BEFORE THE NORTH CAROLINA UTILITIES COMMISSION
DOCKET NO. E-100, SUB 137

In the Matter of:	)	
	)	**REPLY COMMENTS OF**
Investigation of Integrated Resource	)	**SIERRA CLUB AND SOUTHERN**
Planning in North Carolina – 2012	)	**ALLIANCE FOR CLEAN ENERGY**
	)	

PURSUANT TO North Carolina Utilities Commission Rule R8-60(j) and the Commission's February 18, 2013 Order Granting Extension of Time, intervenors Southern Alliance for Clean Energy ("SACE") and the Sierra Club, through counsel, file these reply comments in the above-captioned docket on certain issues raised in the initial comments of other parties.

I. Initial Comments of the Public Staff

A. Avoided Costs and the Benefit of Energy Efficiency

1. Introduction

The Commission's 2012 IRP Order required the investor-owned utilities ("IOUs") to include in their IRPs a discussion of their market potential studies for demand-side management ("DSM") and energy efficiency ("EE") programs. The Duke Energy Carolinas ("DEC") and Progress Energy Carolinas ("PEC") market potential studies use the utility's avoided cost, as determined in the most recent biennial PURPA avoided cost proceeding, to measure the benefit of DSM/EE for purposes of determining the economic potential for DSM/EE in each utility's service territory.

In its comments, the Public Staff expresses concern that the avoided cost used in PEC's and DEC's potential studies—$0.07 per kWh—may be too high to properly assess the economic potential of DSM and EE in light of the lower avoided cost rates proposed

by the IOUs in the current avoided cost proceeding, Docket No. E-100, Sub 136. Comments of the Public Staff (Feb. 5, 2013) ("Public Staff Initial Comments") at 45-46. The Public Staff points out that the DEC and PEC potential studies included an assessment of economic potential using an alternative, lower avoided cost of $0.05/kWh. Using $0.05/kWh, rather than $0.07/kWh, resulted in a significantly lower assessment of economic potential: 30% lower for DEC, and 28% lower for PEC, totaling less than 15,000 GWh for both DEC and PEC combined. Id. at 46.

The Public Staff's suggestion reveals the limitation of using the PURPA avoided cost to determine the value of energy efficiency. As discussed in detail in our initial comments, energy efficiency lowers the total system cost—the High EE/DSM cases analyzed by DEC and PEC resulted in $4.7 and $4.3 billion in net savings, respectively, relative to their preferred plans over the 2012-2061 time period. In light of the Public Staff's concern that the avoided cost estimate in DEC's and PEC's potential studies may be too high to properly assess economic potential, we conducted an analysis contrasting the PURPA avoided cost used with the real levelized benefit of EE/DSM, which we believe to be a better metric for avoided cost when assessing potential.

As shown below, our analysis revealed that using the PURPA avoided cost underestimates the gross system benefit of EE by 52% (PEC) and 43% (DEC). Thus, by using the PURPA avoided cost to represent the benefit of energy efficiency, DEC's and PEC's market potential studies undervalue the benefit of EE to the utility system and underestimate the economic potential for EE. Basing the avoided cost on the gross system benefit of energy efficiency, the combined economic potential of DEC and PEC is

nearly 27,000 GWh, or almost twice the amount estimated by using the alternative lower avoided cost figure of $0.05/kWh.

In light of our analysis, described in detail below, we conclude that DEC and PEC should adopt higher, not lower, estimates of energy efficiency potential for planning purposes. We further suggest that in assessing DSM/EE program cost-effectiveness for purposes of developing DSM/EE measures and program designs, DEC and PEC adopt estimates of the benefit of DSM/EE programs and measures that are consistent with their IRPs.

2. Calculating the Real Levelized Benefit of EE/DSM

Using IRP data, we calculated the real levelized system benefit of EE/DSM for DEC and PEC. In order to calculate the benefit of efficiency based on IRP data, we normalized several metrics to ensure a fair comparison with the levelized costs as presented in the utilities' potential studies:

- Savings associated with the incremental impact of the High EE/DSM cases must be expressed on a benefit per kWh basis.
- The calculation of the real levelized benefit of EE/DSM programs had to be constrained to the 2012-2031 period because necessary data was not available for the remaining 30 years of the study period.
- To calculate the real levelized benefit, we used a discount rate of 5.15% and express figures in 2010 dollars, as used by Forefront et al. in the potential studies.

With these considerations, we were able to calculate the real levelized benefit of EE/DSM programs in the DEC and PEC systems. As shown in Table 1, below, our calculations resulted in a real levelized benefit of EE/DSM of $0.097 per kWh for DEC,

and $0.113 per kWh for PEC—notably higher than the roughly $0.05/KWh avoided cost rates proposed by DEC and PEC in the current avoided cost proceeding. Because the real levelized benefit is calculated using the same method as the real levelized costs of EE/DSM used in the utilities' potential studies, it is a more appropriate benchmark for determining the economic potential of energy efficiency.

Table 1: Incremental Benefit of High EE/DSM Cases (2012-2031, PV to 2010)

Incremental Benefit of High EE/DSM Cases	**DEC**	**PEC**
Gross PVRR savings	$3.0 billion	$2.5 billion
Real levelized annual reduction in revenue requirement	$241.3 million	$200.8 million
PV energy savings	30.6 GWh	22.6 GWh
Real levelized annual energy savings	2.5 GWh	1.8 GWh
Real Levelized Benefit of Energy Efficiency and DSM	**$0.097 per kWh**	**$0.113 per kWh**

Source: Analysis of DEC and PEC system model data.

We also calculated the real levelized benefit of energy efficiency using the same method for 10-year periods reflecting the average measure life for a typical utility EE portfolio. We chose the first decade to represent the benefit associated with an immediate increase in energy efficiency programs, and we chose the 2018-2027 decade to represent the period of time in which the utilities' resource plans require capacity additions. As shown in Table 2, below, the ten-year PURPA avoided costs underestimate EE/DSM program benefits by 28-41% (DEC) and 28-51% (PEC). The approximately $0.05 per kWh PURPA avoided cost rates filed by DEC and PEC in the current avoided cost proceeding are about 43% (DEC) and 52% (PEC) lower than the real levelized benefit of EE/DSM programs over the full study period. The benefit of EE/DSM programs is somewhat greater for a decade in which the resource plan indicates an ongoing need for capacity additions than a decade in which most capacity needs are assumed to be met.

Table 2: Real Levelized Benefit of EE/DSM (PV to 2010)

	DEC		PEC	
	(per kWh)	PURPA / Benefit	(per kWh)	PURPA / Benefit
Filed Ten-year PURPA Avoided Costs[1]	$0.055	-	$0.054	-
Real Levelized Benefit of High EE/DSM Cases				
Study Period (2012-2031)	$0.097	- 52 %	$0.113	- 43 %
First Decade (2012-2021)	$0.076	- 28 %	$0.075	- 28 %
Capacity Need Decade (2018-2027)	$0.093	- 41 %	$0.111	- 51 %

Our finding that avoided costs developed for PURPA purposes understate the system benefit of energy efficiency is supported by data from three other vertically integrated utilities which have used this "differential revenue requirement" approach to calculating the real levelized benefit of energy efficiency.

- In its 2011 IRP process, the Tennessee Valley Authority conducted a special study to measure the "change in present value of revenue requirements from reference case" for a "continual [energy efficiency demand response] growth strategy." TVA found in the study that net PVRR savings are $1.3 billion due to the additional EEDR resources, and that the levelized benefit of EE/DSM is $0.091 per kWh. By contrast, TVA's published avoided cost rate is only $0.024-0.026 per kWh.[2]

  Notably, TVA does not use its published short-term avoided cost rate to determine the economic potential of energy efficiency programs. Instead, TVA provided its consultant with an avoided cost estimate that reflects long-term

[1] Duke Energy Carolinas, Initial Statement and Exhibits, Exhibit 3, p. 1, line 7; calculated from Progress Energy Carolinas, proposed Schedule CSP-29 as filed November 1, 2012; Docket No. E-100, Sub 136.
[2] Tennessee Valley Authority, "Dispersed Power Production Guidelines" (March 1, 2012). These values reflect only short-term generation costs.

resource costs.[3] The levelized benefit used in TVA's efficiency potential study, approximately $0.102 per kWh, is somewhat higher than the levelized benefit of EE/DSM calculated in TVA's special IRP study.

- In its past few IRPs, PacifiCorp has estimated the benefit of energy efficiency by comparing system production cost with and without EE/DSM resources. In its 2011 IRP, this benefit estimate was refined by applying "cost credits" including transmission and distribution investment deferral benefit, generation capacity investment deferral benefit, and risk reduction benefit.[4] These benefit estimates were developed for up to nine different EE/DSM load shapes in each of its two regions and the total levelized system benefit for PacifiCorp's western region was $0.087 per kWh.[5] In contrast, PacifiCorp's 20-year levelized avoided costs for PURPA purposes in Utah were $0.064 per kWh.[6]
- Avista explicitly develops "two avoided cost calculations … one for energy efficiency and one for new generation resources."[7] Avista performs three comparisons between resource plan portfolios in order to separately calculate an avoided cost for energy, an avoided cost for capacity, and an avoided cost for greenhouse gas policy. To these costs, Avista adds a "risk premium to account for RPS and rate volatility reductions." The resulting avoided cost is $0.88 per kWh.[8]

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[3] Global Energy Partners, *Tennessee Valley Authority Potential Study*, Report Number 1360 (December 21, 2011) at Volume 2, p. 7-2 - 7-3.
[4] PacifiCorp, *2011 Integrated Resource Plan,* Addendum (June 27, 2011).
[5] Id. at 16.
[6] Rocky Mountain Power, "Response to Utah Public Service Commission October 31, 2011 Order," Attachment B, Table 7, Docket No. 11-035-T06.
[7] Avista Utilities, *2011 Electric Integrated Resource Plan* (August 31, 2011) at 8-16.
[8] Id. at 8-17. Note: Avista also calculates a higher avoided cost for conservation of $0.104 per kWh with the statutorily required consideration of the benefits of reduced transmission and distribution losses, the benefits of reduced operations and maintenance, and the addition of a 10 percent adder to reflect a preference for conservation.

In contrast, Avista's 20-year levelized avoided costs for PURPA purposes are $0.061 per kWh.[9]

As shown in Table 3, below, PURPA avoided cost rates are 26 – 61% lower than the system benefit of EE/DSM resources as calculated from IRP model results at these five utilities.

Table 3: Real Levelized Benefit of EE/DSM Compared to Avoided Costs

Utility	IRP Model EE/DSM Benefit	PURPA Avoided Cost Rate	PURPA / Benefit
DEC (Study Period)	$0.097 per kWh	$0.055 per kWh	- 43%
PEC (Study Period)	$0.113 per kWh	$0.054 per kWh	- 52%
TVA	$0.091 per kWh	$0.025 per kWh	- 61%
Pacificorp (Utah)	$0.087 per kWh	$0.064 per kWh	- 26%
Avista (Washington)	$0.088 per kWh	$0.061 per kWh	- 31%

3. Conclusion and Recommendations

Our analysis suggests that using the PURPA avoided cost to measure the benefit of energy efficiency skews the cost-effectiveness analysis and undervalues the economic potential of the resource. As illustrated in Table 4, using the real levelized benefit of EE/DSM results in EE/DSM potential estimates for DEC and PEC that are 74% and 88%, respectively, higher than the potential using an avoided cost of $.05/kWh.

Table 4: Economic Potential for Energy Efficiency

	DEC	PEC
At 5 cents per kWh, reflecting avoided cost rates	8,222 GWh	6,493 GWh
At 7 cents per kWh, as recommended in potential studies	11,868 GWh	9,086 GWh
At 9 cents per kWh, reflecting real levelized benefit of EE/DSM	14,322 GWh	12,212 GWh

Source: Energy efficiency potential studies conducted for DEC and PEC.

[9] Id. at 8-19. Note: Avista's five-year annual avoided cost rates as filed in 2011 are slightly higher than those reported in its IRP, but the filing does not provide a 20-year levelized avoided cost calculation. Avista Utilities, "Schedule 62: Small Power Production and Cogeneration Schedule," Washington Utilities and Transportation Commission, Docket UE-112001 (November 18, 2011).

Based on these findings, DEC and PEC should update their potential studies to reflect the real levelized benefit of EE/DSM, which would result in higher economic potential, and should also update their achievable potential estimates for energy efficiency based on this higher estimate. We also recommend that DEC and PEC develop a method for estimating the benefit of energy efficiency that is consistent with the system benefit as demonstrated in their resource planning revenue models. In addition, using the real levelized benefit of EE/DSM to estimate avoided cost, DEC and PEC should review their current and planned energy efficiency programs, update the programs' cost-effectiveness calculations, and enhance the programs with additional cost-effective measures to achieve greater customer savings.

B. Use of DSM for Fuel Savings

In light of the results from the utilities' investigation into the use of DSM programs for fuel cost savings, the Public Staff does not believe that the Commission needs to continue to require the utilities to discuss using DSM for possible fuel savings in future IRPs. Public Staff Initial Comments at 50. We do not disagree with the Public Staff's position as it pertains to current DSM programs. However, we would caution against generalizing this conclusion beyond the specific DSM programs that were analyzed. Future DSM programs have the potential to yield fuel savings—for example, smart grid technology may be used to facilitate fuel saving opportunities. Utilities should have the opportunity to propose pilot programs or offer new techniques for using DSM to achieve economic fuel savings in the future this issue. This issue should be revisited at that time.

C. Refinement of Load Forecasts

In its comments, the Public Staff notes that DEC's and PEC's peak load forecasts have exceeded actual loads for the past five years, and that the utilities' peak load and energy sales forecast errors are higher than those of Dominion North Carolina Power. Public Staff Initial Comments at 22. As a result, the Public Staff recommends that DEC and PEC "review their equations and other assumptions for possible refinement to reduce the possibility of overestimation bias in future load forecasts," to the extent they have not already done so. Id.

SACE and Sierra Club support this recommendation. Overestimation bias in load forecasting can result in DEC and PEC building or acquiring more capacity than is necessary to meet their customers' electricity needs in a reliable manner. Such excess capacity would result in excess ratepayer burden. Therefore, we urge DEC and PEC to examine ways to reduce the possibility of overestimation bias in future load forecasts.

D. Collaboration on DSM/EE Programs

In its comments, the Public Staff states that is has worked collaboratively with the investor-owned electric utilities and other interested parties to encourage continuation of existing and implementation of new cost-effective DSM/EE programs. Public Staff Initial Comments at 42-43. SACE and the Sierra Club continue to support and encourage existing and new cost-effective efficiency programs, and look forward to further collaboration with the electric utilities and the Public Staff.

E. Evaluation of Renewable Energy Resources

In its comments, the Public Staff discusses each electric utility's evaluation of alternative supply-side resource options. The Public Staff commends DEC on its analysis

and discussion of alternative supply-side resource additions, as well as its clear delineation of new capacity additions by resource type, and recommends that other utilities provide similar details and discussion in future IRP filings. Public Staff Initial Comments at 55.

As discussed in their initial comments, SACE and the Sierra Club agree that DEC's 2012 IRP reflects a more robust evaluation of renewable energy resource options, and shows a greater commitment to renewable energy than does PEC's IRP. Unlike DEC, PEC does not have a long-term REPS compliance plan. Moreover, PEC does not evaluate renewable energy as a resource option apart from the REPS, and does not appear to have conducted or commissioned its own study of renewable energy potential. While DEC's evaluation of renewable energy is superior to PEC's on these points, it still suffers from serious flaws, as discussed in detail in our initial comments. For example, in DEC's quantitative analysis, the company only evaluated higher levels of renewable energy resources at the initial screening phase, and constrained its detailed portfolio analysis of renewables to REPS compliance levels.

Although DEC's evaluation of renewables is generally superior to PEC's, both the DEC and PEC 2012 resource plans reflect an overly cautious approach to the use of RE to meet system needs over the next 15 years. Both utilities should give RE resources greater consideration, particularly over the long term, because of their distinct advantages compared to other supply-side resources. SACE and the Sierra Club therefore reiterate the recommendation in their initial comments that DEC and PEC evaluate one or more "High Renewables" portfolios that incorporate renewable energy resources above minimum REPS compliance. Such an evaluation would put renewables on an equal

footing with conventional supply-side resources, and allow DEC, PEC, the Commission, the Public Staff, and other stakeholders to more fully understand the value renewable resources can offer beyond basic energy and capacity contributions.

F. Nuclear Generation

The Public Staff raised the issue of DEC's heavy reliance on nuclear generation, noting that DEC selected as its preferred plan a portfolio based on full ownership of two nuclear units, even though it was not the least-cost plan, and stating that "the benefit of additional nuclear generation from a fuel diversity perspective requires further evaluation" and that "the potential risks associated with added construction costs and other uncertainties associated with nuclear power raise additional questions on the merits of DEC's preferred plan." Public Staff Initial Comments at 58-59. SACE and the Sierra Club agree. If the goal of "fuel diversity" is to reduce the risk of fuel cost increases, increased levels of EE/DSM are more effective at mitigating fuel cost risks than a conventional supply-side resource such as nuclear. SACE and Sierra Club Initial Comments at 11, 13-14. Further, development of new nuclear generation is subject to numerous risks and uncertainties, as discussed in detail in the SACE and Sierra Club Initial Comments. These factors weigh strongly against over-reliance on nuclear generation in the DEC and PEC IRPs.

II. Initial Comments of NCSEA

NCSEA states that inadequate access to customer data is an impediment to greater implementation of DSM/EE. North Carolina Sustainable Energy Association's Comments (Feb. 5, 2013) at 12. To begin the process of making customer information more accessible, NCSEA requests that the Commission open a rulemaking docket

focused on creating and/or modernizing rules for accessing customer information. Id. at 16. Specifically, NCSEA advocates that the Commission consider making meter-level electricity consumption, load profile, and billing history data more accessible to customer and third parties such as smart grid technology companies, as well as making aggregated/"de-identified" data more accessible to third parties. Id. at 29-30.

Without taking a position on the specific changes advocated by NCSEA to Commission rules and electric utility codes of conduct, SACE and the Sierra Club agree that access to customer data is an important issue and a potential barrier to maximum implementation of DSM/EE. Accordingly, SACE and the Sierra Club support NCSEA's request to open a docket to examine the current regulatory structure governing customer data, and to make appropriate changes to that regulatory structure based on input from interested parties.

III. Amended Initial Comments of MAREC

In its Amended Initial Comments, the Mid-Atlantic Renewable Energy Coalition ("MAREC") states that the DEC and PEC IRPs fail to adequately address wind energy. According to MAREC, wind energy is "seriously underutilized" in meeting the requirements of the REPS, and should also be considered outside the context of the REPS. Amended Initial Comments of MAREC (Feb. 7, 2013) at 5. MAREC also points out that wind energy offers several benefits, including a lack of price volatility, in-state economic development, and zero emissions. Id. at 9. SACE and the Sierra Club agree.

As discussed in detail in our Initial Comments, wind energy offers distinct advantages compared to conventional supply-side resources: lower production costs (and zero fuel costs), a smaller environmental footprint, and a modular nature that matches

load growth more closely than larger capacity additions. Id. at 40-41. Given these attributes, DEC and PEC should evaluate wind energy not only for REPS compliance, but as a system resource.

To hedge against price volatility and help meet REPS requirements, MAREC proposes that DEC and PEC include a provision in their IRPs for a new RFP process that would solicit at least 100 MW of new wind energy capacity through a long-term contract(s) for energy and RECs. SACE and the Sierra Club support this concept. The REPS allows electric suppliers a good deal of flexibility to select among several eligible renewable energy resources to meet its requirements, but the total lack of in-state wind development has come as a surprise to many. As MAREC points out, there is significant interest by the wind industry in developing the resource in North Carolina—yet despite this interest, no utility-scale wind energy facilities have been built. The prudency of competitive proposals in response to the RFP would need to be ensured, either through a pre-approved price cap or through Commission review. Further, since wind developments may be more cost-effective at sizes larger than 100 MW, it would be appropriate for an RFP to allow for proposals of at least 300 MW of wind capacity.

There may be reasons other than the difficulty that wind energy developers have encountered in negotiating power purchase agreements with DEC and PEC that are hindering development of in-state wind projects; however, an RFP process would represent a clear and transparent path to project success. Establishment of an RFP process would signal to wind developers that the State welcomes their investment and the benefits that wind energy would bring to North Carolina's ratepayers, economy and environment.

IV. Initial Comments of NC WARN et al.

A. Critique of IRPs

In their comments and supporting reports, N.C. Waste Awareness and Reduction Network ("NC WARN"), the Blue Ridge Environmental Defense League ("BREDL"), and Greenpeace, Inc. (collectively, "NC WARN et al.") critique the DEC and PEC IRPs as overly reliant on costly, risky fossil fuel and nuclear plants. Initial Comments by NC WARN, BREDL and Greenpeace (Feb. 4, 2013). NC WARN et al. contend that increased reliance on energy efficiency, renewable energy and combined heat and power would reduce both cost and risk to customers. SACE and the Sierra Club have not had an opportunity to review in detail the assumptions and methodology used in the reports supporting NC WARN et al.'s comments; however, they agree with general points made by NC WARN et al., which are consistent with the points made in our initial comments.

B. Evidentiary Hearing Request

NC WARN et al. request an evidentiary hearing on "whether the IRPs are in the best interest of ratepayers and provide 'least cost' electricity." Id. at 1. As stated in their initial comments, if the Commission allows NC WARN's motion, SACE and the Sierra Club respectfully submit the issues raised in their Initial Comments for the Commission's consideration as possible issues for an evidentiary hearing. In the alternative, if the Commission does not schedule an evidentiary hearing, SACE and the Sierra Club reiterate their recommendation for a workshop and/or collaborative working group on issues related to integrated resource planning.

Respectfully submitted this 5th day of March, 2013.

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CERTIFICATE OF SERVICE

I hereby certify that the persons on the service list have been served with the Reply Comments of Sierra Club and Southern Alliance for Clean Energy either by electronic service or by deposit in the U.S. Mail, postage prepaid:

This 5th day of March, 2013.

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Gudrun Thompson