Progress Energy Carolinas

Integrated Resource Plan

September 13, 2010

North Carolina Utilities Commission - Docket No. E-100, Sub 128

Public Service Commission of South Carolina - Docket No. 2010 - 8 - E

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Appendices

Overview

This document is Progress Energy Carolinas, Inc.'s ("the Company" or "PEC") 2010 Biennial Integrated Resource Plan (IRP). It reflects current forecasts and management approved changes to the resource additions. In general the majority of the nearer term supply-side and demand-side additions have both management approval and North Carolina Utilities Commission (NCUC) and/or Public Service Commission of South Carolina (PSCSC) approval, as appropriate, while the longer term portion of the plan represents forecasts of undesignated resources that are still subject to both internal approval and regulatory review.

As stated in last year's plan, the current environment presents many significant challenges to deal with from a resource planning perspective, e.g. historic levels of fuel price volatility, tremendous economic uncertainty, potential federal environmental legislation dealing with regulation of carbon emissions, proposals for Federal renewable portfolio standards, the proposed new Environmental Protection Agency ("EPA") Transport Rule, the expected EPA Maximum Achievable Control Technology (MACT) mercury rule, the potential consideration of coal ash as hazardous waste by EPA, and customer behavior and usage changes. What continues to be one of the most notable examples of such uncertainty is the potential for environmental and climate change legislation. Even though at the time of this filing there appears to be a temporary loss in legislative momentum with respect to climate change it is widely assumed there will ultimately be legislation of some form resulting in a mandate to reduce the carbon output from the Company's generation fleet. This potential legislation paired with proposed and expected EPA regulations regarding greenhouse gas emissions led to the Company's decision to retire three coal units at each of its Lee and Sutton facilities and construct new state of the art efficient natural gas combined cycle units at those sites.

These same considerations have caused the Company to conclude that it should plan to retire it remaining uncontrolled coal units in North Carolina at the beginning of 2015. It should be noted that this projected date is still subject to movement pending the outcome of many of the legislative initiatives listed in the Company's Coal Retirement Plan approved in by the North Carolina Utilities Commission well as continued movement in underlying fuel prices. As a cumulative result of the new gas fired combined cycles being constructed at the Lee and Sutton sites and the associated retirement of eleven coal units at the Lee, Sutton, Weatherspoon and Cape Fear sites the Company will have replaced approximately 1500 MWs of unscrubbed coal generation with 1500 MWs of state of the art gas fired generation. Benefits of this portfolio modernization include both environmental benefits, in the form of significant reductions in the output of SO_2, NOx, mercury and CO_2, as well as fuel diversification benefits resulting from the addition of the new gas fired generation. PEC continues to evaluate the best course of action with regard to its South Carolina Robinson coal plant.

Beyond gas fired generation additions, ongoing efforts represented in the 2010 IRP include significant commitments to alternative sources of energy and capacity. Renewable energy resources, demand side management ("DSM") and energy efficiency ("EE") measures provide substantial energy and demand contributions to the resource plan. Excluding the gas generation replacing the retiring coal units renewables, DSM and EE account for approximately 25% of the planned resource additions over the 2011 through 2025 study period.

With respect to baseload carbon free generation, new nuclear generation continues to be an important component of PEC's resource plan. The 2010 IRP contemplates the potential for regional partnerships rather than full ownership of a nuclear facility. For long range planning purposes it was assumed that 25 percent shares of undesignated nuclear would be available in the market place. This generation could come from partnerships in self-built nuclear facilities or from a partnership in another utility's regional nuclear project. Under this regional assumption nuclear projects would be jointly undertaken by utilities in the region with participating utilities and load serving organizations taking ownership stakes in each others' projects. At this point in time no specific plans for such partnerships have been entered into and the 25 percent nuclear blocks simply represent undesignated baseload generation for planning purposes. Analysis conducted for the 2010 IRP selected approximately 550 (e.g. 25% ownership in two units) of undesignated nuclear resources over the 2011 through 2025 study period with 275 MW coming online in 2020 and another 275 MW coming online in 2021. In practice, the exact timing and amount ownership of an eventual regional partnership would depend on the specific project resulting in potential adjustments of both timing and volume. Under the current assumptions for future carbon legislation carbon dioxide limits would continue to ramp down significantly beyond the study period. Such an outcome would likely require additional nuclear generation after 2025 to meet declining CO_2 targets.

The Company continually evaluates numerous possible changes to its resource plan. These changes include, but are not limited to further investments in energy efficiency, construction or purchase of additional renewable resources, and investment in regional nuclear generation that could potentially change the timing and ownership stake of Company constructed nuclear units. If one or more of these changes are made the current proposed resource additions will change as well. Obviously, the further out in time a resource addition is scheduled to occur, the greater its uncertainty. As economic, legislative and market conditions continue to unfold the Company will adjust its IRP accordingly.

In summary, this IRP includes a balanced mix of additional DSM and EE, renewable energy, purchased power, combustion-turbine generation, combined cycle generation, and nuclear generation.. This approach helps ensure electricity remains available, reliable and affordable and is produced in an environmentally sound manner. This diversified approach also helps to insulate customers from price volatility with any one particular fuel source.

Included in this document is a detailed discussion of the IRP process including the load and energy forecast, screening of supply-side technologies, renewables, DSM and EE plans as well as the methodology and development of the IRP.

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 loads for the residential, commercial, and industrial classes are then adjusted for projected load management impacts. The individual loads for the retail classes, wholesale customers, North Carolina Eastern Municipal Power Agency (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 Tables 1 and 2 found later in this section. 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 DSM, which is almost equal to the customer growth rate of 1.7%. The retail demand growth rate drops to 1.1% after adjusting for DSM.

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 such as we have seen with the current severe economic downturn. The exact nature, timing and magnitude of such short-term variations are unknown. 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.

Customer Data

The tables below contain ten years of historical and 15 years of forecasted customer data.

Annual Average Customers

	Residential	Commercial	Industrial	Total
2000	1,040,549	183,486	4,739	1,228,773
2001	1,066,612	188,658	4,655	1,259,924
2002	1,091,229	193,301	4,511	1,289,040
2003	1,112,149	197,271	4,403	1,313,822
2004	1,133,669	202,981	4,310	1,340,960
2005	1,158,896	208,578	4,218	1,371,691
2006	1,184,071	213,354	4,138	1,401,563
2007	1,208,293	216,989	4,080	1,429,362
2008	1,229,119	218,279	4,241	1,451,639
2009	1,240,626	217,447	4,625*	1,462,698
2010	1,251,126	219,447	4,625	1,475,198
2011	1,265,626	220,979	4,625	1,491,231
2012	1,284,376	224,272	4,625	1,513,273
2013	1,303,876	229,759	4,625	1,538,260
2014	1,325,876	236,060	4,625	1,566,561
2015	1,349,876	241,842	4,625	1,596,343
2016	1,377,806	245,512	4,625	1,627,942
2017	1,405,694	248,474	4,625	1,658,793
2018	1,433,370	251,312	4,625	1,689,307
2019	1,460,947	254,275	4,625	1,719,847
2020	1,488,354	257,617	4,625	1,750,596
2021	1,515,676	260,892	4,625	1,781,193
2022	1,542,862	264,335	4,625	1,811,821
2023	1,569,973	268,115	4,625	1,842,713
2024	1,596,971	272,145	4,625	1,873,742

* PEC undertook a review of its Standard Industrial Classification and revenue classifications for all accounts in December 2008 to insure the assignments were appropriate. A significant number of small usage commercial accounts were re-classified as industrial accounts during this effort; therefore, the number of industrial accounts increased significantly, while the overall industrial demand and energy sales were only slightly impacted.

Retail Sales MWH – Reduced by EE and DR

	Residential	Commercial	Industrial
2000	14,090,936	11,432,314	14,445,641
2001	14,372,145	11,972,153	13,332,380
2002	15,238,554	12,467,562	13,088,615
2003	15,282,872	12,556,905	12,748,754
2004	16,003,184	13,018,688	13,036,419
2005	16,663,782	13,314,324	12,741,342
2006	16,258,675	13,358,042	12,415,862
2007	17,199,511	14,033,008	11,882,660
2008	16,999,685	13,939,902	11,215,507
2009	17,117,480	13,639,299	10,374,623
2010	17,374,226	13,475,456	10,300,175
2011	17,576,157	13,569,589	10,392,877
2012	17,802,983	13,771,742	10,652,698
2013	18,051,639	14,108,713	10,798,141
2014	18,271,221	14,495,635	11,040,354
2015	18,575,791	14,850,684	11,082,484
2016	18,879,974	15,076,025	11,314,217
2017	19,218,468	15,257,914	11,335,852
2018	19,570,505	15,432,178	11,357,342
2019	19,931,847	15,614,169	11,378,701
2020	20,315,900	15,819,387	11,400,135
2021	20,718,860	16,020,483	11,421,542
2022	21,053,797	16,231,880	11,443,081
2023	21,381,097	16,464,009	11,464,621
2024	21,718,515	16,711,494	11,486,072

Screening of Generation Alternatives

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 was 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.

Second, technical feasibility for commercially available technologies was considered to determine if the technology meets 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's 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 2010 Annual Energy Outlook report and on internal PEC resources. Busbar curves are useful for comparing costs of resource types at various capacity factors but cannot be utilized for determining a long term resource plan because future units must be optimized with an existing system containing various resource types.

The generic 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:

<u>Conventional Technologies</u>
Combined Cycle (CC)
Combustion Turbine (CT)

Hydro
Onshore Wind
Pulverized Coal (PC)

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

Emerging Technologies
Fuel Cell (FC)
Offshore Wind

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 combined cycle (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 the Carolinas. 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 low 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 the Carolinas are concentrated in two regions. The first is along the Atlantic coast and barrier islands. The second area is the higher ridge crests in the western portions of the states. Because wind is not dispatchable , 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 the Carolinas in the future. The Carolinas benefit 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 the PEC system. PEC is partnering with the University of NC at Chapel Hill on a new study to fully map and model NC's viable offshore wind resources. The three-year research study will measure wind speeds in areas for which there is currently no data, create a refined wind resource map, and develop an atmospheric modeling system to enable improved wind forecasting capabilities. This study is expected to be the most comprehensive analysis to date on NC's capability to support offshore wind energy generation and will help utility, state and local decision makers determine how best to pursue offshore wind power while still providing cost-effective and reliable electricity to customers.

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. PV projects 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. With the passage of North Carolina Senate Bill 3 and the premiums provided by the NC GreenPower program, solar photovoltaic installations are increasing in number and scale. PEC has aggressively pursued solar contracts to meet early requirements of North Carolina Senate Bill 3 and to take advantage of recent price declines due to current oversupply in the market. Through these solar contracts, PEC is well positioned to meet the North Carolina Senate Bill 3 solar requirements. In South Carolina, the premiums provided by Palmetto Clean Energy (PaCE) also encourage the installation of small customer-owned solar photovoltaic systems.

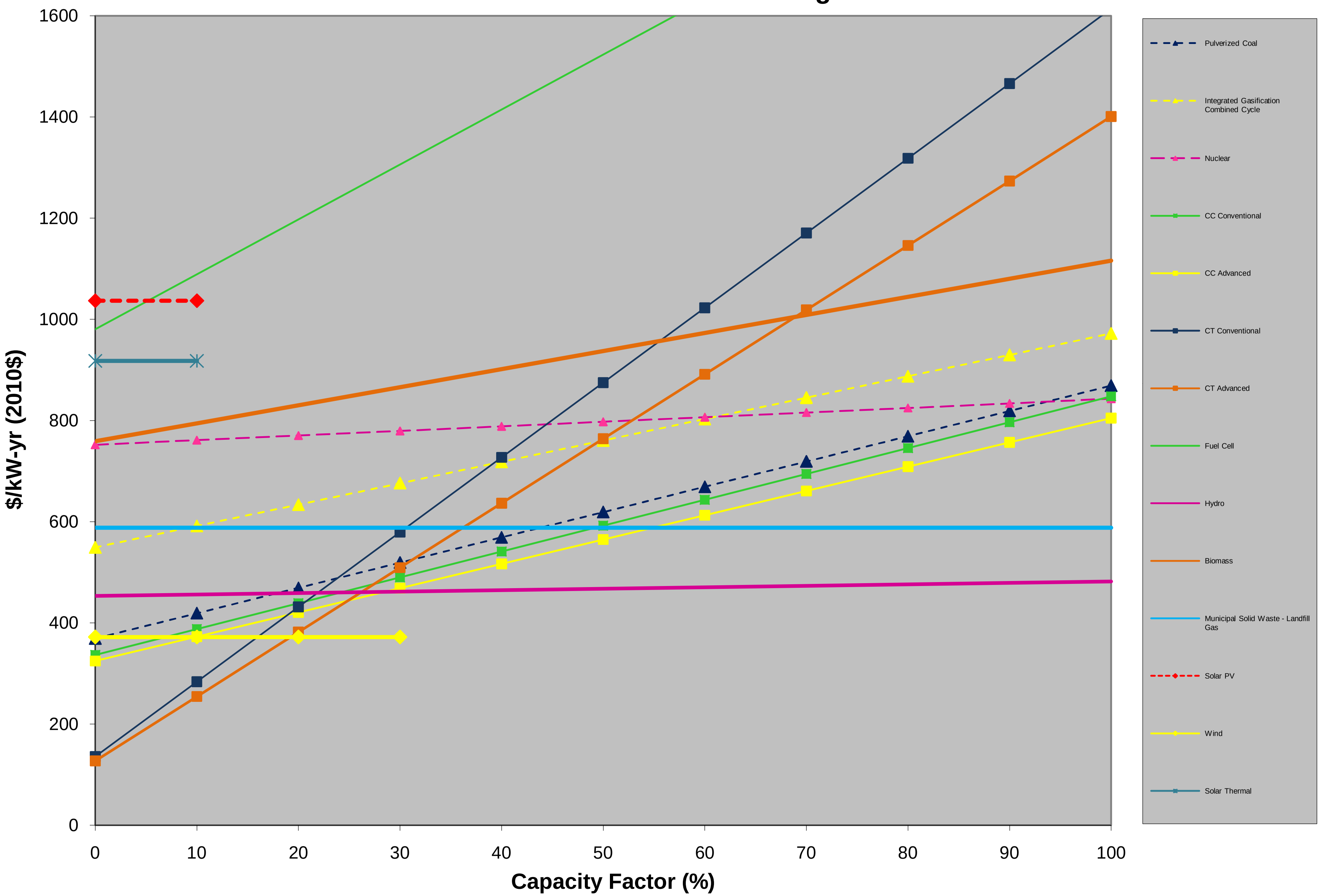
The capacity value of wind and solar resources depends heavily on the correlation between the system load profile, wind speed, and solar insolation. A recent Utility Wind Integration Group report noted that the capacity value of wind is typically less than 40% of nameplate capacity. Although wind and solar projects are currently not viable options for meeting *reserve* requirements due to their relatively high cost and uncertain operating characteristics, they will play an increasing role in PEC’s *energy* portfolio through PEC’s renewable compliance program, which is detailed below and in Appendix D. Geothermal has not been evaluated as it is not reasonably available in the Carolinas. 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”, also 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.

PEC’s IRP includes purchased power from renewables such as solar, biomass, and municipal solid waste-landfill gas (MSW-LFG) facilities. While these purchase contracts are targeted at adding renewable energy to PEC’s portfolio, a limited number of these renewable resources also provide capacity to the resource plan. The IRP Tables 1 and 2 detail the current and undesignated renewable capacity. PEC is actively engaged in a variety of projects to develop new alternative sources of energy, including solar, storage, biomass, and landfill gas technologies. Renewables will consistently be evaluated for their ability to meet renewable energy requirements and resource planning needs on a case-by-case basis and included as a resource as appropriate. Further detail regarding renewables is given in the Renewable Energy Requirements section below and in Appendix D.

While this IRP and the REPS Compliance Plan incorporate resources for meeting the requirements of North Carolina Senate Bill 3, PEC has not incorporated additional resources that may be needed in the future for meeting the requirements of potential federal legislation. The type and timing of additional renewable resources will depend heavily on federal legislation being passed and implementing rules being established.

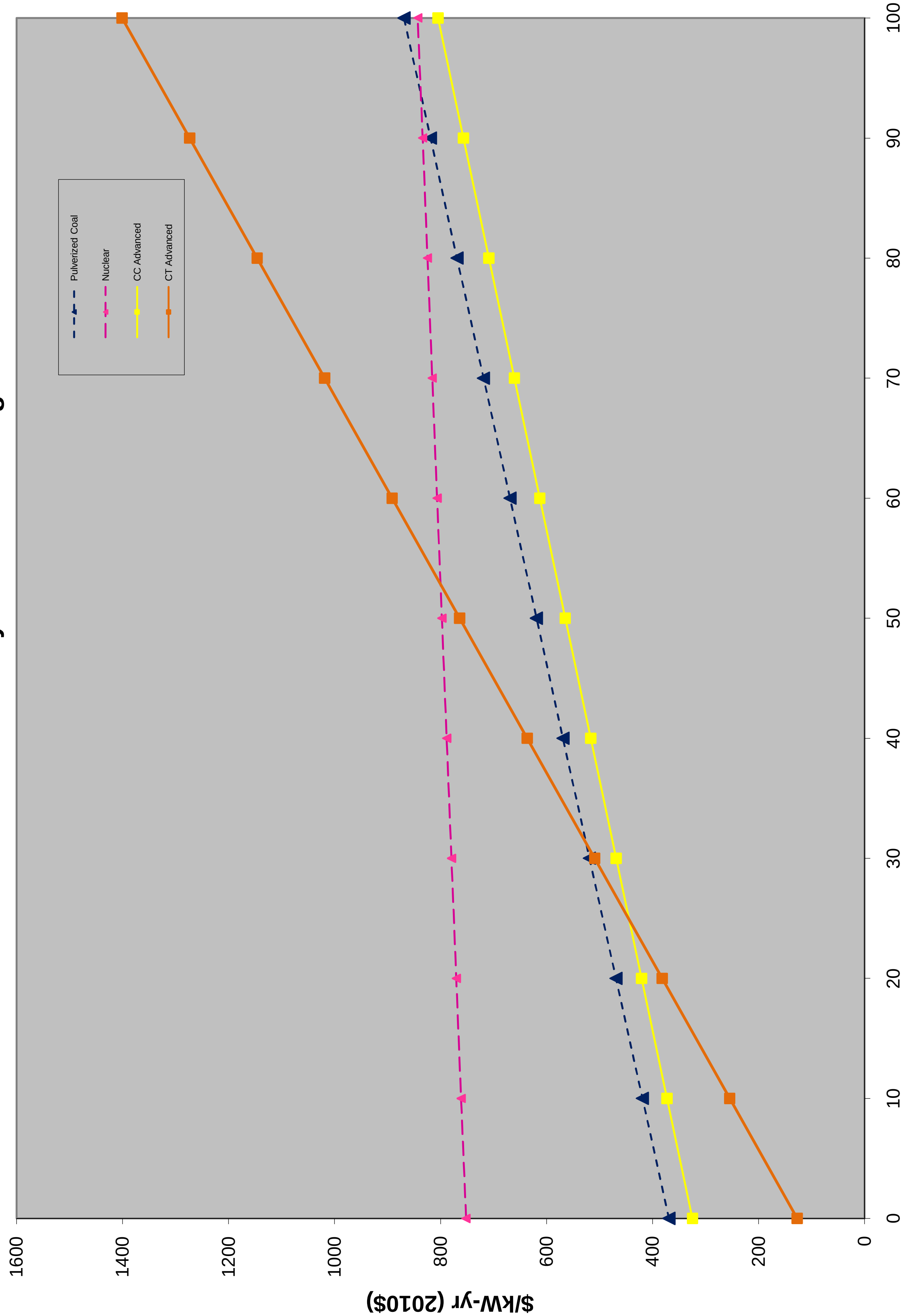
Figures 1-1 and 1-3 provide an economic comparison of all technologies examined based on generic capital, operating, and fuel cost projections without and with carbon costs. Figures 1-2 and 1-4 show the most economical and viable utility scale technologies without and with carbon costs. For the most economic utility scale supply-side technologies in Figure 1-4, more detailed economic and site specific information was developed for inclusion in the resource plan evaluation process. These technologies include simple-cycle combustion turbine, combined cycle, pulverized coal, and nuclear.

Figure 1-1
Levelized Busbar Cost for All Technologies without Carbon



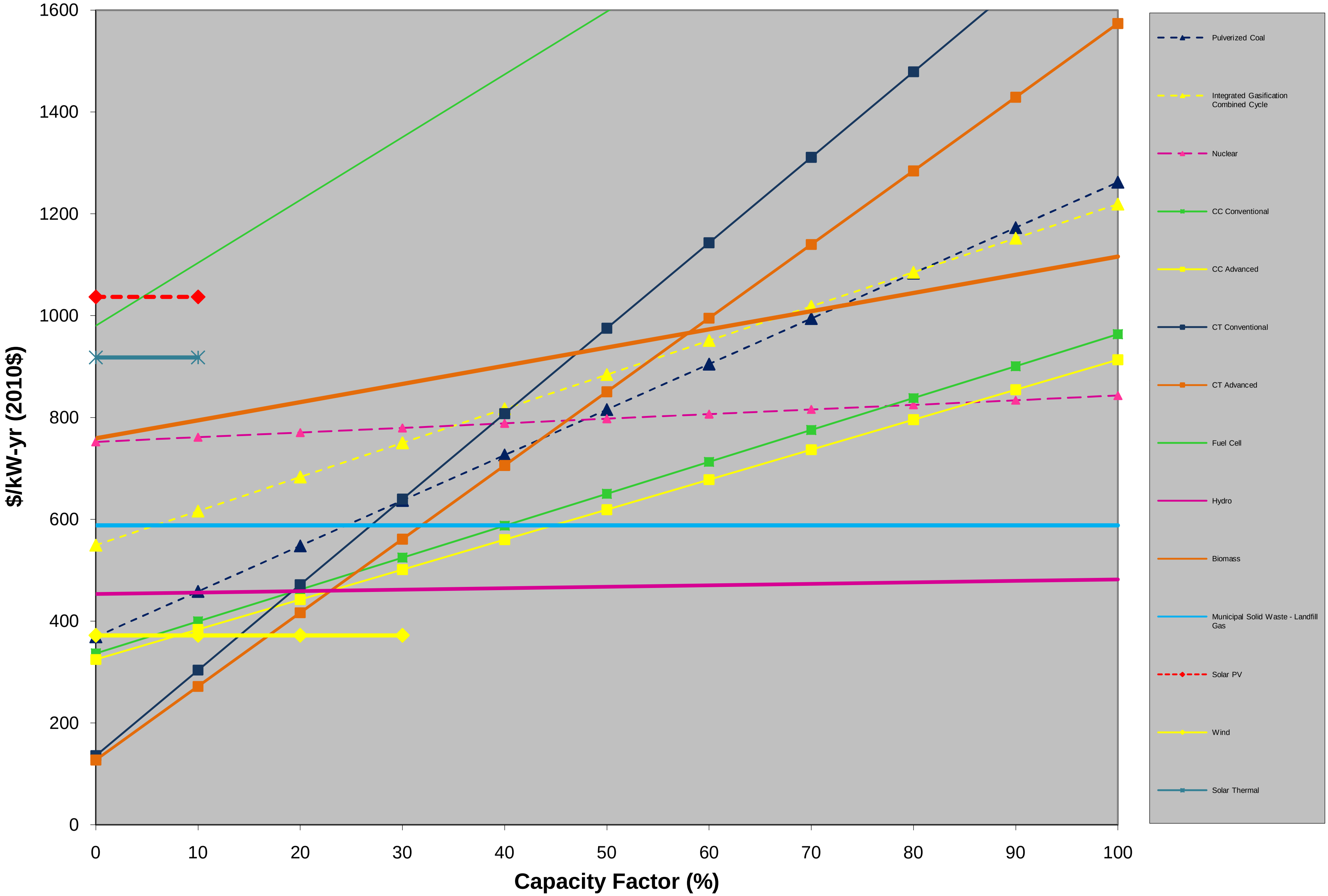
NOTE: The graph above is based on generic capital, O&M, and delivered fuel costs data but without transmission or other site specific criteria.

Figure 1-2
Levelized Busbar Cost for Utility Scale Technologies without Carbon



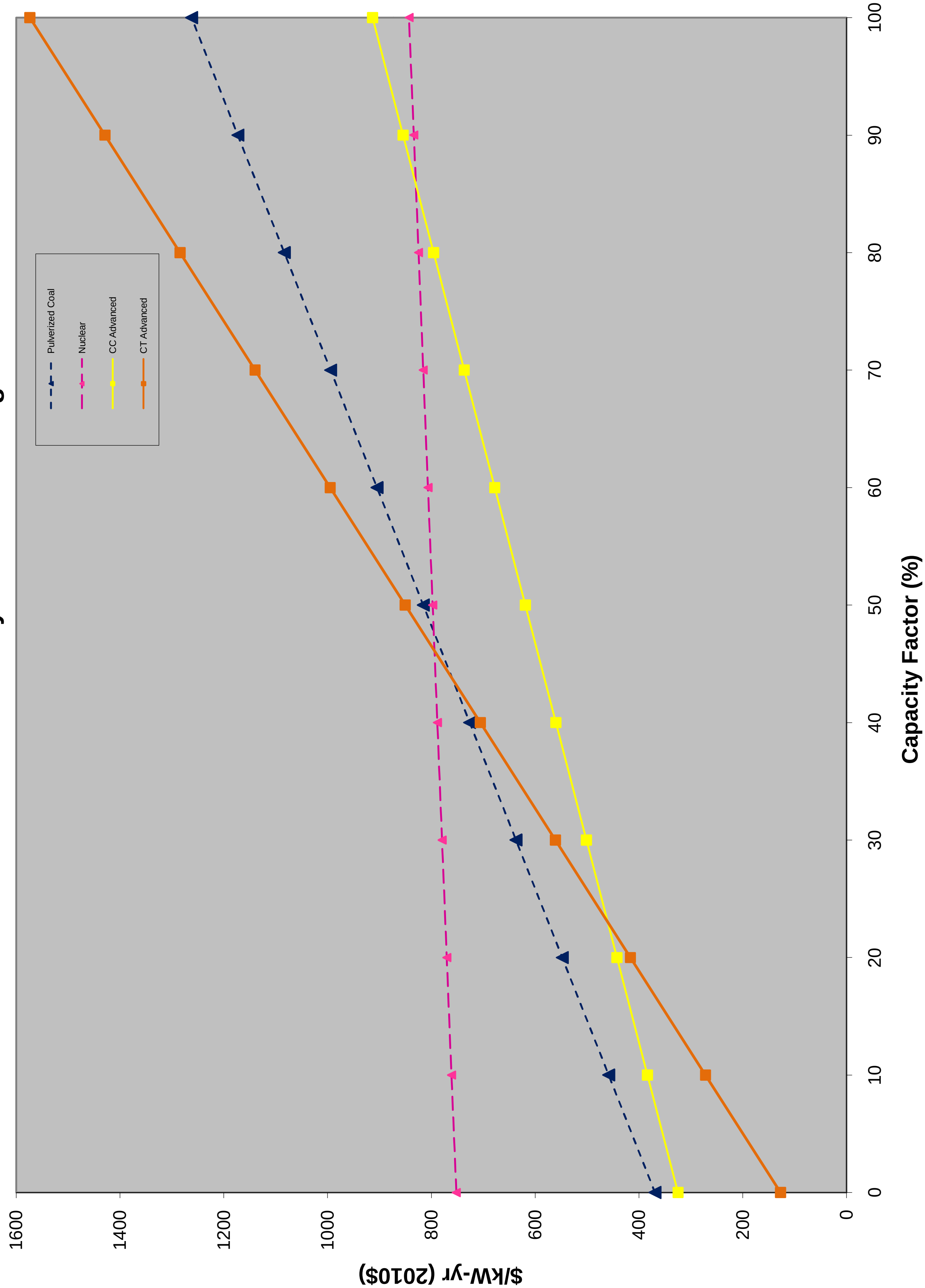
NOTE: The graph above is based on generic capital, O&M, and delivered fuel costs data but without transmission or other site specific criteria.

Figure 1-3
Levelized Busbar Cost for All Technologies with Carbon



NOTE: The graph above is based on generic capital, O&M, and delivered fuel costs data but without transmission or other site specific criteria.

Figure 1-4
Levelized Busbar Cost for Utility Scale Technologies with Carbon



NOTE: The graph above is based on generic capital, O&M, and delivered fuel costs data but without transmission or other site specific criteria.

Renewable Energy Requirements

In 2007, NC Senate Bill 3 (SB 3) was signed into 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, in general, must purchase or generate 3 percent of their energy (based on the prior year's total retail sales) from renewable resources by 2012. The public utilities – PEC, Duke Energy Carolinas, and Dominion North Carolina Power – must increase their use of renewable energy to 12.5 percent in 2021 according to the schedule below.

REPS Requirement

Calendar Year	% Requirement
2012	3% of 2011 NC retail sales
2015	6% of 2014 NC retail sales
2018	10% of 2017 NC retail sales
2021 and thereafter	12.5% of 2020 NC retail sales

The utilities are allowed to meet a portion of the renewable requirement through energy efficiency. Through 2020, up to 25% of the REPS requirement may be met with energy efficiency; after 2020, up to 40% of the REPS requirement may be met with energy efficiency. The standard may also be met through the purchase of renewable energy certificates (RECs).

A portion of the renewable standard must be met with solar power and with power generated by swine and poultry waste. The swine and poultry waste requirements are requirements for the state of NC, in aggregate.

Requirement for Solar Energy Resources

Calendar Year	% of NC Retail Sales
2010	0.02%
2012	0.07%
2015	0.14%
2018	0.20%

Requirement for Swine Waste Resources

Calendar Year	% of NC Retail Sales
2012	0.07%
2015	0.14%
2018	0.20%

Requirement for Poultry Waste Resources

Calendar Year	Energy Required
2012	170,000 MWh
2013	700,000 MWh
2014 and thereafter	900,000 MWh

Exactly how all the requirements of the REPS will be achieved, and through which technologies, is not fully known at this time. In order to prepare for compliance with the new REPS requirements, PEC has issued multiple RFP's for various renewable power supply technologies since November 2, 2007. In addition, PEC currently maintains an open RFP for non-solar projects that are 10 MW or less. Through the RFP process, PEC has executed numerous contracts to ensure compliance with the requirements of SB 3. To select the projects that provide the most cost-effective means for meeting SB 3 requirements, renewable bids received are evaluated against each other, the market, how each project fits within the near-term and long-term REPS compliance plan, and how each project impacts the annual cost cap limitations. The REPS compliance plan is detailed in Appendix D and the IRP Tables 1 and 2 reflect both committed renewables and undesignated renewables given the exact makeup of the compliance is unknown at this time.

Demand Side Management and Energy Efficiency Program Plan

PEC is committed to making sure electricity remains available, reliable and affordable and that it is produced in an environmentally sound manner and, therefore, advocates a balanced solution to meeting future energy needs in the Carolinas. That balance includes a strong commitment to DSM and EE as well as investments in renewable and emerging energy technologies and state-of-the art power plants and delivery systems.

Over the past several years PEC has been actively developing and implementing new DSM and EE programs throughout its North Carolina and South Carolina service areas to help customers reduce their electricity demands. PEC's DSM and EE plan was designed to be flexible, with programs being 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. Initiatives are aimed at helping all customer classes and market segments use energy more wisely.

PEC will also be evaluating the potential for new technologies and new delivery options on an ongoing basis to ensure delivery of comprehensive programs in the most cost effective way. PEC will continue to seek Commission approval to implement DSM and EE programs that are cost effective and consistent with PEC's forecasted resource needs over the planning horizon. In order to determine cost effectiveness, PEC primarily relies upon the Total Resource Cost Test to evaluate energy efficiency programs, and uses the Rate Impact Measure test to evaluate DSM programs. PEC currently has approval from the North Carolina Utilities Commission and Public Service Commission South Carolina to offer nine DSM and EE programs and one Pilot program (for Solar Water Heating).

PEC also offers several educational initiatives aimed at increasing consumer awareness around energy efficiency. These include a strategic consumer education campaign, "Save The Watts," which includes a dynamic website as well as radio and newspaper advertisements aimed at providing a wide array of efficiency tips to match varying customer lifestyles. Additionally, the website provides direct links to PEC's energy efficiency programs at www.savethewatts.com. PEC also launched a new self audit tool in 2009, the Customized Home Energy Report, which allows residential customers to conduct a self-audit by simply answering a series of questions about their home. Once the assessment is completed, the customer receives a custom four-page summary that provides a billing history, tips towards saving energy that are specific to the customer, and a list of DSM/EE programs that the customer may be able to use to help them save energy.

All of these investments are essential to 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 and sustained customer participation is critical to the success of PEC's DSM/EE programs. To support this effort, PEC has focused on planning and implementing programs that work well with customer lifestyles, expectations and business needs.

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. For further detail on PEC's DSM and EE programs see Appendix E.

Reserve Criteria

The reliability of energy service is a primary input in the development of the resource plan. Utilities require a margin of generating capacity reserve to be 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.

Methodology

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.

PEC's reliability assessments have demonstrated that a minimum capacity margin target of approximately 11-13% satisfies the one day in ten years LOLE criterion and provides an adequate level of reliability to its customers. PEC considers an 11% capacity margin to be a minimum and may be acceptable in the near term when there is greater certainty in forecasts. PEC uses a minimum capacity margin target of 12-13% in the longer term to provide an extra margin of reserves to compensate for possible load forecasting uncertainty, uncertainty in DSM/EE forecasts, or delays in bringing new capacity additions on-line, and uses this criterion to determine the need for generation additions. It should be noted that resource additions cannot be brought on-line in the exact amount needed to match load growth. Thus, reserve levels are inherently lumpy as a result of adding new blocks of capacity to the system.

Adequacy of Projected Reserves

Reserves projected in PEC's IRP meet the minimum capacity margin target and thus satisfy the one day in ten years LOLE criterion. The Company's resource plan reflects capacity margins in the range of approximately 12% to 20%, corresponding to reserve margins of approximately 14% to 25%. Thus, reserves projected in PEC's IRP are appropriate for providing an adequate and reliable power supply. 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.

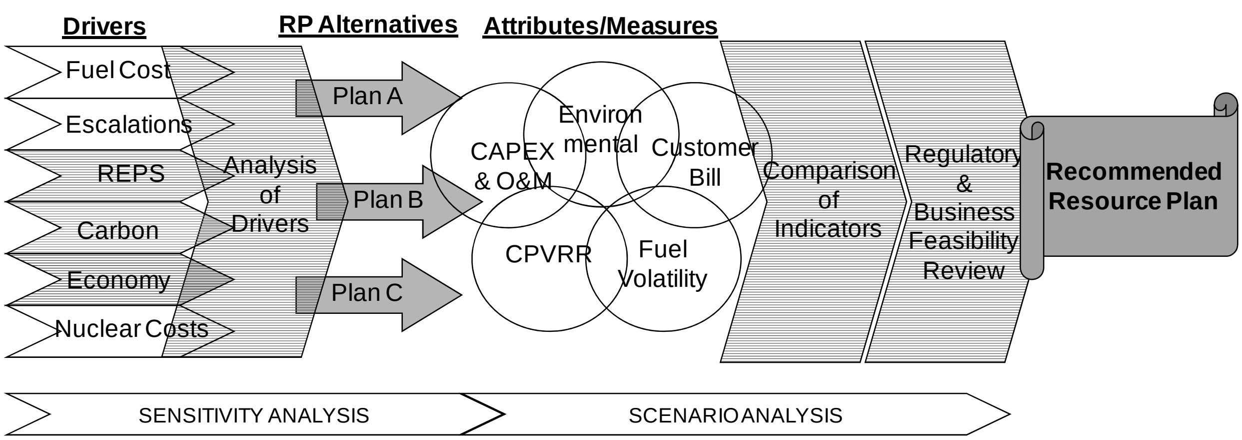
The addition of smaller and highly reliable CT capacity increments to the Company's resource mix improve the reliability and flexibility of the PEC fleet in responding to increased load requirements. Since 1996, PEC has added approximately 3,700 MW of new combustion turbine and combined cycle capacity to system resources, either through new construction or long term 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 635 MW of additional CC capacity in 2011 at the Richmond County site. The Company announced plans to retire the coal-fired Units 1, 2, and 3 at its Lee Plant at the end of 2012. Those units will be replaced with a 3 x 1 natural gas-fired combined cycle unit at its Wayne County facility. The units to be retired represent 397 MW of capacity and the CC will be approximately 920 MW of capacity for a net increase of approximately 520 MW. This increase will be off-set by subsequent retirements of coal-fired units at PEC's Weatherspoon and Cape Fear Plants. The Company has also announced plans to retire coal-fired Units 1, 2, and 3 at its Sutton Plant at the end of 2013. This capacity will be replaced with a 625 MW combined cycle unit. Each of the new combined cycle facilities will be equipped with bypass dampers to ensure that the plants can be operated in simple cycle or combined cycle mode to enhance reliability and operational flexibility. All of these factors help to ensure the Company's ability to provide an adequate and reliable power supply.

Resource Plan Evaluation and Development

The objective of the resource planning process is to create a robust plan. While the type of analysis illustrated in Figures 1-1 through 1-4 above provide a valuable tool for a comparative screening of technologies, i.e. a comparison of technologies of like operating characteristics, peaking vs. peaking, baseload vs. baseload, etc., it does not address the specific needs of any particular resource plan. Additionally, site-specific requirements, such as transmission, pipeline costs, and fuel availability, must be considered when conducting resource optimization analyses. A robust plan is one that provides the greatest potential benefits given the uncertainties, constraints, and volatility of key drivers that are currently affecting the plan or have a significant probability of influencing the plan in the future. In order to complete this objective, the resource planning process is comprised of a two-phase process that takes into consideration numerous factors, both current and future, related to issues such as customer costs, fuel costs, renewables, environmental requirements and unknowns, demand-side management, energy efficiency, potential technology shifts, load and energy changes, and capital costs of new central station facilities. 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.

The two-phase resource planning process is comprised of a sensitivity analysis phase and a scenario analysis phase. Below is a brief overview of the resource planning process. Appendix A discusses the process to develop the robust resource plan in detail. The resource planning process can be seen in a simplistic format in Figure 2 below.

Figure 2 Integrated Resource Planning Process Flowchart



The sensitivity analysis is based on the expertise of numerous individuals throughout PEC's organization that provide input and knowledge relative to the key drivers that are, or may be, influencing the plan. These key drivers are then utilized to stress the models to determine which of the drivers significantly change the plan.

The scenario analysis contemplates and develops future states that bound the potential outcomes of the key drivers such as load, energy, escalations, nuclear capital costs, fuel costs, and carbon costs. The alternative plans that are developed based on the sensitivity analysis are then tested in each scenario. By testing each of these alternative plans in each of the scenarios, how each of the plans fare in each scenario and in aggregate to all scenarios can be determined. The ranking of each plan in each scenario is performed using key attributes in the categories of customer cost and environmental. In short, the scenario analysis develops bounding future potential states and subjects the alternative plans to the future states such that they can be ranked relative to each other based on key attributes in the customer cost and environmental categories.

As mentioned previously, a robust plan minimizes the adverse impacts of unforeseen changes, and produces acceptable results for a wide range of events. This is why different scenarios of load, energy, fuel, construction cost escalation, environmental, and other factors were taken into consideration when testing the plans to determine robustness.

The results of the resource planning process detailed in Appendix A, demonstrate that a plan that includes DSM and EE, renewables, purchased power, combustion turbine generation, combined cycle generation, and nuclear generation, accomplishes the objective of a robust resource plan. Thus, it is the basis of the preferred resource plan shown in Tables 1 and 2 below. Meeting the anticipated growth and resulting demand for electricity within PEC's service territory requires 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.

Assessment of Purchased Power Alternatives

Because the goal of the IRP process is to meet customer needs for a reliable supply of electricity at the lowest reasonable cost, the plan that has been identified as the preferred plan then serves as a benchmark against which purchased power opportunities are measured. Before proceeding with a self-build option, it must be determined whether there are any purchased power alternatives available that would maintain the system reliability level in a more cost-effective manner.

PEC constantly studies, tracks and evaluates the costs of new generation and the market price for purchased power. For self build options PEC utilizes a competitive bidding process for equipment, engineering and construction services when seeking to build new generation. PEC requests proposals from a range of qualified and credit worthy contractors with proven experience in utility scale generation projects. For power purchases, depending on the circumstances PEC will then utilize a formal or informal RFP to evaluate the feasibility of purchasing equivalent generation resources from the wholesale market. PEC evaluates the cost, reliability, flexibility, environmental impacts, risk factors, and various operational considerations in determining the optimal resource addition for a given situation. As a general policy, PEC solicits the wholesale market before making resource decisions. PEC incorporates by reference its more detailed discussion of its purchased power methodology filed in Docket No. E-100, Sub 118 on August 31, 2009.

The 2010 resource plan includes the following planned capacity additions:

Name	Capacity (MW)	Type	In-Service date
Richmond County CC	635	CC	06/11
Wayne County CC	920	CC	01/13
Sutton CC	625	CC	12/13
Undesignated	126	CT	12/15
Undesignated	528	CT	06/18
Undesignated	176	CT	06/19
Undesignated	275	Baseload	06/20
Undesignated	275	Baseload	06/21
Undesignated	528	CT	06/21
Undesignated	606	CC	06/22
Undesignated	176	CT	06/24
Undesignated	176	CT	06/25

The consideration of purchase power options for the Richmond County CC was described in PEC's application for a CPCN. The Commission has already reviewed PEC's justification and granted a CPCN for the addition and construction is underway. On August 18, 2009, PEC filed an application for a CPCN for the Wayne County CC pursuant to N.C. Gen. Stat. § 62-110.1(h). The statute allows a utility to construct and operate a natural gas fueled generating facility upon permanent closure of existing uncontrolled coal fired generation in order to meet the requirements of the Clean Smokestacks Act. The NCUC granted PEC a certificate for construction of the Wayne County CC on October 22, 2009. On December 18, 2009, PEC filed an application for a CPCN for construction of a combined cycle unit at the Company's Sutton Plant site. PEC demonstrated that it is more cost effective to retire its existing Sutton coal-fired units and replace them with the combined cycle unit than to install the environmental controls necessary to allow their continued operation. The proposed combined cycle facility is essentially the same capacity size as the coal units, thus the project will not result in any net increase in generating capacity. Given the uniqueness of the circumstances and the criticality of having generation at the Sutton Plant site, the NCUC granted PEC a certificate for construction of the Sutton CC on June 9, 2010.

With regards to the 126 MW of undesignated peaking capacity planned for 2015, this capacity is needed in PEC's Western Region. As explained in PEC's comments in Docket No. E-100, Sub 122, PEC has conducted both a formal RFP and a follow-up informal RFP seeking purchase power options in its Western Region. Regarding the other undesignated capacity additions mentioned above, PEC will adhere to its purchase power assessment procedure outlined above. Because these potential additions are so far into the future, and therefore somewhat uncertain, PEC's assessment of purchase power options has not yet been conducted. However, this assessment will be conducted, and the results included in PEC's application for a CPCN, should the decision be made to proceed with these additions.

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Table 1   2010 Annual IRP (Summer)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
GENERATION CHANGES															
Sited Additions	635		920	625											
Undesignated Additions (1)						126		528	176	276	804	606		176	176
Planned Project Uprates	8	55		10	24										
Pollution Control Derates															
Retirements			(397)	(604)	(487)										
INSTALLED GENERATION															
Nuclear	3,490	3,545	3,545	3,555	3,579	3,579	3,579	3,579	3,579	3,579	3,579	3,579	3,579	3,579	3,579
Fossil	5,190	5,190	4,793	4,189	3,702	3,702	3,702	3,702	3,702	3,702	3,702	3,702	3,702	3,702	3,702
Combined Cycle	1,171	1,171	2,091	2,716	2,716	2,716	2,716	2,716	2,716	2,716	2,716	2,716	2,716	2,716	2,716
Combustion Turbine	3,152	3,152	3,152	3,152	3,152	3,152	3,152	3,152	3,152	3,152	3,152	3,152	3,152	3,152	3,152
Hydro	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225
Undesignated (1)						126	126	654	830	1,106	1,910	2,516	2,516	2,692	2,868
TOTAL INSTALLED *	**13,228**	**13,283**	**13,806**	**13,837**	**13,374**	**13,500**	**13,500**	**14,028**	**14,204**	**14,480**	**15,284**	**15,890**	**15,890**	**16,066**	**16,242**
PURCHASES & OTHER RESOURCES															
SEPA	95	95	109	109	109	109	109	109	109	109	109	109	109	109	109
NUG QF - Cogen **	161	161	161	161	161	161	161	161	161	161	161	161	161	161	161
NUG QF - Renewable ***	83	119	120	130	108	112	112	67	67	64	51	52	52	52	52
Butler Warner		220	220	220	220	220	220								
Anson CT Tolling Purchase			336	336	336	336	336	336	336	336	336	336	336	336	336
Broad River CT	816	816	816	816	816	816	816	816	816	816	336				
Southern CC Purchase - ST	150														
Southern CC Purchase - LT	145	145	145	145	145	145	145	145	145						
TOTAL SUPPLY RESOURCES	**14,677**	**14,839**	**15,712**	**15,753**	**15,269**	**15,398**	**15,398**	**15,662**	**15,838**	**15,966**	**16,277**	**16,547**	**16,547**	**16,723**	**16,900**
PEAK DEMAND															
Retail	9,189	9,389	9,621	9,875	10,099	10,295	10,453	10,615	10,784	10,958	11,132	11,306	11,483	11,664	11,850
Wholesale	3,050	3,219	4,012	4,075	4,100	4,140	4,187	4,215	4,277	4,314	4,376	4,423	4,489	4,541	4,608
Firm (Duke Area)	150	100	150	150	150	150	150	150	150	150	150	150	150	150	0
OBLIGATION BEFORE DSM	12,389	12,708	13,782	14,099	14,348	14,585	14,789	14,979	15,211	15,422	15,657	15,878	16,122	16,355	16,458
DSM & EE	611	824	925	1,015	1,095	1,170	1,240	1,303	1,365	1,425	1,478	1,532	1,590	1,646	1,701
OBLIGATION AFTER DSM	11,778	11,884	12,857	13,084	13,253	13,415	13,550	13,676	13,846	13,997	14,180	14,346	14,532	14,709	14,757
RESERVES (2)	2,900	2,954	2,854	2,669	2,016	1,983	1,849	1,986	1,992	1,968	2,098	2,201	2,015	2,015	2,142
Capacity Margin (3)	20%	20%	18%	17%	13%	13%	12%	13%	13%	12%	13%	13%	12%	12%	13%
Reserve Margin (4)	25%	25%	22%	20%	15%	15%	14%	15%	14%	14%	15%	15%	14%	14%	15%
ANNUAL SYSTEM ENERGY (GWh)	**62,765**	**63,715**	**65,899**	**67,085**	**68,023**	**69,040**	**69,839**	**70,581**	**71,454**	**72,370**	**73,305**	**74,164**	**75,059**	**75,983**	**76,813**

Notes:

* TOTAL INSTALLED includes Mod-24 unit rating changes.

** EPCOR Capacity has been included but subject to change pending arbitration outcome.

*** Renewables are assumed to be provided by sources that are dispatchable and/or high capacity factor sources and therefore are counted towards capacity margin. The MWs shown include potential sources that have not yet been identified but are expected to be obtained to meet PEC's Renewable Portfolio Standard requirements.

Footnotes:

(1) Undesignated capacity may be replaced by purchases, uprates, DSM; or a combination thereof. Joint ownership opportunities will be evaluated with baseload additions.

(2) Reserves = Total Supply Resources - Firm Obligations.

(3) Capacity Margin = Reserves / Total Supply Resources * 100.

(4) Reserve Margin = Reserves / System Firm Load after DSM * 100.

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Table 2 2010 Annual IRP (Winter)

	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25
GENERATION CHANGES															
Sited Additions		694	1,049	717											
Undesignated Additions (1)						147			603	201	281	884	674		201
Planned Project Uprates	4	25	30	10		28									
Pollution Control Derates															
Retirements			(417)	(616)	(500)										
INSTALLED GENERATION															
Nuclear	3,626	3,651	3,681	3,691	3,691	3,719	3,719	3,719	3,719	3,719	3,719	3,719	3,719	3,719	3,719
Fossil	5,284	5,284	4,867	4,251	3,751	3,751	3,751	3,751	3,751	3,751	3,751	3,751	3,751	3,751	3,751
Combined Cycle	610	1,304	2,353	3,070	3,070	3,070	3,070	3,070	3,070	3,070	3,070	3,070	3,070	3,070	3,070
Combustion Turbine	3,657	3,657	3,657	3,657	3,657	3,657	3,657	3,657	3,657	3,657	3,657	3,657	3,657	3,657	3,657
Hydro	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
Undesignated (1)						147	147	147	750	951	1,232	2,116	2,790	2,790	2,991
TOTAL INSTALLED *	**13,406**	**14,125**	**14,787**	**14,898**	**14,398**	**14,573**	**14,573**	**14,573**	**15,176**	**15,377**	**15,658**	**16,542**	**17,216**	**17,216**	**17,417**
PURCHASES & OTHER RESOURCES															
SEPA	95	95	109	109	109	109	109	109	109	109	109	109	109	109	109
NUG QF - Cogen **	161	161	161	161	161	161	161	161	161	161	161	161	161	161	161
NUG QF - Renewable ***	83	119	120	130	108	112	112	67	67	64	51	52	52	52	52
Butler Warner			260	260	260	260	260								
Anson CT Tolling Purchase			365	365	365	365	365	365	365	365	365	365	365	365	365
Broad River CT	888	888	888	888	888	888	888	888	888	888	888	389			
Southern CC Purchase - ST	150														
Southern CC Purchase - LT	145	145	145	145	145	145	145	145	145						
TOTAL SUPPLY RESOURCES	**14,927**	**15,533**	**16,834**	**16,955**	**16,433**	**16,612**	**16,612**	**16,307**	**16,910**	**16,963**	**17,231**	**17,617**	**17,902**	**17,902**	**18,104**
OBLIGATION BEFORE DSM	11,158	11,441	12,566	12,848	13,067	13,272	13,446	13,605	13,801	13,979	14,180	14,367	14,576	14,775	14,844
DSM & EE	493	654	695	737	773	802	834	867	901	938	971	1,006	1,044	1,081	1,119
OBLIGATION AFTER DSM	10,664	10,787	11,871	12,112	12,294	12,470	12,612	12,738	12,900	13,041	13,209	13,362	13,532	13,694	13,725
RESERVES (2)	4,263	4,746	4,962	4,843	4,139	4,142	4,000	3,569	4,010	3,922	4,023	4,256	4,370	4,209	4,378
Capacity Margin (3)	29%	31%	29%	29%	25%	25%	24%	22%	24%	23%	23%	24%	24%	24%	24%
Reserve Margin (4)	40%	44%	42%	40%	34%	33%	32%	28%	31%	30%	30%	32%	32%	31%	32%

Notes:

* TOTAL INSTALLED includes Mod-24 unit rating changes.

** EPCOR Capacity has been included but subject to change pending arbitration outcome.

*** Renewables are assumed to be provided by sources that are dispatchable and/or high capacity factor sources and therefore are counted towards capacity margin. The MWs shown include potential sources that have not yet been identified but are expected to be obtained to meet PEC's Renewable Portfolio Standard requirements.

Footnotes:

(1) Undesignated capacity may be replaced by purchases, uprates, DSM; or a combination thereof. Joint ownership opportunities will be evaluated with baseload additions.

(2) Reserves = Total Supply Resources - Firm Obligations.

(3) Capacity Margin = Reserves / Total Supply Resources * 100.

(4) Reserve Margin = Reserves / System Firm Load after DSM * 100.

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IRP Tables and Plan Discussion

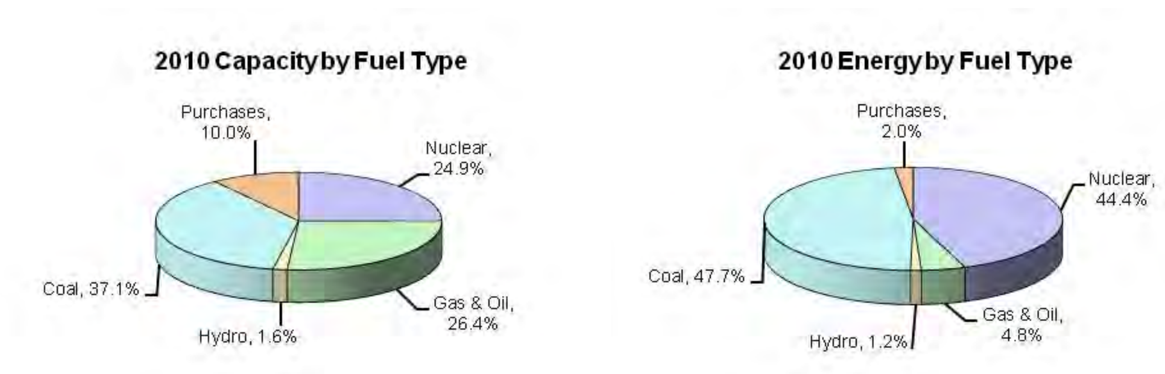
PEC's 2010 Annual IRP as presented in Tables 1 and 2 includes additional DSM and EE as well as significant additional renewables (see renewables and DSM appendices for further detail). PEC is actively pursuing expansion of its demand-side management and renewables programs as one of the most effective ways to offset the need for new power plants and protect the environment. In the coming years, PEC will continue to invest in renewables, DSM, EE and state-of-the art power plants and will evaluate the best available options for building new baseload, including advanced design nuclear and clean coal technologies. If PEC proceeds with a new nuclear plant, it would not be online until 2020 or later. At this time, though, no definitive decision has been made to construct new baseload plants.

In the near term, the current resource plan utilizes gas-fired generators for intermediate needs and peaking needs when possible, and oil-fired units for peaking needs 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 plants. Construction is underway on a new combined cycle unit at PEC's Richmond County Facility with an in-service date of June 2011 (see Short Term Action Plan in Appendix H). A Certificate of Public Convenience and Necessity was approved on October 22, 2009 for a combined cycle unit at the Wayne County facility with an in-service date of January 2013. A Certificate of Public Convenience and Necessity was approved on June 9, 2010 for a combined cycle unit at the Sutton Plant with an in service date of December 2013.

Capacity and Energy

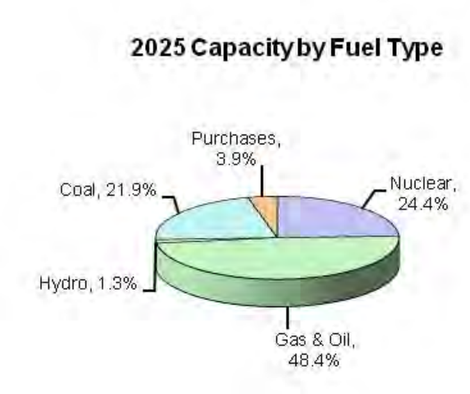
Figure 3 below shows PEC's capacity (MW) and energy (MWh) by fuel type projected for 2010. Nuclear and coal generation currently make-up approximately 62% of total capacity resources, yet account for about 92% of total energy requirements. Gas and oil generation accounts for about 26% of total supply capacity, yet about 5% of total energy; the balance is from hydro and purchased power.

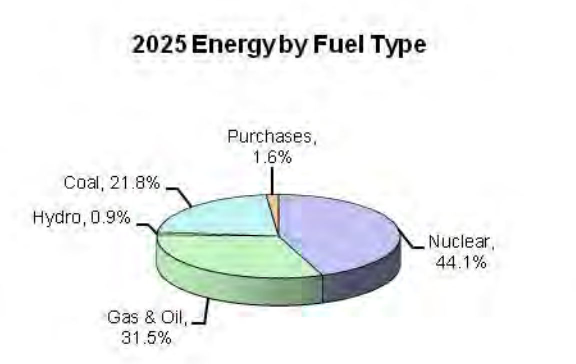
Figure 3



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 2025 are shown in Figure 4. Gas and oil resources are projected to increase to about 48% of total supply capacity, while serving about 32% of the total energy requirements. In 2025, nuclear and coal are projected to account for approximately 46% of total capacity resources and serve about 66% 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. By 2025, the percentage share of system capacity is approximately the same between gas/oil resources versus nuclear/coal resources; however, nuclear and coal resources will continue to satisfy most of the system energy requirements.

Figure 4





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.

Load Duration Curves

Figures 5 through 8 below are load duration curves for 2010 and 2025. The load duration curves detail the need relative to hours of the year, which is shown as a percentage. Figure 5 shows a curve without the existing DSM but it does not show existing EE as it is embedded in the forecast at this point. For clarity Figures 7 & 8 show the reduction of peak load due to DSM which reduces the need for additional peaking generation for the highest 15% of the annual hours. By comparing the 2010 and 2025 curves it is also possible to see the growth that is expected.

Figure 5

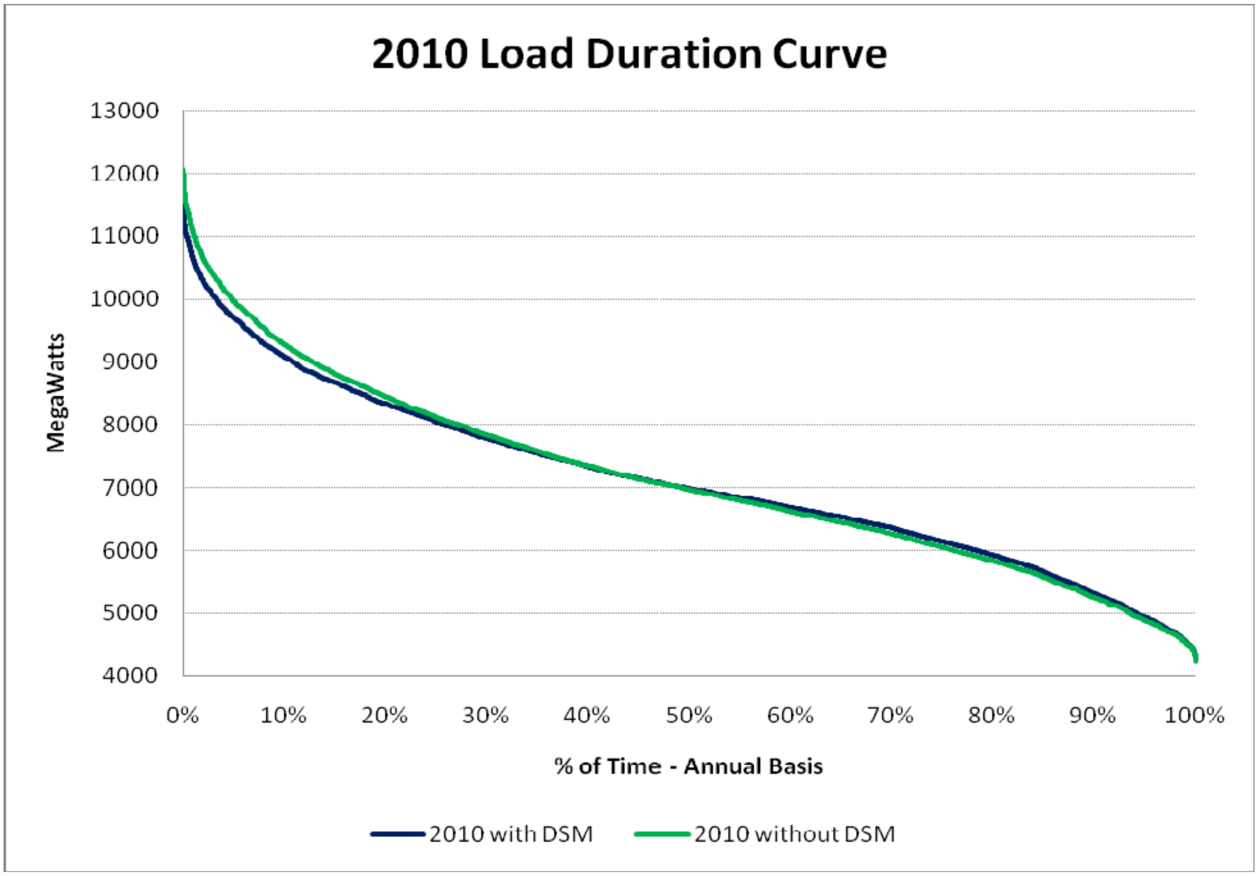


Figure 6

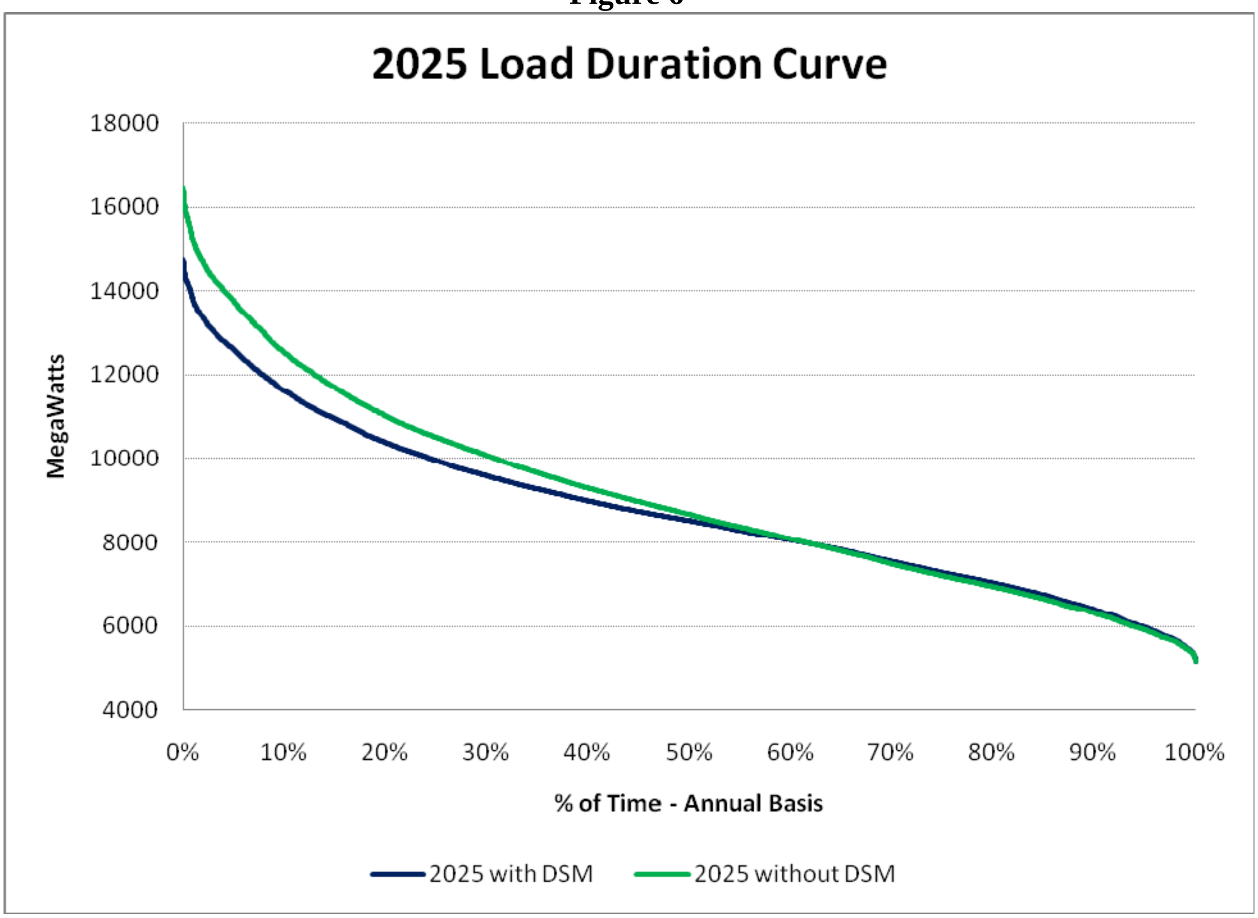


Figure 7

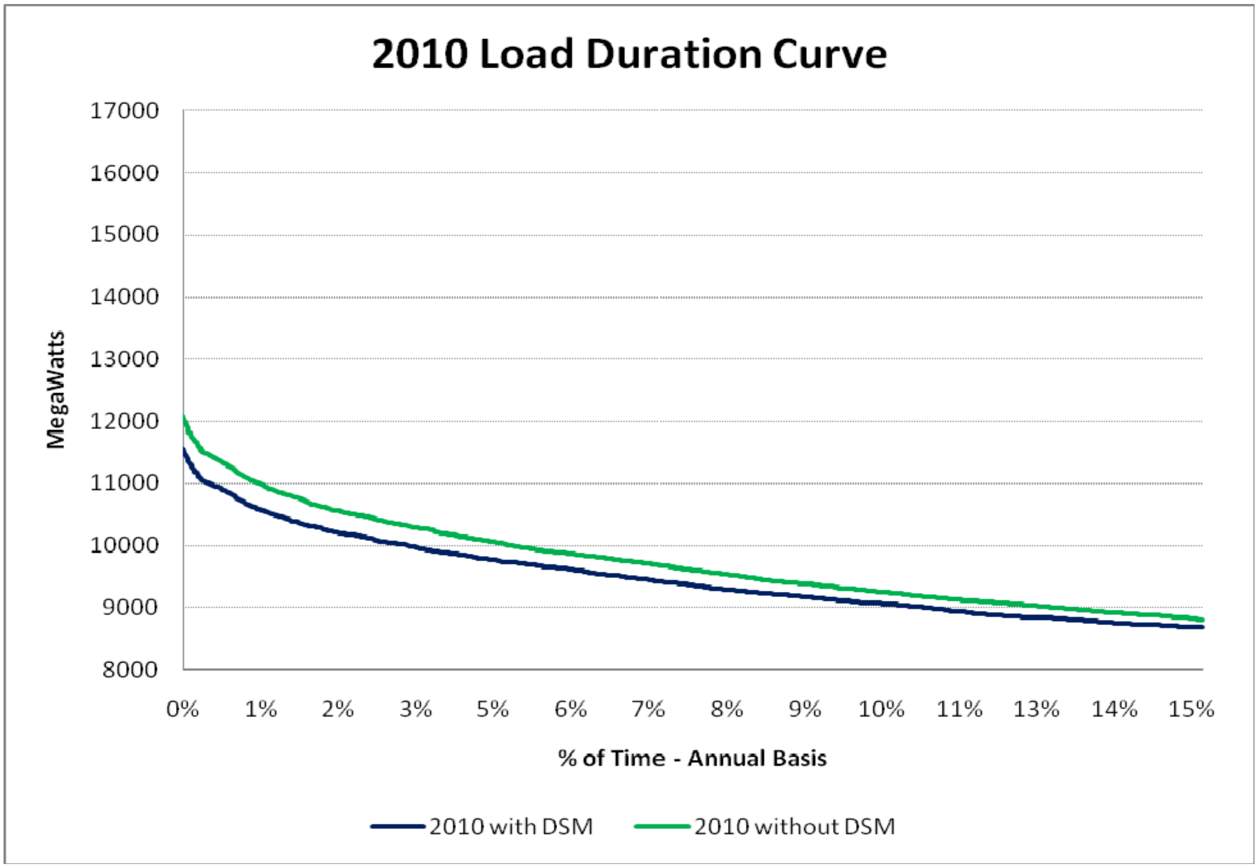
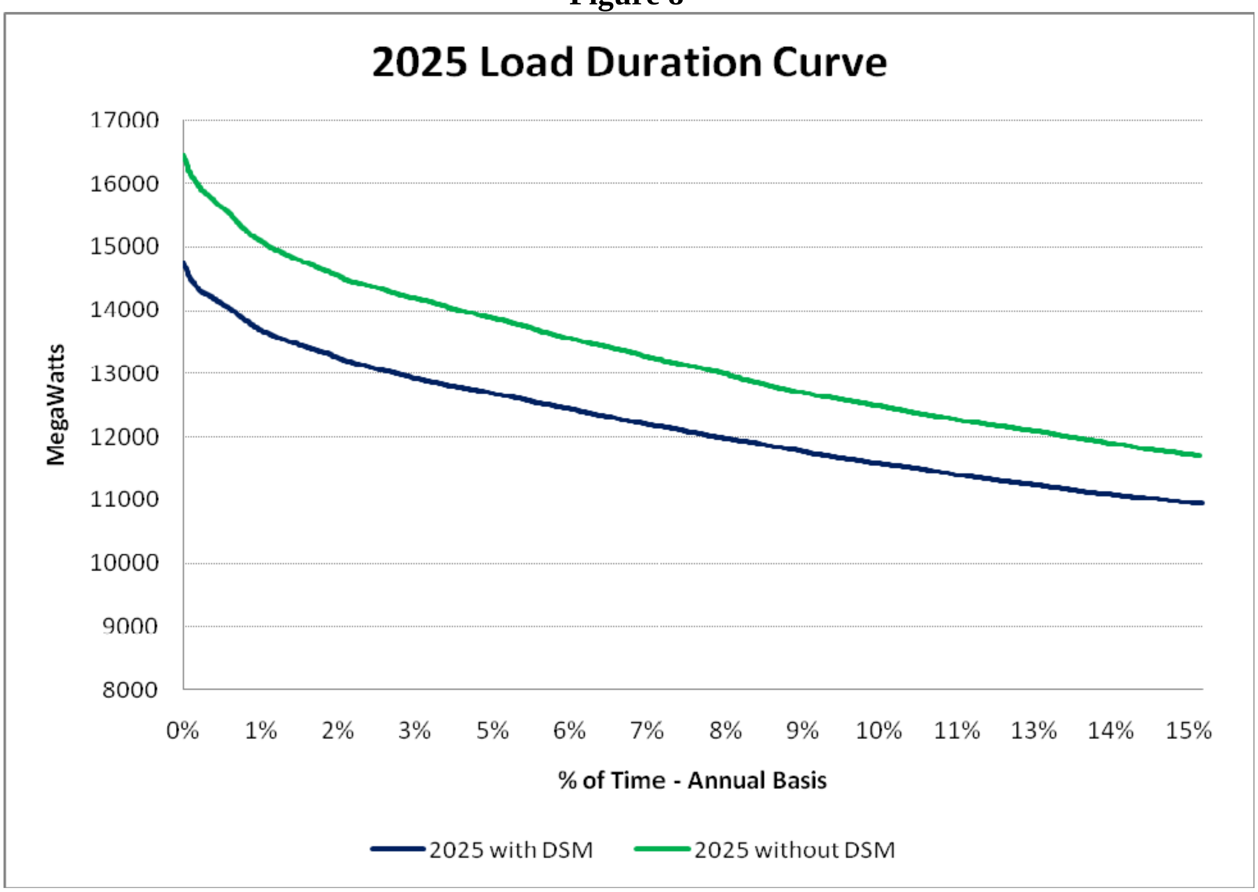


Figure 8



Summary

PEC is an advocate of the balanced approach for satisfying future power supply needs, which includes a strong commitment to DSM and EE, investments in renewables and emerging technologies, and state-of-the art power plants and delivery systems. This approach ensures electricity remains available, reliable, and affordable and is produced in an environmentally sound manner. PEC's balanced approach is also essential in order to mitigate rate impacts resulting from volatility in individual fuel and CO_2 prices. The plan presented and developed through the resource planning process and presented in this IRP document is not only balanced but robust. It provides the greatest potential benefits given the uncertainties, constraints, and volatility of key drivers that are currently affecting the plan or have a significant ability to influence the plan in the future.

PEC's balanced plan is shown to be one that includes DSM and EE, renewables, purchased power, combustion turbine generation, combined cycle generation, and nuclear generation. Though uncertainties will continue to change and evolve, this process and its results provide the necessary guidance to proceed. This is why PEC evaluates and explores the potential impacts of global climate policies, environmental regulation, technology shifts, and more in its process and PEC continues to invest in and explore emerging technologies, renewables, DSM and EE, and state-of-the art generating plants. Only through this integrated effort will PEC be able to provide electricity in a reliable, affordable, and environmentally sound manner.

Appendix A

Progress Energy Carolinas

Integrated Resource Plan

Appendix A
Evaluation of Resource Options

September 13, 2010

Resource Planning Analytics and Evaluations for Plan Development

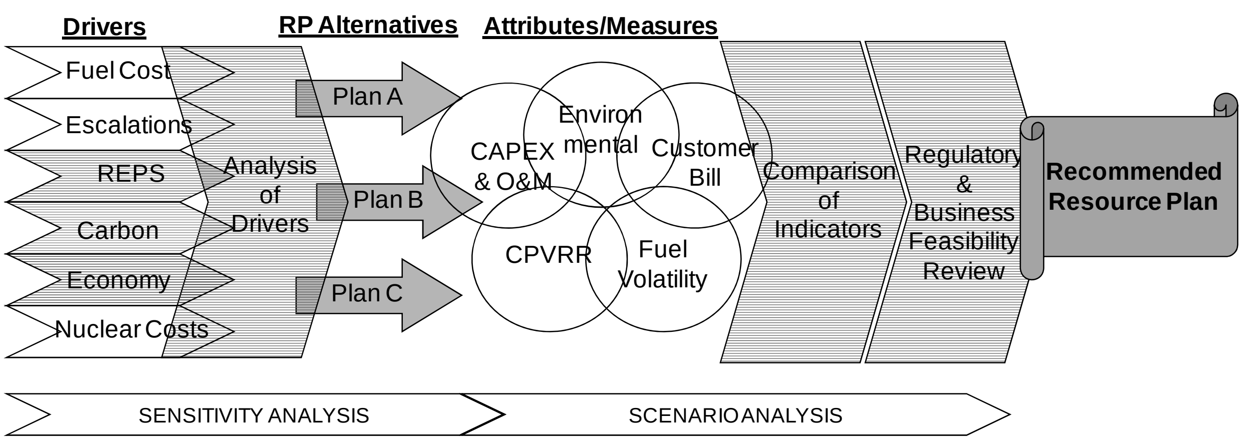
The objective of the resource planning process is to create a robust plan. A robust plan is one that provides the greatest potential benefits given the uncertainties, constraints, and volatility of key drivers that are currently affecting the plan or have a significant probability of influencing the plan in the future. In order to complete this objective, the resource planning process is comprised of a two-phase process that takes into consideration numerous factors, both current and future, related to issues such as customer costs, fuel costs, renewables, environmental requirements and unknowns, demand side management (DSM), energy efficiency (EE), potential technology shifts, load and energy changes, and capital cost of new central station facilities. This Appendix A discusses the process specifically designed to develop the robust resource plan.

The resource planning process is performed in two phases: sensitivity analysis and scenario analysis. Below is a brief overview of the resource planning process, followed by a more detailed discussion of each phase of the analysis.

Resource Planning Process Overview

The resource planning process can be seen in a simplistic format in Figure A-1 below.

Figure A-1. Integrated Resource Planning Process Flowchart



The sensitivity analysis is based on the expertise of numerous individuals throughout PEC's organization that provide input and knowledge relative to the key drivers that are, or may influence the plan. These key drivers are then utilized to stress the models to determine which of the drivers significantly change the resource plan. This analysis results in the development of potential alternative plans that can then be utilized in the scenario analysis.

The scenario analysis contemplates and develops future states of the world that bound the potential outcomes of the key drivers such as load, energy, escalations, nuclear capital costs, fuel costs, and carbon costs. The alternative plans that are developed in the sensitivity analysis are then tested in each scenario. By testing each of these alternative plans in each of the scenarios, how each of the plans fare in each scenario and in aggregate for all scenarios can be determined.

The ranking of each plan in each scenario is performed using key attributes in the categories of customer cost and environmental. In short, the scenario analysis develops bounding future potential states and subjects the alternative plans to the future states such that they can be ranked relative to each other based on key attributes in the customer cost and environmental categories.

Each of the phases of the process is explored in more detail with results and supporting information throughout the remainder of Appendix A.

Sensitivity Analysis

There is vast uncertainty today as to what the future will hold—seemingly more than any time in the past—especially with respect to utility resource plans. The purpose of the sensitivity analysis in the resource planning process is to identify the uncertainties that, depending on their outcomes, could influence resource plan decisions.

The first step in the sensitivity analysis was to identify the key factors that impact the total cost of a resource plan. In addition, emerging issues in the current planning environment were identified. Some of the emerging issues include the following: carbon legislation has been pushed to the forefront of many discussions; changes in demand and customer use due to a fluctuating economy; fuel costs have risen dramatically in the past, only to be followed by steep declines; the potential for huge, new natural gas reserves due to technological breakthroughs in shale gas exploration, resulting in low prices for natural gas; and the list continues.

It is important to identify which of these uncertainties and emerging issues can significantly alter the direction that would be required by a resource plan. To pinpoint which of the uncertainties and emerging issues are key drivers, the expertise of numerous individuals throughout PEC’s organization was taken into consideration. Each key driver is then independently stressed in order to determine which of the drivers result in significantly different resource plans. It is important to understand some drivers have less impact on the resource plan and can be adapted to more easily; whereas, other have a more significant impact on the resource plan and may require new directions to be taken. For example, load can vary significantly, and though it has a dramatic impact, it rarely results in a significantly different resource mix, only in the timing of the resources. On the other hand, environmental changes such as CO_2 legislation can massively alter resource plans and their components and can require a greater change, which translates to greater risk.

The key drivers identified in the sensitivity analysis are shown in Figure A-2, below. The majority of the drivers result in some plan modification; however, only three significant variations occur. Figure A-3 shows the alternative plans that resulted from the sensitivity analysis that was performed. Each of these plans are the result of an optimization completed with the Strategist model taking into consideration operational criteria, construction schedules, capital costs, fuel costs, emissions costs, and more. The resource options available to be picked in the optimization analysis are shown in Figure A-4, which is the result of the “Screening of Generation Alternatives,” detailed in the main text. A more detailed discussion of each plan follows.

Figure A-2. Sensitivities Analyzed

Driver	Sensitivity
Gas Prices	Low
	High
Construction Escalation	Low *Confidential*
	High *Confidential*
Load & Energy	Low Growth
	High Growth
Load shape	Low Load Factor
	High Load Factor
CO_2 Prices	Low
	High
Nuclear Cost	Low (30% decrease)
	High (30% increase)

See Supporting Information Section below that provides data for these sensitivities.

Figure A-3. Alternative Plans for Scenario Analysis

	Plan A	Plan B	Plan C	
2011	Richmond CC	Richmond CC	Richmond CC	2011
2012				2012
2013	Wayne CC	Wayne CC	Wayne CC	2013
2014	Sutton CC	Sutton CC	Sutton CC	2014
2015	3 Fast Start CTs	3 Fast Start CTs	3 Fast Start CTs	2015
2016				2016
2017				2017
2018	3 CT 190	3 CT 190	3 CT 190	2018
2019	CT 190	CT 190	CT 190	2019
2020	ALWR 25%	2 CT 190	ALWR 25%	2020
2021	ALWR 25% 3 CT 190	CC 2x1	ALWR 25% 3 CT 190	2021
2022	CC 2x1	CC 2x1	3 CT 190	2022
2023	CT 190	CT 190	CT 190	2023
2024	CT 190	CT 190	ALWR 50%	2024
2025				2025
2026	CC 2x1	CC 2x1		2026
2027			ALWR 50%	2027
2028	CC 2x1	CC 2x1		2028
2029				2029
2030			2 CT 190	2030

Figure A-4. Resource Options from Alternative Plans

Unit Type	Winter	Summer
CT 190	201	176
CC 2x1	674	606
ALWR (Nuclear)	1125	1105

Plan A

Plan A contains a mix of combustion turbine, combined cycle, and nuclear generation. These resources are cost-effective in cases when the parameters are at the mid level and also when construction escalation rates are low. The nuclear generation is assumed to be jointly owned with PEC owning an approximate 25% share.

Plan B

Plan B consists of a mix of combustion turbine and combined cycle resources. This type of capacity was indicated in the low gas, low CO_2 price, high nuclear construction cost, and high construction escalation rate cases.

Plan C

Plan C contains two sets of nuclear units; one set assumes a 25% ownership share and the other assumes a 50% ownership share. A plan with two sets of nuclear units was indicated in three of the sensitivity analysis cases (high gas, high CO_2 prices, and low nuclear construction costs). Other capacity requirements are fulfilled by adding combustion turbines.

The development of the alternative plans through the sensitivity analysis is informative but, as mentioned previously, these plans must be evaluated through the scenario analysis to determine the most robust plan.

Scenario Analysis

Scenario Definition

The scenario analysis phase contemplates and develops future states that bound the potential outcomes of the key drivers such as load, energy, escalations, nuclear capital costs, fuel costs, and carbon costs. The scenario analysis relies on PEC experts to determine which future states are most probable and how the future states would evolve. The alternative plans developed in the sensitivity analysis are stressed in each scenario. By testing each of these alternative plans in each of the scenarios, how each of the plans fare in each scenario and in aggregate to all scenarios can be determined. Figure A-5 below outlines the scenarios and key uncertainties in each of these scenarios. The scenarios reflect multiple uncertainties moving in concert instead of changing a single variable at a time as was done in the sensitivity analysis. These scenarios range from a case where, in effect, costs are low (the Low Stress scenario) to a case where costs are very high (the CO_2 Aggressive scenario). The range of future scenarios ensures that each plan is tested broadly to determine which plan is the most robust; that is, which plan performs the best, given the risks and uncertainties the future holds.

To determine which plan is most robust, the alternative plans are compared to one another in two general categories using seven key attributes. The general categories are Customer Cost and Environmental. These categories are described by several attributes that are used to measure the “goodness” of the alternative plans relative to each other. A brief description of the attributes is given below.

Figure A-5. Scenarios Used to Stress Alternative Plans

Scenario	Definition	Gas Prices	Nuclear Cost	Construction Escalation	CO2
Low Stress	- Carbon legislation enacted at low price levels - Gas prices at low case - Construction escalation rates are at the low end of the range	Low	30% decrease	Low	Low
CO2 Aggressive (Strict Climate - High Cost)	- Legislation drives a dramatic carbon tax (or cap) that results in high gas prices - Demand for nuclear plants increases, which drives up prices	High	30% increase	High	High
Current Trends	- Current world scenario including CO2 tax mid case	Mid	Current cost	Mid	Mid

Evaluation Attributes

Customer Cost Category
The key attributes in the Customer Cost category are total cost, system fuel price volatility, and price growth. The total cost of each alternative plan is determined by the Cumulative Present Value of Revenue Requirements (CPVRR), and is an indication of the cost of the plan to the customer over the long term. The price growth attribute is measured by the geometric mean growth of annual prices based on the annual revenue requirements. The system fuel price volatility is the standard deviation in system average fuel prices based on a normal distribution of prices around the base fuel price forecast.

Environmental Category
The key attributes in the Environmental category are SO_2, NO_x, Hg, and CO_2 emissions. Each of the emissions is summed over the study period.

Utility Functions

Since two different evaluation categories are used to evaluate each plan, a method of incorporating the trade-offs of one category against the other is needed. The type of analysis used is known as utility function analysis. In this type of analysis, the different categories are assigned weights, with the sum of the weights equaling one. In this fashion, the relative importance of each category in the decision process is identified. Since each category is described by more than one attribute, these attributes are also assigned weights to identify their importance relative to other attributes within a category. The weights of the attributes within a category also sum to a value of one. The weights for the categories and attributes were determined from a survey of Company experts and are shown in Figure A-6 below.

Figure A-6. Attributes Used to Rank Alternative Plans

Customer Cost	**70%**
Total Cost	40%
Price Growth	30%
System Fuel Price Volatility	30%
Environmental	**30%**
SO_2	10%
NOx	5%
Mercury	15%
CO_2	70%

Because the attributes have different units of measure, they must be unitized before they can be compared to other attributes. This is accomplished by identifying the range for each attribute, from the worst possible outcome to the best possible outcome, among all the alternative plans. This range is used as a basis to scale the possible outcomes for each attribute to values between zero and one. Thus, the results are non-dimensional and the different attributes can be combined and evaluated simultaneously.

Scenario Analysis Results

The results of the plans being tested under the scenarios discussed above and being weighted by the key attributes can be seen in Figure A-7. Figure A-7 shows the relative rank of each plan from 1 to 3, with 1 being the best plan in each scenario and 3 being the worst plan in each scenario. The rankings show that Plan A is the top ranked plan in the scenarios. Plan A is the top ranked plan in the scenarios because the combination of gas-fired combined cycle and combustion turbine units and nuclear units are able to score well in both the customer cost and environmental attribute groups. An examination of all the attributes in all the scenarios shows Plan A scored at, or near, the top in many of the combinations of attributes and scenarios. The supporting information section below contains the results of each scenario, and many of the inputs to these scenarios and sensitivities.

Figure A-7. Scenario Analysis Results

Overall Best Plan

	Scenario		
	Low Stress	**CO2 Aggressive**	**Current Trends**
	Plan A	Plan A	Plan A

Rank of Each Plan

	Scenario		
	Low Stress	**CO2 Aggressive**	**Current Trends**
Plan A	1	1	1
Plan B	2	2	2
Plan C	3	3	3

Best Plan for Each Scenario by Attribute Category

	Scenario		
	Low Stress	**CO2 Aggressive**	**Current Trends**
Customer Cost	Plan A	Plan A	Plan A
Environmental	Plan A	Plan A	Plan A

Sensitivity Analysis of Weights

The results were further tested by performing an additional sensitivity to the weights assigned to the attribute categories. This was accomplished by varying the weight assigned to an attribute category and modifying the other category weight appropriately to ensure they still sum to one. For example if the Customer Cost category is being evaluated at 40%, the weight assigned to the Environmental category is thus modified to 60%. In this manner, the weights were changed until a different plan became the highest ranked plan for each scenario. The results of this analysis are shown in Figure A-8, below. The figure shows the best overall plan in each scenario usually does not change when the Customer Cost weight increases, even to 100%, or is reduced all the way to zero (no change in the best plan is shown as --).

Figure A-8. Sensitivity of Weightings for Each Scenario

Sensitivity of Weightings for Each Scenario

	Scenario		
	Low Stress	**CO2 Aggressive**	**Current Trends**
Best Overall Plan	Plan A	Plan A	Plan A
Customer Cost (70%)			
High Weight changes to:	100%	100%	100%
Best Plan becomes:	--	--	--
Low Weight changes to:	0%	0%	0%
Best Plan becomes:	--	--	--
Environmental (30%)			
High Weight changes to:	100%	100%	100%
Best Plan becomes:	--	--	--
Low Weight changes to:	0%	0%	0%
Best Plan becomes:	--	--	--

Summary

A robust plan minimizes the adverse impacts of unforeseen changes, and produces acceptable results for a broad range of events. This is why different scenarios of fuel, construction cost escalation, environmental, and technology costs were taken into consideration when testing the plans to determine robustness.

As seen from the results above, Plan A, which includes combustion turbines, combined cycle, nuclear, renewables, as well as DSM and EE, accomplishes the objective of a robust resource plan. Thus, it is the basis for the preferred resource plan shown in the IRP. It is not surprising that this balanced solution provides a more robust plan than one that is heavily biased towards any one or two technologies.

Supporting Information Section

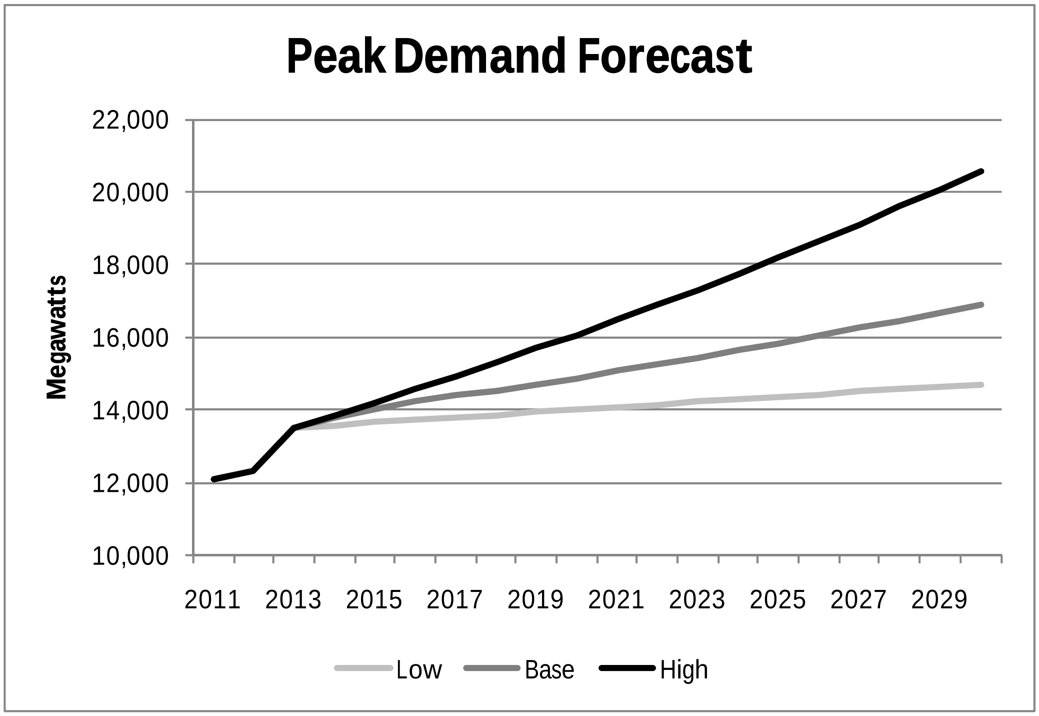
Gas Prices Utilized

This information is being filed as confidential.

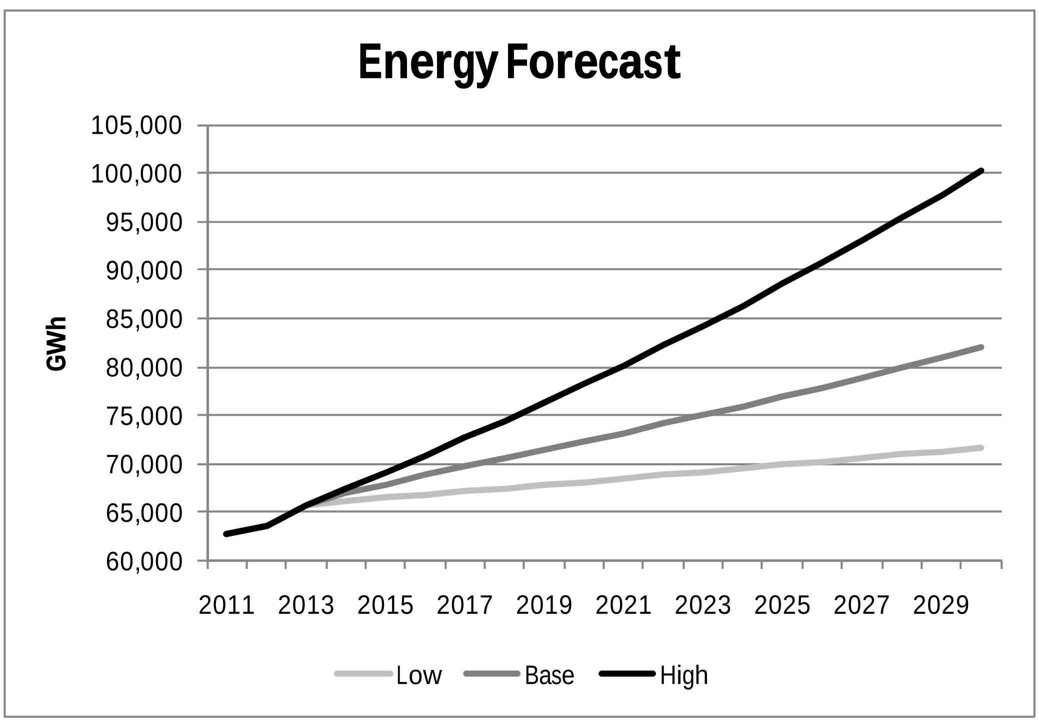
CO_2 Prices Utilized

This information is being filed as confidential.

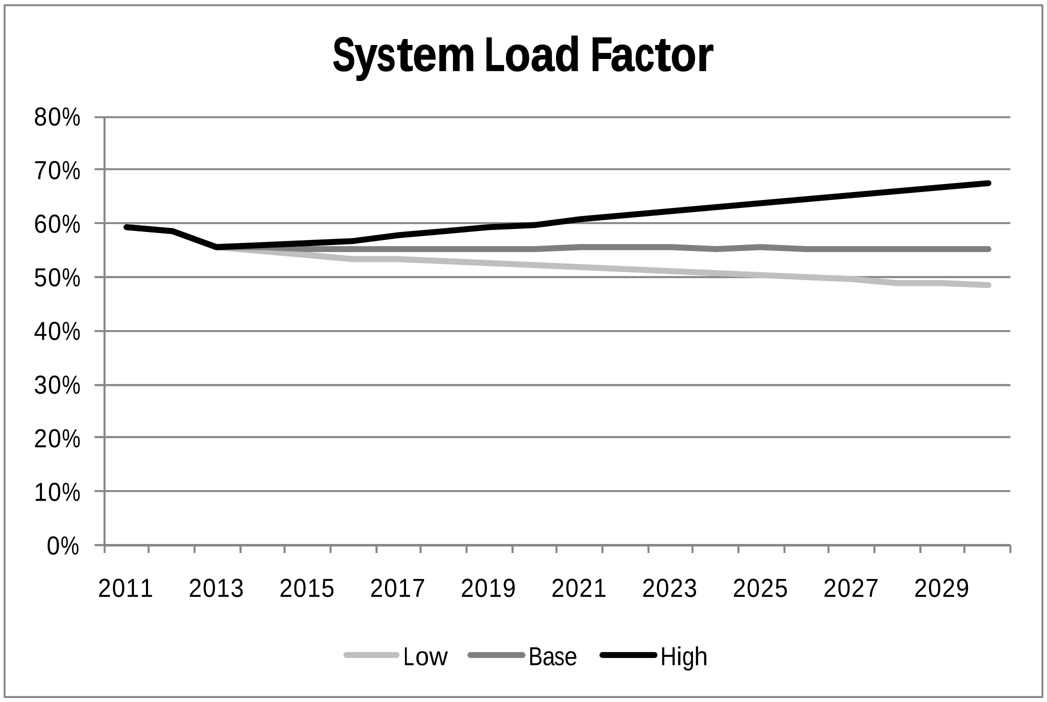
Load Curves Utilized



Energy Curves Utilized

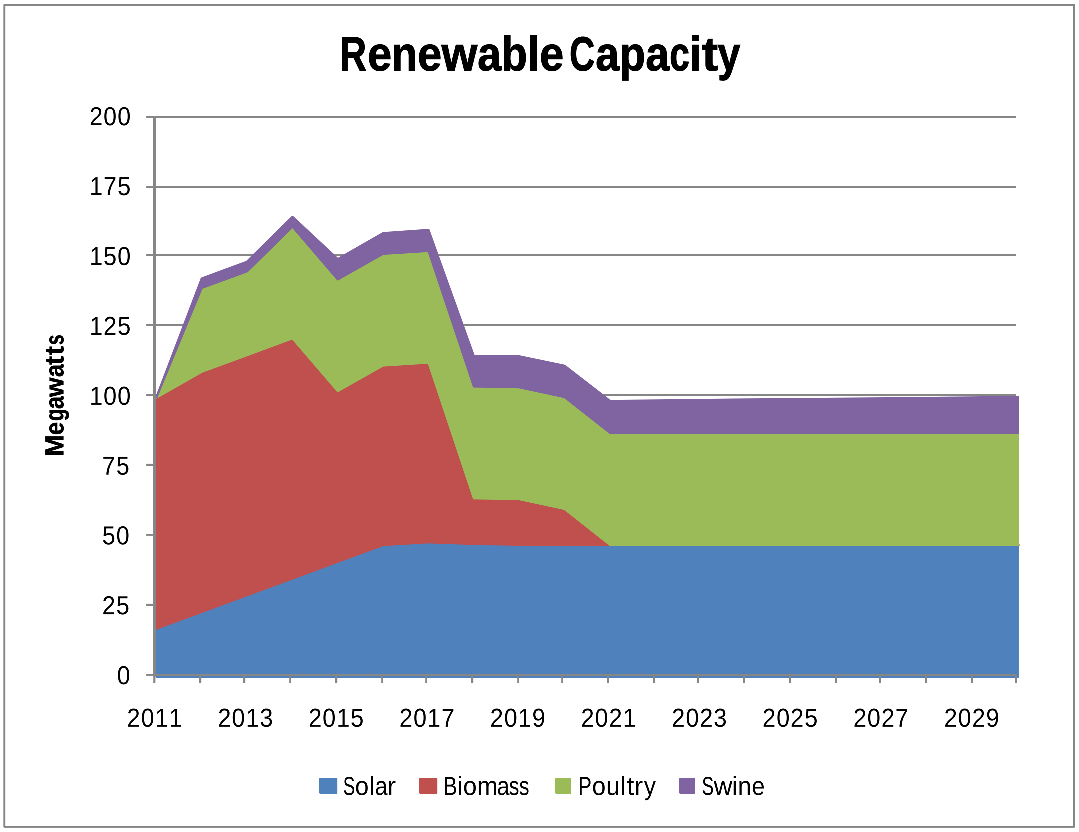


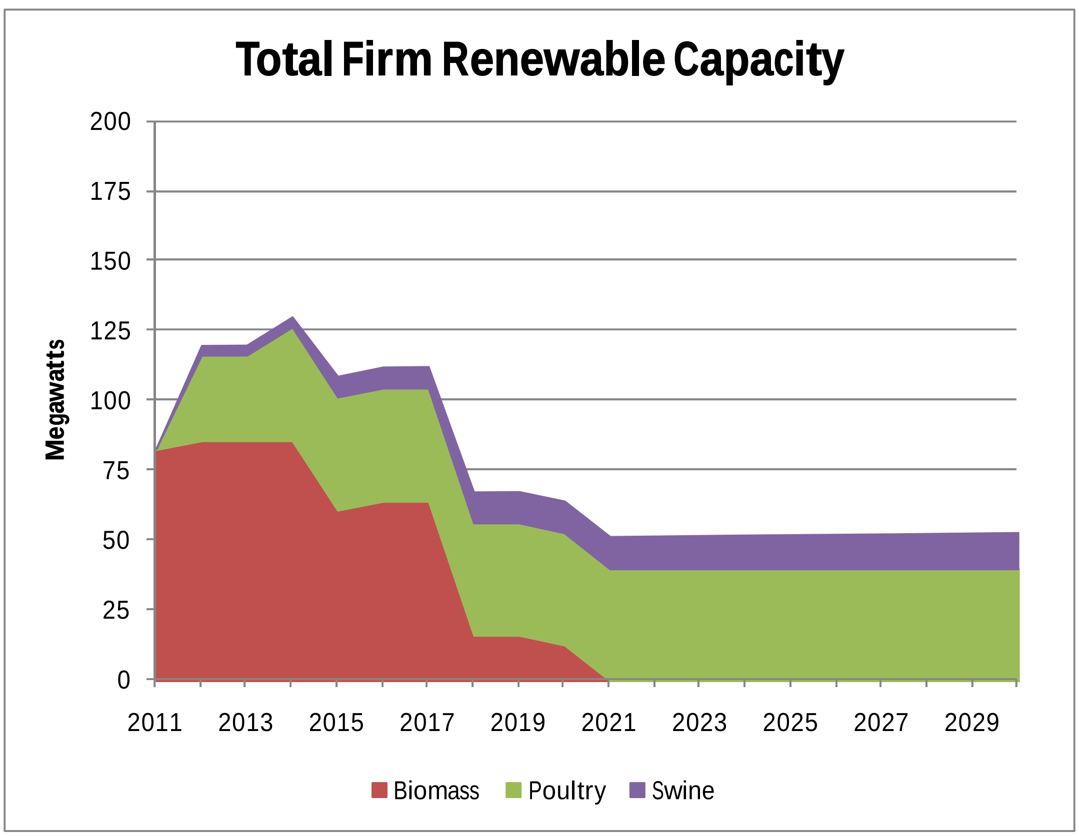
Load Factor Sensitivities

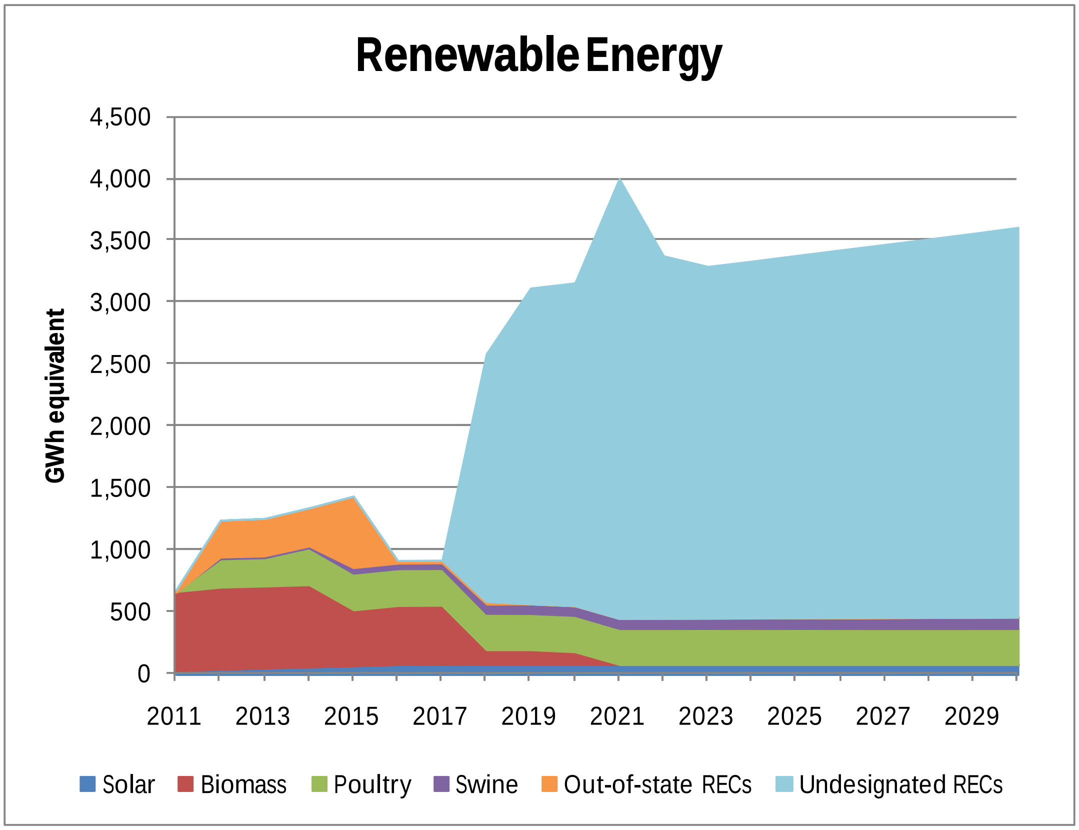


Renewables Capacity and Energy Utilized in Analyses

- Much of the renewable capacity would not count as resource capacity given it is not dispatchable. This can be seen in comparing the two charts below: the first shows total renewable capacity included in the plans, and the second, that shows capacity counted towards reserve margins.


Renewable Capacity
Megawatts
200
175
150
125
100
75
50
25
0
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
Solar
Biomass
Poultry
Swine


Total Firm Renewable Capacity
Megawatts
200
175
150
125
100
75
50
25
0
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
Biomass
Poultry
Swine


Renewable Energy
GWh equivalent
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
Solar
Biomass
Poultry
Swine
Out-of-state RECs
Undesignated RECs

Scenario Analysis Results

Low Stress

	Objective	Plan A	Plan B	Plan C
Customer Cost				
CPVRR ($ Millions)	min	54,629	54,378	55,881
Geometric mean of price growth	min	2.42%	2.40%	2.66%
System fuel price volatility	min	5.66	6.61	4.65
Environmental				
SO2 (tons)	min	515,787	519,161	532,434
NOx (tons)	min	198,829	201,359	204,155
Hg (lbs)	min	8,284	8,314	8,581
CO2 (1000s tons)	min	579,500	598,689	571,297

Score 0-10 Points Based on Value within Range (best=10, worst=0, interpolate between)

	Plan A	Plan B	Plan C
Customer Cost	7.49	7.00	3.00
CPVRR	8.33	10.00	0.00
Geometric mean of prices	9.00	10.00	0.00
System fuel price volatility	4.86	0.00	10.00
Environmental	7.90	2.41	7.00
SO2	10.00	7.97	0.00
NOx	10.00	5.25	0.00
Hg	10.00	8.99	0.00
CO2	7.01	0.00	10.00
Weighted score	7.61	5.62	4.20
Rank	1	2	3

CO2 Aggressive

	Objective	Plan A	Plan B	Plan C
Customer Cost				
CPVRR ($ Millions)	min	95,396	95,381	97,124
Geometric mean of price growth	min	5.31%	5.33%	5.58%
System fuel price volatility	min	12.52	14.72	9.21
Environmental				
SO2 (tons)	min	575,845	579,173	589,658
NOx (tons)	min	207,496	210,117	212,561
Hg (lbs)	min	8,725	8,760	9,019
CO2 (1000s tons)	min	586,331	605,710	578,328

Score 0-10 Points Based on Value within Range (best=10, worst=0, interpolate between)

	Plan A	Plan B	Plan C
Customer Cost	8.16	6.77	3.00
CPVRR	9.92	10.00	0.00
Geometric mean of prices	10.00	9.22	0.00
System fuel price volatility	3.98	0.00	10.00
Environmental	7.95	2.32	7.00
SO2	10.00	7.59	0.00
NOx	10.00	4.82	0.00
Hg	10.00	8.80	0.00
CO2	7.08	0.00	10.00
Weighted score	8.10	5.43	4.20
Rank	1	2	3

Current Trends

	Objective	Plan A	Plan B	Plan C
Customer Cost				
CPVRR ($ Millions)	min	71,910	71,976	72,507
Geometric mean of price growth	min	3.59%	3.58%	3.86%
System fuel price volatility	min	8.70	10.23	6.58
Environmental				
SO2 (tons)	min	558,975	564,088	573,041
NOx (tons)	min	207,565	210,381	212,602
Hg (lbs)	min	8,819	8,861	9,110
CO2 (1000s tons)	min	590,825	610,227	582,732

Score 0-10 Points Based on Value within Range (best=10, worst=0, interpolate between)

	Plan A	Plan B	Plan C
Customer Cost	8.13	6.56	3.00
CPVRR	10.00	8.89	0.00
Geometric mean of prices	9.57	10.00	0.00
System fuel price volatility	4.20	0.00	10.00
Environmental	7.94	2.14	7.00
SO2	10.00	6.36	0.00
NOx	10.00	4.41	0.00
Hg	10.00	8.55	0.00
CO2	7.06	0.00	10.00
Weighted score	8.07	5.23	4.20
Rank	1	2	3

Appendix B

Progress Energy Carolinas

Integrated Resource Plan

Appendix B
PEC Owned Generation

September 13, 2010

PEC has a diverse fleet of generating facilities to meet customer demands and maintain reliability. Below are tables detailing PEC's existing, planned, and planned undesignated generation capacity as well as units to be retired and planned uprates.

Existing Generating Units and Ratings *(1)*

All Generating Unit Ratings are as of December 31, 2009

Coal

	Unit	Winter (MW)	Summer (MW)	Location	Fuel Type	Resource Type
Asheville	1	196	191	Arden, NC	Coal	Base
Asheville	2	187	185	Arden, NC	Coal	Base
Cape Fear	5	148	144	Moncure, NC	Coal	Intermediate
Cape Fear	6	175	172	Moncure, NC	Coal	Intermediate
Lee	1	80	74	Goldsboro, NC	Coal	Intermediate
Lee	2	80	77	Goldsboro, NC	Coal	Intermediate
Lee	3	257	246	Goldsboro, NC	Coal	Intermediate
Mayo *(2,4)*	1	735	727	Roxboro, NC	Coal	Base
Robinson	1	179	177	Hartsville, SC	Coal	Base
Roxboro	1	374	369	Semora, NC	Coal	Base
Roxboro	2	671	662	Semora, NC	Coal	Base
Roxboro	3	698	693	Semora, NC	Coal	Base
Roxboro *(2)*	4	711	698	Semora, NC	Coal	Base
Sutton	1	98	97	Wilmington, NC	Coal	Intermediate
Sutton	2	107	104	Wilmington, NC	Coal	Intermediate
Sutton	3	411	403	Wilmington, NC	Coal	Intermediate
Weatherspoon	1	49	48	Lumberton, NC	Coal	Intermediate
Weatherspoon	2	49	48	Lumberton, NC	Coal	Intermediate
Weatherspoon	3	79	75	Lumberton, NC	Coal	Intermediate
Total Coal		5,284	5190			

Combustion Turbines

	Unit	Winter (MW)	Summer (MW)	Location	Fuel Type	Resource Type
Asheville	3	182	164	Arden, NC	Natural Gas/Oil	Peaking
Asheville	4	180	160	Arden, NC	Natural Gas/Oil	Peaking
Blewett	1	17	13	Lilesville, NC	Oil	Peaking
Blewett	2	17	13	Lilesville, NC	Oil	Peaking
Blewett	3	17	13	Lilesville, NC	Oil	Peaking
Blewett	4	17	13	Lilesville, NC	Oil	Peaking
Darlington	1	65	52	Hartsville, SC	Natural Gas/Oil	Peaking

Darlington	2	67	52	Hartsville, SC	Oil	Peaking
Darlington	3	67	50	Hartsville, SC	Natural Gas/Oil	Peaking
Darlington	4	66	51	Hartsville, SC	Oil	Peaking
Darlington	5	66	52	Hartsville, SC	Natural Gas/Oil	Peaking
Darlington	6	65	51	Hartsville, SC	Oil	Peaking
Darlington	7	67	52	Hartsville, SC	Natural Gas/Oil	Peaking
Darlington	8	66	49	Hartsville, SC	Oil	Peaking
Darlington	9	66	52	Hartsville, SC	Oil	Peaking
Darlington	10	67	52	Hartsville, SC	Oil	Peaking
Darlington	11	67	52	Hartsville, SC	Oil	Peaking
Darlington	12	128	118	Hartsville, SC	Natural Gas/Oil	Peaking
Darlington	13	128	116	Hartsville, SC	Natural Gas/Oil	Peaking
Lee	1	15	12	Goldsboro, NC	Oil	Peaking
Lee	2	27	21	Goldsboro, NC	Oil	Peaking
Lee	3	27	21	Goldsboro, NC	Oil	Peaking
Lee	4	27	21	Goldsboro, NC	Oil	Peaking
Morehead	1	15	12	Morehead City, NC	Oil	Peaking
Richmond	1	178	162	Hamlet, NC	Natural Gas/Oil	Peaking
Richmond	2	183	167	Hamlet, NC	Natural Gas/Oil	Peaking
Richmond	3	185	169	Hamlet, NC	Natural Gas/Oil	Peaking
Richmond	4	186	163	Hamlet, NC	Natural Gas/Oil	Peaking
Richmond	6	187	159	Hamlet, NC	Natural Gas/Oil	Peaking
Robinson	1	15	15	Hartsville, SC	Natural Gas/Oil	Peaking
Sutton	1	12	11	Wilmington, NC	Oil/Natural Gas	Peaking
Sutton	2A	31	24	Wilmington, NC	Oil/Natural Gas	Peaking
Sutton	2B	31	26	Wilmington, NC	Oil/Natural Gas	Peaking
Wayne	1	192	177	Goldsboro, NC	Oil/Natural Gas	Peaking
Wayne	2	192	174	Goldsboro, NC	Oil/Natural Gas	Peaking
Wayne	3	193	173	Goldsboro, NC	Oil/Natural Gas	Peaking
Wayne	4	191	170	Goldsboro, NC	Oil/Natural Gas	Peaking
Wayne (3)	5	191	169	Goldsboro, NC	Oil/Natural Gas	Peaking
Weatherspoon	1	41	33	Lumberton, NC	Natural Gas/Oil	Peaking
Weatherspoon	2	41	32	Lumberton, NC	Natural Gas/Oil	Peaking
Weatherspoon	3	41	34	Lumberton, NC	Natural Gas/Oil	Peaking
Weatherspoon	4	41	32	Lumberton, NC	Natural Gas/Oil	Peaking
Total CT		3,657	3152			

Combined Cycle

	Unit	Winter (MW)	Summer (MW)	Location	Fuel Type	Resource Type
Cape Fear	1	12	11	Moncure, NC	Oil	Peaking
Cape Fear	1A	14	11	Moncure, NC	Oil	Peaking
Cape Fear	1B	13	11	Moncure, NC	Oil	Peaking
Cape Fear	2	12	11	Moncure, NC	Oil	Peaking
Cape Fear	2A	14	11	Moncure, NC	Oil	Peaking
Cape Fear	2B	13	11	Moncure, NC	Oil	Peaking
Richmond	CT7	177	148	Hamlet, NC	Natural Gas/Oil	Intermediate
Richmond	CT8	180	149	Hamlet, NC	Natural Gas/Oil	Intermediate
Richmond	ST4	175	173	Hamlet, NC	Natural Gas/Oil	Intermediate
Total CC		610	536			

Hydro

	Unit	Winter (MW)	Summer (MW)	Location	Fuel Type	Resource Type
Blewett	1	4	3	Lilesville, NC	Water	Peaking
Blewett	2	4	3	Lilesville, NC	Water	Peaking
Blewett	3	4	4	Lilesville, NC	Water	Peaking
Blewett	4	5	4	Lilesville, NC	Water	Peaking
Blewett	5	5	4	Lilesville, NC	Water	Peaking
Blewett	6	5	4	Lilesville, NC	Water	Peaking
Marshall	1	2	2	Marshall, NC	Water	Intermediate
Marshall	2	2	2	Marshall, NC	Water	Intermediate
Tillery	1	21	21	Mt. Gilead, NC	Water	Peaking
Tillery	2	18	18	Mt. Gilead, NC	Water	Peaking
Tillery	3	21	21	Mt. Gilead, NC	Water	Peaking
Tillery	4	26	27	Mt. Gilead, NC	Water	Peaking
Walters	1	36	36	Waterville, NC	Water	Intermediate
Walters	2	40	40	Waterville, NC	Water	Intermediate
Walters	3	36	36	Waterville, NC	Water	Intermediate
Total Hydro		229	225			

Nuclear

	Unit	Winter (MW)	Summer (MW)	Location	Fuel Type	Resource Type
Brunswick *(2)*	1	975	938	Southport, NC	Uranium	Base
Brunswick *(2)*	2	953	920	Southport, NC	Uranium	Base
Harris *(2)*	1	936	900	New Hill, NC	Uranium	Base
Robinson	2	758	724	Hartsville, SC	Uranium	Base
Total Nuclear		3,622	3,482			
TOTAL PEC SYSTEM		13402	12585			

FOOTNOTES:
(1) Ratings reflect compliance with new NERC reliability standards and are gross of co-ownership interest as of 12/31/09.
(2) Jointly-owned by NCEMPA: Roxboro 4 - 12.94%; Mayo 1 - 16.17%; Brunswick 1 - 18.33%; Brunswick 2 - 18.33%; and Harris 1 - 16.17%.
(3) Combustion Turbine placed in-service as of June 1, 2009 – Winter rating is estimated.
(4) Winter rating reflects FGD in-service testing.

Planned Designated Generation

Plant Name	Location	Summer Capacity (MW)	Plant Type	Fuel Type	Expected In-Service Date
Richmond County	Hamlet, NC	635	CC	Nat gas/oil	06/11
Wayne County	Goldsboro, NC	920	CC	Nat gas/oil	01/13
Sutton Plant	Wilmington, NC	625	CC	Nat gas/oil	12/13

Notes:

In 2006, we announced that PEC selected a site at the Shearon Harris Nuclear Plant (Harris) to evaluate for possible future nuclear expansion. We selected the Westinghouse Electric AP1000 reactor design as the technology upon which to base PEC's application submission. On February 19, 2008, PEC filed its COL application with the NRC for two additional reactors at Harris, which the NRC docketed on April 17, 2008. No petitions to intervene have been admitted in the Harris COL application. If we receive 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 2019.

Units Planned to Be Retired

Unit & Plant Name	Location	Capacity (MW) Winter/Summer	Plant Type	Expected Retirement Date
Lee 1	Goldsboro, NC	80 MW / 74 MW	Coal	01/01/13
Lee 2	Goldsboro, NC	80 MW / 77 MW	Coal	01/01/13
Lee 3	Goldsboro, NC	257 MW / 246 MW	Coal	01/01/13
Sutton 1	Wilmington, NC	98 MW / 97 MW	Coal	01/01/13
Sutton 2	Wilmington, NC	107 MW / 104 MW	Coal	01/01/13
Sutton 3	Wilmington, NC	411 MW / 403 MW	Coal	01/01/13
Cape Fear 5	Moncure, NC	148 MW / 144 MW	Coal	12/31/14
Cape Fear 6	Moncure, NC	175 MW / 172 MW	Coal	12/31/14
Weatherspoon 1	Lumberton, NC	49 MW / 48 MW	Coal	12/31/14
Weatherspoon 2	Lumberton, NC	49 MW / 48 MW	Coal	12/31/14
Weatherspoon 3	Lumberton, NC	79 MW / 75 MW	Coal	12/31/14
Total		1,533 MW / 1,488 MW		

Planned Uprates

Unit	Date	Winter MW	Summer MW
Brunswick 2	2015	10	10
Robinson 2	2011	20	20
Robinson 2	2011	5	5
Harris 1	2010	4	8
Harris 1	2012	14	14
Harris 1	2012	16	16
Harris 1	2013	10	10
Harris 1	2015	18	14

Operating License Renewal

The plan also includes renewal of operating licenses for two of the Company's hydroelectric plants as well as its four existing nuclear units, as shown below.

Unit & Plant Name	Location	Original Operating License Expiration	Date of Approval	Extended Operating License Expiration
Blewett #1-6 (1)	Lilesville, NC	04/30/08	*Pending*	2058*
Tillery #1-4 (1)	Mr. Gilead, NC	04/30/08	*Pending*	2058*
Robinson #2	Hartsville, SC	07/31/10	04/19/04	07/31/30
Brunswick #2	Southport , NC	12/27/14	06/26/06	12/27/34
Brunswick #1	Southport, NC	09/08/16	06/26/06	09/08/36
Harris #1	New Hill, NC	10/24/26	12/12/08	10/24/46

Notes:

(1) The license renewal application for the Blewett and Tillery Plants was filed with the FERC on 04/26/06; the Company is awaiting issuance of the new license from FERC. Pending receipt of a new license, these plants are currently operating under a renewable one-year license extension which has been in effect since May 2008. Although Progress Energy has requested a 50-year license, FERC may not grant this term.

*New license expiration date will be determined by FERC license issuance date and length of granted license.

Appendix C

Progress Energy Carolinas

Integrated Resource Plan

Appendix C
Wholesale, Customer Owned Generation, and RFP's

September 13, 2010

This appendix contains firm wholesale purchased power contracts, wholesale sales, customer owned generation capacity, and requests for proposals.

Firm Wholesale Purchased Power Contracts

Purchased Power Contract	Primary Fuel Type	Summer Capacity (MW)	Capacity Designation	Location	Term	Volume of Purchases (MWh) Jul 09-Jun 10
Broad River CTs # 1-3	Gas	480	Peaking	Gaffney, SC	5/31/2021	342,626
Broad River CTs # 4-5	Gas	336	Peaking	Gaffney, SC	2/28/2022	227,509
Primary Energy-Roxboro[1]	Wood Waste/TDF[2] /Fossil	47	Intermediate	Roxboro, NC	12/31/2009	43,529
Primary Energy-Southport[1]	Wood Waste/TDF[2] /Fossil	86	Intermediate	Southport, NC	12/31/2009	68,525
New Hanover WASTEC	Waste	7.5	Base	Wilmington, NC	12/31/2010	18,529
Southern Company	Gas	150	Intermediate	Rowan County, NC	1/1/2010-12/31/2010	272,980
Southern Company	Gas	150	Intermediate	Wansley, GA	1/1/2011-12/31/2011	0
Southern Company	Gas	145	Intermediate	Rowan County, NC	1/1/2010-12/31/2019	258,159
Stone Container	Fossil/waste wood	20	Base	Florence, SC	12/31/2010	66,754

Note: The capacities shown are delivered to the PEC system and may differ from the contracted amount. Renewables purchases are listed in Appendix D.

[1]Contracts expired 12/31/09, and parties are currently in arbitration at the North Carolina Utilities Commission. Until the arbitration is resolved, PEC continues to purchase under the terms and conditions of the expired contracts.

[2]TDF is Tire Derived Fuel

In addition to the purchases shown above, PEC receives approximately 95 MW from SEPA for their customers located in PEC's control area. The SEPA energy for calendar year 2009 was 198,722 MWH.

Wholesale Sales

Customer Name	Current Active Contracts:	Firm or Interruptible	Estimated Peak Demand MW	Contract Commencement date	Contract Termination Date
Town of Black Creek, NC	Full Requirements Power Supply	Native Load Firm	3.2	2/1/2008	12/31/2017
City of Camden, SC	Full Requirements Power Supply	Native Load Firm	50	1/1/2009	12/31/2013
Fayetteville Public Works Commission	Partial Requirements Power Supply	Native Load Firm	301	7/1/2003	6/31/2012
Fayetteville Public Works Commission	Full Requirements Power Supply	Native Load Firm	531	7/1/2012	6/30/2032
French Broad EMC	Full Requirements Power Supply	Native Load Firm	90	1/1/2004	12/31/2012
Haywood EMC	Partial Requirements Power Supply	Native Load Firm	34	1/1/2009	12/31/2021
Town of Lucama, NC	Full Requirements Power Supply	Native Load Firm	5.3	2/1/2008	12/31/2017
North Carolina Electric Membership Corporation	NCEMC SOR D	Native Load Firm	420	1/1/2005	12/31/2019
	NCEMC SOR A	Native Load Firm	225	1/1/2005	12/31/2015
	NCEMC SOR A Ext.	Native Load Firm	225	1/1/2016	12/31/2022
	NCEMC SOR E	Native Load Firm	225	1/1/2005	12/31/2012
	NCEMC SOR E Ext.	Native Load Firm	275 (2013), 325 (2014-2020), 150 (2021)	1/1/2013	12/31/2021
	NCEMC Intermediate	Native Load Firm	100	4/1/2007	12/31/2011
	NCEMC 7x24 75 MW	Native Load Firm	75	6/1/2010	02/28/2011
	NCEMC PPA	Subordinate to Native Load Firm	200 (2008-2011); 300 (2012); 150 (2013-2024)	1/1/2005	12/31/2024
	NCEMC PSCA	Native Load Firm	900	1/1/2013	12/31/2032
	NCEMC Load Following	Subordinate to Native Load Firm	50	1/1/2010	12/31/2011
North Carolina Eastern Municipal Power Agency					
	Partial Requirements Power Supply	Native Load Firm	763	1/1/2010	12/31/2017
Piedmont EMC	Partial Requirements Power Supply	Native Load Firm	21	9/1/2006	12/31/2021
Town of Sharpsburg, NC	Full Requirements Power Supply	Native Load Firm	5.6	2/1/2008	12/31/2017
Town of Stantonsburg, NC	Full Requirements Power Supply	Native Load Firm	5.9	2/1/2008	12/31/2017
Town of Waynesville, NC					
	Full Requirements Power Supply Extension	Native Load Firm	17	1/1/2010	12/31/2015
Town of Winterville, NC	Full Requirements Power Supply	Native Load Firm	12	3/1/2008	12/31/2017

Note: Contracts, unless information indicates otherwise, are assumed to extend in the forecast.
(1) Contract expiration is assumed in the forecast as of 12/31/09.

Customer-Owned Generation – Accounts Served Under Standby, Curtailable or Net Metering
Status as of July 2009, with adjustment to reflect new participants through July 2009

Facility Name	Location	Primary Fuel Type	Capacity	Designation	Inclusion in PEC Resources
Customer 1	Eastern NC	Natural Gas	46,000 kW	Baseload	(1)
Customer 2	Eastern NC	By-product	60,000 kW	Baseload	(1)
Customer 3	Eastern NC	By-product	50,000 kW	Baseload	(1)
Customer 4	Western NC	By-product & Coal	51,000 kW	Baseload	(1)
Customer 5	Eastern NC	By -products	27,000 kW	Baseload	(1)
Customer 6	Western NC	Hydro	2,500 kW	Baseload	(1)
Customer 7	Eastern NC	Diesel Fuel	2,250 kW	Baseload	(1)
Customer 8	Eastern NC	Diesel Fuel	300 kW	Peaking	(2)
Customer 9	Eastern NC	Diesel Fuel	300 kW	Peaking	(2)
Customer 10	Eastern NC	Diesel Fuel	5,000 kW	Peaking	(2)
Customer 11	Eastern NC	Diesel Fuel	1,800 kW	Peaking	(2)
Customer 12	Eastern NC	Diesel Fuel	6,500 kW	Peaking	(2)
Customer 13	Eastern NC	Diesel Fuel	5,000 kW	Peaking	(2)
Customer 14	Eastern NC	Diesel Fuel	2,472 kW	Peaking	(2)
Customer 15	Eastern NC	Diesel Fuel	6,000 kW	Peaking	(2)
Customer 16	Eastern NC	Diesel Fuel	600 kW	Peaking	(2)
Customer 17	Eastern NC	Diesel Fuel	600 kW	Peaking	(2)
Customer 18	Eastern NC	Diesel Fuel	600 kW	Peaking	(2)
Customer 19	Eastern NC	Diesel Fuel	750 kW	Peaking	(2)
Customer 20	Western NC	Diesel Fuel	500 kW	Peaking	(2)
Customer 21	Western NC	Diesel Fuel	250 kW	Peaking	(2)
Customer 22	Western NC	Diesel Fuel	350 kW	Peaking	(2)
Customer 23	Western NC	Diesel Fuel	750 kW	Peaking	(2)
Customer 24	Eastern NC	PV Solar	7 kW	Intermediate	(3)
Customer 25	Western NC	PV Solar	2 kW	Intermediate	(3)
Customer 26	Eastern NC	PV Solar	1 kW	Intermediate	(3)
Customer 27	Western NC	PV Solar	2 kW	Intermediate	(3)
Customer 28	Eastern NC	PV Solar	2 kW	Intermediate	(3)
Customer 29	Western NC	PV Solar	3 kW	Intermediate	(3)
Customer 30	Western NC	PV Solar	2 kW	Intermediate	(3)
Customer 31	Eastern NC	PV Solar	3 kW	Intermediate	(3)
Customer 32	Western NC	PV Solar	2 kW	Intermediate	(3)
Customer 33	Eastern NC	PV Solar	3 kW	Intermediate	(3)
Customer 34	Western NC	PV Solar	4 kW	Intermediate	(3)
Customer 35	Western NC	PV Solar	4 kW	Intermediate	(3)
Customer 36	Western NC	PV Solar	7 kW	Intermediate	(3)
Customer 37	Western NC	PV Solar	3 kW	Intermediate	(3)

Customer 38	Western NC	PV Solar	1 kW	Intermediate	(3)
Customer 39	Eastern NC	PV Solar	3 kW	Intermediate	(3)
Customer 40	Eastern NC	PV Solar	10 kW	Intermediate	(3)
Customer 41	Eastern NC	PV Solar	8 kW	Intermediate	(3)
Customer 42	Eastern NC	PV Solar	1 kW	Intermediate	(3)
Customer 43	Western NC	PV Solar	4 kW	Intermediate	(3)
Customer 44	South Carolina	By-product	27,000 kW	Baseload	(1)
Customer 45	South Carolina	Fossil Coal	28,000 kW	Baseload	(1)
Customer 46	South Carolina	By-product & Coal	73,000 kW	Baseload	(2)
Customer 47	South Carolina	Diesel Fuel	1,500 kW	Peaking	(2)
Customer 48	South Carolina	Diesel Fuel	1,500 kW	Peaking	(2)
Customer 49	South Carolina	PV Solar	8 kW	Intermediate	(3)
Customer 50	South Carolina	PV Solar	3 kW	Intermediate	(3)
Total			399,036 kW		

(1) Standby Service customer; therefore, load forecast is reduced for generation output.
(2) Included as a curtailable resource.
(3) Net Metering customer; therefore, load forecast is reduced for generation output.

Requests for Proposals

PEC did not issue any Requests for Proposals for purchased power since its last biennial report.

Appendix D

Progress Energy Carolinas

Integrated Resource Plan

Appendix D
Alternative Supply Resources
NC REPS Compliance Plan

September 13, 2010

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Rule R8-67

Progress Energy Carolinas, Inc.'s (PEC's) overall compliance plan is to meet the requirements of G.S. § 62-133.8 with the most cost effective and reliable renewable resources available.

A specific description of planned actions to comply with G.S. 62-133.8 (b), (c), (d), (e) and (f) for each year is as follows:

G.S. § 62-133.8(b): MEETING THE RENEWABLE ENERGY AND ENERGY EFFICIENCY PORTFOLIO STANDARDS FOR ELECTRIC PUBLIC UTILITIES

In an effort to promote the development of renewable energy and energy efficiency through the implementation of a Renewable Energy and Energy Efficiency Portfolio Standard (REPS), PEC is constantly evaluating options to meet the overall requirements. Under G.S. **§** 62-133.8 (b), opportunities to meet the REPS requirements can be categorized by PEC ownership of or purchases from renewable generation, use of renewable energy resources at generating facilities, purchases of renewable energy certificates (RECs), and implementation of energy efficiency measures.

In the case of utility ownership, PEC does not currently own or operate new renewable generating facilities. Future direct or partial ownership will be based on cost-effectiveness and portfolio requirements.

PEC engages in ongoing research regarding the use of alternative fuels meeting the definition of renewable energy resources at its existing generation facilities. However, introducing alternative fuels in traditional power plants must be proven technically feasible, reliable, and cost effective prior to implementation. To the extent PEC determines the use of alternative fuels is appropriate and fits within the framework of Senate Bill 3, these measures would be included in future compliance plan filings.

Regarding the purchase of energy or RECs from renewable facilities, PEC has adopted a competitive bidding and evaluation process whereby market participants have an opportunity to propose projects on a continuous basis. PEC currently maintains an open RFP for non-solar projects less than 10 MWs in size. In addition, PEC issued a wood biomass specific RFP in November 2009. Through the renewable RFP process, since November of 2007 PEC has executed a significant number of contracts for solar, hydro, biomass, landfill gas and out of state wind RECs, which are shown on Exhibit 1.

PEC has purchased out-of-state wind RECs as allowed by Senate Bill 3. These RECs are the most cost effective options available, and they will allow PEC to balance its compliance each year while also helping to mitigate vendor performance risk.

Lastly, PEC intends to comply with a portion of the Senate Bill 3 requirements by implementing energy efficiency measures. In the year since the previous IRP filing, PEC has received approval for a number of programs and has begun implementation. A discussion of existing and proposed programs is included in the demand-side management (DSM) and energy efficiency (EE) section and Appendix E of the IRP. The projected MWhs reduced by the incremental energy efficiency programs have been included in the compliance plan tables included in Exhibit 2. PECs overall compliance plan table (Exhibit 7) depicts energy efficiency MWhs only up to the 25% and 40%

caps in any given year. However, EE MWhs that exceed the specified cap in any given year would be banked for use in future compliance years.

<u>G.S. § 62-133.8(c)</u>: RENEWABLE ENERGY AND ENERGY EFFICIENCY STANDARDS FOR ELECTRIC MEMBERSHIP CORPORATIONS AND MUNICIPALITIES

While this requirement does not apply specifically to PEC, a number of wholesale customers have contracted with PEC to comply on their behalf. The compliance plan table in Exhibit 3 includes the load and associated REPS requirement for these wholesale customers. In addition, Exhibit 6 includes the anticipated premium cap for these wholesale customers.

PEC continues to refine development of the overall process to comply on behalf of these wholesale customers. The costs associated with renewable resources procured to comply with the combined retail loads of PEC and the wholesale customers are included in PEC's compliance plan and will be allocated across the total MWhs and recovered appropriately. The details of all purchases and the cost allocation to each party will be included in PEC's annual compliance report filing.

<u>G.S. § 62-133.8(d)</u>: COMPLIANCE WITH REPS REQUIREMENT THROUGH USE OF SOLAR ENERGY RESOURCES

With the objective of meeting the initial 0.02% requirement in 2010, PEC prioritized solar bids within the November 2007 renewable RFP and subsequent planning periods. A significant number of proposals have been accepted through the RFP process and are listed on Exhibit 1. In addition to the renewable RFP, PEC implemented a commercial PV program in July 2009 with a target of adding 5 MWs of grid-tied solar PV per year and a standard offer to purchase commercial solar hot water RECs to promote development of this technology. PEC has also filed for approval by the Commission a residential PV rebate program aimed at adding 1 MW per year of distributed solar generation. Exhibit 8 shows the anticipated production from both PV and solar thermal projects that vary in technology, size, and geographic location. The "Projected Solar RECs" line item includes the effect of adding the full 6 MWs per year through 2016 under the commercial PV and residential PV programs.

<u>G.S. § 62-133.8(e)</u>: COMPLIANCE WITH REPS REQUIREMENT THROUGH USE OF SWINE RESOURCES

PEC is committed to taking all actions necessary to comply with these requirements. On February 12, 2010, in Docket E-100, Sub 113, the Commission issued an Order approving the issuance of a joint RFP as a means for the state's electric power suppliers to work together to collectively meet the swine waste resource set-aside. As a result, the state's electric power suppliers issued a joint RFP for swine waste generation on February 15, 2010 with a bid deadline of April 15, 2010. The state electric power suppliers are currently in negotiation with multiple short-listed parties from the RFP to procure swine waste resources available in the state. Based on analysis of the short-listed proposals, the identified projects appear capable of delivering sufficient RECs to meet the 2012 requirements of all of the state's electric power suppliers; however, the suppliers remain cautious in concluding that the requirements will be met because many uncertainties remain to be addressed in contract negotiations and the subsequent project development efforts of the selected suppliers. In addition, on March 31, 2010, in the same docket noted above, the Commission issued an Order on pro rata allocation of the aggregate swine and poultry waste set-aside requirements. In that Order, the Commission ruled that the statewide aggregate swine waste set-aside requirement would be allocated among the state's electric power suppliers using the annual percentage requirement for swine waste generation as established by G.S. §62-133.8(e) multiplied by such electric power supplier's previous year's North Carolina retail kWh sales. The "Projected Swine" generation data shown on Exhibit 8 is the amount of energy PEC would need to procure to be compliant with its pro-rata share of swine generation.

G.S. § 62-133.8(f): COMPLIANCE WITH REPS REQUIREMENT THROUGH USE OF POULTRY WASTE RESOURCES

NC Senate Bill 3 provides for a statewide aggregate requirement for poultry waste generation. In the March 31, 2010 Order noted above, the Commission also held that the statewide aggregate poultry waste set-aside requirement would be allocated among the state's electric power suppliers in the following manner: the statewide aggregate poultry waste set-aside MWh requirements as detailed in G.S. §62-133.8(f) multiplied by the ratio of an electric power supplier's previous year's North Carolina retail kWh sales divided by the total North Carolina retail kWh sales of all electric power suppliers in the previous year. In addition, on June 25, 2010, the Commission issued an Order approving collaborative efforts among various state electric power suppliers as a means to collectively meet the poultry waste set aside. PEC is participating in these collective efforts and based upon the information received to date, PEC's ability to meet its share of the 2012 statewide poultry requirement is promising; however, it is too early to conclude that the 2012 obligations will be met based on similar issues to those stated above for swine. The "Projected Poultry" generation amounts shown on Exhibit 8 reflect anticipated transactions that should assist PEC in meeting its pro rata share of this requirement.

DESCRIPTION OF EXHIBITS

- **A list of executed contracts to purchase renewable energy certificates (whether or not bundled with electric power), including type of renewable energy resource, expected MWhs, and contract duration.**

PEC has executed a number of contracts with renewable energy facilities. These contracts are displayed in Exhibit 1. To provide adequate time for filing preparation, only contracts executed as of August 25, 2010 are included in this exhibit.

- **A list of planned or implemented energy efficiency measures, including a brief description of the measure and projected impacts.**

A discussion of existing and planned energy efficiency programs is included in the DSM and EE section of the IRP and Appendix E. Exhibit 2 in this document summarizes the projected energy efficiency MWhs included for REPS compliance.

- **The projected North Carolina retail sales and year-end number of customer accounts by customer class for each year**

Exhibit 3 in this document summarizes the retail sales forecast and corresponding REPS energy requirement. Exhibit 4 summarizes the customer account forecasts and the corresponding REPS cost cap.

- **The current and projected avoided cost rates for each year**

Exhibit 5 summarizes the total avoided costs based upon PEC's most recently approved avoided cost tariff. The specific avoided cost assigned to each transaction depends on the deal term and the date the contract was executed.

- **The projected total and incremental costs anticipated to implement the compliance plan for each year**

Exhibit 6 displays the projected total and incremental costs for executed contracts . The costs for undesignated contracts are not forecasted due to the uncertainty regarding the cost of these resources.

- **A comparison of projected costs to the annual cost caps for each year**
- **An estimate of the amount of the REPS rider and the impact on the cost of fuel and fuel-related costs rider necessary to fully recover the projected costs**

Exhibit 6 displays the cost caps and the projected costs for executed contracts. After removing these forecasted costs from the REPS premium, the Exhibit shows the remaining funds projected to be available for undesignated contracts. These future premiums are subject to change due to several factors, including retail growth rate assumptions, underlying cost escalation in executed contracts, change in the energy generation forecast from these resources, amongst others.

Progress Energy - Carolinas

2010 REPS Compliance Filing

Exhibit 1, Page 1: Executed Contract Summary

Counterparty:	Resource Type:	Load:	Contract Duration (years):	Capacity MW	Energy MWh	Expected Annual RECs:
Customer A	Landfill Gas	Baseload				
Customer B	Landfill Gas	Baseload				
Customer C	Biomass	Baseload				
Customer D	Biomass (thermal RECs)	REC Only				
Customer E	Solar PV	Energy and REC				
Customer F	Solar PV	Energy and REC				
Customer G	Solar PV	Energy and REC				
Customer H	Solar PV	Energy and REC				
Customer I	Solar PV RECs	REC Only				
Customer J	Solar PV	Energy and REC				
Customer K	Solar PV	Energy and REC				
Customer L	Solar PV	Energy and REC				
Customer M	Solar PV	Energy and REC				
Customer N	Solar PV	Energy and REC				
Customer O	Solar PV	Energy and REC				
Customer P	Solar PV	Energy and REC				
Customer Q	Solar PV	Energy and REC				
Customer R	Solar PV	Energy and REC				
Customer S	Solar PV	Energy and REC				
Customer T	Solar PV	Energy and REC				
Customer U	Solar PV	Energy and REC				
Customer V	Solar PV	Energy and REC				
Customer W	Solar PV	Energy and REC				
Customer X	Solar PV	Energy and REC				
Customer Y	Solar PV	Energy and REC				
Customer Z	Solar PV	Energy and REC				
Customer AA	Solar PV	Energy and REC				
Customer AB	Solar PV	Energy and REC				
Customer AC	Solar PV	Energy and REC				
Customer AD	Solar PV	Energy and REC				
Customer AE	Solar PV	Energy and REC				
Customer AF	Solar PV	Energy and REC				

Progress Energy - Carolinas

2010 REPS Compliance Filing

Exhibit 1, Page 2: Executed Contract Summary

Counterparty:	Resource Type:	Load:	Contract Duration (years):	Capacity MW	Energy MWh	Expected Annual RECs:
Customer AG	Solar Thermal	RECs Only				
Customer AH	Solar Thermal	RECs Only				
Customer AI	Solar Thermal	RECs Only				
Customer AJ	Solar Thermal	RECs Only				
Customer AK	Solar Thermal	RECs Only				
Customer AL	Hydro	RECs Only				
Customer AM	Hydro	RECs Only				
Customer AN	Hydro	RECs Only				
Customer AO	Hydro	RECs Only				
Customer AP	Hydro	RECs Only				
Customer AQ	Hydro	RECs Only				
Customer AR	Hydro	RECs Only				
Customer AS	Wind RECs	RECs Only				
Customer AT	Wind RECs	RECs Only				

Footnote

(1) These figures are total contracted RECs and not representative of expected annual deliveries

Progress Energy - Carolinas

2010 REPS Compliance Filing

Exhibit 2: Energy Efficiency Forecast

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Energy Efficiency Forecast (GWh)	181	352	511	672	821	950	1,102	1,243	1,396	1,566	1,710	1,837	2,025	2,214	2,396	2,569
Maximum Energy Efficiency for REPS Compliance (%)	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	40%	40%	40%	40%
PEC REPS Requirement (GWh)	7	7	1,100	1,120	1,141	2,332	2,372	2,414	4,076	4,130	4,185	5,305	5,381	5,450	5,522	5,596
Maximum Energy Efficiency for REPS Compliance (GWh)	-	-	275	280	285	583	593	603	1,019	1,032	1,046	1,326	2,152	2,180	2,209	2,238
Net Energy Efficiency for REPS	-	-	275	280	285	583	593	603	1,019	1,032	1,046	1,326	2,025	2,180	2,209	2,238

Progress Energy - Carolinas

2010 REPS Compliance Filing

Exhibit 3: Proposed Retail Sales and REPS Compliance

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
PEC REQUIREMENT:																
NC Retail GWh	36,272	36,678	37,335	38,037	38,866	39,531	40,230	40,760	41,297	41,849	42,441	43,046	43,603	44,172	44,765	45,383
REPS Req (%)	0.02%	0.02%	3%	3%	3%	6%	6%	6%	10%	10%	10.0%	12.5%	12.5%	12.5%	12.5%	12.5%
REPS Req (GWh)	7	7	1,100	1,120	1,141	2,332	2,372	2,414	4,076	4,130	4,185	5,305	5,381	5,450	5,522	5,596
Wholesale Requirements:																
Wholesale GWh (1)	162	163	166	168	171	173	174	176	178	180	181	183	185	187	189	191
REPS Req (%)	0.02%	0.02%	3.00%	3.00%	3.00%	6.00%	6.00%	6.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
REPS Req (GWh)	0	0	5	5	5	10	10	10	18	18	18	18	18	19	19	19
TOTAL REPS REQUIREMENT:	7.3	7.3	1,105.2	1,125.0	1,146.2	2,342.2	2,382.2	2,424.3	4,093.6	4,147.5	4,202.9	5,323.3	5,399.0	5,468.8	5,540.2	5,614.5

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Set Aside Requirements:																
PEC Solar Req %	0.02%	0.02%	0.07%	0.07%	0.07%	0.14%	0.14%	0.14%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%
PEC Solar Req GWh (2)	7	7	26	26	27	55	56	57	82	83	84	85	86	88	89	90
Swine Waste Req %			0.07%	0.07%	0.07%	0.14%	0.14%	0.14%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%
PEC Swine Waste Req GWh (2)			26	26	27	55	56	57	82	83	84	85	86	88	89	90
State-Wide Poultry Waste Req GWh			170	700	900	900	900	900	900	900	900	900	900	900	900	900

Footnote:

(1) Wholesale load includes forecast for Waynesville, Sharpsburg, Stantonsburg, Black Creek and Lucama.

(2) Requirements are based on combined load for PEC NC Retail and Wholesale.

SACE 1st Response to Staff
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Exhibit 4: Proposed RPS Cost Cap - North Carolina

Projected Customers [1]

		2009 Actuals	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Est. Number of Res Cust	(000)	1,096	1,106	1,119	1,136	1,153	1,173	1,195	1,220	1,245	1,270	1,295	1,320	1,345	1,369	1,394	1,418	1,443
Est. Number of Comm Cust	(000)	178	179	181	185	190	196	202	206	210	214	219	223	228	232	237	241	246
Est. Number of Ind Cust	(000)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Est. Total Number of Cust	(000)	1,276	1,287	1,302	1,322	1,345	1,371	1,399	1,428	1,457	1,487	1,516	1,545	1,574	1,603	1,633	1,662	1,691

Annual Cap by Customer Account

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Residential Annual Cap Per Account	$10	$10	$12	$12	$12	$34	$34	$34	$34	$34	$34	$34	$34	$34	$34	$34
Commercial Annual Cap Per Account	$50	$50	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150
Industrial Annual Cap Per Account	$500	$500	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000

Projected Annual Total RPS Cap Amount - PEC

		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Residential Class Amount	($ Millions)	**$11.0**	**$11.1**	**$13.4**	**$13.6**	**$13.8**	**$39.9**	**$40.6**	**$41.5**	**$42.3**	**$43.2**	**$44.0**	**$44.9**	**$45.7**	**$46.6**	**$47.4**	**$48.2**
Commercial Class Amount	($ Millions)	**$8.9**	**$9.0**	**$27.2**	**$27.7**	**$28.5**	**$29.4**	**$30.3**	**$30.9**	**$31.5**	**$32.1**	**$32.8**	**$33.5**	**$34.1**	**$34.8**	**$35.5**	**$36.2**
Industrial Class Amount	($ Millions)	**$1.0**	**$1.0**	**$2.1**	**$2.1**	**$2.1**	**$2.1**	**$2.1**	**$2.1**	**$2.1**	**$2.1**	**$2.1**	**$2.1**	**$2.1**	**$2.1**	**$2.1**	**$2.1**
Total Amount from All Customers	($ Millions)	**$20.9**	**$21.1**	**$42.7**	**$43.4**	**$44.4**	**$71.3**	**$73.0**	**$74.5**	**$75.9**	**$77.4**	**$78.9**	**$80.4**	**$81.9**	**$83.4**	**$85.0**	**$86.5**

Footnote:

(1) The number of customer accounts reflect premise billing and represent PEC customer numbers only.

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Exhibit 5: Avoided Costs

Current Avoided Cost
Schedule CSP-25

	2-yr	5-yr	10-yr	15-yr
Total Nominal Avoided Energy and Capacity Cost ($ / MWh) [1]	$ 56.96	$ 58.29	$ 60.54	$ 61.11

Footnotes:
(1) Levelized energy and capacity costs

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Exhibit 6: Projected Total and Incremental Costs

($ millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
North Carolina Retail REPS Premium Cap	$ 20.9	$ 21.1	$ 42.7	$ 43.4	$ 44.4	$ 71.3	$ 73.0	$ 74.5	$ 75.9	$ 77.4	$ 78.9	$ 80.4	$ 81.9	$ 83.4	$ 85.0	$ 86.5
Wholesale REPS Premium Cap (1)	$ 0.1	$ 0.1	$ 0.2	$ 0.2	$ 0.2	$ 0.4	$ 0.4	$ 0.4	$ 0.4	$ 0.4	$ 0.4	$ 0.4	$ 0.4	$ 0.4	$ 0.4	$ 0.4
Total CAP	$ 21.0	$ 21.2	$ 42.9	$ 43.6	$ 44.6	$ 71.7	$ 73.3	$ 74.8	$ 76.3	$ 77.8	$ 79.3	$ 80.8	$ 82.3	$ 83.8	$ 85.4	$ 86.9
Total Cost of Purchases Excluding Undesignated	$ 25.0	$ 51.0	$ 51.9	$ 54.8	$ 56.0	$ 36.9	$ 40.1	$ 41.4	$ 12.6	$ 12.3	$ 10.9	$ 2.5	$ 2.6	$ 2.6	$ 2.6	$ 2.6
Avoided Cost of Purchases Excluding Undesignated	$ 13.4	$ 37.8	$ 39.4	$ 39.4	$ 39.4	$ 27.7	$ 29.3	$ 29.3	$ 8.2	$ 8.1	$ 7.1	$ 0.8	$ 0.8	$ 0.8	$ 0.8	$ 0.8
REPS PREMIUM EXCLUDING UNDESIGNATED	$ 11.6	$ 13.2	$ 12.5	$ 15.4	$ 16.6	$ 9.1	$ 10.8	$ 12.1	$ 4.5	$ 4.2	$ 3.8	$ 1.7	$ 1.8	$ 1.8	$ 1.8	$ 1.8
R&D and Incremental Expense	$ 1.6	$ 1.5	$ 2.0	$ 2.0	$ 2.0	$ 2.0	$ 2.0	$ 2.0	$ 2.0	$ 2.0	$ 2.0	$ 2.0	$ 2.0	$ 2.0	$ 2.0	$ 2.0
TOTAL ($MM)	$ 13.2	$ 14.7	$ 14.5	$ 17.4	$ 18.6	$ 11.1	$ 12.8	$ 14.1	$ 6.5	$ 6.2	$ 5.8	$ 3.7	$ 3.8	$ 3.8	$ 3.8	$ 3.8
TOTAL Including GRT and Reg Fee ($MM)	$ 13.6	$ 15.2	$ 15.0	$ 18.0	$ 19.2	$ 11.5	$ 13.2	$ 14.6	$ 6.7	$ 6.4	$ 6.1	$ 3.8	$ 3.9	$ 3.9	$ 3.9	$ 4.0
REPS Premium Cap	$ 21.0	$ 21.2	$ 42.9	$ 43.6	$ 44.6	$ 71.7	$ 73.3	$ 74.8	$ 76.3	$ 77.8	$ 79.3	$ 80.8	$ 82.3	$ 83.8	$ 85.4	$ 86.9
Available Premium for Undesignated	$ 7.4	$ 6.0	$ 27.9	$ 25.6	$ 25.4	$ 60.2	$ 60.1	$ 60.2	$ 69.6	$ 71.3	$ 73.2	$ 77.0	$ 78.5	$ 79.9	$ 81.4	$ 83.0

Footnotes:

(1) Premium based on assumption of 0.5% of Progress Energy North Carolina retail load

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Exhibit 7: REPS Compliance

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
REPS REQUIREMENT																
North Carolina Retail (GWh)	36,272	36,678	37,335	38,037	38,866	39,531	40,230	40,760	41,297	41,849	42,441	43,046	43,603	44,172	44,765	45,383
Wholesale (GWh) [1]	162	163	166	168	171	173	174	176	178	180	181	183	185	187	189	191
REPS Requirement (GWh Equivalent)	7	7	1,105	1,125	1,146	2,342	2,382	2,424	4,094	4,147	4,203	5,323	5,399	5,469	5,540	5,615
ENERGY EFFICIENCY (GWh Equiv.) [2]	-	-	275	280	285	583	593	603	1,019	1,032	1,046	1,326	2,025	2,180	2,209	2,238
COMMITTED PURCHASES (GWh Equiv.)																
Solar Generation	11	14	14	14	14	14	14	14	13	13	13	13	13	13	13	13
Biomass Generation	229	638	663	663	663	451	477	477	120	120	103	-	-	-	-	-
Hydro Generation	39	19	19	19	19	19	19	19	19	-	-	-	-	-	-	-
Wind Generation	-	-	277	281	287	555	-	-	-	-	-	-	-	-	-	-
PROJECTED RESOURCES (GWh Equiv.) [3]																
Undesignated Poultry Generation	-	-	202	201	271	271	271	271	271	271	271	271	271	271	271	271
Undesignated Solar Generation	1	12	21	31	40	50	59	61	61	61	61	61	61	61	61	61
Undesignated Swine Generation	-	-	26	26	27	55	56	57	82	83	84	85	86	88	89	90
Undesignated Other Renewables [4]	-	-	22	22	22	22	22	22	2,020	2,568	2,625	3,567	2,944	2,857	2,898	2,942
TOTAL SUPPLY RESOURCES AND ENERGY EFFICIENCY (GWh Equiv.)	279	683	1,520	1,539	1,629	2,021	1,512	1,525	3,604	4,147	4,203	5,323	5,399	5,469	5,540	5,615
REPS Requirement (GWh Equiv.)	7	7	1,105	1,125	1,146	2,342	2,382	2,424	4,094	4,147	4,203	5,323	5,399	5,469	5,540	5,615
SUPPLY RESOURCES RELATIVE TO REQ. (GWh Equiv.)	272	676	415	414	483	(321)	(870)	(900)	(489)	0	0	(0)	0	0	0	0
REC BANKING																
Beginning REC Carryforward Balance (000)	321	594	1,269	1,684	2,098	2,581	2,259	1,389	489	-	0	0	0	0	0	0
RECs Added (Removed) (000)	272	676	415	414	483	(321)	(870)	(900)	(489)	0	0	(0)	0	0	0	0
Ending REC Carryforward Balance (000)	594	1,269	1,684	2,098	2,581	2,259	1,389	489	-	0	0	0	0	0	0	0
Net Supply Relative to Req. After REC Carryover (GWh Equiv.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Footnotes:

(1) Represents the requirement of wholesale customers that have agreed to have Progress Energy comply on their behalf and have contributed REPS premium dollars for this requiremer

(2) Reflects the forecasted Energy Efficiency limited to 25% of REPS compliance through 2020 and 40% afterwards

(3) The undesignated generation is the amount required to meet the MWh requirement. The MWh shown may decrease due to $/customer cap limitations depending on the price of these resource:

(4) The undesignated other renewables may include REC only purchases for compliance (no associated generation

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Exhibit 8: Set Asides

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
PEC Solar Energy Requirement (GWh)	7	7	26	26	27	55	56	57	82	83	84	85	86	88	89	90
PEC Swine Waste Energy Requirement (GWh)	-	-	26	26	27	55	56	57	82	83	84	85	86	88	89	90
State-Wide Poultry Waste Energy Requirement (GWh)	-	-	170	700	900	900	900	900	900	900	900	900	900	900	900	900
Solar Purchase Summary (GWh)																
Solar Energy Requirement (1)	7.3	7.3	25.8	26.3	26.7	54.7	55.6	56.6	81.9	82.9	84.1	85.2	86.5	87.6	88.7	89.9
Contracted Solar RECs	10.7	14.4	14.4	14.4	14.4	14.4	14.4	14.4	13.4	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Projected Solar RECs	1.2	11.8	21.3	30.7	40.2	49.7	59.1	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7
Total Solar Resources	11.9	26.2	35.7	45.1	54.6	64.0	73.5	75.1	74.1	73.7	73.7	73.7	73.7	73.7	73.7	73.7
Solar Resources Relative to Requirement (000)	4.6	18.9	9.9	18.9	27.8	9.4	17.9	18.5	(7.7)	(9.3)	(10.4)	(11.6)	(12.8)	(13.9)	(15.1)	(16.2)
Beginning Solar REC Bank (000)	4.1	8.7	27.6	37.5	56.3	84.2	93.6	111.5	130.0	122.3	113.0	102.6	91.0	78.2	64.3	49.3
Ending Solar REC Bank (000)	8.7	27.6	37.5	56.3	84.2	93.6	111.5	130.0	122.3	113.0	102.6	91.0	78.2	64.3	49.3	33.0
Swine Purchase Summary (GWh):																
Swine Waste Energy Requirement (1)	-	-	25.8	26.3	26.7	54.7	55.6	56.6	81.9	82.9	84.1	85.2	86.5	87.6	88.7	89.9
Contracted Swine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Projected Swine	-	-	25.8	26.3	26.7	54.7	55.6	56.6	81.9	82.9	84.1	85.2	86.5	87.6	88.7	89.9
Total:	-	-	25.8	26.3	26.7	54.7	55.6	56.6	81.9	82.9	84.1	85.2	86.5	87.6	88.7	89.9
Poultry Waste Purchase Summary (GWh):																
Poultry Waste Energy State-Wide Requirement	-	-	170.0	700.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0
Contracted Poultry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Projected Poultry	-	-	201.6	201.0	270.6	270.6	271.2	270.6	270.6	270.6	271.2	270.6	270.6	270.6	271.2	270.6

Footnotes:

(1) Requirements are based on combined load for PEC NC Retail and Wholesale.

Appendix E

Progress Energy Carolinas

Integrated Resource Plan

Appendix E
Demand Side Management and Energy Efficiency

September 13, 2010

New Demand Side Management (DSM) and Energy Efficiency (EE) Programs

Progress Energy Carolinas, Inc. (PEC) continues to pursue a long-term, balanced capacity and energy strategy to meet the future electricity needs of its customers. This balanced strategy includes a strong commitment to demand side management (DSM) and energy efficiency (EE) programs, investments in renewable and emerging energy technologies, and state-of-the art power plants and delivery systems. PEC currently has the following six EE programs, three DSM programs and one pilot program that have been approved by both the North Carolina Utilities Commission and the Public Service Commission of South Carolina:

Energy Efficiency Programs

- Residential Home Energy Improvement
- Residential Home Advantage
- Residential Neighborhood Energy Saver (Low-Income)
- Residential Lighting Program
- Residential Appliance Recycling Program
- Commercial, Industrial, and Governmental (CIG) Energy Efficiency

Demand Response Programs

- Residential EnergyWise Home^{SM}
- CIG Demand Response Automation Program
- Distribution System Demand Response (DSDR) Program

Pilot Programs

- Solar Water Heating Pilot Program

<u>Energy Efficiency Programs</u>

Residential Home Energy Improvement Program

The Residential Home Energy Improvement Program offers PEC customers a variety of energy conservation measures designed to increase energy efficiency for existing residential dwellings that can no longer be considered new construction. The prescriptive menu of energy efficiency measures provided by the program allows customers the opportunity to participate based on the needs and characteristics of their individual homes. Financial incentives are provided to participants for each of the conservation measures promoted within this program. The program utilizes a network of pre-qualified contractors to install each of the following energy efficiency measures:

- High-Efficiency Heat Pumps and Central A/C
- Duct Testing & Repair
- HVAC Tune-up

- Insulation Upgrades/Attic Sealing
- Window Replacement

In addition, PEC's previously existing Energy Efficiency Financing program was incorporated into this program in 2009 to connect customers with screened contractors who provide complete installation and financing on a range of energy-saving home improvements.

The Residential Home Energy Improvement program was launched in July 2009. Through July 31, 2010, there have been 25,746 participants contributing 11,510 MWh in net annualized energy savings and 8,776 kW in peak demand savings.

Residential Home Advantage (New Construction) Program

The Residential Home Advantage New Construction Program offers developers and builders the potential to maximize energy savings in various types of new residential construction. The program utilizes a prescriptive approach for developers and builders of projects for single-family, multi-family (three stories or less), and manufactured housing units. The program is also available to high rise multi-family units that are currently not eligible for ENERGY STAR® as long as each unit meets the intent of the ENERGY STAR® builder option package for their climate zone and the Home Advantage Program criteria.

The primary objectives of this program are to reduce system peak demands and energy consumption within new homes. New construction represents a unique opportunity for capturing cost effective DSM and EE savings by encouraging the investment in energy efficiency features that would otherwise be impractical or more costly to install at a later time. These are often referred to as lost opportunities.

Since the launch of the Residential Home Advantage program in December 2008, there have been 1,608 participants through July 31, 2010, contributing 1,797 MWh in net annualized energy savings and 618 kW in peak demand savings.

Residential Lighting Program

PEC has partnered with various manufacturers and retailers across its entire service territory to offer ENERGY STAR® qualified lighting products to its customers. PEC's Residential Lighting Program was launched in January 2010 to provide both customer incentives, in the form of reduced pricing, and marketing support to retailers in order to encourage a greater adoption of ENERGY STAR® qualified or other high efficiency lighting products. The program promotes the purchase of these products using in-store and on-line promotions. PEC is also promoting a greater awareness of these products using special retail and community events. The early years of the program focuses on compact fluorescent light bulbs (CFLs), with the intent to add newer lighting technologies as they become available and cost-effective.

Through July 31, 2010, 1,760,541 CFLs have been sold through the Residential Lighting Program, contributing 38,605 MWh in net annualized energy savings and 3,665 kW in peak demand savings.

Prior to implementation of the Residential Lighting Program, PEC ran a CFL Buy-Down Pilot during the last quarter of 2007 which accounted for 203,222 bulbs sold and contributed 6,706 MWh in annualized net energy savings and 630 kW in peak demand savings.

Residential Neighborhood Energy Saver (Low-Income) Program

PEC's Neighborhood Energy Saver Program was launched in October 2009 to assist low-income residential customers implement energy conservation measures which in turn lessen their household energy costs. The program provides assistance to low-income families by installing a comprehensive package of energy conservation measures that lower energy consumption at no cost to the customer. Prior to installing measures, an energy assessment is conducted on each residence to identify the appropriate measures to install. In addition to the installation of energy efficiency measures, an important component of the Neighborhood Energy Saver program is the provision for one-on-one energy education. Each resident receives education on energy efficiency techniques and is encouraged to make behavioral changes to help reduce and control their energy usage.

As of July 31, 2010, measures have been installed in 2,936 homes. These installed measures contributed 2,727 MWh in net annualized energy savings and 420 kW in peak demand savings.

Residential Appliance Recycling Program

The Appliance Recycling Program is designed to reduce energy usage by removing less efficient refrigerators and freezers that are operating within residences across the PEC service territory. The program provides residential customers with free pick-up and an incentive of $50 for allowing PEC to collect and recycle their less efficient refrigerator or freezer and permanently remove the unit from service.

The Residential Appliance Recycling Program was launched in April 2010. As of July 31, 2010, there have been 1,711 participants contributing 1,078 MWh in net annualized energy savings and 125 kW in peak demand savings.

Commercial, Industrial, and Governmental (CIG) Energy Efficiency Program

The CIG Energy Efficiency Program is available to all CIG customers interested in improving the energy efficiency of their new construction projects or existing facilities. New construction incentives provide an opportunity to capture cost effective energy efficiency savings that would otherwise be impractical or more costly to install at a later time. The retrofit market offers energy saving opportunities for CIG customers with older, energy inefficient electrical equipment. The program includes prescriptive incentives for measures that address the following major end-use categories:

- HVAC
- Lighting
- Motors & Drives
- Refrigeration

In addition, the program offers incentives for custom measures to specifically address the individual needs of customers in the new construction or retrofit markets, such as those with more complex applications or in need of energy efficiency opportunities not covered by the prescriptive measures. The program also seeks to meet the following overall goals:

- Educate and train trade allies, design firms and customers to influence selection of energy efficient products and design practices.
- Educate CIG customers regarding the benefits of energy efficient products and design elements and provide them with tools and resources to cost-effectively implement energy-saving projects.

The CIG Energy Efficiency program was launched in April 2009. As of July 31, 2010, there have been 905 participants contributing 32,203 MWh in net annualized energy savings and 7,014 kW in peak demand savings.

Demand Response Programs

Residential EnergyWise Home℠ Program

The Residential EnergyWise Home℠ Program is a direct load control program that allows PEC, through the installation of load control switches at the customer's premise, to remotely control the following residential appliances.

- Central air conditioning or electric heat pumps
- Auxiliary strip heat on central electric heat pumps (Western Region only)
- Electric water heaters (Western Region only)

For each of the control options above, an initial one-time bill credit of $25 following the successful installation and testing of load control device(s) and annual bill credits of $25 will be provided to program participants in exchange for allowing PEC to control the listed appliances.

The program provides PEC with the ability to reduce and shift peak loads, thereby enabling a corresponding deferral of new supply-side peaking generation and enhancing system reliability. Participating customers are impacted by (1) the installation of load control equipment at their residence, (2) load control events which curtail the operation of their air conditioning, heat pump strip heating or water heating unit for a period of time each hour, and (3) the receipt of an annual bill credit from PEC in exchange for allowing PEC to control their electric equipment.

Through July 31, 2010, the Residential EnergyWise Home℠ Program has 32,189 participants contributing 36,642 kW of summer peak load reduction capability and 1,671 kW of winter peak load reduction capability. Since the time of PEC's last biennial resource plan filing in September 2008, and extending through July 2010, there have been three Residential EnergyWise Home℠ Program activations. In addition, PEC has performed 17 test activations for M&V purposes in 2009 and 2010 to help estimate program impacts and identify opportunities to maximize program use while minimizing customer complaints that may cause them to drop out of the program.

Residential EnergyWise Home℠			
Start Time	**End Time**	**Duration (Minutes)**	**MW Load Reduction**
05/06/2010 14:30	05/06/2010 18:30	240	18.0
06/24/2010 15:00	06/24/2010 17:07	127	28.6
07/07/2010 15:00	07/07/2010 17:30	150	34.1

Commercial, Industrial, and Governmental (CIG) Demand Response Automation Program

The CIG Demand Response Automation Program allows PEC to install load control and data acquisition devices to remotely control and monitor a wide variety of electrical equipment capable of serving as a demand response resources. This program utilizes customer education, enabling two-way communication technologies, and an event-based incentive structure to maximize load reduction capabilities and resource reliability. The primary objective of this program is to reduce PEC's need for additional peaking generation by reducing PEC's seasonal peak load demands, primarily during the summer months, through deployment of load control and data acquisition technologies.

The CIG Demand Response Automation Program was launched in October 2009. As of July 31, 2010, there were 18 active installations in the program contributing 6,333 kW of available load reduction capability. From this program's inception through July 31, 2010, there have been two CIG Demand Response Automation Program control events.

CIG Demand Response Automation			
Start Time	End Time	Duration (Minutes)	MW Load Reduction
06/24/2010 13:00	06/24/2010 19:00	360	4.9
07/07/2010 13:00	07/07/2010 19:00	360	5.4

Distribution System Demand Response Program (DSDR)

PEC and other utilities have historically utilized conservation voltage reduction (CVR) to reduce peak demand for short periods of time by lowering system voltage. This practice has been used in a limited fashion due to concerns that some customers could experience voltages below the lowest allowable level. DSDR is a program that enables PEC to increase peak load reduction capability and displace the need for additional future peaking generation capacity by investing in a robust system of advanced technology, telecommunications, equipment, and operating controls. This increased peak load reduction is accomplished while maintaining customer delivery voltage above the minimum requirements. The DSDR Program enables PEC to implement a least cost mix of demand reduction and generation resources that meet the electricity needs of its customers.

<u>Pilot Programs</u>

Residential Solar Water Heating Pilot Program

This pilot program was launched in June 2009 and was designed to provide PEC with the ability to measure and validate the achievable energy savings and coincident peak impacts associated with implementing residential solar water heating in the PEC service territory. Results from the pilot program will enable PEC to determine whether it is cost effective to incorporate solar water heating as part of its least cost mix of demand reduction and generation measures to meet the electricity needs of its customers. The data from this pilot program will also enable PEC to form a validated foundation for determining the future value of energy efficiency rebates or potential REC values, and create a better database of operational characteristics that could be used by other stakeholders (i.e., vendors/installers, developers, homeowners, solar advocates, policy makers, regulators, etc.).

As of July 31, 2010, there are 104 customers participating in the Residential Solar Water Heating Pilot Program, which has a cap of 150 total participants in PEC's service area.

Summary of Prospective Program Opportunities

PEC is considering the implementation of a new EE resource targeted to residential customers and designed to reduce residential electrical consumption by applying behavioral science principals in which eligible customers receive reports that compare their energy use with neighbors in similar homes. In addition to the household comparative analysis, the reports will provide specific recommendations to motivate participants to reduce their energy consumption. PEC is also considering expanding its Residential Home Energy Improvement program to include several new, additional EE measures.

DSM and EE Forecasts

On March 16, 2009, a DSM Potential Study Final Report for PEC was completed and issued by ICF International. The primary objective of this study was to characterize the realistically achievable potential for a variety of DSM and EE programs in the PEC service territory under a specific set of assumptions. The study concluded that over a 15 year period, approximately 1,020 MWs and 2,094 GWh/year were cost effectively and realistically achievable under the specific assumptions and caveats set forth therein. This includes the significant effect of certain large commercial and industrial customers “opting-out” of the programs, thereby reducing the amount of potential that could be developed by PEC.

ICF International recently performed an update to that forecast of PEC’s DSM/EE potential based on updated avoided cost projections and the addition of several measures that were not part of the original study. The results of this update show that the cost-effective, realistically achievable potential within the PEC service area over a 15-year period is 1,101 MWs and 2,356 GWh/year, a 7.9% and 12.5% increase, respectively, over the original study results.

While these estimates are suitable for use in long-range system planning models and integrated resource planning, the study did not attempt to closely forecast DSM/EE achievements in the short-term or from year to year. Such an annual accounting is highly sensitive to the nature of programs adopted, the timing of the introduction of those programs, and other factors. In contrast, this study illustrates the approximate DSM/EE impacts that may be possible over an extended time period if the study assumptions hold, as well as the approximate cost of those impacts.

Based on the results of the updated potential study, PEC has also updated its DSM/EE savings forecast for integrated resource planning purposes. The tables below show the projected composite impacts of all new PEC DSM, EE, and DSDR programs, including the expected potential from program growth, program enhancements and future new programs. The tables do not include savings from previously existing programs, such as Large Load Curtailment or Voltage Control, which will be discussed later in this document.

Peak MW Demand Savings (at generator)

Year	Summer Peak MW Savings				Winter Peak MW Savings			
	DSM	EE	DSDR	Total	DSM	EE	DSDR	Total
2010	42	21	99	162	4	9	99	112
2011	102	41	111	253	14	19	111	144
2012	159	72	241	472	23	38	241	303
2013	211	110	249	570	32	61	249	342
2014	257	148	255	659	39	88	255	382
2015	296	180	261	737	46	109	261	416
2016	328	216	267	810	48	129	267	444
2017	352	255	272	879	49	152	272	474
2018	367	297	278	941	50	177	278	505
2019	375	344	283	1,002	50	204	283	538
2020	379	392	289	1,060	51	233	289	573
2021	381	436	295	1,112	51	259	295	605
2022	383	481	301	1,164	52	286	301	638
2023	385	529	307	1,220	52	316	307	674
2024	386	577	313	1,275	52	346	313	710
2025	387	622	319	1,328	52	375	319	746

Annual MWh Energy Savings (at generator)

Year	DSM	EE	DSDR	Total Savings
2010	1,155	152,381	28,845	182,380
2011	2,658	314,494	37,968	355,120
2012	4,104	462,716	48,327	515,147
2013	5,407	621,846	49,689	676,942
2014	6,569	770,106	50,552	827,227
2015	7,532	898,617	51,518	957,668
2016	8,264	1,049,971	52,389	1,110,624
2017	8,803	1,189,737	53,297	1,251,837
2018	9,127	1,341,482	54,240	1,404,849
2019	9,303	1,511,254	55,153	1,575,710
2020	9,398	1,653,810	56,089	1,719,297
2021	9,454	1,779,851	57,034	1,846,339
2022	9,501	1,966,779	57,994	2,034,274
2023	9,539	2,155,526	58,972	2,224,036
2024	9,569	2,335,892	59,967	2,405,428
2025	9,594	2,508,257	60,979	2,578,830

Previously Existing Demand Side Management and Energy Efficiency Programs

Prior to the passage of North Carolina Senate Bill 3 in 2007, PEC had a number of EE/DSM programs in place. These programs are available in both North and South Carolina and include the following:

Existing Energy Efficiency Programs

Energy Efficient Home Program

PEC introduced in the early 1980's an Energy Efficient Home program. This program provides residential customers with a 5% discount of the energy and demand portions of their electricity bills when their homes met certain thermal efficiency standards that were significantly above the existing building codes and standards. Homes that pass an ENERGY STAR® test receive a certificate as well as a 5% discount on the energy and demand portions of their electricity bills. Through December 2009, 282,504 dwellings system-wide qualified for the discount.

Energy Efficiency Financing

PEC began offering energy efficiency financing for its residential customers through its "Home Energy Loan Program" in 1981. Since the last biennial report, energy efficiency financing options have now been integrated within PEC's Residential Home Energy Improvement program.

Existing Demand Response (DR) Programs

Time-of-Use Rates

PEC has offered voluntary Time-of-Use (TOU) rates to all customers since 1981. These rates provide incentives to customers to shift consumption of electricity to lower-cost off-peak periods and lower their electric bill.

Thermal Energy Storage Rates

PEC began offering thermal energy storage rates in 1979. The present General Service (Thermal Energy Storage) rate schedule uses two-period pricing with seasonal demand and energy rates applicable to thermal storage space conditioning equipment. Summer on-peak hours are noon to 8 p.m. and non-summer hours of 6 a.m. to 1 p.m. weekdays.

Real-Time Pricing

PEC's Large General Service (Experimental) Real Time Pricing tariff was implemented in 1998. This tariff uses a two-part real time pricing rate design with baseline load representative of historic usage. Hourly rates are provided on the prior business day. A minimum of 1 MW load is required. This rate schedule is presently fully subscribed.

Curtailable Rates

PEC began offering its curtailable rate options in the late 1970s, and presently has two tariffs whereby industrial and commercial customers receive credits for PEC's ability to curtail system load during times of high energy costs and/or capacity constrained periods.

Voltage Control

This procedure involves reducing distribution voltage during periods of capacity constraints, representing a potential system reduction of 76 MW. This level of reduction does not adversely impact customer equipment or operations.

Summary of Available Existing Demand-Side and Energy Efficiency Programs

The following table provides current information available at the time of this report on PEC's existing DSM/EE programs (i.e., those programs that were in effect prior to January 1, 2007). This information, where applicable, includes program type, capacity, energy, and number of customers enrolled in the program as of the end of 2009, as well as load control activations since those enumerated in PEC's last biennial resource plan. The energy savings impacts of these existing programs are embedded within PEC's load and energy forecasts.

Program Description	Type	Capacity (MW)	Annual Energy (MWH)	Participants	Activations Since Last Biennial Report
Energy Efficiency Programs[1]	EE	494	NA	NA	NA
Large Load Curtailment	DSM	309	NA	79	0
Real Time Pricing (RTP)[1]	DSM	19	NA	100	NA
Commercial & Industrial TOU[1]	DSM	5	NA	23,345	NA
Residential TOU[1]	DSM	12	NA	28,833	NA
Voltage Control	DSM	76	NA	NA	89

[1] Impacts from these existing programs are embedded within the load and energy forecast.

Since PEC's last biennial resource plan report in September 2008, voltage reduction has been implemented on 89 occasions through July 2010. The following table shows the date, starting and ending time, and duration for each of those voltage reduction activations.

Voltage Reduction		
Start Time	**End Time**	**Duration (Minutes)**
08/21/2008 14:13	08/21/2008 19:00	287
08/22/2008 13:08	08/22/2008 19:05	357
08/25/2008 13:09	08/25/2008 19:02	353
08/26/2008 13:14	08/26/2008 19:06	352
08/28/2008 13:00	08/28/2008 19:05	365
08/29/2008 12:59	08/29/2008 19:02	363
08/30/2008 15:06	08/30/2008 15:48	42
09/03/2008 13:07	09/03/2008 19:02	355
09/04/2008 12:59	09/04/2008 19:02	363
09/15/2008 13:02	09/15/2008 19:00	358
10/15/2008 13:00	10/15/2008 19:01	361
10/16/2008 13:01	10/16/2008 19:02	361
10/21/2008 13:03	10/21/2008 19:00	357
10/30/2008 13:02	10/30/2008 19:26	384
11/05/2008 21:48	11/05/2008 22:05	17
11/07/2008 08:36	11/07/2008 08:50	14
11/09/2008 11:17	11/09/2008 11:31	14
11/17/2008 05:53	11/17/2008 05:59	6
12/22/2008 13:08	12/22/2008 13:30	22
01/09/2009 05:59	01/09/2009 08:02	123
01/17/2009 05:58	01/17/2009 06:42	44
01/19/2009 06:00	01/19/2009 08:01	121
01/21/2009 17:30	01/21/2009 19:30	120
01/23/2009 06:02	01/23/2009 08:07	125
01/30/2009 06:00	01/30/2009 09:03	183
01/30/2009 17:29	01/30/2009 20:31	182
02/03/2009 17:29	02/03/2009 20:32	183
02/17/2009 06:00	02/17/2009 09:02	182
02/18/2009 05:59	02/18/2009 09:01	182
02/23/2009 06:01	02/23/2009 09:01	180
02/23/2009 17:29	02/23/2009 20:30	181
02/24/2009 17:30	02/24/2009 20:30	180
03/05/2009 05:59	03/05/2009 09:00	181
05/05/2009 08:28	05/05/2009 08:36	8

Voltage Reduction		
Start Time	**End Time**	**Duration (Minutes)**
05/07/2009 14:39	05/07/2009 14:50	11
06/11/2009 10:18	06/11/2009 10:24	6
06/11/2009 11:44	06/11/2009 12:02	18
06/18/2009 13:00	06/18/2009 19:00	360
06/19/2009 11:44	06/19/2009 12:05	21
06/23/2009 13:00	06/23/2009 19:02	362
06/24/2009 13:02	06/24/2009 19:00	358
07/01/2009 13:23	07/01/2009 19:26	363
07/02/2009 13:14	07/02/2009 19:14	360
07/06/2009 14:42	07/06/2009 15:14	32
07/08/2009 12:59	07/08/2009 19:01	362
07/09/2009 12:59	07/09/2009 19:03	364
07/14/2009 13:08	07/14/2009 19:03	355
07/15/2009 12:59	07/15/2009 19:07	368
07/16/2009 13:02	07/16/2009 19:03	361
07/28/2009 13:06	07/28/2009 19:05	359
07/30/2009 13:03	07/30/2009 18:59	356
07/31/2009 13:00	07/31/2009 19:00	360
08/04/2009 13:00	08/04/2009 19:01	361
08/05/2009 13:11	08/05/2009 19:01	350
08/07/2009 12:59	08/07/2009 19:00	361
08/10/2009 13:01	08/10/2009 19:04	363
08/11/2009 13:02	08/11/2009 19:07	365
08/19/2009 13:00	08/19/2009 19:33	393
08/20/2009 13:00	08/20/2009 19:01	361
08/25/2009 13:00	08/25/2009 18:59	359
08/26/2009 13:00	08/26/2009 18:59	359
08/27/2009 13:00	08/27/2009 18:59	359
08/29/2009 19:57	08/29/2009 20:06	9
09/24/2009 20:03	09/24/2009 20:19	16
10/02/2009 06:56	10/02/2009 07:04	8
10/04/2009 19:12	10/04/2009 19:24	12
11/06/2009 22:06	11/06/2009 22:14	8
11/15/2009 22:43	11/15/2009 22:53	10
01/11/2010 03:24	01/11/2010 03:43	19
01/31/2010 07:34	01/31/2010 07:39	5
02/25/2010 06:02	02/25/2010 09:01	179
02/26/2010 06:21	02/26/2010 09:02	161
03/02/2010 06:00	03/02/2010 08:59	179

Voltage Reduction		
Start Time	**End Time**	**Duration (Minutes)**
03/03/2010 06:00	03/03/2010 06:07	7
03/04/2010 05:59	03/04/2010 08:59	180
03/05/2010 06:00	03/05/2010 08:59	179
03/28/2010 18:54	03/28/2010 19:01	7
05/05/2010 11:46	05/05/2010 11:59	13
05/17/2010 19:27	05/17/2010 19:32	5
06/04/2010 13:03	06/04/2010 13:30	27
06/18/2010 22:59	06/18/2010 23:09	10
06/19/2010 09:22	06/19/2010 09:55	33
06/28/2010 10:33	06/28/2010 10:48	15
07/03/2010 13:44	07/03/2010 13:57	13
07/21/2010 17:31	07/21/2010 17:59	28
07/27/2010 13:00	07/27/2010 14:59	119
07/28/2010 13:00	07/28/2010 19:03	363
07/29/2010 13:00	07/29/2010 20:15	435
07/30/2010 13:00	07/30/2010 18:59	359

The following table presents information on the two Large Load Curtailment activations that have occurred since PEC's last biennial resource plan report in September 2008 and extending through July 2010.

Large Load Curtailment		
Start Time	**End Time**	**Duration (Minutes)**
06/24/2010 13:00	06/24/2010 21:00	480
06/25/2010 11:00	06/25/2010 22:00	660

PEC has not discontinued any of its DSM programs since its previous resource plan submission.

Rejected Demand Side Management and Energy Efficiency Programs

PEC has not rejected any evaluated DSM/EE resources since the last Resource Plan filing.

Current and Anticipated Consumer Education Programs

In addition to the DSM/EE programs previously listed, PEC also has the following informational and educational programs.

- Customized Home Energy Report
- On Line Account Access
- "Lower My Bill" Toolkit
- Energy Saving Tips
- Energy Resource Center
- CIG Account Management
- Save the Watts.com
- Wind For Schools
- Energy Efficiency World Website
- SunSense Schools Program
- Newspapers in Education
- Community Events

Since the time of the last biennial report, Contractor Training has been incorporated into PEC's current set of energy efficiency offerings, so it is no longer being listed here as a stand-alone educational program

Customized Home Energy Report

During 2009, PEC launched a new educational tool available to all residential customers called the Customized Home Energy Report. This free tool educates customers about their household energy usage and how to save money by saving energy. The customer answers a questionnaire either online via www.progresscher.com or through the mail, and then receives a report that details their energy usage and educates them on specific ways to reduce their energy consumption. Additionally, the report provides specific information about energy efficiency programs and rebates offered by Progress Energy that are uniquely applicable to the customer based on data obtained within the questionnaire.

On Line Account Access

On Line Account Access provides energy analysis tools to assist customers in gaining a better understanding of their energy usage patterns and identifying opportunities to reduce energy consumption. The service allows customers to view their past 24 months of electric usage including the date the bill was mailed; number of days in the billing cycle; and daily temperature information. This program was initiated in 1999.

"Lower My Bill" Toolkit

This tool, implemented in 2004, provides on-line tips and specific steps to help customers reduce energy consumption and lower their utility bills. These range from relatively simple no-cost steps to more extensive actions involving insulation and heating and cooling equipment.

Energy Saving Tips

PEC has been providing tips on how to reduce home energy costs since approximately 1981. PEC's web site includes information on household energy wasters and how a few simple actions can increase efficiency. Topics include: Energy Efficient Heat Pumps, Mold, Insulation R-Values, Air Conditioning, Appliances and Pools, Attics and Roofing, Building/Additions, Ceiling Fans, Ducts, Fireplaces, Heating, Hot Water, Humidistats, Landscaping, Seasonal Tips, Solar Film, and Thermostats.

Energy Resource Center

In 2000, PEC began offering its large commercial, industrial, and governmental customers a wide array of tools and resources to use in managing their energy usage and reducing their electrical demand and overall energy costs. Through its Energy Resource Center, located on the PEC web site, PEC provides newsletters, online tools and information which cover a variety of energy efficiency topics such as electric chiller operation, lighting system efficiency, compressed air systems, motor management, variable speed drives and conduct an energy audit.

CIG Account Management

All PEC commercial, industrial, and governmental customers with an electrical demand greater than 200 kW (approximately 4,800 customers) are assigned to a PEC Account Executive (AE). The AEs are available to personally assist customers in evaluating energy improvement opportunities and can bring in other internal resources to provide detailed analyses of energy system upgrades. The AEs provide their customers with a monthly electronic newsletter which includes energy efficiency topics and tips. They also offer numerous educational opportunities in group settings to provide information about PEC's new DSM and EE program offerings and to help ensure the customers are aware of the latest energy improvement and system operational techniques.

SavetheWatts.com

In 2007, Progress Energy Carolinas launched "Save the Watts," a customer education and engagement campaign primarily targeted to PEC's residential customers. Its goal was to help customers understand not only how to use energy wisely, but to also provide them with specific tools and tips to help them save energy and money. At Progress Energy's customized, interactive website, www.savethewatts.com, customers can find energy-efficiency tips, calculators to help identify potential savings and information about PEC's energy-efficiency and demand-side management programs.

Wind for Schools

PEC is a partner in a North Carolina's first-ever Wind for Schools program in Madison County. This program involves a regional partnership providing for the installation of a small wind turbine at Hot Springs Elementary School in Madison County. The partnership also includes development of a K-12 alternative-energy curriculum as part of an effort to introduce wind power to rural communities and initiate community discussions around the benefits and challenges of alternative-energy resources. The program is modeled after the U.S. Department of Energy's (DOE) Wind for Schools initiative. The intent of the program, as defined by DOE, is to provide students and teachers with a physical example of how communities can take part in providing for the economic and environmental security of the nation while allowing exciting, hands-on educational opportunities.

Energy Efficiency World Website

PEC is offering a new educational online resource for teachers and students in our service area called Energy Efficiency World. The web site educates students on energy efficiency, conservation, and renewable energy and offers interactive activities in the classroom. It is available on the web at www.progress-energy.com/shared/eew. PEC also distributes workbooks for kids that accompany the website experience.

SunSense Schools Program

The SunSense Schools program was launched by PEC in March 2009. This solar education program is the first of its kind in the Carolinas, and is designed to give middle and high school students and faculty a unique, hands-on opportunity to learn more about solar energy. Five winning schools received a two-kilowatt solar photovoltaic system installed on their campus along with internet-based tracking equipment that shows the real-time energy output. Progress Energy is proud to bring this exciting opportunity to local schools. Program details are available at www.progress-energy.com/sunsense.

Newspapers in Education

During 2009 and 2010, PEC designed and authored an educational newspaper insert geared toward K-12 students, which included information about energy efficiency and renewable energy. This insert was distributed to customers via the Raleigh News & Observer and was provided cost-free to more than 15,000 students in the PEC service area.

Community Events

PEC representatives participated in community events across the service territory to educate customers about PEC's energy efficiency programs and rebates and to share practical energy saving tips. PEC energy experts attended events and forums to host informational tables and displays, and distributed handout materials directly encouraging customers to learn more about and sign up for approved DSM/EE energy saving programs.

Appendix F

Progress Energy Carolinas

Integrated Resource Plan

Appendix F
Air Quality and Climate Change

September 13, 2010

Air Quality Legislative and Regulatory Issues

Progress Energy Carolinas (PEC) is subject to various federal and state environmental compliance laws and regulations that require reductions in air emissions of nitrogen oxides (NOx), sulfur dioxide (SO_2), and mercury. PEC is installing control equipment pursuant to the provisions of the NOx SIP Call, the North Carolina Clean Smokestacks Act, the Clean Air Interstate Rule (CAIR), the Clean Air Visibility Rule (CAVR) and mercury regulation, which are discussed below.

NOx SIP Call

The EPA finalized the NOx State Implementation Plan (SIP) Call in October 1998. The NOx SIP Call requires reductions in NOx emissions from power plants and other large combustion sources in 21 eastern states. The regulation is designed to reduce interstate transport of NOx emissions that contribute to non-attainment for ground-level ozone. As a result, PEC has installed NOx controls on many of its units.

North Carolina Clean Smokestacks Act

In June 2002, the North Carolina Clean Smokestacks Act was enacted, requiring the state's electric utilities to reduce NOx and SO_2 emissions from their North Carolina coal-fired power plants in phases by 2013. PEC owns and operates approximately 5,000 MW of coal-fired generation capacity in North Carolina that is affected by the Clean Smokestacks Act.

As a result of compliance with the Clean Smokestacks Act and the NOx SIP Call, PEC will significantly reduce SO_2 and NOx emissions from its NC coal-fired units. By 2013, PEC projects SO_2 emissions will be reduced by approximately 80% and NOx emissions will be reduced by approximately 70% from their year 2000 levels.

Clean Air Interstate Rule (CAIR)

On March 10, 2005, the EPA issued the final CAIR, which required the District of Columbia and 28 states, including North and South Carolina, to reduce NOx emissions in two phases beginning in 2009 and 2015, respectively, and reduce SO_2in two phases beginning in 2010 and 2015, respectively.. States were required to adopt rules implementing the CAIR. The EPA approved both the North and South Carolina CAIR rules in 2007.

On July 11, 2008, the U.S. Court of Appeals for the District of Columbia (D.C. Court of Appeals) vacated the CAIR in its entirety. The Court ruled that the CAIR would remain in effect until EPA revised or replaced it with a regulation that complies with the Court's decision. On July 6, 2010 the EPA released the proposed Transport Rule, which is the regulatory program that will replace the CAIR. The proposed Transport Rule contains limited intrastateemissions trading programs for NOx and SO_2 emissions and more stringent overall emissions targets. The EPA plans to finalize the new Transport Rule in the spring of 2011. PEC is well-positioned to comply with the requirements of the Transport Rule given the Clean Smokestacks Act requirements. However, depending on the final rule and the associated emissions caps and allocations, additional reductions may be needed at some of PEC's units.

Clean Air Visibility Rule (CAVR)

On June 15, 2005, the EPA issued the final CAVR. The EPA's rule requires states to identify facilities, including power plants, built between August 1962 and August 1977 with the potential to produce emissions that affect visibility in 156 specially protected areas, including national parks and wilderness areas. To help restore visibility in those areas, states must require the identified facilities to install Best Available Retrofit Technology (BART) to control their emissions. PEC's BART eligible units are Asheville Units No. 1 and No. 2, Roxboro Units No. 1, No. 2 and No. 3, and Sutton Unit No. 3. PEC's compliance plan to meet the NC Clean Smokestacks Act requirements is expected to fulfill the BART requirements.

Clean Air Mercury Rule (CAMR)

On March 15, 2005, the EPA finalized two separate but related rules: the CAMR that set mercury emissions limits to be met in two phases beginning in 2010 and 2018, respectively, and encouraged a cap-and-trade approach to achieving those caps, and; a delisting rule that eliminated any requirement to pursue a maximum achievable control technology (MACT) approach for limiting mercury emissions from coal-fired power plants. On February 8, 2008, the D. C. Court of Appeals vacated both the delisting determination and the CAMR. As a result, the EPA subsequently announced that it will develop a MACT standard consistent with the agency's original listing determination. The United States District Court for the District of Columbia has issued an order requiring the EPA to issue a final MACT standard for power plants by November 16, 2011. It is uncertain how the decision that vacated the federal CAMR will affect state rules; however, state-specific provisions are likely to remain in effect. The North Carolina mercury rule contains a requirement that all coal-fired units in the state install mercury controls by December 31, 2017, and it requires compliance plan applications to be submitted in 2013.

National Ambient Air Quality Standards (NAAQS)

On March 12, 2008, the EPA announced changes to the NAAQS for ground-level ozone. The EPA revised the 8-hour primary and secondary standards from 0.08 parts per million to 0.075 parts per million. As a result of legal action regarding the revised standard, in September 2009 the EPA announced that it is reconsidering the level of the ozone NAAQS. On January 7, 2010, the EPA announced a proposed revision to the primary ozone NAAQS. In addition, the EPA proposed a cumulative seasonal secondary standard. The EPA plans to finalize the revisions by October 31, 2010, and to designate nonattainment areas by August 2011. The proposed revisions are significantly more stringent than the current NAAQS. Should additional nonattainment areas be designated in our service territories, PEC may be required to install additional emission controls at some facilities.

On October 15, 2008, the EPA revised the NAAQS for lead to 0.15 micrograms per cubic meter on a rolling 3-month average basis. The revision is not expected to have a material impact on PEC's operations.

On January 25, 2010, the EPA announced a revision to the primary NAAQS for NOx. Since 1971, when the first NAAQS were promulgated, the standard for NOx has been an annual average. The EPA has retained the annual standard and added a new 1-hour NAAQS. In conjunction with proposing changes to the standard, the EPA is also requiring an increase in the coverage of the monitoring network, particularly near roadways where the highest concentrations are expected to occur due to traffic emissions. The EPA plans to designate nonattainment areas by January 2012. Currently, there are no monitors reporting violation of the new standard in PEC's service territories, but the expanded monitoring network will provide additional data, which could result in additional nonattainment areas. On June 22, 2010, the EPA published a final new 1-hour NAAQS for SO_2, which sets the limit at 75 parts per billion. The primary NAAQS on a 24-hour average basis and annual average will be eliminated under the new rule. The new 1-hour standard is a significant increase in the stringency of the standard and increases the risk of nonattainment, especially near uncontrolled coal-fired facilities. In addition, for the first time the EPA plans to use air quality modeling in addition to monitor data in determining whether areas are attaining the new standard, which is likely to expand the number of nonattainment areas. Should additional nonattainment areas be designated in PEC's service territories, PEC may be required to install additional emission controls at some of its facilities.

Global Climate Change

PEC has identified principles that hould be incorporated into any global climate change policy. In addition to reports issued in 2006 and 2008, PEC issued an updated report on global climate change in 2010 as part of its annual Corporate Responsibility Report, which further evaluates this dynamic issue. While PEC participates in the development of a national climate change policy framework, it will continue to actively engage others in its region to develop consensus-based solutions, as was done with the NC Clean Smokestacks Act. In North Carolina, PEC is a member of the Legislative Commission on Global Climate Change, which is developing recommendations on how the state should address the issue. In South Carolina, PEC participated in the Governor's Climate, Energy, and Commerce Committee, which released recommendations on how the state should address the issue in August 2008.

On April 2, 2007, the U.S. Supreme Court ruled that the EPA has the authority under the Clean Air Act (CAA) to regulate CO_2 emissions from new automobiles. On December 15, 2009, the EPA announced that six GHGs (CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride) pose a threat to public health and welfare under the CAA. A number of parties have filed petitions for review of this finding in the D.C. Court of Appeals

On April 1, 2010, the EPA and the National Highway Transportation Safety Administration jointly announced the first regulation of GHG emissions from new vehicles. The EPA is regulating mobile source GHG emissions under Section 202 of the CAA, which according to the EPA also results in stationary sources, such as coal-fired power plants, being subject to regulation of GHG emissions under the CAA. On March 29, 2010, the EPA issued an interpretation that stationary source GHG emissions will be subject to regulation under the CAA beginning in January 2011. On May 13, 2010, the EPA issued the final "tailoring rule", which establishes the thresholds for applicability of Prevention of Significant Deterioration (PSD) permitting requirements for GHG emissions from stationary sources such as power plants and manufacturing facilities. The rule establishes the GHG permitting threshold at 75,000 tons per year, and the EPA has stated that the permitting requirements for GHG emissions from stationary sources will begin January 2, 2011. These developments may require PEC to address GHG emissions in air quality permits.

In addition, Congress continues to consider passing GHG emissions legislation. The full impact of such legislation, if enacted, and additional regulation resulting from other federal GHG initiatives cannot be determined at this time; however, PEC anticipates that it could result in significant cost increases over time.

Appendix G

Progress Energy Carolinas

Integrated Resource Plan

Appendix G
Transmission and NC Rule R8-62

September 13, 2010

This appendix lists transmission line and substation additions, and a discussion of the adequacy of PEC's transmission system. This appendix also provides information pursuant to the North Carolina Utility Commission Rule R8-62.

PEC Transmission Line Additions

	LOCATION				
YEAR	FROM	TO	CAPACITY MVA	VOLTAGE KV	COMMENTS
2010	Asheville	Enka	528	230	Conversion
2011	Richmond	Fort Bragg Woodruff Street	1195	230	New
	Asheboro	Pleasant Garden (Duke)	1195	230	New
	Rockingham	West End East	1195	230	New
	Clinton	Lee Sub	628	230	New
2014	Harris	RTP Switching Sta.	1195	230	New
2017	Greenville	Kinston Dupont	615	230	New
2019	Lilesville South	Rockingham	1195	230	New

PEC Substation Additions

YEAR	SUBSTATION NAME	COUNTY	STATE	VOLTAGE (KV)	MVA	COMMENTS
2010	Enka	Buncombe	NC	230/115	300	New
2011	Mt Olive	Duplin	NC	230/115	200	New
2012	Jacksonville	Onslow	NC	230	300	New
	West End	Moore	NC	230/115	600	Uprate
	Lee Sub	Wayne	NC	230/115	N/A	Modification
2013	Folkstone	Onslow	NC	230/115	200	New
	Sumter	Sumter	SC	230	N/A	Modification
	Selma	Johnston	NC	230/115	400	Uprate
	Sutton Plant	Brunswick	NC	230/115	N/A	Modification
2014	Fayetteville	Cumberland	NC	230/115	600	Uprate
2016	Falls	Wake	NC	230/115	500	Uprate

Rule R8-62: Certificates of environmental compatibility and public convenience and necessity for the construction of electric transmission lines in North Carolina.

(p) Plans for the construction of transmission lines in North Carolina (161 kV and above) shall be incorporated in filings made pursuant to Commission Rule R8-60. In addition, each public utility or person covered by this rule shall provide the following information on an annual basis no later than September 1:

(1) For existing lines, the information required on FERC Form 1, pages 422, 423, 424, and 425, except that the information reported on pages 422 and 423 may be reported every five years.

Please refer to the Company’s FERC Form No. 1 filed with NCUC in April, 2010.

(p) Plans for the construction of transmission lines in North Carolina (161 kV and above) shall be incorporated in filings made pursuant to Commission Rule R8-60. In addition, each public utility or person covered by this rule shall provide the following information on an annual basis no later than September 1:

(2) For lines under construction, the following:

a. Commission docket number;

b. Location of end point(s);

c. length;

d. range of right-of-way width;

e. range of tower heights;

f. number of circuits;

g. operating voltage;

h. design capacity;

i. date construction started;

j. projected in-service date;

See following pages

Richmond-Fort Bragg Woodruff Street 230 kV Line

Project Description: Construct 60 miles of new 230 kV line from the Richmond 500 kV Substation in Richmond County to the Fort Bragg Woodruff Street 230 kV Substation in Cumberland County.

a. Commission docket number; NCUC Docket No. E2, Sub 925
b. Location of end point(s); Richmond and Cumberland Counties
c. Length; 60 Miles
d. Range of right-of-way width; 45-100 feet
e. Range of tower heights; 75 – 130 feet
f. Number of circuits; 1
g. Operating voltage; 230 kV
h. Design capacity; 1195 MVA
i. Estimated date for starting construction; May 2009 Right-of-way clearing underway, July 2009 – Construction underway
j. Projected in-service date; June 2011

Asheboro – Pleasant Garden 230 kV Line

Project Description: Construct 22 miles of new 230 kV line from the Asheboro 230 kV Substation in Randolph County to Duke Power's Pleasant Garden 230 kV Substation in Guilford Counties.

a. Commission docket number; NCUC Docket No. E2, Sub 920
b. Location of end points(s); Randolph (Asheboro) and Guilford (Pleasant Garden)
c. Length; 18.9 miles
d. Range of right-of-way width; 100 feet
e. Range of tower heights; 80 feet
f. Number of circuits; 1
g. Operating voltage; 230 kV
h. Design capacity; 1195 MVA
i. Estimated date for starting construction; January 2010 – Clearing, May 2010- Construction
j. Projected in-service date; June 2011

Rockingham-West End East 230 kV Line

Project Description: Construct 32 miles of new 230 kV line from the Rockingham 230 kV Substation in Richmond County to the West End 230 kV Substation in Moore County.

a. Commission docket number; NCUC Docket No. E2, Sub 933
b. Location of end points(s); Richmond and Moore Counties
c. Length; 32 miles
d. Range of right-of-way width; 100 feet
e. Range of tower heights; 75 - 110 feet
f. Number of circuits; 1
g. Operating voltage; 230 kV
h. Design Capacity; 1195 MVA
i. Estimated date for starting construction; October 2009-Clearing, March 2010-Construction
j. Projected in-service date; June 2011

Clinton – Lee Substation 230 kV Line

Project Description: Construct approximately 28 miles of new 230 kV transmission line from the Lee Substation in Wayne County to the Clinton 230 kV Substation in Sampson County.

a. Commission docket number; NCUC Docket No. E-2, Sub 796
b. Location of end point(s); Wayne and Sampson Counties
c. Length; 28 Miles
d. Range of right-of-way width; 100 feet
e. Range of tower heights; 90 – 120 feet
f. Number of circuits; 1
g. Operating voltage; 230 kV
h. Design capacity; 628 MVA
i. Estimated date for starting construction; July 2010-construction underway (Right-of-way has been cleared)
j. Projected in-service date; December 2011

Harris – Research Triangle Park (RTP) 230kV Line

Project Description: Construct 22 miles of new 230 kV line from the Harris 230 kV Substation in Wake County to the RTP 230 kV Substation in Wake County. The four-mile segment from Amberly Substation to RTP Substation is in service and built on self-supporting single poles. The remaining construction is planned to be placed in service 6/2014 and consists of: a four-mile segment from Harris Substation to Apex US1 Substation built on H-frame construction; the seven-mile segment from Apex US1 to Green Level Substation is an existing 115 kV line, which will be removed and rebuilt as 230 kV on self-supporting single poles; the remaining seven-mile segment from Green Level Substation to Amberly Substation will be built on self-supporting single poles.

a. Commission docket number; NCUC Docket No. E2, Sub 914
b. County location of end point(s); Wake
c. Approximate length; 22 miles
d. Range of right-of-way width; 70 feet
e. Range of tower heights; 100 feet
f. Number of circuits; 1
g. Operating voltage; 230 kV
h. Design capacity; 1195 MVA
i. Estimated date for starting construction; 2010- RTP-Amberly 230 kV Section in-service Amberly-Green Level Section is Cleared, 2011- Construction of line to resume.
j. Projected in-service date; June 2014 (Delayed due to updated load projections)

(p) Plans for the construction of transmission lines in North Carolina (161 kV and above) shall be incorporated in filings made pursuant to Commission Rule R8-60. In addition, each public utility or person covered by this rule shall provide the following information on an annual basis no later than September 1:

(3) For all other proposed lines, as the information becomes available, the following:

a. county location of end point(s);
b. approximate length;
c. typical right-of-way width for proposed type of line;
d. typical tower height for proposed type of line;
e. number of circuits;
f. operating voltage;
g. design capacity;
h. estimated date for starting construction (if more than 6 month delay from last report, explain); and
i. estimated in-service date (if more than 6-month delay from last report, explain). (NCUC Docket No. E-100, Sub 62, 12/4/92; NCUC Docket No. E-100, Sub 78A, 4/29/98.)

See following pages.

Greenville – Kinston DuPont 230 kV Line

Project Description: Construct approximately 25.3 miles of new 230 kV transmission line from the Greenville 230 kV Substation in Pitt County to the Kinston DuPont 230 kV Substation in Lenoir County. Pursuant to N.C.G.S. 62-101, no Certificate of Environmental Compatibility and Public Convenience and Necessity is required because the rights-of-way for this line were acquired prior to March 6, 1989.

a. County location of end point(s); Lenoir and Pitt Counties
b. Approximate length; 25.3 Miles
c. Typical right-of-way width for proposed type of line; 100 Feet
d. Typical tower height for proposed type of line; 80 - 120 Feet
e. Number of circuits; 1
f. Operating voltage; 230 kV
g. Design capacity; 628 MVA
h. Estimated date for starting construction; March 2015 (Delayed due to updated load projections)
i. Estimated in-service date; June 2017 (Delayed due to updated load projections)

Rockingham-Lilesville 230 kV Line

Project Description: Construct 14 miles of new 230 kV line from the Rockingham 230 kV Substation in Richmond County to the Lilesville 230 kV Switching Station in Anson County. NCUC Docket No. E2, Sub 922.

a. County location of end point(s); Richmond and Anson Counties
b. Approximate length; 14 miles
c. Typical right-of-way width for proposed line type; 100 feet
d. Typical tower height for proposed type of line; 75 - 110 feet
e. Number of circuits; 1
f. Operating voltage; 230 kV
g. Design Capacity; 1195 MVA
h. Estimated date for starting construction; January 2018- Clearing, June 2018- Construction (Delayed due to updated load projections)
i. Estimated in-service date; June 2019 (Delayed due to updated load projections)

Discussion of the adequacy of the PEC transmission system.

The PEC transmission system consists of approximately 6,000 miles of 69, 115, 138, 161, 230 and 500 kV transmission lines and just over 100 transmission-class switching stations in its North and South Carolina service areas. PEC has transmission interconnections with Duke Energy Carolinas, PJM (via American Electric Power and Dominion Virginia Power), South Carolina Electric & Gas Company, South Carolina Public Service Authority, Tennessee Valley Authority, and Yadkin. The primary purpose of this transmission system is to provide the electrical path necessary to accommodate the transfer of bulk power as required to ensure safe, reliable, and economic service to control area customers.

Transmission planning typically takes into consideration a 10-year planning period. Required engineering, scheduling, and construction lead times can be satisfactorily accommodated within this planning period. Planning is based on PEC's long-range system peak load forecast, which includes all territorial load and contractual obligations; PEC's resource plan; and local area forecasts for retail, wholesale, and industrial loads.

The PEC transmission system is planned to comply with the North American Electric Reliability Council (NERC) Reliability Standards. The Energy Policy Act of 2005 included new federal requirements to create an electric reliability organization (ERO) with enforceable mandatory reliability rules with Federal Energy Regulatory Commission (FERC) oversight. FERC chose NERC to fulfill the role of ERO for the industry. Compliance with the NERC Reliability Standards became mandatory on June 18, 2007 and is enforced by the NERC Regions. PEC's service area is within the SERC Reliability Corporation (SERC) NERC Region. SERC annually checks for compliance and conducts detailed audits of standards compliance every three years. The most recent PEC audit, in the spring of 2008, found "no possible violations" of the NERC Reliability Standards.

Planning studies are performed to assess and test the strength and limits of the PEC transmission system to meet its load responsibility and to move bulk power between and among other electrical systems. PEC will study the system impact and facilities requirements of all transmission service requests pursuant to its established procedures.

Transmission planning requires power flow simulations based on detailed system models. PEC participates with neighboring companies in developing and maintaining accurate models of the eastern interconnection. These models include the specific electrical characteristics of transmission equipment such as lines, transformers, relaying equipment, and generators. All significant planned equipment outages, planned inter-company transactions, and operating constraints are included.

The transmission planning process and the generation resource planning process are interrelated. The location and availability of generation additions has significant impacts on the adequacy of the transmission system. Generation additions within the PEC system may help or hinder transmission loading. By planning for both generation needs and transmission needs, PEC is able to minimize costs while maintaining good performance. PEC will interconnect new generating facilities to the transmission system and will accommodate increases in the generating capacity of existing generation pursuant to its established interconnection procedures.

PEC coordinates its transmission planning and operations with neighboring systems to assure the safety, reliability, and economy of its power system. Coordinated near-term operating studies and longer-range planning studies are made on a regular basis to ensure that transmission capacity will continue to be adequate. These studies involve representatives from the Virginia-Carolinas Subregion (VACAR) and adjacent subregions and regions to provide interregional coordination. For intra-regional studies, PEC actively participates on the Intra-regional Long-term Power Flow Study Group (LT-PFSG), the Intra-regional Near-term Power Flow Study Group (NT-PFSG), and the VACAR reliability committees. For inter-regional studies PEC actively participates on the Eastern Interconnection Reliability Assessment Group (ERAG).

The transmission system is planned to ensure that no equipment overloads and adequate voltage is maintained to provide reliable service. The most stressful scenario is typically at peak load with certain equipment out of service. A thorough screening process is used to analyze the impact of potential equipment failures or other disturbances. As problems are identified, solutions are developed and evaluated.

In addition, PEC, Duke, NCEMPA and NCEMC are engaged in a collaborative transmission planning process called the NCTPC (NC Transmission Planning Collaborative). This effort allows NCEMPA and NCEMC to participate in all stages of the transmission planning process, resulting in Duke and PEC moving towards a single collaborative transmission plan for their control areas, and a plan designed to address both reliability and market access. The NCTPC has a data exchange agreement with PJM to share planning data.

PEC also participates in the SIRPP (Southeastern Inter-regional Participation Process) and the EIPC (Eastern Interconnection Planning Collaborative) inter-regional efforts.

PEC's transmission system is expected to remain adequate to continue to provide reliable service to its native load and firm transmission customers.

Appendix H

Progress Energy Carolinas

Integrated Resource Plan

Appendix H
Short Term Action Plan

September 13, 2010

PEC Short Term Action Plan Summary

The following activities are underway as part of the near-term implementation of the Company's Integrated Resource Plan.

Near Term, Known Resource Additions

1. Richmond County CC – 06/2011, Certificate of Public Convenience and Necessity approved and construction has begun.
2. Miscellaneous unit uprates (see 2010 IRP)
3. Wayne County CC – 01/2013, Certificate of Public Convenience and Necessity was approved on October 22, 2009.
4. Sutton CC – 12/2013, Certificate of Public Convenience and Necessity was approved on June 9, 2010.

New DSM and EE

PEC will be implementing the following new DSM and EE programs as approved by the North Carolina Utilities Commission and the South Carolina Public Service Commission:

1. Residential Home Energy Improvement Program
2. Residential Home Advantage (New Construction) Program
3. Neighborhood Energy Saver (Low-Income) Program
4. Residential Lighting Program
5. Appliance Recycling Program
6. Commercial, Industrial, and Governmental (CIG) Energy Efficiency Program
7. Residential EnergyWise℠ Program
8. Commercial, Industrial, and Governmental (CIG) Demand Response Program
9. Distribution System Demand Response (DSDR) Program
10. Solar Water Heating Pilot

Additional programs to be considered for potential implementation in the future include a behavioral change initiative and other EE research & development pilots.

Alternative Supply Resources (Incremental Renewables)

The 2010 Integrated Resource Plan includes the following near term assumptions for additional renewable resources:

1. Approximately 40 MW of poultry waste generation online by 2014
2. Approximately 4 MW of swine waste generation online by 2012
3. 6 MW of new solar generation each year

Negotiations for these and other projects are ongoing.

For more detail on all of these ongoing activities, please see PEC's 2010 IRP.