



**NORTH CAROLINA  
PUBLIC STAFF  
UTILITIES COMMISSION**

**FILED**  
FEB 19 2010  
Clerk's Office  
N.C. Utilities Commission

February 19, 2010

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

Re: Docket No. E-100, Sub 124

Dear Ms. Vance:

In connection with the above-captioned docket, I transmit herewith for filing on behalf of the Public Staff, twenty-one (21) copies of the following:

1. Redacted Version of the Affidavit of Jay B. Lucas, Electric Engineer, Electric Division;
2. Affidavit of Jack L. Floyd, Electric Engineer, Electric Division; and
3. Affidavit of Kennie D. Ellis, Electric Engineer, Electric Division; and
4. Testimony of John R. Hinton, Financial Analyst, Economic Research Division.

By copy of this letter, I am forwarding a copy of the above to all parties of record.

Sincerely yours,

Kendrick C. Fentress  
Staff Attorney

*Full Dist.*

KCF/bll

Enclosures

c: Parties of Record

Executive Director  
733-2435

Communications  
733-2810

Economic Research  
733-2902

Legal  
733-6110

Transportation  
733-7766

Accounting  
733-4279

Consumer Services  
733-9277

Electric  
733-2267

Natural Gas  
733-4326

Water  
733-5610

DOCKET NO. E-100, SUB 124

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of  
Investigation of Integrated Resource  
Planning in North Carolina – 2009

)  
)

AFFIDAVIT OF  
JAY B. LUCAS

STATE OF NORTH CAROLINA

COUNTY OF WAKE

I, Jay B. Lucas, first being duly sworn, do depose and say:

I am an engineer with the Electric Division of the Public Staff – North Carolina Utilities Commission. A summary of my education and experience is attached to this affidavit as Appendix A.

The purpose of my affidavit is to present the Public Staff's position on the alternative supply-side energy resources assessments filed by Carolina Power & Light Company, d/b/a Progress Energy Carolinas, Inc. (PEC); Duke Energy Carolinas, LLC (Duke); and Virginia Electric and Power Company, d/b/a Dominion North Carolina Power (DNCP) as part of their Integrated Resource Planning (IRP) filings in the above docket. My affidavit also presents the Public Staff's position on all three utilities' Renewable Energy Portfolio Standard (REPS) Compliance Plans.

Commission Rule R8-60(i)(7) requires each utility to file an assessment of existing and potential alternative supply-side energy resources. Each utility is also required to provide general information on any changes to the methods and assumptions used in its assessment since its most recent biennial or annual report. Commission Rule R8-60(e) states that alternative supply side energy resources include but are not limited to hydro, wind, geothermal, solar thermal, solar photovoltaic, municipal solid waste, fuel cells, and biomass. All of these resources can be used to meet a utility's REPS requirements.

G.S. 62-133.8 requires all electric power suppliers to provide specified percentages of their retail sales using renewable energy resources or reduce energy consumption through implementation of EE measures. Commission Rule R8-67(b) requires electric power suppliers to file a plan on or before September 1 of each year explaining how they will meet the requirements of G.S. 62-133.8(b), (c), (d), (e), and (f). The plans must cover the current year and the next two calendar years, or in this case 2009, 2010, and 2011. The only compliance requirement covered by this planning period is found in G.S. 62-133.8(d) for solar energy resources. Electric power suppliers

must meet 0.02 percent of their retail sales in 2010 and 2011 using solar photovoltaic or solar thermal energy.<sup>1</sup>

Each of the three utilities provided an assessment of alternative supply-side energy resources and a REPS Compliance Plan. A discussion of the actions proposed by each utility and associated concerns is found below.

### **Duke Energy Carolinas, LLC**

Duke is considering bids for the following alternative supply-side energy resources: offshore wind, biomass (wood, poultry, and swine waste), solar photovoltaic (PV), and landfill gas. With respect to offshore wind, Duke has entered the planning phase for one to three large wind turbines in the Pamlico Sound. This project is a result of a study on North Carolina coastal wind energy feasibility by the University of North Carolina at Chapel Hill.

Duke has tested the co-firing of coal mixed with sawdust and wood chips at its Buck Steam Station near Salisbury, but remains concerned that the Department of Environment and Natural Resources (DENR) will regulate sawdust and wood chips as a solid waste. DENR has ruled that many types of wood waste should not be regulated as solid waste, but has reserved the right to evaluate wood wastes on a case-by-case basis. Any additional regulatory oversight of this nature would likely increase the costs of generation. Duke has also tested co-firing of other forestry products mixed with coal at its Lee Steam Station near Williamston, South Carolina. This test was hampered by a mild summer and lower than expected electricity demand, resulting in fewer opportunities for the Lee Station to operate. While these tests have provided valuable information on co-firing, Duke has yet to make a final conclusion or decision on proceeding based upon the results.

Duke is confident that it will meet the 2010 and 2011 solar set-aside requirements by implementing the following projects:

- A 20-year agreement for a large solar farm in Davidson County to be built and operated by SunEdison.
- A Distributed Generation Solar PV Program for which Duke has received Commission approval.
- Long-term agreements to purchase solar renewable energy certificates (RECs) from FLS Energy and Vanir Energy.

For Duke, 0.02 percent of anticipated sales for the solar set-aside equates to 11,142 megawatt-hours (MWh) in 2010 and 11,246 MWh in 2011. Duke projects the following results from its efforts to meet the requirements:

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<sup>1</sup> For 2010, the utilities must supply 0.02% of their 2009 retail sales using solar energy resources. In 2011, they must supply 0.02% of their 2010 retail sales using solar energy resources.

**\*\*\* CONFIDENTIAL \*\*\***

Duke should be able to meet its solar set-aside requirements in 2010 and 2011.

Duke and other electric power suppliers in the State have had difficulty securing resources to meet the poultry and swine waste set-asides required in G.S. 62-133.8(e) and (f).<sup>2</sup> They have made joint filings with the Commission in Docket No. E-100, Sub 113, and I will discuss this issue later in this affidavit.

With respect to other alternative supply-side resources, Duke considered coal-fired fluidized bed technology, advanced battery storage, and fuel cells but rejected them due to their high cost and difficulty in creating large (utility) scale projects. Duke also intends to utilize new EE resources, as defined in G.S. 62-133.8, to meet a portion of its REPS requirements.

Duke is contractually obligated to secure resources to meet all the REPS requirements of the following electric power suppliers: Rutherford EMC, City of Dallas, Town of Forest City, City of Concord, Town of Highlands, and City of Kings Mountain. It will also secure resources to meet a portion of the REPS requirements of Blue Ridge EMC and Piedmont EMC.

In accordance with Rule R8-67(b)(1)(iv), Duke filed the following projections of sales to its North Carolina retail customers and by the electric power suppliers listed above. It also submitted year-end customer counts by class for each year:

	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>Total MWh Sales</b>	56,139,461	55,712,059	56,232,640

<b>Number of Customers</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>Residential</b>	1,700,724	1,725,212	1,752,157
<b>Commercial</b>	273,862	278,088	282,931
<b>Industrial</b>	5,346	5,234	5,217

Duke provided the following data on its avoided costs:

<b>Annualized Capacity and Energy Rates (\$ per MWh)</b>	
<b>Variable Rate</b>	64.00
<b>5-Year</b>	63.90
<b>10-Year</b>	64.20
<b>15-Year</b>	65.60

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<sup>2</sup> These set-aside requirements begin in 2012 and are not covered by the 2009-11 compliance plans.

Duke provided information, as required by Rules R8-67(b)(1)(vi) and (vii), on the projected total and incremental costs anticipated to implement its compliance plan for each year, together with a comparison of these costs to the annual cost caps. This information includes its North Carolina retail customers as well as the retail electric customers of the electric power suppliers for which Duke provides resources to meet their REPS requirements. The information provided by Duke is summarized in the following table:

	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>
Total costs	\$8,715,337	\$14,974,549	\$25,407,348
Incremental costs	\$6,771,514	\$4,859,085	\$8,588,219
Annual cost cap	\$32,956,769	\$33,352,593	\$33,850,966

**Progress Energy Carolinas, Inc.**

PEC is continuously evaluating the purchase of RECs and electricity from renewable generators, the use of renewable fuels at existing generation facilities, and energy efficiency programs. PEC has considered ownership of renewable generation facilities, but, as yet, has not pursued this strategy due to the lack of cost effectiveness of utility-owned projects, as well as the absence of REPS requirements in the planning period.

In 2009, PEC participated in a small-scale study using torrefied wood as a fuel source either in isolation or mixed with coal. Torrefied wood is waste wood that is heated in the absence of oxygen, which reduces the moisture content and improves its energy output. PEC partnered with the Electric Power Research Institute (EPRI) to perform this trial of torrefied wood at the Southern Research institute (SRI) facility in Birmingham, Alabama. PEC considers the test to have been successful, but has been unable to find a large scale supplier of torrefied wood for its own use.

PEC has a continuously open bidding process for the purchase of RECs or renewable energy. As of September 2009, PEC has received bids from renewable energy generators for 25 projects, including wind, hydro, landfill gas, biomass, solar photovoltaic, and solar thermal, for the purchase of bundled energy and RECs. PEC has also purchased unbundled wind RECs.

In addition to the aforementioned bids for solar projects, PEC has implemented its SunSense program to comply with the solar set-aside requirements in G.S. 62-133.8(d). Under the SunSense program, commercial customers agree to install rooftop-mounted solar PV facilities, or solar thermal water heating facilities, on their property. PEC agrees to purchase the power generated at the solar PV facilities at a rate of 18 cents per kilowatt-hour over a period of 20 years, and to purchase the solar thermal RECs produced by the water heating systems at a rate of \$20 per REC. PEC also intends to offer rebates to residential customers who install solar PV equipment. The SunSense program has no termination date and aims to add 6 MW per year of customer-owned solar PV to PEC's grid.

For PEC, 0.02 percent of anticipated sales for the solar set-aside equates to 7,517 MWh in 2010 and 7,628 MWh in 2011. PEC projects the following results from contracts for solar energy resources:

**\*\*\* CONFIDENTIAL \*\*\***

The contracts for solar RECs listed above will meet PEC's requirements for 2010 and 2011.

If PEC achieves its goal of adding 6 MW of solar PV per year and finalizing current contract proposals, then approximately 10,000 solar RECs will be added in 2010 and approximately 23,000 additional solar RECs will be added in 2011.

PEC and other electric power suppliers in the State have had difficulty securing resources to meet the poultry and swine waste set-asides required in G.S. 62-133.8(e) and (f). They have made joint filings with the Commission in Docket No. E-100, Sub 113, and I will discuss this issue later in this affidavit. PEC also intends to utilize new EE resources, as defined in G.S. 62-133.8, to meet a portion of its REPS requirements.

PEC is contractually obligated to secure resources to meet all of the REPS requirements of the following towns that provide retail electric service: Black Creek, Lucama, Sharpsburg, Stantonsburg, and Waynesville.

In accordance with Rule R8-67(b)(1)(iv), PEC filed the following projections of sales to its North Carolina retail customers and to the retail customers of the electric power suppliers listed above. It also submitted year-end customer counts by class for each year:

	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>
<b>Total MWh Sales</b>	37,265,000	37,516,000	38,140,000

<b><u>Number of Customers</u></b>	<b><u>2009</u></b>	<b><u>2010</u></b>	<b><u>2011</u></b>
<b>Residential</b>	1,097,000	1,107,000	1,117,000
<b>Commercial</b>	178,000	180,000	181,000
<b>Industrial</b>	2,000	2,000	2,000

PEC provided the following data on its avoided costs:

<b>Annualized Capacity and Energy Rates (\$ per MWh)</b>	
<b>2-Year</b>	56.96
<b>5-Year</b>	58.29
<b>10-Year</b>	60.54
<b>15-Year</b>	61.11

PEC provided information, as required by Rules R8-67(b)(1)(vi) and (vii), on the projected total and incremental costs anticipated to implement its compliance plan for each year, together with a comparison of these costs to the annual cost caps. The information includes its North Carolina retail customers as well as the retail customers of the electric power suppliers for which PEC provides resources to meet their REPS requirements. The information provided by PEC is summarized in the following table:

	<b>2009</b>	<b>2010</b>	<b>2011</b>
Total costs	\$21,400,000	\$24,700,000	\$24,000,000
Incremental costs	\$8,600,000	\$12,700,000	\$12,400,000
Annual cost cap	\$20,800,000	\$21,000,000	\$21,200,000

### **Dominion North Carolina Power**

DNCP owns and operates an 83-MW power plant in Hurt, Virginia, that is capable of using biomass, typically waste wood, as its sole fuel source. It is also constructing the 585-MW Virginia City Hybrid Energy Center near Wise, Virginia, which can use up to 20 percent biomass as a fuel source. DNCP has applied for federal stimulus funds for researching carbon capture and sequestration at this site.

DNCP is monitoring the following alternative supply-side energy resources: coal-fired integrated gasification combined cycle (IGCC) technology, fuel cell, solar photovoltaic, solar thermal, tidal and wave power, and wind.

High costs and uncertain efficiency have caused DNCP not to pursue IGCC. Fuel cell technology has not proven effective for utility-scale operation. DNCP ruled out tidal and wave power because no applications are commercially available. DNCP views wind energy as having potential, but does not yet have sufficient information on wind energy's viability in its service territory.

DNCP intends to purchase solar RECs to meet the set-aside requirements for 2010 and 2011, but will obtain bundled solar energy if necessary. For DNCP, 0.02 percent of anticipated sales for the solar set-aside equates to 757 MWh in 2010 and 778 MWh in 2011. DNCP's plan to purchase solar RECs should be sufficient to meet its requirements for 2010 and 2011 since G.S. 62-133.8(b)(2) allows DNCP to purchase all necessary RECs from outside of North Carolina.

DNCP did not mention any difficulty in meeting the poultry and swine waste set-asides in its REPS Compliance Plan. However, it is a party to joint action regarding these set-asides filed by several electric power suppliers in Docket No. E-100, Sub 113. I will discuss this issue later in this affidavit.

DNCP plans to utilize EE to meet a portion of its REPS requirements, and the Public Staff expects DNCP to request NCUC approval of several EE programs sometime in 2010.

In accordance with Rule R8-67(b)(1)(iv), DNCP filed the following projections of sales to its North Carolina retail customers. It also submitted year-end customer counts by class for each year:

	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>Total MWh Sales</b>	3,784,952	3,765,334	3,890,513

<b>Number of Customers</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>Residential</b>	102,540	103,391	104,537
<b>Commercial</b>	18,335	18,537	18,758
<b>Industrial</b>	61	59	58

DNCP provided the following data on its avoided costs:

<b>Annualized Capacity and Energy Rates (\$ per MWh)</b>		
	<b>2010</b>	<b>2011</b>
On-Peak	65.47	65.10
Off-Peak	48.91	47.24

DNCP provided information, as required by Rules R8-67(b)(1)(vi) and (vii), on the projected total costs anticipated to implement its compliance plan for each year, with a comparison of these costs to the annual cost caps. The information provided by DNCP is summarized in the following table:

	<b>2009</b>	<b>2010</b>	<b>2011</b>
Total costs	\$0	\$17,663	\$26,355
Incremental costs	\$0	\$17,663	\$26,355
Annual cost cap	N/A	\$1,990,260	\$2,012,270

DNCP's incremental costs are the same as its total costs because it intends to purchase solar RECs that are not bundled with energy to meet its REPS requirements.

### **Swine and Poultry Waste Set-Asides**

On August 14, 2009, several electric power suppliers including Duke, PEC, and DNCP (Joint Movants) filed a motion requesting that the Commission delay and reduce the poultry waste set-aside requirement and delay the swine waste set-aside requirement. Numerous parties filed comments opposing the Joint Movants' request. On December 16, 2009, the Joint Movants withdrew their request regarding poultry waste, stating that they had resolved their primary issues with the State's poultry waste generators. On January 29, 2010, the Joint Movants, together with several parties interested in generating power from poultry and swine waste, requested Commission approval of an RFP for swine waste generation. On February 5, 2010, several electric power suppliers and other interested parties jointly filed for approval of an allocation method for the poultry and swine waste set-asides. Under G.S. 62-133.8 these two set-



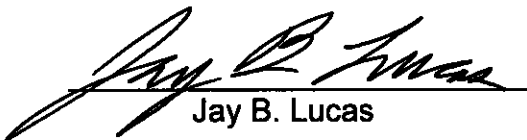
asides are designated as aggregate requirements for all electric power suppliers in the State. These proposals are currently before the Commission for consideration in its rulemaking docket, Docket No. E-100, Sub 113.

### Conclusion

The Public Staff believes Duke, PEC, and DNCP can meet their REPS requirements for the time period covered by their REPS Compliance Plans (2009, 2010, and 2011). The only requirement for this period is that 0.02 percent of North Carolina retail sales must be met with solar photovoltaic or solar thermal energy.

In their initial plans filed in September 2009, Duke and PEC anticipated having difficulty meeting the poultry and swine waste set-asides that take effect in 2012. However, since their filings, they have taken significant steps towards resolution of this problem.

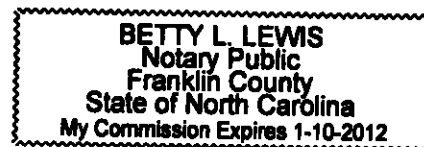
This completes my affidavit.

  
Jay B. Lucas

Sworn to and subscribed before me

this the 19<sup>th</sup> day of February, 2010.

  
Notary Public



My Commission Expires: 1-10-2012

Jay B. Lucas

I graduated from the Virginia Military Institute in 1985, earning a Bachelor of Science Degree in Civil Engineering. I also graduated from the Virginia Polytechnic Institute and State University in 1991, earning a Master of Science degree in Environmental Engineering. I have 24 years of engineering experience and, since joining the Public Staff in January 2000, have worked on utility rate cases, new program applications, customer complaints, and other aspects of utility regulation. I am a licensed Professional Engineer in North Carolina.

DOCKET NO. E-100, SUB 124

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of  
Investigation of Integrated Resource Planning in )  
North Carolina and REPS Compliance Plans – )  
2009 )

AFFIDAVIT  
OF  
JACK L. FLOYD

STATE OF NORTH CAROLINA

COUNTY OF WAKE

I, Jack L. Floyd, being first duly sworn, do depose and say:

I am an Engineer in the Electric Division of the Public Staff – North Carolina Utilities Commission representing the using and consuming public.

I have attached, as Appendix A, a summary of my education and experience.

The purpose of this affidavit is to summarize my investigation and to make recommendations concerning the development, evaluation, and inclusion of demand side management (DSM) and energy efficiency (EE) resources within the context of the integrated resource plans (IRPs) filed by the investor owned utilities, Progress Energy Carolinas, Inc. (PEC), Duke Energy Carolinas, LLC (Duke), and Dominion North Carolina Power (DNCP) (collectively, IOUs) in Docket No. E-100, Sub 124 (2009 IRPs). I also support the testimony of Public Staff witness John R. Hinton regarding the use of DSM by the IOUs. In preparing this affidavit, I have reviewed the 2009 IRPs and pertinent portions of the 2008 IRPs, filed by the IOUs in Docket No. E-100, Sub 118 (2008 IRPs).

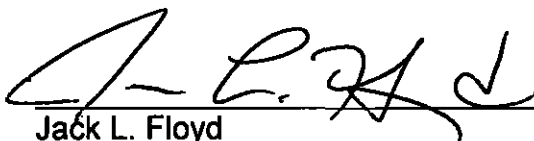
With respect to the evaluation and inclusion of DSM and EE and the level of DSM and EE used in the calculations of planning reserves, the 2009 IRPs do not differ materially from the IOUs' respective 2008 IRPs. Duke, PEC, and DNCP each included in their planning horizon slightly lower impacts from DSM and EE resources than were included in their 2008 IRPs. I believe this is the result of delays in implementation of DSM and EE programs due to current economic conditions, as well as delays in the timing of development, approval, and rollout of the various programs within each portfolio. Notwithstanding these delays, the IOUs continue to incorporate DSM and EE as fundamental resources in their IRPs. In addition, the Public Staff continues to work with the IOUs regarding new DSM and EE programs, and I expect that some of these new programs will be submitted for Commission approval in the near future.

I also investigated the use of DSM by the IOUs during their respective peak periods. DNCP and PEC both indicated that they utilized their DSM resources during their August 10, 2009 peak hours. Duke's peak period occurred the same day, but Duke indicated that no DSM was utilized during that period of time.

Regarding the application and modeling of DSM and EE resources in the IOUs' IRPs, I assisted Public Staff witness Hinton with evaluating the modeling methods and inputs used by the IOUs to develop their optimal plans for capacity resources. I understand that PEC and Duke generally modeled their DSM resources consistent with their modeling of DSM resources in their individual program approval proceedings. DNCP has not yet submitted any new DSM or EE programs for approval under G.S. 62-133.9 or Commission Rule R8-68. I concur with witness Hinton that the IOUs should utilize their DSM resources to obtain the maximum system value possible. While further capacity savings may not result from increased utilization, additional energy savings, with corresponding fuel savings, could result during periods when energy prices are typically greater than the costs of operating these DSM resources.

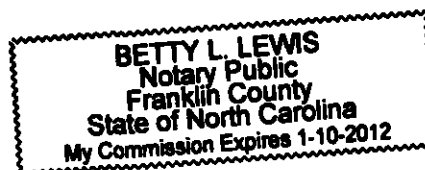
Duke and PEC both received approval in 2009 for new residential air conditioning cycling programs. Duke's program is called Power Manager; PEC's program is known as EnergyWise (collectively, "residential A/C cycling programs"). Both programs provide the capability to control central air conditioning systems on a more tactical basis than earlier versions of air conditioning load control programs that interrupted the air conditioning compressors of all participants for several hours at a time. In contrast, the residential A/C cycling programs allow the utility to selectively interrupt the air conditioning on more frequent, but shorter, intervals among targeted groups of participants at any given time. These aspects of both programs should improve the customer acceptance of the resource by minimizing any discomfort that customers experience by having their air conditioning units interrupted during extremely hot weather. These residential A/C cycling programs are relatively new to Duke's and PEC's portfolios, and, therefore, Duke and PEC should be given a sufficient opportunity to determine the optimal use of these resources. The Public Staff encourages the IOUs to maximize the value of these resources, and it will continue to review the utilization of these resources in future DSM and EE cost recovery proceedings, IRP proceedings, and annual fuel proceedings.

This completes my affidavit.

  
Jack L. Floyd

Sworn to and subscribed before me  
on this the 19th day of February 2010.

  
Notary Public



My Commission Expires: 1-10-2012

JACK L. FLOYD

I am a graduate of North Carolina State University with a Bachelor of Science Degree in Chemical Engineering. I am licensed in North Carolina as a Professional Engineer. I have more than 17 years of experience in the water and wastewater treatment field; nine of those years were with the Public Staff's Water Division. In addition, I have been with the Electric Division for six years.

Prior to my employment with the Public Staff, I was employed by the North Carolina Department of Natural Resources, Division of Water Quality as an Environmental Engineer. In that capacity, I performed various tasks associated with environmental regulation of water and wastewater systems, including the drafting of regulations and general statutes.

In my capacity with the Public Staff's Water Division, I investigated the operations of regulated water and sewer utility companies and prepared testimony and reports related to those investigations.

Currently, my duties with the Public Staff include evaluating the operation of regulated electric utilities, including rate design, cost of service, and demand side management and energy efficiency resources. My duties also include assisting in the preparation of reports to the Commission; preparing testimony regarding my investigation activities; reviewing Integrated Resource Plans; and making recommendations to the Commission concerning the level of service for electric utilities.

**DOCKET NO. E-100, SUB 124**

**BEFORE THE NORTH CAROLINA UTILITIES COMMISSION**

In the Matter of		
Investigation of the Integrated Resource Planning	)	<u>AFFIDAVIT</u>
in North Carolina- 2009	)	<u>OF</u>
	)	<u>KENNIE D. ELLIS</u>

**STATE OF NORTH CAROLINA**

**COUNTY OF WAKE**

*I, Kennie D. Ellis, first being duly sworn, do depose and say:*

I am an engineer with the Electric Division of the Public Staff -- North Carolina Utilities Commission. A summary of my education and experience is attached to this affidavit as Appendix A.

The purpose of my affidavit is to present the results of my investigation of the Integrated Resource Plans (IRPs) filed by Progress Energy Carolinas, Inc. (PEC), Duke Energy Carolinas, LLC (Duke), and Dominion North Carolina Power (DNCP), in this docket on September 1, 2009. Duke filed an amended IRP (2009 IRP Update) on January 11, 2010.

Based upon my investigation, I determined that each company's discussion of generating facilities, reserve margin adequacy, non-utility generation, wholesale power contracts, transmission facilities, transmission planning, evaluation of resource options, and levelized busbar costs appeared to meet the requirements of R8-60. Some additional comments are included below.

On October 22, 2009, the Commission issued an Order in Docket No. E-2 Sub 960, granting a certificate of public convenience and necessity to construct a 950-megawatt (MW) natural gas fired generating plant at the Lee site in Wayne County. This certificate was subject to a condition that required PEC to submit a plan for retirement of "additional unscrubbed coal-fired generating capacity reasonably proportionate to the amount of incremental gas-fired generating capacity authorized by this certificate above 400 MW". PEC submitted a plan, which was approved by Commission Order on January 28, 2010, that identified the unscrubbed coal-fired generation capacity it intended to retire to comply with the October 22, 2009 Order. The January 28, 2010 Order also required PEC to reflect the retirements approved by such Order and its progress in retiring its unscrubbed coal units in future IRP filings, beginning with the 2010 filing.

Pursuant to the Commission's Order on Advance Notice issued on November 10, 2009, in Docket No. E-7 Sub 923, Duke filed its 2009 IRP Update to address undesignated wholesale load. The 2009 IRP filed September 1, 2009, maintained a

reserve margin averaging 18.8% throughout the planning horizon. The 2009 IRP Update incorporates undesignated wholesale load and some changes to the capacity addition schedule which results in a reserve margin averaging 19.1% through the planning horizon. Duke witness McMurray indicates in his prefiled direct testimony filed on January 11, 2010 in this proceeding that preliminary results indicate that the inclusion of the undesignated wholesale load increases the need for additional peaking generation in the 2017 to 2026 timeframe, and increases the need for additional baseload generation in the 2018 to 2021 timeframe.<sup>1</sup>

The Public Staff is still pursuing information with respect to Duke's reasonable expectations for serving such customers. The Public Staff and Duke have scheduled a meeting for this purpose, but, because of workload and scheduling conflicts, this meeting has not yet occurred. Depending on the outcome of those discussions, the Public Staff may request permission from the Commission to file a supplemental affidavit or testimony as appropriate.

Duke witness McMurray also states in his prefiled direct testimony that estimated nuclear project cost escalation rates decreased from the 2008 IRP filing to the 2009 filing, resulting in reduced inflationary impacts on the projected nuclear costs. Responses to data requests from PEC also reflect lower escalation rates and, therefore, lower inflationary impact on the cost of new nuclear. Both companies also indicated, in response to data requests, an anticipated increase in the projected cost of combustion turbines and combined cycle generating facilities.

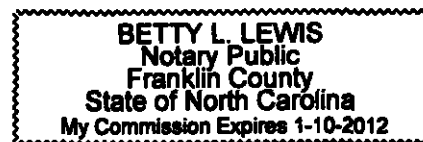
This completes my affidavit.

  
Kennie D. Ellis

Sworn to and subscribed before me

this the 19<sup>th</sup> day of February 2010.

  
Notary Public



My Commission Expires: 1-10-2012

<sup>1</sup> Duke's internal analysis indicated that the peaking generation will be met with combustion turbines, and the baseload generation will be met through the proposed Lee Nuclear station.

KENNIE D. ELLIS

I am a graduate of North Carolina State University with a Bachelor of Science Degree in Engineering with a concentration in nuclear power.

I began my employment with the Public Staff Electric Division in May of 2003. While with the Electric Division, my primary responsibilities have been customer growth analysis and validation, small power and non-utility generator Certificates of Public Convenience and Necessity, investigation of inquiries and complaints, and management of generation and co-generation tracking databases. I have also worked in the areas of rate analysis and design, revenue analysis and design, nuclear decommissioning, power plant performance, utility service rules and regulations, cost of service, analysis and review of conservation and load management programs, least-cost integrated resource planning, avoided cost, electromagnetic fields, electrical safety, fuel factor computation and inventory, unbundling of service, review of wheeling and rates and depreciation analysis.

From October of 1984 until April of 2002, I was employed by Carolina Power & Light Company (Progress Energy Carolinas) in various capacities including Regulatory Specialist, Operating Experience Coordinator, Corrective Action Program Specialist, Pressure Test Engineer, and Health Physics Technician.

From 1978 until 1984, I was employed by the United States Navy in the Naval Nuclear Power Program.

I have previously filed testimony before the Commission in new certificate applications for generating facilities, fuel proceedings, renewable portfolio standards recovery proceedings, rate case proceedings, and participated in several special investigations.



**DOCKET NO. E-100, SUB 124**

**TESTIMONY OF JOHN R. HINTON  
ON BEHALF OF THE PUBLIC STAFF  
NORTH CAROLINA UTILITIES COMMISSION**

**February 19, 2010**

1 Q. PLEASE STATE YOUR NAME, POSITION, AND BUSINESS ADDRESS FOR  
2 THE RECORD.

3 A. My name is John R. Hinton. I am a Public Utilities Financial Analyst in the  
4 Economic Research Division of the Public Staff - North Carolina Utilities  
5 Commission. My business address is 430 North Salisbury Street, Raleigh, North  
6 Carolina 27603.

7

8 Q. PLEASE DISCUSS YOUR EDUCATIONAL BACKGROUND.

9 A. I received a Bachelor of Science degree in Economics from the University of  
10 North Carolina at Wilmington in 1980 and a Master of Economics degree from  
11 North Carolina State University in 1983.

12

13 Q. PLEASE DISCUSS YOUR EXPERIENCE WITH PEAK LOAD AND ENERGY  
14 SALES FORECASTS.

15 A. After joining the Public Staff in May of 1985, I developed forecasts for the 1986,  
16 1989, and 1992 Long Range Forecasts of Peak Demand for Electricity in North  
17 Carolina that were provided to the NCUC and the Governor. Since then, I have  
18 reviewed numerous peak demand and energy sales forecasts filed by Duke  
19 Energy Carolinas, LLC (Duke), Progress Energy Carolinas, Inc. (PEC), and

1 Dominion North Carolina Power (DNCP) in the integrated resource planning  
2 (IRP) proceedings from 1998 to the present. I also filed testimony on Duke's and  
3 PEC's peak load and energy sales forecasts in Docket No. E-100, Sub 114. I  
4 have filed testimony on electricity weather normalization in Docket Nos. E-7, Sub  
5 620, E-2, Sub 833, and E-7, Sub 909.

6  
7 I have also filed testimony on the issuance of certificates of public convenience  
8 and necessity in Docket Nos. E-2, Sub 669, SP-132, Sub 0, E-7, Sub 790, and E-  
9 7, Sub 791, relating to financial and planning issues for new generation. My  
10 qualifications and experience are further discussed in Appendix A.

11  
12 Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

13 A. The purpose of my testimony is to present my findings regarding the  
14 reasonableness of the peak load and energy forecasts of the investor owned  
15 utilities (IOUs), Duke, PEC, and DNCP, and their integration of demand-side  
16 management (DSM) programs in their production simulation models (models).

17  
18 Q. BRIEFLY DESCRIBE YOUR REVIEW OF THE IOUS' FORECASTS.

19 A. I reviewed the compound annual growth rates of the IOUs' forecasts of their  
20 annual peak demands and energy sales. In addition, given the large impact that  
21 weather can have on sales, and especially on peak demands, I reviewed the  
22 historical growth of weather-normalized peak demands and weather-normalized  
23 energy sales. I also reviewed several of the regression equations and key

1 assumptions that underlie the forecasts, and I reviewed growth rates of forecasts  
2 for other adjoining IOUs and forecasts for the SERC Reliability Corporation  
3 (SERC).

4  
5 Q. DO YOU HAVE ANY CONCERNS WITH DUKE'S FORECASTS OF PEAK  
6 DEMAND AND ENERGY SALES?

7 A. No. Duke's 15-year forecasts of its peak demand and total energy sales are  
8 reasonable. After adjusting for Duke's DSM and energy efficiency (EE)  
9 programs, the increases in the peak demand and energy sales growth rates from  
10 those in its 2008 Integrated Resource Plan (IRP) are largely due to the additional  
11 wholesale load associated with Central Electric Power Cooperative, Inc. (Central)  
12 and the additional undesignated wholesale load<sup>1</sup>. Before these wholesale loads,  
13 the growth rate of Duke's summer peak demand from 2010 through 2024 is  
14 1.2%, and the growth rate for total energy sales is 1.1%, which is similar to the  
15 growth rates in Duke's 2008 IRP. The addition of the Central wholesale load and  
16 the undesignated load increases the growth rate of the summer peak demand to  
17 1.8% and the growth rate of its total energy sales to 1.6%.

18  
19 Q. DO YOU HAVE ANY CONCERNS WITH PEC'S FORECASTS OF PEAK  
20 DEMAND AND TOTAL ENERGY SALES?

21 A. No. PEC's 15-year forecasts of its peak demand and total energy sales are  
22 reasonable. After adjusting for PEC's DSM and EE programs, the increases in

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<sup>1</sup> At this time, the Public Staff is continuing to review Duke's undesignated wholesale loads and is in discussions with Duke. Supplemental testimony may be necessary to address this issue.

1 the peak demand and energy sales growth rates from its 2008 IRP are largely  
2 due to the additional wholesale load associated with North Carolina Electric  
3 Membership Corporation (NCEMC). Before these wholesale loads, the growth  
4 rate of PEC's summer peak demand from 2010 through 2024 is 1.0%, and the  
5 growth rate for total energy sales is 1.3%, which is similar to the growth rates in  
6 PEC's 2008 IRP. The addition of the NCEMC load increases the growth rate of  
7 the summer peak demand to 1.6% and the growth rate of its total energy sales to  
8 1.4%.

9  
10 Q. DO YOU HAVE ANY CONCERNS WITH DNCP's FORECASTS OF PEAK  
11 DEMAND AND TOTAL ENERGY SALES?

12 No. DNCP's 15-year forecasts of its peak demand and total energy sales are  
13 reasonable. After adjusting for DNCP's DSM and EE programs, the growth rate  
14 of DNCP's summer peak demand from 2010 through 2024 is 2.0%, and the  
15 growth rate for total energy sales is 2.2%. The increases in these growth rates in  
16 peak demand and total energy sales as compared to DNCP's 2008 IRP are due,  
17 partially, to above average economic growth in Virginia, particularly in the  
18 government and housing sectors of the economy.

19  
20 Q. WHAT PREDICTED GROWTH RATES FOR OTHER UTILITIES DID YOU  
21 REVIEW?

1 A. I examined the 2009 IRP<sup>2</sup> filed by South Carolina Electric and Gas Company  
2 (SCE&G). After adjusting for the effects of its DSM programs, SCE&G predicts a  
3 2.0% long-term growth rate in its peak demand and a 1.7% long-term growth rate  
4 in its energy sales. I also examined the July 2009 Informational Summary  
5 published by SERC<sup>3</sup>. SERC projects a 1.8% long-term growth rate in the peak  
6 demand and a 1.7% long-term growth rate in energy sales for the region.  
7

8 Q. PLEASE DESCRIBE YOUR REVIEW OF THE ASSUMPTIONS USED IN THE  
9 FORECASTS AND WHAT YOUR REVIEW INDICATED.

10 A. I reviewed Duke's, PEC's, and DNCP's projections of population and personal  
11 income. Long-term forecasts of population and various measures of economic  
12 activity typically have the largest influence on the forecasts of peak demands and  
13 energy sales. I compared the forecasts used by Duke, PEC, and DNCP with  
14 forecasts of population and personal income for North Carolina by Global Insight,  
15 Inc., a nationally recognized provider of long-range forecasts. The comparison of  
16 the forecasts indicated that the IOUs' assumptions regarding population and  
17 personal income were reasonable.  
18

19 Q. PLEASE DESCRIBE YOUR REVIEW OF THE ACCURACY OF THE IOUs'  
20 FORECASTS AND WHAT YOUR REVIEW INDICATED.

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<sup>2</sup> Public Service Commission of South Carolina, Docket No. 2009-9-E, filed February 27, 2009.

<sup>3</sup> <http://www.serc1.org/Application/HomePageView.aspx>

1 A. My review of the IOUs' forecast accuracy entailed comparing the forecasts from  
2 the 2004<sup>4</sup> Annual Reports with actual loads. For the comparison, I examined the  
3 forecast error<sup>5</sup> between the predicted load and the actual load and the forecast  
4 error between the predicted load and the weather-normalized actual load. The  
5 analysis indicated that the 2004 peak and energy forecasts by Duke, PEC, and  
6 DNCP had less than a five percent forecast error.

7  
8 Q. WHAT DID YOU CONCLUDE FROM YOUR REVIEW OF THE FORECASTS BY  
9 DUKE, PEC, AND DNCP?

10 A. Based on my review of Duke's, PEC's, and DNCP's forecasts, I believe the  
11 forecasts are valid and reasonable for planning purposes.

12  
13 Q. DID YOU REVIEW THE INPUTS USED IN THE IOUS' PRODUCTION COST  
14 SIMULATION MODELS TO OPTIMIZE THE SUPPLY-SIDE AND DEMAND-SIDE  
15 RESOURCES TO DETERMINE EXPANSION PLANS THAT OFFER RELIABLE  
16 POWER AT LEAST COST?

17 A. Yes. In addition to the peak load and energy sales forecasts, I reviewed many of  
18 the inputs used in the IOUs' models. The models integrate data on the operating  
19 characteristics of existing generation units, such as heat rates and operating and  
20 maintenance (O&M) expenses, projected capital costs of new generation and  
21 their projected operating characteristics, discount rates and escalation rates, fuel  
22 price forecasts, projected impacts of each IOU's DSM and EE programs, and

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<sup>4</sup> The 2004 forecasts were filed in Docket No. E-100, Sub 102.

<sup>5</sup> The Mean Absolute Error is used to calculate the forecast error.

1 reserve margin assumptions. These models create combinations of resource  
2 alternatives to find the least cost mix of resources under simulated conditions.  
3 After various plans have been developed, the IOUs conduct sensitivity analyses  
4 to determine the base or preferred plan that is considered least cost.

5  
6 Q. DO YOU HAVE ANY CONCERNS WITH THE INPUTS USED IN THE IOUS'  
7 PRODUCTION COST SIMULATION MODELS?

8 A. I do not have any concerns with the IOUs' inputs relating to the operating  
9 characteristics of their existing generation units, projected capital costs, fuel price  
10 forecasts, and discount rates. The assumptions used in the models are  
11 comparable to the inputs that were incorporated in the IOUs' 2008 IRPs in  
12 Docket No. E-100, Sub 118 and in the 2008 avoided cost proceeding in Docket  
13 No. E-100, Sub 117. Furthermore, I believe that the expansion plans set forth by  
14 the IOUs are reasonable for purposes of this proceeding, subject to the ongoing  
15 discussions with Duke regarding undesignated load noted earlier in my  
16 testimony.

17  
18 Q. PLEASE DISCUSS HOW EE AND DSM ARE INCORPORATED IN THE  
19 PRODUCTION COST SIMULATION MODELS.

20 A. All three IOUs have reduced their forecasted peak loads and energy sales by the  
21 impacts of their DSM programs and EE programs. With respect to DSM, the  
22 production simulation models used by the IOUs incorporate controls that allow  
23 them to set the available run hours and the incremental cost rate for each

1 program. In general, a low number of available run hours and a high cost rate  
2 relative to other supply-side resources tend to limit the activation of load control  
3 to emergency or "near" emergency situations.

4  
5 Q. WOULD AN INCREASE IN THE NUMBER OF PROJECTED ACTIVATIONS OF  
6 LOAD CONTROL RESULT IN DEFERRING OR ELIMINATING AN ADDITIONAL  
7 COMBUSTION TURBINE OR COMBINED CYCLE FACILITY IN THE IOUS'  
8 EXPANSION PLANS?

9 A. No. As I previously noted, the models reflect the peak load reductions attributed  
10 to the DSM programs; thus, increasing the activations of these programs should  
11 *not have a material effect on the IOUs' generation expansion plans.*

12  
13 Q. IF AN INCREASED LEVEL OF DSM ACTIVATIONS DOES NOT DEFER OR  
14 ELIMINATE NEW PLANTS, THEN WHY IS DSM MODELING IMPORTANT?

15 A. If the IOUs perceive the DSM programs as only having value during times of  
16 near-emergency conditions, then the full value of DSM programs will not be  
17 realized. A/C cycling programs are being used by the IOUs primarily as a  
18 capacity resource; however, utilization of these programs during other peak and  
19 near-peak periods should assist the IOUs, not only in reducing their annual peak  
20 loads as planned, but also in achieving added fuel savings during other near-  
21 peak or forced outage events.



1 My review of Duke's and PEC's lambdas,<sup>6</sup> and the Locational Marginal Prices<sup>7</sup>  
2 (LMPs) in the Dominion zone for PJM, from 2006 through 2009 indicates that  
3 there were numerous hours where the marginal cost of energy was very high,  
4 thus suggesting that, in the future, the IOUs may have opportunities to activate  
5 these DSM programs to achieve cost savings for consumers. Other reasons for  
6 planning for activation of these resources under other than emergency conditions  
7 are to gain operational experience, test the program infrastructure, and assess  
8 customer response to more frequent power curtailments, thus assisting the IOUs  
9 in refining future programs operations.

10  
11 Q. WHAT IS YOUR RECOMMENDATION IN THIS REGARD?

12 A. The Public Staff recommends that the IOUs continue to investigate increased  
13 reliance on A/C cycling load control as both a capacity resource and as a way of  
14 lowering fuel costs. If DSM resources are not utilized optimally, consumers may  
15 pay higher fuel costs than necessary, and the full value of these resources will  
16 not be realized.

17  
18 Q. DOES THIS COMPLETE YOUR TESTIMONY?

19 A. Yes.

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<sup>6</sup> Lambdas represent the variable energy cost associated with the next generation unit dispatched to serve the load.

<sup>7</sup> LMPs represent the variable energy cost of generation for the next unit dispatched to serve the load measured at various points in the Dominion Zone of PJM.

## QUALIFICATIONS AND EXPERIENCE

### JOHN ROBERT HINTON

I received a Bachelor of Science degree in Economics from the University of North Carolina at Wilmington in 1980 and a Master of Economics degree from North Carolina State University in 1983. Since joining the Public Staff in May of 1985, I have filed testimony on the long-range electrical forecast in Docket No. E-100, Sub 50. In 1986, 1989 and 1992, I developed the long range forecasts of peak demand for electricity in North Carolina. I filed testimony on electricity weather normalization in Docket No. E-7, Sub 620 and Docket No. E-2, Sub 833. I have reviewed numerous peak demand and energy sales forecasts filed in utilities' Annual Plans.

I have filed testimony on the avoided cost of electricity in Docket No. E-100, Sub 106 and in Docket No. E-2, Sub 948.

*I have filed testimony on the issuance of certificates of public convenience and necessity in Docket No. E-2, Sub 669; Docket No. SP-132, Sub 0; Docket No. E-7, Sub 790; and Docket No. E-7, Sub 791.*

I have filed testimony on the issue of fair rate of return in Docket No. E-22, Sub 333; Docket No. E-22, Sub 412; Docket No. P-26, Sub 93; Docket No. P-12, Sub 89; Docket No. G-21, Sub 293; Docket No. P-31, Sub 125; Docket No. G-5, Sub 327; Docket No. G-5, Sub 386; Docket No. G-9, Sub 351; Docket No. P-100, Sub 133b; Docket No. P-100, Sub 133d (1997 and 2002); Docket No. W-778, Sub 31; and in several water utility rate cases.

I have filed testimony on the expansion of natural gas in Docket No. G-5, Sub 337 and Docket No. G-5, Sub 372. I performed the financial analysis in the two audit reports on Mid South Water Systems, Inc., which were filed in Docket No. W-100, Sub 21. I have filed testimony on weather normalization of water sales in Docket No. W-274, Sub 160.

With regard to the 1996 Safe Drinking Water Act, I was a member of the Small Systems Working Group that reported to the National Drinking Water Advisory Council of the U.S. Environmental Protection Agency (EPA). Since my involvement with the EPA, I have published an article in the National Regulatory Research Institute's (NRRI's) Quarterly Bulletin entitled Evaluating Water Utility Financial Capacity.