Progress Energy

December 3, 2007

Mr. Charles Terreni
Chief Clerk and Administrator
South Carolina Public Service Commission
Post Office Drawer 11649
Columbia, South Carolina 29211

Re: Progress Energy Carolinas, Inc.
2007 Resource Plan
Docket No. 2006-174-E

Dear Mr. Terreni:

Pursuant to Section 58-37-40 of the Code of Laws of South Carolina, Carolina Power & Light Company d/b/a Progress Energy Carolinas, Inc. ("PEC") hereby submits for filing an original and one copy of its 2007 Resource Plan. PEC is also providing a Demand-Side Management (DSM) Plan that describes in detail several new energy efficiency and demand response programs which PEC is considering as part of its balanced approach to providing clean, reliable and affordable power to its customers.

Sincerely,

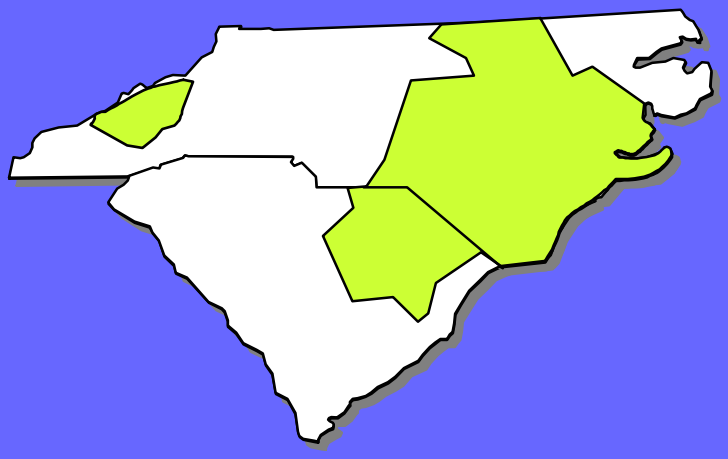
/s Len S. Anthony
Deputy General Counsel - Carolinas

Enclosures
55006

c: John Clark, State Energy Office
John Flitter, ORS

Progress Energy Carolinas Resource Plan

Progress Energy



South Carolina Public Service Commission
Docket No. 2006-174-E
December 2007

TABLE OF CONTENTS

INTRODUCTION

OWNERSHIP

Progress Energy Carolinas, Inc. (PEC) is a wholly owned subsidiary of Progress Energy, Inc. (Progress Energy). PEC is subject to the rules and regulations of the Federal Energy Regulatory Commission (FERC), the Public Service Commission of South Carolina (SCPSC) and the North Carolina Utilities Commission (NCUC).

AREA OF SERVICE

PEC territory consists of an area approximately 34,000 square miles, and includes part of northeastern South Carolina, a substantial portion of the coastal plain of North Carolina extending to the Atlantic coast between the Pamlico River and the South Carolina border, the lower Piedmont section of North Carolina, and an area in western North Carolina in and around the city of Asheville. PEC provides electric services, retail and wholesale, to approximately 1.4 million customers. Major wholesale power sales customers include North Carolina Eastern Municipal Power Agency (Power Agency or NCEMPA), North Carolina Electric Membership Corporation (NCEMC), and the Public Works Commission of the City of Fayetteville (PWC).

TOTAL CAPACITY RESOURCE

PEC's eighteen generating plants, composed of fossil, nuclear, hydroelectric, combustion turbines and combined cycle units, along with purchases and other resources, provide a flexible mix of supply options. As of December 31, 2006, PEC had a total summer generating capacity (including jointly owned capacity) of over 12,400 MW and approximately 1,500 MW of firm purchased capacity under contract.

1. The demand and energy forecast for at least a 15-year period.

Peak Load and Energy Forecast

Methodology

PEC's forecasting processes have utilized econometric and statistical methods since the mid-70s. During this time enhancements have been made to the methodology as data and software have become more available and accessible. Enhancements have also been undertaken over time to meet the changing data needs of internal and external customers.

The System Peak Load Forecast is developed from the System Energy Forecast using a load factor approach. This load forecast method couples the two forecasts directly, assuring consistency of assumptions and data. Class peak loads are developed from the class energy using individual class load factors. Peak load for the residential, commercial, and industrial classes are then adjusted for projected load management impacts. The individual loads for the retail classes, wholesale customers, NCEMPA, and Company Use are then totaled and adjusted for losses between generation and the customer meter to determine System Peak Load.

Wholesale sales and demands include a portion that will be provided by the Southeastern Power Administration (SEPA). NCEMPA sales and demands include power which will be provided under the joint ownership agreement with them.

Summaries of the summer and winter Peak Load and Energy Forecast are provided in Appendices A and B. PEC's peak load forecasts assume the use of all load management capability at the time of system peak.

Assumptions

The filed forecast represents a retail demand growth rate of approximately 1.8% across the forecast period before subtracting for Demand-Side Management (DSM). The retail demand growth rate drops to 1.1% after adjusting for DSM. Generally, growth in the standard of living as reflected in personal income and Gross Domestic Product (GDP) per capita is expected to slow modestly over the long term relative to historic levels. Real dollar prices are used to enhance model reliability during periods of varying inflation.

The forecast of system energy usage and peak load does not explicitly incorporate periodic expansions and contractions of business cycles, which are likely to occur from time to time during any long-range forecast period. While long-run economic trends exhibit considerable stability, short-run economic activity is subject to substantial variation. The exact nature, timing and magnitude of such short-term variations are unknown years in advance of their occurrence. The forecast, while it is a trended projection, nonetheless reflects the general long-run outcome of business cycles because actual historical data, which contain expansions and contractions, are used to develop the general relationships between economic activity and energy use. Weather normalized temperatures are assumed for the energy and system peak forecasts.

Forecast

The Company's Peak Load and Energy Forecast are given in the table below. Wholesale sales have become more uncertain due to the 1992 Energy Policy Act, subsequent FERC initiatives related to the wholesale market, the continuing evolution of the wholesale market and market conditions. As expectations for the various wholesale contracts change, those expectations are appropriately reflected in the wholesale forecast.

ANNUAL PEAK LOAD and ENERGY FORECAST		
Year	Firm Obligation (MW)	PEC System Energy (GWh)
2008	12,209	65,589
2009	12,212	66,137
2010	12,285	66,762
2011	12,398	67,937
2012	12,494	69,224
2013	12,652	70,397
2014	12,815	71,581
2015	12,935	72,703
2016	13,063	73,850
2017	13,182	74,916
2018	13,317	75,951
2019	13,505	77,108
2020	13,711	78,293
2021	13,964	79,586
2022	14,191	80,855

2. The supplier's or producer's program for meeting the requirements shown in its forecast in an economic and reliable manner, including both demand-side and supply-side options.

PEC's "December, 2007 South Carolina Resource Plan" can be found in Appendices A and B. This plan represents the self-build option that PEC would pursue given current alternatives. The Company will, however, pursue additional alternatives, including DSM, joint participation in new generation, and power purchases, if cost effective, in place of the generation additions identified herein. Currently, PEC is negotiating to procure purchase power contracts for 2010 and beyond.

Also, it should be noted that earlier this year, the State of North Carolina passed a law establishing a renewable energy and energy efficiency portfolio standard (REPS). In accordance with the bill, the state's electric companies must gradually increase their use of renewable energy. The utilities must purchase or generate 3 percent of their energy (based on the prior year's total retail sales) from renewable resources by 2012. The North Carolina public utilities – PEC, Duke Energy Carolinas, and Dominion North Carolina Power – must increase their use of renewable energy to 12.5 percent in 2021. Exactly how the requirements of the REPS will be achieved, and through which technologies, is not fully known at this time. In order to fully incorporate and plan for the impacts of the REPS the NC Utilities Commission must develop rules to carry out the provisions of the REPS.

In May 2007, PEC announced a goal of displacing 2,000 megawatts (MW) of power generation through demand-side management (DSM) programs. In order to meet this goal, PEC will double the approximate 1,000 MW of peak load reduction capability associated with existing programs by acquiring another 1,000 MW of new DSM resources over the next ten years. This Resource Plan reflects the demand and energy impacts of these new DSM resources.

To achieve this goal, PEC is planning to implement a host of new energy efficiency and demand response programs targeted toward major electric end-uses from the customer classes. These new programs are identified and described in PEC's DSM Plan, which is being filed separately in conjunction with the 2007 PEC Resource Plan.

PEC is providing the DSM Plan to inform the Commission of planned investments in demand-side resources that PEC intends to make as part of its balanced approach to providing clean, reliable, and affordable power to its customers. The assessment of these potential programs is not yet complete. The final portfolio of DSM programs may include some or all of the initiatives identified in the DSM Plan, as well as others. PEC will develop more specific proposals and obtain required regulatory approvals for all programs determined to be cost effective, prior to program implementation.

In addition, effective December 1, 2007, the Company will retire the Roxboro CT Unit. This small combustion turbine unit was placed into service in 1968. For the reasons listed below, this unit is being retired and has been excluded from the Resource Plan in Appendices A and B.

- The space and location required by the installation of new environmental control equipment at the Roxboro Fossil Plant, primarily related to Clean Smokestacks, make future maintenance on this unit impractical.
- The unit will no longer be able to serve as a blackstart unit for Roxboro given the increased auxiliary loading associated with the new environmental control equipment.
- The unit needs a significant overhaul to enable reliable operation and repair current damage.

3. A brief description and summary of cost-benefit analysis, if available, of each option, which was considered, including those not selected.

Screening of Generation Alternatives

Resource Planning Process

The Resource Planning process used by PEC incorporates sophisticated resource optimization computer models to evaluate future generation alternatives. The integrated planning process combines existing and new generation resources, demand-side management programs, and purchased power contracts in a portfolio that will provide reliable electric service at a reasonable overall cost to PEC's customers over the planning horizon.

Methodology

PEC periodically assesses various generating technologies to ensure that projections for new resource additions capture new and emerging technologies over the planning horizon. This analysis involves a preliminary screening of the generation resource alternatives based on commercial availability, technical feasibility, and cost.

First, the commercial availability of each technology is examined for use in utility-scale applications. For a particular technology to be considered commercially available, the technology must be able to be built and operated on an appropriate commercial scale in continuous service by or for an electric utility. Reasonable levels of detail for emerging technologies were developed to allow PEC to screen the technology options and to stay abreast of potential economic benefits as they mature.

Second, technical feasibility for commercially available technologies was considered to determine if the technology met PEC's particular generation requirements and whether it would integrate well into the PEC system. The evaluation of technical feasibility included the size, fuel type, and construction requirements of the particular technology and the ability to match the technology to the service it would be required to perform on the PEC system (e.g., baseload, intermediate, or peaking).

Finally, for each alternative, an estimate of the levelized cost of energy production, or "busbar" cost, was developed. Busbar analysis allows for the long-term economic comparison of capital, fuel, and O&M costs over the typical life expectancy of a future unit at varying capacity factor levels.

For the screening of alternatives, the data are generic in nature and thus not site specific. Cost and performance projections were based on EIA's 2007 Annual Energy Outlook report and on internal PEC resources.

Capital and operating costs reflect the impact of known and emerging environmental requirements to the extent that such requirements can be quantified at this time. As these requirements and their impacts are more clearly defined in the future, capital and operating costs

are subject to change. Such changes could alter the relative cost of one technology versus another and therefore result in the selection of different generating technologies for the future.

Cost and Performance

Categories of capacity alternatives that were reviewed as potential resource options included Conventional, Demonstrated, and Emerging technologies. Conventional technologies are mature, commercially available options with significant acceptance and operating experience in the utility industry. Demonstrated technologies are those with limited commercial operating experience and/or are not in widespread use. Emerging technologies are still in the concept, pilot, or demonstration stage or have not been used in the electric utility industry. In the most recent assessment, the following generation technologies were screened:

Conventional Technologies
Combined Cycle (CC)
Combustion Turbines (CT)
Hydro, Conventional
Pulverized Coal (PC)

Demonstrated Technologies
Biomass
Integrated (Coal) Gasification/Combined Cycle (IGCC)
Nuclear Advanced Light Water Reactor (ALWN)
Municipal Solid Waste-Landfill Gas (MSW-LFG)
Wind

Emerging Technologies
Fuel Cell (FC)
Solar Photovoltaic (PV)

Of the technologies evaluated, not all are proven, mature, or commercially available. This is important to keep in mind when reviewing the data, as some options shown as low cost may not be commercially available or technically feasible as an option to meet resource plan needs and requirements at this time. In addition, the less mature a technology is the more uncertain and less accurate its cost estimate may be.

For example, fuel cells, which are currently still in the pilot or demonstration stage, can be assembled building-block style to produce varying quantities of electric generation. However, as currently designed, a sufficient number of fuel cells cannot be practically assembled to create a source of generation comparable to other existing bulk generation technologies, such as CC. Further development of this technology is needed before it becomes viable as a resource option.

Integrated Gasification-Combined Cycle (IGCC) appears to offer the potential to be competitive with other baseload generation technologies and has fewer environmental concerns. This technology, though, has only been demonstrated at a handful of installations and is just now

becoming commercially available. With the possible need for new baseload generation in the future, PEC will continue to monitor the progress of this technology.

Hydro generation has been a valuable and significant part of the generating fleet for North Carolina. The potential for additional hydro generation on a commercially viable scale is limited and the cost and feasibility is highly site specific. Given these constraints, hydro was not included in the more detailed evaluations but may be considered when site opportunities are evidenced and the potential is identified. PEC will continue to evaluate hydro opportunities on a case-by-case basis and will include it as a resource option if appropriate.

Wind projects have high fixed costs but essentially no operating costs. Therefore, at high enough capacity factors they could become economically competitive with the conventional technologies identified. However, geographic and atmospheric characteristics affect the ability of wind projects to achieve those capacity factors. Wind projects must be constructed in areas with high average wind speed. In general, wind resources in North Carolina are concentrated in two regions. The first is along the Atlantic coast and barrier islands. The second area is the higher ridge crests in western North Carolina. Because wind is not dispatchable and provides little or no capacity value, it may not be suited to provide consistent capacity at the time of the system peak. Offshore wind power, an emerging technology, may provide greater potential for North Carolina in the future. North Carolina benefits from offshore wind and shallow water that is less than 30 meters deep within 50 nautical miles of shore. Once the technology is developed and the regulatory process is established, this untapped energy source may contribute capacity and energy production for North Carolina. PEC will continue to monitor the progress and the cost effectiveness of this technology.

Solar photovoltaic (PV) projects are technically constrained from achieving high capacity factors. In the southeast, they would be expected to operate at a capacity factor of approximately 20%, making them unsuitable for intermediate or baseload duty cycles. At the lower capacity factors, they, like wind, are not dispatchable and therefore less suited to provide consistent peaking capacity. Aside from their technical limitations, PV projects are not currently economically competitive generation technologies. Residential photovoltaic installations are increasing due to the premiums provided by the NC GreenPower program. Solar providers generally sell the entire output of the system to PEC at avoided cost rates to be eligible for NC GreenPower incentives. While there are over twenty solar contracts that contribute about 0.086 MW, all of it is non-firm power, which cannot be counted towards system reserves.

The capacity value of wind and solar resources depends heavily on the correlation between the system load profile, wind speed, and solar insolation. A recent Utility Wind Integration Group report noted that the capacity value of wind is typically less than 40% of nameplate capacity. Although wind and solar projects are currently not viable options for meeting reserve requirements due to their relatively high cost and uncertain operating characteristics, they may play a future role in PEC's energy portfolio. External economic and non-economic forces, such as tax incentives, environmental regulations, federal or state policy directives, technological breakthroughs, and consumer preferences through "green rates", may drive these types of technologies. As part of PEC's regular planning cycle, changes to these external conditions are

considered, as well as any technological changes, and will be continually evaluated for suitability as part of the overall resource plan.

Currently, our Resource Plan includes purchased power from two MSW facilities and contracts with landfill gas facilities. We are also actively engaged in a variety of projects to develop new alternative sources of energy, including solar, hydrogen, biomass, and landfill gas technologies. In addition, wind and solar, as well as other renewables, will be evaluated for their ability to meet renewable energy requirements on a case-by-case basis and included as a resource option if appropriate.

For the remaining technologies, a more detailed economic analysis was performed. These technologies included simple-cycle combustion turbines, combined cycle, pulverized coal, and nuclear.

Appendix C provides an economic comparison of all technologies examined based on capital, operating, and fuel cost projections. Appendix D shows the technologies that are commercially available, technically feasible, and cost effective, making them viable generation alternatives in the Carolinas. These graphs illustrate that, based on current planning assumptions, heavy-frame combustion turbines (CTs) and combined cycle (CC) units are the most economical generation alternatives for peaking and intermediate duty cycles, and coal and nuclear technologies are cost effective options for base load operation. These findings are dependent on projections for fuel prices, capital costs, and costs associated with environmental compliance, all of which are dynamic and subject to change.

Resource Plan and Optimization

While the type of analysis illustrated in Appendices C and D provide a valuable tool for a comparative screening of technologies, it does not address the specific needs of any particular resource plan. To develop a cost-effective resource plan, the type of generation added must match the utility's load and energy requirements. Additionally, site-specific requirements, such as transmission, pipeline costs, and fuel availability, must be considered when conducting resource optimization analyses.

The resource planning process incorporates the impact of all demand-side management programs on system peak load and total energy consumption, and optimizes supply-side options into an integrated plan that will provide reliable and cost-effective electric service to PEC's customers. PROVIEW, a module of New Energy Associates' STRATEGIST proprietary computer model, performs this optimization through an economic evaluation of PEC's existing resource portfolio and viable capacity alternatives for satisfying reliability requirements. The primary output of PROVIEW is a Cumulative Present Worth Revenue Requirements (CPWRR) comparison of all of the viable resource combinations. PROVIEW considers thousands of combinations of generation alternatives and ranks each of the resource combinations based on cost performance.

Meeting the anticipated growth and resulting demand for electricity within the utility's service territories will require a balanced approach, including a strong commitment to demand side

management, investments in emerging alternatives and renewable energy technologies, and investments in state-of-the-art power plants.

PEC is actively pursuing expansion of its demand side management programs (as is shown in Appendices A and B) as one of the most effective ways to reduce energy costs, offset the need for new power plants, and protect the environment. In the coming years, PEC will continue to invest in existing plants and consider the best available options for building new baseload plants needed by the middle of the next decade, including advanced design nuclear and clean coal technologies. At this time, though, no definitive decision has been made to construct new baseload plants. In fact, PEC has announced a two-year moratorium on constructing new coal-fired plants, and if PEC proceeds with a new nuclear plant, it would not be online until at least 2018.

In the near term, the current Resource Plan continues to focus on the use of gas-fired generators for peaking and intermediate load needs when possible and on oil-fired units for peaking load when necessary. Gas-fired units are the most environmentally benign, economical, large-scale capacity additions available for meeting peaking and intermediate loads. New designs of these technologies are more efficient (as measured by heat rate) than previous designs, resulting in a smaller impact on the environment. PEC is also seeking license renewal options for our existing hydro and nuclear plants.

4. The supplier's and producer's assumptions and conclusions with respect to the effect of the plan on the cost and reliability of energy service, and a description of the external, environmental and economic consequences of the plan to the extent practicable.

Effect of plan on cost of energy service

As discussed in Item 3, the Company's resource planning process incorporates demand-side and supply-side resource options to produce an optimal plan for providing reliable and cost-effective electric service to its customers. PEC's current Resource Plan continues to provide reliable and cost-effective energy service. This plan includes combustion turbine (CT) additions, combined cycle (CC) additions, and purchases through 2012. In the longer term, the Company is evaluating the economics of new nuclear and coal capacity, in addition to gas-fired alternatives. The plan includes renewal of operating licenses for two of the Company's hydroelectric plants as well as its existing nuclear units.

Peaking resources such as CTs are operated during peak load periods or emergency conditions. Combustion turbines have relatively low capital costs but higher operating costs than intermediate or base load generation, and are the most cost-effective new resource when a generator is needed to operate less than roughly 15% of the time. Combustion turbines can be started quickly in response to a sharp increase in customer demand and help supply power during cold winter mornings and hot summer afternoons.

Combined cycle units, which consist of combustion turbines equipped with heat recovery steam generators, are the most cost-effective new resource for satisfying intermediate generation needs. Intermediate units, such as combined cycle units have higher capital costs than peaking units, but lower operating costs. Intermediate generation resources will reduce generation produced by less efficient combustion turbines burning both gas and oil. These fuel savings directly benefit ratepayers. Intermediate resources take several hours to start up and bring to full power output. These facilities are best utilized to operate at higher capacity factors than peaking units, and to respond to more predictable system load patterns.

Baseload units, which consist of coal and nuclear units, are the most cost-effective new resource when generation is needed to provide service for a very predictable and stable load with capacity factors ranging from about 60-100%. These units have the highest capital costs but lower operating costs. The Company continues to study the feasibility of baseload generation alternatives. The economics are driven by changes in fuel price assumptions, capital costs and permitting for constructing new facilities, and costs associated with environmental compliance. Alternatives being assessed include coal and nuclear facilities; however, PEC has delayed any decision on coal for approximately two years.

PEC has announced that it is pursuing development of combined license (COL) applications to potentially construct new nuclear plants. The announcement is not a commitment to build a nuclear plant but is a necessary step to keep open the option of building a plant or plants. On January 23, 2006, PEC announced that it selected a site at Harris to evaluate for possible future nuclear expansion. PEC selected the Westinghouse Electric AP1000 reactor design as the

technology upon which to base PEC's application submission. PEC expects to file the application for the COL in 2008. The NRC estimates that it will take approximately three to four years to review and process the COL application. If PEC receives approval from the NRC and applicable state agencies, and if the decisions to build are made, a new plant would not be online until at least 2018.

Effect of plan on reliability of energy service

The reliability of energy service is a primary input in the development of the Resource Plan. Utilities require a margin of generating capacity reserve available to the system in order to provide reliable service. Periodic scheduled outages are required to perform maintenance, inspections of generating plant equipment, and to refuel nuclear plants. Unanticipated mechanical failures may occur at any given time, which may require shutdown of equipment to repair failed components. Adequate reserve capacity must be available to accommodate these unplanned outages and to compensate for higher than projected peak demand due to forecast uncertainty and weather extremes. In addition, some capacity must also be available as operating reserve to maintain the balance between supply and demand on a real-time basis.

The amount of generating reserve needed to maintain a reliable power supply is a function of the unique characteristics of a utility system including load shape, unit sizes, capacity mix, fuel supply, maintenance scheduling, unit availabilities, and the strength of the transmission interconnections with other utilities. There is no one standard measure of reliability that is appropriate for all systems since these characteristics are particular to each individual utility.

Reliability Criteria

PEC employs both deterministic and probabilistic reliability criteria in its resource planning process. The Company establishes a reserve criterion for planning purposes based on probabilistic assessments of generation reliability, industry practice, historical operating experience, and judgment.

PEC conducts multi-area probabilistic analyses to assess generation system reliability in order to capture the random nature of system behavior and to incorporate the capacity assistance available through interconnections with other utilities. Decision analysis techniques are also incorporated in the analysis to capture the uncertainty in system demand. Generation reliability depends on the strength of the interconnections, the generation reserves available from neighboring systems, and the diversity in loads throughout the interconnected area. Thus, the interconnected system analysis shows the overall level of generation reliability and reflects the expected risk of capacity deficient conditions for supplying load.

A Loss-of-Load Expectation (LOLE) of one day in 10 years continues to be a widely accepted criterion for establishing system reliability. PEC uses a target reliability of one day in ten years LOLE for generation reliability assessments. LOLE can be viewed as the expected number of days that load will exceed available capacity. Thus, LOLE indicates the number of days that a

capacity deficient condition would occur, resulting in the inability to supply some portion of customer demand. Results of the probabilistic assessments are correlated to appropriate deterministic measures of reliability, such as capacity margin or reserve margin, for use as targets in developing the Resource Plan.

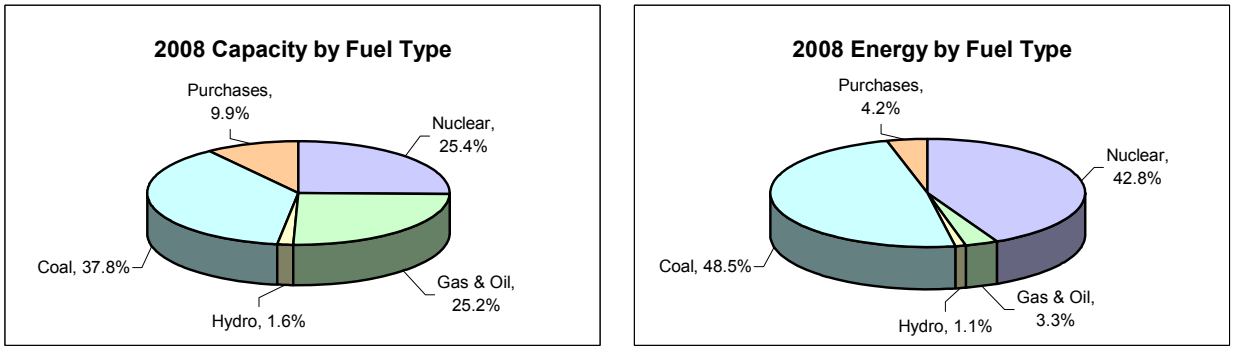
Adequacy of Projected Reserves

Reliability assessments have shown that reserves projected in PEC's Resource Plan are appropriate for providing an adequate and reliable power supply. The Company's Resource Plan reflects capacity margins in the range of approximately 11% to 21%, corresponding to reserve margins of approximately 13% to 27%. It should be noted that actual reserves as measured by megawatts of installed capacity continue to increase as the load and the size of the system increase.

The reliability of PEC's generating system has improved since the mid-nineties. The addition of smaller and highly reliable CT capacity increments to the Company's resource mix improve the reliability and flexibility of the PEC fleet in responding to increased load requirements. Since 1996, PEC has added approximately 3,300 MW of new combustion turbine and combined cycle capacity to system resources, either through new construction or purchased power contracts. Shorter construction lead times for building new combustion turbine and combined cycle power plants, as contrasted to baseload plants, allow greater flexibility to respond to changes in capacity needs and thus reduce exposure to load uncertainty. The Company's Resource Plan includes approximately 157 MW of additional CT capacity by 2009 and 600 MW of additional CC capacity by 2011. All of these factors help to ensure the Company's ability to provide an adequate and reliable power supply.

Figure 1 below shows PEC's capacity (MW) and energy (MWh) by fuel type projected for 2008. Nuclear and coal generation currently make-up approximately 63% of total capacity resources, yet account for about 91% of total energy requirements. Gas and oil generation accounts for about 25% of total supply capacity, yet about 3% of total energy.

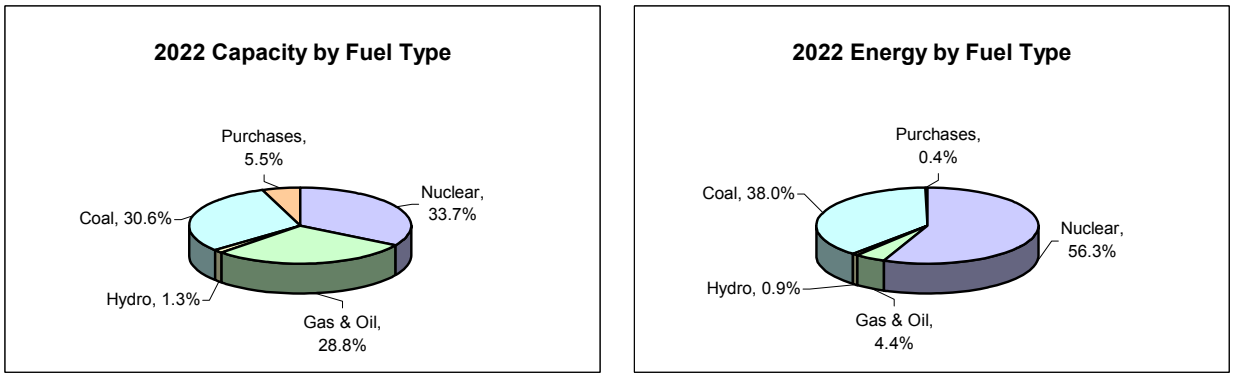
Figure 1



The Company's resource plan includes additions fueled by natural gas and oil, as well as possible new baseload generation. The Company's capacity and energy by fuel type projected for 2022 are shown in Figure 2. Gas and oil resources are projected to increase to about 29% of total

supply capacity, while only serving about 4% of the total energy requirements. In 2022, nuclear and coal are projected to account for approximately 64% of total capacity resources and serve about 94% of total system energy requirements. These figures demonstrate that nuclear and coal resources will continue to account for the largest share of system capacity (MW) and satisfy most of the system energy (MWh) requirements through the planning horizon.

Figure 2



Based on PEC's forecasted load and resources in the current Resource Plan, LOLE is expected to be within the reliability target of one day in ten years. The resources in the current plan, including reserves, are expected to continue to provide a reliable power supply.

Environmental consequences of plan

In the near term, PEC's Resource Plan continues to focus on the use of gas-fired generators for peaking and intermediate load needs when possible and on oil-fired units for peaking load when necessary. Gas-fired units are the most environmentally benign, economical, large-scale capacity additions available. New designs of these technologies are more efficient (as measured by heat rate) than previous designs, resulting in a smaller impact on the environment. PEC is also seeking license renewal options for our existing hydro and nuclear facilities, which have essentially no air emissions impact. The Plan also includes new nuclear facilities in the future to meet capacity and energy requirements with essentially no air emissions impact.

In addition to deferring any decision on new coal fired units for two years, the Company's Resource Plan also reflects capacity derates to some of its coal-fired facilities in order to install controls necessary to ensure compliance with new environmental regulations. Progress Energy Carolinas continues to study and optimize its generation fleet to ensure economical operation and to minimize impact on the environment.

Appendix A

Progress Energy - Carolinas

2007 South Carolina Resource Plan Filing (Summer)

	2008	2009	2010*	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
GENERATION ADDITIONS															
Wayne County CT		157													
Richmond County CC				600											
Planned Projects	19	21	20		5										
Pollution Control Derates	(39)	(38)	(1)		(1)	(2)									
Undesignated (1)			168		129			168	168		1,085	1,085			
Roxboro CT retirement	(12)														
INSTALLED GENERATION															
Nuclear	3,485	3,495	3,515	3,515	3,520	3,520	3,520	3,520	3,520	3,520	3,520	3,520	3,520	3,520	3,520
Fossil	5,196	5,169	5,168	5,168	5,168	5,166	5,166	5,166	5,166	5,166	5,166	5,166	5,166	5,166	5,166
Hydro	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225
Combined Cycle	528	528	528	1,128	1,128	1,128	1,128	1,128	1,128	1,128	1,128	1,128	1,128	1,128	1,128
Combustion Turbine	2,939	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096
Undesignated (1)			168	168	297	297	297	465	633	633	1,718	2,803	2,803	2,803	2,803
PURCHASES & OTHER RESOURCES															
SEPA	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
AEP/Rockport 2	250	250													
Broad River CT	816	816	816	816	816	816	816	816	816	816	816	816	816	816	816
NUG QF - Cogen	179	179	20	20	20	20	20	20	20	20	20	20	20	20	20
NUG QF - Renewable	4	8	8	8	8	8	4	4	4	4	4	4	4	4	4
NUG QF - Other	16	9													
Southern CC Purchase			150	150	150	150	150	150	150	150	150	150			
Undesignated Short-term Purchase*			150	150											
TOTAL SUPPLY RESOURCES	**13,733**	**13,869**	**13,938**	**14,538**	**14,522**	**14,520**	**14,516**	**14,684**	**14,852**	**14,852**	**15,937**	**17,022**	**16,872**	**16,872**	**16,872**
PEAK DEMAND															
Retail	8,946	9,031	9,108	9,183	9,255	9,331	9,412	9,498	9,592	9,682	9,801	9,957	10,129	10,302	10,499
Wholesale	3,063	2,981	2,977	3,015	3,139	3,221	3,303	3,337	3,371	3,400	3,416	3,448	3,482	3,562	3,592
SYSTEM PEAK LOAD	12,009	12,012	12,085	12,198	12,394	12,552	12,715	12,835	12,963	13,082	13,217	13,405	13,611	13,864	14,091
Firm Sales	200	200	200	200	100	100	100	100	100	100	100	100	100	100	100
FIRM OBLIGATION	**12,209**	**12,212**	**12,285**	**12,398**	**12,494**	**12,652**	**12,815**	**12,935**	**13,063**	**13,182**	**13,317**	**13,505**	**13,711**	**13,964**	**14,191**
Energy Efficiency/Demand Reduction	431	526	644	771	888	1,000	1,110	1,216	1,321	1,414	1,484	1,523	1,547	1,568	1,584
TOTAL LOAD	12,640	12,738	12,929	13,169	13,382	13,652	13,925	14,151	14,384	14,596	14,801	15,028	15,258	15,532	15,775
RESERVES (2)	1,524	1,657	1,653	2,140	2,028	1,868	1,701	1,749	1,789	1,670	2,620	3,517	3,161	2,908	2,681
Capacity Margin (3)	11%	12%	12%	15%	14%	13%	12%	12%	12%	11%	16%	21%	19%	17%	16%
Reserve Margin (4)	12%	14%	13%	17%	16%	15%	13%	14%	14%	13%	20%	26%	23%	21%	19%
ANNUAL SYSTEM ENERGY (GWh)	**65,589**	**66,137**	**66,762**	**67,937**	**69,224**	**70,397**	**71,581**	**72,703**	**73,850**	**74,916**	**75,951**	**77,108**	**78,293**	**79,586**	**80,855**

Notes:

* Purchases are being pursued beginning 2010 and beyond

Footnotes:

(1) For planning purposes only; does not indicate a commitment to type, amount or ownership
(2) Reserves = Total Supply Resources - Firm Obligations
(3) Capacity Margin = Reserves / Total Supply Resources * 100
(4) Reserve Margin = Reserves / Firm Obligations * 100.

Appendix B

Progress Energy - Carolinas

2007 South Carolina Resource Plan Filing (Winter)

	07/08	08/09	09/10	10/11*	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
GENERATION ADDITIONS															
Wayne County CT			185												
Richmond County CC					650										
Planned Projects	9	21	10	20	5										
Pollution Control Derates	(14)	(41)	(23)		(1)	(2)									
Undesignated (1)				195	147				195	195		1,125	1,125		
Roxboro CT retirement	(18)														
INSTALLED GENERATION															
Nuclear	3,505	3,505	3,515	3,535	3,540	3,540	3,540	3,540	3,540	3,540	3,540	3,540	3,540	3,540	3,540
Fossil	5,320	5,290	5,268	5,268	5,268	5,266	5,266	5,266	5,266	5,266	5,266	5,266	5,266	5,266	5,266
Hydro	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
Combined Cycle	621	621	621	621	1,271	1,271	1,271	1,271	1,271	1,271	1,271	1,271	1,271	1,271	1,271
Combustion Turbine	3,511	3,522	3,707	3,707	3,707	3,707	3,707	3,707	3,707	3,707	3,707	3,707	3,707	3,707	3,707
Undesignated (1)				195	342	342	342	342	537	732	732	1,857	2,982	2,982	2,982
PURCHASES & OTHER RESOURCES															
SEPA	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
NUG QF - Cogen	179	179	20	20	20	20	20	20	20	20	20	20	20	20	20
NUG QF - Renewable	4	4	8	8	8	8	4	4	4	4	4	4	4	4	4
NUG QF - Other	16	9													
AEP/Rockport 2	250	250													
Broad River CT	841	841	841	841	841	841	841	841	841	841	841	841	841	841	841
Southern CC Purchase			150	150	150	150	150	150	150	150	150	150			
Undesignated Short-term Purchase*			150	150											
TOTAL SUPPLY RESOURCES	**14,570**	**14,543**	**14,603**	**14,818**	**15,470**	**15,468**	**15,464**	**15,464**	**15,659**	**15,854**	**15,854**	**16,979**	**17,954**	**17,954**	**17,954**
PEAK DEMAND															
Retail	7,896	7,866	8,022	8,073	8,112	8,158	8,227	8,302	8,385	8,456	8,551	8,681	8,836	8,987	9,164
Wholesale	2,777	2,796	2,694	2,726	2,847	2,924	3,000	3,027	3,057	3,083	3,092	3,121	3,149	3,224	3,249
SYSTEM PEAK LOAD	10,673	10,662	10,716	10,799	10,959	11,082	11,227	11,329	11,442	11,539	11,643	11,802	11,985	12,211	12,413
Firm Sales	200	200	200	200	100	100	100	100	100	100	100	100	100	100	100
FIRM OBLIGATION	**10,873**	**10,862**	**10,916**	**10,999**	**11,059**	**11,182**	**11,327**	**11,429**	**11,542**	**11,639**	**11,743**	**11,902**	**12,085**	**12,311**	**12,513**
Energy Efficiency/Demand Reduction	523	622	740	874	996	1,115	1,216	1,317	1,413	1,507	1,587	1,633	1,657	1,677	1,694
TOTAL LOAD	11,396	11,484	11,656	11,873	12,055	12,297	12,543	12,746	12,955	13,146	13,330	13,535	13,742	13,988	14,207
RESERVES (2)	3,697	3,681	3,687	3,819	4,411	4,286	4,137	4,035	4,117	4,215	4,111	5,077	5,869	5,643	5,441
Capacity Margin (3)	25%	25%	25%	26%	29%	28%	27%	26%	26%	27%	26%	30%	33%	31%	30%
Reserve Margin (4)	34%	34%	34%	35%	40%	38%	37%	35%	36%	36%	35%	43%	49%	46%	43%

Notes:

* Purchases are being pursued beginning 2010 and beyond

Footnotes:

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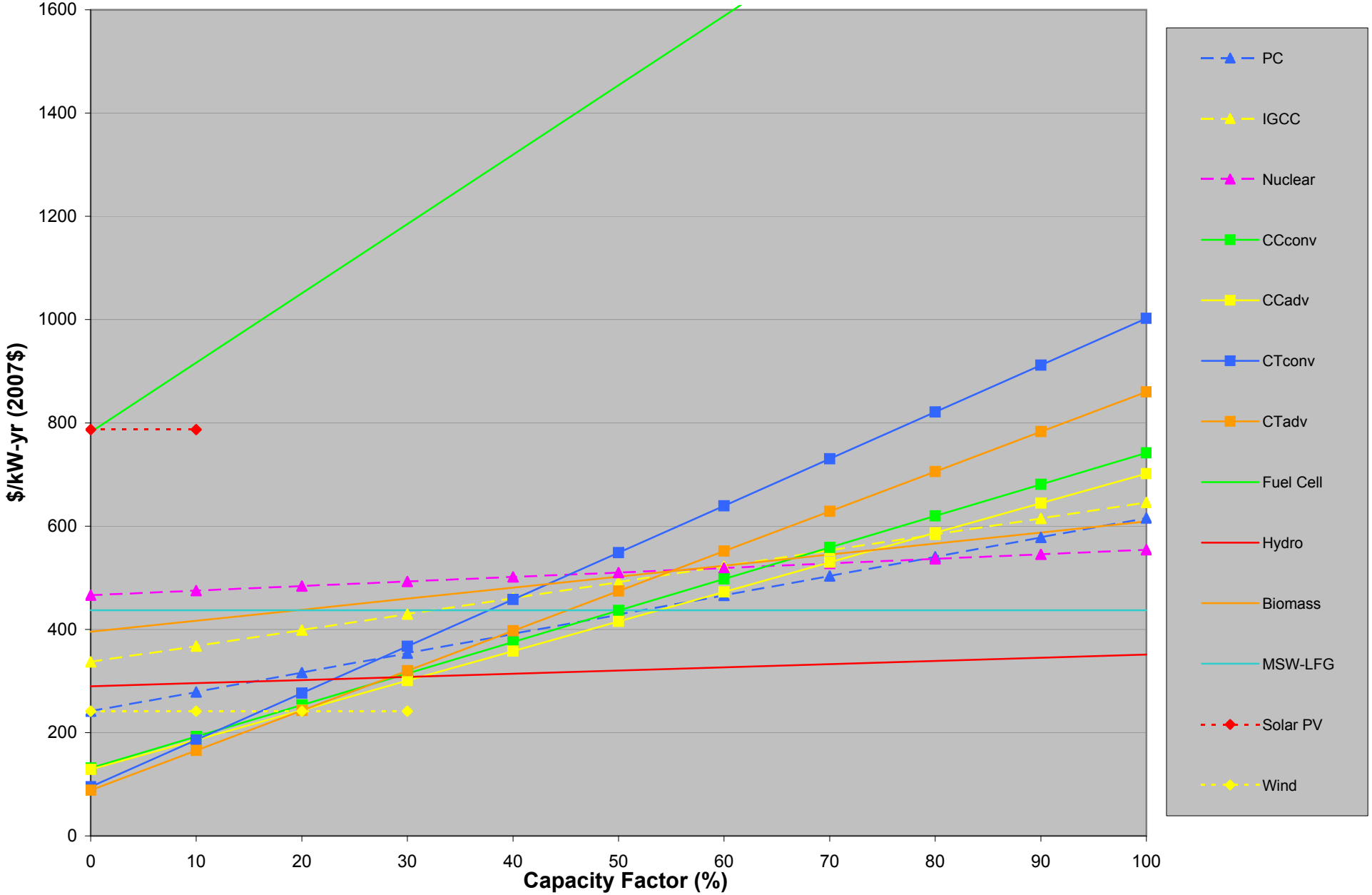
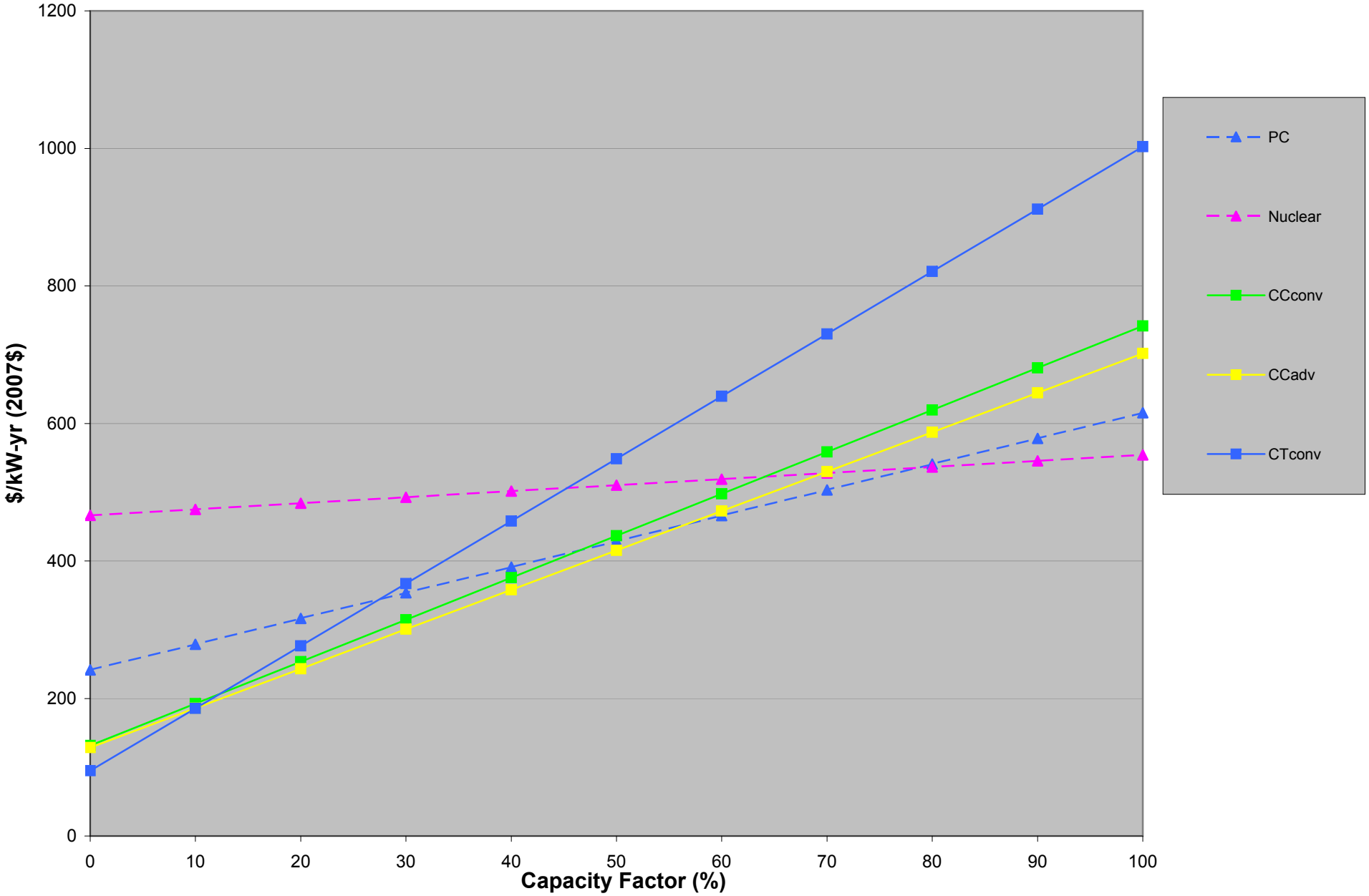
(2) Reserves = Total Supply Resources - Firm Obligations
(3) Capacity Margin = Reserves / Total Supply Resources * 100
(4) Reserve Margin = Reserves / Firm Obligations * 100.

Appendix C
Levelized Busbar Cost for All Technologies



NOTE: The graph above is based on generic capital, O&M, and fuel costs data.

Appendix D
Levelized Busbar Cost for Viable Technologies



NOTE: The graph above is based on generic capital, O&M, and fuel costs data.

Progress Energy Carolinas Demand-Side Management (DSM) Plan

Progress Energy

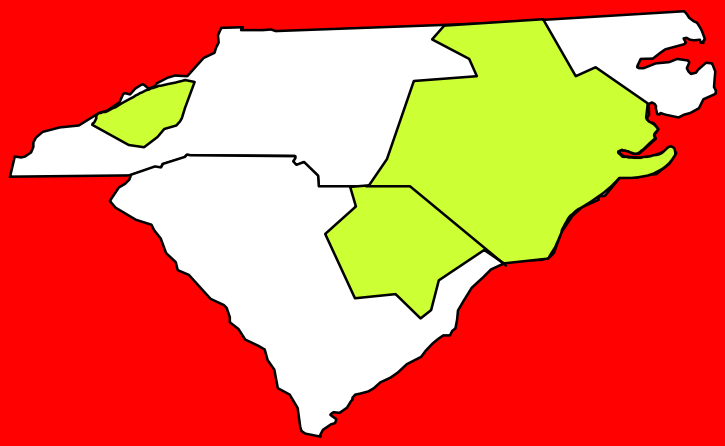


TABLE OF CONTENTS

1. Executive Summary

The Progress Energy Carolinas, Inc. (PEC) service area continues to grow by 25,000 to 30,000 new households and businesses each year. New homes, on average, are larger than ever, and as consumers expand their use of electronics in daily life, per-capita use of electricity has increased by 46 percent in the last three decades. North Carolina is forecast to top 12 million residents by 2030, surpassing Ohio, Michigan and Georgia to become the nation's seventh-largest state. South Carolina is also projected to show continued growth, as it surpasses two states to become the 23rd-largest state with over 5 million residents by 2030. To meet the needs of this significant growth, we must plan now for the continuation of a dependable energy supply in the future.

As a utility, PEC is committed to making sure electricity remains available, reliable and affordable and that it is produced in an environmentally sound manner. PEC advocates a balanced solution to meeting future energy needs in the Carolinas. That balance includes a strong commitment to demand-side management (DSM) and energy efficiency (EE), investments in renewable and emerging energy technologies and state-of-the art power plants and delivery systems. PEC believes this long-term, responsible approach will preserve reliability and protect customers and the environment.

In May 2007, PEC announced an aggressive goal of doubling the amount of peak load reduction capability available through DSM and energy efficiency programs, currently about 1,000 megawatts (MW). This plan has the potential to displace the need for 1,140 MW of new generation by 2017.

Many PEC customers are already participating in DSM programs. In fact, since 1980, PEC's customers have saved 16 billion kilowatt-hours of electricity, deferring the need for building new power plants. In 2008 and future years, significant expansion is under way.

PEC is developing new DSM programs and evaluating their effectiveness and potential participation rates to determine their viability in further reducing electricity demand. Initiatives aimed at helping residential customers use energy more wisely include:

- Installation of next-generation load control technologies for controlling air conditioners and water heaters to help reduce on-peak energy use in homes and businesses.
- Programs targeted toward improving residential heating, ventilation, and air conditioning (HVAC) efficiency through proper HVAC maintenance, high-efficiency equipment upgrades, and attic insulation improvements as well as duct testing and repair.
- Large-scale replacement of incandescent light bulbs with energy-saving compact fluorescent bulbs.
- Increased energy education and awareness, including in-home energy assessments and the use of new digital displays that provide real-time energy use and cost information for homeowners.

As described in the plan, deployment of new cost-effective DSM and energy efficiency programs is planned to begin in early 2008. PEC is evaluating a full range of DSM and energy efficiency programs targeting all customer classes and market segments focusing on opportunities in New

Construction, Retrofit, and Demand Response. Since it is impossible to roll out all programs for all customers at once, PEC will prioritize programs for implementation utilizing various criteria including the potential for cost-effectiveness, energy savings, demand reduction, customers' needs and interests, and other market forces. PEC is evaluating programs (see the Appendix) and delivery models that have proven successful in the past. PEC's DSM and EE plan will be flexible, and programs will be evaluated on an ongoing basis so that program refinements and budget adjustments can be made in a timely fashion to maximize benefits and cost effectiveness. PEC will also be evaluating new technologies and new delivery options on an ongoing basis to insure that we are delivering comprehensive programs in the most cost effective way.

To support the aggressive goal, PEC will also implement a strategic consumer education campaign, "Save The Watts," which includes a dynamic Web site as well as print and broadcast media. The outreach campaign provides a wide array of efficiency tips to match varying lifestyles and directly links consumers to PEC's energy efficiency program offerings at www.savethewatts.com.

These investments and this educational campaign are focused on building customer awareness about energy efficiency and, ultimately, changing consumer energy behaviors and reducing energy resource needs by driving large-scale, long-term participation in efficiency programs. Significant, sustained customer participation is critical to achieving and surpassing the aggressive DSM goals shared by PEC and its customers.

PEC is also significantly expanding its DSM organization, whose focus will be to plan and implement programs that work well with customer lifestyles, expectations and business needs.

Additionally, PEC has initiated multiple DSM pilot programs during 2007, including home energy displays and smart thermostats, to gain experience with new and innovative approaches to achieving DSM.

Finally, PEC is setting a conservation example by converting its own buildings and plants, as well as distribution and transmission systems, to new technologies that increase operational efficiency.

2. Introduction

Progress Energy Carolinas, Inc. (PEC) is providing this Demand-Side Management (DSM) plan to inform the Commission of planned investments in demand-side resources that PEC intends to make as part of its balanced approach to providing clean, reliable and affordable power to its customers. Demand-side resources are a key element of PEC's overall resource strategy to meet growing customer needs while minimizing greenhouse gas emissions. The other key elements are the development of alternative renewable energy and state-of-the-art generation. PEC is committed to being a good steward of the natural resources entrusted to its care, and environmental factors are an integral part of planning, design, construction and operational decisions for all resources.

DSM resources represent utility-sponsored energy efficiency and demand response programs designed to help customers reduce their electricity use, especially during times of peak system demand. Energy efficiency is simply the cleanest source of energy available as it works to conserve, rather than serve, the Carolinas growing need for electricity. Likewise, the ability of demand response programs to reduce peak demand can effectively defer the need to build new supply-side generation resources. This DSM plan lays out the need for substantial additional investments in demand-side resources, and outlines how these prudent investments will be delivered, monitored and reported on in a cost-effective manner.

This new DSM strategy builds on the programs historically delivered by PEC. PEC recently announced plans to double these efforts and develop an *additional* 1,000 MW of demand-side resources over the next 10 years. These additional savings will come from a host of new energy efficiency and demand response programs targeted toward all major electric end-uses from all customer classes. PEC is staffing an expanded organization devoted to management and administration of the broad portfolio of residential, commercial, government and industrial DSM programs needed to meet these aggressive targets. Table 1 provides a list of new DSM programs currently being considered by PEC. Each program encompasses multiple energy conservation measures. These programs are more fully described in the Appendix.

Table 1. New DSM Programs being Considered by PEC

Residential Programs	**Commercial, Industrial, Governmental (CIG) Programs**
• Residential Energy Information & Audits • Residential Home Energy Improvement • Residential New Construction • Low Income Assistance • Residential Demand Response	• CIG Educational & Awareness Initiatives • CIG Energy Improvement • CIG New Construction • CIG Demand Response • CIG Energy Innovation **PEC Specific Programs** • R&D and Alternative Energy Initiatives • Smart Grid

This DSM plan outlines the efforts that PEC will implement to achieve the following objectives:

- Provide education and outreach across all customer classes to create an awareness about the value of energy efficiency and demand response and to encourage changes in customer attitudes and behaviors toward energy usage
- Provide and promote participation in cost-effective DSM programs that benefit customers and PEC
- Reduce system peak demands, while ensuring reliability by utilizing cost-effective DSM
- Reduce energy requirements and provide opportunities for customers to reduce their electric bills
- Transform the markets for energy efficiency products and services through the use of incentives, training and other market interventions
- Manage the investment risk associated with resource options available to meet forecasted demand.

Customer participation is critical at every level for the successful realization of PEC's conservation goal and probably represents PEC's biggest challenge. The relatively low cost for electricity in the Carolinas results in longer pay-backs for DSM investments as compared to other areas of the country where electricity is much more expensive. Achieving the aggressive conservation targets PEC has chosen will require significant new initiatives, including regional and local acquisition programs, improved energy codes and equipment standards, and market transformation ventures. Cost-effective, sustainable conservation requires thoughtful coordination among many local, regional and national players, and successful DSM programs are built on strong stakeholder relationships and a supportive regulatory environment, so that DSM investments benefit all. *Participating customers* benefit from DSM programs with lower energy bills and by having additional choices to manage their energy use. *Low-income customers* benefit through outreach efforts designed specifically for their needs. *All PEC customers* benefit from DSM through lower electric rates when least-cost DSM resources are selected. And of course, successful DSM and energy efficiency programs are expected to result in environmental benefits by reducing the use of fossil fuels.

PEC recognizes DSM as a resource that has business risks to be managed and mitigated like any other resource. Thus the DSM strategy is focused on the development of a balanced portfolio of demand-side programs that can benefit all customer segments and utilizes technologies and services that can provide a diversified set of demand-side resources well-matched to the needs of the Carolinas. The initial program portfolio described in this document is designed to assure resource adequacy while balancing the uncertainty of demand growth, future fuel prices and environmental regulations.

At the same time, these programs are designed to be flexible to respond to changes in market dynamics, consumer preferences and new technology introductions. A measurement and evaluation approach will be employed that focuses on two key objectives: reducing the uncertainty surrounding the accuracy of energy and demand impacts, and improving the delivery of the programs. Employing an effective data-collection, program-tracking and evaluation

process will improve the return on investment for DSM programs and ensure reliability of the DSM resources.

The remainder of this document is organized as follows:

- Section 3 contains a situation assessment that provides a summary of current issues, lessons learned from program experience, projected growth in electric loads and the characteristics of PEC's customers who will be provided the opportunity to participate in the new DSM programs.
- Section 4 describes the energy efficiency and demand response approaches and programs being considered as the demand-side resources portion of PEC's balanced approach.
- Section 5 provides an overview of the demand and energy impacts associated with PEC's proposed DSM portfolio.
- Section 6 outlines the cost-effectiveness tests and program evaluation approaches to be employed in assessing the program portfolio.
- Section 7 summarizes the plan and outlines next steps.
- The Appendix provides descriptions for each of the new DSM programs being considered by PEC.

3. Situation Assessment

3.1. Current Issues

Over the last few years, concerns over global warming, dramatic energy cost increases, supply shortages, environmental air quality concerns and U.S. dependence on foreign energy supplies have made the development of DSM programs (both energy efficiency and demand response) a high priority. Public awareness of these issues has increased exponentially through constant exposure in various media. Business and political leaders have also raised the awareness through public discussion and by taking leadership positions. Major corporations are beginning to take steps toward being "green," or reducing their "carbon footprint."

3.2. Lessons Learned From Previous DSM Program Experience

Energy efficiency programs have been part of PEC's portfolio for more than 25 years. Previously DSM programs were developed and implemented in response to rapid load growth, the high cost of new capacity, high fuel prices and environmental concerns. Over time, some programs were modified or cancelled as these conditions and other factors changed. PEC's existing and past programs have resulted in a current peak load reduction capability of more than 950 MW and have reduced energy consumption by more than 16 billion kilowatt-hours since 1980.

At present PEC's portfolio of programs includes two "dispatchable" load-management programs that can be called on to directly reduce peak loads when needed as well as several energy efficiency programs whose impact on system demand has been implicitly captured in PEC's energy and load forecasts. These existing programs include the following (Table 2):

Table 2. Existing DSM Programs Offered by PEC

Large Load Curtailment – provides a source of customer load that can be curtailed at PEC's request in order to meet system load requirements. Customers who participate in this program receive a credit on their bill. **Voltage Control –** involves reducing distribution voltage during periods of capacity constraints. **Energy Efficiency Education and Awareness Campaign –** year-round energy efficiency campaign to educate customers on the benefits of saving energy, also provides tools and tips to assist them in lowering energy bills. **Home Energy Check –** mail-in home energy audit that helps customers identify the best ways to save energy in their homes and to find resources to achieve those savings. **Energy Efficiency Home Program/Energy Star® -** provides financial incentives for energy efficiency in new homes through a 5 percent energy conservation discount for homes that meet specified energy efficiency criteria.	**Energy Efficiency Financing –** connects customers with pre-screened contractors to provide complete installation and financing on a range of energy savings home improvements. **Time-of-Use Rates –** electricity rates that vary depending on the time of day–even by hour for Real-Time Pricing rates—provide customers with an economic incentive to shift usage to lower cost off-peak periods. **Energy Resource Center –** offers large commercial, industrial and government (CIG) customers a wide array of tools and resources to help them manage energy usage and reduce their electrical demand and electric bills. **CIG Account Management –** provides CIG customers with demand greater than 200 kW with an account executive to help customers manage their energy usage and costs and to assist them in developing energy efficiency solutions.

PEC's DSM plan is designed to leverage these existing efforts while providing new avenues to enhance DSM participation and help balance future electricity supply and demand in a cost-effective manner. All existing DSM programs will also be re-evaluated for changes and enhancements that will improve their effectiveness and acceptance by today's customers. The plan constitutes an expansion of these successful DSM programs that have effectively reduced system loads and provided benefits to customers for more than two decades.

From our experience and expertise in designing and implementing programs we have learned the following:

- Programs must be **easily understood** by our customers.
- Participation must be **straightforward and uncomplicated**.
- Programs must provide **acceptable paybacks to customers and be cost effective**.
- Programs must be **well managed without hindering customer participation**.
- Programs must use **high-efficiency technologies that do not negatively impact the quality of life**.
- Programs will be **delivered by the marketplace.**
- Programs must be **embraced by customers** so they want to participate.

3.3. Meeting a Growing Demand for Electricity

PEC serves approximately 1.4 million customers in a service territory covering roughly 34,000 square miles in North Carolina and South Carolina. PEC's peak system demand is driven by air-conditioning loads and tends to be highest during afternoons in mid-summer. In fact, PEC customers set a new all-time peak demand of 12,656 MW on the afternoon of August 9, 2007. PEC meets its existing load through a portfolio of resources, including generation from fossil (38% of supply capacity) and nuclear (25%) fueled generating units, combustion turbines (21%), power purchases (10%), combined cycle units (4%) and hydroelectric resources (2%). An additional 395 MW is available through PEC's large customer load curtailment and voltage reduction programs.

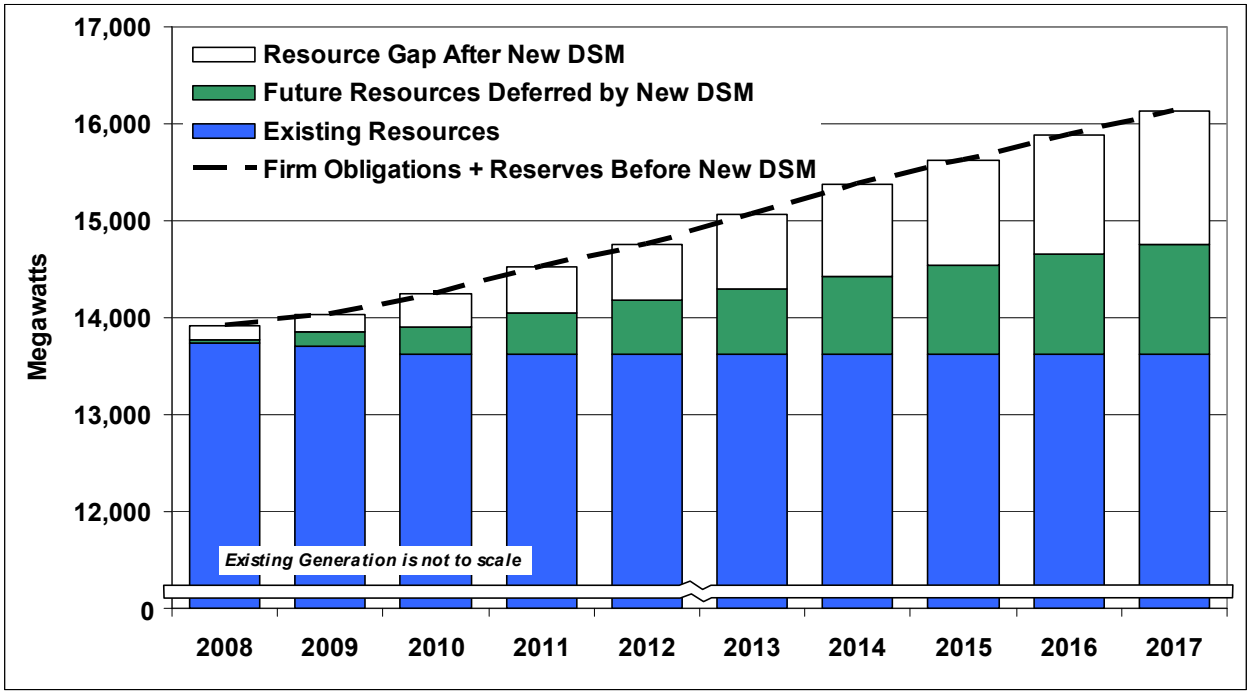
North Carolina and South Carolina constitute one of the fastest-growing regions in the country and will continue to experience strong growth for the foreseeable future. By the year 2030, the population of North Carolina is expected to increase by 40 percent, while South Carolina is projected to grow by 20 percent. Along with the increasing population comes the growth in schools, commercial entities and businesses that support the new residents. We must provide the infrastructure so that in future years we all continue to enjoy the same quality of life that brought people here in the first place.

This continuing growth results in the need for additional resources in order for utilities to continue to provide an adequate and reliable supply of electricity for the citizens of the state. New and enhanced DSM and energy efficiency programs are important parts of our balanced solution to meeting the growing energy needs of our customers.

Total peak load without additional new DSM is projected to grow approximately 1.65 percent per year over the next decade as a result of increasing population in the Carolinas, the trend toward larger homes with additional electrical applications, and growing commercial, business and government sectors that support the growing population. Without new DSM, total peak demand is expected to reach 14,185 MW by 2017, an increase of more than 1,500 MW over the 2007 actual peak. This growing load would create a resource gap between existing supply and future obligations of more than 600 MW by 2010, including reserve requirements. Without the historical DSM efforts, additional generation resources and power purchases—beyond those in PEC's existing portfolio—would have been necessary just to maintain the capacity and reserve margins at their current levels.

To meet this growing demand, PEC will require more than 2,500 MW of new capacity to be in service by 2017. A portion of these resources may be deferred by the new DSM programs outlined in this plan, which are projected to yield approximately 1,000 MW of peak load reductions. These new DSM savings translate into even greater reductions in capacity requirements—approximately 1,140 MW by 2017—because they eliminate the need for new resources and the need for capacity to meet reserve requirements (Figure 1).

Figure 1. Balanced Resource Portfolio to Meet Future Demand, 2008-2017.



PEC has specific resource requirements in its western North Carolina region, where electricity demand peaks in the winter instead of the summer. Additionally, the loss of 250 MW of purchased power at the end of 2009 when the current contracts expire (150 MW of which has now been replaced through a new power purchase) means that by 2010 at least 100 MW of capacity will be needed in the western region. To potentially mitigate this need, PEC has already begun to focus on the development of targeted DSM efforts that specifically aim to reduce the winter peaks that are unique to this region.

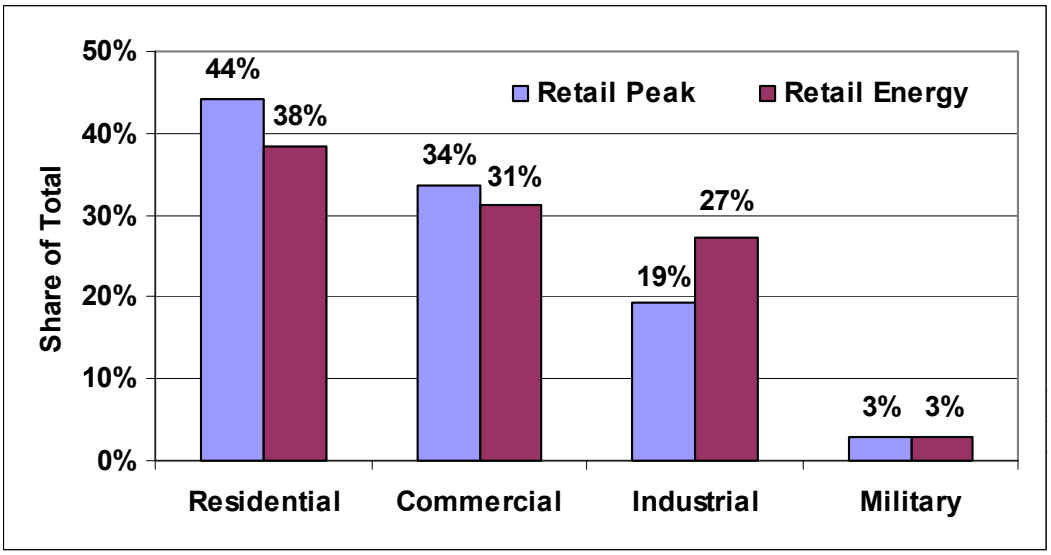
3.4. Demand & Energy by Customer Type

DSM programs can reduce system peak loads and energy consumption through efficiency improvements and demand response programs at a wide range of customer sites. Different types and structures of programs will be more appropriate for different customer types and sizes, and the potential load impacts will be determined in part by the makeup of PEC's customer base. The ability to tailor these programs to each customer base and influence those areas that have the greatest potential for energy and peak load reductions will be a significant determinant of the success of the programs.

The residential customer class represents the largest share of PEC's retail peak load, accounting for approximately 44 percent of the summer retail peak. Commercial customers (34%) and industrial loads (19%) account for the bulk of the remaining retail peak (Figure 2). Energy consumption follows a similar pattern, but the relative shares by customer type become much closer as the industrial sector's high load factor raises its relative share to 27 percent and the low

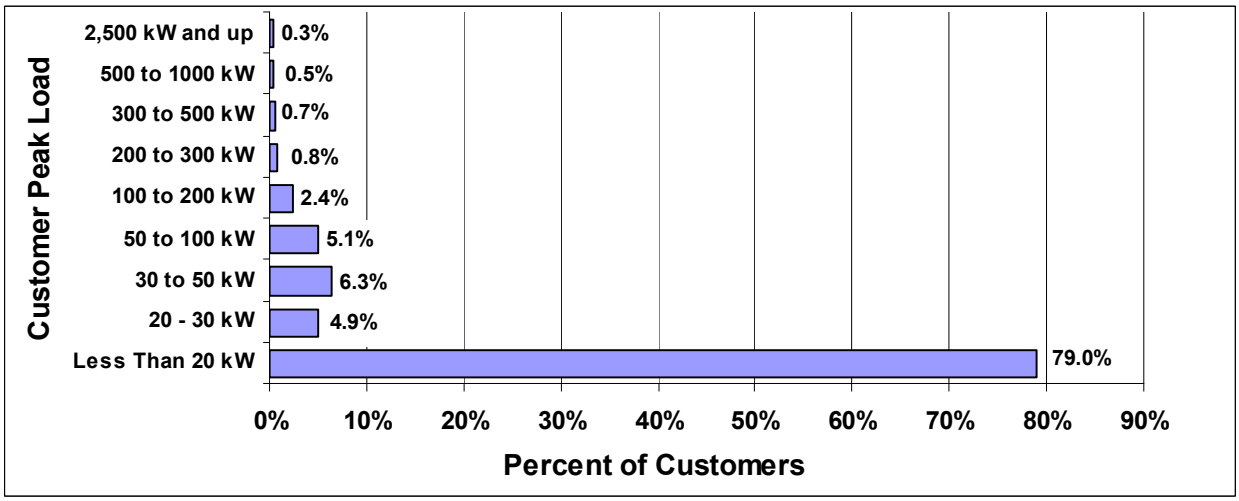
load factor residential sector drops to 38 percent. Wholesale contracts and other nonretail loads are not included in these figures.

Figure 2. PEC Retail Peak Load and Energy Consumption by Customer Type



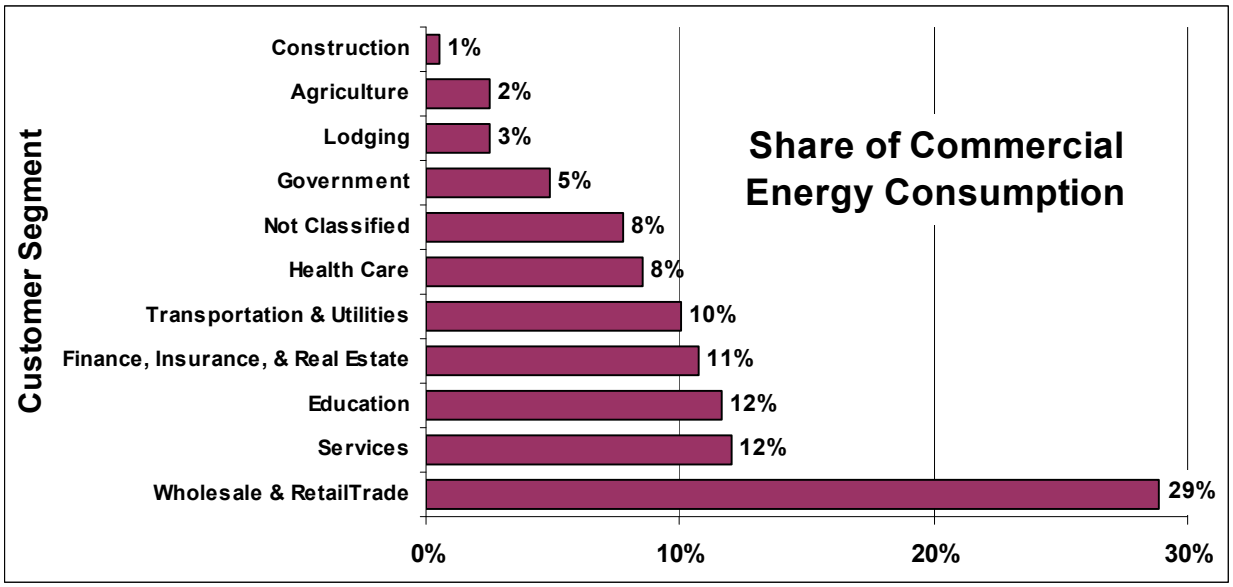
Within the commercial and industrial customer segments, the majority of customers (79%) are small, with peak loads of less than 20 kilowatts (kW). In fact, 95 percent of PEC CIG customer premises have peak loads under 100 kW (Figure 3). DSM programs will be designed and implemented through unique program designs to meet the needs of each nonresidential customer segment and size. PEC's largest customers will be encouraged to participate in PEC's DSM programs through assigned account representatives. The approximately 1,500 customers with peak loads of 500 kW or more represent an important component of the potential DSM savings.

Figure 3. PEC Non-Residential Customers by Level of Peak Load



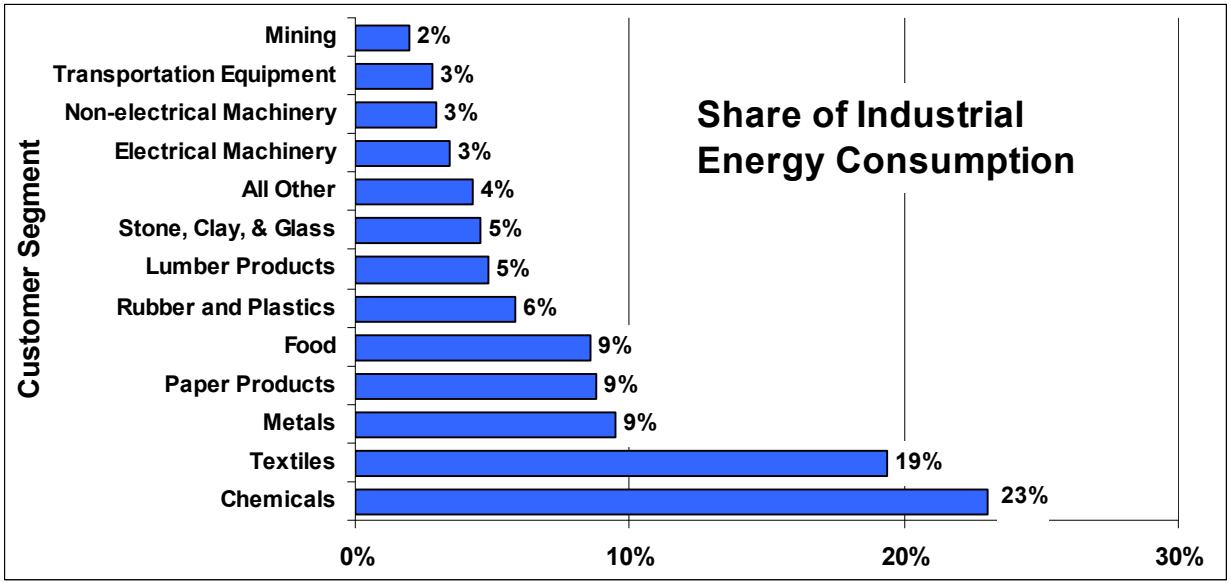
In terms of the relative mix of energy consumption among the various commercial and industrial customer types, usage is heaviest in the retail sales, chemicals and textiles sectors. Within the commercial class, wholesale and retail trade is the largest consumer at more than one-quarter of all commercial usage. The next largest commercial energy users include the services, education and finance, insurance and real estate market sectors, followed by a variety of other business types (Figure 4).

Figure 4. Commercial Energy Consumption by Customer Segment



Within the industrial class, chemicals and textiles represent the greatest share of energy consumption and may receive particular attention in program outreach. Paper products, metals manufacturing and other industries also represent a significant share of energy use, but in general DSM programs may be targeted and marketed by customer size and by type of business (Figure 5).

Figure 5. Industrial Energy Consumption by Customer Segment



These characterizations of PEC customers provide an indication of where DSM programs might be targeted to achieve the greatest impact and to provide the most value for ratepayers. As programs are introduced and marketing plans developed, PEC will conduct more detailed research into how customers of various types and sizes can benefit from energy efficiency investments.

4. Approach to Achieving DSM Objectives

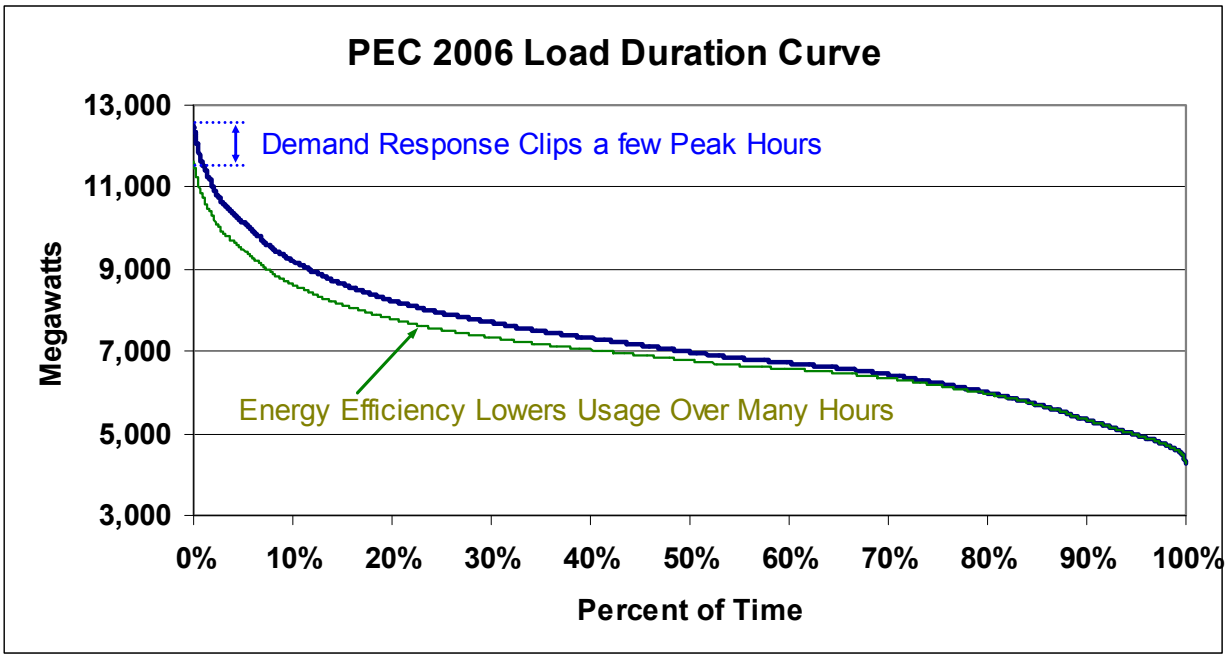
PEC intends to acquire demand-side resources through a variety of channels that will allow for broad participation by all customer classes and enhance the energy efficiency and peak demand impacts of the DSM initiative. For purposes of organizing programs and setting targets for energy and demand savings, programs are organized into two classifications:

1. Energy efficiency programs are designed to reduce the amount of energy used by specific end-use devices and systems, typically without affecting the services provided. Savings are generally achieved through improvements in equipment efficiency and structural components that may affect the operation of customers' end-use electrical equipment, such as HVAC, lighting, motors, etc.

2. Demand response programs are focused on reducing system peak loads through temporary load curtailments, voltage reduction, or shifting energy consumption away from peak periods to off-peak periods. Price-based demand response resources, such as time-of-use rates, are typically in effect year-round or at least on a continuous basis for a portion of the year. Curtailment-based demand response resources, such as direct load control, are typically only called upon for a few days per year for a few hours per event.

Figure 6 provides an illustrative example of the system demand impacts of energy efficiency and demand response programs. Energy efficiency serves to reduce electricity usage over many hours of the year and, therefore, provides significant megawatt-hour (MWh) energy savings. In contrast, demand response is very effective at clipping peak MW demands (and therefore the need for new generation capacity), but offers very little if any MWh energy savings potential, since it may only be used less than 1 percent of the time.

Figure 6. Example of Energy Efficiency and Demand Response Impacts



The initial set of programs being evaluated by PEC can each be mapped to one or more of these program types and were developed to meet the specific resource needs of PEC and its customers. Development of integrated programs that lower overall consumption while providing opportunities to further trim peak loads will leverage program marketing dollars and other program delivery costs.

4.1. Energy Efficiency Program Types

Programs referred to as "energy efficiency programs" are all aimed at reducing the consumption of electricity. However, the means of achieving this reduction will vary, from the types of customers and end uses targeted to the methods of encouraging changes in behavior and equipment purchasing patterns. PEC's DSM programs will be designed and implemented to reach customers in different ways, with some offering direct financial incentives, others educating customers about ways to lower electric bills, and others transforming the equipment supply chain and consumer behaviors through subtle, long-term transformation of markets. To these ends, energy efficiency programs can be categorized as: 1) Resource Acquisition, 2) Market Transformation, or 3) Education.

Resource acquisition programs utilize financial incentives and other mechanisms to address price barriers to new technology deployment and to capture energy efficiency resources at the time of expenditure, or in a given year. These DSM resources, once acquired, continue to generate demand and energy savings throughout their effective useful life. Savings are achieved by displacing a baseline inefficient end-use technology that used more energy to perform the same function as the efficient technology (or operational process).

Market transformation programs tend to be long-term in nature, with little market impact in initial years, but major market effects occurring years later. The primary goal of market transformation programs is overcoming market barriers to the adoption of more efficient technology or behavior. These barriers can be many and often include: the price and availability of energy efficient technologies, lack of awareness of product benefits, or a supply chain not prepared to deliver energy efficiency products and services. Strategies to remove these barriers may be upstream or downstream in the supply chain. Market interventions may include product incentives, educational campaigns, design assistance, and even entrepreneurial programs that help finance the early stage operations of new companies that have the potential to transform a market or submarket.

Education programs are intended to provide information and education that increase participation in PEC's DSM programs and that lead to more purchasing decisions and behaviors that reduce energy consumption. These programs target both the end-use consumers who purchase and use energy efficient products as well as the people and organizations who influence these consumers, including architects and engineers, contractors, energy service companies, retailers and equipment manufacturers. The outreach and marketing of education programs will utilize mass media outlets such as television, radio, newspapers and direct mail, but will also incorporate more targeted strategic efforts customized to the specific program and its target audience as well as participation in energy seminars and other forums.

4.2. Demand Response Program Types

PEC will utilize demand response programs to reduce system loads in several ways. Infrequent, short-term load curtailments at participating customer sites can be controlled directly by PEC or enabled by the customers themselves. These short-term curtailment events (perhaps 10 events per year, depending on the program) can help balance supply and demand during periods of peak demand or during system emergencies. They can also be used to reduce system costs for all ratepayers by avoiding expensive generation or purchases. "Scheduled load control" occurs on a more regular basis—perhaps as much as every weekday during summer months—and provides a predictable reduction in day-to-day system demand. Finally, "time-differentiated rates" provide customers with a financial incentive to shift loads away from designated peak periods when PEC's system peak is most likely to occur. These approaches to demand response all rely on a reduction in the usage of electrical equipment during specific periods. PEC's Smart Grid program represents yet a different approach in which demand is reduced without any noticeable change in equipment functionality or customer behavior.

DR programs provide MW reductions that can be brought online fairly quickly when compared to energy efficiency programs. PEC will secure these resources from a variety of approaches including onsite emergency generator programs, incentive and voluntary load curtailment programs, residential and small CIG cycling programs.

PEC demand response programs will include some or all of the following program types:

Direct load control (DLC) programs enable PEC to temporarily curtail loads at homes and facilities where the customers have volunteered to participate in demand response efforts. DLC programs have typically been directed at residential and small commercial air conditioning and

other appliances. Increased use and functionality of energy-management systems and emergency generation at customer sites are driving growth in DLC curtailment in response to a utility signal. The common factor in these programs is that they are actuated directly by the utility and require the installation of control and communications infrastructure to facilitate the control process.

Customer load response programs offer customers incentives to reduce their electric demand for specified periods of time when notified by the utility. These programs include curtailable and interruptible rate programs and demand bidding/buyback programs. Curtailable and interruptible rate programs can be used as "emergency demand response" if the advanced notice requirements to participants are short enough. All customer load response programs require appropriate metering technology and communications protocols to trigger customer response. PEC's Large Load Curtailment program fits this category.

Time-differentiated rates are pricing programs with electric rates that vary over time to encourage customers to voluntarily reduce their demand for electricity during peak times in response to economic signals. Because electricity usage must be measured against time-varying rates, these programs require investments in the appropriate metering technology. PEC's time-of-use (TOU) and real-time-pricing rates are examples of time-differentiated rates. These will be revisited to assess whether modifications to, or expansion of, these rates can better contribute to a reduction in system peak demand.

Voltage Control can be used by utilities to reduce system demand by temporarily lowering system voltages within permissible ranges. The enabling mechanisms for the Smart Grid program include coordinated control of substation and distribution line equipment and real-time optimization of grid controls. This will require an investment in technology control systems and infrastructure to preserve the quality of the power delivered to our customers. Voltage control is a demand-side resource currently used by PEC and accounted for in the resource plan.

4.3. Comprehensive DSM Programs

PEC's DSM plan includes a comprehensive set of DSM programs that target all major end-uses within the residential, commercial, industrial and governmental markets. There are also a couple of company-specific initiatives. The program offerings include cost-effective energy efficiency and demand response types of programs, many of which consist of a variety of conservation measures and activities that can be used to enable and encourage participation from virtually all PEC customers. The programs may be expanded, revised or removed depending on the success of each program. An educational awareness campaign will be designed to promote all of these programs.

Table 3 briefly describes each of the new DSM programs being considered by PEC. More detailed program descriptions, which include the relevant demand-side measures included in each program, are contained in the Appendix.

Table 3. New DSM Programs being Considered by PEC

Residential Energy Information and Audits – includes a variety of measures designed to educate PEC residential customers about energy efficiency opportunities. These measures will provide customers with energy-saving tips including energy efficient behaviors, energy conservation equipment, and energy-saving appliances.

Residential Home Energy Improvement – is an energy efficiency program that promotes a variety of energy conservation measures for residential customers in homes that can no longer be considered new construction. This program provides incentives for select efficiency measures that are cost-effective to PEC and its customers, as well as information, education and advice on energy-related issues.

Residential New Construction – is designed to improve energy efficiency within the residential new home construction market. This program will promote education and information to the design community and the real estate market on energy-efficient building design and construction, as well as provide financial incentives select energy efficiency measures to builders and manufacturers building EPA Energy Star® residential dwellings.

Low Income Assistance – will be coordinated with the Residential Home Energy Improvement Program to provide additional incentives for improving energy efficiency for low-income customers.

Residential Demand Response – includes a variety of measures designed to encourage customers to reduce their energy usage during times of system peak demand. Options include direct load control of central air-conditioning, electric water heaters, and electric strip heat (western N.C. region only), as well as innovative pricing mechanisms.

CIG Educational & Awareness Initiatives – provides the demand and energy usage information, energy efficiency education, and consulting support required to help CIG customers identify and implement energy efficiency opportunities and better manage their electricity consumption and costs.

CIG Energy Improvement – promotes a variety of energy efficiency measures for CIG customers of all sizes. This program provides customers with incentives for select cost-effective energy efficiency measures, as well as information, education and advice on energy-related issues. The overall goal is to assist customers make energy efficiency improvements.

CIG New Construction – promotes energy efficiency within the CIG new construction market. This program provides education and information to the design community and CIG customers on energy-efficient building design practices, including LEED. Financial incentives will be provided for upgrading electrical end-use equipment to the most energy-efficient and cost-effective options.

CIG Demand Response – promotes a variety of direct load control, load curtailment, and innovative pricing options within the CIG market to encourage reductions in system peak demand.

CIG Energy Innovation – is a customized incentive program designed to meet the specific energy efficiency design needs of larger CIG customers including retrofits and new construction.

Research & Development and Alternative Energy Initiatives – provides PEC with the ability to investigate, develop, test and pilot potential new demand-side management resources, including demand-side renewable energy alternatives, which have promise to become cost-effective programs.

Smart Grid – uses coordinated distribution voltage and VAR control, within permissible regulatory voltage ranges, to provide system peak load reduction.

4.4. DSM Target Markets

PEC's DSM programs will be targeted to specific customer segments within each of the primary customer classes. This type of segmentation is meant to be easy for customers to understand where they fit and how they can participate in the programs. A brief description follows.

Residential – The residential class is a homogenized market in which experience, expertise and research regarding technologies and delivery enable use of a prescriptive program-based approach to the delivery of DSM services. One exception may be PEC's western North Carolina region, which has some demand-side and supply-side characteristics that are sufficiently different from the rest of the PEC service area to support a few customized DSM offerings. In general, however, residential programs will be targeted to the following segments based primarily on housing type:

- Single-Family Homes
- Multi-Family Homes
- Manufactured Homes
- Low-Income Households

Commercial/Industrial/Governmental (CIG) – Smaller CIG customers (< 35 kW) generally reflect a homogenized market consistent with the residential class. As such, prescriptive programs are often successful with this mass-market sector. Larger CIG customers require a customized approach to DSM due to differences in the type and operation of the various facilities in each segment. To that end, comprehensive energy retrofit services and new construction upgrades will be provided to this customer class. PEC will leverage the relationships and knowledge of existing account representatives to engage these customers and encourage their participation. A **Pace Setter** customer will be identified for each segment that will demonstrate the high-efficiency technologies that are most cost effective for that segment. These Pace Setter customers will also demonstrate to other customers in that segment the benefits of program participation.

Commercial & Industrial customers will be identified by the following segments:

- Owner-Occupied Commercial Real Estate
- Developer Owned & Leased Commercial Real Estate
- Hospital
- Hotel
- Multi-Unit Retail (Grocery stores, Department Stores, Restaurants, etc.)
- Industrial
- New Construction (all)

Governmental customers will be identified by the following segments:

- Federal
- State
- County/City/Town
- Universities/Colleges
- Public Schools K-12

5. DSM Program Portfolio

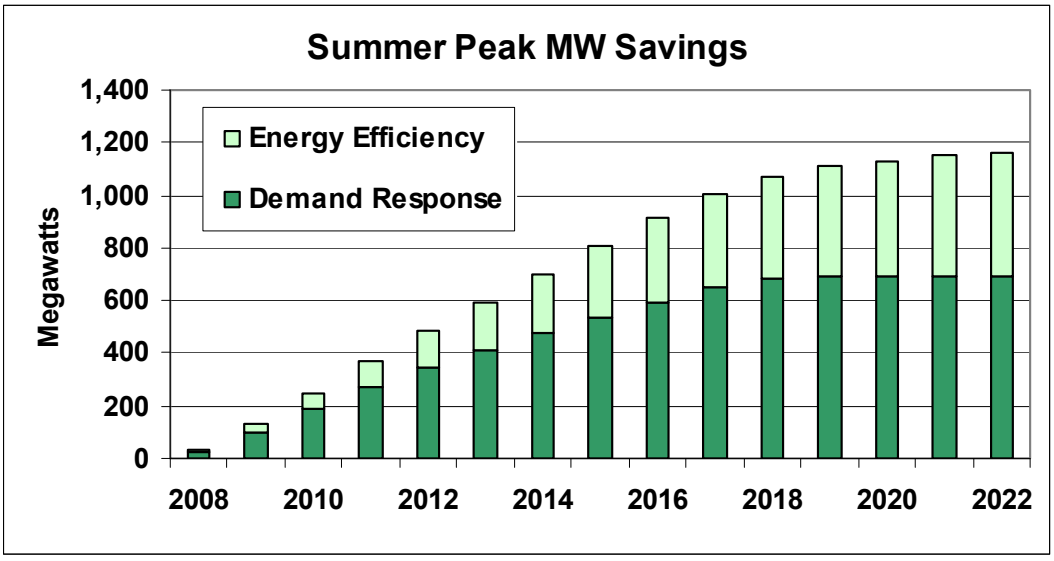
In developing an initial portfolio of DSM programs, PEC utilized knowledge gained from previous program efforts, customer data, and available market research. This portfolio, while comprehensive, will be adjusted over time as new information and technologies become available. In parallel to the development of DSM programs, PEC plans to conduct a thorough study of the achievable (cost effective) potential for demand-side resources within its service territory. This will be accompanied by a market assessment to better understand customer awareness of DSM, trade ally and channel partner preparedness to deliver DSM products and services, and other market factors that could affect the amount of achievable DSM potential.

5.1. Program Portfolio

As stated previously, PEC has set a goal of achieving an additional 1,000 MW of peak demand savings through DSM programs between 2008 and 2017. These savings will come through a combination of energy efficiency and demand response investments. Savings achieved through energy efficiency programs will reduce electricity consumption over time as well as during the time of peak system load. Demand response savings will primarily be realized in terms of reductions in load during the period of highest system demand.

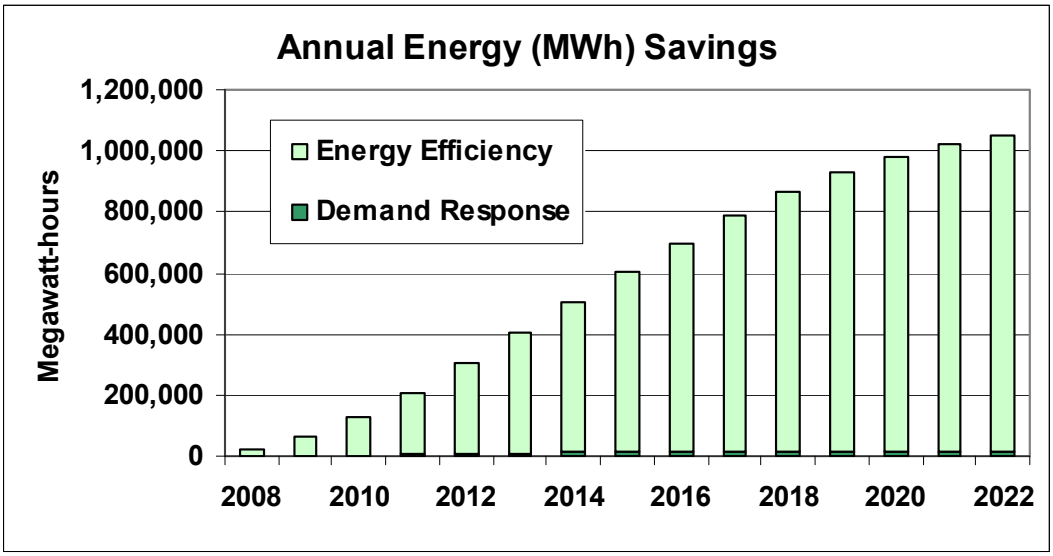
The additional peak load savings from PEC's new DSM programs will be modest until programs are expanded to a larger base of customers. By aggressively marketing its new DSM programs to all customer classes, PEC plans to realize nearly 500 MW of peak demand savings by 2012 and more than 1,000 MW by 2017 (Figure 7).

Figure 7. New DSM Portfolio – Peak Demand Savings by Program Type



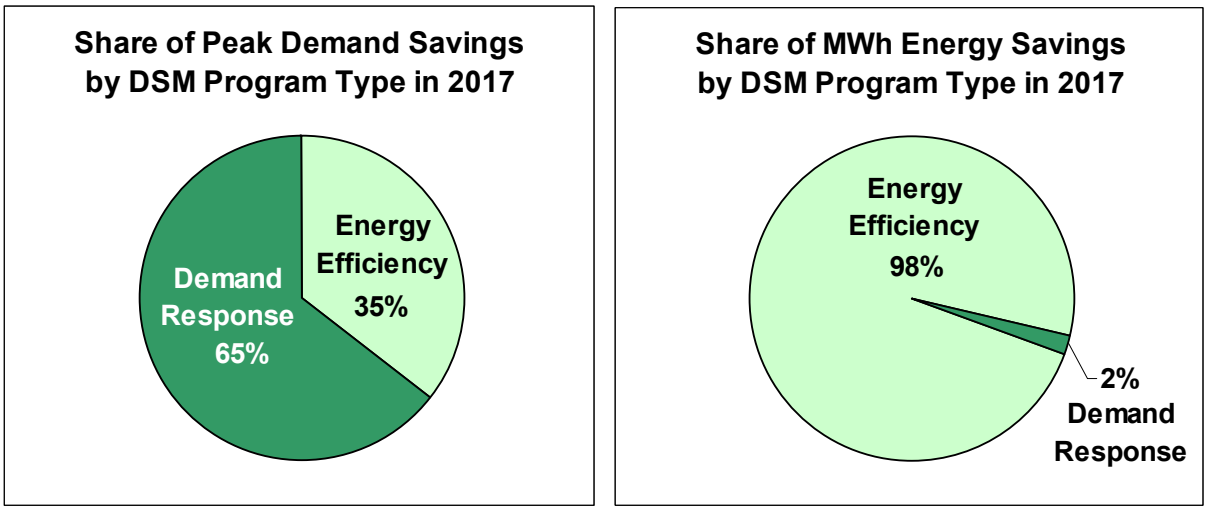
Annual energy savings are also an important component of PEC's DSM Plan and primarily result from the implementation of new energy efficiency programs. These new energy efficiency programs account for virtually all of the MWh energy savings projected to occur over the next 10 years (Figure 8).

Figure 8. New DSM Portfolio – Annual Energy Savings by Program Type



The mix of programs and their relative contribution to peak demand savings will be continually evaluated through ongoing research into customer preferences, market potential and developing technologies. Initial projections indicate that by 2017 new demand response capabilities will account for approximately two-thirds of the 1,000 MW goal for additional peak load reductions, while energy efficiency would account for about one-third of the total (Figure 9). Most of these demand and energy savings are projected to come from the residential sector.

Figure 9. New DSM Portfolio – Relative Peak Demand Savings by 2017



It is possible to overbuild demand response resources relative to supply-side generation. For example, while peaking generation can be operated about 1,000 hours per year, demand response programs are generally designed to operate no more than 200 hours per year and perhaps only 6 hours at a time. Demand response becomes overbuilt when it starts to get used consistently beyond its design capabilities. Some types of demand response programs, such as direct load control, can also negatively impact customers if used too frequently, and cause them to discontinue participation in the program. As a result, PEC has implemented a planning guideline to help safeguard against an over-reliance on, and over-use of, demand response resources that impact customers. This planning guideline does not allow demand response resources that affect customers to exceed 50 percent of planned reserves.

6. Issues Related to Program Selection and Evaluation

6.1. Cost-Effectiveness

Evaluating the cost-effectiveness of DSM programs is an important stage of the DSM program planning and development process. DSM programs must prove to be cost-effective relative to new generation alternatives and other factors in order to earn a spot in PEC's Integrated Resource Plan (IRP), which is designed to ensure reliable and low-cost electric service to all customers. Cost-effectiveness can limit the potential amount of dollars available to create, promote and track a DSM program, as well as the ability to offer customers an incentive to participate in the program. Because DSM programs can affect different groups differently, cost-effectiveness is typically evaluated from several different perspectives. PEC plans to evaluate each DSM program from the following four different perspectives.

- **Rate Impact Measure (RIM) Test**
  Evaluates a DSM program's impact on electric rates and, therefore, is from the perspective of a nonparticipating customer.
- **Participant Test**
  Evaluates a DSM program from the perspective of a participating customer.
- **Total Resource Cost (TRC) Test**
  Evaluates a DSM program's impact on all customers (participating and nonparticipating) as a whole.
- **Utility Cost (UC) Test**
  Evaluates a DSM program's impact from a utility spending perspective.

PEC is in the process of developing all of the projected program costs, participation, and demand and energy impacts required to perform the cost-effectiveness evaluations. Results will be provided with all future requests for Commission approval of specific DSM programs. PEC will also use cost-effectiveness testing periodically during program implementation to verify that programs are delivering net benefits.

6.2. Program Evaluation

A comprehensive program evaluation process will ensure that investments in DSM are providing reliable, cost-effective reductions in electric loads by documenting program impacts and costs, and identifying opportunities for program improvement. Specifically, program evaluation includes activities such as measurement and verification (M&V) of direct and indirect energy and demand savings, tracking of success indicators and process reviews to improve program delivery and performance.

By independently verifying the peak demand impacts and energy impacts being provided by the demand-side resources, PEC will ensure that these resources are available when needed and that the investment in these resources provides benefits to all customers. Since DSM programs are designed to supplant other (supply side) resources in a least-cost manner, the quantity and timing of program load impacts need to be verifiable in a manner that provides confidence in their

estimated availability to the system. PEC's evaluation plans will be based on techniques used in many jurisdictions across North America and designed to provide statistical validity to energy and peak demand savings estimates, as well as reduce uncertainties surrounding their availability and persistence.

PEC has begun developing evaluation plans for new DSM programs. There are many program evaluation methods available, and PEC will use the most appropriate and cost-effective evaluation methods, based on the specific program characteristics and the evaluation objectives. The specific method, the level of detail and the scope of evaluation will be determined by PEC according to factors such as participation levels, dollars invested, energy and demand impacts, and the level of uncertainty of these impacts. These services will be provided through an RFP/RFQ process to the leading M&V companies in the industry.

There are many factors which cause DSM program impacts to contain significant uncertainty, not the least of which is that "savings" cannot be metered so they must be estimated using statistical or engineering-based methods. Those estimates must also account for free riders, rebound effects, overlapping measures, interactive measure effects and the degradation of savings over time. The level of uncertainty and risk associated with the DSM program impacts further escalates when those impacts are applied to forecasts of the number of participants by programs in order to project total DSM savings for use in the load forecast and the resource plan.

Program savings are just one of the indicators that will be used to track success toward meeting program goals. Depending on the program, other indicators may include participation rates, participant satisfaction levels or education outreach metrics such as the number of home energy audits completed or contractor training workshops offered. Programs will be continually improved through a review of these indicators, as well as periodic process reviews involving participants, nonparticipating customers, program-delivery contractors and other market actors. For DSM programs that involve equipment installations, onsite inspections will be performed on a sample of the installations to ensure the programs and projects are properly implemented.

7. Summary and Next Steps

This DSM Plan outlines the direction of PEC's future DSM efforts. PEC has already accumulated about 1,000 MW of peak load reduction through its previous and current DSM efforts. PEC has established an aggressive, yet realistic, goal of reducing annual peak demand by another 1,000 MW through the acquisition of new DSM resources, which translates into 1,140 MW of additional generation displacement. The additional savings will come from a host of new energy efficiency and demand response programs targeted toward all major electric end-uses from all customer classes. Currently, we anticipate that it will take 10 years (through 2017) to realize this goal.

The success of this DSM plan hinges on customer acceptance and involvement. A key component of the plan includes building the customer education and awareness required to encourage significant program participation. The plan also offers a large variety of conservation measures and program approaches that will offer participation opportunities to all PEC customers. The program development process is currently under way, with pilots in progress for several of the new DSM programs identified in this plan. The 1,000 MW goal could be reached in less than 10 years if there is significant customer participation.

In addition to implementing new DSM programs for its electric customers, PEC plans to lead by example in encouraging electricity conservation. PEC has already started replacing incandescent lighting with compact fluorescent bulbs at its facilities and plans to participate in other applicable energy efficiency and demand response measures. For example, the newest PEC headquarters building in downtown Raleigh (Two Progress Plaza) participates in PEC's load-control program, has "smart elevators" and uses programmable thermostats, among other efficient features.

Next steps include gathering and using all of the program information being developed to finalize specific program designs including participation projections, delivery mechanisms, cost estimates, peak demand and energy savings, potential participant incentives and cost-effectiveness results. Upon completion of the program-development stage, and before program implementation, PEC plans to submit all of the relevant program designs, eligibility requirements, participation projections, demand and energy impacts, cost projections and cost-effectiveness results to the Commission for review and approval.

PEC's DSM plan is based on a variety of forecasts, assumptions and expectations about the future, all of which contain uncertainty. Because of the inherent uncertainty about the future, it is imperative that this plan be flexible enough to adjust to changing conditions.

PEC envisions its DSM efforts as a long-term, dynamic process that will undergo constant adjustment and fine-tuning to maintain the proper balance of customer acceptance and satisfaction with PEC's need to deliver reliable, affordable and clean power 24 hours a day, seven days a week. In the end, however, the success of this DSM plan lies in the ability to provide customers with a variety of beneficial, cost-effective programs that are easy to access and use. To do this will require education, ingenuity and a commitment from PEC, its customers and all affected parties.

Appendix

DSM Program Descriptions

A. Residential Energy Information and Audits Program

Program Type: Energy Efficiency

Target Market: Residential

Target End-use: All electric end-uses

Description

The Residential Energy Information and Audits Program will include a variety of measures designed to educate PEC customers about energy efficiency and energy conservation. These measures will provide customers with energy-saving tips including energy efficient behaviors, energy conservation equipment and energy-saving appliances. The program will include:

- In-Home Energy Display (Pilot) -- Participants will receive a display unit that provides direct feedback on real-time electricity usage in dollars and energy demand (kW). These informational displays educate customers about electricity costs associated with using various household appliances in order to help them manage their energy consumption and electric bill. Customers can also view an estimate of cumulative costs of electricity which might assist them in budgeting for their monthly utility costs. A pilot of the In-Home Energy Display began in July 2007 with 300 residential customers receiving a home energy display unit. Energy usage for the pilot participants will be tracked for one year (four distinct usage seasons) to determine the conservation results of this device.
- Home Energy Check – The foundation for the Residential Energy Information and Audit program is an energy audit measure called the "Home Energy Check." The Home Energy Check provides customers with an analysis of their current energy use as well as recommendations on how they can save on their electric bill through low-cost or no-cost energy-saving practices and measures. Participation is encouraged by allowing customers to choose from a variety of different delivery mechanisms. The following types of audits are being considered:
  - Walk-thru Audits – This offering will provide an on-site audit by a trained energy efficiency specialist in order to identify and recommend energy efficiency improvements specific to the household.
  - Online Audits – An online version of the Home Energy Check allows customers to input information about their home and receive a customized report containing specific energy efficiency recommendations through the Internet.
  - Phone-assisted Audits – The Home Energy Check will be offered to residential customers that contact a customer service center by phone and request an energy audit for their household. Dedicated customer service representatives will complete household audits and mail customized reports to customers.
  - Mail-in Audits – The Home Energy Check will be mailed to households by customer request. Customers will answer audit questionnaires and mail the completed form back to PEC to be analyzed. PEC will mail a customized report back to the customer with recommendations for energy efficiency improvements.

- Customized Energy Reports (Pilot) – These reports are quick mail-in audits distributed through targeted direct-mail campaigns to selected customers. Reports can be mailed to segments of customers that need efficiency improvements in their homes.
- Energy Education Expositions – Home shows sponsored by PEC with large home improvement stores will showcase energy efficient Energy Star® appliances as well as insulation improvements, duct repair, compact fluorescent lights, weather-stripping and other energy efficiency upgrades. Shows will result in increased sales of energy-efficient appliances and technologies.
- Energy Star® – The PEC DSM Web site will tie into the EPA's Energy Star® Web site to offer customers up-to-date information on the most energy-efficient products and the various PEC rebate programs.
- "Save The Watts" – is a consumer education campaign that uses a specially designed dynamic Web site at www.savethewatts.com, as well as print and broadcast advertising, to provide a wide array of energy efficiency tips.
- Bill Inserts – PEC uses the quarterly "Plugged In" bill insert to reach most customers with seasonally appropriate energy efficiency messages.
- "Power Pointers" e-mails (existing program) – PEC sends e-mails to registered customers each season with specific tips on how to save energy and lower their electric bill.
- Progress Energy Web site – Customers can log on and use energy analysis tools that help them understand their energy usage patterns and identify opportunities to reduce energy consumption. The "Lower My Bill" toolkit provides tips and steps to help customers determine actions to reduce energy consumption and lower bills, with suggestions for relatively simple no-cost steps to conserve energy.

Objective

The primary objective of the Residential Energy Information and Audits program is to increase energy efficiency education and customer awareness of energy consumption so that customers can better manage their usage and electricity costs. The Home Energy Check serves multiple purposes:

- Educates customers by providing an overview of typical energy use
- Identifies opportunities for improving energy efficiency at the customer's home
- Serves as the marketing tool to introduce customers to PEC's other conservation programs
- Assists PEC in minimizing free ridership in the other DSM programs
- Verifies that the any action requested (e.g., additional attic insulation) will address the customer's energy efficiency need.

Participant Incentive

In-Home Energy Display Pilot participants will receive a display at no cost in return for their agreement to participate in surveys throughout the initial 12-month period.

B. Residential Home Energy Improvement Program

Program Type: Energy Efficiency

Target Market: Residential – Existing Construction

Target End-use: All electric end-uses

Description

The Home Energy Improvement Program is an umbrella efficiency program that promotes a variety of energy conservation measures for residential customers in homes that can no longer be considered new construction. Home Energy Improvement will be implemented through a custom and prescriptive approach and builds on audit activities described under the "Home Energy Check" measure of the Residential Energy Information and Audits program. Targeted programs will be delivered through a network of pre-qualified contractors. Examples of energy conservation measures (ECMs) include:

- High-Efficiency Heat Pumps and Central A/C – encourages residential customers to upgrade HVAC equipment to higher energy-efficient SEER rating standards.
- Duct Testing & Repair – encourages residential customers to improve the efficiency of their existing HVAC systems by testing and sealing leaks in the duct system.
- HVAC Tune-up – encourages residential customers to improve the efficiency of their existing central HVAC system by performing tune-up maintenance on heat pumps or central A/C.
- Insulation Upgrades – encourages residential customers to improve the efficiency of their home by upgrading the attic insulation to R-30 and sealing air leaks in the attic.
- CFL (Compact Fluorescent Lights) – designed to accelerate the market transformation of energy-efficient CFLs to residential customers.
- Energy Efficiency Financing – PEC's energy efficiency financing has connected customers with pre-screened contractors to provide complete installation and financing on a range of energy-saving home improvements since 1981.

Objective

The primary objective of this program is to reduce electric demand and energy use within existing residential structures by encouraging customers to implement cost-effective energy efficiency measures. The Home Energy Improvement program also seeks to meet the following overall goals:

- Improve customer comfort levels through energy efficiency measures
- Obtain energy and demand reductions that are significant, permanent and measurable
- Educate customers about opportunities to upgrade their home's energy efficiency
- Enhance contractor awareness of the capabilities of energy-efficient technologies

- Obtain cost-effective resources from the marketplace
- Minimize "lost opportunities" in the existing residential market

Participant Incentive

Financial incentives will be provided to participants for each of the conservation measures promoted within this program. The incentive amounts may vary by the type of measure.

- High-Efficiency Heat Pump and Central A/C incentives will be available to customers that purchase new equipment with at least a 15 SEER rating. The HVAC incentive may be provided to the customer or contractor. All equipment for which an incentive is paid shall be new and not refurbished.
- Duct Testing & Repair incentives will be paid as a credit on the customer's bill or a check to the customer. All equipment for which an incentive is paid must be a central ducted system.
- HVAC Tune-Up incentives will be paid as a credit on the customer's bill or a check to the customer. All equipment for which an incentive is paid must be a central ducted system.
- Insulation Upgrade incentives will be available to residential customers interested in improving attic insulation levels in their homes. The incentive will be paid as a credit on the customer's bill or a check to the customer. All incentives paid must be in a home at least two years old, and the insulation must be installed by a licensed participating contractor.
- CFL incentives will be available to residential customers through home-improvement store manufacturer buydown programs, rebates or coupons, and possibly through other initiatives.

C. Residential New Construction Program

Program Type: Energy Efficiency

Target Market: Residential – New Construction

Target End-use: All electric end-uses

Description

The New Construction Program is an "umbrella" program designed to improve energy efficiency in the following three new construction segments:

- Residential Site Built and Modular Single Family Dwellings
- Manufactured Homes
- Multi-Family Units

This program is designed to target major construction markets, so as to minimize lost opportunities and promote the following energy efficiency activities:

- Provide education and information to the design community and the real estate market on energy-efficient building design and construction.
- Provide financial incentives for duct testing and installing high-efficiency heat pumps to builders and manufacturers building EPA Energy Star® residential dwellings. An independent Home Energy Rating System (HERS) rater will issue a certificate which identifies the home as meeting the Energy Star® criteria.
- Energy-Efficient Home Program/Energy Star® – Provide incentives for homes that meet specific energy efficiency criteria.
- Contractor Training – PEC will sponsor training for home builders on high efficiency building practices, including Energy Star®.

Objective

It is the objective of this program to work closely with trade allies to build energy-efficient housing for the Carolinas' future. The primary objective of this program is to reduce electric demand and energy use within new residential structures by encouraging builders to build homes that meet the Energy Star® criteria. The program seeks to meet the following overall goals:

- Educate builders about energy-efficient new construction building design to create a supply of energy-efficient homes.
- Educate prospective buyers and real estate agents about the benefits of energy-efficient home design to increase the demand for energy-efficient homes.
- Obtain energy and demand impacts that are significant, accurate, sustainable and measurable.
- Evaluate cost-effective measures for the marketplace.

- Minimize “lost opportunities” in the new construction market.

Participant Incentive

Provide incentives for homes built to the Energy Star® standards.

The builder or manufacturer may be provided an incentive to help offset HERS costs.

D. Residential Low Income Assistance Program

Program Type: Energy Efficiency

Target Market: Residential – Existing Construction

Target End-use: All electric end-uses

Description

The Low-Income Assistance Program will be coordinated with the Home Energy Improvement Program to improve energy efficiency for low-income customers in existing residential housing. The program will provide:

- Customized Energy Reports to targeted low income customers
- An added incentive for selected measures starting with Duct Testing & Repair and HVAC Tune-Up.

Objective

The Low-Income Assistance Program seeks to meet the following goals:

- Identify and educate contractors and low-income customers about energy-saving opportunities to improve home energy efficiency
- Increase low-income families' participation in PEC's DSM programs

Participant Incentive

Financial incentives will be provided to participants for each of the conservation measures promoted within this program. The incentive amounts may vary by the type of measure. Incentives will only be paid if the measures are installed by participating licensed contractors that meet the contractor criteria outlined in the program documents.

- Customized Energy Reports will periodically encourage participation by also providing samples of various energy efficiency products, such as a multiple pack of CFLs or a weatherization starter kit.
- The program will provide an additional incentive for the duct testing and repair, and HVAC Tune-up measures, above the incentive provided under the Home Energy Improvement Program.

E. Residential Demand Response Program

Program Type: Demand Response

Target Market: Residential

Target End-use: Air Conditioning, Water Heating & Electric Heating

Description

The Residential Demand Response Program includes a variety of residential demand response initiatives designed to reduce system peak demand, including:

- Air Conditioner (A/C) Load Control – Participants allow PEC to cycle their A/C units during times of peak electricity usage in exchange for an incentive or a bill credit from PEC. The load control devices will be equipped with communications software which can receive signals from PEC to reduce equipment run time and lowering coincident air conditioning loads.
- Electric Water Heater Load Control – Participants allow PEC to cycle off their electric water heater during peak times.
- Strip Heat Load Control (Western Region only) – This initiative allows PEC to interrupt participants' electric strip heat during peak times for a limited number of hours per year. This program is only planned for the western North Carolina region.
- Time-of-Use Rates – PEC offers several Time-of-Use rates to encourage residential customers to curtail usage during on-peak, high-cost time periods. New rate options will be evaluated in an effort to improve participation and increase impacts.

Objective

The primary objective of these programs is to reduce system peak demand. Central air-conditioning is a major contributor to the system peak, which generally occurs during summer afternoons. A/C load control programs are a proven resource for reducing peak demand with minimal customer impact.

Participant Incentive

Specific incentives will be provided for each program component as described below.

- A/C Load Control – Participants may receive an incentive or a bill credit in exchange for allowing PEC to cycle their A/C units during peak times.
- Electric Water Heater Load Control – Participants may receive bill credits and/or a one-time financial incentive for allowing PEC to control their water heater during peak times.
- Strip Heat Load Control (Western Region only) – Participating customers may receive bill credits and/or a one-time financial incentive for allowing PEC to control the operation of their electric strip heat during peak times.

F. CIG Educational & Awareness Initiatives Program

Program Type: Energy Efficiency

Target Market: Commercial, Industrial and Governmental

Target End-use: All electric end-uses

Description

The Commercial, Industrial and Governmental (CIG) Educational & Awareness Initiatives program will include a variety of measures designed to educate PEC customers about energy efficiency and conservation. These measures will provide customers with energy-saving tips including energy-efficient behaviors, energy conservation equipment and energy-saving appliances. The CIG Educational & Awareness Initiatives program includes the following measures:

- Energy Profiler – The on-line Energy Profiler is available to large customers on a fee-for-service basis. This tool enables customers to monitor their historical usage data on a daily or monthly basis. As part of the overall customer energy awareness, each customer can evaluate both peak demand and energy use. This information can lead to reduced peak demand and energy as participants use the information to make operational adjustments or equipment changes to reduce their electric bill. Routine reports are available through e-mail or via Web access. The Energy Profiler uses meter data to allow a customer to monitor and make adjustments
- Energy Newsletters – Energy newsletters will be provided via e-mail to a wide range of customers. The newsletters are provided on a routine schedule. Content will include publication of DSM programs, energy tips, safety information, price and cost analysis, business tips, and energy outlooks. Enrollment will be provided via Web access, personal contact, affinity groups, bill inserts and direct survey. The basic purpose will be to give customers tools to reduce energy use and to raise awareness of energy issues.
- Schools Benchmarking Program – This program collects energy information data for schools and is available to all schools within the PEC service area. The data are then reported and delivered to schools, allowing each school to understand their performance against the baseline or all other schools. With this understanding, a school system can determine where to concentrate limited resources. Long term, performance of various designs can be evaluated allowing schools to incorporate best practice design in future buildings.
- Walk-Through Audits – Walk-Through Audits will provide customers with energy efficiency recommendations to consider for in-depth study as well as opportunities for quick efficiency improvements that may be implemented by the customer. These audits will be available to large customers. High-level audits will be performed by PEC's Account Management team with aid from in-house and contract resources. This service is available upon request.
- On-Line Audits (Pilot) – On-Line Audits are available to all CIG customers using an online tool that allows customers to enter specific data for their facility on a one-page

form. Using that data, benchmark norms are presented that allow the customer to determine where to focus energy conservation efforts. The tool is most useful for commercial, governmental and small industrial customers.

- Energy Manager on Loan (Pilot) – The Energy Manager on Loan is a focused program available to a limited number of educational and governmental customers. The program is designed to provide customers with an intense concentration of energy analysis across multiple facilities. Participants must agree to implement any short payback recommendations and consider budgeting for long-term recommendations.
- CIG Account Management – All PEC commercial, industrial and governmental customers over 200 kW are assigned to an account manager who can help them manage their energy usage and costs, provide energy education and consultation, assist them in developing energy efficiency solutions and encourage participation in PEC's DSM programs. This group also conducts "Lunch N Learn" seminars for customers to help them save energy and better understand their energy options.
- "Save The Watts" – is a consumer education campaign that uses a specially designed dynamic Web site at www.savethewatts.com, as well as print and broadcast advertising, to provide a wide array of energy efficiency tips.
- Energy Resource Center – The Energy Resource Center is an online resource that offers large commercial, industrial and governmental customers a wide array of tools to use in managing their energy usage and reducing their electrical demand and overall energy costs. PEC also uses this resource to provide newsletters, tools and information to customers on a variety of energy efficiency topics.

Objective

The primary objective of the CIG Educational & Awareness Initiatives program is to increase energy efficiency education and customer awareness of energy consumption so that customers may better manage their usage and electricity costs. This initiative provides the tools for customers to use in their programs. Audit programs can help to empower customers to partner with the utility in energy savings as well as introduce new technologies to customers that have minimal impact on customer satisfaction.

These programs serve multiple purposes:

- Educate customers by providing an overview of typical energy use
- Identify opportunities for improving energy efficiency at the customer's facility
- Serve as the marketing tool to introduce customers to PEC's other conservation programs
- Assist PEC in minimizing free ridership in the other DSM programs
- Verify that any action requested will address the customer's energy efficiency need.

Participant Incentive

Incentives may include receiving reduced price options for on-line audit tools and walk-through audits.

G. CIG Energy Improvement Program

Program Type: Energy Efficiency

Target Market: Commercial, Industrial and Governmental – Existing Construction

Target End-use: HVAC, Lighting

Description

The CIG Energy Improvement Program is an umbrella efficiency program that promotes a variety of energy conservation measures for CIG customers of all sizes. While no customer will qualify for all measures, every customer will qualify for some measure. The overall goal is to assist customers with energy efficiency improvements that reduce their energy usage and costs, and enable them to better accomplish their business missions. This program provides customers with incentives for select efficiency measures that are cost-effective to PEC and its customers, as well as information, education and advice on energy-related issues. The CIG program will be implemented through a custom and prescriptive approach. Programs will be delivered through a network of pre-qualified energy efficiency engineering firms and contractors. Examples of energy conservation measures (ECMs) include:

- High-Efficiency Heat Pumps and Central A/C – encourages customers to upgrade HVAC equipment to higher energy efficient SEER rating standards.
- Duct Testing & Repair – encourages customers to improve the efficiency of their existing HVAC systems by testing and sealing leaks in the duct system.
- HVAC Tune-up – encourages customers to improve the efficiency of their existing HVAC system by performing tune-up maintenance on heat pumps or central A/C.
- Insulation Upgrades – encourages customers to improve the efficiency of their facility by upgrading the attic insulation to R-30 and sealing air leaks.
- Commercial & Industrial Lighting Upgrades – promotes high-efficiency lighting upgrades, including T-8 and metal halide lamps.
- Energy-Efficient Motors Rebates – promotes high efficiency motors.
- Cool Roof Incentive – provides customers with electric cooling systems an incentive to install an Energy Star® Roof Products-approved "cool roof" coating. Energy Star® allows manufacturers to use the Energy Star® label on reflective roof products that meet the U.S. EPA's specifications for solar reflectance and reliability.

Objective

The primary objective of this program is to reduce electric demand and energy use within existing CIG structures by encouraging customers to implement cost-effective energy efficiency measures within their facilities. The program also seeks to meet the following overall goals:

- Improve customer comfort levels through energy efficiency measures.
- Obtain energy and demand reductions that are significant, permanent and measurable

- Educate customers about opportunities to upgrade facility's energy efficiency
- Enhance contractor awareness of the capabilities of energy-efficient technologies
- Obtain cost-effective resources from the marketplace
- Minimize "lost opportunities" in the existing markets.

Participant Incentive

Incentives will be provided to participants for each of the conservation measures promoted within this program. The incentive amounts may vary by the type of measure.

- High Efficiency Heat Pump and Central A/C incentives will be available to customers that purchase new equipment with at least a 15 SEER rating.
- Duct Testing & Repair incentives will be provided for centrally ducted systems.
- HVAC Tune-Up incentives will be paid as a credit on the customer's bill or a check to the customer. All equipment for which an incentive is paid must be a centrally ducted system.
- Insulation Upgrade incentives will be available to customers that are interested in improving attic insulation levels in their facilities. The incentive will be paid as a credit on the customer's bill or a check to the customer. All incentives paid must be in a facility at least 2 years old and the insulation must be installed by a licensed participating contractor.
- Incentives for lighting upgrades will be available to CIG customers.
- Energy Efficient Motors rebates will be based on the size of the motor.
- Cool Roofs incentives will be available based on square footage of the project with a maximum incentive for any single project. The cool roof must meet Energy Star® requirements to gain the incentive.

H. CIG New Construction Program

Program Type: Energy Efficiency

Target Market: Commercial, Industrial and Governmental – New Construction

Target End-use: All electric end-uses

Description

The CIG New Construction Program is an "umbrella" program designed to improve energy efficiency in new CIG facilities. This program is designed to target major new construction projects, so as to minimize lost opportunities and promote the following energy efficiency activities:

- Provide education and information to the design community and CIG customers on energy-efficient building design and construction.
- Provide financial incentives for upgrading electrical end-use equipment such as lighting and HVAC to the most energy-efficient and cost-effective options that surpass the state energy code.
- Design Community Training – PEC will sponsor training on high efficiency design practices, including LEED.

Objective

The primary objective of this program is to reduce electric demand and energy use within the CIG market segment by working closely with trade allies to design and build energy-efficient facilities for the Carolinas' future. The program seeks to meet the following overall goals:

- Educate design firms about energy-efficient new construction building design practices to create a supply of energy-efficient facilities.
- Educate CIG customers about the benefits of energy-efficient design.
- Obtain energy and demand impacts that are significant, accurate, sustainable and measurable.
- Evaluate cost-effective measures for the marketplace.
- Minimize "lost opportunities" in the CIG new construction market.

Participant Incentive

Incentives will be provided to the appropriate decision makers to encourage the use of energy-efficient building design and construction practices as well as high efficiency equipment within CIG new construction. Recognition will be provided to the design firms and customers that achieve "best in class" upgrades.

I. CIG Demand Response Program

Program Type: Demand Response

Target Market: Commercial, Industrial and Governmental

Target End-use: HVAC equipment, lighting, and specialized industrial processes
Any end-use for the Customer-Owned Generation measure

Description

The CIG Demand Response Program will provide a financial incentive for customers to allow PEC contractors to install load control equipment, or to reduce loads upon request by PEC. Customers with backup generation may be able to reduce net demand by utilizing onsite generators with little or no need to reduce usage of other equipment. Specific CIG Demand Response initiatives may include the following:

- Customer-Owned Generation – A demand control program that will reduce PEC's peak demand based upon the indirect control of customer electrical equipment. PEC will rely on customers to initiate their backup generation upon notification during high-peak periods (generally during extreme summer temperatures). Metering will be required to allow measurement of the system outputs and savings. PEC does not restrict other use of the equipment by the customer.
- Curtailable Load – This program provides a source of load that may be curtailed at PEC's request in order to meet system load requirements. It is applicable to customers willing to commit to self-activated load reductions in response to a notice and request from PEC. Customers who participate in this program receive a credit on their bill.
- Time-of-Use Rates – PEC offers several Time-of-Use and Real-Time-Pricing rates to encourage customers to curtail usage during on-peak, high-cost time periods. New rate options will be evaluated in an effort to improve participation and increase impacts.

Objective

The primary objective of these programs is to reduce system peak demand. This program further reduces customer impacts by encouraging customer-owned generation to operate and displace load primarily during PEC's system peak hours.

Participant Incentive

Incentives may be paid as a monthly credit on a participating customer's energy bill according to the demonstrated ability of the customer to reduce demand at PEC's request. Under a voluntary component of the program, incentives would be paid only on the reductions achieved during curtailment events.

J. CIG Energy Innovation Program

Program Type: Energy Efficiency

Target Market: Commercial, Industrial and Governmental

Target End-use: Any End-Use

Description

The Energy Innovation program is an incentive program designed to increase the energy efficiency of CIG customers by addressing the customized needs of their facility and operation, due to the significant variations within this segment of customers. This program will be targeted to both new and existing facilities and aims at identifying and implementing opportunities through a defined design, pre-qualification, audit and construction management process. Proposed projects must meet or exceed a minimum level of peak demand savings (to be specified within the program design).

The general program concept will involve the pre-qualification of design engineering firms and contractors through an RFP/RFQ process. Customer opportunities will be identified by screening processes that are established for each segment (i.e., hospitals, schools, etc.). Customers will have the opportunity to select a pre-qualified design and engineering firm for a preliminary engineering audit. The goal of the engineering audit is to identify a list of cost-effective energy conservation measures unique to the facility. Thereafter, PEC will develop a customized incentive that aims to improve the payback to a term that encourages the customer to move forward with a design/build contract. A list of pre-qualified contractors and vendors will be provided for customers who decide to move forward with the recommendations. Any costs associated with the measurement and verification of proposed measures will be included in the program costs during the cost-effective analysis.

The following opportunities will be targeted under the program envelope:

- Large Comprehensive Retrofits – Targeted toward larger CIG customers with the opportunity to implement multiple, cost-effective energy conservation measures.

- New Construction – Aimed at improving the energy efficiency of new construction by encouraging the upgrade of lighting, HVAC, motors, etc. to a higher efficiency standard and/or higher efficiency Leadership in Energy and Environmental Design (LEED) category.

- Lighting Retrofits – Targeted toward customers and identified opportunities that are not best matched by prescriptive lighting incentives, or who have not chosen to move forward with a larger comprehensive retrofit.

- Equipment Replacement/Remodel – Focused on improving the energy efficiency of operating equipment by encouraging the replacement of HVAC, energy-management systems, etc. by aiding in the design-review process.

- Motors – Intended to improve the efficiency of motor applications by pre-qualifying motor dealers and repair shops to provide cost-effective upgrades to eligible customers.

Objective

The primary objective of this program is to obtain energy reductions by encouraging customers to implement customized energy conservation measures through a pre-defined audit and implementation process.

Participant Incentive

Each project will be eligible for a customized incentive to be determined by PEC based on the cost effectiveness of the measures to be implemented. To be eligible for an incentive, all proposed projects must be reviewed and approved by PEC before the beginning of any work.

K. Research & Development (R&D) and Alternative Energy Initiatives Program

Program Type: Research & Development

Target Market: All Markets

Target End-use: Any end-use

Description

This program provides PEC with the ability to investigate, develop, test and pilot potential new demand-side management resources, including demand-side renewable energy alternatives, which have promise to become cost-effective demand and energy efficiency programs. Examples of potential projects that may be funded under this program include demand response methods, energy efficiency techniques, market transformation initiatives, and renewable and alternative energy technologies. This program will include the following R&D project:

Customer Renewable Energy Research

This is a research and development initiative designed to test (or pilot) and evaluate renewable energy alternatives that may be customer-owned. It will also provide education and information to the design community on incorporating renewable energy technology products into new and existing construction. Some of the products and technologies under consideration include, but are not limited to, the following:

- Photovoltaics (PV)
- Solar Thermal
- Wind

Alternative Energy Research

Research and development is under way to test (or pilot), and evaluate alternative energy technologies that may be viable for future customer use. It will also provide education and information to the design community on incorporating these. Some of the products under consideration include, but are not limited to, the following:

- Plug-in Hybrid Vehicles
- Fuel Cells
- Battery-Storage

L. Smart Grid Program

Program Type: Demand Response

Target Market: Systemwide deployment

Target End-use: Real-time Grid Optimization

Description

Coordinated distribution voltage and VAR control can help avoid or defer investment in additional generation by providing system peak load reduction. The Smart Grid program includes three major components:

- Coordinated control of substation regulators, substation transformer load tap-changers (LTC), substation capacitors, distribution line capacitors and distribution line regulators. This requires extending our control capabilities to the remainder of the PEC distribution substations.
- Feeder conditioning investments to strengthen grid-delivery capability, prepare for dynamic real-time optimization and enable maintaining voltage quality during load reduction scenarios.
- Distribution load-flow computer modeling in real-time via a Distribution Management System (DMS). This is the "intelligence" that will dynamically manage and optimize grid control schema to reduce system peak demand. Additional sensors and feeder-monitoring equipment will be installed to provide validation and to enhance the accuracy of the load-flow model.

Objective

The primary objective of the program is to reduce system peak demand.

Technology

The technology to be used by Smart Grid is a combination of activities that support the programs identified:

- Feeder conditioning hardware and equipment including localized sensors and control schema that serve to levelize the circuit voltage profile, while providing control mechanisms that ensure voltage delivery remains in compliance with regulatory guidelines and requirements on a real-time basis. These preparatory investments will allow for intelligent management and coordination of the distribution grid.
- A Distribution Management System with real-time state estimation capabilities to dynamically optimize the electrical distribution system through management of voltage and VAR profile on a feeder-by-feeder basis, thereby delivering load reduction through peak loading periods. This type of analysis engine enables the minimization of load requirements through dynamic reconfiguration of the circuit characteristics on a periodic basis.

- Two-way communications that enable monitoring and control capabilities to voltage and VAR equipment.
- Advanced sensors that simplify the state estimation solution requirements by providing actual measurement of current, voltage and VARs. These devices would be used to bring real-time inputs into the Distribution Management System.