santee cooper®

November 30, 2018

Stacey Washington
Energy Specialist
Office of Regulatory Staff
Energy Office
1401 Main Street
Suite 900
Columbia, SC 29201

Re: Integrated Resource Plan (2018) from the South Carolina Public Service Authority

Dear Ms. Washington:

Enclosed is the 2018 Integrated Resource Plan (IRP) from the South Carolina Public Service Authority ("Santee Cooper") as required by SC Code Sections 58-37-10, -30 and -40. The plan contains the demand and energy forecast for a fifteen-year period, as well as a program for meeting the requirements shown in the forecast. Also included are details on Santee Cooper's Energy Efficiency, Conservation and Demand-Side Management ("DSM") activities.

If you have any questions, please call me at (843) 761-8000 ext. 5091.

Sincerely,

Traci Grant
Manager, Budget & Customer Billing

South Carolina Public Service Authority
(Santee Cooper)

INTEGRATED RESOURCE PLAN

November 2018

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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 within the counties of Berkeley, Calhoun, Charleston, Clarendon, Colleton, Dorchester, Orangeburg and Sumter, South Carolina. Santee Cooper began electric power operations in February 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 South Carolinians in all 46 counties of South Carolina. Santee Cooper's direct-served customers currently include 27 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). The municipal agreements were entered into in 2013 and have initial terms ranging from 10 to 20 years. Central is a generation and transmission cooperative made up of 20 electric distribution cooperatives, including the five upstate electric distribution cooperatives that were formerly members of the Saluda River Electric Cooperative, Inc. ("Saluda"). Central member cooperatives serve primarily residential, commercial and industrial customers in all 46 counties of the state. Through Central and the two municipal electric systems, approximately 787,000 customers are served indirectly by Santee Cooper. Santee Cooper also serves directly approximately 181,000 residential, commercial and small industrial retail customers in parts of Berkeley, Georgetown and Horry counties ("Distribution" customers).

Santee Cooper and Central adopted an amendment to the Central Agreement on May 20, 2013, that better aligns their future interests, formalizes how they will jointly plan for new resources, and defers their rights to terminate the agreement prior to December 31, 2058. Central has entered into requirements agreements with all 20 of its member cooperatives that extend through December 31, 2058.

In addition to its direct-served customers, Santee Cooper provides wholesale electric service to the City of Seneca, Piedmont Municipal Power Agency, Alabama Municipal Electric Authority, the Town of Waynesville and SCE&G pursuant to long-term contracts with terms that range from 10 to 20 years.

In October 2018, Santee Cooper extended its agreement with Century Aluminum of South Carolina, Inc. ("Century") to December 31, 2020, with no anticipated change in load demand or requirements.

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.

This Integrated Resource Plan ("IRP") contains the demand and energy forecast for a 15-year period, as well as a plan for meeting the requirements shown in the forecast. Santee Cooper's existing portfolio is projected to be capable of meeting its energy and capacity needs through at least 2032. This report also includes a description of demand-side management programs as required by SC Code Sections 58-37-10, -30 and -40.

I. Load Forecast

Overview

The Santee Cooper total territorial load forecast is updated annually and includes projected monthly energy and peak demand requirements for a 20-year forecast horizon. Santee Cooper and GDS Associates, Inc. ("GDS") prepare the energy and peak demand forecasts for all classes except Central. The Santee Cooper portion of 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. Pursuant to the terms of the Coordination Agreement between the parties, Central provides Santee Cooper with its projected loads.

The Santee Cooper territorial forecast represents the aggregate of energy and peak demand projections developed for four sectors: Distribution, Industrial, Central and Municipal. The Distribution and Industrial customers represent Santee Cooper's retail load, and the Central and Municipal sectors represent Santee Cooper's wholesale load. The weather-sensitive portion of the energy forecast (residential and commercial classifications for the Distribution, Central and Municipal sectors) 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. Econometric models are used to project peak demand for the Distribution, Municipal and Central sectors. Industrial demand is forecasted individually by customer and reflects any additions or changes to existing contracts, as well as known or probable future changes.

The 2018 load forecast includes energy and peak demand savings from existing and future energy efficiency and conservation programs for residential and commercial customers. The load forecast quantifies the impacts of numerous factors influencing

energy consumption and reflects normal weather conditions, which are based on the most recent 20-year averages.

Process

1) Database Development

The Santee Cooper load forecast database is updated annually. 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. Additionally, historical data and projections for the key influences on energy consumption and peak demand are updated.

2) Economic Outlook

The economic outlook for Santee Cooper's service territory is updated 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 maintained for the Santee Cooper service area (Horry County) and for the state of South Carolina. Santee Cooper's economic outlook is based on data obtained from Moody's Analytics. Central's economic outlook is based on data obtained from IHS Global Insight.

3) Forecast Development

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

The Load Forecast also includes off-system sales, which are comprised of Alabama Municipal Electric Authority (AMEA), Piedmont Municipal Power Agency (PMPA), City of Seneca, Town of Waynesville and SCE&G.

Territorial Load Sectors:

3.1 Distribution

Distribution requirements for Santee Cooper include retail energy sales, peak demand, and distribution losses for the residential, commercial and small industrial classifications.

The number of residential customers is projected using 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 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 number of commercial and small industrial customers is projected using a regression model that specifies a relationship between number of customers and employment. Average use per customer is projected using a regression model specifying a relationship between energy use per customer, price of electricity, and weather conditions. 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). An econometric model is used to project monthly peak demand as a function of weather normalized energy sales and average daily temperature on the peak day.

3.2 Industrial

Projections of industrial energy sales and peak demand for Santee Cooper are developed individually for each customer. Projections are based on

historical trends, contract demands, state economic data, and information regarding customers' plans and operations during the forecast horizon.

3.3 Central Requirements

Central's 2018 load forecast was prepared by Central and reviewed by Santee Cooper's staff. Following this review, Central's forecast was adjusted by Santee Cooper to include forecast data previously provided by Central for certain delivery points that Santee Cooper plans to continue to serve pursuant to the terms of the Coordination Agreement.

Central's load forecast only includes the portion of Central load that Santee Cooper serves, which reflects the six-year transition of approximately 950 MW from Santee Cooper to another provider. This transition started in 2013 and will be completed by December 31, 2018.

3.4 Municipal

Energy and peak demand requirements for the Municipal sector for Santee Cooper represent less than one percent of total system requirements. The two Municipal customers are modeled for the duration of the forecast, and regression equations are used to project total energy sales and peak demand for each of these customers. Inputs to the equations include heating and cooling degree days for energy and total energy requirements for peak demand.

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 are developed to address weather sensitivity by combining the respective weather impacts for each sector. Impacts for the Distribution sector are based on application of

extreme seasonal load factors to projected energy requirements. Impacts for the Central sector are based on regression model estimates incorporating extreme and mild temperatures on the peak day. No weather impacts for the Industrial sector are developed since that sector is not weather sensitive.

The following table (Table 1) contains the forecasted demand and energy included in LF1801. Table 2 contains historical energy and demand.

Table 1
2018 LOAD FORECAST (1)

	Summer Peak (MW)	Winter Peak (MW)	Energy Sales (GWH)
2018	4,525	4,918	24,564
2019	4,525	4,954	24,597
2020	4,585	4,981	24,956
2021	4,423	4,822	23,299
2022	4,456	4,859	23,436
2023	4,492	4,900	23,589
2024	4,528	4,947	23,793
2025	4,570	4,983	23,917
2026	4,608	5.027	24,079
2027	4,649	5,069	24,247
2028	4,692	5,116	24,462
2029	4,739	5,159	24,604
2030	4,778	5,196	24,748
2031	4,822	5,236	24,904
2032	4,862	5,281	25,107

(1) Excludes all off-system sales.

Table 2
Historical Sales and System Peak Loads

Year	Sales (GWH)	System Peak Load (1) (MW)
2017	22,779	4,989
2016	23,700	4,794
2015	26,498	5,869
2014	27,353	5,673
2013	26,364	5,029
2012	26,756	5,387
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

(1) Excludes all off-system sales.

II. Existing Resources

Santee Cooper's total summer Maximum Continuous Rating ("MCR") is 5,110 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 296 MW of firm hydroelectric power from the Southeastern Power Administration ("SEPA"). The SEPA allocation consists of 161 MW for wheeling to the SEPA preference customers served by Santee Cooper and 135 MW purchased by Santee Cooper for its customers. Santee Cooper also receives 8 MW of dependable capability (15 MW MCR) from the Buzzard Roost hydroelectric generating facility, which it leases from Greenwood County, South Carolina. Santee Cooper has given notice to terminate this contract effective March 2020. Additionally, Santee Cooper also receives 74 MW of biomass capacity and associated energy under four power purchase agreements (the first commenced in September 2010 and the most recent in November 2013, with varying terms from 15 to 30 years). There is also an agreement to purchase the output from a 3 MW solar photovoltaic facility that started producing power in December of 2013 and has a 20-year term.

Table 3
Santee Cooper Owned Generating Facilities in MW[1]

Generating Facility	Units	Location	Summer MCR	Winter MCR	Fuel	Began Commercial Operation
Jefferies Station	1, 2, 3, 4, and 6	Moncks Corner	140	140	Hydro	1942
Wilson Dam		Lake Marion	2	2	Hydro	1950
Myrtle Beach Combustion Turbines[2]	1 and 2	Myrtle Beach	16	20	Oil/Gas	1962
	3 and 4		19	20	Oil	1972
	5		21	25	Oil	1976
Hilton Head Combustion Turbines	1	Hilton Head Island	16	20	Oil	1973
	2		16	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[3]	1	Jenkinsville	322	322	Nuclear	1983
Cross Station	1	Cross	580	585	Coal	1995
	2[4]		565	570	Coal	1983
	3		610	610	Coal	2007
	4		615	615	Coal	2008
Horry County Landfill Gas		Conway	3	3	Landfill methane gas	2001
Lee County Landfill Gas		Bishopville	11	11	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
Total Capacity			**5,110**	**5,338**		

(1) Generating Facilities as of December 31, 2017.

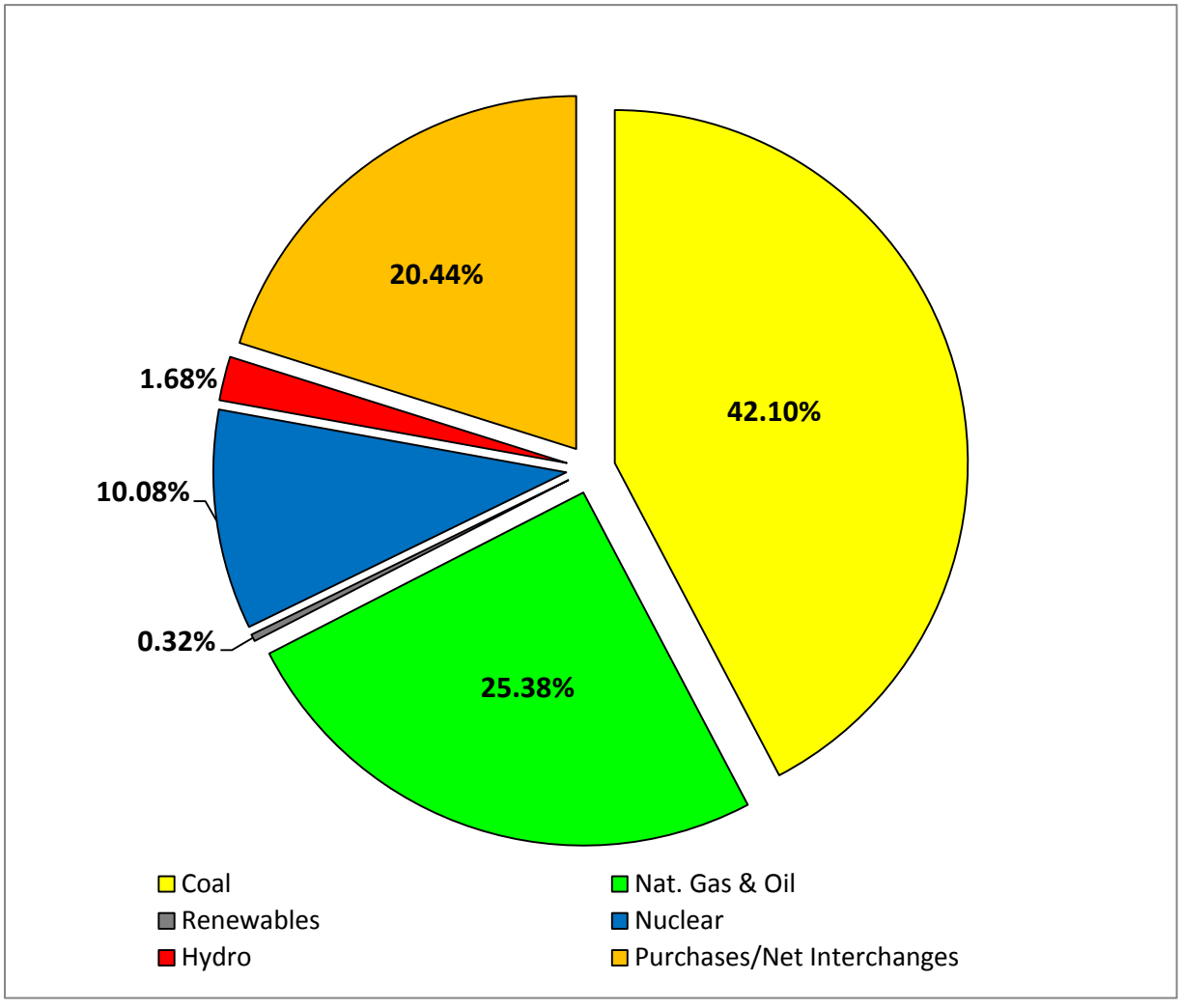
(2) Myrtle Beach Combustion Turbine No. 4 is currently unavailable until further notice.

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

(4) Santee Cooper temporarily idled Cross Unit 2 on March 1, 2017. The unit will be available for normal operations beginning the winter of 2018/2019.

In 2017, Santee Cooper's total energy needs were derived from a diverse portfolio of resources that include 42.10% coal, 25.38% natural gas and oil, 20.44% purchases, and 12.08% from sources that do not emit greenhouse gases, including nuclear, hydro and renewables (see Figure 1).

Figure 1
2017 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

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
	18/19	2019	19/20	2020	20/21	2021	21/22	2022	22/23	2023	23/24	2024	24/25	2025	25/26	2026	26/27	2027	27/28	2028	28/29	2029	29/30	2030	30/31	2031	31/32	2032
Forecast Requirements																												
1 Santee Cooper System Peak	4,955	4,525	4,983	4,586	4,823	4,423	4,860	4,457	4,901	4,493	4,948	4,529	4,984	4,570	5,029	4,608	5,070	4,650	5,118	4,693	5,161	4,740	5,198	4,778	5,237	4,823	5,282	4,863
2 Non-Firm Load	(366)	(405)	(363)	(415)	(363)	(415)	(363)	(415)	(363)	(415)	(363)	(415)	(363)	(415)	(363)	(415)	(363)	(415)	(363)	(415)	(363)	(415)	(363)	(415)	(363)	(415)	(363)	(415)
3 Firm Sales	206	317	213	298	193	305	200	312	206	319	162	276	168	249	150	255	133	245	139	251	144	257	150	263	155	269	160	275
4 Total (Firm) Reserved Load	4,796	4,437	4,832	4,469	4,653	4,313	4,696	4,353	4,743	4,396	4,746	4,389	4,789	4,404	4,815	4,448	4,840	4,480	4,893	4,529	4,941	4,582	4,984	4,626	5,028	4,676	5,079	4,722
5 Load Not Requiring Reserve [1]	(565)	(565)	(565)	(565)	(411)	(411)	(411)	(411)	(411)	(411)	(359)	(359)	(359)	(359)	(359)	(359)	(359)	(359)	(359)	(359)	(359)	(359)	(359)	(359)	(359)	(359)	(359)	(359)
6 Total Load Requiring Reserve	4,231	3,872	4,268	3,904	4,242	3,902	4,285	3,942	4,332	3,985	4,387	4,030	4,430	4,045	4,456	4,089	4,481	4,121	4,534	4,170	4,582	4,223	4,625	4,267	4,669	4,317	4,720	4,363
Cumulative System Capacity																												
7 Available Generating Capacity	5,373	5,144	5,373	5,144	5,373	5,144	5,373	5,144	5,373	5,144	5,373	5,144	5,373	5,144	5,373	5,144	5,373	5,144	5,373	5,144	5,373	5,144	5,373	5,144	5,373	5,144	5,373	5,144
8 Projected Renewable Resources [2]	74	74	74	74	74	74	74	74	74	74	74	74	74	74	36	36	36	36	36	36	36	36	36	36	36	36	36	36
9 Projected Resource Additions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Projected Retired Units [3]	0	0	0	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
11 Projected Unavailable Units [4]	(20)	(19)	(20)	(19)	(20)	(19)	(20)	(19)	(20)	(19)	(20)	(19)	(20)	(19)	(20)	(19)	(20)	(19)	(20)	(19)	(20)	(19)	(20)	(19)	(20)	(19)	(20)	(19)
12 Net Available Generating Capacity	5,427	5,199	5,427	5,184	5,412	5,184	5,412	5,184	5,412	5,184	5,412	5,184	5,412	5,184	5,374	5,146	5,374	5,146	5,374	5,146	5,374	5,146	5,374	5,146	5,374	5,146	5,374	5,146
Cumulative Purchase (Sales) Contracts																												
13 Long Term	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359
14 Mid Term Contract [5]	154	154	154	154	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Proj Short Term Contract	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 Cumulative Production Capacity	5,939	5,711	5,939	5,696	5,771	5,543	5,771	5,543	5,771	5,543	5,771	5,543	5,771	5,543	5,733	5,505	5,733	5,505	5,733	5,505	5,733	5,505	5,733	5,505	5,733	5,505	5,733	5,505
Reserves																												
17 Generating Reserves (Line 16 - Line 4)	1,144	1,274	1,107	1,227	1,117	1,230	1,074	1,190	1,027	1,147	1,024	1,154	981	1,139	917	1,057	892	1,025	839	976	791	923	748	879	704	829	653	783
18 % Reserve Margin (Line 17 / Line 6)	27%	33%	26%	31%	26%	32%	25%	30%	24%	29%	23%	29%	22%	28%	21%	26%	20%	25%	19%	23%	17%	22%	16%	21%	15%	19%	14%	18%

(1) Load served by resources with backstand.
(2) Includes Santee Cooper resources and long-term renewable purchases.
(3) This line item also includes terminated/expired contracts. Buzzard Roost Hydro contract terminates in March of 2020.
(4) Myrtle Beach 4 is considered unavailable for the term of the forecast.
(5) Century (Customer Supplied Power)

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. Should the load forecast reflect the need for future generation, 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 new power resources, the retirement of existing resources, and other modifications to its resource plan.

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

In March 2017, prior to the decision to suspend the construction of Units 2 and 3 at V.C. Summer Nuclear Station, Santee Cooper temporarily idled its Cross 2 unit. The decision to temporarily idle was based on anticipated operation and maintenance cost savings and because the completion of nuclear units was projected to significantly increase Santee Cooper's generating capacity and excess reserves. Idling the unit, while continuing to maintain and regularly inspect it, put it in inactive operation mode but kept it as an existing resource.

In the winter of 2018, Santee Cooper's system experienced higher than expected natural gas transportation prices and purchase power prices at a time when firm load was significantly higher than forecasted; these events caused significant cost increases. Subsequent to the extreme winter weather, management determined that making Cross 2 available for normal operations would help mitigate future risk. The unit will be returned to normal operations in December 2018.

With Cross 2, Santee Cooper's existing portfolio is projected to be capable of meeting its energy and capacity needs through at least 2032.

V. Transmission System Adequacy

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 1,384 miles of 230 kilovolt ("kV"), 1,899 miles of 115 kV, 1,724 miles of 69 kV, and 95 miles of 34 kV and below overhead and underground transmission lines. Santee Cooper operates 106 transmission substations and switching stations serving 86 distribution and industrial substations and 459 Central delivery points. Communications sites at 96 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 Duke Energy Progress at eight locations; with Southern Company Services Inc. ("Southern Company") at one location; and with Duke Energy Carolinas at two locations. Santee Cooper is also interconnected with SCE&G, Duke Energy Carolinas, 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, Duke Energy

Progress, Duke Energy Carolinas, APGI-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 eight regions under the NERC.

VI. Energy Efficiency, Conservation and Demand-Side Management ("DSM") Activities

Santee Cooper has offered demand-side management programs since 1982. 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.

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 181,000 direct-served residential and commercial customers through rebate programs.

The comprehensive "Reduce The Use South Carolina" energy efficiency effort includes 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 Loans

In addition to loans for renewable energy resources, Santee Cooper offers on-bill financing for energy efficient upgrades. A qualifying customer's maximum outstanding loan cannot exceed $20,000 for energy-efficiency and $40,000 for renewable energy resources. The combined maximum outstanding loans per customer cannot exceed $40,000. Customers receiving Smart Energy Loans also receive rebates on qualifying equipment through the Reduce The Use residential programs. To prevent double

counting, the savings from the installations are tracked as part of the rebate program, although many of the equipment upgrades would not be possible without the assistance of the Smart Energy Loan.

Smart Energy Existing Homes Program

The Smart Energy Existing Homes Program offers home energy evaluations, incentive rebates and financial assistance for residential energy efficiency improvements to improve the energy efficiency of customers' homes year-round.

Santee Cooper provided rebates to 2,746 customers in 2017 for a savings of 2,826 MWh. The total incentive cost was $610,435. Since inception in 2010, 172,878 MWh have been saved with a total incentive cost of $8,466,013.

Measure	Customers	Incentive
Air Infiltration	**34**	**$45 - $390**
Ceiling Insulation	**29**	**$38 - $325**
Duct Replacement	**135**	**$500**
Duct Sealing	**73**	**$250**
Heat Pump Install	**1,094**	**$137 - $675**
Heat Pump Tune Up	**961**	**$50**
Smart Thermostat	**535**	**$106-125**
Heat Pump Water Heater	**19**	**$400**
Solar Water Heater	**0**	**$700**

Equipment and Lighting Incentives: Residential LEDs

LEDs last 20 times longer than incandescent bulbs, use approximately 75% less energy, and are available in different sizes and shapes to fit in almost any fixture. Santee Cooper energy advisors provided 7,925 LED bulbs to 1,314 residential customers in 2017. The annual energy savings totaled 1,020 MWh in 2017. Since inception in 2014, 83,675 MWh have been saved with a total incentive cost of $669,549.

Santee Cooper Residential Energy Advisors conducted site visits to do "Home Energy House Calls." During House Calls, the Energy Advisor evaluated the efficiency of the home and made recommendations on how to make a home more energy efficient and comfortable.

During these site visits, 786 customers received a Home Energy House Call Kit that included LEDs, sink aerators, LED night light and, where needed, pipe wrap for their water heater. The annual energy savings totals 430 MWh.

Smart Energy New Homes Program

The Smart Energy New Homes Program offers rebate to builders who construct homes that meet Santee Cooper's eligibility requirements and either meet Smart Energy New Home performance path criteria or include qualifying equipment. There are three tiers of energy efficiency standards for the single-family performance pathway and two tiers for multi-family.

- Tier 1: Achieve a HERS (Home Energy Rating System) Index of 65 or below, which require that homes be 35% more energy efficient than a standard new home. The rebate for this tier is $3,000 for single-family homes and $1,400 per unit for multi-family homes.
- Tier 2: Achieve a HERS Index of 75 or below, which require that homes be 25% more energy efficient than a standard new home. The rebate for this tier is $1,600 for single-family homes and $400 per unit for multi-family homes.
- Tier 3: Achieve a HERS Index of 85 or below, which require that homes be 15% more energy efficient than a standard new home. The rebate for this tier is $800 for single-family homes only.

In 2017, under Tier 1, 12 new single-family homes and 20 multi-family homes were built for a savings of 114 MWh. Under Tier 2, 57 new single-family homes and 8 new multi-family homes were built for a savings of 168 MWh. Under Tier 3, 17 new single-family homes were built for a savings of 27 MWh. Two homes received qualifying equipment

rebates for 17+ SEER Split heat pumps for a savings of 3.6 MWh. No qualifying performance pathway rebates were paid for multi-family homes in 2017. There were 57 new single-family homes that received an LED Bonus for installing more than 50% of household lighting with new LED Energy Star bulbs. The total combined incentive cost was $181,360. Since inception in 2010, 66,558 MWh have been saved with a total incentive cost of $2,822,257.

On-site Energy Assessments

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

Commercial Programs

Commercial Prescriptive Program

Projects with qualified lighting, HVAC, building envelope, or refrigeration components are eligible for rebates under the Commercial Prescriptive Program. In 2017, 653 projects saved a total of 27,444 MWh. These savings came from several different measures implemented as an individual project or in combination with other measures. The total combined incentive cost in 2017 was $2,309,476. Since inception in 2011, 1,305,677 MWh have been saved with a total incentive cost of $19,798,796.

Commercial Custom Program

Custom rebates are tailored and range from $0.05 to $0.25 for every kWh saved during the first year after installation, based on the type of measure, with the total incentive capped at 50% of the qualifying measure's incremental cost. Customers are subject to a maximum rebate of $200,000 per facility per calendar year 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 2017, 60 customers participated in the Commercial Custom Program for a combined savings of 2,366 MWh. The combined incentive cost was $330,115. Since inception in 2011, 213,264 MWh have been saved with a total incentive cost of $4,453,077.

On-site Energy Assessments

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

Load Management

Interruptible / Economy Power Pricing Rates

Santee Cooper has developed and offers several types of time-of-use, non-firm, and off-peak rates to its direct-served 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, and is based on an hourly incremental energy rate. This is a real-time pricing rate; the price for energy changes each hour. Customers are required to schedule their usage each hour. This service is non-firm and curtailable by Santee Cooper. Pricing alternatives are available under this rate where the energy price is fixed during certain hours. There is also an interruptible rate available to industrial customers which is non-firm and allows for curtailment under certain circumstances.

As part of Santee Cooper's demand control program, currently there are 644 MW of non-firm load taking service under the industrial 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; therefore, Santee Cooper does not build capacity to provide service for this load.

Public Information

Web-based Customer Tips & Tools

Santee Cooper offers online energy saving tips for residential and commercial customers. Santee Cooper partnered with EnergyEarth to offer residential customers a free, online home energy audit. The online personalized home energy checkup helps customers identify places to be more energy efficient in their homes, which can reduce energy consumption and lower utility bills. The process is easy, progress and results can be saved, and when the audit is finished, suggested products that can help lower energy use are made available for customers to purchase. There is no purchase required to complete the home energy checkup and get personalized energy-saving tips.

Direct-to-Customer Communications and Public Campaigns

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 utilize direct mail promotions and communication, and email customers through our opt-in program, with monthly information and links to sign up or have questions answered. In 2017, that opt-in email program included more than 70,000 customers, and our direct mail numbers vary according to the target audience for each specific program. The number of email subscribers is lower for 2017, but a full cleanup was completed and inactive subscribers and spam emails were removed. We now have a higher open and engagement rate on email blasts. We also communicate with customers through Facebook, Twitter, Instagram, LinkedIn, and YouTube. At the end of 2017, Santee Cooper has more than 4,600 followers on Twitter, over 1,400 followers on Instagram, 10,400 on LinkedIn, and our Facebook fans are more than 90,700 strong. Over the life of our YouTube channels, our YouTube videos were viewed more than 208,000 times for a total of 329,731 minutes. All of these avenues of communication saw growth in the last year. In 2017 alone, there were 5,020,356 impressions and 572,108 engagements through our social media accounts, including Facebook, Twitter, Instagram, and LinkedIn.

Public Campaigns:

Santee Cooper continues to use advertising and communications vehicles that target specific customers and customer groups. We advertise and promote our programs primarily 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. We analyze and measure performance of communications, allowing us to quickly adjust promotions to achieve better results with our customers and other public stakeholders. We also promote programs through traditional advertising such as outdoor, radio and print ads, as well as press releases and press conferences, if warranted, to round out our public communications. In addition, we 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 initiatives, 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. The following describes the programs in place for ongoing community education and involvement in the energy efficiency and conservation aspects of Santee Cooper's operations.

- ***Energy Educators Institute***. Each summer Santee Cooper sponsors the Energy Educators Institute, a graduate level course for certified South Carolina K-12 teachers and administrators. Ninety educators explore the scientific concepts of energy, its sources, use and impact on the environment, economy, and society. Since 1988 over 2,130 South Carolina educators have attended the Institute and have received relevant curriculum based materials to enhance their teaching in areas such as energy efficiency and conservation.
- ***Educational Publications.*** Approximately 25,000 curriculum-based environmental/energy conservation publications (K-12) are sent to teachers in the

state each year. These publications educate teachers and students about environmental issues such as the importance of Reduce, Reuse and Recycle, how renewable resources can play a part in the generation of power, as well as the need to develop life-long practices to conserve energy wisely.

- ***Solar Schools' Project/Conservation of Energy Curriculum.*** Santee Cooper's Solar Schools Initiative in 2007 led to the development of the Conservation of Energy science curriculum kit now being taught to all sixth grade students in 32 middle schools in South Carolina. Teachers are trained each summer (145 to date) on the Conservation of Energy curriculum, equipping them with the scientific knowledge needed to understand the opportunities and limitations associated with renewable power sources as well as the need for societies to develop lifestyles that embrace the efficient use of energy.
- ***E-SMART Kids***. This interactive website is a tool to inspire teachers, students, and parents to be "green." The intent of the website is to bring awareness and understanding about the need to be energy efficient and the steps each individual can take to prevent energy waste. Also available on this site is a link for teachers and parents to learn how Santee Cooper's "green initiatives" can help make homes, schools, and businesses operate in a more energy efficient manner.
- ***Environmental Bookmarks.*** Santee Cooper's energy conservation message is also delivered through the distribution of bookmarks, **Live the Good Life** and **Make an Impact** (over 76,000 through 2017), at educational and community venues, such as career day events, classroom presentations, and environmental fairs. The "green" tips shared on the bookmarks are a daily reminder to students, parents, and community members on the actions they can take every day to use energy more wisely.

VII. Renewable Resources and Programs

Renewable resources are defined as renewable generation on our system that Santee Cooper maintains or purchases the output from a renewable facility. Santee Cooper offers programs for our customers to encourage the use of renewable energy.

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 1940s 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. The hydroelectric units on the lake have gradually shifted from the sole source of electric generation to being used mainly as peaking capacity today due to contractually obligated flow restrictions.

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. In the past, Santee Cooper has evaluated potential small hydro projects around the state and continues to look at opportunities as they arise.

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 six sites totaling 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.

EDF Renewable Energy has two 17.8-MW facilities in Allendale and Dorchester counties that utilize wood chips and waste wood for fuel. Santee Cooper continues to purchase the output of these facilities since they were declared commercial in the fall of 2013. Santee Cooper also purchases the output from the 38-MW Domtar biomass facility located in Marlboro County that began operation in 2010.

SOLAR

Santee Cooper has developed a Green Power Solar Schools ("GPSS") program for middle schools 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. To provide training opportunities for the teachers who will be using the curriculum, a similar 2-kW PV panel has also been installed at Santee Cooper's Wampee Conference Center. Since it began in 2007, Santee Cooper has continued to expand the Solar School program and to date there are now 28 Solar School installations across the state with a total capacity of 60-kW.

Santee Cooper continues to investigate and utilize solar power. 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, a second 20-kW installation in December of 2009 at the Technical College of the Lowcountry in Bluffton, and an 8-kW solar project in Rock Hill was completed and placed in service in early 2014. In 2016, the first dual axis tracking array in combination with a fixed array, a total of 4-kW, was constructed at the Center for Advance Technical Studies in Chapin, S.C. In 2017, the first bifacial solar array, totaling 4-kW, was installed at Trident Technical College's Berkeley Campus. 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.

In October of 2013, Santee Cooper signed an agreement with TIG Sun Energy I LLC to buy the output of a 3-MW solar farm in Walterboro which began operating in January 2014. Santee Cooper will be using the project to learn more about integrating solar power

into the generation portfolio, both from a cost and reliability standpoint, and as part of the state's first Community Solar program.

In March of 2018, the construction of a 1.5-MW solar farm, named Bell Bay Solar Farm located in Conway, SC, was completed. It was oriented to the southwest to provide additional generation during the peak hours of the summer when energy demand is high.

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. 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 was used to validate an emerging wind measuring technology, developed by Secondwind.

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 has also contracted to purchase the output of a 2.4-kW wind turbine owned by City of North Myrtle Beach at Burgess Preserve.

Offshore Wind Research: In March 2009, Santee Cooper, Coastal Carolina University and the South Carolina 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 University, 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.

In 2015, Santee Cooper again partnered with Coastal Carolina University in deploying a Sonic Detection and Ranging System (SODAR) to remotely gather wind data at "hub height." This system is located on Waites Island and continues to collect data.

In 2017, data collected from the SOADAR was being used to formulate wind maps with greater accuracy at higher heights than previously possible with other technology.

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 2017, Santee Cooper collected 1,252,498 gallons of used oil from more than 450 do-it-yourself collection sites. GOFER will also collect used oil from industries, commercial operations and farmers when it meets the regulatory criteria.

3. Green Power Program

In 2001, Santee Cooper became the first electric utility in South Carolina to offer electricity generated from renewable resources through its Green Power Program. The program is offered to all of Santee Cooper's direct serve retail customers as well as the state's 20 Electric Cooperatives. All revenue from the sale of Green Power is reinvested in future development of renewable energy resources in South Carolina. The current resource mix for Green Power is methane gas from landfills, solar and wind. Santee Cooper's participation for 2017 was 1,243 participants purchasing 11,826 MWh of energy.

Santee Cooper's Green Power Program is certified by a third party. The Green-e Energy Program certifies that Santee Cooper's Green Power meets the minimum environmental and consumer protection standards established by the non-profit Center for Resource Solutions.

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. Several major state sporting events such as the RBC Heritage Golf Tournament and the Bojangle's Southern 500 Race replace its energy usage with 100% renewable energy provided by the Green Power Tag program. Participation in 2017 was 36 Green Tag customers.

5. Solar Incentive Package

Santee Cooper customers interested in purchasing or leasing rooftop solar panels or buying into a community solar program will benefit under a comprehensive incentive package. The incentive package focuses on three areas:

- Rooftop Rebates: Up-front rebates for the installation of solar PV systems are set as a one-time payment of $1.30/watt paid based on the system's rated capacity (watt AC). Solar Home and Solar Business Rebates are capped at $7,800 per account number. Nonprofit customers are eligible for an additional rebate of $0.25/watt (AC), capped at a maximum of $1,500.
- Energy Credit: Solar customers will receive an energy credit as outlined in the Distributed Generation Rider of 3.84 cents per kWh for non-summer months and 4.16 cents per kWh for summer months for any excess solar power produced that is put back on the grid. The first 500 residential rooftop customers to sign up will receive an additional 3-cent per kWh credit for excess electricity through 2018. The credit is available for residential customers who own or lease the panels.
- Community Solar: Customers have the opportunity to subscribe to a share of the capacity at the Colleton Solar Farm, Santee Cooper's first community solar project. Solar Share allows customers to own solar output without having to install a rooftop solar electric system at their home or business. Customers will use their share's output each month to offset the total electricity they need to run their home or business. Solar Share costs $1.75 per watt for customers and Santee Cooper offers a rebate amount of $1.30 per watt. Solar Share is sold per kW, which equates to a rebate amount of $1,300 per kW. There is a 6 kW cap for rebates. (The amount per watt and the rebate amount will be reviewed each year.) Santee Cooper plans to use Santee Cooper Green Power funds to seed future community solar projects once the Colleton project is fully subscribed.

Santee Cooper launched Solar Home, Solar Business and Solar Share on April 1, 2016. The incentive package is approved for three years and is subject to expansion depending on customer response. Santee Cooper's Solar Home and Business packages include installing solar panels on homes and businesses and receiving rebates and opportunities to save money on monthly electric bills. Santee Cooper's Solar Share package allows a

customer to enjoy the benefits of solar power without actually having it installed on their own roof. This includes pooling resources, saving money and using locally produced solar power. A customer buys a share and lets Santee Cooper take care of the rest.

VIII. Environmental Considerations

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 of doing 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 the 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, and Santee Cooper offers these DSM programs where cost effective. Santee Cooper's existing portfolio is projected to be capable of meeting its energy and capacity needs through at least 2032.

Santee Cooper will continue to deliver on its responsibility to provide low-cost, reliable energy, water, and other essential services and to do so with excellent customer service. Santee Cooper is also committed to operating according to the highest ethical standards, maintaining a quality workforce, being a steward of the environment, and being a leader in economic development.