STATE OF SOUTH CAROLINA)
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(Caption of Case))
Progress Energy Carolinas, Inc.'s Integrated Resource Plan (IRP))
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BEFORE THE
PUBLIC SERVICE COMMISSION
OF SOUTH CAROLINA

COVER SHEET

DOCKET NUMBER: 2011 - 8 - E

(Please type or print)

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☐ **Emergency Relief demanded in petition** ☐ **Request for item to be placed on Commission's Agenda expeditiously**

☐ **Other:**

INDUSTRY (Check one)

- ☒ Electric
- ☐ Electric/Gas
- ☐ Electric/Telecommunications
- ☐ Electric/Water
- ☐ Electric/Water/Telecom.
- ☐ Electric/Water/Sewer
- ☐ Gas
- ☐ Railroad
- ☐ Sewer
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- ☐ Affidavit
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- ☐ Discovery
- ☐ Exhibit
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- ☐ Interconnection Agreement
- ☐ Interconnection Amendment
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- ☐ Letter
- ☐ Memorandum
- ☐ Motion
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- ☐ Petition
- ☐ Petition for Reconsideration
- ☐ Petition for Rulemaking
- ☐ Petition for Rule to Show Cause
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- ☐ Petition to Intervene Out of Time
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- ☐ Proposed Order
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- ☐ Request
- ☐ Request for Certification
- ☐ Request for Investigation
- ☐ Resale Agreement
- ☐ Resale Amendment
- ☐ Reservation Letter
- ☐ Response
- ☐ Response to Discovery
- ☐ Return to Petition
- ☐ Stipulation
- ☐ Subpoena
- ☐ Tariff
- ☐ Other:

STATE OF SOUTH CAROLINA

BEFORE THE PUBLIC SERVICE COMMISSION

DOCKET NO. 2011-8-E

In the Matter of:	)	
Progress Energy Carolinas, Incorporated's Integrated Resource Plan (IRP)	)	COMMENTS ON PROGRESS ENERGY CAROLINAS, INC.'S 2011 INTEGRATED RESOURCE PLAN

Pursuant to South Carolina Public Service Commission ("Commission") Order No. 2010-124 on least cost planning for electric utilities, the Southern Alliance for Clean Energy ("SACE") and South Carolina Coastal Conservation League ("CCL") (collectively, "Petitioners"), through counsel, hereby submit comments in the above-captioned docket concerning Progress Energy Carolinas, Inc.'s ("PEC" or "the Company") 2011 Integrated Resource Plan ("IRP").[1]

I. SUMMARY OF CONCLUSIONS.

Based on a review of PEC's 2011 IRP, Petitioners present the following conclusions:

- PEC could and should analyze higher levels of energy efficiency in its resource plan scenarios to offer customers lower costs, lower risks, and lower rates.

- PEC failed to adequately consider energy efficiency as a resource in its evaluation of energy options.

- PEC has prudently decided to retire nearly all of its existing unscrubbed coal units, but the IRP fails address the economics of the continued operation of Robinson Unit 1, its one remaining unscrubbed coal plant in South Carolina, and its scrubbed coal units.

- PEC did not incorporate realistic assumptions about the cost and timing of new nuclear generation in its IRP. Although the Company increased its cost forecast

[1]On October 26, 2011, the Commission granted Petitioners' motion for leave to file comments out of time by October 31, 2011. *See* Order No. 2011-788. These comments were prepared with the assistance of John D. Wilson, Director of Research for SACE.

by about 25% from last year, it did not update its evaluation of resource options to reflect this change, and the high nuclear cost sensitivity may be insufficient.

- Modeling of economic impacts should be included to inform the evaluation of resource portfolios.

II. LEGAL FRAMEWORK FOR INTEGRATED RESOURCE PLANNING.

South Carolina electric utilities must prepare integrated resource plans, which may be patterned after the Commission's integrated resource planning process. S.C. Code Ann. § 58-37-40 (2010). Electric utilities regulated by the Commission must submit their IRPs to the State Energy Office on a triennial basis and must update the plans on an annual basis. *Id.* Compliance with the Commission's IRP requirements constitutes compliance with statutory IRP requirements. *Id.*

An IRP must contain the following information:

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

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

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

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

Commission Order No. 1998-502; S.C. Code Ann. § 58-37-10 (2010). Moreover, the Commission can require additional information in IRP filings and provide it to interested parties if necessary to facilitate the parties' understanding of the above-required information. Commission Order No. 1998-502.

PEC is regulated by the Commission, and therefore is subject to the Commission's integrated resource planning process. S.C. Code Ann. § 58-3-140 (2010). The Commission developed its integrated resource planning process for electric utilities in a least cost planning docket initiated in 1987. *See* Commission Docket No. 1987-223-E. Least cost planning, as the Commission has defined it, "refers to efforts by utilities and regulators to ensure that the lowest cost options to the ratepayers and utilities are integrated into the designing [of] resource plans for the provision of energy services to customers." Order No. 1987-569.

In 1991, the Commission adopted an integrated resource planning process designed to develop a plan that "results in the minimization of the long run total costs of the utility's overall system and produces the least cost to the consumer consistent with the availability of an adequate and reliable supply of electricity while maintaining system flexibility and considering environmental impacts." Appendix A at 1, Order 1991-1002. In 1998, the Commission modified the IRP process to its present form, requiring utilities to file IRPs that contain the four substantive requirements outlined above. *See* Order No. 1998-502.[2] The Commission established procedural requirements for IRP filings in 2010, pursuant to which PEC must file its IRP by September 1 of each year; interested persons are allowed 30 days to file written comments; and Commission Staff must schedule an allowable ex parte briefing within 60 days of the filing. Order No. 2010-124.

For the reasons detailed below, PEC's IRP does not reflect a long-term plan to meet its customers' energy needs in an economic and reliable manner. PEC failed to analyze higher levels of efficiency and integrate this demand-side option into its long-term resource plan, despite the economic benefits of doing so. The IRP does not evaluate the economic impact of continuing to operate some of its coal units in light of pending and imminent environmental regulations and significant environmental compliance costs, nor does it include an evaluation of resource options based on new assumptions regarding the cost of new nuclear generation.

III. PEC SHOULD HAVE EVALUATED A"HIGH DSM" ALTERNATIVE IN ITS RESOURCE PLANNING.

In its 2010 IRP, PEC identified three alternative resource plans that it considered for scenario analysis. PEC 2010 IRP, Figure A-3 at page A-5. PEC did not update this analysis for its 2011 IRP. The three alternative resource plans differ in terms of the amount of gas-fired and nuclear capacity contained in each and in the timing of additional units with these technologies. PEC did not identify any portfolio that included a scenario with additional investments in energy efficiency (or renewable resources). Petitioners strongly recommend that that Company model a resource portfolio with more robust investments in energy efficiency.

Duke Energy Carolinas, LLC ("DEC"), one of PEC's peer utilities in North and South Carolina, modeled several resource portfolios in its IRP analysis in base case and sensitivity analyses. DEC 2011 IRP at 100-01. Some of these portfolios used a "High Energy Efficiency" or "High DSM" case, which demonstrated that increased investment in energy efficiency can reduce forecasted customer cost, risk of cost increases, and average electricity rates, relative to lower investment levels in energy efficiency.[3]

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[2]The IRP process was modified in 1993 but the overall framework of the planning process remained intact. Order No. 1993-845. In 1998, however, Appendix A to Order 1991-1002, which detailed the Commission's IRP planning process, was replaced in its entirety by the 1998 Order Modifying Reporting Requirements, Order No. 1998-502, which outlined the IRP requirements currently in place.

[3]Despite these benefits, however, DEC failed to select a portfolio that included a greater level of efficiency as compared to its base case assumptions. For a detailed discussion of DEC's High DSM case and why DEC should have prioritized its High DSM alternative, *see* comments filed on behalf of Petitioners and Upstate Forever in SCPSC Docket No. 2011-10-E (Oct. 31, 2011).

Because PEC did not even model a higher efficiency case in its resource planning process, PEC's IRP may result in more cost and risk than is necessary. To help meet its forecasted energy and capacity needs in an economic and reliable manner, PEC should evaluate a "High DSM" case.

IV. PEC DID NOT CONSIDER ENERGY EFFICIENCY AS A RESOURCE IN ITS EVALUATION OF ITS OPTIONS.

Energy efficiency is the least-cost system resource. Unlike supply-side resources, energy efficiency, even at aggressive levels, reduces customer utility bills.[4] Energy efficiency can also moderate rate increases in the long-term by reducing or delaying the need for new generating capacity.[5] In fact, several states with leading energy efficiency programs have electricity rates comparable to, or even lower than, rates in South Carolina.[6] In addition to lower customer bills and long-term rate moderation, energy efficiency reduces environmental impact and compliance costs, conserves water, reduces energy market prices, lowers portfolio risk, promotes local economic development and job growth, and assists low-income populations.[7]

However, despite these benefits and the encouraging first-year performance of its efficiency programs, PEC significantly underestimates the potential energy efficiency savings in its IRP. What follows is a brief discussion of the performance of PEC's efficiency programs and PEC's treatment of this low-cost resource in its IRP. A detailed analysis of PEC's energy efficiency savings and the role of energy efficiency in its integrated resource planning is provided in Attachment 1, "Review of Utility Evaluation of Energy Efficiency Resources in the Carolinas (October 2011)."

A. Initial results suggest that PEC's energy efficiency programs are performing well.

PEC appears to be delivering good energy efficiency programs at low cost. In 2010, PEC exceeded its 2010 energy savings goals. The Company spent about $29 million to achieve about 136 GWh of energy savings, which amount to roughly 0.3 percent of retail sales.

PEC is moving forward with several good energy efficiency programs. PEC's Neighborhood Energy Saver Program, for example, uses diligent outreach and direct-installation methods to achieve more than 85% participation rates within target

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[4] *See, e.g.* Marilyn A. Brown et al., Energy Efficiency in the South, Southeast Energy Efficiency Alliance (April, 12, 2010), http://www.seealliance.org/se_efficiency_study/full_report_efficiency_in_the_south.pdf.
[5] *Id.*

[6] John D. Wilson, Energy Efficiency Program Impacts and Policies in the Southeast (May 2009) at 4, http://www.cleanenergy.org/images/files/SACE_Energy_Efficiency_Southeast_May_20091.pdf.
[7] *Supra* note 4. *See also Analyzing and Managing Bill Impacts of Energy Efficiency Programs: Principles and Recommendations,* Utility Motivation and Energy Efficiency Working Group, State and Local Energy Efficiency Action Network (July 2011) at 6, note 4.

neighborhoods, helping households reduce annual energy bills by about $150 on average.[8] PEC is offering programs with a broader range of options than many other regional utilities, and is developing new programs that have the potential to maintain this positive momentum. *See* IRP at E-7. Petitioners are encouraged by the Company's first-year efforts and urge PEC to increase its results on the programmatic side of efficiency.

B. PEC's resource plan undervalues energy efficiency and underestimates its potential.

As detailed in Attachment 1, PEC does not consider the efficiency resource on an equivalent basis with supply-side resources. PEC treats energy efficiency as a fixed model input that adjusts the Company's load forecast. As a result, the resource planning model works around the limited efficiency input, selecting resources to meet the utility's adjusted load. This analytic limitation results in the underutilization of efficiency as an economic and reliable demand-side resource. Accordingly, PEC's ten-year forecast of cumulative energy savings—3.7 percent of retail sales in 2020—is less than what leading utilities estimate to achieve in just five years.

The limited investment in energy efficiency described in PEC's resource plan could result in PEC customers paying more for conventional supply-side energy resources than is necessary. Moreover, if PEC continues to administer successful efficiency programs but does not properly account for them in its resource plans by reducing the need for the more costly and risky supply-side capacity, customers will be bear the burden of paying for excess capacity. Proper consideration of energy efficiency as a resource-equivalent of traditional supply-side resources can protect against these outcomes and result in increased use of this low-cost, reliable resource.

V. PEC SHOULD EVALUATE THE PRUDENCY OF CONTINUED OPERATION OF ROBINSON UNIT 1 AND SCRUBBED COAL UNITS.

PEC currently owns approximately 5,200 MW of coal-fired in North and South Carolina. IRP at B-1. The Company currently plans to retire approximately 1500 MW of unscrubbed coal units by the end of 2013, although it allows itself some flexibility in terms of the specific units to be retired and/or their exact retirement dates. *Id.* at 3, B-6. These retirements consist of all remaining unscrubbed coal units in North Carolina, and the Company currently is evaluating South Carolina Robinson Unit 1, the one remaining unscrubbed coal plant in PEC's fleet. *Id.* PEC's IRP does not discuss, nor provide a timeline for, its evaluation of Robinson Unit 1. Moreover, while the retirement of old, unscrubbed coal units makes clear economic sense, the continued operation of certain scrubbed coal-fired units may also be imprudent.

There are several pending and imminent EPA regulations that would render it economically unwise to continue to operate many of these units, including EPA's

[8]PEC, DSM/EE Filing Requirements, SCPSC Docket No. 2011-181-E (May 2, 2011) at 24; "Neighborhood Energy Saver," presentation by PEC (June 2009).

forthcoming Utility Maximum Achievable Control Technology ("Utility MACT") rule. *Id.* at 3. The final Utility MACT rule is expected later this year. Once EPA promulgates the Utility MACT rule, the Clean Air Act mandates that all covered sources comply with its provisions within 3 years, or by 2015. The Utility MACT is just one of the regulatory risks facing existing coal-fired units that will require capital investments and increase operating expenses. Other EPA regulations impacting existing coal units include greenhouse gas regulations, regulations under Section 316(b) of the Clean Water Act, new steam electric effluent guideline, the Cross State Air Pollution Rule, National Ambient Air Quality standards for ozone and SO_2 and new coal combustion waste regulations

PEC discusses the legislative and regulatory risks facing the Company's coal-fired units, and sensibly concludes that 1500 MW of unscrubbed coal will be retired by the end of 2013, according to the expected retirement dates listed in its IRP. 2011 IRP at 3, B-6. However, these risks are not confined to existing unscrubbed coal units. Scrubbed units face many of the same risks as do the unscrubbed units that PEC is planning to retire, including but not limited to the need to further reduce their emissions of mercury and other hazardous air pollutants, the need to convert from once-through to closed-cycle cooling, and the need to update liquid and solid waste handling techniques.

PEC's IRP contains no analysis of the risks faced by its existing scrubbed coal plants or assessment of what additional pollution controls, such as baghouses and activated carbon injection, will be needed at each of these units. Moreover, PEC does not discuss the evaluation of whether to retire the remaining unscrubbed coal unit in South Carolina, Robinson Unit 1. This is a serious flaw. PEC must "meet[] the requirements shown in its forecast in an economic and reliable manner."[9] It therefore should account for all the costs and risks that its coal units bear. The IRP should reflect an evaluation of whether it will be more economic to retire certain scrubbed coal units, or repower them, rather than investing significant capital in pollution control equipment and other infrastructure necessary to comply with impending regulations.

VI. PEC DOES NOT USE REALISTIC ASSUMPTIONS ABOUT NUCLEAR GENERATION IN ITS EVALUATION OF RESOURCE OPTIONS.

A. PEC's assumptions concerning the timing of new nuclear units are unrealistic.

PEC plans to rely on 25% shares of nuclear units from either self-build partnerships or partnerships in another utility's regional nuclear project.[10] PEC IRP at 3-

[9] Commission Order No. 1998-502; S.C. Code Ann. § 58-37-10 (2010).

[10] In light of the relatively small percent shares (25%), PEC's partial ownership of another utility's regional nuclear project seems more likely than a self-build option. With regards to the new nuclear generation being developed at V.C. Summer by Santee Cooper and South Carolina Electric & Gas Company ("SCE&G"), Petitioners have noted that SCE&G's excessive reserve margin projection for 2020 (21.9%) could be mitigated by delaying the projected start date of Summer. *See* Petitioners and Upstate Forever's

4. PEC's 2011 plan includes the addition of new nuclear capacity in 2020 and 2021, but PEC acknowledges that the timing and volume of new nuclear generation in a regional partnership depends upon the specific project. *Id.* at 4, 24. This 2020-2021 timeframe was also included in PEC's 2010 IRP, in which it did not analyze any alternative timing for the 25% share of new nuclear generation. *See* PEC 2010 IRP at A-5.

The 2020-2021 timeframe for nuclear additions is highly uncertain, for several reasons:

- The Advanced Light Water Reactor designs being considered for construction in the region (including the AP1000 design being considered by Duke, SCE&G and Southern Company) are untested. Design certification by the Nuclear Regulatory Commission ("NRC") does not foreclose the possibility of total plant design flaws and/or construction problems.
- It is uncertain when the NRC will issue the Combined Construction and Operation License ("COL") for nuclear power plants in PEC's region and, consequently, when major construction actually will begin.
- Supply chain bottlenecks or constraints and/or transportation delays may lead to longer than expected lead times for critical plant equipment, especially if multiple nuclear construction projects are competing for limited engineering and construction resources and limited equipment manufacturing capacity.

PEC's 2020-2021 timeframe is even more uncertain in light of the delayed construction schedules of new generation nuclear plants. For example, the Olkiluoto 3 power plant in Finland, the first "new generation" nuclear unit to begin construction, broke ground in 2005 with a scheduled completion date of 2009. The plant, which uses a European Pressurized Water Reactor ("EPR") design, has experienced many problems, and its estimated completion date has been pushed back to the end of 2012, with a scheduled start of operations in early 2013.[11] Additionally, the projected cost of the plant has increased by more than 70 percent or about $4 billion.[12] A second EPR project in France, the Flamanville plant, has also experienced significant construction and schedule problems.[13] Construction on that plant began in late 2007 and was expected to last until mid-2012. As of 2010, the estimated cost of the Flamanville project has increased by 50 percent to 5 billion euros and the start of commercial operations has been delayed by

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comments on SCE&G 2011 IRP, SCPSC Docket No. 2011-9-E (April 15, 2011) at 4 (recommending that SCE&G reduce net capacity additions by approximately 200-500 MW to lower excess reserve margin).

[11] http://www.world-nuclear-news.org/NN-Startup_of_Finnish_EPR_pushed_back_to_2013-0806104.html

[12] *Id.*

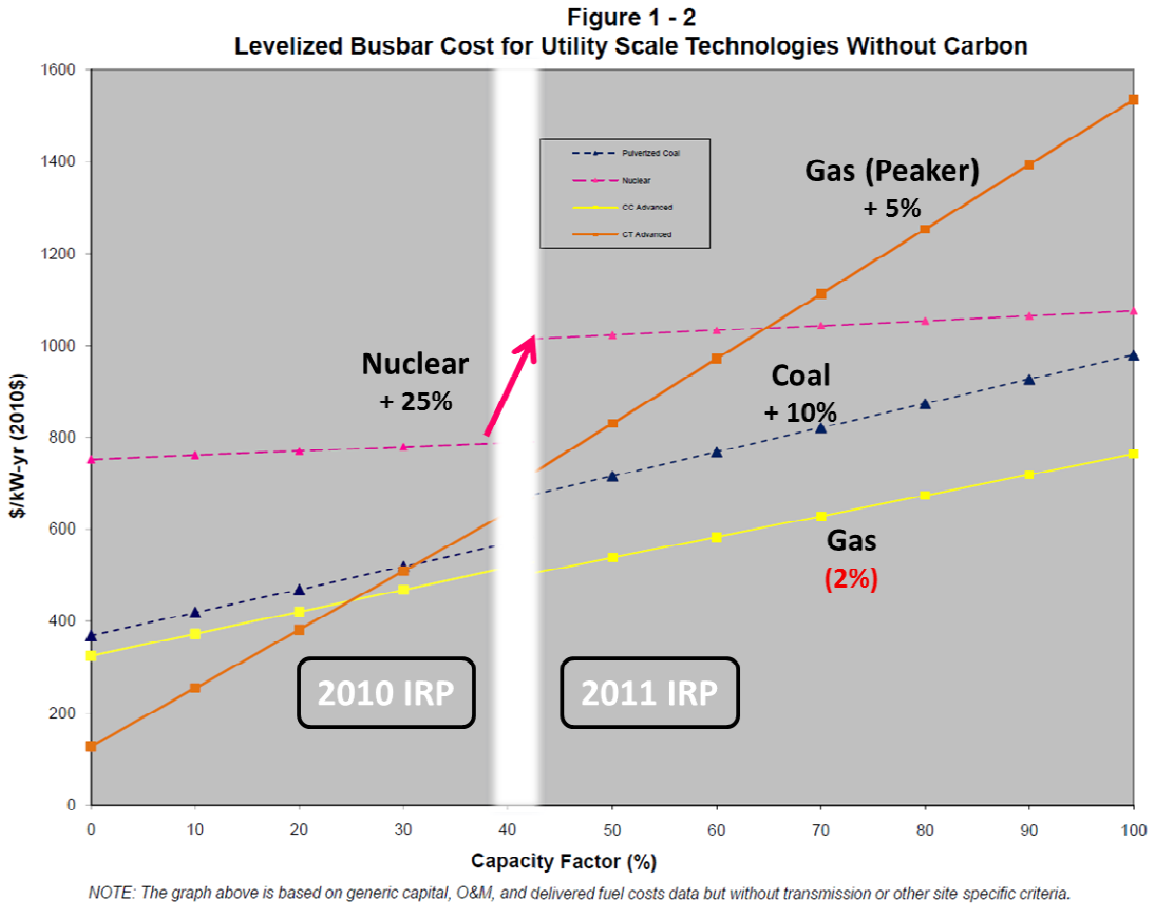
[13] *See, e.g.,* "Regulator stops flow of concrete at Flamanville," *Nuclear Engineering International* (June 18, 2008) at 4.

approximately two years until 2014.[14] Based on the foregoing, PEC's 2020-2021 timeline for new nuclear generation is far from certain.

B. The cost of new nuclear units will likely be significantly higher than PEC has assumed in its resource planning analyses.

As illustrated in Figure 1, PEC's estimated busbar cost for nuclear power increased by about 25% from last year's projections. This cost increase is approximately the same as the high nuclear cost sensitivity (+ 30%) analyzed in PEC's 2010 IRP, which the Company has not updated. PEC 2010 IRP at A-4.

Figure 1: Comparison of PEC Cost Estimates in 2010 and 2011 IRPs



Source: PEC 2010 IRP at 13; PEC 2011 IRP at 14.

This projected increase reflects the increase in nuclear construction costs that has occurred during the past forty years. Starting in the 1970s, the costs of building new nuclear power plants began to increase significantly. Actual costs of new plants were two to three times higher than the costs estimated at licensing or the start of construction.

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[14] Tara Patel, "French Nuclear Watchdog Says EDF Has Problems With Flamanville EPR Liner," Bloomberg, (August 30, 2010), http://www.bloomberg.com/news/2010-08-30/edf-has-welding-problems-at-flamanville-epr-reactor-french-watchdog-says.html.

The nuclear industry has a poor track record in predicting plant construction costs and avoiding cost overruns. Indeed, as Table 1 illustrates, a U.S. Department of Energy study shows that cost overruns for construction of 75 nuclear power plants were more than 200 percent above initial cost estimates.

Table 1[15]

Projected and Actual Construction Costs for Nuclear Power Plants

Construction Starts		Average Overnight Costs [a]		
Year Initiated	Number of Plants[b]	Utilities' Projections (Thousands of dollars per MW)	Actual (Thousands of dollars per MW)	Overrun (Percent)
1966 to 1967	11	612	1,279	109
1968 to 1969	26	741	2,180	194
1970 to 1971	12	829	2889	248
1972 to 1973	7	1,220	3,882	218
1974 to 1975	14	1,263	4,817	281
1976 to 1977	5	1,630	4,377	169
Overall Average	**13**	**938**	**2,959**	**207**

Source: Congressional Budget Office (CBO) based on data from Energy Information Administration, An Analysis of Nuclear Power Plant Construction Costs, Technical Report DOE/EIA-0485 (January 1, 1986).

Notes: Electricity-generating capacity is measured in megawatts (MW); the electrical power generated by that capacity is measured in megawatt hours (MWh). During a full hour of operation, 1 MW of capacity produces 1 MWh of electricity, which can power roughly 900 average households.
The data underlying CBO's analysis include only plants on which construction was begun after 1965 and completed by 1986.
Data are expressed in 1982 dollars and adjusted to 2006 dollars using the Bureau of Economic Analysis's price index for private fixed investment in electricity-generating structures. Averages are weighted by the number of plants.

a. Overnight construction costs do not include financing charges.
b. In this study, a nuclear power plant is defined as having one reactor. (For example, if a utility built two reactors at the same site, that configuration would be considered two additional power plants.)

Based on the foregoing, PEC's +/- 30 percent range for nuclear costs is insufficient.[16] PEC should widen this range and update it to reflect the midrange cost provided in its 2011 IRP.

VII. MODELING OF ECONOMIC IMPACTS WOULD INFORM THE EVALUATION OF RESOURCE PORTFOLIOS.

IRPs must include a description of the economic consequences of the plan to the extent practicable. *See* Commission Order No. 1998-502; S.C. Code Ann. § 58-37-10 (2010). Major utilities across the country perform modeling and analyses to estimate the economic impacts of their resource planning decisions, and PEC and its ratepayers would be well served if that approach were adopted in PEC's IRP. Information about economic impacts would assist PEC, the commissions and interested parties in understanding the broader implications of the Company's resource planning decisions.

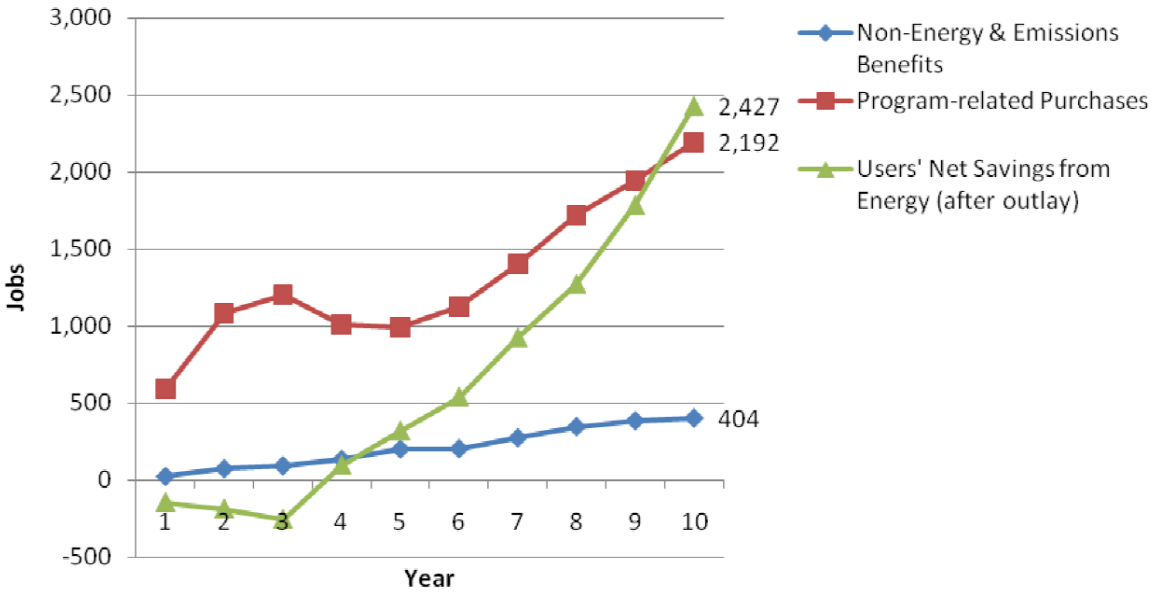
[15] Congressional Budget Office, *Nuclear Power's Role in Generating Electricity* (May 2008) at 17.

[16] Indeed, former Duke Chief Operating Officer and Group Executive Vice President, James Turner, noted that it is not unreasonable for Duke assume and plan for significant cost overruns, in the 40-50% range, for its proposed Lee units. *See* DEC Reply Comments, NCUC Docket No. E-100, Sub 128 (March 1, 2011) at 32.

Specifically, PEC should consider using the REMI Policy Insight model, a tool for conducting economic impacts analyses of resource planning portfolios that has been called the "most sophisticated" approach for conducting economic analysis of energy policies or projects.[17]

A 2010 study on Wisconsin's energy efficiency and renewable energy programs illustrates how the REMI Policy Insight model can be used to cover "all aspects of changes in the economy," including changes in business sales, gross regional product, real after-tax income, and jobs.[18] In that study, the REMI model showed various economic development impacts of efficiency and renewable energy programs, including lower energy costs, increased "business competitiveness," and a lower cost of living, which in turn increased the attractiveness of the state as a place to live and work.[19] Figure 2 shows the REMI model estimates of the job impacts of Wisconsin energy efficiency and renewable energy programs.

Figure 2: REMI Model Estimates of Job Impacts of Wisconsin EE/RE Programs



Economic Development Research Group (EDRG), *Focus on Energy Evaluation, Economic Development Benefits: CY09 Economic Impacts*, report to Public Service Commission of Wisconsin, March 2, 2010.

[17] U.S. Environmental Protection Agency, *Assessing the Multiple Benefits of Clean Energy: A Resource for States*, Climate Protection Partnerships Division. EPA also has noted that REMI Policy Insight model must be used with care so as to avoid unreliable findings, as seen in the Tennessee Valley Authority's draft resource planning documents recently presented for public comment.

[18] Economic Development Research Group (EDRG), *Focus on Energy Evaluation, Economic Development Benefits: CY09 Economic Impacts*, report to Public Service Commission of Wisconsin (March 2, 2010).

[19] *Id.*

Similar information on the economic impacts of PEC's energy resource plans would help the Company evaluate, estimate and describe the economic consequences of its resource options.

In conclusion, PEC's 2011 IRP does not reflect a long-term plan to meet its customers' energy needs in the most economic and reliable manner. PEC's energy efficiency programs are performing well, and we support the Company's efforts, but PEC failed to consider an aggressive efficiency case that would lower customer cost and risks. On the supply side, PEC does not adequately address the economics of the continued operation of scrubbed coal units and its remaining unscrubbed unit; and adopts unrealistic assumptions about the cost of new nuclear generation in its IRP. A proper analysis of alternative resource mixes would result in a preferred resource portfolio that reflects, among other things, increased energy efficiency in the long-term, a reduced need for additional generation, and retirement of uneconomical existing coal units.

Respectfully submitted this 31st day of October, 2011.

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Attachment 1

Review of Utility Evaluation of Energy Efficiency Resources in the Carolinas (October 2011)[1]

Energy efficiency is the least-cost electric system resource. Unlike supply-side resources, energy efficiency, even at aggressive levels, reduces customer utility bills.[2] Energy efficiency also moderates rate increases by reducing or delaying the need for new generating capacity.[3] In fact, states with leading energy efficiency programs often have electricity rates that are comparable to, or even lower than, rates in North and South Carolina.[4] In addition to lower customer bills and rate moderation, the numerous benefits of energy efficiency include environmental quality improvements, water conservation, energy market price reductions, lower portfolio risk, economic development and job growth, and assistance for low-income populations.[5]

Despite these well-recognized benefits, electric utilities in North and South Carolina ("Carolinas utilities")[6] significantly underestimate and underutilize the energy efficiency resource in their integrated resource plans ("IRPs"). Best IRP practices evaluate the efficiency resource on an equivalent basis with supply-side resources.[7] Carolinas utilities do not implement these best practices in a systematic way, however, and therefore fail to give due consideration to available and emerging energy efficiency resource opportunities. As a result, Carolinas utilities continue to develop IRPs that favor more expensive, risky supply-side resources and do not result in the "least-cost mix" of resource options. Leading utilities in many states expect to achieve more energy efficiency savings in the next five years than Carolinas utilities anticipate achieving in the next ten or even fifteen years. Carolinas utilities can and should do better.

What follows is a review of the manner in which Carolinas utilities consider energy efficiency as a resource. The following conclusions and recommendations are presented:

- Long-term efficiency savings projections of DEC and PEC lag behind those of leading utilities, even though DEC and PEC achieved impressive first-year savings impacts. DEC and PEC must build upon their first-year results to realize

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[1] This review was conducted by the Southern Alliance for Clean Energy.

[2] *See, e.g.,* Marilyn A. Brown et al., Energy Efficiency in the South, Southeast Energy Efficiency Alliance (April, 12, 2010), http://www.seealliance.org/se_efficiency_study/full_report_efficiency_in_the_south.pdf.

[3] *Id.*

[4] John D. Wilson, Energy Efficiency Program Impacts and Policies in the Southeast (May 2009) at 4, http://www.cleanenergy.org/images/files/SACE_Energy_Efficiency_Southeast_May_20091.pdf.

[5] *Supra* note 2.

[6] Unless otherwise noted, the current version of this review covers Duke Energy Carolinas, LLC ("DEC") and Progress Energy Carolinas, Inc. ("PEC") only. Future versions will cover additional electric utilities.

[7] S*ee* National Action Plan for Energy Efficiency Leadership Group, *National Action Plan for Energy Efficiency* (July 2006), Chapter 3.

the cumulative savings potential of energy efficiency, and the long-term system-wide benefits it offers customers and utilities.

- Industrial opt-out provisions create a lost energy savings opportunity. DEC and PEC should improve the quality of their programs directed to large commercial and industrial customers to realize the significant savings potential of this energy-intensive customer sector. Additionally, industrial customers who opt-out must implement their own efficiency measures, and the program impacts should be accounted for in the utilities' resource plans.

- DEC and PEC have not used a complete energy efficiency resource analysis in developing their IRPs. Utilities must rely on both existing and new energy efficiency technologies throughout their resource planning horizons. They should conduct comprehensive, independent energy efficiency potential studies and/or set energy savings goals based on available evidence regarding the amount of cost-effective energy efficiency that is achievable.

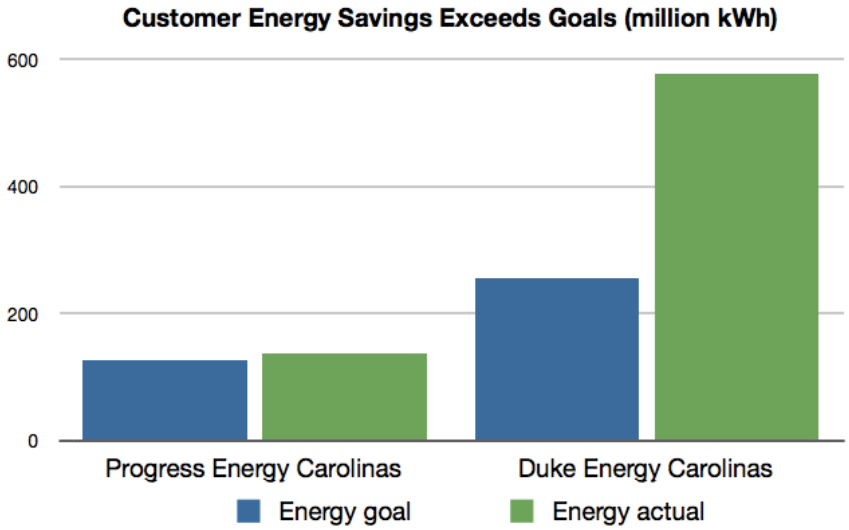
- Utility resource planning models do not optimize cost-effective energy efficiency in portfolio outputs. Rather than treating efficiency as a fixed load modifier, DEC and PEC should use an approach that models energy efficiency as a resource, just as generating plants are modeled on the supply side, such as the two-supply curve approach used by the Northwest Power and Conservation Council.

1. DEC and PEC have achieved substantial first-year efficiency savings but their long-term savings projections lag behind those of leading utilities.

The cumulative impact of DEC's and PEC's energy efficiency programs could reach the levels achieved by leading utilities over the next ten to fifteen years if DEC and PEC adequately analyze and forecast demand-side resources. While DEC and PEC have improved their consideration of energy efficiency in selecting near-term resource options, they still do not adequately consider energy efficiency in the long-term.

DEC and PEC have begun to invest in energy efficiency at meaningful levels. For their first full program year, DEC and PEC exceeded their energy savings targets, as illustrated in Figure 1.

Figure 1: Energy Efficiency Program Impacts, First Full Program Year



Source: SACE analysis of PEC and DEC compliance filings in North and South Carolina. PEC data cover April 2010-March 2011; DEC data cover calendar year 2010.

Typically, ambitious new programs save 0.2 – 0.5% of retail electricity sales in their first full program year. As Table 1 shows, DEC and PEC's first year program impact are within or exceed this range. DEC is outperforming PEC in terms of energy efficiency savings, mostly due to DEC's aggressive residential lighting efforts.

Table 1: Energy Efficiency Program Impacts, First Full Program Year

Program impact (relative to electricity sales)	**PEC**	**DEC**
Efficiency from residential lighting programs	0.20%	0.52%
Efficiency from all other programs	0.13%	0.13%
Total efficiency savings	**0.33%**	**0.65%**

Source: SACE analysis of PEC and DEC compliance filings in North and South Carolina. PEC data cover April 2010-March 2011; DEC data cover calendar year 2010.

Both utilities have made residential lighting incentives, which focus on CFL bulbs, their largest and lowest-cost efficiency program. Over the next decade, federal lighting standards will increase the efficiency of many bulbs, which will benefit consumers, but also raise the bar for utilities to capture lighting savings because the utility will get credit only for energy savings that go beyond existing standards.

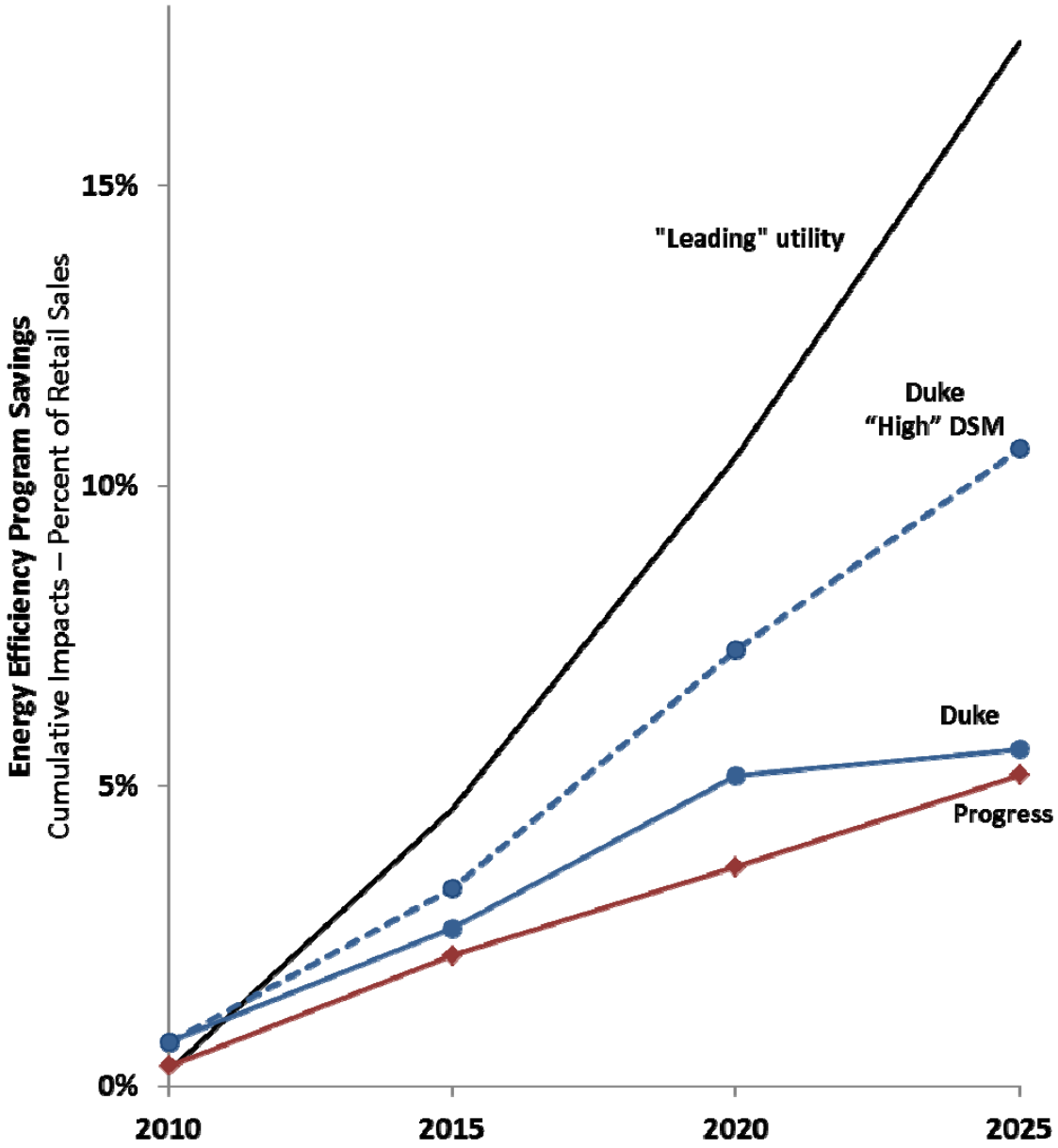
Despite the initial success of the DEC and PEC programs, the Carolinas remain in the bottom quarter compared to states with energy efficiency standards. PEC and DEC expect to achieve about 3.7% and 5.2%, respectively, in cumulative energy savings from energy efficiency programs by 2020. These forecasts are equivalent to annual energy savings of 0.37% and 0.52%—significantly below the levels achieved by national leaders. Figure 2 compares projected energy efficiency savings of DEC and PEC to that of a "leading" utility from the average "top ten" state, which is anticipated to achieve at

least 1% annual energy savings per year.[8] A 1% annual savings goal is consistent with the findings of recent studies, including a 2010 Georgia Tech meta-analysis of several potential studies in the South, which found that the achievable electric efficiency potential ranges from 7.2 to 13.6% after 10 years.[9]

[8]The "leading" utility is represented as the average of the top ten states as reported in Sciortino, M. *et al*., *Energy Efficiency Resource Standards: A Progress Report on State Experience*, American Council for an Energy-Efficient Economy, Research Report U112 (June 2011).

[9]Chandler, S. and M.A. Brown, "Meta-Review of Efficiency Potential Studies and Their Implications for the South," Working Paper # 51 (August 2009). *See also* American Council for an Energy-Efficient Economy, "North Carolina's Energy Future: Electricity, Water, and Transportation Efficiency," Report Number E102, March 2010, at 15 (finding that the "medium case" energy savings potential for utility-led energy efficiency programs is approximately 17% by 2025).

Figure 2: Energy Efficiency Savings Impacts of DEC and PEC Compared to "Leading" Utility



Source: DEC 2011 IRP at 23, 119-121; PEC 2011 IRP at 8, E-9; and Sciortino, M. *et al*, *Energy Efficiency Resource Standards: A Progress Report on State Experience*, American Council for an Energy-Efficient Economy, Research Report U112 (June 2011).

Figure 2 shows that Carolinas utilities lag significantly behind the typical leading utility, regardless of which baseline is used. DEC's energy efficiency program impacts appear to grow during the first decade of the planning horizon, but level off in the second decade. PEC projects increased energy savings in the second decade of its planning horizon, but only enough to account for slow growth in its efficiency program impacts in the first decade. As a result, while aggressive levels of energy efficiency may be sufficient to eliminate a large amount of load growth through about 2020, the efficiency

projections in DEC's and PEC's IRPs favor supply-side additions in the second decade of the planning period, despite available, additional savings opportunities from energy efficiency. Energy efficiency, if properly integrated into a long-term resource plan, can result in steady, significant energy savings growth over the planning horizons. DEC and PEC should build upon their successful first-year energy savings results to realize the long-term system-wide benefits of efficiency, which will lower cost and risk to both customers and the utilities.

2. Industrial opt-out provisions create a lost energy savings opportunity.

In both North and South Carolina, industrial customers can choose to opt out of utility-sponsored energy efficiency programs, and not bear the costs of new programs, if they implement their own energy efficiency programs. Opt-out provisions do not exempt industrial customers from engaging in energy efficiency efforts altogether. Instead, they allow industrial customers to opt out of utility programs only if they implement their own energy efficiency programs.

It does not appear that the load impact from industrial energy efficiency efforts is reflected in the utilities' IRPs. While DEC accounts for the impact of federal lighting standards on its load forecasts,[10] it does not make a similar adjustment for the impact of energy efficiency programs adopted by industrial customers that have opted out of its programs. (PEC does not make this adjustment either). Moreover, PEC appears to have no expectation that customers eligible to opt-out will implement all cost-effective energy efficiency: its energy efficiency study excludes the participation of ***all customers*** eligible to opt-out of DSM programs.[11]

Industrial and large commercial sectors represent a large resource opportunity: more than half of the cost-effective energy efficiency potential. Failure to utilize this resource opportunity increases system costs for all classes of customers.

DEC's discussion of the cost difference between its "base" and "high" energy efficiency cases illustrates the significance of this lost opportunity. DEC acknowledges that "[t]he high energy efficiency sensitivity is cost effective if there is an equal participation between residential and non-residential customers" but that "[i]f a significant number of non-residential customers opt out, then the high EE case may no longer be cost effective."[12] Indeed, DEC's supporting data suggests that if more industrial customers were to participate in DEC's efficiency programs, DEC could increase energy efficiency savings from about 5% to about 11%, and reduce or delay costly new supply-side resources.[13]

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[10]Duke 2011 IRP at 110.
[11]ICF International, *Progress Energy Carolinas DSM Potential Study* (March 16, 2009) at 2-13.
[12]Duke 2010 IRP at 95.

[13]Initial Comments of Southern Alliance for Clean Energy, *In re: Investigation of Integrated Resource Planning in North Carolina–2010*, North Carolina Utilities Commission Docket No. E-100, Sub 128 (February 10, 2011) at 11.

Several steps could be taken to address the impact of industrial opt-outs. First, the electric utilities could, at their own initiative or at the direction of state commissions, improve the quality of their programs directed to large commercial and industrial customers. The increasing number of "opt-ins" indicates that the utilities have made some efforts in this regard, and we encourage DEC and PEC to continue this effort. Second, the commissions or the utilities could initiate a process to ensure that industrial customers who opt-out actually implement their own efficiency measures, as required. Third, industrial customers or their customer associations could work to provide to the electric utilities firmer estimates of their energy efficiency plans and projected impacts on energy use and demand. Fourth, utilities, industrial customers and others could work together to develop more attractive programs that meet the needs of industrial customers.

3. DEC and PEC do not conduct complete energy efficiency resource analyses in developing their IRPs.

DEC and PEC are not using a comprehensive energy efficiency potential study, or a consistent standard in determining the amount of energy savings that can be achieved, in their resource planning processes.

For its 2010 IRP, DEC limited the program potential of its "high energy efficiency" forecast to the "economic potential identified by the 2007 market potential study."[14] In a recent hearing before the North Carolina Utilities Commission, DEC Witness Richard Stevie testified that this study is "out of date" and that DEC is "continuing to look at additional programs" that were not analyzed in the potential study.[15] While the "high energy efficiency" forecast in the DEC 2011 IRP has a similar level of cumulative savings, it is unclear whether DEC continues to limits its program potential by the amount identified in the 2007 market potential study.[16]

For its 2010 and 2011 IRPs, PEC limits its program potential to the "cost-effective, realistically achievable potential" in its "updated potential study."[17] While the scope of PEC's updated study appears to be broader than that of the earlier version, the study appears to suffer from the same fundamental shortcomings as the earlier study, which include:

- The potential study indicates that the findings were benchmarked against other utilities but no benchmarking is disclosed.
- Energy savings practices, measures and entire sectors remain excluded from the scope of study.

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[14] Duke 2010 IRP at 68.
[15] North Carolina 2008 and 2009 IRP hearing, Transcript Vol. 4, pp. 31 and 39.
[16] *Compare* Duke 2011 IRP at 34 (describing the high EE load impact scenario as using the full target impacts of the Save-A-Watt programs for the first five years and then increasing the load impacts at 1% of retail sales *every year after that until 2030*) *with* Duke 2011 IRP at 101 (defining the High DSM case as the full target impacts of Save-A-Watt for the first five years and then increasing load impacts at 1% of retail sales every year after that *until the load impacts reach the economic potential identified by the 2007 market potential study*).
[17] Progress 2010 IRP at E-7.

- It is not evident from the resource plan that PEC has made effective use of the insights offered by its consultant in the potential study. It does not appear that PEC has adopted some highly cost-effective programs and strategies included in PEC's market potential study, such as an ENERGY STAR Appliance program and certain non-residential incentive programs.

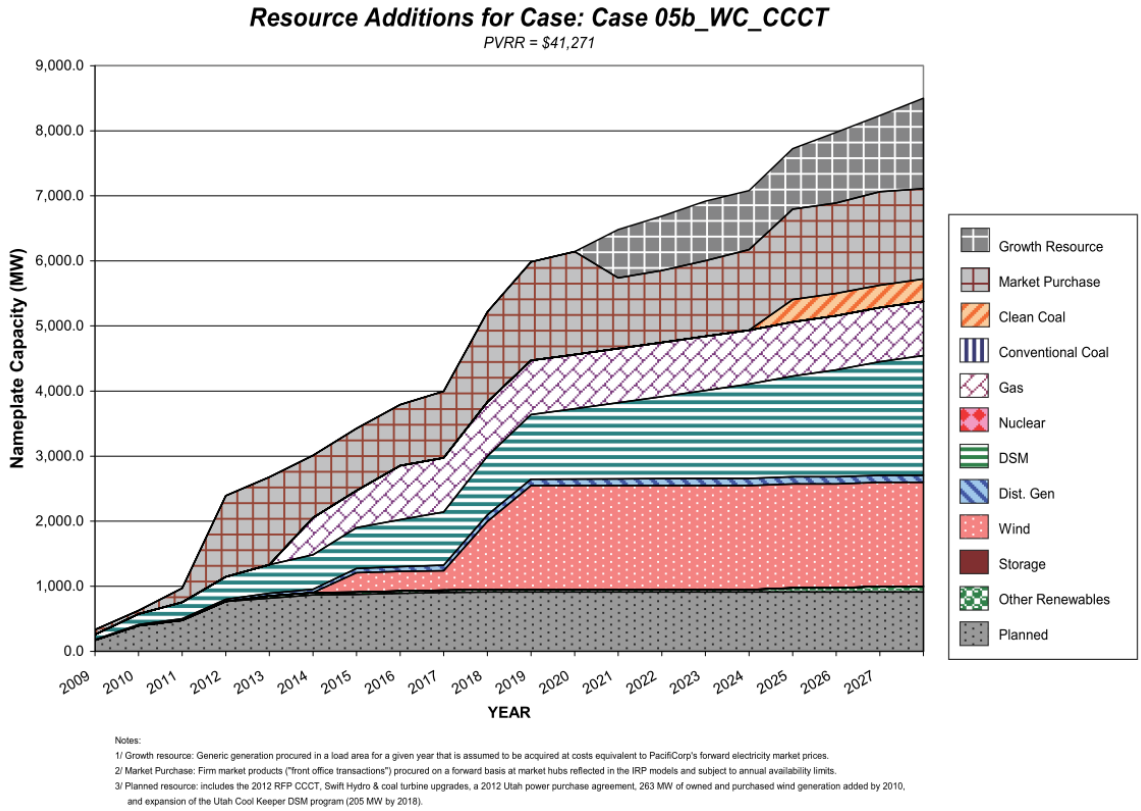
In its IRP, PEC effectively assumes no further technological progress or development of new energy-saving practices. DEC is more confident about advances in efficiency, although this is not fully reflected in its long-term resource plan.

Utilities across the country that have a serious commitment[18] to efficiency, rely on both existing and new energy efficiency technologies throughout their resource planning horizons to achieve energy savings in both the near- and long-term. The Northwest Power and Conservation Council, for example, has concluded that at least 85% of the projected 20-year energy savings estimates in its first regional plan were realized.[19] One of the utilities affected by those regional plans, PacifiCorp, anticipates continued growth of the contribution of DSM resources in its IRP, as illustrated in Figure 3.

[18] The term "serious commitment" is used to reflect a plan to achieve more than 3% energy savings over 10 years – a relatively low threshold.

[19] Northwest Power and Conservation Council, *Achievable Savings: A Retrospective Look at the Northwest Power and Conservation Council's Conservation Planning Assumptions*, Council document 2007-13, August 2007.

Figure 3: PacifiCorp Preferred Resource Portfolio, 2008 IRP



PacifiCorp, *2008 Integrated Resource* Plan, May 2009, Volume I, at 239 and Appendix A, at 31.

DEC and PEC can and should do the same. Indeed, "[m]ost utilities have an established approach to forecast long-term market prices, and the same forecasting technique and assumptions should be used for energy efficiency as are used to evaluate supply-side resource options."[20]

There are several steps that could be taken to help utilities in the Carolinas move toward a more complete energy efficiency analysis. One option is to rely upon a comprehensive, independent energy efficiency potential study. Such a study should be conducted without incorporating utility biases that could constrain the findings; should recognize the limitations inherent in such studies, particularly with respect to quantifying what is "achievable"; and should make reasonable assumptions about long-term technological and program development prospects.

Second, the utilities could conduct more limited studies to address specific shortcomings, such as the failure to study different business sectors for energy savings opportunities. This would partially address the gaps in the existing studies and could lead more directly into program development.

[20]National Action Plan for Energy Efficiency Leadership Group, *National Action Plan for Energy Efficiency* (July 2006), at 3-4.

A third option is to set an energy savings goal. Such a goal may be set by the state legislature or by a regulatory commission, for example, and would be based on available evidence regarding what level of cost-effective energy efficiency is achievable, and would be subject to future revision. Although there may be imprecision and a potential for bias or error, a goal can be implemented in a constructive and positive manner, with flexibility and accountability for results that are truly in the public interest.

4. Utility resource planning models do not optimize cost-effective energy efficiency in portfolio outputs.

In their resource planning modeling, DEC and PEC integrate energy efficiency as a fixed model input, best characterized as a load adjustment. As a result, the resource planning model works around the limited efficiency input, selecting resources to meet the utility's adjusted load. While this treatment is appropriate for demand response, industry best practice is to treat energy efficiency as equal or even preferred to supply-side resources for planning purposes.[21]

Utilities in the Carolinas should use an approach that models energy efficiency as a resource, just as generating plants are modeled on the supply side. For example, the Northwest Power and Conservation Council has pioneered an approach that uses two supply curves for energy efficiency in the model that develops least-cost portfolios.[22] The use of two supply curves allows for different treatment of discretionary and lost-opportunity energy efficiency resources.[23] Just as utilities use short-term market power purchases for different purposes than investments in new power plants, a sophisticated energy efficiency planning process distinguishes between discretionary and lost-opportunity resources. The load-adjustment approach does not allow this distinction to be made.

Unless an aggressive energy savings target is set by a legislature or commission, we recommend that utilities in the Carolinas adopt a two-supply-curve approach to evaluate the energy efficiency resource in their IRP processes. At a minimum, the utilities should model energy efficiency on an equivalent basis to supply-side resources. This would be preferable to the "adjusted load" method that does not account for all cost-effective energy efficiency and therefore leads to resource portfolios with unnecessarily high levels of both cost and risk.

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[21] *See, e.g.*, Aspen Environmental Group and Energy and Environmental Economics, Inc. (Aspen/E3), *Survey of Utility Resource Planning and Procurement Practices for Application to Long-Term Procurement Planning in California: Final Report and Appendices*, prepared for California Public Utilities Commission, April 2009, http://docs.cpuc.ca.gov/published/Graphics/103213.PDF.

[22] *Id.* at 71.

[23] Discretionary energy efficiency resources are investments that can be advanced or deferred based on near-term market decisions, such as a CFL market promotion. Lost-opportunity energy efficiency resources are programs that take advantage of opportunities due to market or customer circumstances, such as new construction and replace-on-burnout programs.