Santee Cooper
Baseload Generation Comments to the PURC Energy Advisory Committee

Baseload generation has been described by the PURC as generation that typically has a capacity factor of 60 percent and above.

Baseload generation is considered highly reliable energy used to supply the constant electricity demand put on an electric system by customers and may also follow fluctuations associated with customer demands.

For high load factor systems such as Santee Cooper's, baseload generation (nuclear, coal, natural gas) has generally been the method of supplying customer's needs due to the economies of scale associated with construction costs and relatively low fuel costs. As a result, South Carolina customers have lower than average electricity rates when compared to other parts of the country.

Santee Cooper currently expects new biomass and nuclear to be additional energy sources to supply its baseload generation needs.

South Carolina has recently passed several laws that promote nuclear baseload generation:

- Act 161 of 2010 modified the state's economic development laws to provide targeted fee in lieu of property tax incentives for new nuclear generation.
- Act 281 of 2006 allowed Santee Cooper to participate with multiple joint owners in new nuclear generation in South Carolina
- Act 19 of 2009 established that the State's Energy Plan should promote nuclear energy as a carbon-free, nongreenhouse gas emitting form of energy.

South Carolina should not adopt restrictive policies that lead to higher costs and/or reduced reliability for baseload generation as has been done in other parts of the country

Public policy can affect the cost of baseload generation and careful attention needs to be paid to whether such policies at the State and Federal level affect the cost of South Carolina's current and future baseload generation mix.

To:	Members of the PURC Energy Advisory Council
From:	Dennis Boyd, Electrical Power Engineer – Nucor Steel Berkeley
Date:	October 26, 2010
Re:	Preliminary Comments on Issues Pertaining to Conventional Baseload Generation

While promising new renewable and non-traditional generation technologies should continue to be explored and developed when it is cost-effective to do so, conventional baseload generation will be a vital part of the resource mix in South Carolina for the forseeable future. Conventional baseload power plants continue to be necessary in order to provide reliable, dispatchable, and competitively-priced power to South Carolina consumers.

Utilities should continue to evaluate the need for new baseload generation, and should build such generation when necessary. New baseload generation will likely be needed in South Carolina in the future to address load growth and to replace older units as they are retired. Building cost-effective new baseload units will also help control fuel costs, since fuel costs for baseload plants such as coal and nuclear tend to be lower and less volatile than for other types of generation.

In their planning processes, utilities should continue to look at the most cost-effective mix of baseload, intermediate, and peaking generation. Utilities should plan for a diverse portfolio of baseload resources, in order to reduce fuel price risk exposure resulting from over-reliance on one type of fuel. Utilities should also be encouraged to evaluate new, cost-effective nuclear generation when they are considering options for new baseload generation.

Costs associated with new baseload plants should be allocated among customer classes, and recovered from customers through rates, in a manner consistent with the recovery of the fixed costs of existing power plants in South Carolina today. The Base Load Review Act codified the long-established practice in South Carolina of allocating the cost of baseload plants based on the customer class contribution to the system firm peak demand, in recognition of the fact that generation plants are generally built and sized to meet the firm system coincident peak demand. South Carolina should use this time-tested approach in allocating and recovering in the rates the fixed costs of new baseload plants.

DUKE ENERGY CAROLINAS, LLC
COMMENTS TO THE PURC ENERGY ADVISORY COUNCIL

BASELOAD GENERATION OBSERVATIONS

Duke Energy Carolinas' generation resource needs increase significantly over the Company's 20-year planning horizon. Cliffside Unit 6 and the Buck and Dan River natural gas combined cycle units, along with EE and DSM programs, will fulfill these needs through 2016. Even if the Company fully realizes its goals for EE and DSM, the resource need grows to approximately 6000 MWs by 2030.

The 2010 Duke Energy Carolinas IRP outlines the Company's options and plan for meeting the Company's projected long-term needs. The factors that influence resource needs are:

- Future load growth projections;
- The amount of EE and DSM that can be achieved;
- Reduction of available capacity and energy resources, for example, due to unit retirements and expiration of purchased power agreements (PPA); and
- A 17 percent target planning reserve margin over the 20-year horizon.

The analysis of new nuclear capacity contained in the 2010 Duke Energy Carolinas IRP focuses on the impact of various uncertainties such as load variations, nuclear capital costs, greenhouse gas legislation, EPA regulations, fuel prices, and the availability of financing options such as federal loan guarantees. The analysis continues to affirm the potential benefits of new greenhouse gas emission-free nuclear capacity in the 2020 timeframe under a carbon-constrained future. The Company continues to support the Nuclear Regulatory Commission's (NRC's) evaluation of a Combined Construction and Operation License (COL) for the proposed Lee Nuclear Station in Cherokee County.

Both DSM and EE programs play important roles in the Company's development of a balanced, cost-effective portfolio.

In light of these analyses, as well as the public policy debate on energy and environmental issues, Duke Energy Carolinas has developed a sustainable strategy to ensure that the Company can meet customers' energy needs reliably and economically over the near and long term. Duke Energy Carolinas' strategic action plan for long-term resources maintains prudent flexibility in the face of these dynamics.

The Company's accomplishments in the past year and actions to be taken in the next year are summarized below:

- Continue to evaluate the probability, timing and impact of retirement of the 890 MWs of unscrubbed coal in the 2015 timeframe.
- Continue to execute the Company's EE plan which includes a portfolio of DSM and EE programs, and continue on-going collaborative work to develop and implement additional cost-effective EE and DSM products and services.
- Continue construction of the 825 MW Cliffside Unit 6, with the objective of bringing this additional capacity on line by 2012 at the existing Cliffside Steam Station.
- Move forward with the construction of new combined-cycle/peaking generation.
- Continue to investigate the potential switch of fuel from coal to natural gas at the 370 MW Lee Steam Station.
- Continue to pursue the option for new nuclear generating capacity in the 2020 timeframe.
  - The Company filed an application with the NRC for a COL in December 2007. The Company plans to continue to support the NRC evaluation of its COL.
  - The Company continues to pursue project development and appropriate recovery and to evaluate the optimal time to file the Certificate of Public Convenience and Necessity (CPCN) in SC.
  - The Company will continue to pursue available federal, state and local tax incentives and favorable financing options at the federal and state level.
  - The Company will continue to assess opportunities to benefit from economies of scale and risk reduction in new resource decisions by considering the prospects for joint ownership.
- Continue to evaluate market options for traditional and renewable generation and enter into contracts as appropriate.
  - Purchased Power Agreements (PPAs) have been signed with developers of solar photovoltaic (PV), landfill gas, and thermal resources. Additionally, renewable energy certificate purchase agreements have been executed.
  - Duke Energy Carolina's Distributed Generation Solar PV program is underway with a goal to install 10 MW Direct Current of PV generation that will be sited on customers' property.
- Continue to pursue wholesale power sales agreements within the Duke Energy Balancing Authority Area.

October 26, 2010

Progress Energy Carolinas, Inc.'s Initial Comments to the PURC EAC Regarding Baseload Generation

Progress Energy Carolinas, Inc. (PEC) has a diverse mix of generating plants and purchase power arrangements to reliably and economically meet its customers' demands for power. The generation mix includes baseload, intermediate and peaking resources. The baseload resources are designed to meet the constant electricity needs of customers at the lowest cost. Baseload resources have the ability to operate around the clock for extended periods of time. These units generally have a higher up-front capital cost, when compared to some other alternatives, but a lower operating cost. The amount of baseload generation in the resource mix is matched to the aggregate constant load of PEC's customers, to maximize the overall cost-effectiveness of this type generation. Historically, baseload generation in the Carolinas has been mostly large coal-fired or nuclear units.

Advances in technology coupled with a decline in natural gas prices have made combined cycle natural gas fired generation a viable option for at least part of PEC's future baseload needs. Newer gas-fired combined cycle plants can economically operate at higher capacity factors than traditional gas-fired units, and these "intermediate" units can operate at capacity factors that overlap the traditional "baseload" designation. In fact, the distinction between intermediate and baseload plants has become blurred.

The most cost-effective mix of future generation will be impacted by PEC's load duration curve (which indicate the percentage of time a certain level of electricity is consumed by PEC's customers), the current generation mix, and the operating characteristics of the available options. Sophisticated utility planning models are used to determine the least-cost mix of resources and the type of new generation needed.

PEC has not added a new coal-fired or nuclear plant to its generating fleet since 1987. PEC's generating unit additions in recent years have been either natural gas-fired combined cycle units or simple-cycle combustion turbine units. This trend continues in PEC's current resource plan.

PEC's 2010 Integrated Resource Plan (IRP) includes the addition of approximately 2,180 MW of new combined cycle generating units by the end of 2013. However, approximately 1,500 MW of this new combined cycle capacity will replace small coal-fired units that are being retired.
In addition to the units to be placed in service by the end of 2013, PEC's latest fifteen year resource plan also includes the addition of an additional 606 MW of combined cycle capacity in 2022 and 275 MW of baseload capacity in 2020 and 275 MW in 2021. The plan also includes several peaking units.

The baseload units included in the plan in 2020 and 2021 are assumed, for long range planning purposes, to be shares of nuclear units that may be available in the region. However, at this time no specific plans for such arrangements have been made, and the potential nuclear partnership simply represents undesignated baseload generation for long-range planning purposes.

All the capacity included in the resource plan after 2013 is termed "undesignated". That means no decisions have been made regarding the fuel-type, location, size or schedule, all of which is subject to additional review and study before a final decision is made.

Consideration of PEC's load duration curve, existing and planned resource mix and future options are very important when considering various resources, including potential renewable sources. Some renewable resource options, such as wind and solar, do not match well with baseload needs, and would have to be supplemented with additional intermediate or peaking capacity to ensure PEC's ability to reliably meet customer loads. Current cost forecasts indicate that such a mix will not produce the least-cost resource plan.

ELECTRIC COOPERATIVES OF SOUTH CAROLINA

Conventional Baseload Generation Policy Suggestions
Submitted to the State Regulation of Public Utilities Review Committee
October 26, 2010

The Electric Cooperatives of South Carolina submit the following proposal regarding baseload generation:

> South Carolina should adopt policies that encourage the collaborative and incremental building of conventional baseload generation by the state's electric power providers in order to ensure adequate capacity to meet the future needs of the state.

Initial Comments of
South Carolina Electric and Gas Company
to the PURC EAC concerning Baseload Electric Generation

1. **What kind of electric generator is conventional baseload?**
   a. Traditionally, a baseload unit is a generator running steadily at its maximum capacity. These units are available and operating for most days of the year. In general, baseload generators overcome a relatively high installation cost but have low operating cost to provide low overall energy cost with superior reliability. They are known for low cost, high efficiency, safety, and reliability.
   b. Coal-fired and nuclear-powered electric generation plants are the most common baseload units in the Southeast.
2. **What is the Baseload Review Act of May 2007 and what does it mean?**
   a. The BLRA has codified checks and balances that protect customers and investors during planning, construction, and operation of needed generation. SCE&G and Santee Cooper are building two cost effective nuclear baseload units under the terms of this South Carolina Law.
3. **Why is a baseload generator needed?**
   a. All Load Serving Entities (retail electric providers) must serve demand that changes from moment to moment through the day. Electric demand is normally high during the day and lowest at night.
   b. The lowest load, typically 50% to 85% of the daily peak load, is the "baseload" usage and defines the amount of energy than can be served most efficiently at a constant output level around the clock.
   c. Over 100% of the daily peak demand must be available from generators in short notice at any time of day. Baseload generators provide most of this capacity.
4. **How will Demand Side Management and Energy Efficiency impact baseload?**
   a. In general, DSM/EE will effectively reduce both peak usage and peak demand. That reduces the need for additional peaking generation units which have the highest cost of operation, but not baseload.
5. **How will renewable sources impact baseload?**
   a. Some renewables such as bio-mass or landfill-gas generators can compete directly with traditional baseload generators since their output can be steady throughout the day, and their variable cost of operation is very low. Reliability can also be high if the fuel source is consistent or managed.
   b. As shown by experience, wind-powered and solar-powered generators cannot displace baseload generators without significant risk to grid integrity.
   c. Since solar energy sources produce their maximum electric output shortly after noon each day (1pm), they will displace intermediate and peaking energy sources at that time. Since solar generation is zero at the time of a heating load peak, 7 A.M. and 9 P.M., and low at the time of a cooling load peak, 5 P.M., its capacity contribution to the peak demand period is small. Traditional energy generators are needed to meet the peak demand even with solar generators present.
   d. Although wind may have more energy potential than solar, wind generation output and time of generation is volatile and less predictable than solar. Wind generation during the day would be beneficial, but at night, that additional energy may actually increase production costs and reduce grid integrity.
6. **What is changing the landscape for traditional baseload?**
   a. Few new coal units are being considered due to serious uncertainty for future regulation of emissions, regulation of coal production, and volatile costs.
   b. For at least several years, natural gas may be a viable baseload fuel due to new production and lower prices. Prices could increase quickly, and price spikes in previous years have been damaging to the gas industry, U.S. industry, and electric production costs.
   c. New nuclear units are enjoying a renaissance due to low operating costs, no CO2 or other airborne emissions, and limited risks.

Conservation Voters of South Carolina: Conventional Baseload

With respect to conventional baseload generation, South Carolina relies overwhelmingly on nuclear and coal. As costs for these finite resources rise, South Carolina will need to develop its own "homegrown" energy resources. For environmental and human health grounds, South Carolina's conservation community opposes any new coal plant proposals. Proposals to develop new nuclear generation should examine the following questions:

I. Costs

A. Estimates of the cost of nuclear power have ranged from a low of 8.4 cents per kilowatt-hour (kWh) to a high of 30 cents. The Energy Advisory Council should seek to understand why estimates vary so widely and then achieve consensus on a working number for our own analysis.

B. Typical utility estimates for new nuclear generation tend to focus on "overnight costs," assuming everything in the contract can be delivered in 24 hours without inflation, construction costs or interest. But what are the "all in" costs for a new nuclear plant, and what additional expenses might provide a fuller picture of a plant's total costs, including lifecycle costs and societal costs such as environmental, safety, waste and security concerns?

C. A devastating recession has wiped out trillions of dollars in taxpayer assets, led to record unemployment and put millions of homes into foreclosure. Updating its demand forecasts in 2010, SCE&G offered a "low load scenario" that assumes sharp reductions in demand through 2013 and a gradual recovery by 2020. Most significant is the complete loss of the projected electricity market used to support the case made in 2008 ("Public Need and Necessity") for the two reactors planned for VC Summer. Assuming these plants go forward, who will buy this electricity and at what price? And who will bare the costs if these plants remain idle?

II. Waste and Security

A. With the designation of Yucca Mountain as a final repository for nuclear waste growing more uncertain, South Carolina needs to develop contingency plans for storing and securing its nuclear waste. What recommendations can we make for this contingency?

III. Water

A. 2009 report by the Loan Guarantee Program Office of the Department of Energy specifically mentioned that among the six national applications for loan guarantees, the Duke proposal at Lee is at greatest risk for station interruptions due to drought impacts on the Broad River. As droughts become increasingly common and severe in a warmer climate, what impact will diminishing freshwater resources have for new nuclear generation in South Carolina?