

*South Carolina Public  
Service Authority  
(Santee Cooper)*



***INTEGRATED RESOURCE PLAN***

*November 2012*

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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’s primary business operation is the production, transmission and distribution of electrical energy, both at wholesale and retail, to the citizens of South Carolina. Santee Cooper is also authorized to acquire, treat transmit, distribute and sell water at wholesale. Santee Cooper began electric power operations in 1942. The commercial operation of the regional water system began in October 1994.

Santee Cooper is one of the nation’s largest municipal wholesale utilities, whose system serves directly or indirectly approximately 2 million customers in all 46 counties of South Carolina. Santee Cooper serves directly and indirectly 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 29 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). 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 734,000 customers are served indirectly by Santee Cooper. 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).

Santee Cooper has a long-term power agreement with Piedmont Municipal Power Agency (“PMPA”) in which Santee Cooper will provide PMPA its supplemental electric power and energy requirements (ranging from approximately 200 MW to 300 MW) above its current resources beginning on January 1, 2014, for a term of no less than 12

years. Santee Cooper also has an agreement with Alabama Municipal Electric Authority to provide 50 MW unit-contingent capacity and associated energy (25MW-50MW) beginning on January 1, 2014, for a term of 10 years.

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.

Santee Cooper has evaluated its capital improvement program and long-term power supply plan:

- The on-going economic downturn has reduced the overall demand for electricity. Additionally, in 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 six year period beginning in 2013, and by 2019 will amount to approximately 1,000 Megawatts (“MW”).
- On October 19, 2012, Santee Cooper’s Board of Directors authorized retirement of six electric generating units: Grainger Generating Station Nos. 1 and 2, and Jefferies Generating Station Nos. 1, 2, 3 and 4. After evaluating the costs of complying with the newly adopted federal regulations and the foreseeable generation resource needs for Santee Cooper’s system, the Board determined it would not be cost effective to implement the new environmental measures that would be necessary for continued operation of those units. The Board authorized the President and CEO to develop and execute plans for an orderly retirement of the four coal and two oil units. Grainger Generating Station Nos. 1 and 2 will cease to operate on or before December 31, 2012 and Title V air permits will be modified to prohibit operation of those units. Jefferies Generating Station Nos. 1, 2, 3 and 4 will be retired within a timeline to be determined by

Santee Cooper's management and in compliance with applicable regulatory deadlines.

- Santee Cooper is seeking to reduce its level of participation in the two new 1,100 MW (summer rating) nuclear units at the V.C. Summer Nuclear Station ("Summer 2" and "Summer 3") from 45% to approximately 20%. V. C. Summer units 2 and 3 are projected to come online in 2017 and 2018, respectively.

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, appliance efficiencies, 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 and Central sectors. Peak demand for the Municipal sector is

based on total energy requirements and assumed load factors. Industrial customer demand is forecast based on contract demand.

The 2012 load forecast includes energy and peak demand savings from future energy efficiency and conservation programs. The current economic downturn is also taken into account. The “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, electricity prices, 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 2012 load forecast, historical and projected economic and demographic data were obtained from Moody’s Analytics.

### *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. A statistically adjusted end-use model is used to project average energy use per residential customer. 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.

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. Average use per customer is projected using an algorithm incorporating consumption from the prior year and changes in the average price of electricity for the class. 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 2012 load forecast was developed by Central and reviewed by Santee Cooper staff. The forecast was based on econometric models and represents the aggregate 20-year forecast for Central's 20 member cooperatives. The Central forecast reflects the transition of a portion of the Upstate Load from Santee Cooper to another supplier.

### 3.4 *Municipal*

Energy and peak demand requirements for the Municipal sector represent less than one percent of total system requirements. The number of municipal customers is assumed at the current two throughout the forecast period. The number of customers served by the individual cities is not projected. A regression equation, including heating degree days, cooling degree days and an autoregressive parameter, is used to project total energy sales for the municipal sector.

Average seasonal load factors, based on recent historical values, are applied to total energy sales to compute peak demand projections.

### 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. High and low range peak demand forecast scenarios were developed to address weather sensitivity by combining the respective weather impacts for each sector. Impacts for the Distribution were based on an econometric model incorporating extreme and mild temperatures on the peak day and the two



days prior to the peak day. Impacts for the Central sector were based on regression model estimates incorporating extreme and mild temperatures on the peak day. The weather impact for the Municipal sector was assumed at 4 MW. No weather impacts for the Industrial sector were developed since that sector is not weather sensitive.

The following table (Table 1) contains the forecasted demand and energy included in LF1201. Table 2 contains historical energy and demand.

**Table 1**  
**2012 LOAD FORECAST** <sup>(1)</sup>

	<b>Summer Peak (MW)</b>	<b>Winter Peak (MW)</b>	<b>Energy Sales (GWH)</b>
<b>2012</b>	5,397	5,382 <sup>(2)</sup>	28,931
<b>2013</b>	5,387	6,024	28,850
<b>2014</b>	5,330	5,977	28,712
<b>2015</b>	5,255	5,903	28,412
<b>2016</b>	5,173	5,827	28,120
<b>2017</b>	5,100	5,753	27,795
<b>2018</b>	5,017	5,674	27,464
<b>2019</b>	4,998	5,668	27,417
<b>2020</b>	5,054	5,732	27,719
<b>2021</b>	5,127	5,806	28,023
<b>2022</b>	5,195	5,879	28,341
<b>2023</b>	5,264	5,953	28,662
<b>2024</b>	5,328	6,028	29,006
<b>2025</b>	5,405	6,103	29,325
<b>2026</b>	5,476	6,178	29,659

(1) Excludes all off-system sales.

(2) Actual Winter Peak.

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

Year	Sales (GWH)	System Peak Load <sup>(1)</sup> (MW)
2011.....	27,552.....	5,676
2010.....	28,182.....	5,743
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

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

## II. Existing Resources

Santee Cooper’s total summer Maximum Continuous Rating (“MCR”) is 5,651 MW for owned generating facilities (see Table 3). In addition, Santee Cooper presently receives 84 MW of firm supply from the U.S. Army Corps of Engineers (the “Corps”) and 327 MW of firm hydroelectric power from the Southeastern Power Administration (“SEPA”). Santee Cooper also receives 8 MW of dependable capability from the Buzzard’s Roost hydroelectric generating facility which it leases from Greenwood County, South Carolina and 38 MW of biomass capacity and associated energy under a power purchase agreement that commenced in September 2010 and extends for 15 years. For the time period January 2011 through December 2014, Santee Cooper entered into an agreement with The Energy Authority for the purchase of 146 MW of unit-contingent power from a Southern Power Company simple cycle combustion turbine resource. Additionally, Santee Cooper has entered into a purchase agreement with JP Morgan for 300 MW of capacity and associated energy beginning June 1, 2012 and continuing through 2015.

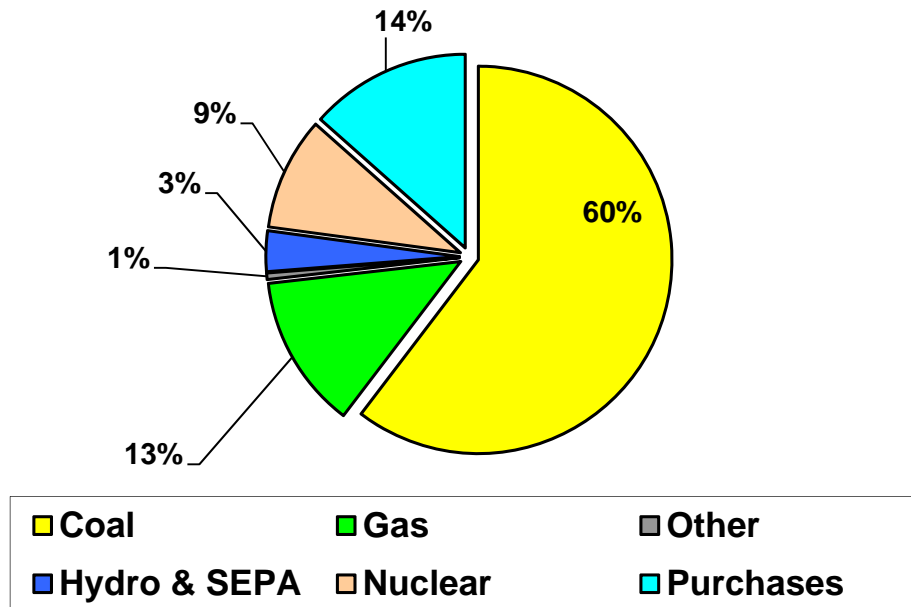
**Table 3**  
**Santee Cooper owned generating facilities in MW**

<b>Generating Facility</b>	<b>Units</b>	<b>Location</b>	<b>Summer MCR</b>	<b>Winter MCR</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	84	88	Oil	1954
	3 and 4		302	307	Coal	1970
Grainger	1 and 2	Conway	166	170	Coal	1966
Myrtle Beach Combustion Turbines	1 and 2	Myrtle Beach	16	20	Oil/Gas	1962
	3 and 4		38	40	Oil	1972
	5		21	25	Oil	1976
Hilton Head Combustion Turbines	1	Hilton Head Island	19	20	Oil	1973
	2		19	20	Oil	1974
	3		52	60	Oil	1979
Winyah Station	1	Georgetown	275	280	Coal	1975
	2		285	290	Coal	1977
	3		285	290	Coal	1980
	4		285	290	Coal	1981
V.C. Summer Nuclear Station <sup>(1)</sup>		Jenkinsville	318	318	Nuclear	1983
Cross Station	1	Cross	580	590	Coal	1995
	2		570	585	Coal	1983
	3		600	600	Coal	2007
	4		600	600	Coal	2008
Horry County Landfill Gas		Conway	4	4	Landfill methane gas	2001
Lee County Landfill Gas		Bishopville	10	10	Landfill methane gas	2005
Richland County Landfill Gas		Elgin	8	8	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
Berkeley County Landfill Gas		Moncks Corner	3	3	Landfill methane gas	2011
Rainey Station	Combined Cycle	Starr	460	520	Gas	2002
	CT 2A		146	180	Gas	2002
	CT 2B		146	180	Gas	2002
	CT 3		75	90	Gas	2004
	CT 4		75	90	Gas	2004
	CT 5		75	90	Gas	2004
<b>Total Capacity</b>			<b>5,651</b>	<b>5,902</b>		

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

In 2013, it is forecasted that Santee Cooper's total energy needs will be met primarily by coal at 60% (see Figure 1). Nuclear energy is projected to supply 9% of the total energy needs, natural gas is projected to supply 13%, while purchases are projected to supply 14%.

**Figure 1**  
**2013 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 12% and 15%, 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 (1)**

W=Winter, S=Summer		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		
		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	24/25	2025	25/26	2026
<b>Forecast Requirements</b>																															
1	Santee Cooper System Peak	5,383	5,397	6,026	5,387	5,978	5,332	5,904	5,256	5,829	5,173	5,755	5,101	5,675	5,018	5,669	4,999	5,734	5,054	5,807	5,129	5,880	5,196	5,953	5,265	6,029	5,329	6,104	5,406	6,179	5,478
2	Interruptible Load	(279)	(393)	(406)	(423)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)	(426)
3	Firm Sales <sup>(2)</sup>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>147</u>	<u>293</u>	<u>155</u>	<u>304</u>	<u>163</u>	<u>314</u>	<u>171</u>	<u>325</u>	<u>179</u>	<u>336</u>	<u>187</u>	<u>346</u>	<u>195</u>	<u>357</u>	<u>202</u>	<u>368</u>	<u>210</u>	<u>379</u>	<u>218</u>	<u>389</u>	<u>175</u>	<u>349</u>	<u>182</u>	<u>359</u>	<u>190</u>	<u>370</u>
4	Total Reserved Load	5,129	5,030	5,645	4,990	5,699	5,198	5,633	5,133	5,565	5,061	5,499	4,999	5,427	4,927	5,429	4,919	5,502	4,985	5,583	5,070	5,664	5,148	5,745	5,228	5,777	5,251	5,860	5,339	5,943	5,421
5	Load Not Requiring Reserve	<u>(411)</u>	<u>(411)</u>	<u>(403)</u>	<u>(403)</u>	<u>(447)</u>	<u>(447)</u>	<u>(439)</u>	<u>(439)</u>	<u>(431)</u>	<u>(431)</u>	<u>(424)</u>	<u>(424)</u>	<u>(416)</u>	<u>(416)</u>	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(411)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>	<u>(359)</u>
6	Total Load Requiring Reserve	4,718	4,619	5,242	4,587	5,252	4,751	5,194	4,694	5,134	4,630	5,076	4,576	5,012	4,512	5,019	4,509	5,092	4,575	5,173	4,660	5,254	4,738	5,335	4,818	5,418	4,892	5,501	4,980	5,584	5,062
<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>(3)</sup>	44	44	47	53	112	112	117	117	147	147	178	178	210	210	235	235	261	261	261	261	261	261	261	261	261	261	261	261	261	261
9	Projected Resource Additions <sup>(4)</sup>	0	0	0	0	0	0	0	0	0	0	495	503	991	1,005	991	1,005	991	1,005	991	1,005	991	1,005	991	1,005	991	1,005	991	1,005	991	991
10	Projected Unit Retirements <sup>(5)</sup>	(17)	(187)	(187)	(187)	(187)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(585)	(623)	(623)
11	Available Generating Capacity	5,938	5,590	5,771	5,599	5,836	5,260	5,443	5,265	5,473	5,295	5,504	5,822	6,038	6,349	6,566	6,374	6,592	6,400	6,592	6,400	6,592	6,400	6,592	6,400	6,592	6,400	6,592	6,400	6,554	6,362
<b>Cumulative Purchase (Sales) Contracts</b>																															
12	Long Term	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	359	359	359	359
13	Mid Term Contract	170	446	470	446	470	446	300	300	0	0	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							130		330	85	235																			
15	Cumulative Production Capacity	6,519	6,447	6,644	6,448	6,702	6,102	6,261	5,953	6,183	5,760	6,111	6,194	6,402	6,713	6,925	6,733	6,951	6,759	6,951	6,759	6,951	6,759	6,951	6,759	6,951	6,759	6,951	6,759	6,913	6,721
<b>Reserves</b>																															
16	Generating Reserves	1,391	1,417	999	1,458	1,002	903	627	819	617	698	612	1,194	975	1,785	1,496	1,814	1,448	1,773	1,367	1,688	1,286	1,610	1,205	1,530	1,173	1,507	1,090	1,419	969	1,299
17	% Reserve Margin	29%	31%	19%	32%	19%	19%	12%	17%	12%	15%	12%	26%	19%	40%	30%	40%	28%	39%	26%	36%	24%	34%	23%	32%	22%	31%	20%	28%	17%	26%

(1) Based on LF1201  
(2) Excludes capacity sales under negotiations.  
(3) Includes Santee Cooper resources and long-term renewable purchases.  
(4) Reflects 45% ownership share of two 1100 MW nuclear units at V.C. Summer Nuclear Station.  
(5) Assumes Grainger 1 & 2 retired June 2012 and Jefferies 1 - 4 retired June 2014. Santee Cooper's Board of Directors authorized the retirement of these units on October 19, 2012. The exact timeline for the retirements has not been determined but retirements will be done in an orderly manner and will be in compliance with applicable regulatory guidelines.

## 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.

Santee Cooper has recently evaluated its capital improvement program and long-term power supply plan in light of the on-going economic downturn, the reduction in previously anticipated sales to Central, and new EPA regulations which increase the operating costs of coal-fired generation. As such, the Santee Cooper generation expansion plans include:

- 1) Continuation of engineering and construction for a 45% ownership share of two

1,100 MW nuclear units at the V.C. Summer Nuclear Station site. The NRC issued the Combined Construction and Operating licenses for the two new nuclear units on March 30, 2012.

- 2) Continuation of active discussions with potential parties to reduce Santee Cooper's level of participation to approximately 20% in the two future 1,100 MW nuclear units.
- 3) The retirement of six electric generating units (Grainger Generating Station Nos. 1 and 2 and Jefferies Generating Station Nos. 1, 2, 3 and 4). Plans will be developed and executed for an orderly retirement which will be in compliance with applicable regulatory deadlines.
- 4) Monitoring of potential regulation related to various environmental control requirements affecting Santee Cooper's existing and future generation facilities.
- 5) Periodic evaluation of the generation expansion plan to determine the impacts of items such as potential environmental legislation or regulation, changes in the load forecast, and updated cost information.

Santee Cooper is projecting 250 MW of purchased renewable capacity and energy to be under contract by 2020. So far, efforts to procure that capacity and energy have resulted in approximately 117 MW of the assumed 250 MW either online or under contract, of which 38 MW is currently being generated. Additionally, Santee Cooper is exploring other wholesale power sales opportunities.

## **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"), 1,798 miles of 115 kV, 84 miles of 100kV, 1,733 miles of 69 kV, 57 miles of 46 kV and 97 miles of 34 kV and below overhead and underground transmission lines (see Figure 2). Santee Cooper



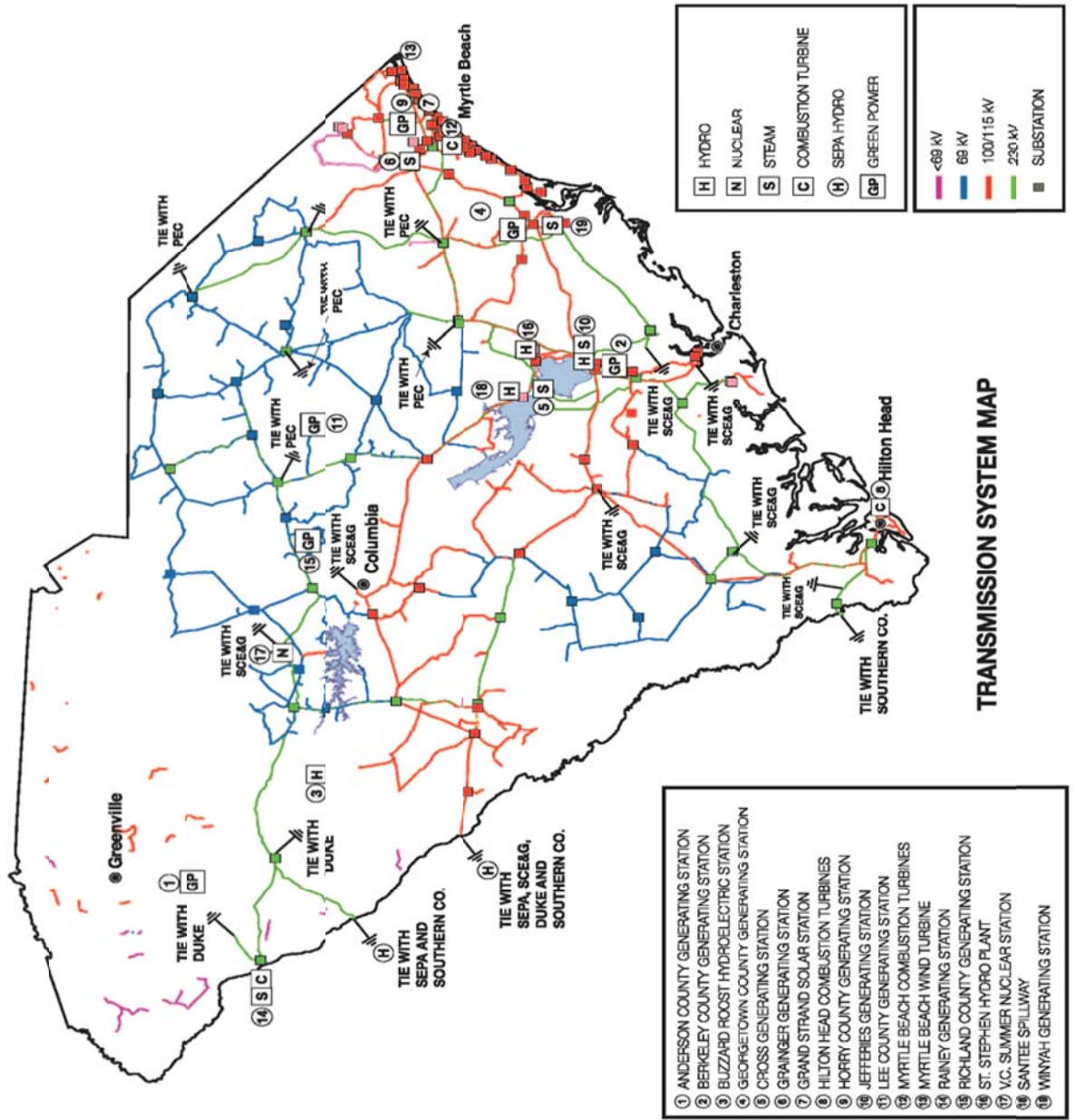
operates 103 transmission substations and switching stations serving 84 distribution substations and 486 Central Cooperative delivery points. Communications sites at 99 locations are in place to support the monitoring and controlling of integrated power system operations. Santee Cooper plans the transmission 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 eight locations; with Southern Company Services, Inc. (“Southern Company”) at one location; and with Duke Carolinas (“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, APCI-Yadkin Division, Dominion Virginia Power, and Public Works Commission of the City of Fayetteville.

Santee Cooper is also a member of the SERC Reliability Corporation, which is one of 8 regions under the NERC.

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.

### **Existing Energy Efficiency Programs**

#### **Reduce the Use South Carolina**

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.

Santee Cooper has launched the following programs:

## Residential Programs

### *Smart Energy Existing Homes Program*

Smart Energy Existing Homes are certified by a Santee Cooper Energy Advisor to meet certain 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. There are additional measures that can be implemented individually or in combination with the Smart Energy Existing Home measure.

Measure	Customers	Incentive
<b>Individual Water Heater</b>	<b>22</b>	<b>\$35.00</b>
<b>Smart Energy Existing Home</b>	<b>354</b>	<b>\$600.00</b>
<b>Individual 15 SEER Heat Pump</b>	<b>79</b>	<b>\$150.00</b>
<b>15 SEER Heat Pump combined with Smart Energy Existing Home</b>	<b>327</b>	<b>\$50.00</b>

In 2011 there were 455 customers participating for a savings of 1,481 MWh. The total incentive cost was \$241,370.

### *On-site Energy Assessments*

Santee Cooper offers free energy assessments to residential customers upon request.

### *Low Income Weatherization Program*

The Low-Income Weatherization Program incorporates a comprehensive approach to building energy retrofits; encouraging not only high efficiency equipment acquisition but also proper unit sizing, installation, operation, interaction, and reducing overall home infiltration. Many Weatherization programs focus on simple high efficiency installations only, which captures a fraction of the savings. Industry research and contractor interviews show that there are significant additional savings opportunities when comprehensively addressing the needs of low income housing.

In addition to bringing awareness to customers about home weatherization and the long-term operational savings they will experience through their high-efficiency retrofits, proper installation, and/or maintenance of the system, the purpose of the Program also is to promote market transformation through increasing customer awareness in the marketplace. There were six pilot projects completed in 2011. The Low Income Weatherization program will be available in 2012.

### ***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.

In 2011 there were 29 new homes built that qualified as Energy Star homes for a savings of 73 MWh. The incentive cost was \$46,400.

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

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.

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 2011 resulted in 236 old refrigerators being recycled and 634 new ENERGY STAR refrigerators being purchased with an estimated annual energy savings of 159 MWh. Total rebates for the Refrigerator Rebate program incurred through Santee Cooper in 2011 were \$33,620.

#### ***Equipment and Lighting Incentives: Residential CFL's***

CFL's can save about \$30 or more electricity costs over each bulb's lifetime. In 2011 the Residential CFL's program gave out 223,652 bulbs to 18,638 customers saving 6,374 MWh. The incentive cost was \$1.45 per bulb for a total bulb cost of \$323,490.

## **Commercial Programs**

#### ***Commercial Prescriptive Program***

The types of measures that qualify are Lighting, HVAC, Building Envelope, and Refrigeration. In 2011 there were 151 customers that participated for a savings of 4,106 MWh. These savings come from several different measures that are implemented as an individual project or in combination with other measures. The incentive cost was \$292,972.

#### ***Commercial Custom Program***

Custom rebates are tailored specifically to provide unique energy saving initiatives on a business-by-business basis. The rebate is based on \$0.10 for every kWh saved during first-year, not to exceed 50% of the qualifying measure's incremental cost. Customers

will be subject to a maximum rebate of \$200,000 per facility per calendar year for the Commercial Custom Program and an overall rebate cap of \$300,000 per facility, per calendar year for participation in multiple energy efficiency programs offered by Santee Cooper. For the purposes of Santee Cooper's energy efficiency programs, a customer facility is defined as one or several adjacent buildings owned or operated by a single customer. In 2011, seven customers participated for a savings of 402 MWh. Four projects implemented Variable Frequency Drives and three projects implemented CO2 sensors. The incentive cost was \$20,298.

### ***On-site Energy Assessments***

Santee Cooper offers free energy assessments to commercial customers upon request.

### ***Commercial CFL's***

Commercial CFL's are classified as either High Use or Low Use based on the number of hours they are used in an average week. In 2011 there were 17,207 High Use bulbs given to 210 customers saving 3,682 MWh and 14,122 Low Use bulbs given to 661 customers saving 664 MWh. The total incentive cost for Commercial CFL's was \$45,314.

## **Load Management**

### ***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 537 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 through 2011 resulted in an estimated demand savings of 19 MW and estimated energy savings of 23,913 MWh. Total expenditures for the Good Cents Program incurred through Santee Cooper in 2011 were \$1,242,607.71.

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

Commercial Good Cents was offered to commercial customers who built new facilities that improved the efficiency in the building thermal envelope, heating and cooling



equipment, and lighting. Commercial customers that met program standards were given an up-front rebate to encourage participation in the program.

The Commercial Good Cents program was closed to new participants in August 2011. Program participation through 2011 resulted in an estimated demand savings of 1.3 MW and an estimated energy savings of 1,785 MWh. Total expenditures for the Commercial Good Cents Program incurred through Santee Cooper in 2011 were \$0.00.

### ***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 2011.

Total expenditures for the H<sub>2</sub>O Advantage Program incurred through Santee Cooper in 2011 for existing participants were \$12,216.97.

### ***Thermal Energy Storage***

Thermal Energy Storage was discontinued in August, 2011. There were no new participants in this program in 2011. This program will be reviewed possibly in 2012.

## **Public Information for the promotion of Energy Efficiency and Conservation**

Web-based Customer Tips & Tools: Santee Cooper offers online energy saving tips for residential and commercial customers and has a Residential Online Energy Audit. The online energy audit helps customers discover how to reduce their energy consumption and lower their utility bills.

In-Home Real-Time Energy Monitoring: Santee Cooper will offer a Blue-Line monitoring rebate in 2012. This device informs customers in real-time exactly how much energy is being consumed. By monitoring energy consumption the customer can decide when to cut back on energy usage and save money.

Direct-to-customer: Santee Cooper Communicates directly to customers to support all of our energy-efficiency, conservation and DSM activities and programs. Our monthly bill inserts highlight new programs and include clear, measureable calls to action. We also communicate with customers through Facebook, Twitter and YouTube.

Public Campaigns: Santee Cooper is increasingly using advertising and communications vehicles that target specific customers and customer groups. We advertise and promote our programs through digital advertising on the web and through Facebook, which is highly measureable and lets us know who we are reaching and how they are responding. It also allows us to quickly adjust promotions to achieve better results with our customers and stakeholders. We also are partnering with customers who can help spread the word, such as large property managers who help us include energy efficiency promotions to their property owners.

School Programs & Resources: Through educational incentives, Santee Cooper has established a strong, collaborative network with school districts in the state to provide educators and students with real-world understanding of the power and purpose of electricity as well as the importance of conserving and using power efficiently. Through our business and education partnerships, Santee Cooper is continually supporting the needs of students, teachers and parents.

## VII. Renewable Resources and Programs

### *1. Renewable Energy*

#### HYDRO

Santee Cooper's largest source of renewable energy is the hydroelectric 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 hydroelectric 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 increased its Green Power generation in 2011 by bringing online the Berkeley Landfill Gas Generating Station, its sixth landfill methane generating station. Santee Cooper now has 29 MW of generating capacity that is fueled by methane gas collected at large landfills.

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.

The state's first anaerobic digester project, built by Environmental Fabrics, Inc. came online in 2011. This project is the first of its kind in South Carolina and will generate 180 kilowatts of power from methane gas captured at a Williamsburg County hog farm and deliver it to electric customers on the Santee Cooper system.

In May 2011, the Santee Cooper board approved contracts with W2E-Organic Power and BioEnergy Technologies for a total of 3.2 MW of additional electricity by anaerobic digestion of renewable resources, including food and yard waste. Both facilities are expected to be online in 2013.

Santee Cooper has purchase power agreements with EDF Renewable Energy for 30 MWs of biomass-fueled energy, North Star Renewable Energy for 21 MWs of biomass-fueled energy and Green Energy Solutions, LLC for up to 25 MWs of biogas-fueled energy from multiple facilities.

The EDF contracts have thirty year terms and the plants are under construction in the counties of Allendale and Dorchester and expected to be online in 2013. The NSRE contract has a twenty year term and the plant scheduled to be built in Williamsburg County is expected to come online in 2014. The GES contract has a 28 year delivery period and the facilities are planned to be built over the next six years at various sites across the State.

### SOLAR

Santee Cooper has developed a Green Power Solar Schools (“GPSS”) program for middle schools around the state and in 2011 the Myrtle Beach Middle School site was dedicated. 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. Twenty 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 16 kW Solar Pavilion at Coastal Carolina University, a 20 kW installation at the

Center for Hydrogen Research in Aiken and a second 20 kW 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 completed the 311 kW Grand Strand Solar Station 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 U.S. 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 Truewind 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: A 2.4 kW Skystream wind turbine was installed at Oceanfront Park in North Myrtle Beach in November of 2010 and has since been in continuous operation. Santee Cooper is working to install small wind turbines at three 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.

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, designs for an offshore meteorological platform were completed in 2011. While the costs for building this research platform remain high, Santee Cooper is pursuing collaboration opportunities that would minimize the costs for continuing offshore wind research.

## ***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 2011, Santee Cooper collected 1,496,170 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 15,900,000 kilowatt-hours of electricity.

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

Santee Cooper entered the arena of Green Power in 2001, being the first electric utility in South Carolina to offer electricity generated from renewable resources. 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, solar panels, biomass and wind. Participation for 2011 was 2,104 participants purchasing 12,881 (100 kWh) blocks of energy.

#### ***4. Green Tags***

Approval was given in September 2006 for the development of a new environmental program to offer to everyone in South Carolina, for the first time, the ability to purchase local renewable energy through a Green Tag program. This program allows all citizens and businesses in the state to do something positive to improve their environment, no matter their electric provider. Participation in 2011 was 54 Green Tag customers.

Green-e certifies Santee Cooper's Green Power, meaning what we produce meets strict and specific national environmental standards.

## **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. One of the chief ways we do that is by protecting 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 2026. Santee Cooper is committed to delivering low-cost, reliable and environmentally protective electricity to our 2 million direct and indirect customers in all 46 counties of South Carolina.