

*South Carolina Public  
Service Authority  
(Santee Cooper)*



***INTEGRATED RESOURCE PLAN***

*November 2010*

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## Introduction

The South Carolina Public Service Authority (“Santee Cooper”) is a body corporate and politic of the State of South Carolina. Santee Cooper operates a vertically integrated electric utility system, including facilities for generation, transmission, and distribution of electric power and energy.

Santee Cooper is one of the nation’s largest municipal wholesale utilities, whose system serves directly or indirectly over one-third of the State’s population. Santee Cooper serves directly and indirectly some of the most rapidly developing areas of the State, including growing suburban areas outside Charleston, Columbia, Greenville and Spartanburg as well as the coastal areas of Myrtle Beach and the Grand Strand, Hilton Head Island, Kiawah Island and Seabrook Island.

Santee Cooper’s direct customers currently include 30 large industrial customers, Central Electric Power Cooperative Inc. (“Central”), and two municipal electric systems, the City of Georgetown and the City of Bamberg (“Municipal” customers). Santee Cooper also serves directly approximately 165,000 residential, commercial and small industrial retail customers in parts of Berkeley, Georgetown, and Horry counties (“Distribution” customers). Central is an association of 20 electric distribution cooperatives, including the five upstate electric distribution cooperatives that were formerly members of the Saluda River Electric Cooperative, Inc. Central serves primarily residential, commercial and small industrial customers in all 46 counties of the State. Through Central and the two municipal electric systems, approximately 727,000 customers are served indirectly by Santee Cooper.

On a regular basis, Santee Cooper analyzes the existing and future demand and energy needs of its customers in order to ensure it has a plan that will serve its customers in an economical and reliable manner.

Several recent developments have caused Santee Cooper to begin re-evaluating its capital improvement program and long-term power supply plan. First, the on-going economic downturn has reduced the overall demand for electricity. In addition, proposed federal regulation of carbon emissions, along with other proposed Environmental Protection Agency regulations, would significantly increase the operating costs of coal-fired generating stations, thereby causing Santee Cooper to evaluate the possibility of mothballing or retiring certain existing resources. Additionally, in September 2009, Santee Cooper and Central Electric Power Cooperative, Inc. (“Central”) entered into an agreement which, among other things, would permit Central to purchase the electric power and energy requirements necessary to serve five cooperatives located in the upper part of South Carolina (“the Upstate Load”) from a supplier other than Santee Cooper. The Upstate Load will transition to the new supplier over a seven-year period beginning in 2013, and by 2019 will amount to approximately 1,000 Megawatts (“MW”). Previously anticipated sales to Central would be reduced by the amount of the transitioned load.

Based on these factors, on April 23, 2010, Santee Cooper’s Board of Directors canceled plans to build new coal-fired generation in Florence County. Santee Cooper’s current plan calls for the continuation of the efforts to obtain a combined construction and operating license for a 45% ownership share of two 1,107 MW nuclear units at the V.C. Summer Nuclear Station site. Santee Cooper continues to review all aspects of its capital improvement program and long-term power supply plan.

This Integrated Resource Plan (“IRP”) contains the demand and energy forecast for a fifteen-year period, as well as a program for meeting the requirements shown in the forecast. This report also includes a description of demand-side management programs as required by SC Code Section 58-37-10, -30 and – 40.

## **I. Load Forecast Overview**

The load forecast is updated on an annual basis and includes projected monthly energy and peak demand requirements for a twenty year forecast horizon. Santee Cooper retains GDS Associates, Inc. to update and validate the forecasting models, develop an economic outlook, and prepare the energy and peak demand forecasts. The forecast is based on an analysis of historical events and assumptions regarding the future. These assumptions relate to key factors known to influence energy consumption and peak demand, including economic activity, housing characteristics, appliance mix, electricity prices, weather conditions, and local area demographics.

The weather-sensitive portion of the energy forecast (residential and commercial classifications) is developed using econometric models. The non-weather sensitive industrial energy forecast is developed based on historical trends and information provided by individual industrial customers.

Peak demand projections are developed by sector. Econometrics is used to project peak demand for the Distribution, Central, and Municipal sectors. Industrial customer demand is forecast based on contract demand.

The 2010 load forecast includes energy and peak demand savings from future energy efficiency and conservation programs. The current economic downturn is also taken into account. This “base case” load forecast is based on projected economic activity and normal weather conditions, which are based on the most recent twenty-year averages. In addition to the base case load forecast, high and low-range projections of energy and peak demand requirements are developed to address uncertainties regarding the future.

### ***Process***

#### *1) Data Collection*

The load forecast database is updated annually to include the most recent historical data. Database elements include: electric system data (e.g., number of customers,

kWh sales, and revenues by customer class), economic and demographic data, market characteristics, housing characteristics, and weather data.

## *2) Economic Outlook*

An economic outlook is prepared each year to address recent trends in economic activity and to develop growth trends for key economic and demographic factors, including: population, number of households, employment, personal income, retail sales, gross state product, and inflation. Economic outlooks are prepared for the Santee Cooper service area (Myrtle Beach metropolitan statistical area) and for the Central service area (the state of South Carolina). For the purposes of the 2010 load forecast, historical and projected economic and demographic data were obtained from Moody's Economy.com.

## *3) Forecast Development*

The Santee Cooper load forecast represents a territorial load covering portions throughout the state of South Carolina. The forecast is comprised of projections developed for the Distribution, Industrial, Central, and Municipal sectors. Forecasts are prepared for each sector and are aggregated to produce the combined Santee Cooper territorial load forecast.

### *3.1 Distribution*

Distribution requirements include energy sales, peak demand, and distribution losses for the residential, commercial and small industrial classifications. The projected number of residential customers is based on a regression model that specifies a relationship between number of customers and number of households. The projected number of commercial and small

industrial customers is based on a regression model that specifies a relationship between number of customers and employment. A statistically adjusted end-use model is used to project average energy use per residential

customer.<sup>1</sup> The model quantifies the impacts of real household income, price of electricity, household size, housing characteristics, market share of major electric end-uses, appliance efficiencies, and weather conditions. Energy sales are computed as the product of number of customers and average energy use per customer.

An econometric model is used to project average commercial and small industrial energy use per customer. The model specifies a relationship between average annual use per customer, the ratio of real retail sales to employment, heating degree days and cooling degree days. Energy sales are computed as the product of number of customers and average energy use per customer.

Projections of peak demand are developed at the aggregate sector level by season (summer and winter). Econometric models are used to project peak demand as a function of weather normalized energy sales and maximum or minimum daily temperature on the summer or winter peak day.

### 3.2 *Industrial*

Projections of industrial energy sales and peak demand are developed individually for each customer. Projections are based on historical trends, contract demands, and information regarding future plans collected from the individual industrial customers.

### 3.3 *Central Requirements*

Central's 2010 load forecast was prepared by Central staff and provided to Santee Cooper. The forecast was based on econometric models and represents the aggregate 20-year forecast for Central's 20 member

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<sup>1</sup> Statistically adjusted end-use ("SAE") models incorporate the strengths of traditional econometric and end-use models.

cooperatives. The Central forecast reflects the transition of a portion of the Upstate Load from Santee Cooper to another supplier.

### 3.4 *Municipal*

The number of municipal customers is assumed at 2 throughout the forecast period. The number of customers served by the individual cities is not projected. An econometric model is used to project total energy sales for the municipal sector. The model includes real total personal income, heating degree days, and cooling degree days as independent variables.

Projections of peak demand are developed at the aggregate sector level by season (summer and winter). Econometric models are used to project peak demand as a function of weather normalized energy sales and maximum or minimum daily temperature on the summer or winter peak day.

### 3.5 *Total Territorial Requirements*

Total territorial requirements include the combined energy and peak demand requirements for the four sectors (i.e., Distribution, Industrial, Central and Municipal). The peak demand projections represent the highest simultaneous 60-minute load for the combined four sectors.

A simulation model is used to produce probabilistic energy and peak demand forecasts. Model inputs include probability distributions of total personal income, number of households, heating and cooling degree days, and peak day average temperatures. Outputs for each year of the forecast period include energy and peak demand distributions including projections from the 0% to 100% probability levels in increments of 5 percent. The high and low range forecasts are represented by the 95% and 5% probability levels. Results of the simulation analysis provide peak demand estimates for given temperatures and the probabilities that peak demand will rise or fall to specific levels around the base case forecast.



The following table (Table 1) contains the forecasted demand and energy included in LF1001. Table 2 contains historical energy and demand.

**Table 1**  
**2010 LOAD FORECAST** <sup>(1)</sup>

	<b>Summer Peak (MW)</b>	<b>Winter Peak (MW)</b>	<b>Energy Sales (GWH)</b>
<b>2010</b>	5,344	5,655	27,426
<b>2011</b>	5,436	6,011	27,918
<b>2012</b>	5,596	6,166	28,780
<b>2013</b>	5,592	6,155	28,910
<b>2014</b>	5,541	6,099	28,653
<b>2015</b>	5,483	6,037	28,378
<b>2016</b>	5,425	5,993	28,151
<b>2017</b>	5,360	5,933	27,879
<b>2018</b>	5,289	5,866	27,581
<b>2019</b>	5,276	5,868	27,557
<b>2020</b>	5,347	5,942	27,863
<b>2021</b>	5,427	6,026	28,198
<b>2022</b>	5,507	6,110	28,530
<b>2023</b>	5,587	6,194	28,861
<b>2024</b>	5,667	6,278	29,193

(1) Excludes all off-system sales.

**Table 2**  
**Historical Sales and System Peak Loads**

Year	Sales (GWH)	System Peak Load <sup>(1)</sup> (MW)
2009.....	25,813.....	5,590
2008.....	26,687.....	5,650
2007.....	27,221.....	5,563
2006.....	25,422.....	5,195
2005.....	25,064.....	5,371
2004.....	24,451.....	5,088
2003.....	24,060 .....	5,373
2002.....	24,121 .....	4,795
2001.....	22,400 .....	4,803
2000.....	22,139 .....	3,876
1999.....	20,281 .....	3,729
1998.....	19,466 .....	3,523
1997.....	18,437 .....	3,336
1996.....	17,548 .....	3,441
1995.....	16,022 .....	3,102

(1) Excludes all off-system sales to other utilities.

## II. Existing Resources

Santee Cooper’s total summer peak generating capacity as of January 2010 was 5,678 MW (see Table 3). In addition, Santee Cooper receives 84 MW of firm supply from the U.S. Army Corps of Engineers (“Corps”) and 327 MW of firm hydroelectric power from the Southeastern Power Administration (“SEPA”). In August 2006, Santee Cooper entered into a lease agreement with the county of Greenwood, South Carolina for the Buzzard Roost hydro electric generating facility for an additional 15 MW of peak capability.

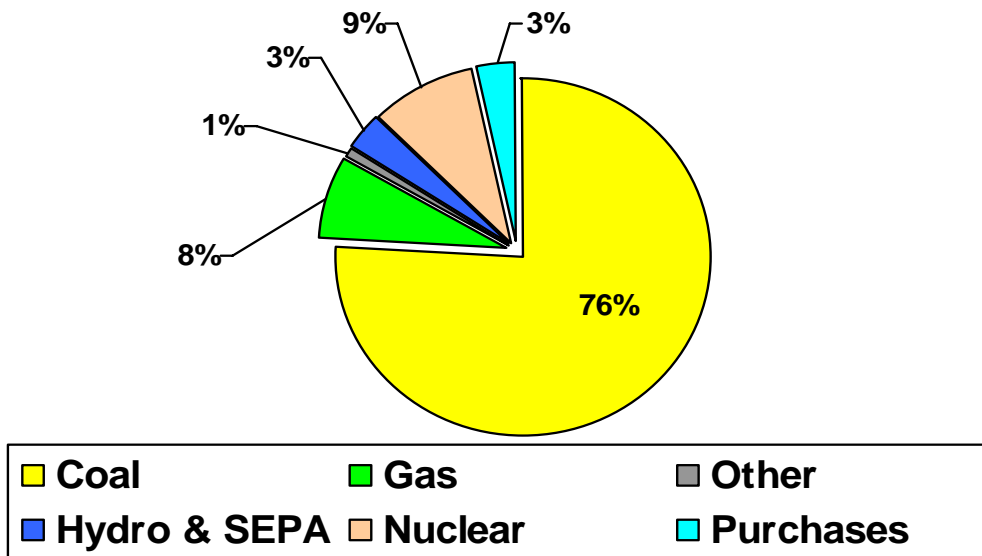
**Table 3**  
**Santee Cooper owned generating facilities as of January, 2010**

<b>Generating Facility</b>	<b>Units</b>	<b>Location</b>	<b>Summer Capacity</b>	<b>Winter Capacity</b>	<b>Fuel</b>	<b>Began Commercial Operation</b>
Jefferies Station	1, 2, 3, 4, 6	Moncks Corner	128	128	Hydro	1942
Wilson Dam		Lake Marion	2	2	Hydro	1950
Jefferies Station	1 and 2	Moncks Corner	92	92	Oil	1954
	3 and 4		306	306	Coal	1970
Grainger	1 and 2	Conway	170	170	Coal	1966
Myrtle Beach Combustion Turbines	1 and 2	Myrtle Beach	20	22	Oil/Gas	1962
	3 and 4		40	50	Oil	1972
	5		30	35	Oil	1976
Hilton Head Combustion Turbines	1	Hilton Head Island	20	25	Oil	1973
	2		20	25	Oil	1974
	3		57	70	Oil	1979
Winyah Station	1	Georgetown	295	295	Coal	1975
	2		295	295	Coal	1977
	3		295	295	Coal	1980
	4		270	270	Coal	1981
V.C. Summer Nuclear Station <sup>(1)</sup>		Jenkinsville	318	318	Nuclear	1983
Cross Station	1	Cross	620	620	Coal	1995
	2		540	540	Coal	1983
	3		580	580	Coal	2007
	4		580	580	Coal	2008
Horry County Landfill Gas		Conway	3	3	Landfill methane gas	2001
Lee County Landfill Gas		Bishopville	10	10	Landfill methane gas	2005
Richland County Landfill Gas		Elgin	5	5	Landfill methane gas	2006
Anderson County Landfill Gas		Belton	3	3	Landfill methane gas	2008
Georgetown County Landfill Gas		Georgetown	1	1	Landfill methane gas	2010
Rainey Station	Combined Cycle	Starr	447	508	Gas	2002
	CT 2A		146	168	Gas	2002
	CT 2B		146	168	Gas	2002
	CT 3		74	85	Gas	2004
	CT 4		74	85	Gas	2004
	CT 5		74	85	Gas	2004
Diesel Units		Various	17	17	Oil	Purchased in 2003
<b>Total Capacity</b>			<b>5,678</b>	<b>5,856</b>		

(1) Represents Santee Cooper's one-third ownership interest.

In 2011, it is forecasted that Santee Cooper's total energy needs will be met primarily by coal at 76% (see Figure 1). Nuclear energy is projected to supply 9% of the total energy needs, while natural gas is projected to supply 8%.

**Figure 1**  
**2011 Projected Total Energy Supply**



### **III. Projections of Load, Capacity and Reserves**

Santee Cooper meets its customers' demand and energy requirements through the use of Santee Cooper generation facilities as well as purchased power contracts. In addition, Santee Cooper ensures there is available capacity over and above that amount necessary to meet the load requirements. This reserve capacity is used to cover unexpected events, such as unit outages, adverse weather conditions, unexpected demand, or an unplanned loss in the transmission system. Santee Cooper evaluates its planning reserve targets periodically and for the purposes of these projections has used reserve targets of 10% and 13%, respectively, for the winter and summer months.

In planning for future reserve needs, the load forecast's firm load requirements, less any requirements that are served by reserved resources such as SEPA, are used. The amount of future reserves needed is compared to the amount of current and planned generation to gauge the need for future generating units.

The load forecast, as well as reserve margin and capacity information, is contained in the table that follows (see Table 4).

**Table 4**  
**Seasonal Projections of Load, Capacity, and Resources**  
**Based on LF1001**

	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S		
	09/10	2010	10/11	2011	11/12	2012	12/13	2013	13/14	2014	14/15	2015	15/16	2016	16/17	2017	17/18	2018	18/19	2019	19/20	2020	20/21	2021	21/22	2022	22/23	2023	23/24	2024
W=Winter, S=Summer																														
<b>Forecast Requirements</b>																														
1 Santee Cooper System Peak	5,657	5,345	6,012	5,438	6,166	5,596	6,155	5,592	6,100	5,542	6,037	5,483	5,993	5,425	5,933	5,360	5,866	5,289	5,868	5,277	5,942	5,347	6,027	5,428	6,111	5,508	6,194	5,587	6,278	5,667
2 Interruptible Load	(49)	(310)	(328)	(328)	(378)	(378)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)	(409)
3 Firm Sales <sup>(1)</sup>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>
4 Total Reserved Load	5,633	5,060	5,709	5,135	5,814	5,244	5,772	5,209	5,717	5,159	5,654	5,100	5,610	5,042	5,550	4,977	5,483	4,906	5,485	4,894	5,559	4,964	5,644	5,045	5,728	5,125	5,811	5,204	5,895	5,284
5 Load Not Requiring Reserve	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(403)</u>	<u>(403)</u>	<u>(395)</u>	<u>(395)</u>	<u>(388)</u>	<u>(388)</u>	<u>(380)</u>	<u>(380)</u>	<u>(372)</u>	<u>(372)</u>	<u>(364)</u>	<u>(364)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>
6 Total Load Requiring Reserve	5,222	4,649	5,298	4,724	5,403	4,833	5,369	4,806	5,322	4,764	5,266	4,712	5,230	4,662	5,178	4,605	5,119	4,542	5,126	4,535	5,200	4,605	5,285	4,686	5,369	4,766	5,452	4,845	5,536	4,925
<b>Cumulative System Capacity</b>																														
7 Available Generating Capacity	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733	5,911	5,733
8 Projected Renewable Resources <sup>(2)</sup>	0	0	58	58	103	108	109	109	111	111	111	111	111	111	143	144	184	184	224	224	264	264	264	264	264	264	264	264	264	264
9 Projected Resource Additions	0	0	0	0	0	0	0	0	0	0	0	0	0	495	503	495	503	495	1,005	991	1,005	991	1,005	991	1,005	991	1,005	991	1,005	991
10 Projected Unit Reductions	0	0	0	0	0	0	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)
11 Available Generating Capacity	5,911	5,733	5,969	5,791	6,014	5,841	6,003	5,825	6,005	5,827	6,005	5,827	6,005	6,322	6,540	6,355	6,580	6,395	7,123	6,931	7,163	6,971	7,163	6,971	7,163	6,971	7,163	6,971	7,163	6,971
<b>Cumulative Purchase (Sales) Contracts</b>																														
12 Long Term	411	411	411	411	411	411	403	403	395	395	388	388	380	380	372	372	364	364	359	359	359	359	359	359	359	359	359	359	359	359
13 Mid Term Contract			170	146	170	146	170	146	170	146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 Proj Short Term Contract			(50)																											
15 Cumulative Production Capacity	6,322	6,144	6,500	6,348	6,595	6,398	6,576	6,374	6,570	6,368	6,392	6,214	6,384	6,702	6,912	6,727	6,944	6,759	7,482	7,290	7,522	7,330	7,522	7,330	7,522	7,330	7,522	7,330	7,522	7,330
<b>Reserves</b>																														
16 Generating Reserves	689	1,084	791	1,213	781	1,154	804	1,165	853	1,209	738	1,114	775	1,660	1,362	1,750	1,462	1,853	1,997	2,396	1,963	2,366	1,878	2,285	1,794	2,205	1,711	2,126	1,627	2,046
17 % Reserve Margin	13%	23%	15%	26%	14%	24%	15%	24%	16%	25%	14%	24%	15%	36%	26%	38%	29%	41%	39%	53%	38%	51%	36%	49%	33%	46%	31%	44%	29%	42%

\*based on LF1001

(1) Excludes capacity sales under negotiation and not executed as of November 30, 2010.  
(2) Includes Santee Cooper resources and long-term purchases.

## IV. Generation Expansion Plan

Santee Cooper's overall power supply objective is to continue to satisfy the electric demand and energy needs of its customers with economical and reliable service. In developing a generation expansion plan to accomplish these objectives, Santee Cooper follows a systematic process in accordance with standard industry practice.

The company begins its resource planning process by reviewing its past load history and developing a load forecast that extends 20 years into the future. Following the determination of future load, potential supply-side generating resources are screened to determine which units are both viable and cost effective. These units are then included for consideration in the plan. Santee Cooper considers the possible addition of a variety of new power resources which may include nuclear, natural gas, oil and coal-fired units, renewable resources, and long-term power purchase agreements.

Assumptions about the future operating environment as well as the various costs associated with operating the new units and the overall system are also defined during the process of screening supply-side options. All of these assumptions are used to develop a recommended generation resource plan.

Santee Cooper then undergoes a rigorous financial and risk analysis to verify that the recommended generation resource plan meets Santee Cooper's needs under a variety of different scenarios.

After a methodical examination and analysis of the developed assumptions, modeling of a variety of different generation mixes, and a thorough analysis of the financial and risk sensitivity of the model results, preliminary recommendations are made.

Currently, Santee Cooper generation expansion plans include:

- 1) Continuation of the efforts to obtain a combined construction and operating license for a 45% ownership share of two 1,107 MW nuclear units at the V.C. Summer

Nuclear Station site.

- 2) Monitoring of potential legislation related to carbon emissions and regulations affecting existing and future generation.
- 3) Periodic evaluation of the generation expansion plan to determine the impacts of items such as potential carbon legislation, nuclear licensing efforts, changes in the load forecast, and updated cost information.

In light of the recent downturn in the economy, proposed federal regulations as well as the reductions in future load requirements, Santee Cooper is reviewing all aspects of its capital improvement program and long-term power supply plan. As of November 1, 2010, Santee Cooper is in active discussions with a number of utilities regarding long-term power sales arrangements, the total of which is over 2,000 MW. Of this, at least 300 MW are the subject of current contract negotiations and are reasonably expected to be finalized by the end of 2010. In addition, Santee Cooper is evaluating proposed environmental regulations to determine their potential impacts on the operation of existing generation resources. These regulations could result in the decision to mothball or retire up to approximately 450 MW of existing resources. Also, Santee Cooper previously included 250 MW of purchased renewable capacity and energy that was assumed to be under contract by 2020. So far, efforts to procure that capacity and energy have resulted in the negotiation for approximately 95 MW of the assumed 250 MW.

## **V. Transmission System Adequacy**

Santee Cooper's transmission and distribution lines, as well as substations, deliver from the generating stations the reliable, low-cost power expected by customers. Santee Cooper operates an integrated transmission system which includes lines owned and leased by Santee Cooper as well as those owned by Central. The transmission system includes approximately 1,220 miles of 230 kilovolt ("kV"), 2,402 miles of 115 kV, 84 miles of 100kV, 1,711 miles of 69 kV, 57 miles of 46 kV and 96 miles of 34 kV and below overhead and underground transmission lines (see Figure 2). Santee Cooper operates 102 transmission substations and switching stations serving 82 distribution



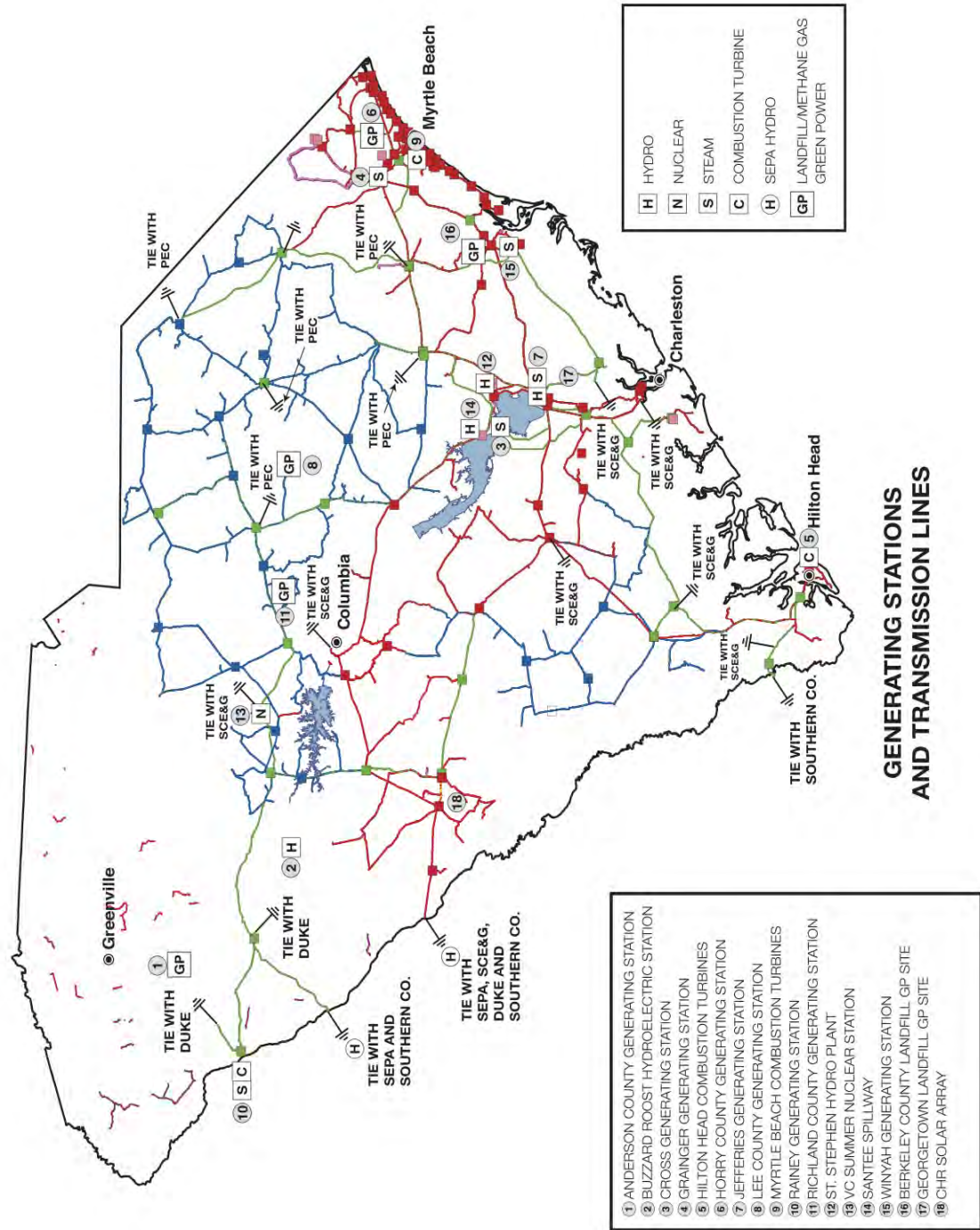
substations and 478 Central Cooperative delivery points. Communications sites at 99 locations are in place to support the monitoring and controlling of integrated power system operations. Santee Cooper plans the transmission system to operate during normal and contingency conditions that are outlined in electric system reliability standards adopted by the North American Electric Reliability Corporation (“NERC”) and to maintain system voltages that are consistent with good utility practice.

Santee Cooper’s transmission system is interconnected with other major electric utilities in the region. It is directly interconnected with SCE&G at eight locations; with Progress Energy Carolinas (“Progress Energy”) at seven locations; with Southern Company Services, Inc. (“Southern Company”) at one location; and with Duke Energy Carolinas, a subsidiary of Duke Energy Corporation (“Duke”), at two locations. Santee Cooper is also interconnected with SCE&G, Duke, Southern Company and SEPA through a five-way interconnection at SEPA’s J. Strom Thurmond Hydroelectric Project, and with Southern Company and SEPA through a three-way interconnection at SEPA’s R. B. Russell Hydroelectric Project. Through these interconnections, Santee Cooper’s transmission system is integrated into the regional transmission system serving the southeastern areas of the United States and the Eastern Interconnection. Santee Cooper has separate interchange agreements with each of the companies with which it is interconnected which provide for mutual exchanges of power.

Santee Cooper is party to the Virginia-Carolinas Reliability Agreement (“VACAR”) which exists for the purpose of safeguarding the reliability of the electric service of the parties thereto. Other parties to the VACAR agreement are SCE&G, Progress Energy, Duke, SEPA, APCI-Yadkin Division, Dominion Virginia Power, North Carolina Electric Membership Corporation, and Public Works Commission of the City of Fayetteville.

As a party to VACAR, Santee Cooper is also a member of the SERC Reliability Corporation, which is one of 8 regions of the North American Electric Reliability Corporation.

Figure 2



## **VI. Energy Efficiency, Conservation, and Demand-Side Management (“DSM”) Activities**

For over 20 years, Santee Cooper has offered demand-side management programs. These programs have measures that save energy and/or demand. The energy and/or demand impacts of the actual and projected participation of Santee Cooper’s directly served retail customers are considered when updating the energy and/or demand needs in the generation plan.

In the fall of 2007, Santee Cooper established a Conservation and Renewable Energy (“C&RE”) Department. The purpose of this department is to develop new energy efficiency and conservation programs and to obtain renewable generation resources.

In 2009, C&RE launched several new energy efficient programs that added to Santee Cooper’s conservation efforts. Some of these programs replaced older energy efficient programs causing these older programs to be closed to new participation. C&RE will continue to launch new energy efficient programs throughout 2010 and 2011.

### **Existing Energy Efficiency Programs**

#### ***Commercial Good Cents***

Commercial Good Cents is offered to commercial customers building new facilities that improve the efficiency in the building thermal envelope, heating and cooling equipment, and lighting. Commercial customers that meet program standards are given an up-front rebate to encourage participation in the program.

Program participation through 2009 resulted in an estimated demand savings of 1,270 kW and an estimated energy savings of 1,741,000 kWh. Total expenditures for the Commercial Good Cents Program incurred through Santee Cooper in 2009 were \$6,102.

### ***Thermal Storage Cooling Program***

The Thermal Storage Cooling Program shifts energy used by commercial customers for air conditioning from peak to off-peak hours by utilizing thermal energy stored in a medium such as ice or water. Rebates are offered to customers who install this type of equipment. There is currently one active participant in this program and an estimated demand reduction of 203 kW.

### ***Interruptible / Economy Power Pricing Rates***

Santee Cooper has developed and offers time-of-use, non-firm, and off-peak rates to its direct-served residential, large commercial and industrial customers to encourage them to reduce their peak demand. The use of these rates is taken into account when developing the load forecast and generation plan.

An “economy power” rate is available to industrial customers, which is based on an hourly incremental energy rate. This is a real time pricing rate; the price for energy changes each hour. Customers must schedule their usage each hour. This service is curtailable in emergency situations by Santee Cooper. Pricing alternatives are available under this rate where the energy price is fixed during certain hours. There are also supplemental curtailable and interruptible rates available to industrial customers which allow for curtailment under certain circumstances.

As part of Santee Cooper’s demand control program, currently there are over 450 MW’s of load taking service under interruptible and economy power schedules. The portion of this load estimated to be on the system at the peak is excluded from the peak demand calculations for generation planning and reserves resource planning.

## **Energy Efficiency Programs Being Discontinued**

### ***Good Cents New and Improved Home Program***

The Good Cents Program was developed to provide residential customers an incentive to build new homes to higher levels of energy efficiency and improve existing homes by correctly sizing heating and air conditioning equipment and installing equipment more

efficient than federal minimum standards. Homes were evaluated to determine if they met the standards set for the program. Inspections were completed throughout construction of the new homes and at the completion of construction for improved homes. This program was closed to new customers as of November 1, 2009 except for any customer who applied for the Good Cents Program prior to that date and whose home was already certified under Santee Cooper's Good Cents Home Program prior to November 1, 2010.

Program participation resulted in an estimated demand savings of 19,301 kW and estimated energy savings of 23,888,000 kWh in 2009. Total expenditures for the Good Cents Program incurred through Santee Cooper in 2009 were \$1,537,961.55.

### ***H<sub>2</sub>O Advantage Water Heating Program***

H<sub>2</sub>O Advantage was a storage water heating program designed to shift the demand related to water heating off-peak. This was accomplished with the installation of an electronic timer or radio controlled switch on an 80 gallon water heater. This program began in 1990. This program was closed to new participation in 2000. The contract spans 10 years so this program will no longer be impacting the system after 2010.

Total expenditures for the H<sub>2</sub>O Advantage Program incurred through Santee Cooper in 2009 for existing participants were \$15,195.01.

## **Energy Efficiency Efforts**

### ***Energy Efficient Lighting***

Santee Cooper offered twelve free CFL bulbs to every residential customer as part of a "Switch and Save" energy efficient lighting effort in 2008. The objective was to encourage residential customers to change their light bulb buying and usage habits for greater energy conservation. Customers received a voucher for twelve ENERGY STAR® 75-watt equivalent CFLs that was redeemable by visiting any of Santee Cooper's Customer Service offices. In 2008, 781,000 CFLs were distributed to 65,083 residential customers.

## **New Energy Efficiency Programs**

Santee Cooper launched its “Reduce the Use South Carolina” energy efficiency effort in September 2009. The goal of this 10-year-long effort is to substantially reduce the use of electricity and improve energy efficiency among its 165,000 direct served residential and commercial customers through rebate programs.

The comprehensive “Reduce the Use South Carolina” energy efficiency effort includes a total of 42 energy efficiency initiatives to help achieve an annual savings of 209 million kilowatt hours, by 2020.

In the first 12 months, Santee Cooper has launched the following rebate programs:

### ***Smart Energy Existing Homes Program***

The Smart Energy Existing Homes Program began on November 1, 2009. Smart Energy Existing Homes are certified by a Santee Cooper Energy Advisor to meet minimum energy performance guidelines. A home can receive the Smart Energy Home certificate by achieving an energy performance target or installing a specific number of eligible energy efficiency upgrades. The rebate for Smart Energy Existing Home is \$600 and is payable to the homeowner.

### ***Smart Energy New Homes Program***

The Smart Energy New Homes Program began on November 1, 2009. The Smart Energy New Homes Program is comprised of two tiers of energy efficiency standards, and it offers incentives to builders to facilitate and encourage their participation. ENERGY STAR® New Home performance standards require that homes be 15% more efficient than the requirements in the 2006 International Energy Efficiency Code (IEEC). Smart Energy New Home performance standards require that homes be 10% more efficient than the requirements of the 2006 IEEC. The rebate for Smart Energy New Homes ENERGY STAR® is \$1,600 and the rebate for the Smart Energy New Homes is \$1,000, both of which are payable to the homebuilder.

### ***Heat Pump Program***

The Heat Pump Program began on September 16, 2010. The heat pump program is for residential customers and offers rebates of up to \$700. When customers participate in the Smart Energy Existing Homes program (\$600 rebate), and choose to add a 15 SEER heat pump with quality installation, they will receive an additional rebate of \$50. They may receive the rebate for up to two heat pumps, bringing the total rebate to \$700. For customers who choose to only install the 15 SEER heat pump with quality installation, they will receive a rebate of \$150. They may receive the rebate for up to two heat pumps, bringing the total rebate to \$300.

### ***Water Heater Program***

The Water Heater Program began on September 16, 2010. The water heater program is for residential customers and offers a \$35 rebate for purchase of a 0.93 EF (Energy Factor) electric storage-type water heater.

### ***Refrigerator Rebate Program***

The Refrigerator Rebate Program began on September 1, 2009. The Refrigerator Rebate Program offers customers rebates for the purchase and installation of ENERGY STAR® refrigerators between 10-30 cubic feet in size. It also offers customers rebates for surrendering their older, inefficient units within the same size range to be recycled by Santee Cooper's recycling contractor. These rebates are intended to reduce the customers' incremental cost of upgrading to higher efficiency appliances, as well as, get the less efficient refrigerators off the grid. To participate in the Refrigerator Rebate Program, the refrigerator must be installed in and/or removed from a residence or business receiving electric service from Santee Cooper.

Rebates include:

\$35 Rebate towards the recycling of a working pre-1993 refrigerator

\$40 Rebate towards the purchase of a new ENERGY STAR® refrigerator

\$75 Rebate towards the purchase of a new ENERGY STAR refrigerator plus recycling of one working refrigerator

\$110 Rebate for purchasing a new ENERGY STAR refrigerator and recycling of two working refrigerators\*

*\*At least one must be a pre -1993 model*

Program participation in 2009 resulted in 149 old refrigerators being recycled with an estimated annual energy savings of 67 MWh and 98 new ENERGY STAR refrigerators being purchased with an estimated annual energy savings of 8 MWh.

### ***Energy Efficient Lighting***

Santee Cooper is targeting residential, as well as, commercial customers in getting them to switch out incandescent light bulbs with energy efficient CFL bulbs.

New residential customers receive a coupon for twelve (12) 20-Watt CFLs to be picked up from any of Santee Cooper's customer service offices. At the time of pick up, a brochure is given to each customer. This provides an educational component regarding the energy savings to be achieved just by switching from traditional incandescent bulbs to CFLs. This brochure explains that CFLs use up to 75 percent less energy than incandescent light bulbs and that CFLs last up to 10 times longer. Educational brochures will also be developed with information on what to look for in a quality CFL bulb, choices of color renderings, choices of bulb shapes, availability of specialized application bulbs, and proper disposal of CFL bulbs.

Commercial CFL distribution is split into the categories of High-Use Sockets and Low-Use Sockets. Commercial customers receive CFLs for the greatest of either 100% of their high use sockets or 50% of their total sockets - only sockets not already using CFLs and those able to utilize a 20W screw-in CFL (equivalent to a 75W incandescent bulb) qualify for this program.

In 2009, Residential CFL Program participation resulted in an estimated annual energy savings of 519 MWh. CFLs were distributed to commercial customers for high-use applications yielding an estimated annual energy savings of 5,485 MWh. CFLs were



distributed to commercial customers with residential-type, low usage applications. The low usage applications yielded an estimated energy savings of 1,421 MWh.

## **VII. Renewable Resources and Programs**

### *1. Renewable Energy*

#### HYDRO

Santee Cooper's largest source of renewable energy is the hydro electric facilities that were developed during the birth of Santee Cooper. Since the 1940's the water that flows through the Santee Cooper lake system has played an integral role in the ability of Santee Cooper to provide low cost reliable power. Originally the hydro units were Santee Cooper's only source of generating capacity. As Santee Cooper grew over the years the hydro electric units on the lake have gradually shifted from the sole source of electric generation to being used mainly as peaking capacity today.

While there are no practical larger hydro projects the scale of the Santee Cooper lake system available in the state, there may be the potential to develop small scale projects distributed throughout the state.

#### BIOMASS

In 2001, Santee Cooper became the first utility in South Carolina to produce electric power using methane gas from landfills as a fuel source. Santee Cooper now has 22 MW of generating capacity that is fueled by methane gas collected at large landfills with construction underway to increase that capacity to 28 MW.

Santee Cooper is looking for ways to increase the use of various forms of biomass to produce electricity. Santee Cooper is investigating the potential of using various wood sources as a fuel, and the potential for methane produced from agricultural waste.

In September 2010, the renewable energy program took a significant step forward. The Santee Cooper Board of Directors authorized Power Purchase Agreements where Santee

Cooper agreed to purchase 50 MW of biomass fueled electricity from Domtar Paper Company, LLC and 45 MW of biomass fueled electricity from Southeast Renewable Energy, to be produced at three 15 MW plants around the state.

### SOLAR

Santee Cooper has developed a Green Power Solar Schools (“GPSS”) program for middle schools in each electric cooperative territory around the state. At the participating schools, Santee Cooper and the local electric cooperative install a 2 kW photovoltaic solar panel (PV) and provide a science curriculum that meets state standards. Nineteen Solar School installations have been completed with a total capacity of over 40 kW. To provide training opportunities for the teachers that will be using the curriculum, a similar 2 kW PV panel has also been installed at Santee Cooper’s Wampee Conference Center.

While South Carolina is not an ideal state for solar power, Santee Cooper continues to investigate and utilize this resource. In addition to the GPSS installations, Santee Cooper built a 16kW Solar Pavilion at Coastal Carolina University, a 20kW installation at the Center for Hydrogen Research in Aiken and a second 20kW installation in December of 2009 at the Technical College of the Lowcountry in Bluffton. Also, with partial funding from the American Recovery and Reinvestment Act, Santee Cooper plans to complete a 310 kW solar installation in Myrtle Beach in early 2011.

### WIND

In 2005, Santee Cooper began investigating the wind generating potential in the state. Santee Cooper partnered with the US Department of Energy and the South Carolina Energy Office to contract with AWS Truewind to provide wind mapping of South Carolina. Since the completion of the mapping, Santee Cooper has joined several partnerships to further the study of potential wind generation in the state.

Meteorological Towers: Santee Cooper helped install and maintain 50m anemometer towers at Waites Island in Horry County and the Baruch Institute in Georgetown. Santee Cooper worked with Coastal Carolina University, Clemson University,

Savannah River National Labs, Secondwind, and the Baruch Foundation to complete these projects. The Waites Tower was removed in August 2009 after two years of operation and the Baruch Tower is still reporting data. While the towers proved that inland wind resources were not strong enough to sustain utility scale wind turbines, they also partially validated the estimates produced by AWS Truewinds in 2005 that predict a large wind resource exists in SC's offshore waters. Also, the Baruch Tower is being used to validate an emerging wind measuring technology, developed by Secondwind. Following the testing, this technology could improve the ability to monitor actual wind data in offshore settings without the installation of large meteorological towers.

Wind Education Project: Santee Cooper is working to install small wind turbines at four public locations where the wind resource is determined to be adequate. Preliminary studies at the Coastal Carolina campus and Georgetown High School revealed an inadequate wind resource at these inland sites. City parks in North Myrtle Beach and Georgetown are set to receive the first two turbines in this program. Two more installations are planned for 2011, with locations to be determined.

Offshore Wind Research: In March 2009, Santee Cooper, Coastal Carolina University and the SC Energy Office announced a joint buoy deployment measuring ocean winds that could lay the foundation for offshore wind energy in the Palmetto State.

After collecting data for a full year, all six buoys were removed in August 2010. Coastal Carolina researchers, working closely with counterparts at NC State, have analyzed the buoy data to help better understand the wave, current, tidal, and wind energy available in South Carolina's state waters.

Based on the buoy data, Santee Cooper has contracted for preliminary designs for an offshore meteorological platform. If approved by the Santee Cooper Board of

Directors, this platform will gather the data necessary for Santee Cooper to better evaluate offshore wind at hub height. Concurrently, Santee Cooper is assisting in transmission and regulatory studies that will help streamline the installation process if Santee Cooper elects to move forward with an offshore project.

## ***2. GOFER Program***

Santee Cooper's Give Oil For Energy Recovery ("GOFER") program, in place since 1990, provides do-it-yourself oil changers a place to safely dispose of used motor oil. In 2009, Santee Cooper collected 1,672,562 gallons of used oil from more than 450 do-it-yourself sites and approximately 1,500 industrial, commercial and farm sites. This oil was safely converted into 17,021,670 kilowatt-hours of electricity with a savings of more than \$1.25 million in fuel costs.

## ***3. Green Power Program***

Green Power customers support the development of renewable Green Power by purchasing blocks each month through their bill. Renewable Green Power costs more to generate than Santee Cooper's traditional generation, and the money raised through Green Power sales is put entirely into the development of new renewable energy. As already noted, Santee Cooper currently generates Green Power through landfill gas facilities and solar panels, and the utility is exploring the feasibility of wind generation and biomass. Santee Cooper's Green Power Tags program allows any South Carolina citizen to purchase Green Power Tags, regardless of who supplies their electricity. As of December 31, 2009, more than 6,000 industries, businesses and homeowners all across the state have joined the effort to protect the environment by purchasing Green Power. All of Santee Cooper's Green Power and Green Power Tags are certified through the Center for Resource Solutions' (CRS) Green-e Program.

# **VIII. Environmental**

The mission of Santee Cooper is to be the state's leading resource for improving the quality of life for the people of South Carolina. To fulfill this mission, Santee Cooper is

firmly committed to being a steward of the environment. As such, Santee Cooper has developed the following Environmental Policy statement:

*Santee Cooper is committed to:*

Compliance with all applicable federal, state and local environmental statutes, regulations, enforceable agreements, and permits, and continual improvement in environmental performance, through

1. proactively seeking ways to enhance compliance,
2. promoting conservation and renewable energy initiatives,
3. minimizing environmental risks,
4. promoting pollution prevention, and
5. dedicating personnel, equipment, training, and materials for the comprehensive Environmental Management System.

## **Conclusion**

Santee Cooper has been a leader in protecting our environment, being the first utility in the state to offer Green Power, generating electricity using landfill gas, promoting conservation and energy efficiency, installing state-of-the-art emission control technology, and funding innovative research into alternative forms of energy. Santee Cooper continues to evaluate and adjust the load forecast and resource plans as needed to meet future customer demand in a reliable and cost effective manner. Demand-side management programs are evaluated on a regular basis for their effect on energy and demand. Santee Cooper offers these DSM programs where cost effective, and has completed generation resource planning necessary to ensure a reliable generation plan to meet projected customer requirements through 2025. Additionally, Santee Cooper has developed rates that have encouraged over 450 MW of contracted peak load control by industrial customers.