



June 30, 2003

The Honorable Gary E. Walsh  
Executive Director  
South Carolina Public Service Commission  
Post Office Drawer 11649  
Columbia, South Carolina 29211

Re: Carolina Power & Light Company's 2003 Resource Plan  
Docket No. 2001-265-E

Dear Mr. Walsh:

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. hereby submits for filing an original and ten copies of its 2003 Resource Plan. We are also enclosing one extra copy to be stamped and returned.

Sincerely,

A handwritten signature in black ink that reads 'B. Mitchell Williams'.

B. Mitchell Williams  
Supervisor, Regulatory Affairs

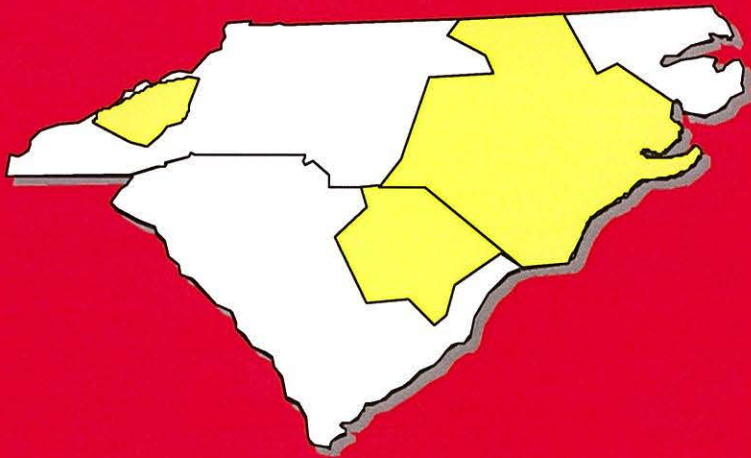
BMW  
Enclosures  
c: Mr. Mitchell M. Perkins, State Energy Office

55006



Progress Energy Service Company, LLC  
P.O. Box 1551  
Raleigh, NC 27602

# Progress Energy Carolinas Resource Plan



South Carolina Public Service Commission  
Docket No. 2001-265-E  
June 30, 2003

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## **INTRODUCTION**

### ***OWNERSHIP***

Progress Energy Carolinas, Inc. (PEC) is a wholly owned subsidiary of Progress Energy, Inc. (Progress Energy), a registered holding company under the Public Utility Holding Company Act of 1935 (PUHCA), as amended. Progress Energy and its subsidiaries, including PEC, are subject to the regulatory provisions of the PUHCA. 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 distributes and sells electricity in 14 counties in northeastern South Carolina and 57 of the 100 counties in North Carolina. The territory served is an area of approximately 34,000 square miles, including 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, an area in northeastern South Carolina and an area in western North Carolina in and around the city of Asheville. The estimated total population of the territory served is more than 4.0 million. As of December 31, 2002, PEC was providing electric services, retail and wholesale, to approximately 1.3 million customers. Major wholesale power sales customers include North Carolina Eastern Municipal Power Agency (NCEMPA or Power Agency) and North Carolina Electric Membership Corporation (NCEMC).

### ***TRANSMISSION / DISTRIBUTION***

As of December 31, 2002, PEC had approximately 6,000 pole miles of transmission lines including about 300 miles of 500 kilovolt (kV) lines and about 3,000 miles of 230 kV lines. PEC had distribution lines of approximately 45,000 pole miles of overhead lines and about 16,000 miles of underground lines. Distribution and transmission substations in service had a transformer capacity of approximately 47,000,000 kilovolt-ampere (kVA) in 823 transformers. Distribution line transformers numbered 495,501 with an aggregate capacity of about 20,000,000 kVA.

### ***TOTAL CAPACITY RESOURCE***

PEC's eighteen generating plants represent a flexible mix of fossil, nuclear, hydroelectric, combustion turbines and combined cycle resources, with a current total summer generating capacity (including Power Agency's share) of 12,397 megawatts.

## **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 forecasting 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 totalized 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.

#### *Assumptions*

Generally, growth in the standard of living as reflected in personal income and Gross Domestic Product (GDP) per capita is expected to slow modestly relative to recent levels. The labor force can be predicted with some reliability because the working population for the early 21st century has already been born. Real dollar prices are used to enhance model reliability during periods of varying inflation. The forecast assumes that our customers will tend toward continuing energy efficiency in the future.

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 is given in the table below. This forecast is somewhat lower than the forecast filed with the SCPSC in June 2002 primarily due to the effects of the economic slowdown and a slight lowering of longer-term economic growth expectations. The current forecast represents a retail growth rate of 2.1% across the forecast period, which reflects a slight reduction from the prior filing. 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.

<b>ANNUAL PEAK LOAD and ENERGY FORECAST</b>		
	<b>System Peak Load (MW)</b>	<b>Net Internal Energy (MWh)</b>
2003	11,465	60,916
2004	11,491	60,390
2005	11,663	60,624
2006	11,921	62,153
2007	12,159	63,709
2008	12,444	65,255
2009	12,715	66,811
2010	12,928	68,145
2011	13,174	69,661
2012	13,427	71,122
2013	13,675	72,609
2014	13,892	74,085
2015	14,142	75,615
2016	14,385	77,061
2017	14,635	78,768
2018	14,889	80,507

- 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.**

See Appendices A and B.

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

The utility industry continues to experience significant changes that challenge the planning process for providing the resources needed to meet growing electricity demands. Industry and environmental regulations plus competition in the wholesale power market are some of the issues that face utilities. In order to make sound resource planning decisions, it is necessary to assess the costs of future generation technologies. To conduct such an assessment, PEC develops a consistent and documented database of future technologies for use in the Company's planning studies.

In the most recent assessment, sixteen (16) technologies were analyzed. These included conventional generation technologies that utilize non-renewable resources, advanced generation technologies that are still being developed, and alternative technologies that utilize renewable sources of energy. Specifically, the following technologies were evaluated:

Conventional Technologies

- Pulverized Coal (PC)
  - Pulverized Coal, Sub-critical
  - Pulverized Coal, Super-critical
  - Pulverized Coal – Wall Board Gypsum
- Combustion Turbine (CT)
  - Aero-derivative
  - E-frame
  - F-frame
- Combined Cycle (CC)

Advanced Technologies

- Atmospheric Fluidized Bed Combustion (AFBC)
- Coal Gasification/Combined Cycle (CGCC)
- Advanced Light Water Nuclear (ALWN)
- Fuel Cell (FC)

Alternative Technologies

- Municipal Solid Waste (MSW)
- Solar Photovoltaic (PV)
- Refuse Tires (TIRE)
- Wind
- Wood

Busbar costs allow for comparison of fixed and operating costs of all technologies over different operating levels. This analysis is done using the spreadsheet program



COMPETE. It compares the long-term economics of future power plants and reports the busbar costs by capacity factor. Data input to COMPETE for each technology includes fixed and variable O&M, fuel, construction costs, and the levelized fixed charge rate.

Except in cases where data specific to PEC and its service territory were obtained, the data presented are **generic** in nature and thus not site specific. The costs and operating parameters are adjusted to reflect installation in the southeastern United States. The operating characteristics are based on state-of-the-art designs, with some of the advanced and renewable resource technologies *not* being currently available commercially. The primary source of information in developing the database is the EPRI Technical Assessment Guide (**TAG**) database.

Appendix C provides the most current economic comparison of all technologies examined, regardless of their technical feasibility. Of the sixteen technologies evaluated and shown in Appendix C, only twelve (12) are commercially available at this time and only eight (8) of those are mature, proven technologies. This is important to keep in mind when reviewing the data, as some of the options shown as low cost may not be commercially available or technically feasible as a generation option at this time. Also, the less mature a technology is, the more uncertain and less accurate its cost estimates may be.

Wind projects have high fixed costs but essentially no operating costs. Therefore, at high enough capacity factors they could become economically competitive with the lower-cost technologies identified. However, the geographic and atmospheric characteristics of the Carolinas limit the ability of wind projects to achieve those capacity factors in locations that are available for commercial operation. Because a wind project would not be expected to operate above 20-25% capacity factor in the Carolinas, it is not a viable alternative to the CC for intermediate duty. Further, because wind is not dispatchable, it is not a suitable alternative to the CT for peaking duty.

Similar to wind projects, solar photovoltaic (PV) projects are also technically constrained from achieving higher capacity factors. In the Carolinas they would be expected to operate at approximately 20% capacity factor making them unsuitable for intermediate or higher duty cycles. At the lower capacity factors, they, like wind, are not dispatchable and therefore not technically suited to provide reliable peaking capacity. Aside from their technical limitations, PV projects are not economically competitive generation technologies as is apparent in Appendix C.

Although fuel cells appear to be competitive with the CC if projected cost reductions can be achieved, they are currently still in the demonstration stage. Fuel cells 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.

Appendix D shows the technologies that are commercially available, cost effective, and technically feasible, making them viable generation alternatives in the Carolinas. This graph illustrates that the combustion turbine (CT) is the most economical generation alternative for peaking duty cycles, and the combined cycle (CC) is the preference for intermediate and base load operation. The busbar curves also indicate a potential for coal technologies to become cost competitive at capacity factors approaching 100%. This relationship is dependent on fuel price and other cost assumptions over the long-term. Although spikes in natural gas prices have recently been experienced, such variances have historically been of a short-term nature and are not expected to continue over the long-term planning horizon. PEC will continue to monitor fuel price and other cost assumptions to ensure the Company plans for the most economical and reliable generation additions.

- 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**

PEC's Resource Plan continues to be a plan that provides low cost energy service. Future capacity additions included in this plan are somewhat less than previous plans as a result of changes in the Company's load forecast. The types of capacity additions are consistent with previous plans and continue to include combustion turbine (CT) and combined cycle (CC) units, and also capacity uprates to the Company's nuclear facilities.

Peaking resources such as combustion turbines are constructed and 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 20% 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 when a generator is needed to operate more than about 20% of the time. Combined-cycle units have higher capital costs than peaking units, but lower operating costs. The heat recovery steam generator utilizes the hot exhaust gases from the combustion turbines to produce steam and generate additional megawatt hours by a steam turbine generator. Because waste exhaust gases from the combustion turbines power the steam turbine, no additional fuel is used to produce electricity from the steam turbine generator. The efficient operation of the combined-cycle facility will burn less gas than a combustion turbine to produce a megawatt hour of generation, and will reduce generation produced by less efficient combustion turbines burning both gas and oil. These fuel savings will directly benefit ratepayers. Combined-cycle facilities take several hours to start-up and bring to full power output and are best utilized to operate at higher capacity factors and respond to the more predictable system load patterns.

The Company's resource plan also includes 71 MW of additional baseload capacity as a result of planned modifications to uprate the Brunswick nuclear units. Baseload nuclear capacity is typically fully loaded due to its low operating cost, except during times of forced outage or refueling. This additional nuclear generation will offset higher cost fuel sources providing further benefits to ratepayers. The Company's resource plan consisting of additional nuclear capacity and new combustion turbine and combined-cycle capacity, in addition to existing low-cost nuclear and coal facilities, will continue to provide reliable and cost-effective generation to serve customer energy needs.

## **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 and 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 the 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 judgement.

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 also 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. However, the real measure of reliability is the loss of load expectation.

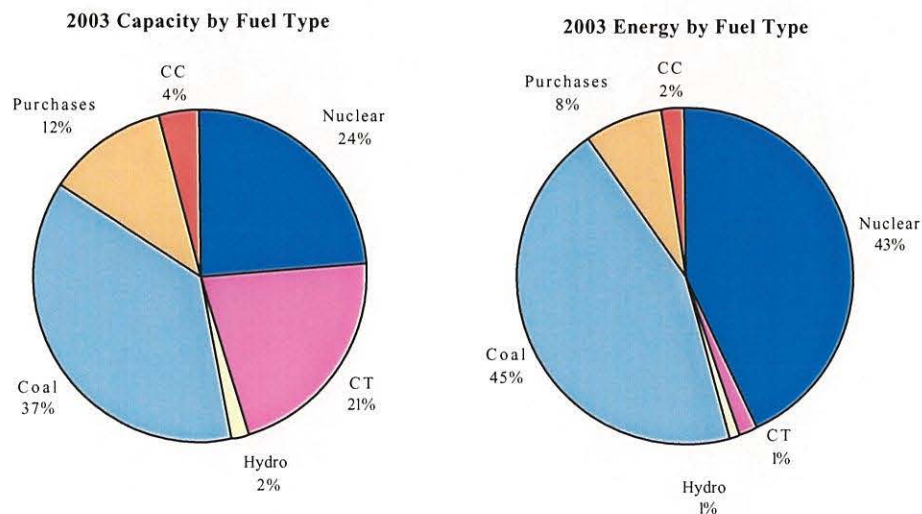
### *Adequacy of Projected Reserves*

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 13%, corresponding to reserve margins of approximately 13% to 15%. It should be noted that actual reserves as measured by megawatts of installed capacity continue to increase as load and the size of the system increase.

The reliability of PEC's generating system has significantly improved over the past several years. 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 over 3,200 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 allow greater flexibility to respond to changes in capacity needs and thus reduce exposure to load uncertainty. The Company's Resource Plan includes approximately 1,300 MW of additional new CT and CC capacity by 2010. Performance of PEC's existing nuclear and fossil fleet has greatly improved over the past few years, which has also significantly contributed to improved system reliability. The Company plans to add 71 MW of additional baseload capacity by 2005 as a result of planned modifications to uprate the Brunswick nuclear facilities. All of these factors combine 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 2003. Nuclear and coal generation currently make-up approximately 61% of total capacity resources, yet account for about 88% of total energy requirements. Gas and oil generation accounts for about 25% of total supply capacity, yet only 3% of total energy.

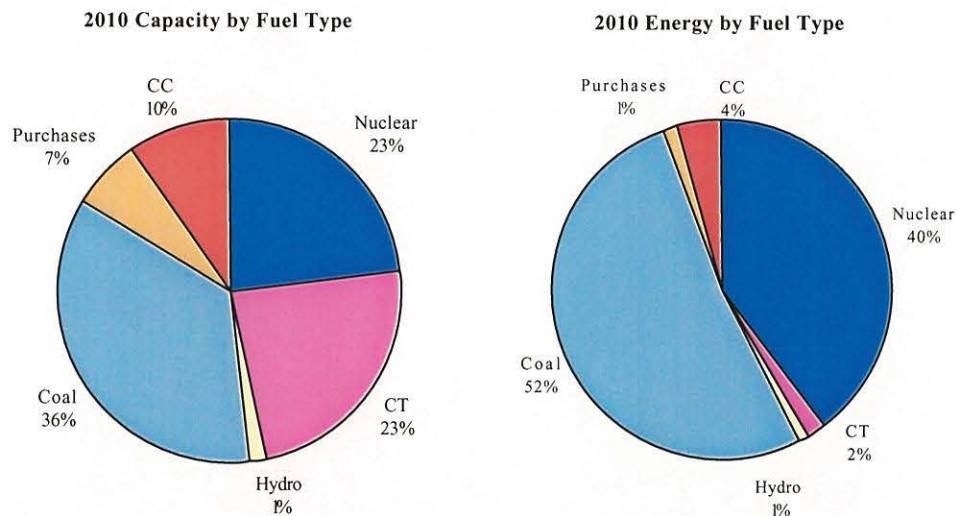
**Figure 1**





The Company's capacity and energy by fuel type projected for 2010 are shown in Figure 2 below. Gas and oil resources are projected to increase to about 33% of total supply capacity, while only serving about 6% of the total energy requirements. In 2010, nuclear and coal are projected to account for almost 60% of total capacity resources and serve over 90% of total system energy requirements. Thus, even though new capacity consists primarily of CT and CC units fueled by natural gas and oil, nuclear and coal resources will still account for the largest share of system capacity (MW) and satisfy most of the system energy (MWh) requirements.

**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 including reserves in the current plan are expected to continue to provide a reliable power supply.

### **Environmental consequences of plan**

PEC's Resource Plan relies to a large extent on the use of gas-fired combustion turbines and combined cycle units. These units are the most environmentally benign, economical, large-scale capacity additions available. The new, advanced designs of these technologies are more efficient (as measured by heat rate) than previous designs, resulting in a smaller impact on the environment. Combined-cycle generation, which utilizes the waste exhaust gases from the combustion turbines to produce additional electricity, is the cleanest and most efficient fossil fueled generation currently available. The Plan also contains 71 MW of nuclear additions through the uprating of the Brunswick units. These additions will provide a significant amount of energy with virtually no environmental impact.

**Appendix A**  
**Progress Energy Carolinas**  
**June 2003 Resource Plan Filing (Summer)**

	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
<b>GENERATION ADDITIONS</b>																
Brunswick NP Uprate		47	24													
Richmond CT					155											
Undesignated Capacity CT (1)						290				145		145		145		145
Undesignated Capacity CC (1)							432	432	432		432		432		432	
<b>INSTALLED GENERATION</b>																
Combustion Turbine	2,975	2,975	2,975	2,975	3,130	3,420	3,420	3,420	3,420	3,565	3,565	3,710	3,710	3,855	3,855	4,000
Combined Cycle	556	556	556	556	556	556	988	1,420	1,852	1,852	2,284	2,284	2,716	2,716	3,148	3,148
Fossil	5,285	5,285	5,285	5,285	5,285	5,285	5,285	5,285	5,285	5,285	5,285	5,285	5,285	5,285	5,285	5,285
Hydro	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218
Nuclear	3,363	3,410	3,434	3,434	3,434	3,434	3,434	3,434	3,434	3,434	3,434	3,434	3,434	3,434	3,434	3,434
<b>PURCHASES &amp; OTHER RESOURCES</b>																
SEPA	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
NUG Cogen	162	98	98	98	98	98	98	98	98	98	68	68	68	68	68	68
NUG Qualifying Facility	61	61	61	16	16	16	9									
AEP/Rockport 2	250	250	250	250	250	250	250									
Broad River CT	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
PECO Purchase (2)	300															
<b>TOTAL SUPPLY RESOURCES</b>	<b>14,051</b>	<b>13,734</b>	<b>13,758</b>	<b>13,713</b>	<b>13,868</b>	<b>14,158</b>	<b>14,583</b>	<b>14,756</b>	<b>15,188</b>	<b>15,333</b>	<b>15,735</b>	<b>15,880</b>	<b>16,312</b>	<b>16,457</b>	<b>16,889</b>	<b>17,034</b>
<b>PEAK DEMAND</b>																
Retail	8,390	8,586	8,790	9,007	9,200	9,441	9,674	9,892	10,100	10,314	10,524	10,702	10,914	11,119	11,328	11,543
Wholesale	3,075	2,905	2,873	2,914	2,959	3,003	3,041	3,036	3,074	3,113	3,151	3,190	3,228	3,266	3,307	3,346
<b>SYSTEM PEAK LOAD</b>	<b>11,465</b>	<b>11,491</b>	<b>11,663</b>	<b>11,921</b>	<b>12,159</b>	<b>12,444</b>	<b>12,715</b>	<b>12,928</b>	<b>13,174</b>	<b>13,427</b>	<b>13,675</b>	<b>13,892</b>	<b>14,142</b>	<b>14,385</b>	<b>14,635</b>	<b>14,889</b>
Firm Sales	750	550	550	100												
<b>FIRM OBLIGATION</b>	<b>12,215</b>	<b>12,041</b>	<b>12,213</b>	<b>12,021</b>	<b>12,159</b>	<b>12,444</b>	<b>12,715</b>	<b>12,928</b>	<b>13,174</b>	<b>13,427</b>	<b>13,675</b>	<b>13,892</b>	<b>14,142</b>	<b>14,385</b>	<b>14,635</b>	<b>14,889</b>
Large Load Curtailment	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322
Voltage Reduction	52	53	54	56	57	59	60	61	63	64	65	66	66	69	69	69
<b>TOTAL LOAD</b>	<b>12,589</b>	<b>12,416</b>	<b>12,589</b>	<b>12,399</b>	<b>12,538</b>	<b>12,825</b>	<b>13,097</b>	<b>13,311</b>	<b>13,559</b>	<b>13,813</b>	<b>14,062</b>	<b>14,280</b>	<b>14,530</b>	<b>14,776</b>	<b>15,026</b>	<b>15,280</b>
<b>RESERVES (3)</b>																
Capacity Margin (4)	13%	12%	11%	12%	12%	12%	13%	12%	13%	12%	13%	13%	13%	13%	13%	13%
Reserve Margin (5)	15%	14%	13%	14%	14%	14%	15%	14%	15%	14%	15%	14%	15%	14%	15%	14%
<b>Net Internal Energy (GWh)</b>	<b>60,916</b>	<b>60,390</b>	<b>60,624</b>	<b>62,153</b>	<b>63,709</b>	<b>65,255</b>	<b>66,811</b>	<b>68,145</b>	<b>69,661</b>	<b>71,122</b>	<b>72,609</b>	<b>74,085</b>	<b>75,615</b>	<b>77,061</b>	<b>78,768</b>	<b>80,507</b>

**Notes:**

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

**Appendix B**  
**Progress Energy Carolinas**  
*June 2003 Resource Plan Filing (Winter)*

	<u>03/04</u>	<u>04/05</u>	<u>05/06</u>	<u>06/07</u>	<u>07/08</u>	<u>08/09</u>	<u>09/10</u>	<u>10/11</u>	<u>11/12</u>	<u>12/13</u>	<u>13/14</u>	<u>14/15</u>	<u>15/16</u>	<u>16/17</u>	<u>17/18</u>
<b>GENERATION ADDITIONS</b>															
Brunswick NP Uprate		47	24												
Richmond CT					180										
Undesignated Capacity CT (1)						372				186		186		186	
Undesignated Capacity CC (1)							552	552	552		552		552		552
<b>INSTALLED GENERATION</b>															
Combustion Turbine	3,474	3,474	3,474	3,474	3,654	4,026	4,026	4,026	4,026	4,212	4,212	4,398	4,398	4,584	4,584
Combined Cycle	648	648	648	648	648	648	1,200	1,752	2,304	2,304	2,856	2,856	3,408	3,408	3,960
Fossil	5,369	5,369	5,369	5,369	5,369	5,369	5,369	5,369	5,369	5,369	5,369	5,369	5,369	5,369	5,369
Hydro	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216
Nuclear	3,383	3,430	3,454	3,454	3,454	3,454	3,454	3,454	3,454	3,454	3,454	3,454	3,454	3,454	3,454
<b>PURCHASES &amp; OTHER RESOURCES</b>															
SEPA	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
NUG Cogen	164	100	100	100	100	100	100	100	100	68	68	68	68	68	68
NUG Qualifying Facility	58	58	13	13	13	5									
AEP/Rockport 2	250	250	250	250	250	250									
Broad River CT	845	845	845	845	845	845	845	845	845	845	845	845	845	845	845
<b>TOTAL SUPPLY RESOURCES</b>	<b>14,516</b>	<b>14,499</b>	<b>14,478</b>	<b>14,478</b>	<b>14,658</b>	<b>15,022</b>	<b>15,319</b>	<b>15,871</b>	<b>16,423</b>	<b>16,577</b>	<b>17,129</b>	<b>17,315</b>	<b>17,867</b>	<b>18,053</b>	<b>18,605</b>
<b>PEAK DEMAND</b>															
Retail	7,732	7,942	8,138	8,317	8,534	8,745	8,934	9,125	9,320	9,511	9,673	9,866	10,053	10,245	10,439
Wholesale	2,610	2,555	2,591	2,626	2,666	2,698	2,701	2,732	2,765	2,796	2,830	2,862	2,894	2,927	2,961
<b>SYSTEM PEAK LOAD</b>	<b>10,342</b>	<b>10,497</b>	<b>10,729</b>	<b>10,943</b>	<b>11,200</b>	<b>11,443</b>	<b>11,635</b>	<b>11,857</b>	<b>12,085</b>	<b>12,307</b>	<b>12,503</b>	<b>12,728</b>	<b>12,947</b>	<b>13,172</b>	<b>13,400</b>
Firm Sales	550	550	100												
<b>FIRM OBLIGATION</b>	<b>10,892</b>	<b>11,047</b>	<b>10,829</b>	<b>10,943</b>	<b>11,200</b>	<b>11,443</b>	<b>11,635</b>	<b>11,857</b>	<b>12,085</b>	<b>12,307</b>	<b>12,503</b>	<b>12,728</b>	<b>12,947</b>	<b>13,172</b>	<b>13,400</b>
Large Load Curtailment	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322
Voltage Reduction	176	181	185	190	195	200	204	209	215	219	223	228	228	228	228
<b>TOTAL LOAD</b>	<b>11,390</b>	<b>11,550</b>	<b>11,336</b>	<b>11,455</b>	<b>11,717</b>	<b>11,965</b>	<b>12,161</b>	<b>12,388</b>	<b>12,622</b>	<b>12,848</b>	<b>13,048</b>	<b>13,278</b>	<b>13,497</b>	<b>13,722</b>	<b>13,950</b>
<b>RESERVES (2)</b>															
Capacity Margin (3)	3,624	3,452	3,649	3,535	3,458	3,579	3,684	4,014	4,338	4,270	4,626	4,587	4,920	4,881	5,205
Reserve Margin (4)	25%	24%	25%	24%	24%	24%	24%	25%	26%	26%	27%	26%	28%	27%	28%
	33%	31%	34%	32%	31%	31%	32%	34%	36%	35%	37%	36%	38%	37%	39%

**Notes:**

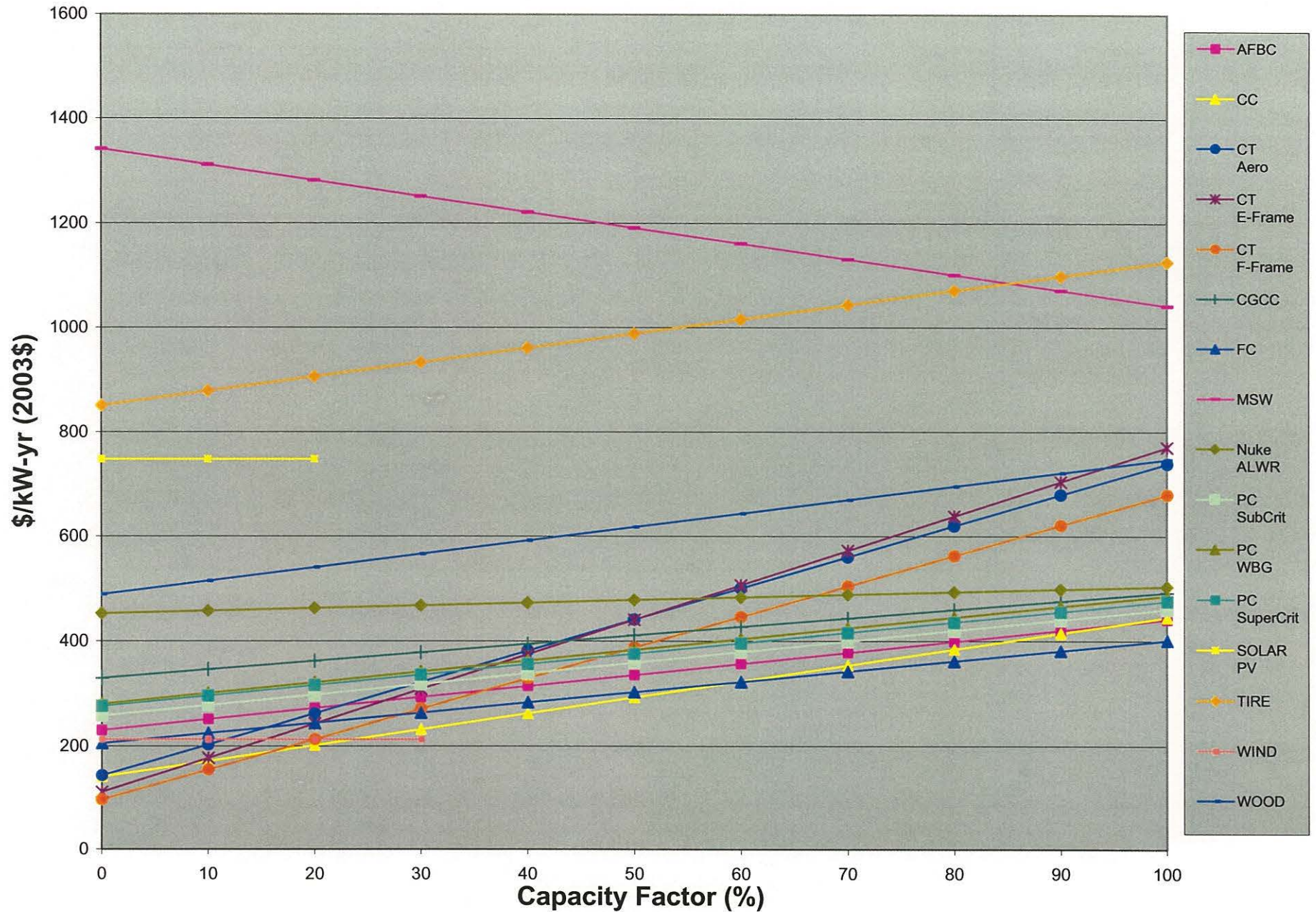
- 1) For planning purposes only; does not indicate a commitment to type, amount or ownership.
- 2) Reserves = Total Supply Resources - Firm Obligations
- 3) Capacity Margin = Reserves / Total Supply Resources \* 100.
- 4) Reserve Margin = Reserves / Firm Obligations \* 100.



# Appendix C

## Levelized Busbar Cost - All Technologies

### CAROLINAS





## Appendix D Levelized Busbar Cost - Viable Technologies *CAROLINAS*

