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Clerk's Office
N.C. Utilities Commission

Ms. Renne Vance
Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4325

RE: Docket No. E-7, Sub 856

Dear Ms. Vance:

Enclosed for filing with the Commission in the above docket on behalf of Duke Energy Carolinas, LLC are the original and thirty (30) copies of the Revised Direct Testimony of Ellen T. Ruff and the Rebuttal Testimony of Jane L. McManeus and Owen A. Smith. I also enclose in separate cover the CONFIDENTIAL Rebuttal Testimony of Jane L. McManeus.

Sincerely,

Robert W. Kaylor

Robert W. Kaylor
Attorney for Duke Energy Carolinas, LLC

Enclosures

w/o Conf
AG
3PS Legal
3PS Acctg
2PS Eckles
3PS Elec
w/ Conf
Comm
Bennink
Kirby
Watson
Hoover
Kite
Hilburn
Sessoms
Ericson
Jones

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-7, SUB 856

	)	
	)	
Application of Duke Energy Carolinas, LLC	)	REBUTTAL TESTIMONY OF
For Approval of Solar Photovoltaic	)	JANE L. MCMANEUS
Distributed Generation Program	)	DUKE ENERGY CAROLINAS, LLC
And for Approval of Proposed Method of	)	
Recovery of Associated Costs	)	

I. INTRODUCTION AND PURPOSE

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Jane L. McManeus, and my business address is 526 South Church Street, Charlotte, North Carolina.

Q. WHAT IS YOUR POSITION WITH DUKE ENERGY CAROLINAS, LLC?

A. I am Director, Rates for Duke Energy Carolinas, LLC ("Duke Energy Carolinas" or the "Company"). Duke Energy Carolinas is a wholly-owned subsidiary of Duke Energy Corporation ("Duke Energy").

Q. HAVE YOU PREVIOUSLY FILED DIRECT TESTIMONY IN SUPPORT OF DUKE ENERGY CAROLINAS' APPLICATION IN THIS PROCEEDING?

A. Yes

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to address concerns and questions raised by the Public Staff and intervenor testimony filed on October 10, 2008, regarding Duke Energy Carolinas' proposed solar photovoltaic ("PV") distributed generation program (the "Program") described in the Company's Application for Approval of a Solar Photovoltaic Distributed Generation Program and for Approval of Proposed Method of Recovery of Associated Costs (the "Application") and in my direct testimony. Specifically, I will (1) confirm that Duke Energy Carolinas will deduct both avoided capacity and avoided energy costs from its calculation of the incremental costs to be recovered through the REPS rider; (2) update the Company's calculation of the cost to customers, as well as the Program's impact

on the REPS customer cost caps; (3) address the Public Staff witnesses Cox and McLawhorn's testimony recommending limitations on the level of Program costs recoverable through the REPS rider; and (4) discuss net metering concerns expressed by the North Carolina Sustainable Energy Association's ("NCSEA") Witness Day and explain the benefits provided to net metering customers from the Company's Small Customer Generator ("SCG") Rider.

II. COST RECOVERY AND RATE IMPACT OF PROGRAM

Q. HOW DOES DUKE ENERGY CAROLINAS RESPOND TO THE POSITIONS OF PUBLIC STAFF WITNESSES COX AND MCLAWHORN AND NCSEA WITNESS DAY THAT AVOIDED ENERGY COSTS SHOULD BE DEDUCTED FROM ITS CALCULATION OF THE INCREMENTAL COSTS TO BE RECOVERED THROUGH THE REPS RIDER?

A. In the Application, the Company proposed that it be allowed to recover through base rates an amount equivalent to the avoided cost of conventional generation that would be displaced by the Program, and recover the incremental costs of generation produced by solar installation under the Program through the REPS rider. Both the Public Staff and NCSEA assert in their respective testimony that the Company should deduct both avoided capacity and avoided energy costs from its calculation of the incremental costs that it plans to recover through the REPS rider. Duke Energy Carolinas agrees with their assertion and, accordingly, will deduct both avoided capacity and avoided energy costs from its calculation. Senate Bill 3 allows for the recovery of avoided energy costs associated with

1 renewable energy purchases for REPS compliance through the fuel and fuel-
2 related costs clause, which results in inconsistent rate treatment for the avoided
3 cost portion as between purchased renewable generation and utility-owned
4 renewable generation. The Company does not believe that the General Assembly
5 intended to afford less timely cost recovery to utility-owned renewable resources;
6 however, Duke Energy Carolinas has agreed that definition of the term
7 incremental cost in Senate Bill 3 may not be fulfilled unless both avoided capacity
8 and avoided energy costs are deducted in determining incremental costs.

9 **Q. IN LIGHT OF THE COMPANY'S DECISION TO REDUCE THE SIZE –**
10 **IN ACCORDANCE WITH THE PUBLIC STAFF'S RECOMMENDATION**
11 **– OF THE PROGRAM TO 10 MW, WHAT IS THE REVISED EXPECTED**
12 **IMPACT ON A RESIDENTIAL CUSTOMER'S MONTHLY BILL?**

13 A. The Company's estimate of the impact on the residential customer's monthly bill
14 as filed in my Direct Testimony was $0.34 per month. Several revisions to the
15 underlying assumptions of this estimate have changed, resulting in a revised
16 estimate of approximately $0.08 per month per residential customer account. The
17 revised assumptions include 1) a change in the size of the Program as discussed
18 by Company Witness Smith, 2) inclusion of both avoided capacity costs and
19 avoided energy costs in the definition of avoided costs for determination of
20 incremental costs, and 3) recognition of the tax benefits of the North Carolina
21 property tax exclusion for solar investment and extension of the federal income
22 tax credit to utilities. It should be noted that the costs of the Program will be just
23 one component of the Company's REPS compliance costs which will be

1 recovered through a REPS rider; all of which will be subject to the per account
2 costs caps stated in the REPS statute.

3 **Q. IN ITS TESTIMONY, THE PUBLIC STAFF WITNESSES STATE THAT**
4 **THE COMPANY, FOR PURPOSES OF REPS RIDER COST RECOVERY,**
5 **INTENDS TO REQUEST ANNUAL RECOVERY OF $8,930,000. IS THIS**
6 **FIGURE AN ACCURATE REPRESENTATION OF THE COMPANY'S**
7 **INTENDED REPS RIDER COST RECOVERY?**

8 A. No. The $8,930,000 estimate of incremental costs was the basis for the estimated
9 REPS rider increment stated in my Direct Testimony. It does not, however,
10 reflect the Company's agreement with the Public Staff and NCSEA positions that
11 the avoided cost used in determination of the incremental cost should include
12 avoided energy cost as well as avoided capacity cost. In addition, this amount
13 does not reflect the Company's agreement to reduce the size of the Program or tax
14 benefits recently made applicable to the Program. The revised estimate of the
15 annual incremental Program costs expected to be recovered through the REPS
16 rider is $2.7 million.

17 **Q. THE PUBLIC STAFF WITNESSES ALSO TESTIFY THAT THE**
18 **COMPANY'S UTILITY-WIDE CEILING FOR REPS COMPLIANCE IS**
19 **APPROXIMATELY $22,500,000 IN 2010 AND WILL INCREASE TO**
20 **APPROXIMATELY $34,000,000 IN 2012. DOES THE COMPANY AGREE**
21 **WITH THIS ESTIMATE?**

22 A. The Company's utility-wide ceiling for REPS compliance is dependent on the
23 estimated number of customer accounts to which the cost cap amounts by

customer class will be applied. At the time it requests approval for a REPS rider, the Company will propose modifications to the number of accounts as reported to the Energy Information Administration in order to mitigate the impacts of the REPS rider on low-usage customers. The Company's most recent estimate of the number of customer accounts, using a modified definition, is approximately $26 million in 2010 and 2011 and increases to $45 million in 2012. The revised estimate of the annual incremental Program costs expected to be recovered through the REPS rider of $2.7 million represents approximately 10% of the aggregate cost cap in 2010 and 2011, declining to approximately 6% in 2012 and to 3% in 2015.

Q. WHAT IS THE ESTIMATED PROGRAM COST PER MWH?

A. The estimated Program cost is **[BEGIN CONFIDENTIAL]** [redacted]. **[END CONFIDENTIAL]**. This number is revised from the **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]** estimated cost that the Company previously provided to the Public Staff, and reflects refinement of the impact of the federal energy investment tax credit and recognition of the tax benefits of the North Carolina property tax exclusion for solar investment. Additionally, as a public utility the Company is required to follow certain tax normalization requirements with respect to the treatment of the federal energy investment tax credit. Absent these requirements, the cost estimate would be approximately **[BEGIN CONFIDENTIAL]** [redacted]. **[END CONFIDENTIAL]**

Q. HOW DOES THE COMPANY RESPOND TO THE PUBLIC STAFF'S RECOMMENDATION THAT THE COMMISSION LIMIT THE AMOUNT OF PROGRAM COSTS RECOVERABLE THROUGH THE REPS RIDER?

A. Duke Energy Carolinas disagrees with the Public Staff's position. In reaching this conclusion, the Public Staff reviewed the solar bids that the Company received in response to its renewable RFP to recommend a limitation on the Company's cost recovery via the REPS rider for this Program. The Public Staff witnesses concluded (at p. 12) that the Project would rank sixth among the eight viable solar bids. This conclusion is based upon the cost estimate of [**BEGIN CONFIDENTIAL**] [redacted]. [**END CONFIDENTIAL**] As I explained above, the Company has revised this cost estimate to [**BEGIN CONFIDENTIAL**] [redacted]. [**END CONFIDENTIAL**] The Public Staff witnesses opine that it is the distributed nature of the Program that results in costs that are higher than certain of the solar bids the Company received; however, the impact of the tax normalization requirements I discussed above is the more significant driver of this difference. The Public Staff admitted in its testimony, however, that "[t]he choice of a specific dollar amount for a cap is somewhat subjective," and added that their proposed limit "*seems* appropriate. . . ." (emphasis added)

The Company believes that the Public Staff's comparison of bids for purchased power agreements received via the renewable RFP to the Company's proposed Program is misguided. As the Company stated in its Application and as

1 Mr. Smith states in his direct and rebuttal testimony, the goals of the Program are
2 different (and more varied) from the solar purchased power agreement that Duke
3 Energy Carolinas entered into as a result of its RFP. More importantly, the
4 Company would not have undertaken this initiative had the REPS legislation not
5 been enacted. Further, all of the kilowatt hours generated by the Program will go
6 towards Duke Energy Carolinas REPS compliance. The REPS statute places a
7 cost cap on the amount of compliance costs to be recovered from customers
8 through the annual REPS rider and offers no apparent mechanism for recovery of
9 compliance costs that exceed the cap. If the Commission approves the
10 Company's Program Application but a limitation is placed on the amount of
11 incremental REPS compliance costs recoverable through the REPS rider for the
12 approved Program, the Company has concerns that recovery of REPS compliance
13 costs above the imposed limit through its base rates will not honor the intent of
14 the cost cap.

15 **Q. NCSEA WITNESS DAY ASSERTS THAT IMPROVED NET METERING**
16 **RULES ARE NEEDED IN NORTH CAROLINA TO ENCOURAGE THE**
17 **DEVELOPMENT OF CUSTOMER-OWNED SOLAR GENERATION.**
18 **DOES DUKE ENERGY CAROLINAS PROVIDE OPTIONS TO**
19 **CUSTOMERS THAT SUPPORT THEIR INVESTMENT IN SOLAR**
20 **GENERATION?**

21 A. Yes. The Company offers several rate options for customers that own generators.
22 In addition to its Net Metering rider, the Company offers a second "net metering"
23 option, Small Customer Generator Rider SCG ("Rider SCG") for residential

generators not larger than 20 KW and non-residential generators not larger than 100 KW. On Rider SCG, a customer is not required to be on an underlying time-of-use demand rate schedule, but rather may remain on a non-time-of-use rate schedule. Rider SCG allows customers to offset their electricity usage using their own generation, thereby receiving a credit at the full bundled retail rate when the customer's generator is offsetting the customer's load. When the output of the generator exceeds the customer's load and the excess generation is delivered to the grid, the Company pays the customer the Company's avoided energy costs based on its approved PP rate schedule. Customers retain all of the RECs associated with their generation. In addition, stand-by charges are waived for all generators not larger than 20KW.

A third option is available for customers who choose to sell all of the output of the generator rather than offset their electricity usage. Under this option, rate schedule PP compensates the customer with both capacity and energy credits for generation delivered to the grid at the Company's avoided generation cost as approved by the Commission. Eligible customers who choose this option may also take advantage of receiving $0.15 per kwh generated from NC GreenPower for generators 10 KW or less.

Q. DOES THIS CONCLUDE YOUR PRE-FILED REBUTTAL TESTIMONY?

A. Yes.

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-7, SUB 856

	)	
	)	
Application of Duke Energy Carolinas, LLC	)	REBUTTAL TESTIMONY OF
For Approval of Solar Photovoltaic	)	OWEN A. SMITH
Distributed Generation Program	)	DUKE ENERGY CAROLINAS, LLC
And for Approval of Proposed Method of	)	
Recovery of Associated Costs	)	

I. INTRODUCTION AND PURPOSE

Q: PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A: My name is Owen A. Smith, and my business address is 400 South Tryon Street, Charlotte, North Carolina.

Q: WHAT IS YOUR POSITION WITH DUKE ENERGY CORPORATION?

A. I am Managing Director, Regulated Renewable Energy and Carbon Strategy for Duke Energy Corporation ("Duke Energy").

Q. HAVE YOU PREVIOUSLY FILED DIRECT TESTIMONY IN SUPPORT OF DUKE ENERGY CAROLINAS' APPLICATION IN THIS PROCEEDING?

A. Yes.

Q: WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my testimony is to address concerns and questions raised by intervenors in testimony filed on or before October 10, 2008, regarding Duke Energy Carolinas' proposed solar photovoltaic ("PV") distributed generation program (the "Program") described in the Company's Application for Approval of a Solar Photovoltaic Distributed Generation Program and for Approval of Proposed Method of Recovery of Associated Costs (the "Application") and in my direct testimony. Specifically, I will address: (1) Duke Energy Carolinas' agreement to reduce the size of the Program from a $100 million investment, over a two-year period, to install, own and operate new solar PV distributed generation facilities expected to have a total combined capacity of approximately 20 megawatts direct current ("MWDC") to a $50 million investment to install, own

1 and operate new solar PV distributed generation facilities expected to have a total
2 combined capacity of approximately 10 MWDC; (2) the Public Staff's erroneous
3 comparisons of the estimated cost of the Program and the bids received in
4 response to the Company's renewable request for proposal ("RFP"); (3) the
5 reasons the concerns raised by the North Carolina Sustainable Energy Association
6 ("NCSEA"), the Vote Solar Initiative ("Vote Solar") and the Solar Alliance
7 (collectively "Solar Intervenors") regarding competitiveness in the solar market
8 are unwarranted; (4) the recommendation by the NCSEA, Vote Solar and Solar
9 Alliance that the Company be required to develop a standard offer for solar
10 renewable energy certificate ("RECs"); (5) Vote Solar's attempt to compare the
11 benefits of the Company's proposal and its standard offer proposal; and (6) the
12 questions raised by Wal-Mart Stores East, LP ("Wal-Mart") regarding the terms
13 and conditions of the Program.

14 **Q. WHAT FACTORS WOULD YOU URGE THE COMMISSION TO KEEP**
15 **IN MIND IN CONSIDERING THE PUBLIC STAFF AND INTERVENOR**
16 **TESTIMONY?**

17 A. In considering the issues raised by Public Staff and intervenor witnesses it is
18 important to keep in mind a few key facts regarding the Program: (1) The
19 Program is a part of a portfolio approach to compliance with Duke Energy
20 Carolinas' obligations under the solar carve-out requirements of the North
21 Carolina Renewable Energy and Energy Efficiency Portfolio Standard ("REPS")
22 that is intended to serve the best interests of all customers. We consider purchased
23 power agreements and the purchase of RECs from customer-owned resources, as

well as utility-owned resources to be appropriate resources within the portfolio. (2) As I describe below, by agreeing to size the Program more modestly it should be clear that Duke Energy Carolinas supports a market for a variety of solar technologies and ownership structures. (3) Timely approval of the Program is of utmost importance. The Company faces a solar energy carve-out requirement in 2010 of over 11,000 MWH. Other alternatives to procuring solar resources entail either too much lead time in project development or cannot be counted on to meet the full level of this near-term requirement. Furthermore, the Program can benefit from the North Carolina solar investment tax credit of 35% of the amount invested, one of the best state tax credits available nationally. However, this tax credit expires at the end of 2010 and the Company cannot project whether that tax credit will be extended or altered beyond that date. (4) The Program arises out of the REPS solar obligations, yet it provides the opportunity for the Company to achieve not merely compliance, but a host of other benefits for our customers and State. As such the Program is prudent, within the public interest and the costs appropriately recoverable through the REPS rider.

II. PROGRAM SIZE

Q. HOW DOES DUKE ENERGY CAROLINAS RESPOND TO THE PUBLIC STAFF'S RECOMMENDATION THAT THE PROGRAM AND ASSOCIATED BLANKET CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY ("CPCN") BE LIMITED TO 10 MWDC?

A. Public Staff witnesses Cox and McLawhorn expressed concern regarding the size of the Program as proposed compared to Duke Energy Carolinas' obligations

1 under the REPS solar carve-out requirements. Ms. Cox and Mr. McLawhorn
2 calculated that in combination with the purchased power agreement between the
3 Company and SunE DEC1, LLC ("Sun Edison") the Program will result in
4 sufficient RECs that would satisfy Duke Energy Carolinas' obligations under the
5 solar carve-out requirements from 2010 through 2014. The combination of these
6 resources also would produce additional RECs that the Company would bank
7 towards its obligations from 2015 through 2018. Additionally, the Public Staff
8 witnesses expressed concern that because the amounts utilities may collect from
9 retail customers for REPS compliance is capped on a customer account basis, the
10 size of the Program as proposed could result in the Company prematurely
11 reaching the utility-wide cost ceiling.

12 In order to address these concerns, Duke Energy Carolinas agrees to
13 reduce the size of the proposed Program such that it would invest, over a two-year
14 period, approximately $50 million to install, own and operate new solar PV
15 distributed generation facilities to produce energy to serve its customers.
16 Specifically, the Program involves installation of multiple solar PV generating
17 facilities in the Company's North Carolina service territory. The facilities are
18 expected to have a total combined capacity of approximately 10 megawatts direct
19 current ("MWDC"). Therefore, the Company revises its request for a blanket
20 CPCN to 10 MWDC. Smith Rebuttal Exhibit 1 sets forth the revised form of the
21 tariff ("Solar Photovoltaic Distributed Generation Program (NC)") setting forth
22 the terms and conditions that the Company intends to offer to customers with

1 businesses, homes, and other property that may be suitable for the installation of a
2 solar PV facility.

3 **Q. DOES THIS CHANGE ALSO ADDRESS CONCERNS RAISED BY THE**
4 **SOLAR INTERVENORS?**

5 A. Yes. This change addresses concerns raised by the witnesses for NCSEA, Vote
6 Solar and the Solar Alliance that the size of the Program as originally proposed,
7 when compared to the Company's solar REPS requirements, could limit the
8 viability of other solar business models. Given NCSEA witness Day's statement
9 that, "We would be artificially limiting the NC solar market ... if Duke is not
10 allowed to pursue some of the small projects it is proposing" (p. 6, lines 10-12), it
11 appears NCSEA supports of the Company's efforts to pursue some of the small
12 projects that it originally proposed in its Application, provided that opportunities
13 are available for other solar ownership models as well.

14 This Program is the Company's only effort to pursue utility ownership of
15 solar resources, whereas the Company already has demonstrated its commitment
16 to the other two models proposed through (1) its announcement of a power
17 purchase agreement with Sun Edison, and (2) a variety of net metering offerings
18 including REC payments offered through NC GreenPower whereby customers
19 can sell their solar RECs for $0.15/kwh, as well as its efforts to develop a
20 standard offer for RECS from customer-generators (although with important
21 differences from the REC purchase proposals of the Solar Intervenors as I discuss
22 below).

1 **Q. WILL THE PROGRAM CONTINUE TO PROVIDE THE BENEFITS**
2 **OUTLINED IN THE APPLICATION AND IN THE COMPANY'S DIRECT**
3 **TESTIMONY AT THIS SIZE?**

4 A. Yes. The Program will continue to provide many benefits, including the
5 following:

6 • The Program will continue to provide renewable energy that the Company
7 can use towards its solar energy REPS requirements. Assuming timely
8 approval, this Program will enable Duke Energy Carolinas to meet its
9 2010 solar energy requirement of over 11,000 MWH. The Program will
10 add to the diversity of solar resources available to the Company for REPS
11 compliance.

12 • The Program will continue to enable the Company to understand the
13 impact of distributed generation on its system. While the reduced CPCN
14 request obviously will reduce the number of sites where the Company
15 would install solar PV facilities, the program is still significant in size,
16 particularly in comparison to the existing installed solar PV capacity in
17 North Carolina. The Company will seek to locate the solar PV facilities
18 under this Program in a manner that will facilitate learning with respect to
19 distributed generation impacts.

20 • The Program will continue to enable the Company to develop and enhance
21 its competencies as owners and operators of renewable generation
22 facilities so that it is not reliant solely on third parties to meet the REPS

compliance requirements (through either purchased power or REC purchases).

- The Program will also continue to promote energy security through its distributed nature; to produce electricity that is emission free; to advance the state of the solar industry in North Carolina; to drive towards standardization of inspection requirements; and to enable the Company's customers to directly participate in the development of renewable resources in North Carolina.

Further, as noted by the Public Staff, after obtaining experience with the Program, the Company will have the option to seek Commission approval to expand the Program and the blanket CPCN at a later date.

Q. PLEASE DESCRIBE HOW THE REDUCED SIZE OF THE PROGRAM IMPACTS THE PROGRAM DESIGN, COMPONENTS, AND COSTS.

A. The Program design, components, and costs will remain consistent with the Company's original Application except for the total expected investment and the total expected installed capacity. The Company estimates that it will spend $50 million (rather than $100 million), and that this investment will yield a total of 10 MWDC (rather than 20 MWDC). The Company still proposes to undertake the Program over the course of two years following approval by the Commission. For planning purposes the Company still assumes that it would spend 40% of the capital in 2009 and 60% in 2010. Further, the Company still proposes that 80-90% of the total installed capacity would come in the form of "large scale" installations (herein defined as projects between 500kw and 3 MW in size; that up

to 10% of the total installed capacity would come in the form of "medium scale" installations (herein defined as projects between 15kw and 500kw in size); and that up to 10% would come in the form of "small scale" installations of 1.5kw to 5kw apiece. The reduced investment will reduce the costs to be recovered through the REPS rider. These impacts are discussed by Company witness McManeus.

Q. HOW WILL THE REDUCED SIZE OF THE PROGRAM IMPACT THE COMPANY'S ESTIMATE OF RECS PRODUCED BY THE PROGRAM FOR COMPLIANCE WITH THE REPS REQUIREMENTS?

A. Previously, the Company had estimated that the Program would result in an estimated 30,000 MWH annually once the Program was fully implemented. At the reduced size, the Company now estimates that the Program would result in approximately 15,000 MWH annually once it is fully implemented.

III. COMPETITIVE BENEFITS OF THE PROGRAM

Q. WHAT HAS BEEN THE CUSTOMER REACTION TO THE PROGRAM PROPOSAL?

A. The customer reaction to the Program has been remarkable. Since we filed our Application on June 6, 2008, we have had more than 460 customers contact us to express their interest in hosting a project on their premises. Many of these customers have multiple sites so the actual number of sites represented by this group is much larger. The Company has made no efforts to market or promote this Program to customers. Instead, the level of customer interest has come

1 completely as a result of numerous news stories that were generated beginning
2 when the Company filed its Application on June 6, 2008.

3 **Q. DOES THE PROGRAM CREATE MARKET OPPORTUNITIES FOR**
4 **SOLAR SUPPLIERS?**

5 A. Yes. Duke Energy Carolinas intends to enter into agreements with solar suppliers
6 to fulfill the Program. The Company issued a RFP in August 2008 to request
7 turn-key proposals from solar suppliers to fulfill the variety of installation types
8 and sizes described in the Application. The response has been tremendous, with
9 over 70 firms submitting a notice of intent to bid and over 90 people participating
10 in a bidder's conference that was held on October 3, 2008. We believe that our
11 Program creates a market opportunity that otherwise would not exist in North
12 Carolina. In absence of this Program, we believe that there would be no
13 mechanism to give this many solar suppliers a reason to consider initiating or
14 expanding their business operations in North Carolina.

15 In addition to the firms that have registered to participate in this RFP,
16 several solar module manufacturers have contacted the Company to express their
17 interest in constructing a manufacturing site within Duke Energy Carolinas'
18 service territory. We believe that a key reason for their interest is the Company's
19 commitment to and enthusiasm for solar energy as expressed by this Program.

20 **Q. NCSEA WITNESS DAY CLAIMS THAT "THE BULK PURCHASES AT**
21 **REDUCED COST OF SOLAR EQUIPMENT THAT DUKE TOUTS DID**
22 **NOT COME TO FRUITION IN THE RECENT REQUEST FOR**

1 **PROPOSAL FOR TURNKEY PROJECTS" (P. 4, LINES 29-31). HOW DO**
2 **YOU RESPOND?**
3 A. This is not true. This is either a misunderstanding by witness Day or a
4 misrepresentation of the facts. Duke Energy Carolinas has an RFP underway for
5 turnkey projects to fulfill the Program, but the due date for receiving proposals
6 has not yet arrived. As such, since the Company has not received the proposals
7 yet, Ms. Day's claim that the Company's projected costs have not come to
8 fruition simply is not accurate. Until the Company receives and evaluates the
9 proposals through the RFP, it stands by the cost estimates it has put forth in the
10 Application and testimony.
11 **Q. HOW IS THE PROGRAM CONSISTENT WITH THE COMPANY'S**
12 **CORE BUSINESS?**
13 A. NCSEA witness Day argues that distributed generation does not comport with the
14 utility model and that Duke Energy Carolinas should stick to its core business and
15 be limited to large scale solar investments. However, the Company's position is
16 that our core business includes the operation of our electrical transmission and
17 distribution system. As such, we believe that understanding the impacts of
18 distributed generation on our system operations is of the utmost importance, and
19 in order to achieve this understanding we should not eliminate small scale PV
20 systems from the Program.
21 **Q. NCSEA WITNESS DAY STATES THAT THIS "...PROPOSAL AND ITS**
22 **PRECEDENT... WOULD MAKE THE REGULATED UTILITIES**

1 **MONOPOLY PROVIDERS OF SMALL SCALE PV SYSTEMS IN NORTH**
2 **CAROLINA" (P. 5, LINE 1-2). HOW DO YOU RESPOND?**
3 A. This is simply not true. Currently a number of small scale PV systems have been
4 installed by customers or other third parties in the Company's North Carolina
5 service territory. The Program in question represents the Company's first efforts
6 at utility-owned solar in the State, which would hardly qualify it as a monopoly
7 provider of these types of projects given the presence of other PV systems that
8 were not provided by the Company.
9 **Q. NCSEA WITNESS DAY ALSO STATES THAT "A CERTAIN AMOUNT**
10 **OF MARKET SHARE SHOULD BE RESERVED FOR PRIVATE**
11 **INVESTMENT TO FULFILL THE LEGISLATIVE GOALS OF THE**
12 **REPS LAW..." (P. 5, LINES 29-30). HOW DO YOU RESPOND?**
13 A. Duke Energy Carolinas is supportive of solar investments by customers and other
14 third parties, but does not believe it is reasonable to set aside a specific amount of
15 its compliance obligation to be met through this mechanism. As I will explain in
16 more detail below in response to Vote Solar witness Starrs' analysis, these so
17 called "private investments"[1] by customers cannot be counted on to occur at any
18 given level or frequency because they are beyond the control of the Company. As
19 such, requiring the Company to set aside some portion of its compliance
20 requirements to be met through these kinds of arrangements is unreasonable and

[1] Use of the term "private investment" by NCSEA witness Day and Solar Alliance witness Hitt suggests that investments made by Duke Energy Carolinas are not private investments. The attempt to distinguish between customer-owned solar generation and utility-owned solar generation on this basis is erroneous given that as an investor owned corporation, the Company's investment in generation is likewise "private investment."

could expose the Company to the risk that it would fail to meet its compliance obligations.

Q. ON PAGES 4 AND 5 OF HER TESTIMONY, SOLAR ALLIANCE WITNESS HITT ARGUES THAT DUKE ENERGY CAROLINAS IS PROMOTING ONLY UTILITY-OWNED SOLAR TO THE EXCLUSION OF OTHER MODELS. HOW DO YOU RESPOND?

A. This is not true. While the Program in question is a utility-owned model, it is not the only model that Duke Energy Carolinas is pursuing. In fact, without this Program, the only models that would take hold would be third party ownership models, which the Company believes is detrimental to the development of the solar industry and poses risks that compliance obligations may not be met. This Program is part of a portfolio approach to renewables that the Company is pursuing. Duke Energy Carolinas already has announced a power purchase agreement with Sun Edison. Further, the Company has a number of solutions to accommodate customer-owned solar generation, and later in my testimony I describe our efforts to develop a standard offer that would enable customer-generators to sell RECS to the Company, although our approach has several important differences from the recommendations of the Solar Intervenors.

Q. SOLAR ALLIANCE WITNESS HITT CITES EXAMPLES OF LARGE RETAILERS PURSUING SOLAR PV INVESTMENTS THAT WOULD BE FORECLOSED BY THE PROGRAM. HOW DO YOU RESPOND TO THESE CONCERNS?

1 A. As discussed above, the Company's decision to revise the Program to reduce the
2 size will result in the need for additional resources to meet the REPS solar carve-
3 out requirements. Even given this opportunity, however, it is unlikely that, absent
4 the Program, initiatives such as those by Kohl's, Macy's, Wal-Mart, and Safeway
5 Stores to work directly with solar suppliers that install, own, and operate solar PV
6 panels on their rooftops (cited by Ms. Hitt on pages 9 through 10 of her
7 testimony) will materialize in this scope and size in the Company's service
8 territory. It is critical to be aware that all of these installations referenced by Ms.
9 Hitt are in California or Hawaii. The average retail rates in California and Hawaii
10 are at least two to three times higher than Duke Energy Carolinas' average retail
11 rates, which significantly impacts a customer's investment decision with regards
12 to solar PV. Further, many of these installations are structured such that the solar
13 supplier owns the PV systems and sells the power to the customer-host under a
14 purchased power agreement. It is my understanding that North Carolina law
15 would not permit this type of contractual structure in this State. Thus, these
16 examples of customer activity in California and Hawaii should not be considered
17 relevant for North Carolina.

18 **Q. SOLAR ALLIANCE WITNESS HITT ALSO CITES EXAMPLES OF**
19 **SIGNIFICANT RESIDENTIAL INSTALLATIONS THAT ARE**
20 **BECOMING COMMONPLACE THROUGH PARTNERSHIPS BETWEEN**
21 **SOLAR SUPPLIERS AND PRODUCTION HOMEBUILDERS. IS IT**
22 **LIKELY THAT THESE KINDS OF ARRANGEMENTS WOULD TAKE**
23 **HOLD IN NORTH CAROLINA WITHIN THE FORESEEABLE FUTURE?**

1 A. No. The examples of residential installations provided by Ms. Hitt are also all in
2 California where, again, the cost of energy and the legislative and regulatory
3 framework is quite different than it is in North Carolina.

4 **Q. SOLAR ALLIANCE WITNESS HITT RECOMMENDS THAT**
5 **"APPROVAL OF DUKE'S PROPOSAL SHOULD BE ACCOMPANIED**
6 **WITH A NCUC DIRECTIVE THAT DUKE CONTINUE TO EXPAND ITS**
7 **EXPLORATION OF VARIOUS BUSINESS MODELS BEYOND THE**
8 **UTILITY OWNERSHIP [SIC] IN THE DISTRIBUTED SOLAR**
9 **MARKET" (P. 12, LINES 224-226). HOW DO YOU RESPOND?**

10 A. A Commission directive along these lines is unnecessary, as Duke Energy
11 Carolinas has already demonstrated its commitment to other business models,
12 including power purchase agreements and programs to promote customer
13 investments in solar energy.

14 **IV. <u>PROGRAM COSTS</u>**

15 **Q. PLEASE EXPLAIN THE BASIS FOR THE COST ESTIMATE PROVIDED**
16 **IN THE APPLICATION AND YOUR DIRECT TESTIMONY.**

17 A. The cost estimates provided in the Application and my direct testimony were
18 derived from a number of public and private sources including various research
19 reports and conversations with a number of solar suppliers. As Wal-Mart witness
20 Baker points out in his testimony, the implied cost/watt of the Company's
21 Program is $5/watt (or $5,000/kw). This cost estimate is derived by dividing the
22 original total cost of the Program of $100M by the installed capacity estimate of

20 MWDC. Under the revised Program size, the cost per watt estimate is unchanged.

This cost estimate is for the cost of installation and does not account for the numerous tax benefits that will result in a reduction of the net cost of the Program. There are four main categories of tax benefits that will reduce the overall costs of the Program. These are: (1) the federal investment tax credit of 30% of the amount invested, (2) the North Carolina investment tax credit of 35% of the amount invested, (3) federal five-year accelerated tax depreciation, and (4) the North Carolina property tax exclusion of 80% of the property taxes. As an update to my direct testimony filed on July 25, 2008, the North Carolina property tax exclusion has now been signed into law. Also, the federal investment tax credit has now been extended to utilities and thus will also be available to the Company.

The RFP that is in process currently will serve as the Company's basis for reaching agreements with solar suppliers and will determine actual Program costs. Wal-Mart's proposal to cap the costs of the Program at the estimated level of $5,000/kw is unreasonable. The Company will comply with the requirements under N.C. Gen. Stat. § 6-110.1 and Commission Rule R8-61 to provide the Commission with progress reports and any revision to this cost estimate during construction.

Q. THE PUBLIC STAFF SEEKS TO COMPARE THE ESTIMATED COST OF THE PROGRAM TO THE BIDS RECEIVED IN THE COMPANY'S

2007 REQUEST FOR PROPOSAL FOR RENEWABLE ENERGY. IS THIS COMPARISON APPROPRIATE?

A. No. The Program is intended to serve multiple purposes that are in the best interests of Duke Energy Carolinas' customers and the communities we serve, which could not be said for the bids received in the Company's renewable energy RFP. Specifically, this Program is designed to broaden the Company's competencies as owners and operators of a variety of sizes and types of renewable assets so that it is not reliant solely on power purchase agreements to meet the renewable energy requirements that will account for a growing percentage of its resource mix in the coming years. Additionally, it is of the utmost importance that Duke Energy Carolinas determine the impacts of distributed generation on its system and the Program provides the Company with the scale and siting control to do so. The bids received in the RFP were not designed with these objectives in mind. For these reasons it is not appropriate to make a comparison between those bids and this Program.

Q. HOW DOES THE COMPANY RESPOND TO THE PUBLIC STAFF'S RECOMMENDATION THAT WOULD LIMIT THE AMOUNT OF PROGRAM COSTS THAT MAY BE RECOVERED THROUGH THE REPS RIDER?

A. Prior to filing the Application for this Program on June 6, 2008, Duke Energy Carolinas initially did consider if it would be reasonable and appropriate to attempt to divide the costs of the Program between different recovery mechanisms based upon the multiple benefits of the Program. As discussed by Duke Energy

Carolinas' witness McManeus, however, the Company ultimately determined not to pursue this approach because all generation resulting from the installations under the Program will serve to meet the REPS requirements. Therefore, if the Commission finds the Program to be reasonable and prudent, the appropriate recovery mechanism for all costs in excess of avoided costs is through the REPS rider.

V. RECS STANDARD OFFER

Q. IS DUKE ENERGY CAROLINAS CONSIDERING A RECS STANDARD OFFER?

A. Yes. The Company is developing a standard REC offer which it would make available to customer-generators for RECs for general and carve-out compliance based upon current market prices. Pricing of the standard offer would be updated on a periodic basis. Although the interval for updating pricing of the offer has not been finalized, a reasonable approach that the Company is considering is one where pricing would be updated quarterly. The offer would be at the Company's discretion on an as needed basis, meaning that we will evaluate our requirements in relation to resources the Company already has under contract, and will reserve the right to not enter into an agreement with a seller if the RECs are deemed to be unneeded or would expose the Company to incurring costs that would be in excess of the REPS cost caps.

A key purpose of the standard offer is to create a streamlined approach to interacting with owners of small generators that produce relatively small quantities of RECs. In these cases, it would likely not serve anyone's interests to

1 require those sellers to participate in an RFP process, and as such a standardized
2 approach to these opportunities makes sense.

3 **Q. VOTE SOLAR WITNESS STARRS ARGUES THAT A STANDARD REC**
4 **OFFER PROVIDES MORE CERTAINTY THAN A UTILITY**
5 **INVESTMENT IN SOLAR PROJECTS DOES (P. 6, LINES 1-9). HOW DO**
6 **YOU RESPOND?**

7 A. Dr. Starrs' claim of greater certainty fails to recognize that the magnitude and
8 timing of customer investments in solar projects is outside the control of the
9 utility, and, as such, Duke Energy Carolinas cannot rely on these kinds of third
10 party investments to meet its compliance obligations. Although Duke Energy
11 Carolinas is supportive of such investments, it cannot depend on them to meet a
12 certain percentage of its compliance requirements.

13 **Q. PLEASE COMMENT ON THE EXAMPLES OF OTHER UTILITIES**
14 **THAT OFFER A STANDARD REC OFFER TO CUSTOMERS CITED BY**
15 **VOTE SOLAR WITNESS STARRS (P. 9, LINES 4-22).**

16 A. None of the utility programs referenced by Dr. Starrs are in North Carolina, and it
17 is not appropriate to conclude that similar programs in other states should be
18 mandated for Duke Energy Carolinas or any other utility serving North Carolina
19 customers. The design of any REC offer program must take into consideration
20 things such as: the nature of cost recovery mechanisms associated with renewable
21 requirements; the prevailing electricity rates; the specifics regarding the
22 magnitude and timing of solar energy requirements; and the quality of solar
23 resources available in the area.

1 **Q. DO YOU AGREE WITH VOTE SOLAR WITNESS STARRS**
2 **REGARDING HIS CALCULATIONS AND CONCLUSIONS AS THEY**
3 **PERTAIN TO HIS EXHIBIT 2?**

4 A. No. Dr. Starrs claims that REC payments of $0.17/kwh or higher would drive
5 investment in customer-owned PV systems, but his analysis does not sufficiently
6 support this. One assumption that Dr. Starrs makes with which Duke Energy
7 Carolinas does not agree is the assumption that electricity prices will rise at a 6%
8 annual rate for the next 15 years. This rate of escalation would result in electricity
9 prices at the end of the period that are 2.3 times what they are today. This is not a
10 reasonable assumption. Further, the Company does not believe that it is
11 reasonable to expect that the private investors to whom Dr. Starrs refers would
12 make this assumption either. If private investors believe the escalation of
13 electricity rates will be less than the 6% that Dr. Starrs assumes, a REC payment
14 of $0.17/kwh would not provide enough incentive for them to make an investment
15 in a PV system.

16 Additionally, NC GreenPower already provides a program in North
17 Carolina where customers can obtain REC payments comparable to the levels that
18 Dr. Starrs recommends (NC GreenPower's rate is currently $0.15/kwh, and was
19 $0.18/kwh prior to March 2008). To require utilities to purchase RECs at
20 comparable rates would not result in any new incentives to customers that are not
21 already available in a practical sense. NC GreenPower serves a valuable role in
22 the development of renewable energy in North Carolina; however, the amount of
23 customer-owned solar generation that exists in North Carolina today is evidence

that this model of paying for RECs at the levels Dr. Starrs recommends cannot be counted on to drive the level of investment that would be required to meet the objectives of the State with respect to solar energy production, and could not be relied upon by Duke Energy Carolinas to assure the Company could meet its REPS requirements.

Q. DO YOU AGREE WITH VOTE SOLAR WITNESS STARRS REGARDING HIS CALCULATIONS AND CONCLUSIONS REGARDING HIS EXHIBIT 3?

A. No. Dr. Starrs utilizes his Exhibit 3 to conclude that a model of paying $0.18/kwh for RECs would result in nearly 50% more solar PV installed capacity than Duke Energy Carolinas projects to install at the same cost; however, this conclusion is based on several flawed assumptions.

First, Dr. Starrs uses a lower capacity factor for customer generators than the capacity factor used by the Company for the Program. Specifically, Dr. Starrs Exhibit 2 shows every kilowatt of installed capacity would produce 1,191 kwh annually. Duke Energy Carolinas has assumed 1,500 kwh annually for each kilowatt installed. The point here is not whether 1,191 is a more or less reasonable assumption than 1,500, but instead it is to highlight that if one assumes a lower capacity factor in this calculation (as Dr. Starrs has), the formula will indicate that one would need substantially more installed capacity to generate a comparable amount of energy. Dr. Starrs' exhibits do not provide enough information to determine what his installed capacity figure would have been if he had assumed the same capacity factor that Duke Energy Carolinas has assumed,

but it is clear that if he had not utilized a different capacity factor he could not have reached the conclusion that he did.

Second, even if Dr. Starrs had not made the flawed assumption described above, it would still be inappropriate to conclude that his proposed REC purchase program is superior to Duke Energy Carolinas' Program. Dr. Starrs Exhibit 3 is based on a 15 year REC purchase agreement, whereas Duke Energy Carolinas believes the economic life of solar PV facilities is generally considered to be approximately 25 years. Dr. Starrs' approach leads to the conclusion that $100 million would buy 555,556 RECs if RECS are priced at $0.18/kwh. However, the investment of $100 million under the Program would generate 750,000 RECs (30,000 RECs annually for 25 years) because the investment would enable the Company to generate RECs over the full economic life of the project of approximately 25 years, rather than only procure them over the 15 years of a contractual agreement.

Third, Dr. Starrs' proposed method of expending $100 million does not allocate any costs to energy produced and, instead, it goes entirely towards buying only RECs. Under Duke Energy Carolinas' proposed Program the $100 million investment results in both the production of energy and the generation of RECS.

Fourth, Dr. Starrs' analysis is based on the flawed assumption that a REC payment of $0.18/kwh would be sufficient to drive investment in solar PV. As indicated earlier in this testimony, it is not reasonable to assume that customers believe electricity rates will rise at a 6% annualized rate for the next 15 years, and

as such a payment of $0.18/kwh would not provide enough incentive to get customers to invest in PV[2].

Q. WILL A SOLAR REC STANDARD OFFER AS PROPOSED BY NCSEA, VOTE SOLAR AND THE SOLAR ALLIANCE RESULT IN LOWER COSTS TO CUSTOMERS AS COMPARED TO THE COMPANY'S PROGRAM?

A. No. NCSEA witness Day, Vote Solar witness Starrs and Solar Alliance witness Hitt all argue that requiring Duke Energy Carolinas to provide a long-term standard offer for solar RECs at a price equal to the cost of the Program to the Company will potentially lower costs to customers. Dr. Starrs also maintains that this price should also permit a customer generator to recover its full investment and earn an internal rate of return of 9-12%. Thus, it appears that the Solar Intervenors' position is that Duke Energy Carolinas should be required to purchase RECs from any solar customer-generator at a price that is the higher of the Company's cost to implement the Program, or the amount needed for the customer-generator to earn an internal rate of return of 9-12% on its investment. The supposition that a "must take" obligation at this price would result in lower costs to customers is not tenable.

Q. WHAT OTHER CONCLUSIONS CAN BE DRAWN FROM THE ANALYSIS PROVIDED BY VOTE SOLAR WITNESS STARRS?

[2] Duke Energy Carolinas realizes that Dr. Starrs' assumption of a 6% escalation rate resulted in a REC payment calculation of $0.17/kwh, rather than the $0.18/kwh that he referenced in Exhibit 3. Dr. Starrs' exhibits do not provide enough information to determine the precise escalation rate that would be associated with a REC payment of $0.18/kwh, but Duke Energy Carolinas assumes that it would still be approximately 6%.

A. The analysis provided by Dr. Starrs can be used to show that the form of REC purchase agreement that the Solar Intervenors recommend would exceed the cost of Duke Energy Carolinas' Program. To illustrate this, I will utilize Dr. Starrs' assumption that retail electricity prices will rise over the long term at a 3% annual rate, rather than his more extreme scenario where prices rise at 6%. Further, I will utilize Dr. Starrs' assumption that many investors would require a 12% return on their investment in a PV system, rather than relying on the 9% level, which is the absolute minimum return that Dr. Starrs believes is acceptable.

Using these assumptions, Dr. Starrs' Exhibit 2 shows that a price of approximately $0.23-$0.32/kwh or more per REC would be required to provide the needed return to customers in order to motivate them to invest in a PV system. This cost covers only the RECs and does not include any value associated with the energy from the PV system. Under these assumptions it is clear that the REC purchase model recommended by the Solar Intervenors would exceed the cost of the Program proposed by Duke Energy Carolinas. Furthermore, the REC purchase model offers no certainty with regards to how many customers would choose to install PV systems at any given REC price.

Duke Energy Carolinas is not opposed to a REC purchase offer for customer-generators, and as stated above, the Company is pursuing that in addition to this Program. The parameters offered by the Solar Intervenors, however, are not acceptable. If too few customers acted on this incentive, and the Company had relied on it for compliance, it would not be able to comply with the REPS requirements. Alternatively, if a large number of customers acted on this

1 incentive and the Company had no way to limit customer participants, the
2 Company could exceed its REPS cost caps.

3 **VI. PROGRAM TERMS AND CONDITIONS**

4 **Q. PLEASE DESCRIBE THE METHOD DUKE ENERGY CAROLINAS**
5 **WILL USE TO DEVELOP THE TERMS AND CONDITIONS OF THE**
6 **LEASE AGREEMENT BETWEEN THE COMPANY AND PROGRAM**
7 **PARTICIPANTS.**

8 A. Duke Energy Carolinas is undertaking market research efforts with customers to
9 assure that the terms and conditions of the lease agreement meet the needs and
10 expectations of customers, while still enabling the Company to meet its
11 objectives. This research is not complete yet, and, as such, the terms and
12 conditions of the lease agreement remain subject to change. In its agreements
13 with host customers, Duke Energy Carolinas will address the kinds of questions
14 raised by Wal-Mart witness Baker in his testimony. However, Duke Energy
15 Carolinas intends to structure the lease agreement in a manner that will meet the
16 needs of a set of customers that is large enough and diverse enough to fulfill the
17 Program. Whether the final terms and conditions of the lease agreement will be
18 acceptable to Wal-Mart or not is not known, and the Company's intent is not to
19 satisfy the needs of one particular customer to the exclusion of others.

20 The Company views the lease agreement in this case similarly to other real
21 estate-related agreements with customers, such as those to procure rights-of-way.
22 It is my understanding that neither the terms and conditions of such agreements
23 nor the compensation amount paid to customers are approved by the Commission.

1 **Q. HOW DO YOU RESPOND TO WAL-MART'S RECOMMENDATION**
2 **THAT CUSTOMERS PARTICIPATING IN THE PROGRAM BE**
3 **PERMITTED TO RETAIN A PORTION OF THE RECS GENERATED?**
4 A. This recommendation is something that the Company has considered and it may
5 be a feature that the Company makes available to customers; however Duke
6 Energy Carolinas should not be required to structure the lease agreement in this
7 manner. Until the Company finalizes its market research studies it should retain
8 the flexibility to structure the lease agreements in a manner that meets customer
9 needs, minimizes complexity, and enables the Company to meet its objectives. At
10 present, Duke Energy Carolinas prefers to structure lease agreements to
11 compensate hosts with cash rather than RECs, because the primary benefit of the
12 Program is to produce solar RECs needed for REPS compliance and we believe
13 that the majority of customers would rather be compensated with cash. If the
14 compensation structure includes RECs it would likely need to be a very small
15 portion of the amount of RECs generated from the systems so as not to materially
16 alter the compliance benefits of the Program.
17 **Q. HOW DO YOU RESPOND TO WAL-MART'S RECOMMENDATION**
18 **THAT CUSTOMERS PARTICIPATING IN THE PROGRAM BE**
19 **PERMITTED TO USE SOME PORTION OF THE POWER GENERATED**
20 **TO SUPPLY ITS POWER NEEDS.**
21 A. This is also an interesting recommendation and one that the Company has
22 considered. It should be noted that the electricity produced by the PV systems
23 under this Program may very well be consumed by the host of the project in many

instances. This is due to the physics of electricity. Because the customer site is a load center located in close proximity to a generation resource it is reasonable to assume that the electricity produced by that particular PV system will indeed flow, in many instances, into that host location. However, I do not believe this is the point that Wal-Mart witness Baker is trying to make with his recommendation. Instead, I believe he is asking that that PV system be metered in such a way that some portion of the electricity produced by the PV system serve to directly reduce the host's utility bill. Duke Energy Carolinas believes that such an arrangement is not practical as it introduces unnecessary complexities with respect to the metering interconnection and billing processes. At present, we would prefer to structure the lease agreement in a manner where the host customer receives cash compensation for use of their premises, which can effectively result in the same outcome for the host from a financial perspective with much less complexity. It is our belief that the majority of potential hosts will find this arrangement to be at least as attractive as Mr. Baker's suggestion, although we would prefer to retain the flexibility to finalize such decisions related to the lease agreement until after its market research studies have concluded.

Furthermore, if a Wal-Mart store wants to retain RECS or use solar PV equipment to supply its own power needs it has the option of making its own investment in a solar PV system itself as an alternative to this Program.

VII. CONCLUSION

Q. IS THE PROGRAM AS MODIFIED JUSTIFIED BY THE PUBLIC CONVENIENCE AND NECESSITY?

1 A. Yes. The Program is a part of a portfolio approach to provide a diversity of
2 resources to meet Duke Energy Carolinas' REPS requirements. It is necessary for
3 compliance with the 2010 and 2011 solar carve out obligations. Over time it will
4 continue to produce RECs needed for compliance as well as provide the
5 opportunity for the numerous other benefits described in the Company's
6 Application and testimony. These benefits include enabling the Company to
7 understand the impact of distributed generation on its system; enhancing the
8 Company's competencies as owners and operators of renewable generation
9 facilities so that it is not solely reliant on third parties; advancing the state of the
10 solar industry in North Carolina; and providing additional opportunities for
11 customers to directly participate in the development of renewable resources in
12 North Carolina. As my rebuttal testimony makes clear, the reduction in the size
13 of the Program addresses the concerns raised by the Public Staff and Solar
14 Intervenors without compromising these benefits.

15 **Q: DOES THIS CONCLUDE YOUR PRE-FILED REBUTTAL TESTIMONY?**

16 A: Yes.

SOLAR PHOTOVOLTAIC
DISTRIBUTED GENERATION PROGRAM (NC)

AVAILABILITY (North Carolina Only)

This program is available on a limited and voluntary basis, at the Company's option, to customers in owner-occupied individually metered single-family residences, or owners of other property, suitable for the installation of a solar photovoltaic (PV) system.

GENERAL PROVISIONS

- The Company will install a PV system on the owner's property, under a separate lease agreement with the owner.
- The maximum number of customers served under this program will be the number required to achieve 10,000kW (DC) of installed PV capacity, of which up to 10% will be installed on single-family residences and the remainder will be installed on nonresidential establishments or other property.
- The maximum installed capacity of the PV system will be 5 kW for residences and 3000 kW for nonresidential establishments or other property.
- The Company reserves the right to limit the number of customers served under this program on the same retail distribution circuit.

CONTRACT
The terms of the agreement will be set forth in the lease agreement with the customer.

North Carolina Original (Proposed) Leaf No. 150
Effective
NCUC Docket No. E-7, Sub

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-7, SUB 856

	)	
	)	
Application of Duke Energy Carolinas, LLC	)	REVISED DIRECT TESTIMONY
For Approval of Solar Photovoltaic	)	OF ELLEN T. RUFF
Distributed Generation Program	)	DUKE ENERGY CAROLINAS, LLC
And for Approval of Proposed Method of	)	
Recovery of Associated Costs	)	

1 I. INTRODUCTION AND PURPOSE

2 Q: **PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A: My name is Ellen T. Ruff, and my business address is 526 South Church Street,
4 Charlotte, North Carolina.

5 Q: **WHAT IS YOUR POSITION WITH DUKE ENERGY CAROLINAS, LLC?**

6 A: I am President of Duke Energy Carolinas, LLC ("Duke Energy Carolinas" or the
7 "Company"). Duke Energy Carolinas is a wholly-owned subsidiary of Duke
8 Energy Corporation ("Duke Energy").

9 Q: **PLEASE BRIEFLY SUMMARIZE YOUR EDUCATIONAL**
10 **BACKGROUND AND PROFESSIONAL AFFILIATIONS.**

11 A: I am a graduate of Simmons College with a Bachelor of Arts in Business. I also
12 have a Juris Doctor degree from the University of North Carolina at Chapel Hill,
13 and have completed the Harvard Business School's Advanced Management
14 Program. I am a member of the North Carolina State Bar, the Mecklenburg
15 County Bar, and the American Bar Association. I serve on the Board of Directors
16 of Aqua America, Inc., the Board of Directors and Executive Committee of the
17 North Carolina Chamber, and the North Carolina Economic Development Board.
18 I also serve on the regional Board of Directors of United Way, and am serving as
19 Chair of the United Way Regional Campaign for 2008.

20 Q: **PLEASE DESCRIBE YOUR BUSINESS BACKGROUND AND**
21 **EXPERIENCE.**

22 A: I joined Duke Power Company (now known as Duke Energy Carolinas) in 1978
23 as an attorney in the Legal Department. I was named Vice President and General

1 Counsel of Electric Operations following the creation of the Duke Energy
2 Corporation in 1997. I was named Vice President and General Counsel of
3 Corporate, Gas and Electric Operations in January 1999, and Senior Vice
4 President and General Counsel in February 2001. I was appointed Senior Vice
5 President of Asset Management for Duke Power, a division of Duke Energy
6 Corporation, in August 2001. I became Senior Vice President of Power Policy
7 and Planning in February 2003, and Group Vice President of Power Policy and
8 Planning in March 2004. I became Group Vice President of Planning and
9 External Relations for Duke Power in March 2005. I assumed my current
10 position in April 2006.

11 **Q: WHAT ARE YOUR RESPONSIBILITIES IN YOUR CURRENT**
12 **POSITION?**

13 A: I lead Duke Energy Carolinas' regulated electric utility business in North Carolina
14 and South Carolina, which serves more than 2.3 million customers.

15 **Q: HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE NORTH**
16 **CAROLINA UTILITIES COMMISSION?**

17 A: Yes, I have testified before this Commission on numerous occasions. I most
18 recently presented testimony in support of Duke Energy Carolinas' Energy
19 Efficiency Plan, Docket No. E-7, Sub 831.

20 **Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

21 A. On June 6, 2008, Duke Energy Carolinas filed an Application for Approval of a
22 Solar Photovoltaic ("PV") Distributed Generation Program and for Approval of
23 Proposed Method of Recovery of Associated Costs (the "Application"). The

1 purpose of my testimony is to discuss the importance of the requested approval
2 and to outline some of the benefits of Duke Energy Carolinas' proposed solar PV
3 distributed generation program (the "Program"). In addition to my testimony,
4 Witness Smith provides a detailed discussion of the Program design and Program
5 costs. Witness Hager describes how the proposed construction of solar generation
6 facilities under the Program conforms to the utility's most recent annual plan.
7 Witness McManeus explains the cost recovery proposal for the Program as well
8 as the potential rate impacts of the Program.

9 II. **PROGRAM DESCRIPTION AND RATIONALE**

10 **Q: PLEASE BRIEFLY DESCRIBE THE PROGRAM.**

11 A: The Company proposes to invest $50 million over two years to install numerous
12 solar PV facilities throughout its service territory to generate electric energy to
13 serve its customers. We anticipate that the total generating capacity of these
14 facilities would be 10 megawatts direct current (MWDC). When operating at
15 peak capacity, the facilities installed under the Program will generate enough
16 electricity to power approximately 1300 homes in the Carolinas.

17 **Q: WHY IS DUKE ENERGY CAROLINAS PURSUING THE PROGRAM?**

18 A: The Company is pursuing this program primarily to comply with the Renewable
19 Energy and Energy Efficiency Portfolio Standard ("REPS") established by the
20 North Carolina General Assembly in 2007 as part of Senate Bill 3. The REPS is a
21 set of standards specifying that electric public utilities in North Carolina must
22 supply their retail customers with a certain amount of electricity from renewable
23 sources or reduce consumption of electricity through energy efficiency measures

by a certain date. The Company anticipates increasing its reliance on renewable energy generation resources to serve its customers over time. Accordingly, the Company is committed to supporting the development of solar PV technology into a flourishing and self-sustaining industry that can complement more conventional technologies to supply the electricity needs of the Company's customers. The Program also will enable Duke Energy Carolinas to evaluate the impact of distributed generation of a significant scale on the Company's electric system.

III. REPS COMPLIANCE

Q: **DOES SENATE BILL 3 SPECIFY A SCHEDULE FOR COMPLYING WITH THE REPS REQUIREMENTS?**

A: Yes it does. Under Senate Bill 3, each electric public utility in the State must comply with the REPS requirement according to the following schedule:

Calendar Year	REPS Requirement
2012	3% of 2011 N.C. retail sales
2015	6% of 2014 N.C. retail sales
2018	10% of 2017 N.C. retail sales
2021 and thereafter	12.5% of 2020 N.C. retail sales

Q: DOES THE REPS INCLUDE "SET ASIDES" FOR ANY PARTICULAR RENEWABLE RESOURCES?

A: Yes, the REPS includes "set asides" or "carve outs" for solar energy, swine waste and poultry waste resources. With respect to solar, it provides that beginning with the year 2010, each electric public utility must satisfy its REPS requirement in

part with a combination of new solar electric facilities and new metered solar thermal energy facilities that use one or more of certain specified applications. This requirement is sometimes referred to as the "Solar Set Aside" or the "Solar Carve Out". The Solar Carve Out requires compliance according to the following schedule:

Calendar Year	Requirement for Solar Resources
2010	0.02% N.C. retail sales
2012	0.07% N.C. retail sales
2015	0.14% N.C. retail sales
2018	0.20% N.C. retail sales

Q: HOW MAY A UTILITY COMPLY WITH THE REPS REQUIREMENTS?

A: Subject to certain limitations, an electric public utility may meet the REPS requirements by doing one or more of the following: (1) generating electric power at a new renewable energy facility; (2) using a renewable energy resource to generate electric power at a generating facility (other than the generation of electric power from waste heat derived from the combustion of fossil fuel); (3) implementing energy efficiency measures to reduce electricity consumption; (4) purchasing electric power from a new renewable energy facility; and (5) purchasing renewable energy certificates derived from new renewable energy facilities. Additionally, Senate Bill 3 allows a utility to carry forward renewable energy generated in one year that exceeds the compliance requirements of that year into a future year.

1 **Q: DOES THE COMPANY'S PROGRAM COMPLY WITH THE REPS**
2 **REQUIREMENTS IN GENERAL AND THE SOLAR CARVE OUT**
3 **PROVISIONS IN PARTICULAR?**
4 A: Yes, the Program complies with the REPS requirements as well as the solar carve
5 out provisions. The solar PV facilities the Company proposes to install under the
6 Program are "renewable energy facilities" as defined by Senate Bill 3 and,
7 therefore, may be used to comply with the REPS requirements. Thus, the
8 Program will enable Duke Energy Carolinas to partially fulfill its REPS
9 obligations in general and the Solar Carve Out in particular. As Company witness
10 Smith explains, the Company intends to include the Program in its REPS
11 compliance plan when such plan is filed with the Commission annually pursuant
12 to Commission Rule R8-67. The Company also will register facilities constructed
13 under the Program as required by Commission Rule R8-66.

14 ## IV. PROGRAM BENEFITS

15 **Q: WHAT ARE SOME OF THE BENEFITS OF THE PROGRAM?**
16 A: In addition to helping the Company meet its REPS obligations, overall, the
17 Program will promote the development of renewable energy in the State of North
18 Carolina. As Witness Smith explains, the Company proposes to invest $50
19 million to install several hundred facilities around the Company's North Carolina
20 service territory with a generating capacity totaling approximately 10 MWDC.
21 Despite the significant federal and state tax incentives available for investments in
22 solar resources, there were, as of June 6, 2008 (the date of the Company's initial
23 application in this docket), only approximately 60 customer-installed solar

generation facilities in the Company's territory with a total installed capacity of approximately 300 kilowatts. We believe that by getting involved on such a large scale, the Company can help promote the development of solar generation resources in North Carolina. Also, as explained in Ms. Hager's testimony, the Program will, in a modest way, help diversify the resources the Company uses to reliably meet the energy needs of its customers. Importantly, the development of renewable resources and the diversification of energy supply resources are among the specific goals enumerated by the General Assembly in enacting Senate Bill 3.

Q: WILL THE PROGRAM BENEFIT CUSTOMERS IN OTHER WAYS?

A: Yes. As Witness Smith explains, the generating facilities will be installed on both customer and Company-owned property in the Company's North Carolina service area. The distributed nature of the generation of electricity under the Program will enable the Company to develop competency as an owner of solar renewable assets, leverage volume purchases, build relationships with PV developers, manufacturers, and installers, and gain invaluable experience with the installation and operation of multiple types of solar distributed generation facilities. Developing competencies in these areas mean that ultimately, the Company will not be dependent solely on power purchases to meet the requirements of the Solar Carve Out.

Q: WHY DOES THE COMPANY BELIEVE THAT THIS APPLICATION IS JUSTIFIED BY THE PUBLIC CONVENIENCE AND NECESSITY?

A: Duke Energy Carolinas believes that its decision to invest in the Program is justified by the public convenience and necessity for all the reasons provided in

my testimony and that of the other Company witnesses. In short, implementation of the Program is prudent and the Company's Program is designed to serve the public interest. It will enable the Company to meet its obligations under the REPS, serve the electricity needs of its customers, and diversify its generation resource mix as well as that of the State in general. It also will encourage economic development, private investment in renewable energy, and improve the air quality, among other benefits.

Q: DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A: Yes.

CERTIFICATE OF SERVICE

I do hereby certify that I have this day served a copy of the foregoing upon each of the parties of record in this proceeding (NCUC Docket No. E-7, Sub 856), or their attorneys of record by emailing an electronic copy to such parties or their attorneys.

This the 20th day of October, 2008.

Robert W. Kaylor
Attorney for Duke Energy Carolinas, LLC