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] *See* 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.

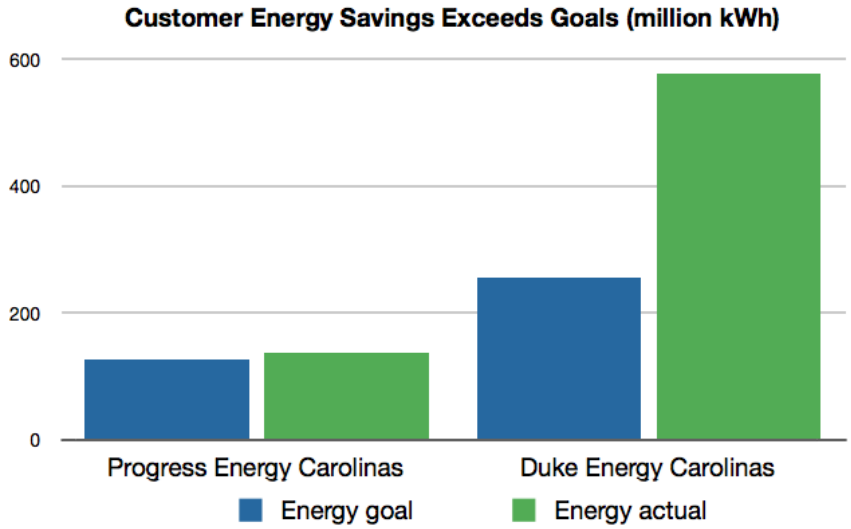
- Utility resource planning models do not optimize cost-effective energy efficiency in portfolio outputs. Rather than treating efficiency as a fixed load modifier, DEC and PEC should use an approach that models energy efficiency as a resource, just as generating plants are modeled on the supply side,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

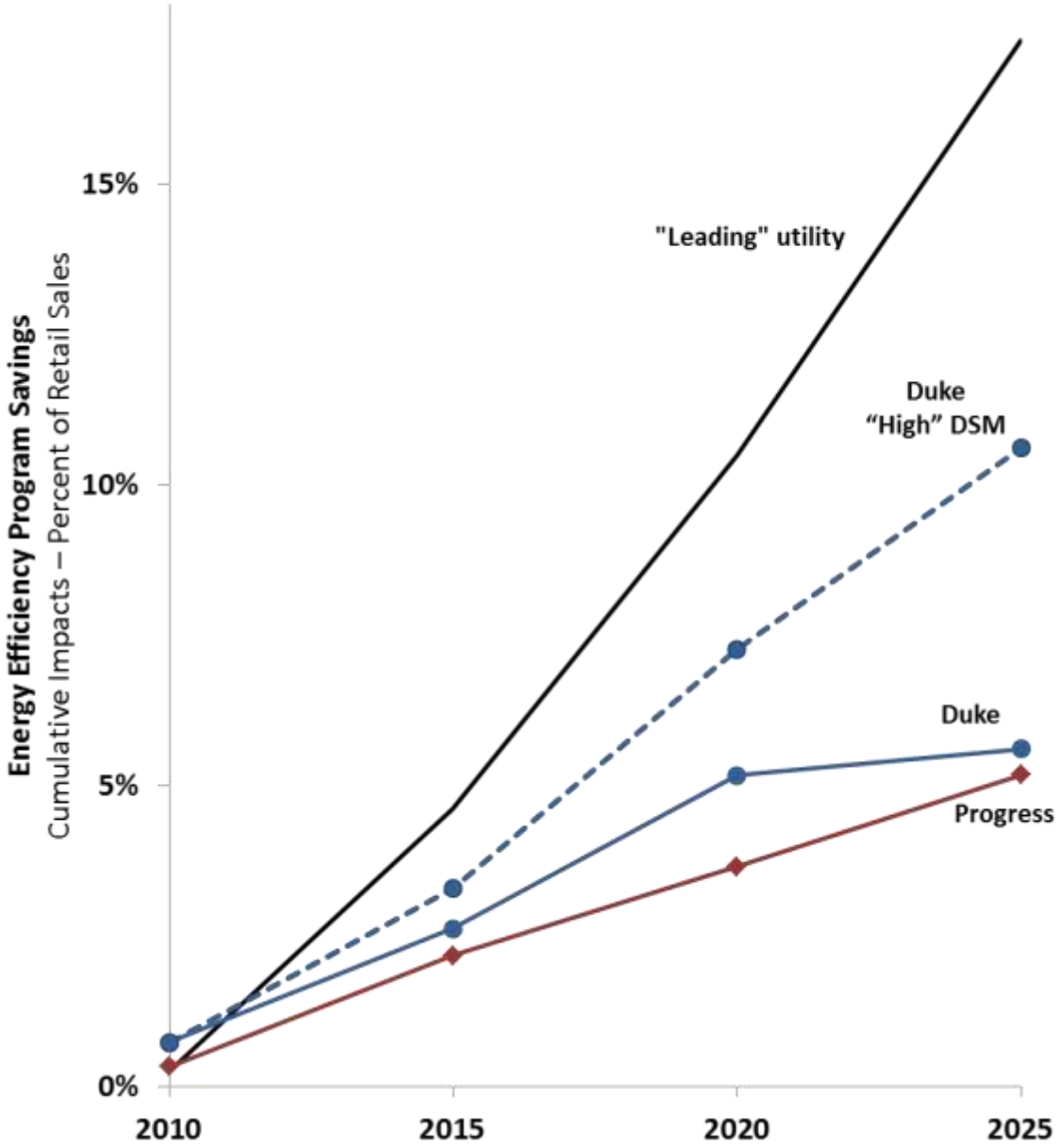
Despite the initial success of the DEC and PEC programs, the Carolinas remain in the bottom quarter compared to states with energy efficiency standards. PEC and DEC expect to achieve about 3.7% and 5.2%, respectively, in cumulative energy savings from energy efficiency programs by 2020. These forecasts 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.

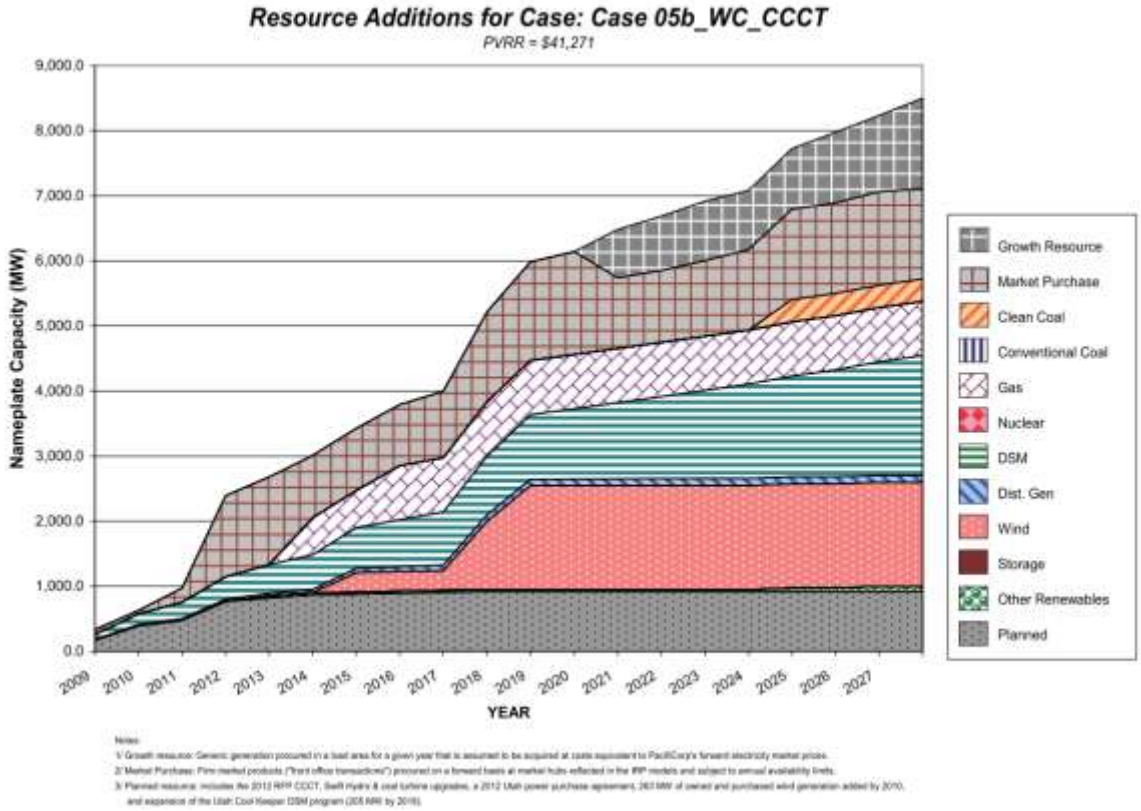
In its IRP, PEC effectively assumes no further technological progress or development of new energy-saving practices. DEC is more confident about advances in efficiency, although this is not fully reflected in its long-term resource plan.

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.