

Santee Cooper

Transmission and Energy Storage Comments to the PURC Energy Advisory Committee

Energy Transmission

- As a vertically integrated utility, it is Santee Cooper's practice to develop its transmission system to ensure firm, reliable service from Santee Cooper resources to native load customers.
- The need for expansion is identified through assessments evaluated against internal criteria as well as NERC Standards. Such assessments based on these deterministic criteria identify the need for future investments.
- Additional planning processes, including idea development and validation along with economic analyses, are then used to propose specific plans.
- Such plans developed to support native load are funded through embedded rates applicable to native load customers.
- Development for uses other than native load customers should be managed through Santee Cooper's Open Access Transmission Tariff (OATT) to ensure costs are properly assigned, and to ensure native load customers are not subsidizing such uses.
- The single greatest issue confronting transmission development is increasing uncertainty.
- While uncertainty has always been an issue when addressing future requirements, in the past such uncertainties were limited in scope and generally associated with load forecast uncertainty.
- Uncertainty associated with regulatory considerations has increased leading to less certainty regarding the availability of existing resources, and the scope and location of future resources. In addition, standards by which systems are required to be developed and operated continue to change and expand. Also, requirements associated with implementing specific plans continue to increase.

Energy Storage

- Energy storage systems, either stand-alone or developed in conjunction with intermittent generation sources, could be used to reduce or defer transmission investment. However, this should only be to the extent that such resources provide a level of reliability comparable to transmission and baseload generation facilities.



PURC Energy Transmission and Storage Comments

10.27.2010

Net Metering

- 2MW system limit
- 5% of annual utility load for net distributed generation limit
- Applicable to all utilities (municipal, investor owned and public) and cooperatives
- All renewable technologies and customer classes should be eligible
- Extra fees and burdensome application processes should be prohibited
- Allowance for carry over of monthly excess generation at full rates

Interconnection Standards

- Fair fees in proportion to project size
- 10 MW minimum system limit
- Reasonable application process timelines and minimized costs
- Standard form agreements
- Standard systems requirements should not include: interconnection fees, insurance requirements, unnecessary interconnection studies

Energy Storage

Because of intermittency issues related to energy generated from wind and solar technologies, energy storage is critical to scaling up the use of these resources in the future. Presently, energy storage is primarily in the research and development phase and large scale, economically viable systems are not available for deployment. SC should develop and maintain a flexible comprehensive energy policy that anticipates potential breakthroughs in energy storage technology which would allow for increased development of the state's renewable energy resources.

Resources

Model Net Metering Rules:

http://irecusa.org/fileadmin/user_upload/ConnectDocs/IREC_NM_Model_October_2009-1.pdf

Model Interconnection Standards:

- IREC: <http://irecusa.org/wp-content/uploads/2010/01/IREC-Interconnection-Procedures-2010final.pdf>

- Institute of Electrical and Electronic Engineers

Clemson Offshore Wind Transmission Study:

<http://www.energy.sc.gov/publications/CUEPRA%20Presentation%2012-11-09.pdf>

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 Transmission and Storage Issues

A strong transmission system is critical to ensure system reliability, and can also provide economic, energy efficiency and environmental benefits. For example, robust transmission can: (i) allow the transfer of capacity and energy from one utility to another on an economic basis when cost-justified; (ii) enable the delivery of renewable energy to end-use customers from sites where such energy can be reasonably produced; and (iii) reduce line losses, thereby reducing costs for customers and making the process of generating and delivering energy more efficient.

Some states allow transmission improvements to count toward meeting energy efficiency, demand response, or advanced energy goals. To the extent South Carolina adopts such goals or targets, it should also consider allowing transmission improvements to count as an eligible resource.

The size and nature of a utility's transmission system is driven primarily by the system coincident firm peak demand, similar to the generation system. As a result, the fixed cost of the transmission system has traditionally been allocated in South Carolina on a retail basis in the same way as the fixed cost of the utility's generation system. This approach is bolstered by the fact that sometimes generation can replace the need for additional transmission, or vice-versa. Transmission cost allocation and recovery in rates should be consistent with the method for allocating and recovering the fixed costs of generation.

Although storage will be an important issue in the energy industry in coming years, particularly with the increased penetration of intermittent renewable generation resources, I have no specific comments on this topic at this time. However, I look forward to hearing from the other members of the Energy Advisory Council on this topic.

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

ENERGY TRANSMISSION OBSERVATIONS

1. **The Duke Energy Carolinas Transmission system is operated at voltages from 44 kV to 525 KV and includes approximately 12,000 circuit miles of transmission lines in both SC and NC.**
2. **Timely recovery of transmission costs is important. To that point, Duke Energy Carolinas is pursuing the filing of a formula transmission rate with FERC.**
3. **NERC reliability standards continue to be an area of focus. Critical Infrastructure Protection/Cyber Security standards are currently receiving a lot of attention at Duke Energy Carolinas and all other transmission entities in the industry.**
4. **The North Carolina Transmission Planning Collaborative (NCTPC) is the means by which Duke Energy Carolinas complies with FERC Order 890 requirements for regional transmission planning.**
 - In December 2007, Duke Energy Carolinas and other transmission service providers filed FERC Order 890 filings to be compliant with FERC requirements for regional transmission planning.
 - The NCTPC is the regional planning process that Duke Energy Carolinas uses to meet the FERC Order 890 requirements for its system in SC and NC.
5. **Duke Energy Carolinas is a participant in the Southeastern Interregional Participation Process (SIRPP).**
 - The SIRPP process provides a means for conducting stakeholder requested Economic Planning Studies across multiple interconnected systems
 - The SIRPP was created by southeastern transmission providers in compliance with Order 890.
6. **The Eastern Interconnection Planning Collaborative (EIPC) is a forum for performing interconnection wide planning studies to inform policy makers and stakeholders on the potential impact of possible future transmission scenarios.**
 - The EIPC was formed in 2009 by Duke Energy Carolinas and other Planning Authorities in the Eastern Interconnection.
 - In late 2009, the US Department of Energy awarded the EIPC a grant of \$16 million to perform work between now and 2012 that will result in three studies of transmission system build-outs needed to support certain resource scenarios as defined by a broad stakeholder process, with significant input from the states.
7. **On July 17, 2010 FERC issued a NOPR regarding possible reforms in the area of transmission planning and cost allocation. Duke Energy Carolinas filed the following comments on September 29, 2010:**
 - FERC should make unambiguous that the tariff reforms ultimately adopted will apply only to regional and inter-regional projects, and that FERC does not intend to expand the planning processes currently used to develop local projects.
 - The elimination of incumbent right-of-first refusal (ROFR) should be limited to regional and inter-regional projects. Incumbent providers should maintain the ROFR for local projects.
 - FERC should clarify that already approved Order 890 regional planning processes such as the NCTPC meet the FERC NOPR requirements for regional transmission planning.
 - FERC should make unambiguous that the public policy aspect of regional and inter-regional planning refers only to those transmission projects driven by the need to comply with state and/or federal laws, rules and/or regulations.
 - FERC needs to address the cost-allocation issue. Duke Energy Carolinas supports flexibility in the development of regional and inter-regional cost allocation methodologies that reflect the widespread benefits of Extra High Voltage transmission.

**Progress Energy Carolinas, Inc.'s Initial Comments to the PURC EAC
Regarding Transmission**

The Progress Energy Carolinas, Inc. (PEC) transmission system consists of approximately 6,000 miles transmission lines and just over 100 transmission-class switching stations in its North and South Carolina service areas. PEC has transmission interconnections with neighboring utilities including Duke Energy Carolinas, South Carolina Electric & Gas Company, South Carolina Public Service Authority, TVA and PJM. The primary purpose of this transmission system is to provide the electrical path necessary to accommodate the transfer of bulk power as required to ensure safe, reliable, and economic service to Progress Energy customers.

Transmission Planning

Transmission planning typically takes into consideration a 10-year planning period. Required engineering, scheduling, and construction lead times can be satisfactorily accommodated within this planning period. Planning is based on PEC's long-range system peak load forecast, which includes all territorial load and contractual obligations; PEC's resource plan; and local area forecasts for retail and wholesale loads.

The PEC transmission system is planned to comply with the North American Electric Reliability Council (NERC) Reliability Standards. Compliance with the NERC Reliability Standards is mandatory and is enforced by the NERC Regions. PEC's service area is within the SERC Reliability Corporation (SERC) NERC Region. Alternative solutions to any identified system deficiencies are compared to identify the most cost effective alternative.

Planning studies are performed to assess and test the strength and limits of the PEC transmission system to meet its load responsibility and to move bulk power between and among other electrical systems. PEC studies the system impact and facilities requirements of all transmission service requests pursuant to its established procedures.

Transmission planning requires steady-state power flow simulations based on detailed system models. Studies of the transmission system response to disturbances are also required to ensure reliability. PEC participates with neighboring companies in developing and maintaining accurate models of the eastern interconnection. These models include the specific electrical characteristics of transmission equipment such as lines, transformers, relaying equipment, and generators.

The transmission planning process and the generation resource planning process are interrelated. The location and availability of generation additions has significant impacts on the adequacy of the transmission system. Generation additions within the PEC system may help or hinder transmission loading. By planning for both generation needs and transmission needs, PEC is able to minimize costs while maintaining good performance. PEC will interconnect new

generating facilities to the transmission system and will accommodate increases in the generating capacity of existing generation pursuant to its established interconnection procedures.

PEC coordinates its transmission planning and operations with neighboring systems to assure the safety, reliability, and economy of its power system. Coordinated near-term operating studies and longer-range planning studies are made on a regular basis to ensure that transmission capacity will continue to be adequate. These studies involve representatives from the Virginia-Carolinas Subregion (VACAR), which includes North Carolina and South Carolina, and adjacent subregions and regions to provide interregional coordination.

The transmission system is planned to ensure that no equipment overloads and adequate voltage is maintained to provide reliable service.

PEC participates in several inter-regional and intra-regional planning groups, including the NCTPC (NC Transmission Planning Collaborative), the Carolinas Transmission Planning Coordination Arrangement the SIRPP (Southeastern Inter-regional Participation Process) and the EIPC (Eastern Interconnection Planning Collaborative) inter-regional efforts.

Transmission Access – Federal Regulation

The FERC requires public utilities to provide open access to the transmission system through a non-discriminatory Open Access Transmission Tariff (OATT), which must be approved by FERC. The FERC has also established rules governing the Open Access Same-time Information System (OASIS), which is the process for making transmission use reservations, and prescribing standards of conduct related to transmission access.

Transmission Siting – State Regulation

The siting and construction of major transmission lines in South Carolina requires Public Service Commission certification pursuant to the Utility Facility Siting and Environmental Protection Act (SC Code 58-33-10 *et seq.*).

ELECTRIC COOPERATIVES OF SOUTH CAROLINA

**Transmission and Storage Policy Suggestions
Submitted to the State Regulation of Public Utilities Review Committee
October 26, 2010**

The Electric Cooperatives submit the following proposals regarding transmission and storage:

1. New options for energy storage will be critical to the future viability of clean energy sources, such as solar, hydro, and wind power. The Public Service Commission should be specifically authorized to encourage investor owned utilities to invest in research and development of new and cost effective energy storage options by providing appropriate incentives and cost recovery.
2. South Carolina should provide matching funds for academic research on energy efficiency and energy storage technology at the state's research universities. A review board appointed by the PURC should oversee the program, making merit based funding decisions, and establishing research priorities.

**Initial Comments of
South Carolina Electric & Gas Company
to the PURC EAC concerning Energy Delivery and Storage**

SCE&G has designed its energy delivery system to be stable and robust so as to provide reliable power to its customers. Substations, transformers and capacitor banks are strategically placed on the system to maintain voltage within tight specifications. Generators are strategically placed to provide power with a minimal amount of transmission losses and to follow load minute by minute so that our customers have the energy they need and the frequency of the power is maintained very close to 60-cycles per second.

The system is primarily designed to provide transmission service to SCE&G's native load customers as opposed to being designed to move large amounts of power across the system or to participate in the large power market. The general design of the system has always been to move large amounts of power away from centrally located power plants and to disperse this power in ever smaller amounts as it moves to the extremities of the distribution system. This has implications for off-shore wind power. Since the coast lies on the fringe of SCE&G's system, the transmission capacity would need to be reinforced if a large amount of wind power was brought ashore and needed to be moved inland to a load center.

SCE&G's transmission system is designed so that no single contingency can crash the grid, that is, it is built with redundancy. That means if SCE&G was depending on a large amount of off-shore wind power, there would have to be redundant transmission paths to the shore. SCE&G read with interest the announcement by Google¹ that it was considering spending \$5 billion to build a transmission backbone for off-shore wind power off the north Atlantic coast. That may be part of a long term solution. We will have to see.

The Department of Energy has commissioned a study of the feasibility of moving large amounts of wind power from the mid-section of the country to load centers in the east. SCE&G is part of this North American Electric Reliability Council (NERC)-led study called the Eastern Interconnection Planning Collaborative (EIPC)². This idea may prove economical but there are challenges. Just like SCE&G, most utilities plan their transmission system around their own customers. Also wind speed is erratic which makes load following on the system more difficult and adds risk to maintaining the integrity of the grid.

SCE&G is continually running transmission reliability studies on its own system but several times a year, it participates with its neighbors such as Progress Energy, Duke Energy and Santee Cooper in regional transmission studies. Some of these studies reach well beyond those utilities directly connected to the SCE&G grid such as the AEP system and PJM. Whenever a change occurs on any system, it affects the others to some degree. The larger the change and the closer it is to your system, the larger the effect will be. The addition of a large generator, a large customer

or installing a significant transmission line can affect neighboring systems so these coordinated power flow studies are necessary to maintain reliability of the regional grid.

Battery storage is not yet economically feasible for large scale implementation but SCE&G has a large battery-like facility, the Fairfield Pumped Storage Plant, which can store 3,960 MWH of power. This plant is almost always running, either pumping or generating. At night SCE&G pumps water up to the Monticello Reservoir with low cost, off-peak power and then during the day releases the water and generates power for the system to help meet the higher daytime loads.

There are many changes coming to the utility business in the future. Electric transportation is on the threshold of development. Distributed generators, such as solar panels, continue to be added to the system. At some time in the future all utilities will have a smart grid or perhaps more appropriately called a smarter grid which will provide much more information and control to the utility. These are exciting times in the utility business and SCE&G is looking forward to providing reliable and economical production, transmission and distribution services to its customers.

1. <http://www.snl.com/InteractiveX/article.aspx?CDID=A-11821684-11571&KPLT=2>

2. <http://www.eipconline.com>

<http://www.narucmeetings.org/Presentations/Buechler%20NARUC%20Staff%20Sub%20Feb%2014%202010.pdf>



Energy Transmission and Storage Comments

South Carolina must consider the potential impacts on our state's vital natural resources and wildlife habitats as we consider energy transmission and storage policies. As The Nature Conservancy's comments on energy efficiency and renewables emphasize, high land conversion rates in South Carolina threaten the land and water resources that drive our state's economy.

Clear cutting forestland for new energy transmission lines is an example of how expanded energy production will impact South Carolina's forest habitats and resources. Through sound policy that incorporates environmental assessments and siting processes, we can minimize these impacts in order to move our state forward in both the short term and long term.

Improving our state's net metering law and interconnection standards is also critical. Well-crafted net metering policies and interconnection standards will promote renewable technologies. Eligibility for all customers, standardizing interconnection requirements, and promoting use of all renewable technologies are ways that current policy can be improved.

Energy storage is an important component of large scale wind and solar energy production; future technology will be vital to increasing the state's use of these renewable energy resources. Although energy storage technology on a large scale is not yet available for South Carolina to utilize effectively, the state must consider how its energy policy will incorporate energy storage technology as it emerges.

Recommendations

- Energy Transmission
 - Siting processes for new infrastructure that minimize impact on natural resources
 - Improve current net metering law to increase opportunities for all customers and encourage use of renewable resource technology

- Energy Storage
 - Maintain flexibility to incorporate emerging technology