STATE OF NORTH CAROLINA
UTILITIES COMMISSION
DOCKET NO. E-100, SUB 118
DOCKET NO. E-100, SUB 124

In the Matter of	)	
	)	
Investigation of Integrated Resource Planning in North Carolina - 2008	)	PREFILED TESTIMONY OF JOHN O. BLACKBURN ON BEHALF OF NCWARN (as corrected 3/16/10)
	)	
In the Matter of	)	
	)	
Investigation of Integrated Resource Planning in North Carolina - 2009	)	

Q. PLEASE STATE YOUR NAME, ADDRESS AND POSITION.

A. My name is John O. Blackburn. My address is 47 Forest at Duke Drive, Durham, North Carolina. I am Professor Emeritus of Economics, Duke University.

Q. WHAT ARE YOUR QUALIFICATIONS?

A. I hold the PhD Degree in Economics from the University of Florida. I have conducted research into energy efficiency and renewable energy over a period of twenty years. I have written two books on the subject as well as numerous articles. I have served on the Advisory Boards of the Florida Solar Energy Center and the Biomass Research Program at the University of Florida. A further summary of my qualifications is attached to this prefiled testimony as Exhibit 1.

In the past year I have prepared a report, *North Carolina's Energy Future: Data*

Shows We Can Close Power Plants Instead of Building New Ones, March 31, 2009, which was attached to NC WARN's comments in Docket E-100, Sub 118, and a supplement to that report, *North Carolina's Energy Future 2010: Phasing Out the Generation of Electricity by Coal*, February 19, 2010. Exhibits 2 and 3. Most recently I am publishing an analysis of wind and solar energy in North Carolina, "Matching Utility Load with Solar and Wind Power in North Carolina: Dealing with Intermittent Electricity Sources."

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My purpose is to address the Integrated Resources Plans (IRPs) of Progress Energy and Duke Energy filed for 2008 and 2009 in Dockets E-100, Sub 118 and Sub 124, including the revision by Duke Energy filed in January 2010.

Q. HOW WILL YOU PROCEED?

A. I will present my analysis of the IRPs and the findings in my reports and show that substantially all coal plants can be phased out in over the IRP planning horizon, even using the ambitious growth projections for both Progress Energy and Duke Energy. I will discuss the basis for my assumptions that with energy efficiency, renewable energy and customer cogeneration, coal plants can be phased out without the need for new nuclear generation. In the 2010 report, Exhibit 3, the analysis is of output to better reflect the Renewable Energy and Energy Efficiency Portfolio Standard (REPS) in Senate Bill 3. Additionally, solar energy sources have a relatively low capacity factor, although are important in meeting generation.

Q. WHY DO YOU THINK THAT THE GROWTH PROJECTIONS OF DUKE ENERGY AND PROGRESS ENERGY MAY BE OVERSTATED?

A. The expected increases in electricity demand are already lower than those typical of utilities in the 1990's and in the earlier years of this decade, but still show projected annual increases of 1.5 - 1.8% range. The forecasts are based in large part on expected population growth, with very small further increases in per-capita electricity use. Nonetheless, increases at modest rates show considerable increases when they are maintained over periods of 15-20 years. Duke Energy projects an increase in kilowatt hours generated of 43% by 2029 and Progress Energy 24% by 2024. The utilities' IRP forecasts of generation and sales in coming years are summarized in Exhibit 3 -- Table 1 for Duke Energy and Table 2 for Progress Energy. Duke's figures are for the period 2010-2029, while Progress' figures are for the shorter period 2010-2024.

I believe that electricity demand is likely to grow more slowly than the two utilities project, since carrying out the construction programs in the IRP filings will necessarily raise rates to customers. I invite the Commission to review Duke Energy's recent estimate of NC retail sales in its rate increase filing, Docket E-7, Sub 909, showing ***flat sales for the 2009 - 2014 period.*** Exhibit 4. This is apparently without any effects of the present recession.

Although I believe projected demands for electricity to be overstated, I use the IRP figures as the starting point for our analysis, though I make a deduction for new wholesale sales which do not appear to be necessary or in the interests of existing

customers. An example of this is the recent wholesale sales contract between Duke Energy and the South Carolina cooperatives that requires a capacity of 1500 MW, i.e., more plants that the NC customers will to pay for.

It is important to note that if demand does not increase at the utilities' optimistic levels, the phase out of coal plants will occur even more rapidly.

Q. IN THE IRPs, WHAT NEW GENERATING PLANTS ARE PROJECTED?

A. Each utility plans to add more natural gas generation for peak, shoulder and even baseload periods. Combined cycle gas plants can be put on line faster and in smaller increments than coal or nuclear plants. Each of the utilities plans to add two large nuclear plants to their generation facilities in the planning period although operational dates for the Progress Energy's Harris and Duke Energy's Lee plants have been delayed.

What is important to note that no other coal plants are being proposed. In the IRPs and other recent filings at the Utilities Commission, each utility has announced plans to close many of its smaller coal plants. Duke Energy has listed 18 plants in the 38 - 170 MW range that it expects to close by 2020; Progress Energy has listed 12 plants that it will close or convert to natural gas.

Q. IN YOU OPINION, CAN SUBSTANTIALLY ALL OF THE COAL PLANTS BE PHASED OUT?

A. Yes, the core features of the coal phase out plan are aggressive programs to increase energy efficiency at customer locations and a renewable energy build-up to

20% of total sales, including both retail and wholesale sales in North Carolina. I also recommend the development of substantial cogeneration (combined heat and power) facilities for commercial and industrial customers who use both heat and electricity in their facilities. Although the analysis assumes the completion of the one new coal plant still under construction by Duke Energy, Cliffside 6, it also shows that this plant is not needed and should not be built.

Q. WHAT IS THE BASIS FOR RECOMMENDING AN ENERGY EFFICIENCY GOAL OF 1.5% ANNUALLY?

A. The efficiency gain calculations in Exhibit 3, Tables 3 and 4, are based on gains of 1.5% annually, cumulated over the planning period. This is in line with many national and state studies; the most recent report from the National Academy of Sciences, affirms that, by 2030 savings of 25-31% can be accomplished. A representative from the American Council for an Energy-Efficient Economy (ACEEE), in a recent presentation to the NC Energy Policy Council, recommended a statewide efficiency standard with annual gains reaching 1.5% in 2016, rising to 2% by 2020.

These gains are reasonable as steady increases of 1% or more have been achieved in states all over the country. In North Carolina, state government buildings are now required to reduce energy consumption by 30% by 2015, a cumulative reduction of more than 2.5% annually. California utilities have worked on efficiency programs steadily since the late 1970's, and have reduced, or prevented the growth of, electricity demand at the 1.5% rate. Wisconsin is now planning annual cumulated gains of 2%, and a similar rate has been proposed in Maryland's energy planning.

Duke Energy has accepted the principle of a 1% annual gain in its Save-a-Watt program, but starting in 2012 after a lengthy ramp up process. I think that it is time to exploit energy efficiency in earnest and do so system-wide -- not because it is the law, but because it is the cheapest of all the alternatives. As indicated above, I have used an efficiency gain figure of 1.5% per year, cumulated. This level is both doable and cost-effective.

Q. WHAT IS THE BASIS FOR RECOMMENDING A RAPID DEVELOPMENT OF RENEWABLE ENERGY?

A. The amounts for new renewables – 16.7 billion kWh for Duke Energy in 2025 and 10 billion kWh for Progress Energy in 2024 – go well beyond present REPS requirement of 12.5%. Our proposed 20% goal would recognize existing renewable facilities, mostly hydroelectric, whereas the 12.5% figure does not. Meeting the 20% level would require some [26] billion kWh of new renewable generation in addition to the 5 billion kWh now generated.

The development of wind generation in NC would be necessary, as well as meeting the REPS requirement for biomass sources, along with new and small hydroelectric facilities. Falling prices for solar PV equipment make it possible to contemplate several thousand megawatts of solar installations. Large installations are now going into service at costs below $4 per watt before incentives. The key to pushing down costs even further is enlarging the market, opening opportunities for numerous installers, and creating competition, especially for residential installations.

Seventeen states now have renewable portfolio standards of 20% or more, with

terminal dates of 2020 or 2025. Many of these have been raised from lower initial targets as the utilities in those states gain experience.

Q. WHAT IS THE BASIS FOR RECOMMENDING ADDITIONAL CUSTOMER GENERATED COGENERATION?

A. North Carolina already has about 1500 MW of combined heat and power (CHP) facilities, all but one in industrial settings. These facilities, at most, contribute 7 or 8 billion kWh, around 5% of North Carolina's electricity.

The Oak Ridge National Laboratory has explored the implications of raising this figure to 20% nationally, a level which is both technically and economically feasible. There would be many benefits in addition to relatively cheap electricity, such as increased efficiency in the use of natural gas, diminished water use and reduced air pollution. Their studies show more than 3,000 MW of potential cogeneration in both North and South Carolina. Our proposal would raise this figure in North and South Carolina to about 16 -17% of power generation.

In North Carolina, there are commercial opportunities as well, of which only one relatively large unit, UNC Chapel Hill, has been developed. These facilities, at most, contribute 7 - 8 billion kWh, around 5% of North Carolina's electricity. The larger prospects are the University campuses of the State systems, and private institutions such as Wake Forest and Duke University. Clemson and Bob Jones universities in South Carolina already have these systems. CHP is also well-suited to hospitals with year-round loads for electricity, hot water and steam, which may also be used to run air-conditioning systems. Food Lion has installed CHP systems in at least five of its

grocery stores.

Q. DOES THE PHASE OUT OF COAL PLANTS DEPEND ON THE CONSTRUCTION OF NEW NUCLEAR PLANTS?

A. Not at all. Our proposals amount to asking the utilities to forego further nuclear construction except for the uprates now scheduled. The power generated by new nuclear plants is not needed, and the $40 billion which might be spent on four new nuclear reactors surely has better uses.

Q. WHAT ARE THE COST CONSIDERATIONS FOR THE PHASE OUT OF COAL PLANTS?

A. Our plan to phase out coal plants entails additional costs for a much larger energy efficiency program, although the average cost of energy efficiency is approximately 4 - 5 cents per kWh saved for the aggressive program that I have proposed. We need to encourage renewable energy, and especially solar and wind, as the average costs of renewables are approximately 9 -10 cents per kWh generated, with solar photovoltaics (PV) as high as 18 cents per kWh. We need to encourage customer cogeneration as its average costs are approximately 6 - 7 cents per kWh. We are spared the 13 -18 cents per kWh costs of nuclear electricity and the avoidance of yet more nuclear waste. Without the coal plants, we will not have to bear the economic, environmental [and] health costs of generating coal-based electricity.

The bottom line is an estimated annual savings for electricity customers in NC of $1.5 billion - $2 billion, a healthier place to live and doing our share in the fight

against global warming.

Q. WHAT IS YOUR OVERALL CONCLUSION?

A. Even given the ambitious growth forecasts of Duke Energy and Progress Energy, all of their coal plants can be phased out over the planning horizon in the IRPs through energy efficiency, renewable energy and customer cogeneration.

Thank you for the opportunity to testify.