

CHAPTER 8, NEED FOR POWER

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8.0 NEED FOR POWER

NRC has indicated that the environmental report should include consideration of the benefits of the proposed action [10 CFR 51.45(c)] and that it must assess the need for power to accurately characterize the benefits associated with the proposed action (NRC 2003).

Chapter 8 addresses the need for the power that the proposed action, construction and operation of VCSNS Units 2 and 3, would produce. Unit 2 would come on line in 2016 and Unit 3 would come on line 2019 (1,107 megawatts-electric net summer rating each). As indicated in Chapter 1, the proposed action is a joint project between SCE&G and Santee Cooper. SCE&G would receive 1,218 megawatts of the net electricity generated and Santee Cooper 996 megawatts. SCE&G is acting as Santee Cooper's agent for the purposes of securing licenses to operate.

NRC expects states and regions to prepare need-for-power evaluations that can be the bases for NRC evaluation if they are (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty (NRC 1999). In this chapter, SCE&G summarizes the state of South Carolina process for evaluating the need for power within public utility service areas and the SERC Reliability Corporation (SERC)^a regional process for evaluating need for power, and demonstrates how these processes satisfy NRC criteria.

The proposed project would be a traditionally regulated plant. SCE&G and Santee Cooper would have state-designated service territories; customers would have no choice of alternative electric service providers; and the state would have approval authority for the need for the electric power to be generated. However, SCE&G and Santee Cooper are subject to different South Carolina statutory and regulatory requirements. The following sections discuss utility-specific and regional need-for-power evaluations as follows:

- State Need-for-Power Planning – SCE&G ([Section 8.1](#))
- State Need-for-Power Planning – Santee Cooper ([Section 8.2](#))
- Regional Need-for-Power Planning ([Section 8.3](#))
- Satisfaction of NRC Criteria ([Section 8.4](#))
- Conclusion ([Section 8.5](#))

a. The former Southeastern Electric Reliability Council (SERC) is now incorporated as the SERC Reliability Corporation.

8.1 STATE NEED-FOR-POWER PLANNING – SCE&G

The South Carolina General Assembly has created the South Carolina Public Service Commission (PSC) and elects its members. The General Assembly has vested the PSC with the power and jurisdiction to supervise and regulate rates and service of South Carolina investor-owned public utilities, including the establishment of service territories. In addition, the General Assembly has established the Office of Regulatory Staff (ORS) to serve as a public interest advocate before the PSC and the South Carolina State Regulation of Public Utilities Review Committee to oversee PSC and ORS operations (SCCL 2007a, SCCL 2007b).

SCE&G is an investor-owned, integrated electric utility that generates, transmits, and distributes electric power. SCE&G is subject to PSC regulation as a traditional utility, meaning that SCE&G is responsible for providing electric power within a designated geographic area, called a service territory, and that customers within that area have no choice of alternative electric providers. SCE&G provides electric service to more than 623,000 customers in 24 of the state's 46 counties (SCE&G 2007a). **Figure 8.1-1** shows South Carolina regulated electric service territories. The SCE&G territory is shown in red and is further identified by the numeral 5.

South Carolina imposes on SCE&G a two-step process for evaluating the need for power. The first step involves preparing integrated resource plans (IRPs) and the second involves obtaining certificates of environmental compatibility and public convenience and necessity. The following subsections address these steps.

8.1.1 INTEGRATED RESOURCE PLANS

The PSC is a quasi-judicial body with the authority to issue orders. In 1998, by order, the PSC established the current requirements for investor-owned electric utility integrated resource plans, requiring the following contents (PSC 1998; See also S.C. Code Ann. Section 58-37-40):

- Demand and energy forecast for at least a 15-year period
- Supplier's or producer's program for meeting the requirements shown in its forecast in an economic and reliable manner, including demand-side and supply-side options
- Brief description and summary of cost-benefit analysis, if available, of each option which was considered, including those not selected
- Supplier's or producer's assumptions and conclusions with respect to the effect of the plan on the cost and reliability of energy services, and a description of the external environmental and economic consequences of the plan to the extent practicable

The IRP is a public document, providing disclosure to customers and the general public, the ORS, PSC, and Public Utilities Review Committee, and the General Assembly. The state has discretion regarding review of an integrated resource plan but, at a minimum, uses it as a basis against which the PSC evaluates subsequent facility-specific evaluation of the need for power ([Section 8.1.2](#)).

SCE&G submits integrated resource plans to the PSC annually, with a copy to the ORS. The company's integrated resource plan dated 2007 (SCE&G 2007b) contains information summarized in the following paragraphs.

8.1.1.1 Load Forecast

SCE&G is responsible to the state for generating or otherwise securing electric energy and distributing it to customers who use it. The amount of electric energy that SCE&G customers use is called the SCE&G load. There are two common measures of load. The first is the average amount of electricity used over time, generally referred to as "energy sales." The second is the maximum amount of electricity used at any one time, generally referred to as "peak demand." To be successful, SCE&G must be able to accurately forecast future loads so as to be able to cost-effectively and reliably plan for securing requisite electric energy. This subsection briefly summarizes the process that SCE&G uses to forecast its load.

SCE&G bases its load forecasts on the following:

- Historical Data – SCE&G maintains a database of historical energy sales and peak demand values and historical data for factors that influence sales and demand, such as:
 - Number and type of customers
 - Total population numbers and characteristics such as per capita income
 - Industrial production indices
 - 15-year weather measurements and calculated heating and cooling degree-days
 - Electricity prices

SCE&G updates this data annually to incorporate the past year's information, and reviews previous forecasting accuracy. On average, SCE&G forecasting error has been about 1.3% (SCANA 2007).

- Projections – Where available, SCE&G uses commercially generated projections of factors that influence sales and demand, such as economic and demographic variables from Global Insight, Inc. SCE&G makes its own projections of other factors, such as weather, for which it has historical data.

- Modeling – SCE&G uses econometric modeling to establish the relationships between variables to be explained or forecasted (e.g., energy sales and peak demand) and other factors (e.g., population and economic growth and industrial development). The modeling enables SCE&G to use those relationships to predict energy sales and peak demand using projections of the factors that historically influence sales and demand. The modeling also enables SCE&G to perform analyses of the sensitivity of results to changes in model inputs such as fuel prices. SCE&G uses commercially developed software (from SAS Institute, Inc.) that incorporates regression analysis and various statistics to evaluate the success of the regression analyses.

- Professional Judgment – SCE&G uses in-house and outside expertise to adjust projections and modeling to take into account new or discontinued marketing programs, new industrial loads, contract expiration, economic factors (e.g., recessions), and input from SCE&G's largest industrial customers about potential changes in electricity usage.

SCE&G's forecast process is more detailed in the short range than over the long range. In the short range, two years of monthly forecasts for electric customers, average usage, and total usage were developed according to company class and rate structures, with industrial customers further classified into Standard Industrial Classification codes. Residential customers were classified by housing type (single family, multifamily, and mobile homes) and by whether or not they use electric space heating. For each forecasting group, the number of customers and either total usage or average usage were estimated for each month of the forecast period.

The long-range electric sales forecast was developed for seven classes of service: residential, commercial, industrial, street lighting, other public authorities, municipals, and cooperatives. These classes were disaggregated into appropriate subgroups where data was available and there were notable differences in the data patterns. The residential, commercial, and industrial classes are considered the major classes of service and account for over 90% of total territorial sales. A customer forecast was developed for each major class of service. For the residential class, forecasts were also produced for those customers with electric space heating and for those without electric space heating. They were further disaggregated into housing types of single family, multifamily and mobile homes. These subgroups were chosen based on available data and differences in the average usage levels and/or data patterns.

The industrial class was disaggregated into two-digit Standard Industrial Classification code classification for the large general service customers, while smaller industrial customers were grouped into an "other" category. These subgroups were chosen to account for the differences in the industrial mix in the service territory. With the exception of the residential group, the forecast for sales was estimated based on total usage in that class of service. The number of residential customers and average use per customer were estimated separately and total sales were calculated as a product of the two.

Historical data has demonstrated that SCE&G experiences a peak demand in the summer and a peak demand in the winter, with the first usually being the greater. SCE&G uses a load factor methodology to forecast summer peak demands by class of customer. A load factor is a value that can be used in a formula with historical energy sales values to approximate historical summer peak demands (Load Factor = Energy Sales ÷ [Peak Demand × 8,760 hours per year]). Applying the load factor against forecast energy sales results in forecast summer peak demand. For winter peak demand forecasting, SCE&G has correlated historical winter peak loads to historical energy sales and weather, with some lesser variables. Given an energy sales forecast and a weather projection, SCE&G can use the historical correlation to forecast winter peak demand.

The results of the SCE&G load forecasting for the next 15 years show energy sales predicted to grow at an approximate average of 2% per year. [Figure 8.1-2](#) illustrates this growth. [Table 8.1-1](#) shows the values used to create the figure, indicating an expected growth in energy sales from 23,741 gigawatt-hours in 2007 to 31,187 gigawatt-hours in 2021. For perspective, [Figure 8.1-2](#) and [Table 8.1-1](#) also show SCE&G energy sales for the past ten years, which represent a growth rate of a little more than 2% per year.

The SCE&G peak demand forecast shows summer and winter peak demands predicted to increase at 2% per year. [Figure 8.1-3](#) illustrates the peak summer load growth and [Table 8.1-1](#) shows the values used to create this figure. These indicate an expected growth in peak demand from 5,173 MW in 2007 to 6,355 MW in 2021, an average growth rate of approximately 84 MW per year after having subtracted the effect of demand side management. Variations in the peak demand growth curve are the result of variations in capacity caused by expirations of sales contracts (SCE&G 2007b).

8.1.1.2 Demand-Side Management

The integrated resource plan presents the three components that comprise the SCE&G demand-side management program—customer information programs, energy conservation programs, and load management programs. Customer information programs involve presenting to customers educational materials designed to create an awareness of issues related to energy and energy conservation. SCE&G uses bill inserts and other mailings to customers, brochures and other printed materials available in business offices, a web site, community appearances, and interviews and press releases to print and broadcast media in order to contact customers and others.

SCE&G energy conservation programs include visiting customer homes and discussing benefits of energy conservation in purchasing energy-related equipment and materials, including rebates for insulation and storm windows. Customers who upgrade to meet higher energy efficiency levels receive reduced electric rates.

SCE&G's load management programs include the following:

- Standby Generator Program – Customers having large standby generators agree with SCE&G to run their generators during times of reserve margin stress due to system problems or high customer demand. Standby generator operation reduces system stress in exchange for credits that reduce subsequent operating costs.
- Interruptible Load Program – Participating customers receive electric rate discounts for agreeing to shed load when SCE&G is short of capacity.
- Real Time Pricing Rate – During peak usage periods when system capacity is low, SCE&G sends a high-price signal to participating customers to encourage conservation and load shifting. In exchange, during low usage periods, the customer's rates are lower.
- Time of Use Rates – Rates during daily peaks in demand are higher, to encourage conservation and load shifting during these periods.

SCE&G's load management program reliably reduces the system's peak demand by approximately 250 MW of capacity. SCE&G uses this figure to reduce its system peak demand forecasts to produce a firm peak demand for planning purposes. Subsection 9.2.1.3 provides additional detail about SCE&G demand side management. (SCE&G 2007b)

8.1.1.3 Existing Capacity and Energy Sales

At the end of 2006, SCE&G had a generating capacity of 5,808 MW consisting of (SCE&G 2007b):

- Coal-fired plants (2,566 MW, or 44% of capacity)
- Two-thirds ownership of one nuclear plant (644 MW, or 11% of capacity)
- Oil- and gas-fired plants (1,717 MW or 30% of capacity)
- Hydroelectric plants (823 MW, or 14% of capacity)
- Long-term power purchases (58 MW, or 1% of capacity)

Coal produced approximately 62% of the system's energy, nuclear 20%, gas 13%, and hydro 5%. The loss of 11 MW of Southeastern Electric Power Administration capacity related to a wholesale contract is projected for 2010. **Figure 8.1-3** shows the growth in capacity that SCE&G projects through 2020, with **Table 8.1-1** showing the values used to create the figure. This data indicates an expected growth in capacity from 5,808 MW in 2007 to 7,197 MW in 2021. Variations in the capacity growth curve are the result of variations in expectations for firm annual purchases, retirements, and assumed additions to capacity. The projection for 2021 assumes the addition of 200 MW of peaking or intermediate load capacity and 1,200 MW of baseload generation. The baseload additions represent the addition of the SCE&G portions of Unit 2 in 2016 and Unit 3 in 2019. During

intervening years, SCE&G will purchase power as needed to maintain the reserve margin.(SCE&G 2007b)

8.1.1.4 Reserve Margin

Reserve margin is the supply capacity that a company maintains in excess of anticipated demand. This excess helps the company maintain reliable load regardless of unanticipated interruptions in supply (generation or transmission capacity) or increases in demand. Reserve margins are typically established to maintain the risk of unscheduled interruptions to between 1 day in 10 years and 1 day in 1 year.

SCE&G is a member of the Virginia-Carolinas Reliability Group, a subregion of the SERC Reliability Corporation (see [Section 8.3](#) for discussion of the corporation). Operating agreements between the Virginia-Carolinas Reliability Group companies establish the subregion's daily reserve margin. SCE&G's annual prorata share of this capacity is approximately 200 MW. Failure to maintain this reserve margin could result in loss of membership in the Virginia — Carolinas Reliability Group. This would mean that SCE&G would have to meet SERC requirements of having operating reserves to cover the largest unit on the system (*i.e.*, 644 MW).

In addition to this requirement, SCE&G has planned for reserve needed to balance supply and demand risk. SCE&G accounts for uncertainty in developing its planning reserve margin, which captures the impact of forecast error and extreme weather as well as risks related to supply (e.g., plants off line because of hurricanes) (SCE&G 2007c). SCE&G has a minimum reserve margin of 12%, which is sufficient to handle the demand-side risk related to forecast error and extreme weather as well as much of the supply-side risk usually encountered.

[Figure 8.1-3](#) shows the SCE&G capacity and demand forecast as separate lines on the same graph. Generally, the space between these lines represents reserve margin.

8.1.1.5 Need for Power

Technologies for generating electricity are often categorized as baseload, which operates the most; intermediate, and peaking, which operates the least amount of time. Baseload capacity is generally coal-fired or nuclear, is the most expensive to build, takes the most time to start up and shut down, and is the least expensive to operate for extended periods of time. Peaking units are generally gas-fired turbines and are the least expensive to build, can be quickly started or stopped, and are the most expensive to operate for extended periods. Characteristics of intermediate capacity fall between the other two ([Figure 8.1-3](#)).

Baseload capacity typically operates in excess of 70% of the time. Currently, approximately 56% of SCE&G's generation capacity is baseload. As SCE&G's load continues to grow, so does its need for baseload capacity. The integrated resource plan identifies a need for an addition of 1,200 MW of SCE&G baseload

capacity by 2020 and indicates SCE&G and Santee Cooper are planning to build nuclear capacity to meet baseload capacity needs.

8.1.1.6 Role of Purchased Power

SCE&G anticipates making several firm annual purchases between 2009 and 2015. SCE&G constantly monitors markets for electric energy and, at times, is an active purchaser and seller. Currently, SCE&G is a net seller, with firm contract sales of 250 MW through 2012.

8.1.1.7 Transmission Planning

Subsection 2.2.2 describes the VCSNS transmission lines. The SCE&G transmission system is interconnected with those of Progress Energy, Duke Power, Santee Cooper, Georgia Power Company, and SEPA. SCE&G participates in regional computer modeling to produce an integrated electrical network. SCE&G is a member of SERC Reliability Corporation ([Section 8.3](#)). SCE&G tests and designs its transmission system to be compliant with reliability standards of the North American Electric Reliability Corporation and maintains a 10-year schedule of modifications and additions to its network. SERC maintains information about interties between SERC subregions (SERC 2006a).

8.1.1.8 State Review

The regulation of investor-owned electric utilities, like SCE&G, in South Carolina is accomplished through the adjudicatory role of PSC and the investigative, legal, prosecutorial, and educational role of ORS. ORS is charged with representing the public interest in regulation of utilities before PSC, the courts, the South Carolina General Assembly, and federal regulatory agencies (ORS 2008a). PSC had scheduled a hearing on the most recent SCE&G IRP (PSC 2008a). However, IRP review is integral to review of the SCE&G application for a certificate of environmental compatibility and public convenience and necessity for VCSNS Units 2 and 3. For this reason, SCE&G asked PSC to hold the IRP hearing in abeyance, pointing out that SCE&G would file direct testimony and present a witness to discuss the IRP during the certificate proceeding and that the Commission would have the opportunity to be fully briefed on the IRP at that time (PSC 2008b). ORS had no objection (ORS 2008b) and PSC directed that the hearing for the IRP be held in abeyance pending the PSC and ORS review of the certificate application (PSC 2008c). For further discussion of this state review, see [Subsection 8.1.2](#).

8.1.2 CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC CONVENIENCE AND NECESSITY

The South Carolina Facility Siting and Environmental Protection Act requires that a utility seek and obtain from PSC a certificate of environmental compatibility and public convenience and necessity (certificate) as a prerequisite to constructing a major utility facility (SCCL 2007c, Article 3). The South Carolina Base Load Review Act allows utilities to apply for PSC authorization to include the cost of

capital associated with a new facility in rate base as construction is under way (SCCL 2007c, Article 4). SCE&G has submitted to PSC a combined application for a certificate and base load review for VCSNS Units 2 and 3 (SCE&G 2008b) and, as discussed below, need for power is a significant component of that application. In contrast to an IRP, which analyzes the need for power on a system-wide basis, the certificate and base load review process goes beyond that and results in a very facility-specific determination.

Subsection 8.1.2 describes the SCE&G combined application and the PSC and ORS process for reviewing the application and issuing the certification. Overall, the state review process comprises the following steps:

- SCE&G application
- Public notice and opportunity for comment and intervention
- Pre-filed, written direct and rebuttal testimony by all parties
- Discovery
- ORS audits
- Administrative hearings with full rights of cross examination
- ORS report and recommendation
- PSC final order (findings of fact, conclusions of law)

The PSC final order is appealable to the South Carolina Supreme Court. Appeals do not stay the effectiveness of the order pending decision.

As shown in **Figure 8.1-4**, need for power is one of several topics that SCE&G addresses in its application for a certificate and base load review order. The main body of the application contains a brief summary of need-for-power information (11. Statement of Need and Necessity) and Exhibit G of the application contains more detail about the SCE&G projected reserve margin, existing supply portfolio and expansion plan, and forecasts of summer loads and resources for 2008 - 2022. A second section, 12. Contribution to System Efficiency and Choice of Fuel Type and Exhibit H of the application address SCE&G's need for base load capacity.

In accordance with PSC direction (PSC 2008c), SCE&G provided public notice (SCE&G 2008c). PSC has received 52 sets of comments and listed 14 intervenors, five of whom are statutory parties and two of whom withdrew as intervenors (PSC 2008d).

Eleven people provided direct testimony on behalf of SCE&G (PSC 2008e). Of these, the following provided testimony related to need for power:

Kevin B. Marsh - Testified regarding overall case for need for power (SCE&G 2008d). See [Figure 8.1-5](#) for a list of topics that Mr. Marsh covered.

Joseph M. Lynch - Testified on specifics of demand growth, load projection, supply projection, and reserve margin target (SCE&G 2008d). See [Figure 8.1-6](#) for a list of topics that Dr. Lynch covered. Dr. Lynch indicated that his testimony was based on studies performed as part of the SCE&G IRP process and several of the exhibits in his testimony are from the most recent IRP (dated May 28, 2008; SCE&G 2008f).

David K. Pickles - Testified regarding demand side management (SCE&G 2008g). See [Figure 8.1-7](#) for a list of topics that Mr. Pickles covered.

Dr. Lynch also provided rebuttal testimony in response to direct testimony filed on behalf of an intervenor (SCE&G 2008h). See [Figure 8.1-8](#) for a list of topics that Dr. Lynch covered in rebuttal.

Because the South Carolina statute gives ORS the authority to require that the regulated utility provide it with information (SCCL 2007c, Section 58-4-55), ORS can be more informal in its review and discovery. The South Carolina statute also gives ORS the authority to hire expert witnesses and consultants (SCCL 2007c, Section 58-33-295). ORS utilized this authorization and hired consultants with specialized knowledge to assist ORS in its review and to testify during the merits hearing in the docket (ORS 2008c). During its review of the SCE&G docket, ORS frequently met with SCE&G to discuss aspects of the application and related documentation. ORS also submitted approximately 500 questions in writing to SCE&G (ORS 2008d-h), of which approximately 150, mostly in ORS 2008d, related to need for power. See [Figure 8.1-9](#) for a list of the questions from ORS 2008d that illustrate the depth of the ORS review.

Following review of SCE&G responses to the ORS questions, ORS provided direct testimony by its panel of experts. The testimony of two, Dr. Zhen Zhu and Mr. George Evans, relate to need for power. Dr. Zhu focused on load forecast (ORS 2008i, pages 1-14), whereas Mr. Evans covered load forecast and other aspects of need for power (ORS 2008i, pages 15 - 37). Both reviewed the SCE&G IRP, application, direct testimony, and responses to ORS questions, and both concluded that the SCE&G analyses are reasonable. [Figures 8.1-10](#) and [8.1-11](#) provide a list of topics that Dr. Zhu and Mr. Evans covered, respectively.

PSC conducted hearings over ten days between December 1 and December 17, 2008, receiving testimony and other evidence. Two of the hearing sessions were for the receipt of public comments. During the hearings, SCE&G witnesses presented the SCE&G case and were subjected to interrogation by the commissioners and cross examination by all other parties. Intervenor witnesses presented their cases and their witnesses were also subjected to interrogation and cross examination. The parties have the opportunity to submit briefs and proposed orders for Commission consideration. The Commission will deliberate and should issue its order before the end of February 2009. The Commission

must find and determine the basis of the need for the facility before granting the certification (SCCL 2007c, Section 58-33-106).

8.1.3 RELEVANCE TO NRC REVIEW

NRC's review of need for power is to support its accurate characterization of the benefits of the proposed action. This would enable NRC to weigh the likely benefits against the environmental impacts of constructing and operating Units 2 and 3. One such benefit is the electricity that the units would produce. The NRC is not supplanting the role of the state, which is responsible for assessing the need for power facilities and their economic feasibility and for regulating rates and services. The state process for evaluating the need for Units 2 and 3 began with SCE&G's inclusion of the units in its integrated resource plan, continued with ORS's review of SCE&G's application for a certificate of environmental compatibility and public convenience and necessity, and will culminate in a PSC order expected by February 2009. Review of this evaluative process gives NRC a reasonable basis for relying on realization of the need for power as a benefit while acknowledging the state's primacy in evaluating whether the power is needed. NRC's review can determine that the state evaluation meets NRC criteria for being systematic, comprehensive, subject to confirmation, and responsive to forecasting uncertainty. **Section 8.4** analyzes how the state evaluation satisfies each criterion.

**Table 8.1-1
SCE&G Energy Sales, Capacity, and Peak Demand**

Year	Energy Sales (gigawatt- hours)	Capacity (MW)	Peak Demand (MW)
Historical			
1997	17,969		
1998	19,709		
1999	20,018		
2000	21,253		
2001	20,948		
2002	22,275		
2003	22,044		
2004	23,232		
2005	23,300		
2006	23,091		
Forecast^(a)			
2007	23,741	5,808	5,173
2008	24,277	5,808	5,170
2009	24,790	5,898	5,262
2010	24,994	5,997	5,310
2011	25,482	6,067	5,418
2012	25,956	6,187	5,520
2013	26,457	6,022	5,375
2014	27,006	6,157	5,493
2015	27,588	6,287	5,615
2016	28,157	6,597	5,732
2017	28,734	6,597	5,855
2018	29,323	6,697	5,976
2019	29,927	7,197	6,099
2020	30,599	7,197	6,228
2021	31,187	7,197	6,355

a) Source: SCE&G (2007b). Capacity includes addition of Unit 2 in 2016 and Unit 3 in 2019. Other capacity changes are the net result of expiration of an existing sales contract and additional purchases.

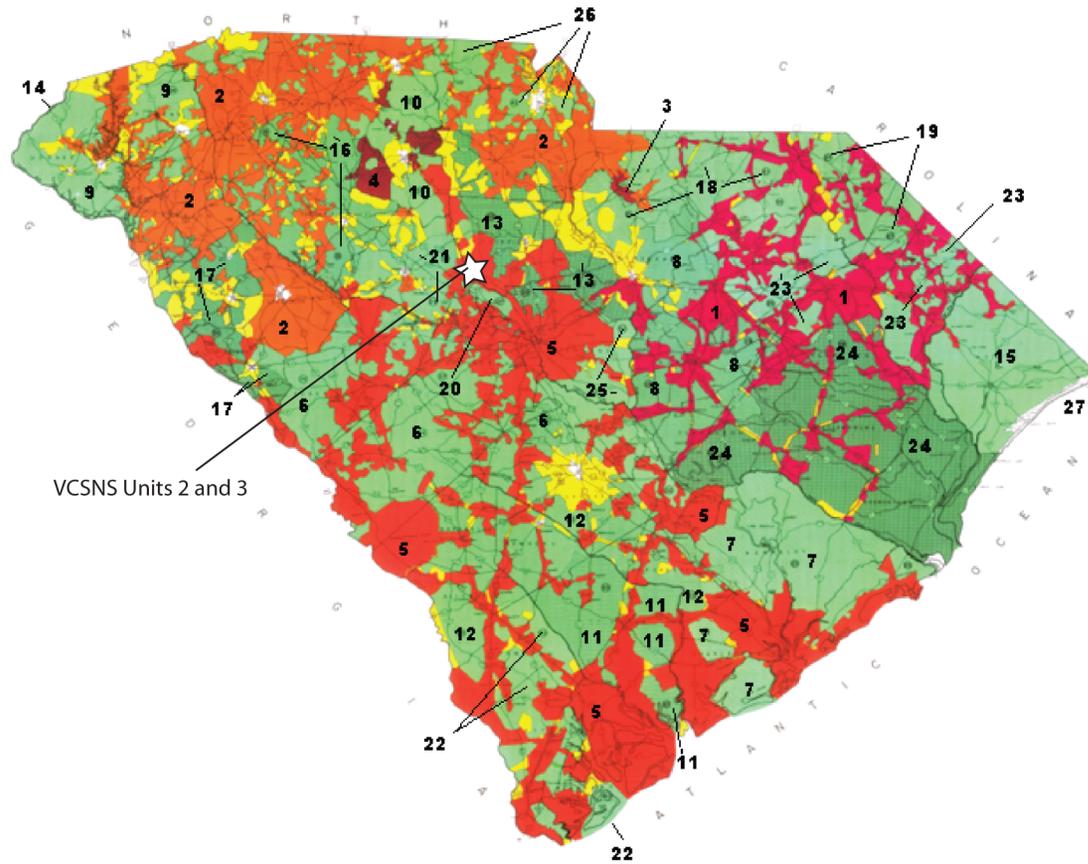
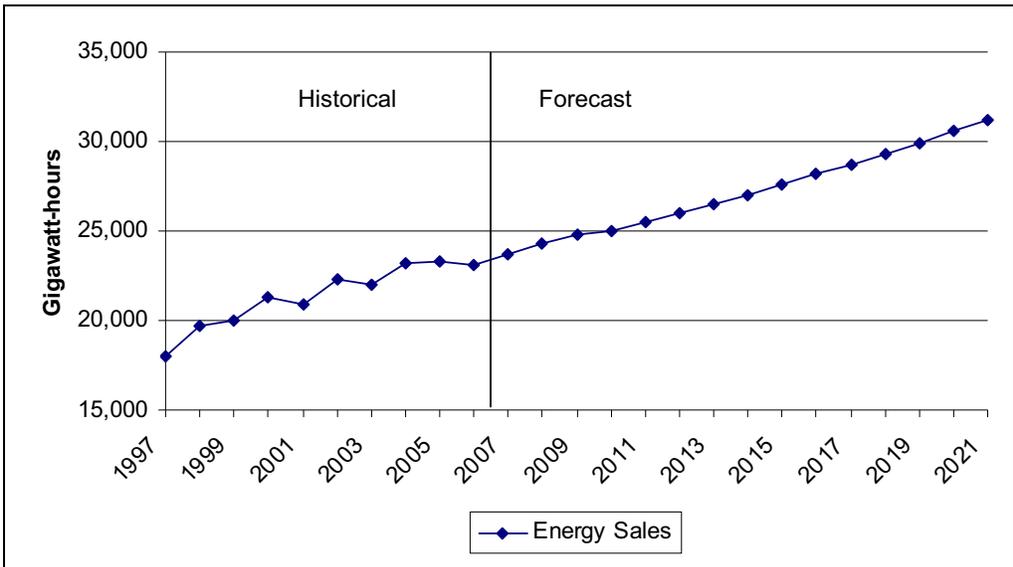


Figure 8.1-1. South Carolina Regulated Electric Service Territories (Sheet 1 of 2)

Legend

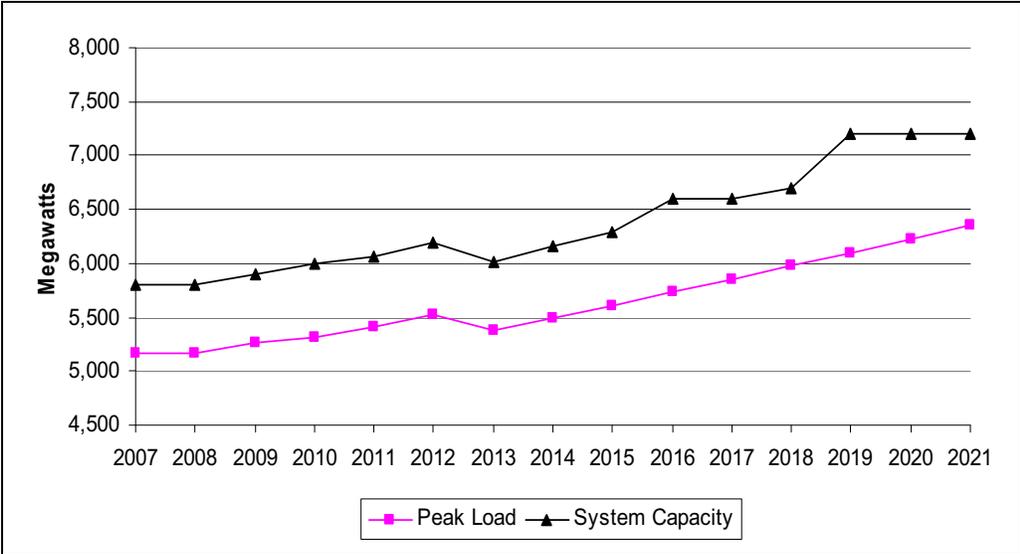
1 Progress Energy	16 Laurens Electric Cooperative
2 Duke Power Company	17 Little River Electric Cooperative
3 Heath Springs Light & Power	18 Lynches Electric Cooperative
4 Lockhart Power Company	19 Marlboro Electric Cooperative
5 South Carolina Electric & Gas Company	20 Mid-Carolina Electric Cooperative
6 Aiken Electric Cooperative	21 Newberry Electric Cooperative
7 Berkeley Electric Cooperative	22 Palmetto Electric Cooperative
8 Black River Electric Cooperative	23 Pee Dee Electric Cooperative
9 Blue Ridge Electric Cooperative	24 Santee Electric Cooperative
10 Broad River Electric Cooperative	25 Tri-County Electric Cooperative
11 Coastal Electric Cooperative	26 York Electric Cooperative
12 Edisto Electric Cooperative	Unassigned Area
13 Fairfield Electric Cooperative	27 South Carolina Public Service Authority
14 Haywood Electric Cooperative	Municipally Owned Electric System
15 Horry Electric Cooperative	

**Figure 8.1-1. South Carolina Regulated Electric Service Territories
(Sheet 2 of 2)**



Source: Data from Table 8.1-1.

Figure 8.1-2. SCE&G Energy Sales



Source: Data from Table 8.1-1. Capacity includes addition of VCSNS Unit 2 in 2016 and Unit 3 in 2019.

Figure 8.1-3. SCE&G Capacity and Demand Forecasts

Table of Contents	
SCE&G Combined Application for Certificate of Environmental Compatibility, Public Convenience and Necessity and for a Base Load Review Order for VC Summer Nuclear Station Units 3 and 4 * May 30, 2008	
Note: Sections in bold relate to need for power	
<u>Section</u>	<u>Page</u>
1. Applicant	2
2. Service Area	2
3. Description of the Facilities and Basis for Selection.....	2
4. The Westinghouse AP1000 Reactor.....	2
5. Unit Capacity and Output.....	3
6. Choice of Suppliers of Major Components of the Facilities and Principal Contractors for Construction	38.1-3 through
7. Choice of Suppliers of Other Major Components of the Facilities and Principal Contractors.....	4
8. Anticipated Construction Schedule	4
9. Construction Schedule Contingency	5
10. Anticipated Components of Capital Costs and Schedule.....	5
11. Statement of Need and Necessity	5
12. Contribution to System Efficiency and Choice of Fuel Type	6
13. Inflation Indices Used by SCE&G	6
14. Cost Contingencies Used by SCE&G	7
15. Capital Cost Schedule Contingencies.....	7
16. Updating of Cost Projections.....	7
17. Risk Factors Related to Construction and Operation of the Plant	9
18. Proposed Rate Design and Class Allocation Factors for Revised Rates	9
19. Return on Equity for Plant Construction.....	9
20. Year-by-Year Revenue Requirements	9
21. Date for Measuring Investment in Construction Work in Progress.....	10
22. Revised Rates.....	10
23. In-Service Expenses	10
24. Environmental Assessment.....	11
25. Transmission Interconnection Studies	11
26. Public Notice	26
27. Correspondence or Communications.....	27

Figure 8.1-4. Contents, Application for Certificate and Base Load Review

*Typographical error, corrected in the PSC record.

Table of Contents	
Direct Testimony of Kevin B Marsh, SCE&G	
Note: Topics in bold related to need for power	
<u>Topic</u>	<u>Page</u>
Please state your name, business address, and position.	1
Describe your educational background and business experience.	1
Have you ever testified before this commission in the past?.....	2
What subjects do you discuss in your testimony?.....	2
Who are the other witnesses that will provide direct testimony for SCE&G?	3
Please give a short description of SCE&G’s electric service territory and generating facilities.	7
What was SCE&G’s peak demand and reserve margin in 2007?.....	8
How much electricity was generated by SCE&G in 2007?	8
Please describe the process by which SCE&G identified the need for new base load generation in the 2016-2019 time period	8
Please define base load generation.	9
What types of plants do you consider to be base load units?.....	9
What needs are met by intermediate and peaking units?	10
What kinds of plants are built today as intermediate and peaking units?.....	10
What has created the need for base load generation on SCE&G’s system in the 2016-2019 period?	11
Can you quantify this growth from an electric perspective?	11
What is your view of the prospects for continued growth in SCE&G’s territory?.....	12
What predictions of future growth has the State of South Carolina made?	12
When did SCE&G last add base load generation to its system?	13
How has customer demand on SCE&G’s system changed since that time?	13
What modeling and forecasting was done to quantify SCE&G’s need for additional base load generation in the 2016-2019 period?.....	14
What experience does Dr. Lynch have in forecasting electric loads on SCE&G’s system?.....	14
How does Dr. Lynch’s conclusion concerning the need for base load generation compare with your operating knowledge of SCE&G’s system?	15
Please explain.	15
Can you quantify these changes?.....	16
What is the age of SCE&G’s base load generation assets?.....	16
Mr. Marsh, you have reviewed the load forecasts which identify the need for new base load capacity in the 2016-2019 period. What is your opinion concerning them?	17
In your opinion, is it appropriate to base a decision to build new base load generation on studies that tend toward conservatism in forecasting growth?.....	17
When did SCE&G begin to evaluate its options for adding nuclear generation in the 2016-2019 time period?	18
When was the decision required to be made?	18
What did SCE&G conclude?	19

Figure 8.1-5. Contents, Direct Testimony of Kevin B. Marsh (Sheet 1 of 2)

Table of Contents, Continued	
Direct Testimony of Kevin B Marsh, SCE&G	
Note: Topics in bold related to need for power	
<u>Topic</u>	<u>Page</u>
Please describe how the AP1000 unit was selected	19
Why did SCE&G decide on two units shared with Santee Cooper rather than one unit?.....	20
Why is Santee Cooper a good partner for this project?.....	20
Between SCE&G and Santee Cooper, what percentage of South Carolina’s electric customers will be served by these new units?	21
Please explain how you came to negotiate with a consortium of Westinghouse and Stone & Webster.....	21
Why did this arrangement seem beneficial to SCE&G?	22
What other utilities are considering AP1000 units?	22
What was the principal alternative SCE&G considered to new nuclear generation?.....	22
How did coal figure into this analysis?	23
How did renewable or alternative energy sources figure into this analysis?	23
Please explain.....	24
What role does demand side management play in these analyses?.....	25
In the end, why did SCE&G pick nuclear generation over combined cycle gas generation?	27
How did nuclear generation perform in variations from the reference case for evaluating future costs?.....	28
What do these results mean about risk diversity for SCE&G’s generation system?.....	28
How significant a risk is gas and coal price volatility?	29
What are the environmental issues related to coal and gas generation?	30
What then are the risks from choosing nuclear generation to meet SCE&G’s 2016-2019 base load requirements?	30
What then are the principal risks from the VCSNS Units 2 & 3 construction project?	33
How has SCE&G addressed these risks?	33
Please elaborate.	34
What did SCE&G do to obtain reasonable assurances of price and schedule from Westinghouse/ Stone & Webster?	34
Did SCE&G ever break off negotiations with the consortium?	36
Do you believe that SCE&G received appropriate price and schedule commitments from Westinghouse/ Stone & Webster?	36
How will SCE&G manage price and schedule risk going forward?	37
Mr. Marsh, how does the decision to proceed with construction of VCSNS Units 2 & 3 fit with SCE&G’s philosophy of utility operations as presented to this commission in past proceedings?	38
In summary, why is SCE&G proposing to proceed with construction of two ap1000 nuclear units?	41
What are you asking this commission to do?	41
Does this conclude your testimony?.....	42

Figure 8.1-5. Contents, Direct Testimony of Kevin B. Marsh (Sheet 2 of 2)

Table of Contents	
Direct Testimony of Joseph M. Lynch, SCE&G	
Note: Topics in bold related to need for power	
<u>Topic</u>	<u>Page</u>
Please state your name, business address and current position with South Carolina Electric & Gas Company ("SCE&G" or "Company").	1
Describe your educational background and professional experience	1
What are your current duties as manager of resource planning?	2
What is the purpose of your testimony in this proceeding?	2
Has SCE&G conducted any studies projecting its energy and peak demand growth over the next fifteen years?	3
Based on these studies, what peak demand growth does SCE&G project for the next fifteen years?	4
Did SCE&G take these wholesale contracts into consideration when it determined its capacity needs?	4
Has SCE&G conducted any similar studies with respect to its projected energy growth?	5
Please explain how the EASAI legislation impacts the company's energy sales.	6
Taking these issues into account, what is the projected load that SCE&G will be required to serve in 2016?	7
What is the current supply capacity of SCE&G?	7
Will this amount of generating capacity meet the needs of SCE&G's customers and system through 2016?	8
What is SCE&G's planning reserve margin target and how does it affect the need for capacity?	8
What types of generation has the company considered to meet these needs?	9
What were the results of the company's consideration of solar power?	9
Does SCE&G currently receive any of its energy supply from solar panels on its system?	10
Does the company consider wind power to be a viable option for electric generation in South Carolina?	10
If it is so difficult to generate electricity with wind turbines, why is wind power being added elsewhere in the country?	11
Are there other drawbacks to wind power?	11
You stated earlier that South Carolina had insufficient on-shore winds to make wind power feasible. Did SCE&G consider off-shore wind power?	12
Would landfill gas plants be economical on the SCE&G system?	13
Does SCE&G expect to add this type of capacity in the future?	13
Is there enough capacity from landfill gas in the state to affect your nuclear decision?	14
Is biomass a reasonable alternative for generating capacity?	14
If SCE&G were presented with acceptable opportunities which would make biomass a feasible alternative, might that eliminate the need for the proposed nuclear plants?	14
Are the La Capra study results reasonable?	15
Has SCE&G taken any steps in an attempt to reduce demand such that additional capacity would not be necessary?	16
Please explain SCE&G's demand response programs.	16

Figure 8.1-6. Contents, Direct Testimony of Joseph M. Lynch (Sheet 1 of 2)

Table of Contents, Continued Direct Testimony of Joseph M. Lynch, SCE&G	
Note: Topics in bold related to need for power	
<u>Topic</u>	<u>Page</u>
Are there reasonable opportunities for SCE&G to expand its demand response efforts?	17
Discuss SCE&G's energy efficiency programs.	19
Have these DSM programs proven to be successful?	20
Does SCE&G plan to expand its portfolio of programs?	21
Is it possible that your expanded energy efficiency efforts might affect SCE&G's decision to build two nuclear plants?	22
Did the company analyze the reasonableness of more traditional generation solutions?	23
Were years other than 2016 and 2019 considered for the nuclear strategy?	24
Please summarize the results of the economic analysis.	25
Has the company studied the potential impact of its new DSM efforts on the need for the nuclear facilities?	27
What conclusion did you reach?	28
What total efficiency reductions are required?	28
Why did the company assume that CO ₂ emission allowances would cost \$15 per ton and escalate at 7% per year?	28
What were SCE&G's projections for natural gas prices	29
Could the company's projection of gas prices be high	30
How did the company project the cost of nuclear fuel?	30
Do you consider these projections of fuel costs to be reasonable?	30
Please summarize your testimony.	31
Does this conclude your testimony?	32

Figure 8.1-6. Contents, Direct Testimony of Joseph M. Lynch (Sheet 2 of 2)

Table of Contents	
Direct Testimony of David K. Pickles, SCE&G	
Note: Topics in bold related to need for power	
<u>Topic</u>	<u>Page</u>
Please state your name, business address, and position.	1
Please describe ICF International.	1
Describe your educational background and business experience.	2
On whose behalf are you testifying?	3
Have you ever testified before this commission in the past?.....	3
What subjects do you discuss in your testimony?	3
What is demand-side management?	3
What are the benefits of DSM?	4
Please describe SCE&G's current DSM programs	5
Is SCE&G considering expanding its portfolio of DSM programs?	6
Have you performed a detailed assessment of the potential for DSM in SCE&G's service territory?	6
Is it likely that reasonably achievable SCE&G-sponsored cost effective DSM programs could change the need to build the plants?	8
Do you believe that there is an opportunity for additional cost effective DSM programs within the SCE&G service territory?	8
Does this conclude your testimony?.....	10

Figure 8.1-7. Contents, Direct Testimony of David K. Pickles

Table of Contents	
Rebuttal Testimony of Joseph M. Lynch, SCE&G	
Note: Topics in bold related to need for power	
<u>Topic</u>	<u>Page</u>
Are you the same Joseph M. Lynch that has prefiled direct testimony in this case?	1
What is the purpose of your rebuttal testimony in this proceeding?	1
On page 13 of her direct testimony, Ms. Brockway states that the deferred consideration of the company's integrated resource plan ("IRP") "assur[ed] that no public or stakeholder review or commission approval of its planning process could occur independent of the decision on this nuclear project." Do you agree with this contention?	1
When did SCE&G begin serious consideration of the construction of the two proposed nuclear plants?	3
Do you agree with Ms. Brockway's claims that the company did not consider alternatives to nuclear generation? ...	5
Do you agree with Ms. Brockway's assertion that certain parties in South Carolina are seriously considering the construction of wind powered generation?	5
Are there any off-shore wind projects currently operating in the United States?	6
Do you agree with Ms. Brockway's statement on page 17 of her direct testimony that, while reliable capacity from a wind turbine is often much lower than its nameplate capacity, it does not prevent utilities across the country from including wind as an important resource in their portfolio?	7
Ms. Brockway claims on page 18 of her direct testimony that the company "sets up a straw man by calculating what would be required to displace 2,234 mws of [nuclear] generation." Is that what the company is doing?	9
What is your opinion with respect to Ms. Brockway's suggestion on page 18 of her direct testimony that SCE&G should consider alternative sources of generation as "part of a superior alternative portfolio?"	10
Do you agree with Ms. Brockway's conclusions beginning on page 18 of her direct testimony regarding the suitability of constructing solar power in South Carolina and her suggestion that Duke Energy's solar initiatives in North Carolina demonstrate solar power's viability for this state?	10
Do you agree with Ms. Brockway's statement on page 20 of her direct testimony that the company has not shown that "as of 2009, it will have exhausted all demand-reduction potential via DSM?"	12
What then is the company saying about exhausting all demand-reduction potential?	13
Does SCE&G contend that it has exhausted the potential for energy efficiency on its system?	14
Beginning on page 25 of her prefiled direct testimony, Ms. Brockway claims that SCE&G's measures of success with DSM do not demonstrate success at all. Specifically, on page 26, she states: "the company's statistics measure activity, not results." Do you agree?	14
Ms. Brockway states on page 21 of her direct testimony that California has flattened its per capita kwh use from 1975 through 2004. Please place this statement in proper context.	16
On page 22 of her direct testimony, Ms. Brockway offers exhibit NB-3 based on EIA Form-861 filings as evidence that "a number of utilities around the country have been able to harvest significantly more energy and demand savings than the company acknowledges are possible." Do you agree?	17
Does this conclude your rebuttal testimony?	19

Figure 8.1-8. Contents, Rebuttal Testimony of Joseph M. Lynch

- List of Questions**
- ORS First Continuing Audit Information Request (CHG-1)**
1. Please provide all documents that describe the development of the load forecast utilized in the May 2008 Update to SCE&G's Integrated Resource Plan ("IRP").
 2. Did SCE&G evaluate the impacts of any load forecast other than the load forecast shown on page 2 of the May 2008 Update to SCE&G's IRP? For example, did SCE&G consider a "Low Forecast" and/or a "High Forecast" in addition to the base forecast?
 3. What level of confidence does SCE&G attribute to the load forecast shown on page 2 of the May 2008 Update to SCE&G's IRP?
 4. Was SCE&G able to include the impact of the recent economic downturn in the load forecast utilized in the May 2008 Update to SCE&G's IRP? If so, please describe the impacts to the load forecast. If not, please explain.
 5. For each customer class, please provide the actual monthly energy sales for January 2000 through the most recent month available.
 6. For each customer class, please provide the forecasted monthly energy sales for January 2008 through December 2022.
 7. Please provide the monthly and annual system peaks for January 2000 through the most recent month available.
 8. Please provide the day and hour in which the monthly system peaks occurred for January 2000 through the most recent month available.
 9. Please provide the SCE&G FERC Form 1 for the years 2000 through 2007.
 10. Please provide in electronic format (via CD) all spreadsheets used to develop the load forecast utilized in the May 2008 Update to the SCE&G IRP.
 11. Please provide in electronic format (via CD) all models utilized to develop the load forecast used in the May 2008 Update to SCE&G's IRP.
 12. Please provide the five most recent SCE&G load forecasts.
 13. For each DSM program that SCE&G evaluated and rejected, please provide a detailed description of the program, the basis for the program's rejection and all spreadsheets and models (in electronic form via CD) used to evaluate the program.
 14. For each load management program that SCE&G evaluated and rejected, please provide a detailed description of the program, the basis for the program's rejection and all spreadsheets and models (in electronic form via CD) used to evaluate the program.
 15. Please provide the efficiency for the Fairfield Pumped Storage Plant.
 16. Please provide actual hourly system loads for each hour in the calendar year 2007.
 17. Please provide the basis for the capacity ratings shown on page 11 of the May Update to SCE&G's IRP.
 18. Please provide the most recent capacity test for each of SCE&G's generating units.
 19. Do any of SCE&G's generating units have additional capacity (in addition to the capacities shown on page 11 of the May Update to SCE&G IRP) that is available in the summer for short periods of time? If so, please list each such generating unit and the amount of additional capacity available.
 20. Please provide the anticipated retirement dates for each SCE&G generating unit.
 21. Please provide all studies, reports, analyses, memos and documents that support SCE&G's "12 to 18 percent" reserve capacity requirement.

Figure 8.1-9. List of ORS Questions (Sheet 1 of 4)

List of Questions, Continued

ORS First Continuing Audit Information Request (CHG-1)

22. Please describe in detail the development of SCE&G's supply-side expansion plan described in the May 2008 Update to SCE&G's IRP.
23. Please provide all studies, reports, analyses, memos and documents that support SCE&G's selection of additional nuclear capacity in 2016 and 2019.
24. Please describe each computer model utilized to support SCE&G's selection of additional nuclear capacity in 2016 and 2019.
25. Please provide in electronic form (via CD) all spreadsheets used to develop or analyze SCE&G's supply-side expansion plan given in the May 2008 Update to SCE&G's IRP.
26. For each supply-side option that SCE&G considered in the development of the supply-side expansion plan given in the May 2008 Update to SCE&G's IRP, please provide the following:
 - a) A description of the supply-side options
 - b) Construction costs
 - c) Fixed O&M cost
 - d) Variable O&M cost
 - e) Fuel utilized
 - f) Fuel costs
 - g) Average and incremental heat rates
 - h) Startup costs or startup energy
 - i) Minimum down time
 - j) Minimum up time
 - k) Operational limitations
 - l) Equivalent forced outage rate
 - m) Scheduled maintenance requirements
27. Please provide all reports, documents, studies, analyses and memos that support the information provided in response to 26.
28. Please describe all sensitivity analyses that were performed as a part of the development of the supply-side expansion plan.
29. Please provide the five best supply-side expansion plans that were rejected in favor of the selected supply-side expansion plan.
30. Please provide, in electronic form, the historical values of territorial sales, by class (residential, commercial, industrial, street lighting, other public authorities, municipalities and cooperatives), also by individual categories as outlined in Table 1 "Short Term Forecasting Groups" in SCE&G's IRP May 2008 Update.
31. Please provide, in electronic form, short-term baseline forecasts of territorial sales — aggregate, by class and by individual categories as outlined in Table 1 in SCE&G's IRP May 2008 Update.
32. Please provide, in electronic form, the historical values of customers, average usage and total usage by classes and/or individual categories utilized as a basis in the planning model.
33. Please provide, in electronic form, the forecasts of customers, average usage and total usage by classes and/or individual categories for the planning horizon utilized in this proceeding.

Figure 8.1-9. List of ORS Questions (Sheet 2 of 4)

- List of Questions, Continued**
- ORS First Continuing Audit Information Request (CHG-1)**
34. Please provide, in electronic form, the detailed adjustments to baseline forecasts generated by short-term forecasting models. Please provide all work-papers in electronic form.
 35. Please explain how the non-model adjustments (adjustments due to AC and heat pump efficiency standard change, improved lighting efficiencies, addition of several large industrial loads and any others) were calculated. Specify why a particular amount of reduction or addition has been adopted (see table on page 5 of the IRP May 2008 Update). Please provide all relevant work papers in electronic form.
 36. Please provide model specifications for each of the short-term models (customers, average usage and total usages). Please specify the variable names, estimation periods, and any data transformations that might have been utilized in model estimations.
 37. Please provide, in electronic form, estimation results of models of short-term sales (by class, by individual categories) for both regression and ARIMA models. These results should include, but not limited to, the following: estimation summary table, ANOVA table and coefficient tables, as output by the SAS software.
 38. Please provide, in electronic form, the historical values of all variables (weather, economic, demographic, and other relevant variables such as dummy variables) used in the estimation of the short term models. Please also provide in electronic form the forecasted value of the independent variables used for the forecast of short-term sales. Please provide all information, in electronic form, that can be used to replicate the model results.
 39. Please provide, in electronic form, work papers that detail the process of obtaining the final forecast of territorial sales by class and individual categories.
 40. Please provide the out-of-sample forecast performance of the short-term model of territorial sales since 2000.
 41. Are there any previous versions of the short-term models used in previous IRP's? If there are, were adjustments made to the earlier version of the models? If so, please specify and explain what adjustments were made and why the adjustments were made.
 42. Please show, in electronic form, the detailed process of developing HDD and CDD to account for billing cycles. Please include all relevant work papers.
 43. Please provide, in electronic form, the plots of average use by month and the resulting summer and winter groups mentioned on bottom of page A-2 and top of page A-3 in the May 2008 Update of IRP.
 44. Please be specific about the effect of time on average use as described in the middle section of A-3 in the May 2008 Update of IRP. Please provide an electronic version of the models estimate using the three groups of time variables mentioned, and the variable values used in the regressions.
 45. Please explain what statistics were involved in selecting appropriate ARIMA models. Were the final models selected mainly by the software automatically or by the analysts? What main statistic was used in determining the final version of the models?
 46. Does the load forecast in Exhibit G of the Application (Docket No. 2008-196-E) reflect the short term forecasts? How have the long-term and short-term load forecasts been reconciled for consistency? If adjustments were made in this regard, please explain in detail and provide any work papers in electronic form to this effect.
 47. Please provide, in electronic form, the historical values of the variables (dependent and independent variables) used in the long range sales forecasts by class and appropriate subgroup. Also provide in electronic form the forecasts for each group.
 48. Please provide, in electronic form, the forecast models of long-term sales including model specification, variables definitions, estimation periods, estimation results and diagnostic statistics. Please explain any tests that have been used to determine the degree of statistical problems such as autocorrelation and heteroscedasticity. If problems existed, provide any corrective procedures that have been adopted?

Figure 8.1-9. List of ORS Questions (Sheet 3 of 4)

- List of Questions, Continued**
- ORS First Continuing Audit Information Request (CHG-1)**
49. Are any of the time-series variables nonstationary? Please explain if any tests have been performed.
 50. Please provide more details regarding the appropriateness of the models as mentioned on pages B-3 and B-2 in the May 2008 Update of the IRP. Please provide examples of the appropriateness of the elasticity coefficients against studies of electricity sales. Please provide the sources of these studies.
 51. Please explain why different methods were used to forecast summer and winter peak demands. Were the decisions based on statistical tests or judgment? If they were based on statistical tests, what tests have been performed? Please provide the tests' results. If they were based on judgment, please explain.
 52. Please provide, in electronic form, the calculation of load factors for different categories.
 53. Please provide, in electronic form, the calculation of the firm summer territorial peak demand including the forecasts of individual customer demand, incremental reduction in demand and the final peak demand estimates as outlined on page B-8 of the May 2008 Update of IRP.
 54. Please provide, in electronic form, the historical summer and winter peaks used in the determination of peak demand hours as outlined on pages B-6 and B-8 of the May 2008 Update of IRP.
 55. Please provide, in electronic form, the correlations between winter peaks and total territorial energy and weather. Please also provide the data used in calculation.
 56. Please provide the data (including historical values of variables and the forecasted input variable values for forecast) and model estimation results for the winter peak demand in electronic form. Specify any adjustments and data transformations that have been performed.
 57. Please provide long-term forecasts of territorial sales and demand from previous annual runs, and actual values of sales and demand since year 2000.
 58. Please provide all information, in electronic form, related to graphs on pages 7 (Average Cost of Fuel) and 8 (Projected Fuel Costs) in Exhibit H. Please specify the source of fuel forecasts. Please provide the basis for gas price forecasts.

Figure 8.1-9. List of ORS Questions (Sheet 4 of 4)

Table of Contents	
Testimony of Dr. Zhen Zhu, ORS	
Note: Topics in bold related to need for power	
<u>Topic</u>	<u>Page</u>
Please state your name, business address and occupation	1
Please state your educational background and experience	1
Whom are you representing in this proceeding?	1
What is your assignment in this proceeding?	1
Have you testified before this commission?	2
Have you reviewed SCE&G's load forecast?	2
Describe SCE&G's energy sales and peak demand in 2007.	2
Please briefly describe SCE&G's forecasts of energy sales and peak demand for the next fifteen years?	3
How does SCE&G's forecasts compare to other utilities in the region?	3
How do SCE&G's forecasts of sales and peak demand compare to its historical values?	3
What caused the forecast of territorial sales and summer peak demand to be lower than the historical growth rate of sales and summer peak demand?	4
How has SCE&G developed the forecast in energy sales?	4
Discuss SCE&G's long range energy forecast models.	5
Please explain the reason for the large reduction in the forecast of sales to wholesale customers.	5
Did SCE&G adjust model forecasts to reach the final forecasts of energy sales?	5
Describe the adjustment to model forecast output.	6
Please describe and comment on the magnitude of the adjustment.....	6
Please describe SCE&G's forecasts of peak demand.	6
Are SCE&G's forecasting methods consistent with industry conventions?	7
Have you evaluated SCE&G's model performance?	7
Do you believe SCE&G has over estimated future load growth?	8
Please describe SCE&G's gas price forecast.....	8
How was SCE&G's gas price forecast obtained?	8
Comment on the method SCE&G used in obtaining gas price projections.	9
How does SCE&G's gas price forecast compare to current NYMEX prices?	9
How does SCE&G's gas price forecast compare to U.S. Department of energy's long term price forecast?	9
Have you reviewed SCE&G's coal price forecast?	9
Have you reviewed SCE&G's nuclear fuel price forecast?	10
What is your conclusion regarding SCE&G's load and fuel price forecasts?	10
Does this conclude your testimony?	10

Figure 8.1-10. Contents, Direct Testimony of Zhen Zhu

Table of Contents	
Testimony of George W. Evans, ORS	
Note: Topics in bold related to need for power	
<u>Topic</u>	<u>Page</u>
Please state your name, business address and occupation.	15
Mr. Evans, please state your educational background and experience.	15
Where have you testified before?.....	16
Have you appeared before the public service commission of south carolina in the past?.....	16
What is the purpose of your testimony in this proceeding?.....	16
Please summarize your conclusions.	17
How is your testimony organized?.....	17
What process did SCE&G follow in estimating future needs for additional resources?.....	18
Would you describe this process as being industry standard?	18
Please describe SCE&G's development of its current load forecast.	18
How did SCE&G determine the capabilities of its existing resources?	18
Is this an industry standard approach?	19
Do you find the capabilities used by SCE&G to be reasonable?.....	19
Do you agree that SCE&G will need additional base load generation at least by 2016?.....	19
What reserve margin does SCE&G use to determine whether it has sufficient generating capacity?	19
Is this 12 to 18% requirement similar to other local electric utilities?	20
Combining SCE&G's load forecast, portfolio of existing generating capacity and reserve margin requirement, what future capacity needs emerge?.....	20
Do the proposed nuclear additions fit into SCE&G's future capacity needs?.....	20
Please describe the process used by SCE&G to select the proposed nuclear additions.	21
Do you consider the company's process to be sufficient to justify the selection of the proposed nuclear additions?	21
What process have you used to reach this conclusion?	22
What were the results of your examination of the company's analyses?.....	22
What were the results of your independent analysis?	23
What do you recommend?	23
Does this conclude your testimony?.....	23

Figure 8.1-11. Contents, Direct Testimony of George W. Evans

8.2 STATE NEED-FOR-POWER PLANNING – SANTEE COOPER

Santee Cooper is a state-owned public utility created by the South Carolina General Assembly. The South Carolina Governor appoints the Santee Cooper Board of Directors with the advice and consent of the Senate. The General Assembly has created an advisory board to oversee Santee Cooper operations. The advisory board is composed of the Governor, Attorney General, State Treasurer, Comptroller General, and Secretary of State (SCCL 2007d).

Santee Cooper provides electric service directly to more than 155,000 residential, commercial, and industrial customers. In addition, Santee Cooper is the primary source of power distributed by 20 of the state's electric cooperatives to over 665,000 customers located in all of the state's 46 counties (Santee Cooper 2005). **Figure 8.1-1** shows South Carolina regulated electric service territories. The Santee Cooper direct service territory is shown in cross-hatched white and is further identified by the numeral 27 (identified in the legend as South Carolina Public Service Authority). The electric cooperative service territories are shown in green and are further identified as numerals 6 through 13 and 15 through 26.

South Carolina statutes require Santee Cooper to submit an integrated resource plan triennially, with annual updates during intervening years, to the State Energy Office (SCCL 2007e). The statutorily required contents are the same as those imposed by the PSC on SCE&G, that is:

- Demand and energy forecast for at least a 15-year period
- Supplier's or producer's program for meeting the requirements shown in its forecast in an economic and reliable manner, including demand-side and supply-side options
- Brief description and summary of cost-benefit analysis, if available, of each option which was considered, including those not selected
- Supplier's or producer's assumptions and conclusions with respect to the effect of the plan on the cost and reliability of energy services, and a description of the external environmental and economic consequences of the plan to the extent practicable

The integrated resource plan is a public document, providing disclosure to customers and the general public, the advisory committee, and the General Assembly. Santee Cooper's most recent integrated resource plan is dated 2008 (Santee Cooper 2008). This contains information summarized in the following paragraphs.

8.2.1 LOAD FORECAST

The Santee Cooper integrated resource plan contains forecasts of energy sales, summer peak demand, and winter peak demand. Santee Cooper works with GDS Associates, Inc., to perform annual updates of its load forecast database to

include the most recent historical data, including electric system data (e.g., number of customers, energy sales, revenues by customer class), economic data, and weather data. Santee Cooper bases historical values on data available from the Census Bureau, Department of Labor, and Bureau of Economic Analysis, and on Santee Cooper's own records. Most recent historical records have shown that Santee Cooper's winter peak demand is greater than its summer peak demand.

Santee Cooper then forecasts growth trends for key economic and demographic factors, including population, employment, personal income, retail sales, and inflation. Between 1997 and 2005, after weather adjustment, the Santee Cooper average annual forecasting error was less than 1%. Projected values are based on information obtained from Woods & Poole Economics, Economy.com, and the University of South Carolina (Division of Research, Moore School of Business).

The Santee Cooper service area is composed of three electric systems that have differing geographic, demographic, economic, and weather characteristics. Santee Cooper prepares separate economic outlooks and forecasts for each area and combines them for total territorial energy sales and peak demand forecasts.

Santee Cooper develops forecasts of monthly energy sales and peak demand requirements for the 20-year period. For energy sales forecasting, Santee Cooper uses econometric modeling for weather-sensitive components (residential and commercial classifications) and historical trends and customer input for non-weather-sensitive components (industrial classifications). For peak demand forecasting, Santee Cooper uses econometric modeling based on temperatures on historical peak days.

Santee Cooper accounts for uncertainties in the forecasting process by using model simulations for energy sales and peak demand. Santee Cooper uses temperature distribution to develop a probability distribution of temperature at the time of the territorial peak. The results provide peak demand estimates for given temperatures and the probabilities that load requirements will rise or fall to specified levels around the base case forecast (Santee Cooper 2005).

In the 2007 load forecast, forecasted energy and peak demand projections are reduced to take into account potential savings from future energy efficiency and conservation programs (Santee Cooper 2008).

Figure 8.2-1 illustrates the results of the Santee Cooper energy sales forecast and **Table 8.2-1** identifies the values used to create the figure. As shown, Santee Cooper expects its energy sales to grow approximately 1.8% per year for the next 15 years, rising from 28,982 gigawatt-hours in 2008 to 36,461 gigawatt-hours in 2021 (Santee Cooper 2008). In large part, this growth is attributable to Santee Cooper directly serving one of the state's fastest growing areas, Myrtle Beach. Santee Cooper's growth rate in its direct service area has averaged 3.5% over the past 5 years (Santee Cooper 2007). It should be noted that the projected growth rate does not include growth in Santee Cooper's direct-served large industrial sector. Growth in the large industrial sector beyond contract amounts is not assumed in the load forecast projections. For overall perspective, **Figure 8.2-1**

and **Table 8.2-1** also include Santee Cooper historical energy sales for the past 10 years.

8.2.2 DEMAND-SIDE MANAGEMENT

Santee Cooper provides energy conservation options for residential and commercial customers, giving reduced rates for homes and buildings built or upgraded to high energy efficiency standards. This includes standards for heating and air conditioning equipment, water heaters, weather stripping and storm windows and doors, attic insulation, and major electric appliances. Customers can also obtain low-interest loans for purchasing these items, and commercial customers may be eligible for up-front rebates (Santee Cooper 2005).

Curtailed, interruptible, and economy power pricing rates are available for commercial and industrial customers. Time-of-use pricing encourages electricity usage during off-peak times and discourages usage during peak loads (Santee Cooper 2005).

In 2008, Santee Cooper's Board of Directors approved a new conservation initiative that will allow its residential customers to receive energy efficient light bulbs. This program encourages the use of compact fluorescent lights (CFL) in homes served by Santee Cooper as a way to conserve energy. Under this program, residential customers received a voucher in their electric bill which could be redeemed for twelve Energy Star, 75-watt equivalent CFLs. With more than 135,000 direct serve residential customers, the potential number of CFLs to be provided by Santee Cooper will be approximately 1.6 million bulbs at a cost of approximately \$2.7 million. This equates to over 68,000 MWh per year in total energy savings. The program will also have an educational component detailing information on the energy savings from switching from traditional light bulbs to CFLs. As of the middle of July 2008, Santee Cooper has given away over 500,000 CFLs to over 45,000 customers.

Subsection 9.2.1.3 provides additional detail about Santee Cooper demand side management.

8.2.3 EXISTING CAPACITY AND ENERGY SALES

At the end of 2007, Santee Cooper owned summer peak generating capacity of 5,089 MW. The summer generation capacity mix included (Santee Cooper 2008):

- Coal-fired plants (3,371 megawatts, or 66% of capacity)
- Oil- and gas-fired plants (1,270 MW, or 25% of capacity)
- Hydroelectric plants (130 MW, or 3% of capacity)
- Partial ownership in Unit 1 (318 MW, or 6% of capacity)

With an addition of 419 MW of firm purchases and a lease, Santee Cooper's total summer peak generating capacity comes to 5,508 MW.

In 2007, coal provided approximately 84% of the energy sales, nuclear 10%, oil, natural gas, and landfill gas 4%, and hydro 1% (Santee Cooper 2007). [Figure 8.2-2](#) shows the growth in capacity that Santee Cooper projects through 2021, with [Table 8.2-1](#) showing the values used to create the figure. This data indicates an expected growth in summer capacity from 5,766 MW in 2008 to 8,147 MW in 2021.

8.2.4 RESERVE MARGIN

Santee Cooper operates using planning reserve targets of 10% and 13% for winter and summer months, respectively. This includes Santee Cooper obligations as part of Virginia-Carolinas Reliability Group. As noted in [Subsection 8.1.1.4](#), failure to maintain reserve margins would increase operating reserves required by SERC. The space between the graphs of capacity and demand forecast on [Figure 8.2-2](#) generally represents reserve margin.

8.2.5 NEED FOR POWER

At the end of 2006, Santee Cooper had under construction two 600 MW coal-fired units (Cross 3 & 4) scheduled for commercial operation January 2007 and 2009, respectively. In addition, Santee Cooper generation planning has identified the following as necessary to meet projected demand:

- Approximately 170 MW simple cycle combustion turbines for commercial operation in 2012
- Various firm purchased power amounts
- 600 MW-class supercritical pulverized coal unit for commercial operation in 2013 or earlier (Pee Dee)
- 45% ownership share of two 1,107 MW nuclear units located at the VCSNS site
- Approximately 250 MW of new renewable resources by 2021

Currently, approximately 70% of Santee Cooper's generation fleet is baseload.

8.2.6 PURCHASED POWER

During 2006, Santee Cooper met 3% (net) of its energy requirements using power purchases. Capacity purchases supplied 8% of demand requirements. Santee Cooper is projecting interim shortfalls in capacity and reserve requirements that it will meet using firm purchases as necessary.

The following is a list of the challenges that Santee Cooper investigated during the generation planning process with regards to the purchase of long-term power from the wholesale market.

- There is a lack of excess baseload capacity within the region. For example, Santee Cooper issued an RFP during the generation planning process in 2005 and there were no bids. Duke, Progress, and SCE&G are also in need of capacity in this timeframe. Many utilities in the region are also tight on capacity and are attempting to build/permit new units.
- Purchased power leads to higher costs than self-build options. During the generation planning process, there were two utilities that were willing to discuss build-to-buy, although this is not attractive because these utilities have to issue taxable debt and have to realize a profit on sales, thereby increasing the cost to Santee Cooper.
- There are currently limited transmission paths into Santee Cooper that can, or are reliably able to, bring in power in the 600 MW range.
- A long-term power purchase deal introduces counterparty risk. There is the risk that the company remains viable and able to deliver the required energy and capacity, and there is the risk that the company can continue to purchase fuel required and provide any liquidated damages that may be written into any contracts.

8.2.7 TRANSMISSION PLANNING

Subsection 2.2.2 describes the VCSNS transmission lines. The Santee Cooper transmission system is interconnected with those of Progress Energy, Duke, SCE&G, Southern Company, and the Southeastern Power Administration. Santee Cooper participates in regional computer modeling to produce an integrated electrical network. Like SCE&G, Santee Cooper is a member of the SERC Reliability Corporation, tests and designs its transmission system to be compliant with reliability standards of the North American Electric Reliability Corporation, and maintains a 10-year schedule of modifications and additions to its network.

8.2.8 RELEVANCE TO NRC REVIEW

See [Subsection 8.1.3](#) for general information about the purpose of the NRC review for need-for-power. Santee Cooper is different from SCE&G in that Santee Cooper is a state-owned public utility. Thus, the Santee Cooper need-for-power analysis in its integrated resource plan is the state's evaluation. [Section 8.4](#) analyzes how the State evaluation satisfies each NRC review criterion.

**Table 8.2-1
Santee Cooper Energy Sales, Capacity, and Peak Demand**

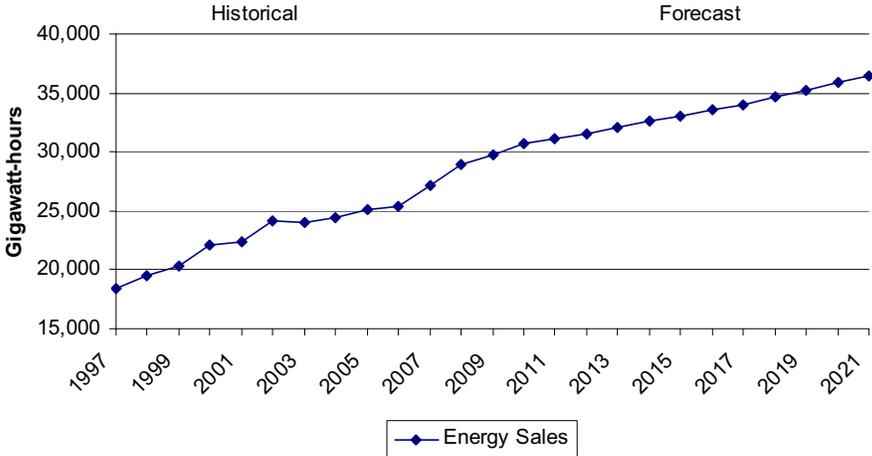
Year	Energy Sales (gigawatt- hours)	Capacity (megawatts)	Peak Demand (megawatts)
Historical^(a)			
1997	18,437		
1998	19,466		
1999	20,286		
2000	22,139		
2001	22,400		
2002	24,121		
2003	24,060		
2004	24,451		
2005	25,064		
2006 ^(b)	25,422		
2007 ^(c)	27,221		
Forecast^(d)			
2008	28,982	5,766	5,430
2009	29,776	6,152	5,616
2010	30,679	6,179	5,820
2011	31,130	6,327	5,931
2012	31,574	6,515	6,041
2013	32,062	7,165	6,161
2014	32,559	7,165	6,282
2015	33,061	7,045	6,404
2016	33,541	7,536	6,521
2017	34,049	7,576	6,645
2018	34,647	8,067	6,778
2019	35,249	8,107	6,913
2020	35,840	8,147	7,045
2021	36,461	8,147	7,184

a) Source: Santee Cooper (2006). Note: Data does not include distribution losses.

b) Source: Santee Cooper (2007). Note: Data does not include distribution losses.

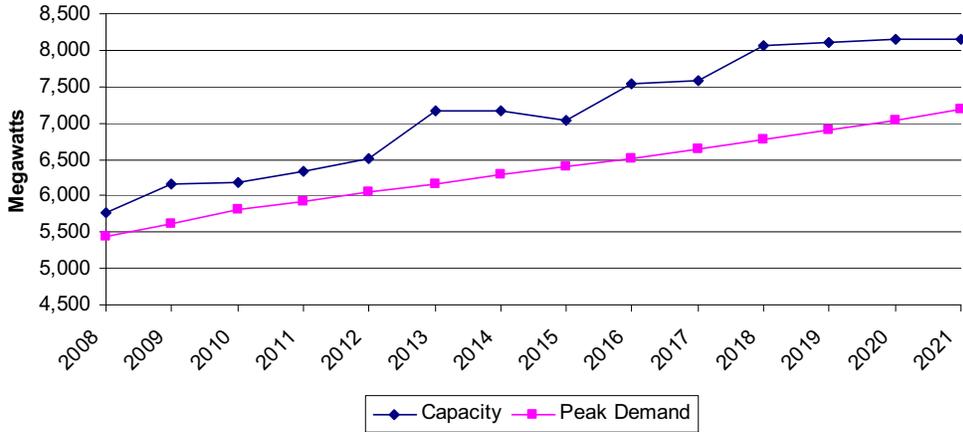
c) Source: Santee Cooper (2008). Note: Data does not include distribution losses.

d) Forecast energy sales include distribution losses. Capacity and peak demand data are summer values. Peak demand data are firm demand only. Capacity includes additional coal units in 2007, 2009, and 2012, several landfill gas units between 2007 and 2012, VCSNS Unit 2 in 2016, natural gas unit in 2018, VCSNS Unit 3 in 2019, and various purchases.



Source: Data from Table 8.2-1. See table for explanatory notes.

Figure 8.2-1. Santee Cooper Energy Sales



Source: Data from Table 8.2-1. See table for explanatory notes.

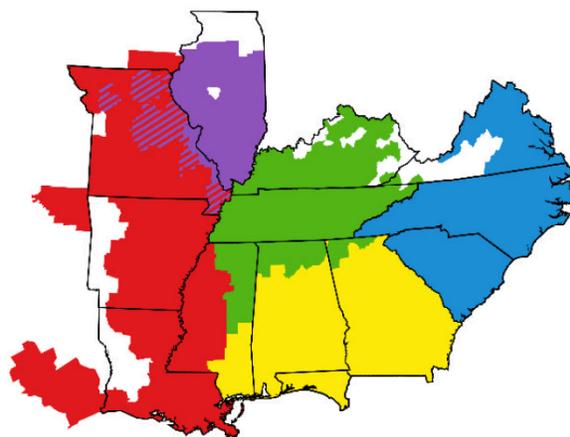
Figure 8.2-2. Santee Cooper Capacity and Demand Forecasts

8.3 REGIONAL NEED-FOR-POWER PLANNING

The North American Electric Reliability Corporation (NERC) was established by the electric power industry as a self-regulatory organization to ensure that the bulk electric system in North America is reliable, adequate, and secure. NERC is composed of eight regional reliability corporations, whose memberships include electricity producers, such as investor-owned utilities and merchant generators, and transmission owners. Annually, member electricity producers and transmission owners submit to their regional corporations information that the Energy Information Administration (EIA), U. S. Department of Energy, requests on Form EIA-411. Submitted information is as follows (EIA 2004):

- Historical and projected peak demand and energy
- Existing capacity
- Historical and projected demand and capacity
- Historical and projected capacity purchases, sales, and transfers
- Bulk electric transmission system description
- Projected changes to bulk electric transmission system

Member methodologies must be documented and are subject to audit by the regional councils. The regional councils compile the information into a regional composite that is submitted to NERC, which prepares national composite information and submits the regional and national composites to EIA. EIA organizes the information, adds its own analyses, and prepares annual reports for public dissemination (e.g., EIA 2006).



SERC Geographic Coverage

The SERC Reliability Corporation (SERC) is one of the NERC regional corporations. SERC has more than 50 members, which are investor-owned utilities; municipal, cooperative, state, and federal systems; merchant generators; and power marketers in 16 states (SERC 2006a). SERC is divided into 5 subregions, one of which is the Virginia-Carolinas Region (VACAR). VCSNS is located within the

SERC and VACAR geographic coverage, and VCSNS owners, SCE&G and Santee Cooper, are corporation members. SERC provides member data in its

annual EIA-411 reports to NERC (e.g., SERC 2006b). In addition, the corporation has provided to NERC the results of a regional self-assessment that NERC has compiled with other regional self-assessments into a national self-assessment (NERC 2006). SCE&G used both of these sources in providing this regional planning information.

Figure 8.3-1 shows southeast regional composite peak demand and capacity estimates for the report's current year (2005) and projections for the next 10 years. **Table 8.3-1** shows the data used to create **Figure 8.3-1**. The average annual growth rate is projected to be approximately 2.1% over the next 10 years (SERC 2006a). This is slightly higher than the historical growth rate of 1.9% over the last 5 years. These data take into account interruptible demand, load management, and other significant demand-side management programs.

Figure 8.3-1 shows two capacity values for each year. The first (Total capacity) includes capacity for which interconnection service has been requested but there is no commitment to provide the capacity. This is frequently the case for merchant generation facilities. While this could be a significant amount of capacity (e.g., estimated to be approximately 39,000 MW by the year 2015), because there is no commitment to serve the regional load, it is not included in reserve margin assessment.

The second capacity value shown in **Figure 8.3-1** (Committed capacity) excludes uncommitted capacity and is the one used in comparison to demand projections to calculate reserve capacity. For the year 2015, the capacity projection of 259,482 MW assumes the addition of almost 40,000 MW of committed capacity between 2005 and 2015. This capacity would exceed the demand projection of 222,083 MW by 37,399 MW, which is slightly more than a 14% capacity reserve.

In addition to the instantaneous peak demand shown in **Figure 8.3-1**, an area's need for electricity can be expressed as an annual net energy for load, which is a measure of electricity usage over time. **Figure 8.3-2** shows annual net energy loads for SERC and **Table 8.3-1** shows data used to create the figure. As illustrated, energy used in the region during 2005 was 962,054 gigawatt-hours, a value that members project will grow to 1,134,210 gigawatt-hours by the year 2015.

SERC data are relevant to the NRC review by providing an independent need-for-power evaluation against which NRC can compare the VCSNS Units 2 and 3 evaluation. SERC data are a composite of evaluations from more than 50 electric generators, giving regional values that would average out outliers in the form of lower- or higher-than normal evaluations. In this manner, the SERC average annual growth projection of approximately 2.1% for the next 10 years compares favorably with the SCE&G and Santee Cooper projections of approximately 2% for the next 15 years.

**Table 8.3-1
SERC Capacity, Demand, Energy Forecast**

Year	Total Capacity (MW)	Committed Capacity (MW)	Peak Demand (MW)	Energy (gigawatt- hours)
2005	247,803	219,749	186,049	962,054
2006	249,550	221,246	183,783	973,215
2007	252,907	223,103	187,982	991,874
2008	260,424	226,119	193,706	1,013,167
2009	265,960	230,978	197,248	1,029,412
2010	273,400	236,518	201,233	1,045,180
2011	279,768	242,176	204,992	1,059,158
2012	283,739	246,262	209,782	1,076,198
2013	287,839	250,402	214,100	1,094,208
2014	291,949	254,587	218,537	1,113,886
2015	298,483	259,482	222,083	1,134,210

Source: SERC (2006b).

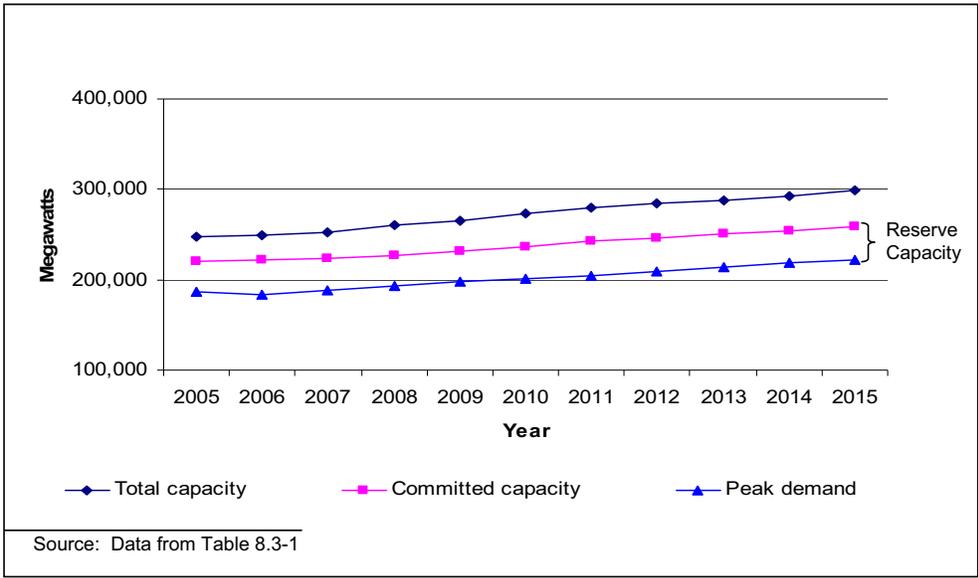


Figure 8.3-1. SERC Capacity and Demand Forecast

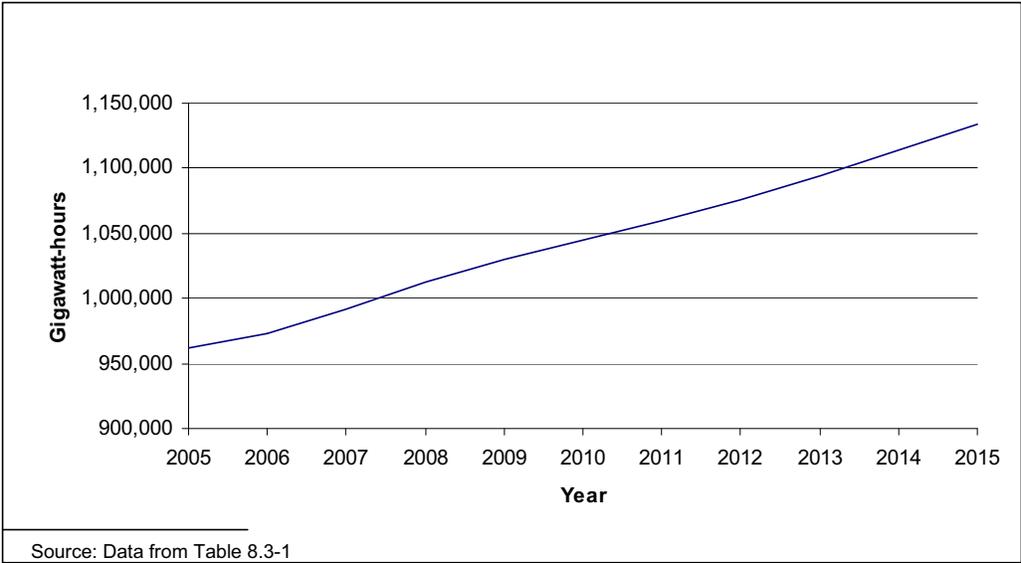


Figure 8.3-2. SERC Energy Forecast

8.4 SATISFACTION OF NRC CRITERIA

As introduced at the beginning of Chapter 8, NRC expects states and regions to prepare need-for-power evaluations that can be the bases for NRC evaluation if they are 1) systematic, 2) comprehensive, 3) subject to confirmation, and 4) responsive to forecasting uncertainty. The following subsections discuss how state and regional evaluations satisfy these NRC criteria for VCSNS Units 2 and 3.

8.4.1 SYSTEMATIC

The state of South Carolina and the SERC approaches to determining need for power include processes that are systematic. The state of South Carolina evaluation of need for power as it relates to SCE&G is a two-step process involving annual IRPs and project-specific applications for certificates of environmental compatibility and public convenience and necessity. As described in [Section 8.1](#), South Carolina statutes establish the requirements to prepare and submit IRPs and certificate applications to PSC and ORS, and a PSC order expands on statutory requirements for IRP contents. PSC, in its adjudicatory role, has the authority to hold a hearing on an IRP and a statutory obligation to hold a hearing on a certification application. ORS, in its investigative role, has the authority to review both documents and has an obligation to represent the public interest in PSC hearings. In the case of VCSNS Units 2 and 3, the PSC certificate hearing and ORS review address both documents. Hearing conduct, participation, record keeping, and decision making is dictated by statute and PSC has established conforming steps of notice, direct and rebuttal testimony; comments, intervention, and discovery; and a hearing schedule. ORS has completed its review and direct testimony on need for power and presented its case during the hearing. Finally, PSC must find and determine the basis of the need for the facility prior to issuing the certification, expected late February 2009.

The state evaluation of need for power for Santee Cooper is fundamentally different than that for SCE&G because Santee Cooper is a state agency. For SCE&G, the systematic nature of the state evaluation is embodied in how it reviews, confirms, and certifies the analysis of need that the regulated utility prepares. For Santee Cooper, there is no state review of another's analysis; the state prepares the analysis. South Carolina statutes require Santee Cooper to prepare and submit IRPs to the South Carolina Energy Office, but not applications for certification, and the systematic nature of the state evaluation lies in how Santee Cooper goes about preparing its IRPs. As [Section 8.2](#) describes, Santee Cooper does this on a triennial basis, with annual updates. Santee Cooper annually updates its load forecast database incorporating the most recent economic, demographic, and weather data, and submits the updated IRP to the South Carolina Energy Office, which makes the document publicly available on its web site (SCEO 2008).

SERC follows a process set up by the North American Electric Reliability Corporation to comply with the Energy Information Administration data-gathering requirements. The corporation gathers the data on an annual basis, compiles it,

and submits it to the North American Electric Reliability Corporation as a region-specific composite. The North American Electric Reliability Corporation submits the data to the Energy Information Administration as a national composite together with region-specific information.

SCE&G has concluded that the statutory, regulatory, and administrative requirements that make up the South Carolina and SERC processes comprise methodical state and regional processes for systematically reviewing the need for power that SCE&G and Santee Cooper are responsible for satisfying.

8.4.2 COMPREHENSIVE

South Carolina imposes similar requirements on SCE&G and Santee Cooper for annual comprehensive integrated resource planning that includes:

- Demand and energy forecast for at least a 15-year period
- Supplier's or producer's program for meeting the requirements shown in its forecast in an economic and reliable manner, including demand-side and supply-side options
- Brief description and summary of cost-benefit analysis, if available, of each option which was considered, including those not selected
- Supplier's or producer's assumptions and conclusions with respect to the effect of the plan on the cost and reliability of energy services, and a description of the external environmental and economic consequences of the plan to the extent practicable

SCE&G and Santee Cooper follow similar industry practices in performing their integrated resource planning, breaking their analyses down by types of customers, identifying economic inputs to modeling, performing more-detailed analyses for short term forecasts, and accounting for supply and demand uncertainties. SCE&G goes through a second, more detailed planning evaluation at the CPCN stage.

ORS has evaluated these practices by SCE&G as part of its review of the certification application and concluded that they are consistent with industry conventions and that their conclusions are reasonable. The comprehensiveness of the ORS review, which constitutes the investigative portion of the state evaluation, is perhaps best illustrated by the list of questions that ORS asked after reviewing the need for power analyses in the IRP and certification application (Figure 8.1-9). The 58 numbered questions, many of which are multiple questions, address inputs to and analytical methodology used in the load forecast, DSM program details, capacity status, reserve capacity requirements, and supply-side expansion. ORS direct testimony indicates that, for some topics, ORS experts performed their own analyses. The ORS pre-filed direct testimony and testimony during the merits hearing, together with any modification identified in the PSC

order, will be the state evaluation of the need for the SCE&G portion of the power from VCSNS Units 2 and 3.

SERC regional planning includes the following elements:

- Historical and projected peak demand and energy
- Existing capacity
- Historical and projected demand and capacity
- Historical and projected capacity purchases, sales, and transfers
- Bulk electric transmission system description
- Projected changes to bulk electric transmission system

SCE&G has concluded that the South Carolina and SERC need-for-power planning processes comprise comprehensive state and regional processes that encompass all of the components that NRC would cover if NRC had to perform a detailed review, covering the subject completely.

8.4.3 SUBJECT TO CONFIRMATION

The state evaluation of the need for the SCE&G portion of the VCSNS Units 2 and 3 power is documented in public records on the PSC docket. The ORS case for the need for power is presented in direct testimony that is subject to public review and comment. Discovery requests can be addressed to ORS, and ORS testimony during the merits hearing is subject to interrogation by PSC and cross examination by parties to the hearing. The PSC findings and conclusions regarding the evaluation are appealable to the South Carolina Supreme Court.

The Santee Cooper evaluation of its need for power is subject to review by its Board of Directors and advisory board. Santee Cooper submits its IRPs to the South Carolina Energy Office, which makes them available on its public web site.

The South Carolina need-for-power planning processes are also confirmable by comparing SCE&G and Santee Cooper forecasts to SERC composite forecasts. Although the SCE&G and Santee Cooper forecasts are included in the SERC regional composite, the regional composite includes forecasts by many other generators and suppliers. The SCE&G and Santee Cooper capacities, 5,808 MW and 5,089 MW, respectively, are not sufficiently large to unduly influence analyses at the level of a region that has a capacity that is well in excess of 200,000 MW. The SCE&G and Santee Cooper projections of approximately 2% annual growth rate compare favorably to the SERC regional annual growth rate of approximately 2.1%. Similarly, SERC projections are comparable to those of other regions in the Energy Information Administration national data.

SCE&G concludes that South Carolina and SERC need-for-power analyses are subject to corroboration at the level of the generator or supplier (e.g., SCE&G and Santee Cooper) and, by way of comparison, to overall regional data.

8.4.4 RESPONSIVE TO FORECASTING UNCERTAINTY

Both SCE&G and Santee Cooper use commercially developed software to perform uncertainty analyses to account for forecasting uncertainty. Each uses econometric modeling that enables them to perform analyses of the sensitivity of results to changes in model inputs and to create high- and low-range forecasts. Uncertainty analysis is also used in establishing planning reserve margins, themselves an acknowledgement of uncertainty.

The ORS evaluation of the SCE&G IRP and application reviewed the appropriateness of the software and inputs and confirmed the reasonableness of the outputs. Together with confirmation that conservative assumptions went into the analysis, the ORS evaluation concluded that the case for need for power may reasonably be expected to understate growth and, therefore, the need for power.

8.5 CONCLUSION

SCE&G concludes that South Carolina, having opted to retain traditional regulation of its investor-owned utility (SCE&G) and its state-owned utility (Santee Cooper), has the kind of need-for-power planning process that meets the NRC criteria for an acceptable state need-for-power analysis. Similarly, SCE&G concludes that the SERC process for gathering need-for-power data provides further satisfaction of NRC criteria at the regional level. At the state and regional levels, growth projections support the need for the power that Units 2 and 3 would produce.

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