BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of	**)**	
	)	
Application of Duke Power Company LLC d/b/a Duke	**)**	
Energy Carolinas, LLC for Approval for an Electric	**)**	**Docket No. E-7,**
Generation Certificate of Public Convenience and	**)**	**Sub 790**
Necessity to Construct Two 800 MW State of the Art	**)**	
Coal Units for Cliffside Project	**)**	

Supplemental Testimony of
David A. Schlissel and Anna Sommer
Synapse Energy Economics, Inc.

On Behalf of
Southern Alliance for Clean Energy
Environmental Defense and
Southern Environmental Law Center

PUBLIC VERSION
PROTECTED MATERIALS REDACTED

January 8, 2007

I. Introduction

Q. Mr. Schlissel, please state your name, position and business address.

A. My name is David A. Schlissel. I am a Senior Consultant at Synapse Energy Economics, Inc, 22 Pearl Street, Cambridge, MA 02139.

Q. Ms. Sommer, please state your name position and business address.

A. My name is Anna Sommer. I am a Research Associate at Synapse Energy Economics, Inc., 22 Pearl Street, Cambridge, MA 02139.

Q. On whose behalf are you testifying in this case?

A. We are testifying on behalf of the Southern Alliance for Clean Energy ("SACE"), Environmental Defense, and Southern Environmental Law Center.

Q. Have you previously filed testimony in this proceeding?

A. Yes. We filed Direct Testimony on September 6, 2006.

Q. What is the purpose of this Supplemental Testimony?

A. We have been asked to evaluate the need for and the economics of Duke Energy Carolinas' ("Duke" or "the Company") Cliffside Project in light of the recently announced cost increase and the Supplemental Testimony filed by the Company on November 29, 2006.

Q. Please summarize your conclusions.

A. Our September 2006 Direct Testimony recommended that the Commission should not grant a Certificate of Public Convenience and Necessity for the Cliffside Project. This recommendation was based on several findings. First, we were concerned that Duke's then current capital cost estimate for the Cliffside Project was too low. Second, the Company's planning methodology was flawed because all but the coal, gas and nuclear alternatives were eliminated as part of a preliminary screening analysis. Third, the Company had failed to adequately consider the potential for greenhouse gas regulations. Finally, the Company also

had failed to adequate consider the potential for energy efficiency and renewable alternatives to the Project.

The additional information that we have reviewed since we filed our Direct Testimony on September 6, 2006 confirms each of our original findings. Thus, our recommendation remains the same as it was in our Direct Testimony: the Commission should not grant a Certificate of Public Convenience and Necessity for the Cliffside Project. This conclusion is based on the following findings:

1. Duke has prepared a number of updated optimization runs using the Capacity Expansion Module (CEM) model that reflect the new, increased capital cost estimate for the Cliffside Project.

2. Despite repeated requests, the Company only provided the files for these updated optimization runs on Saturday January 6, 2007. Therefore, we have not had a full opportunity to review these files in any detail.

3. Nevertheless, it is clear from the materials that Duke has provided that the results of the Company's updated capacity expansion modeling analyses do not support the addition of the new coal capacity from the Cliffside Project.

4. It also is clear from the Company's Supplemental Testimony and the materials that Duke has provided during discovery that Company's updated modeling analyses remain significantly flawed and biased because they continue to ignore the potential for significant amounts of energy efficiency and renewable resources.

5. In particular, a new study prepared for the North Carolina Utilities Commission shows that there is a significant potential for energy efficiency in North Carolina. However, Duke's updated modeling analyses do not adequately consider this potential for energy efficiency to be part of a portfolio of alternatives to the Cliffside Project.

6. Another new study for the North Carolina Utilities Commission also shows that there is a significant potential for renewable resources in North

Carolina. However, Duke's updated analyses do not adequately consider this potential for renewable resources as part of a portfolio of alternatives to the Cliffside Project.

7. The new evidence that we have reviewed confirms the conclusion in our Direct Testimony that Duke's analyses do not adequately consider the potential impact of greenhouse gas regulations.

8. For these reasons, the Commission cannot rely on the results of Duke's updated capacity expansion modeling analyses and should not grant a Certificate of Public Convenience and Necessity for the Cliffside Project.

II. The Results of Duke's Updated Capacity Expansion Modeling Analyses Do Not Support the Addition of the New Coal Capacity from the Cliffside Project.

Q. What is the current, estimated cost of the Cliffside Project?

A. The cost of the Cliffside Project has increased from approximately $2 billion to $3 billion,[1] an increase of about 50%.

Q. Do you accept the explanations that Duke witnesses Rose and McCollum have provided for the recent increase in the estimated cost of the Cliffside Project?

A. Yes. As we explained in our September 2006 Direct Testimony in this Docket, we believed that the then-current projected capital cost for the Cliffside Project was too low.[2] The Company's subsequent capital cost revision confirmed our earlier testimony.

---

[1] Murawski, John. "Cost of power plant jumps." *The News & Observer*. 17 November 2006. Available at http://www.newsobserver.com/666/story/511525.html.

[2] Direct Testimony of David A. Schlissel and Anna Sommer, at page 4, line 8, to page 6, line 17.

Q. Has Duke completed its detailed engineering design for the Cliffside Project?

A. Not to our knowledge. Duke has said that it anticipates that a conceptual design for the Cliffside Project will be completed in the .[3]

Q. Has Duke completed the selection of the suppliers of the main equipment for the Cliffside Project?

A. No. Duke has indicated that it expects to complete the equipment selection for the Cliffside Project in the .[4]

Q. When does Duke expect to revise its current cost estimate for the Cliffside Project?

A. Duke has said that it expects to revise its current cost estimate in the .[5]

Q. Is it reasonable to expect that there could be further increases in the cost of the Cliffside Project?

A. Yes. Duke may increase the estimated cost of the project once it completes its preliminary design and/or selects the equipment suppliers. Moreover, any number of factors could lead to even higher costs during the remaining six or seven years before the Project is completed, if indeed a Certificate is issued and the Project is allowed to continue. These factors could include the worldwide competition for power plant equipment, commodities and labor, project delays, regulation-related costs, and weather conditions. Thus, there is no guarantee that the current capital cost estimate for the Cliffside Project will be the last. Indeed, it is even possible that the actual cost of the Cliffside Project may be higher than the 20 percent sensitivity assumed by Duke in its capacity expansion modeling.

---

[3] Duke's confidential response to SACE's First Data Request, Question No. 1.b.

[4] Duke's response to SACE's Third Data Request, Question No. 4.

[5] Duke's confidential response to SACE's Third Data Request, Question No. 1.b.

Q. Has Duke prepared new modeling analyses to examine the impact of the recently announced capital cost increase for the Cliffside Project?

A. As discussed in the Supplemental Testimony of Duke witness Hager, the Company has prepared a number of updated modeling analyses to reflect the increased cost of the Cliffside Project.

Q. Have you had a full opportunity to review these modeling analyses?

A. No. Duke witness Hager testified that Duke took three steps to update its model to reflect the higher Cliffside Project capital cost: (1) screening curves were updated based on new capital costs; (2) optimization runs were updated to identify portfolios; and (3) the portfolios were analyzed using detailed production costing models.[6]

In two separate data requests submitted in mid-November and early December, SACE requested the files for the Company's new updated optimization runs.[7] These were the runs that used the Capacity Expansion Module ("CEM"). In response to these requests, Duke gave SACE the files for the original CEM model runs that had been prepared prior to the September 2006 hearings in this proceeding. The files for the new updated CEM model runs were not included on the CD/DVDs provided to SACE by the Company in mid-December 2006.[8]

---

[6] Supplemental Testimony of Janice D. Hager, at page 2, lines 15-18.

[7] These materials were requested in SACE's Third Data Request, Question No. 6, and SACE's Fourth Data Request, Question No. 19.

[8] We could see that the CEM files that were initially provided by Duke in response to SACE's 3rd Data Request, Question No. 19 were not from the updated CEM runs because the files had last been modified prior to the September 2006 hearings in this Docket. In addition, the CEM model runs provided to SACE in mid-December 2006 reflected the original capital costs for the Cliffside Project. The new updated CEM model files that we have now received on January 6, 2007 were last modified in November 2006 and used the newer, and significantly higher, capital costs for the Cliffside Project.

Q. Has SACE ever received the files for the updated CEM runs that were performed by Duke in November 2006?

A. Yes. After numerous e-mail requests, we finally received the correct updated CEM files on Saturday, January 6, 2007, as we were finalizing this testimony. Consequently, we have not had a reasonable opportunity to review those files.

Q. Do the results of Duke's updated CEM files support the addition of the 1600 MW of new coal capacity from the Cliffside Project in the years 2011-2013?

A. No. Table 1 below replicates the amounts of new coal capacity that the CEM model added in the scenarios discussed in the Supplemental Testimony of Duke witness Hager. These results were provided by Duke in response to Public Staff Request No. 4, Question No. 12 in a summary file named "CEM Expansion Plans LP 11-21-06.xls."[9]

Table 1. Megawatts of New Coal Capacity Added in Updated November 2006 CEM model optimization runs

	Total	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Base																
High Load																
Low Load																
High Gas Prices																
Low Gas Prices																
High Coal Prices																
Low Coal Prices																
CO2 Tax																
CO2 Tax + High Gas Prices																
Coal Capital Cost + 20%																
Nuclear Capital Cost + 20%																
No New Nuclear Units																

In particular, Table 1 reveals that:

- The CEM model only added a total of MW of new coal capacity in the Base load forecast scenario, and that new coal capacity was not selected until the years .
- The CEM model did not add coal in the Company's CO_2 Tax Scenario. The CEM model only added MW of new coal (in the years) in a combined CO_2 Tax + High Gas Price scenario.

[9] The "CEM Expansion Plans LP 11-21-06.xls" file also contained the results of a number of scenarios that were not discussed by Ms. Hager. These results are not included in Table 1.

- The CEM model also did not add coal capacity in the High Coal Prices and 20% Higher Coal Capital Cost scenarios.
- The CEM model did add MW of new coal capacity in the High Load scenario but in the years .

Q. Did the original CEM model runs that were prepared in July 2006 match up any more closely with the portfolios discussed by Ms. Hager in either the Direct or Supplemental Testimony?

A. Yes. The original CEM runs appear to have matched up somewhat more closely with the portfolios discussed by Ms. Hager. However, even back in the summer of 2006, before the recent 47 percent coal capital cost was announced, the CEM model only added MW of new coal capacity in the Base case scenario, MW of new coal capacity in the CO_2 Tax scenario and MW in the 20% Higher Coal Capital Cost scenario.[10] These results would hardly have justified the addition of the 1600 MW of the Cliffside Project or the inclusion of 1600 MW of new coal capacity in the portfolios to be examined further in the production cost modeling.

Q. Has Duke acknowledged that the portfolios it has examined do not match the updated CEM results?

A. Yes. In a December 28, 2006 e-mail response, counsel for Duke indicated that due to the short time limit, Duke had used the existing portfolios that were used in the original 2006 Plan and updated the capital costs in the results. Therefore, we were told that the portfolios discussed by Ms. Hager "best agree with the original 2006 CEM results and not exclusively with the newest CEM runs." In fact, according to Duke, "the newest CEM runs for the most part universally show lower coal due to the higher CAPEX [capital cost] coal costs, so it will be difficult to exactly match updated CEM with portfolios." Indeed, we were told that "if SACE continues to try to match new CEM exactly with the original portfolios, it will be a fruitless exercise." As a result, it is unclear what analyses form the basis

[10] "CEM Expansion Plans LP 07-13-06.xls" file provided in Duke's response to SACE's 3rd Data Request, Question No. 6.

for the various coal, gas and nuclear portfolios discussed by Ms. Hager in her November 2006 Supplemental Testimony.

Q. What explanation has Duke given for the fact that the portfolios discussed in Ms. Hager's Supplemental Testimony do not match up with the results of the original or the updated CEM optimization runs?

A. In its December 28, 2006 e-mail, Duke said that one of the reasons why the portfolios it examined in its production cost modeling analyses do not match up with the CEM optimization run results is because "CEM does not use discrete unit sizes and optimum construction timing." That is, Duke was saying that CEM could add 133 MW of new coal in one year and 20 MW in the next. It did not have to add units in the sizes that would normally be added to a utility system.

Q. Is this explanation persuasive?

A.

Q. Can you tell how much new coal capacity the CEM model would add, and in which years, if it were run in the
?

A. No. It would be necessary to rerun the model in that Mode to determine how much new coal capacity would be added.

However, the results of some scenarios that Duke ran on the CEM model, but are not discussed in Ms. Hager's Supplemental Testimony, do offer some insights and suggest that the model might add even less new coal capacity if it were run in the .

Q. Please explain.

A.

Q. In your Direct Testimony in this proceeding you concluded that the Commission should not rely on the results of Duke's capacity expansion modeling because the Company used a flawed methodology to eliminate the non-coal, gas and nuclear alternatives. Has that conclusion changed?

A. No, it has not. Despite the *significant* magnitude of the cost increase of the Cliffside Project, the Company continues to rely upon a flawed methodology to evaluate possible portfolios of resources needed to meet its load requirements. In particular, the Company's new modeling includes the addition of 201 MW of demand side management in the year 2007 only. That is, the Company new modeling assumes that *no* additional energy efficiency can be achieved on its system in years beyond 2007. It is incredible that Duke would do so little analysis of energy efficiency when it is contemplating the addition of 1600 MW of coal-fired capacity. It is clearly imprudent for Duke to continue to rely upon that analysis in the face of a nearly 50% cost increase for that coal-fired capacity.

Q. What is the basis for your conclusion that the Company's methodology for evaluating potential resource portfolios is flawed?

A. First, to be clear, the models the Company uses, Capacity Expansion and Planning and Risk are appropriate tools for integrated resource planning. Our criticism applies not to those tools, but to the method in which they are employed. That is, Duke first eliminated in its busbar screening analysis all but the coal, gas, and nuclear alternatives. This meant that in the later optimization analyses the model was not allowed to select any renewable alternatives or any additional DSM beyond the 201 MW that Duke pre-determined were the maximum amounts that was technically feasible and economic. As we explained in our Direct Testimony, given the capabilities of the CEM model, it is perplexing that Duke would undertake such a preliminary busbar screening analysis that eliminates all of the non-coal, gas and nuclear options.[11]

Q. Did Duke's new modeling analyses include any new supply side options besides coal, natural gas and nuclear?

A. No. The Company's new modeling analyses examined the same coal, natural gas and nuclear portfolios.[12] The only new portfolio examined by the Company included the shared ownership of the Cliffside Project but it still only considered coal, natural gas and nuclear options.

Q. Do you agree with Duke that there is significant uncertainty surrounding future natural gas prices?

A. Yes.

---

[11] Direct Testimony of David A. Schlissel and Anna Sommer, at page 6, line 18, to page 7, line 20.

[12] Supplemental Testimony of Janice D. Hager, at page 3, lines 7-11.

Q. Is the Cliffside Project the only reasonable hedge against future natural gas price uncertainties?

A. No. DSM, including energy efficiency, and renewable technologies, such as wind and biomass, also would provide a hedge against future natural gas price uncertainties.

Q. Are there significant uncertainties surrounding other assumptions in the Company's modeling analyses?

A. Yes. There are significant uncertainties surrounding many of the other assumptions in the Company's modeling analyses including, but not limited to, the coal and nuclear capital costs.

Q. Could DSM, including energy efficiency, and renewable technologies also provide a hedge against the uncertainties associated with coal and nuclear capital costs?

A. Yes. In fact, the uncertainty in the ultimate capital cost of the Cliffside Project is one of the reasons why it is so critical that Duke allow its capacity expansion model to select additional DSM, including energy efficiency, and renewable technologies during the optimization and production cost modeling analyses instead of pre-determining the maximum amounts of each alternative that would be feasible and economic.

Q. In addition, could DSM, including energy efficiency, and renewable technologies also provide a hedge against the uncertainties associated with potential greenhouse gas regulations?

A. Yes.

Q. Duke witness Hager has testified that Duke has evaluated several carbon tax sensitivities/scenarios in its updated analysis.[13] Do these carbon tax sensitivities adequately consider the potential impact of greenhouse gas regulations?

A. No. Duke did not consider the potential impact of greenhouse gas regulations when it was evaluating what were the appropriate types of resources to examine in greater detail in its optimization and production cost modeling. Instead, it only considered the potential impact of potential greenhouse gas regulations **after** it had decided to focus its further analyses on a limited number of coal, nuclear and gas portfolios. This meant that the Company did not analyze what impact potential greenhouse gas regulations would have on the relative economics of energy efficiency, DSM and renewable alternatives as compared to its unnecessarily limited coal, nuclear and gas options. This was not adequate or prudent.

Q. Has Duke performed any optimization and/or production cost modeling analyses since the hearings in September 2006 that have assumed any additional investments on DSM, including energy efficiency, or renewable supply options as possible alternatives to coal, natural gas, and nuclear supply-side options?

A. No.[14]

Q. Would it have been possible to include DSM, including energy efficiency, and renewable resources in the Company's new optimization and production cost modeling?

A. Yes. The CEM model used by Duke in its IRP planning certainly is capable of selecting from DSM and renewable alternatives, as well as a broader range of

---

[13] Supplemental Testimony of Janice D. Hager, at page 10, line 6, to page 11, line 2.

[14] Duke's response to SACE Fourth Data Request, Question No. 40.a.

supply side options than the inappropriately limited coal, natural gas and nuclear options examined by the Company.

Q. Since the hearings in September, has Duke considered any power purchase contracts or acquisitions of existing generating facilities as part of any portfolio(s) to meet projected demands?

A, No.[15]

Q. Earlier you mentioned that a new supply-side portfolio examined by Duke in its Supplemental Testimony is the Balanced Cliffside Shared Ownership Portfolio. Has Duke indicated what party or parties might be interested in sharing ownership of the Cliffside Project?

A. No. Even though Company witnesses Hager and Rogers testify about the potential for shared ownership of the Cliffside Project, Duke has refused to identify the other parties that have expressed interest in owning up to 50 percent of the Project.[16]

Q. Has Duke provided any information to justify the need for up to 50 percent of the Project by another utility who might be interested in sharing ownership of the Cliffside Project or whether the public convenience and necessity requires such additional capacity for that unnamed utility?

A. No.

---

[15] Duke's response o SACE Third Data Request, Question No. 9.

[16] Duke's response to SACE's Fourth Data Request, Question No. 18.a.

III. Duke's New Analyses Still Do Not Adequately Consider the Potential Impact of Greenhouse Gas Regulations

Q. Duke witness Hager has testified that the Company has included a sensitivity in its updated analyses with a 50 percent higher carbon tax than its original CO_2 tax sensitivity.[17] Does this address all of the concerns that you have raised in your September 2006 Direct Testimony in this Docket?

A. No. We are pleased that Duke has included a wider and higher range of possible CO_2 prices. However, the Company's modeling of the impact of potential greenhouse gas regulations is still inadequate for the following reasons:

1. As we discussed earlier in this testimony, Duke only applied the CO_2 tax after it limited the options to coal, gas and nuclear alternatives. Therefore, it ignores the impact that such a tax would have on the economics of demand-side measures and renewable options. By applying the tax in this manner, it results in relatively small reductions in CO_2 emissions.

2. Duke assumes in its sensitivity analyses that the carbon tax would not be implemented until 2015 which, as we noted in our Direct Testimony, is inconsistent with the single piece of draft legislation on which the Company's carbon tax prices are based. That draft legislation, the draft Climate and Economic Insurance Act of 2005, had a proposed starting date of 2010. As we noted in our Direct Testimony, by pushing the starting date for the CO_2 tax five years out into the future in its carbon tax sensitivities, Duke reduced the effect of that tax on the costs of fossil-fired alternatives.[18]

[17] Supplemental Testimony of Janice D. Hager, at page 10, lines 15-18.

[18] Direct Testimony of David A. Schlissel and Anna Sommer, at page 12, lines 5-13.

Q. Why would increasing the Company's CO_2 tax sensitivity by 50% have little impact on its CO_2 emissions?

A. Analyzing portfolios under CO_2 tax sensitivities will simply serve to make system costs higher if the model can not choose to increase generation from non or low CO_2 emitting resources. The model must still meet the load and energy requirements given to it, so if only gas, nuclear and coal portfolios are analyzed one would expect to see little difference in the emission profiles of those portfolios.

Figures 1a through 1d below compare the CO_2 emissions from four Duke portfolios, P1 – Balanced Cliffside, P2 – Balanced Single Unit Cliffside, P3 – Balanced Cliffside with Retirements, and P6 – Balanced Cliffside Shared Ownership under the base case assumptions and the same portfolios under the Company's 150% CO_2 tax sensitivity. Each of these comparisons shows that there would be little change in Duke's projected CO_2 emissions in each scenario whether or not there is a CO_2 tax. The prices paid by ratepayers might increase substantially, but there would be little impact on greenhouse gas emissions.

Figure 1a. CO_2 Emissions in Balanced Cliffside Portfolio P1 in Base Case and 150% Carbon Tax Scenarios

Figure 1b. CO_2 Emissions in Balanced Cliffside with Retirements Portfolio P3 in Base Case and 150% Carbon Tax Scenarios

Figure 1c. CO_2 Emissions in Balanced Single Unit Cliffside Portfolio P2 in Base Case and 150% Carbon Tax Scenarios

Figure 1d. CO_2 Emissions in Balanced Cliffside Shared Ownership Portfolio P6 in Base Case and 150% Carbon Tax Scenarios

The implementation of the Company's assumed 150% carbon tax would have such minor impacts on the CO_2 emissions in each of these Portfolios that the lines

between the base case emissions and the emissions in the 150% carbon tax scenarios are virtually indistinguishable in each of the figures.

Q. Would Duke have to make significant reductions in its CO_2 emissions under its proposed resource portfolios if Congress ultimately adopted a plan that required absolute reductions in CO_2 emissions as opposed to compliance with a GHG intensity regulation?

A. Yes. As Figures 1a through 1d above showed, under the Cliffside portfolios considered by Duke in its modeling analyses, Duke Carolinas is essentially on a trajectory of increasing CO_2 emissions. This is true even in the 150% carbon tax sensitivities.

A common goal for many of the proposed greenhouse gas regulation bills recently introduced in Congress is to mandate reductions to a level in a historic year to be achieved by a given year in the future, for example, 2000 levels in 2010. Since we have limited information on Duke's CO_2 emissions in years prior to 2006, we chose to use the most recent historical year available, that is, the year 2000. Duke assumes that a CO_2 tax would start in 2015. So we asked ourselves, "What would the Company's CO_2 emissions look like if they had to be reduced to 2000 levels in 2015 instead? What about in 2010?"

As illustrative examples, Figures 2a and 2b, below, reveal the significant reductions that the Company would have to make under any of its portfolios in order to meet a federally imposed plan that would limit its emissions to 2000 levels in either 2010 or 2015.

Figure 2a. CO2 Emissions in Duke's No Carbon Tax Scenarios versus Illustrative Emissions Limits in 2010 or 2015

Figure 2a. CO2 Emissions in Duke's 150% Carbon Tax Scenarios versus Illustrative Emissions Limits in 2010 or 2015

Q. Have you seen any credible new evidence that contradicts the conclusion in your September 2006 Direct Testimony that Duke did not fully consider the risks of potential greenhouse gas regulations or that causes you to revise Synapse's carbon dioxide price forecasts?

A. No. The credible evidence that we have seen since early September 2006 confirms our belief that the federal government will take meaningful action in the foreseeable future to reduce greenhouse gas emissions and that our Synapse carbon price forecasts reflects a reasonable range of future CO_2 emission prices.

Our Direct Testimony discussed a number of climate change-related bills that had been introduced in Congress.[19] Since we filed that testimony other proposed legislation that would impose significant restrictions on greenhouse gas emissions also have been introduced and discussed in Congress. For example, Senators Kerry and Snowe also have introduced the "Global Warming Reduction Act of 2006," S. 4039, which would establish an economy-wide cap and trade program with a goal of reducing emissions about 65% below 2000.[20] The Senators say the targets are set at levels that the best science available suggests will keep global temperatures below the danger point.

Also, Representative Waxman has introduced the "Safe Climate Act," H.R. 5642, which also would establish an economy-wide cap and trade program and complimentary programs to avoid "dangerous, irreversible, warming of the climate.[21] The proposal would freeze U.S. greenhouse gas emissions in 2010, at the 2009 levels, followed by annual emission reductions of roughly two percent

---

[19] Direct Testimony of David A. Schlissel and Anna Sommer, at page 16, line 16, to page 17, line 26.

[20] "Senators Kerry and Snowe Introduce Landmark Bipartisan Climate Change Proposal," press release, October 3, 2006 available at http://kerry.senate.gov/v3/cfm/record.cfm?id=264368

[21] Information available from Representative Waxman's website at: http://www.house.gov/waxman/safeclimate/index.htm

per year through 2020, and annual reductions of about 5% thereafter. By 2050, emissions will be 80% lower than in 1990.[22]

The emissions reductions that would be required in bills that have been introduced or discussed in Congress in recent years are summarized in Table 2 below:

[22] Representative Waxman's bill attracted more than 100 co-sponsors. http://thomas.loc.gov/cgi-bin/bdquery/z?d109:HR05642:@@@P

Table 2. Summary of Mandatory Emissions Targets in Proposals Discussed in Congress

Proposed National Policy	Title or Description	Year Proposed	Emission Targets	Sectors Covered
McCain Lieberman S.139	Climate Stewardship Act	2003	Cap at 2000 levels 2010-2015. Cap at 1990 levels beyond 2015.	Economy-wide, large emitting sources
McCain Lieberman SA 2028	Climate Stewardship Act	2003	Cap at 2000 levels	Economy-wide, large emitting sources
National Commission on Energy Policy (basis for Bingaman-Domenici legislative work)	Greenhouse Gas Intensity Reduction Goals	2005	Reduce GHG intensity by 2.4%/yr 2010-2019 and by 2.8%/yr 2020-2025. Safety-valve on allowance price	Economy-wide, large emitting sources
Jeffords S. 150	Multi-pollutant legislation	2005	2.050 billion tons beginning 2010	Existing and new fossil-fuel fired electric generating plants > 15 MW
Carper S. 843	Clean Air Planning Act	2005	2006 levels (2.655 billion tons CO2) starting in 2009, 2001 levels (2.454 billion tons CO2) starting in 2013.	Existing and new fossil-fuel fired, nuclear, and renewable electric generating plants > 25 MW
Feinstein	Strong Economy and Climate Protection Act	2006	Stabilize emissions through 2010; 0.5% cut per year from 2011-15; 1% cut per year from 2016-2020. Total reduction is 7.25% below current levels.	Economy-wide, large emitting sources
Rep. Udall - Rep. Petri	Keep America Competitive Global Warming Policy Act	2006	Establishes prospective baseline for greenhouse gas emissions, with safety valve.	Energy and energy-intensive industries
Carper S.2724	Clean Air Planning Act	2006	2006 levels by 2010, 2001 levels by 2015	Existing and new fossil-fuel fired, nuclear, and renewable electric generating plants > 25 MW
Kerry and Snowe S.4039	Global Warming Reduction Act	2006	No later than 2010, begin to reduce U.S. emissions to 65% below 2000 levels by 2050	Not specified
Waxman H.R. 5642	Safe Climate Act	2006	2010 – not to exceed 2009 levels, annual reduction of 2% per year until 2020, annual reduction of 5% thereafter	Not specified
Jeffords S. 3698	Global Warming Pollution Reduction Act	2006	1990 levels by 2020, 80% below 1990 levels by 2050	Economy-wide

Q. Is it reasonable to expect that the potential for passage of greenhouse gas regulations has improved as a result of the recent federal elections?

A. Yes. Although there are an increasing number of Republican legislators who recognize the need for legislation to regulate the emissions of greenhouse gases, the results of the recent elections, in which control of both Houses of Congress shifted to Democrats, are likely to improve the chances for near-term passage of significant legislation.

For example, experts at an industry conference right after the elections expressed the opinion that now that Democrats have won control of Congress, electric utilities should expect a strong legislative push for mandatory caps on carbon dioxide emissions.[23] One observer expressed the opinion that the first climate bill that Democrats will take up when the new Congress convenes in January 2007 is the bill that Representative Waxman introduced that would cap emissions at current levels beginning in 2010 and ratchet them down to 80 percent below 1990 levels by 2050.[24]

Senator McCain also has said that the McCain-Lieberman climate change bill will be re-introduced in Congress in late January 2007.[25] Senator McCain also indicated that he believed that the chances of Congress approving meaningful global warming legislation before 2008 were "pretty good" and that he believed that "we've reached a tipping point in this debate, and it's long overdue."[26]

At the same time, Senators Bingaman, Boxer and Lieberman sent a letter to President Bush on November 14, 2006, seeking the President's commitment to work with the new Congress to pass meaningful climate change legislation in 2007.[27] Senators Bingaman, Boxer and Lieberman in January will assume the chairmanship of, respectively, the Senate Energy and Natural Resources

---

23 *Mandatory US carbon caps coming following elections: observers*, Platts 9Nov2006.

24 Ibid.

25 "McCain Tees Up Global Warming Bill; Says Bush 'Coming Around,'" Energy Daily, November 17, 2006.

26 Ibid.

27 Ibid.

Committee, the Senate Environment and Public Works Committee and the Senate Homeland Security and Governmental Affairs Committee.

Nevertheless, our conclusion that significant greenhouse gas regulation is inevitable is not based on the results of any single election or on the fate of any single bill discussed in Congress. Instead, this conclusion is based on our review of the proposals that have been discussed and introduced in Congress recently, as shown in Table 2 above.

Q. Your September 2006 Direct Testimony discussed a number of polls that revealed that there is strong support among Americans for government action to address global warming.[28] Have you seen any more recent poll results that confirm this conclusion?

A. Yes. A September 2006 telephone poll, conducted by NYU's Brademas Center for the Study of Congress, reported that 70% of those polled stated that they were worried about global warming.[29]

At the same time, according to a recent public opinion survey for the Massachusetts Institute of Technology, Americans now rank climate change as the country's most pressing environmental problem—a dramatic shift from three years ago, when they ranked climate change sixth out of 10 environmental concerns.[30] Almost three-quarters of the respondents felt the government should do more to deal with climate change, and individuals were willing to spend their own money to help.

---

[28] Direct Testimony of David A. Schlissel and Anna Sommer, at page 10, line 24, to page 11, line 10.

[29] Kaplun, Alex: "Campaign 2006: Most Americans 'worried' about energy, climate;" Greenwire, September 29, 2006.

[30] *MIT Carbon Sequestration Initiative, 2006 Survey,* http://sequestration.mit.edu/research/survey2006.html

Q. Has Duke prepared any assessments of likely future CO_2 regulations costs or a CO_2 tax since the September 2006 hearings in this proceeding?

A. No.[31]

Q. Duke witness Rogers has testified that "as a practical matter, CO_2 regulation will impact "old coal" plants much more heavily than new, state-of-the-art plants such as the Cliffside Project."[32] Do you agree?

A. No. If CO_2 regulation takes the form of a cap and trade regulation (as is widely expected), *all* coal plants would be affected regardless of their relative efficiencies.

Indeed, Duke was unable to provide any supporting documents for this claim.[33] The only basis was Mr. Rogers' "informed personal belief."[34]

Q. Have you made any changes to the Synapse carbon dioxide price forecast since you filed your Direct Testimony in September 2006?

A. No. Our Synapse carbon dioxide price forecast remains the same, as shown in Figure 3 below:

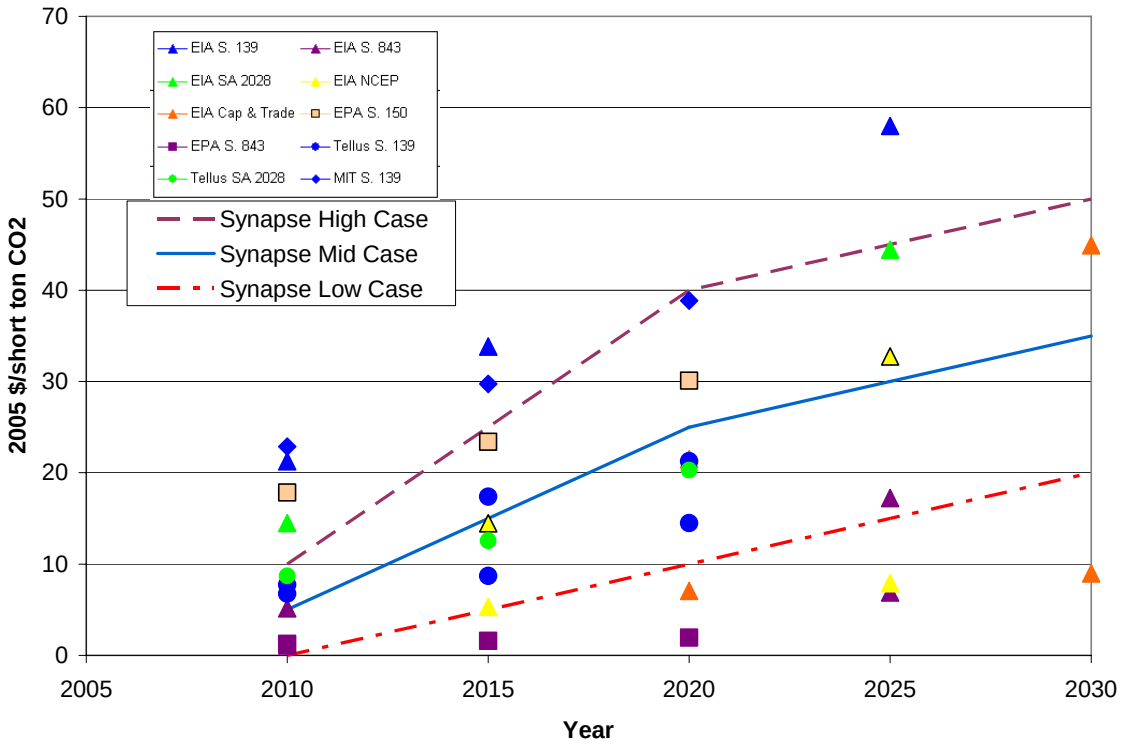
[31] Duke's response to SACE's Third Data Request, Question No. 7.

[32] Supplemental Testimony of James E. Rogers, at page 12, lines 1-3.

[33] Duke's response to SACE's Fourth Data Request, Question No. 17.

[34] Ibid.

Figure 3. Synapse Carbon Dioxide Price Forecast



Q. Would incorporating Synapse's carbon dioxide price forecast have a material effect on the economics of building and operating the proposed Cliffside Project?

A. Yes. For example, Duke has said that the busbar cost of Cliffside will be approximately $ /MWh (2012$).[35] The use of the Synapse middle CO_2 price forecast of a $21.30/MWh increase in operating costs would represent a percent increase in the cost per MWh of Cliffside generation. The use of even the Synapse low CO_2 price forecast of an $8.72/MWh alone would represent a percent increase in the cost per MWh of Cliffside generation.

[35] Duke's confidential response to SACE's 3rd Data Request, Question No. 3.

Q. Would incorporating Synapse's carbon dioxide price forecast have a material effect on the relative economics of DSM and renewable alternatives to the proposed Cliffside Project?

A. Yes. It is reasonable to expect that increasing the projected cost of Cliffside generation by , or even percent, (for example, to reflect a carbon tax or carbon dioxide allowance costs) would significantly improve the relative economics of additional DSM and renewable alternatives as compared to the Cliffside Project.

IV. Duke's New Analyses Still Do Not Adequately Consider the Potential for Energy Efficiency and Demand Side Management As Part of a Portfolio of Alternatives to the Cliffside Project

Q. In your Direct Testimony in this docket you concluded that Duke has not adequately considered the potential for energy efficiency and renewable wind and biomass facilities as alternatives to the Cliffside Project. Has your conclusion changed?

A. No, it has not. As mentioned above, Duke continues to rely on those same analyses despite the 47% cost increase for the Cliffside Project.

Q. Duke witness Rogers has testified that "subject to completion of the Company's ongoing collaborative stakeholder process to develop new energy efficiency programs, and appropriate regulatory treatment of the Company's energy efficiency investments, Duke Energy Carolinas is willing to commit to invest one percent of its annual revenues in energy efficiency programs."[36] How should the Commission weigh the impact of this offer?

A. First, one percent of annual revenues would certainly represent a significant improvement over Duke Energy's current investment in energy efficiency. However, it is only just a start and falls short of the full cost-effective energy efficiency available in North Carolina. One percent of Duke's revenues would be

[36] Supplemental Testimony of James E. Rogers, at page 13, lines 15-17.

below what utilities in other states already spend and would be less than some states require.

For example, Minnesota statute requires Minnesota utilities to spend at least 1.5% of gross revenues on demand-side management programs. Minnesota governor Tim Pawlenty recently announced that he would push to change this requirement from a spending requirement to a savings requirement, that is, that Minnesota utilities would have to save 1.5% of their annual retail sales. This would require Minnesota electric utilities to spend approximately double what they do now on energy efficiency programs, which would be roughly 3% of gross revenues..

Second, the amount of the DSM resources to pursue and the extent of the DSM budgets are the most important DSM issues facing the Company. These issues should be addressed through sound, comprehensive integrated resource planning practices.

In particular, the Company should not be permitted to proceed with important supply-side projects, like Cliffside, without demonstrating that it has fully considered and reflected in its analyses the potential for DSM savings.

Q. Does Mr. Rogers' statement cause you any additional concern?

A. Yes. The phrase "appropriate regulatory treatment" is also of concern. In 2004, PSI Energy, now Duke Energy Indiana, proposed a set of energy efficiency programs for its service territory. The Company proposed that in addition to recovering the costs of the programs, it be allowed to collect a series of incentives from ratepayers. Under the Company's proposal, those incentives would have equaled 49% of program expenditures in 2005 rising to 144% of program expenditures in 2009.[37] If Mr. Rogers is implying that such incentives are "appropriate regulatory treatment" this may well mean further delays in the introduction of new energy efficiency programs if Duke is the program administrator.

Q. What changes, if any, have been made from Duke's June 1, 2006 testimony regarding energy efficiency as an alternative to the Cliffside Project?

A. No changes have been made. Since the underlying analyses have largely not changed, neither has the assumption of just 101 MW of energy efficiency. The Company also has continued to assume that it would be able to achieve an additional 100 MW in new demand response resources.[38]

Q. Have you seen any recent studies that show that there is potential for significantly more than this amount of energy efficiency in North Carolina?

A. Yes. In December 2006, GDS Associates issued a Report for the North Carolina Utilities Commission by GDS Associates, "A Study of the Feasibility of Energy Efficiency as an Eligible Resource as Part of a Renewable Portfolio Standard for the State of North Carolina."

Q. What is the conclusion of this recent GDS Report to the North Carolina Commission?

A. GDS concluded that there are significant savings potential in North Carolina for cost-effective electric energy efficiency and fuel conversion measures:

> The technical potential savings for electric energy efficiency measures in North Carolina is 33 percent of projected 2017 kWh sales in the State, and the achievable savings potential (before cost-effectiveness screening) is 20 percent of projected 2017 kWh sales.
>
> Based on cost-effectiveness screening, capturing the achievable cost-effective potential for energy efficiency in North Carolina would reduce electric energy use by 14 percent in 2017.[39]

---

[37] Page 26 of the Testimony of William Steinhurst on behalf of Citizens' Action Coalition of Indiana in Cause No. 42612.

[38] For example, see Duke's response to SACE's Fourth Data Request, Question No. 37.b.

[39] GDS Associates Report for the North Carolina Utilities Commission, *A Study of the Feasibility of Energy Efficiency as an Eligible Resource as Part of a Renewable Portfolio Standard for the State of North Carolina*, dated December 2006, at page 1.

According to GDS, the 14 percent reduction in electric energy use would mean approximately 25,000 GWh of energy efficiency savings in North Carolina are achievable at a cost of 5 cents/kWh or less.[40]

Q. What cost-effective MW savings did GDS estimate were achievable in North Carolina?

A. Appendix D in the GDS Report estimated that a total cost-effective savings of 5,500 MW were achievable by 2017.[41] Twenty two hundred and thirty six (2,236) of these cost-effective MW savings would be achievable by 2011.

Q. How might this affect Duke's analysis?

A. We continue to believe the lack of appropriate evaluation of energy efficiency in Duke's analysis is a "fatal flaw." However, it is important to understand the potential magnitude of that flaw. Figure 4 below is a comparison of the energy efficiency savings in Duke's "Balanced Cliffside Shared Ownership" portfolio or "P6"[42] compared to the level of savings that could be achievable on the Duke system given the results of the GDS Associates' study. For purposes of this analysis, we assumed Duke would achieve 13.9% of savings in 2017 in a linear fashion starting in 2008. However, other permutations are possible, including scenarios that would advance the level of savings in earlier years.

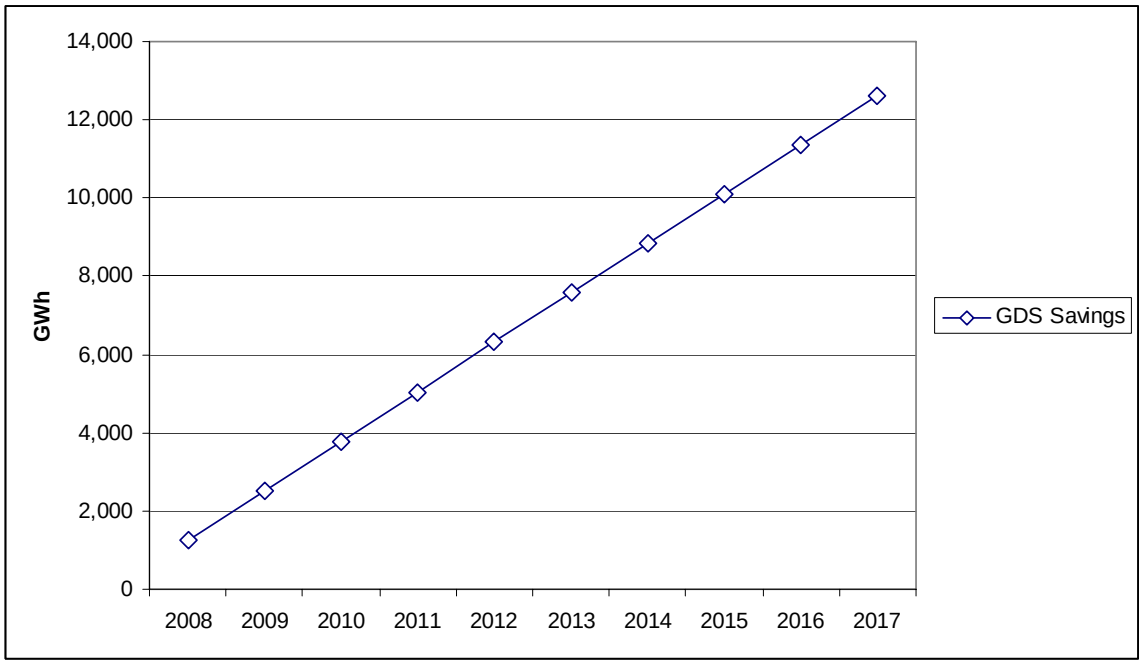
---

40 Ibid.

41 Ibid, at page 145.

42 There was no material difference between the level of energy efficiency savings achieved in this scenario compared to other Cliffside scenarios.

Figure 4. GDS Study Potential Energy Efficiency Savings vs. Savings Assumed in Duke Modeling Analyses [REDACTED]



Clearly, Duke's level of energy efficiency savings is dramatically below those predicted in the GDS Associates study.

Q. Are there any indications that a savings level of 13.9% by 2017 is a conservative estimate of cost-effective achievable potential on Duke's system?

A. Yes. GDS only included those measures that would be achievable at a cost of 5 cents/kWh, i.e., $50/MWh, or less. However, as noted earlier, Duke's projected busbar cost for the Cliffside Project is approximately $ /MWh. It is reasonable to expect that significant greater savings would be achievable if the $ /MWh cost of the Cliffside Project were used as the applicable avoided cost in place of the more conservative $50/MWh limit used by GDS. Even more energy efficiency measures would be economic, and even greater energy savings could be achieved, if a reasonable greenhouse gas regulation cost were added to the Company's estimated busbar cost for the Cliffside Project.

In addition, the level of achievable potential is very much dependent on the program administrator's aggressiveness in designing and marketing energy efficiency programs. Consequently, achievable potential studies should not be

seen as a maximum amount of efficiency potential available. In a number of cases we've seen utilities who've actually exceeded the achievable potential estimated in their potential studies. The achievable potential estimated in the GDS study should certainly *not* be seen as a ceiling on the energy efficiency potential in the state.

Q. How do the savings estimated in the GDS study compare with the expected generation from the Cliffside Project?

A. Figure 5 below compares the GDS savings on Duke's system to the generation from the Cliffside Project (Units 6 & 7) in the portfolio "Balanced Cliffside with Retirements," P3.

Figure 5. Generation from Both Units of Cliffside Project Generation Compared to Potential 13.9 Percent Energy Efficiency Savings

By 2017, the projected energy savings would be greater than projected generation from the Cliffside Project.

Q. Duke witness Hager has testified that "a partial ownership of [Cliffside] almost always outperforms full ownership."[43] How would the generation from a single unit of the Cliffside Project compare to this same level of savings from energy efficiency?

A. Mr. Rogers and Ms. Hager have offered to retire up to 577 MWs of existing coal generation on a megawatt per megawatt basis as energy efficiency increases. These would be retirements of generally older coal plants with low capacity factors. However, energy efficiency is also an energy resource. So for comparison purposes, Figure 6 compares the energy efficiency savings potential estimated in the GDS study with the energy that would be generated by a single Cliffside unit plus that generated by the units that Duke has said it would consider retiring: Riverbend 4-5, Dan River 1-3 and Buck 3-4.

Please note that Figure 6 includes the projected generation for the first Cliffside Unit in two of the Company's Portfolios, P2 and P6. Portfolio P2 represents Duke's "Balanced Single Unit Cliffside" Portfolio and Portfolio P6 is the Company's "Balanced Cliffside Shared Ownership" Portfolio.

[43] Supplemental Testimony of Janice D. Hager, at page 11, lines 10-11.

Figure 6. Generation from One Cliffside Unit + the Coal Units that Duke has Said it will consider retiring compared to Potential 13.9 Percent Energy Efficiency Savings

Again, the energy efficiency savings are greater than the energy generated by a single Cliffside unit and the old coal units.

V. Duke's New Analyses Still Do Not Adequately Consider the Potential for Renewable Wind and Biomass Resources As Part of a Portfolio of Alternatives to the Cliffside Project

Q. Have you seen any recent studies that show that there is potential for significant amounts of renewable technologies in North Carolina?

A. Yes. A December 2006 Report by La Capra Associates, Inc., for the North Carolina Utilities Commission, "Analysis of a Renewable Portfolio Standard for the State of North Carolina," examined the potential for renewable resources in the State.

Q. What were the conclusions of the La Capra Associates' Report?

A. La Capra concluded that the State of North Carolina has about 3,400 MW of renewable energy resources that can be practically developed.[44] This includes 150 MW of landfill gas, 1,100 MW of biomass (wood and agricultural crops waste), 105 MW of poultry litter, 93 MW of hog waste, 425 MW of hydro development larger than 10 MW, and 1,500 MW of wind.[45] Unfortunately, some of the wind is located in the western mountains where development may be limited due to legal and/or environmental concerns.

The La Capra Report also concluded that:

- North Carolina should have sufficient renewable resources within the State to support a 5% renewable portfolio standard, ("RPS") whether efficiency measures are included or not. This would double the current level of renewable energy generation in the state and about 1,000 MW of new baseload generation might be avoided.[46] However, in this scenario, 500 MW of intermediate natural gas combined cycle generation would be needed.[47]

---

44 Report by La Capra Associates, Inc., for the North Carolina Utilities Commission, *Analysis of a Renewable Portfolio Standard for the State of North Carolina*, dated December 2006, at page (v).

45 Ibid, at page (vi).

46 Ibid, at page 94.

47 Ibid.

- A more aggressive 10% RPS without including energy efficiency would require the development of 900-2,300 MW of off-shore wind since other practical on-land resources would already be developed. If off-shore wind projects were not feasible during the forecast period, a 10% RPS would only be achievable by including energy efficiency programs, larger hydro generation, and development of wind in the western part of the state.[48]

- Inclusion of energy efficiency for 25% of an RPS can dramatically reduce the cost. The RPS portfolios (5% and 10% RPS) with energy efficiency are each estimated to save about half a billion dollars NPV over 20-years relative to the Utilities' Portfolio. Essentially, the reduction of load of 1.25% or 2.5% by the end of the RPS study period creates energy cost savings overall for the State.[49]

Q. Did the La Capra Report discuss the potential impact that the use of increased renewable resources could have on greenhouse gas emissions within North Carolina?

A. Yes. La Capra concluded that renewable generation can be a major contributor to greenhouse gas reduction or mitigation goals because most renewable and energy efficiency measures are considered either non-emitting or carbon-neutral.[50] The annual displacement of carbon dioxide emissions, once a 5% or 10% RPS was achieved, could total 7.3 to 13.6 million tons per year.[51] This could help the State meet greenhouse gas regulations and save state ratepayers hundreds of millions of dollars per year.[52]

---

48 Ibid.

49 Ibid.

50 Ibid, at pages (xii) and 80.

51 Ibid.

52 Ibid.

Q. What impact might the inclusion of these renewable resources have on Duke's new modeling analyses?

A. The inclusion of renewable resources can be expected to reduce or defer Duke's need for new baseload capacity and/or energy. This would certainly be true if renewable resources were considered in conjunction with DSM, including energy efficiency measures.

Q. Does this complete your Testimony?

A. Yes. However, we reserve the right to supplement this testimony if Duke provides additional data.