

**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

1 **I. Introduction**

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

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

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

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

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

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

11 **Q. Have you previously filed testimony in this proceeding?**

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

13 **Q. What is the purpose of this Supplemental Testimony?**

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

18 **Q. Please summarize your conclusions.**

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

1 had failed to adequately consider the potential for energy efficiency and renewable  
2 alternatives to the Project.

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

- 8 1. Duke has prepared a number of updated optimization runs using the  
9 Capacity Expansion Module (CEM) model that reflect the new, increased  
10 capital cost estimate for the Cliffside Project.
- 11 2. Despite repeated requests, the Company only provided the files for these  
12 updated optimization runs on Saturday January 6, 2007. Therefore, we  
13 have not had a full opportunity to review these files in any detail.
- 14 3. Nevertheless, it is clear from the materials that Duke has provided that the  
15 results of the Company's updated capacity expansion modeling analyses  
16 do not support the addition of the new coal capacity from the Cliffside  
17 Project.
- 18 4. It also is clear from the Company's Supplemental Testimony and the  
19 materials that Duke has provided during discovery that Company's  
20 updated modeling analyses remain significantly flawed and biased because  
21 they continue to ignore the potential for significant amounts of energy  
22 efficiency and renewable resources.
- 23 5. In particular, a new study prepared for the North Carolina Utilities  
24 Commission shows that there is a significant potential for energy  
25 efficiency in North Carolina. However, Duke's updated modeling analyses  
26 do not adequately consider this potential for energy efficiency to be part of  
27 a portfolio of alternatives to the Cliffside Project.
- 28 6. Another new study for the North Carolina Utilities Commission also  
29 shows that there is a significant potential for renewable resources in North

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

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

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

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

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

14 A. The cost of the Cliffside Project has increased from approximately \$2 billion to  
15 \$3 billion,<sup>1</sup> an increase of about 50%.

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

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

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

<sup>2</sup> Direct Testimony of David A. Schlissel and Anna Sommer, at page 4, line 8, to page 6, line 17.

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

2 A. Not to our knowledge. Duke has said that it anticipates that a conceptual design  
3 for the Cliffside Project will be completed in the .<sup>3</sup>

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

6 A. No. Duke has indicated that it expects to complete the equipment selection for the  
7 Cliffside Project in the .<sup>4</sup>

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

10 A. Duke has said that it expects to revise its current cost estimate in the  
11 .<sup>5</sup>

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

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

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<sup>3</sup> Duke's confidential response to SACE's First Data Request, Question No. 1.b.

<sup>4</sup> Duke's response to SACE's Third Data Request, Question No. 4.

<sup>5</sup> Duke's confidential response to SACE's Third Data Request, Question No. 1.b.

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

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

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

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

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

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<sup>6</sup> Supplemental Testimony of Janice D. Hager, at page 2, lines 15-18.

<sup>7</sup> These materials were requested in SACE's Third Data Request, Question No. 6, and SACE's Fourth Data Request, Question No. 19.

<sup>8</sup> We could see that the CEM files that were initially provided by Duke in response to SACE's 3<sup>rd</sup> 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.

Protected Materials Redacted

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

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

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

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

13 **Table 1. Megawatts of New Coal Capacity Added in Updated November**  
 14 **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																

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16 In particular, Table 1 reveals that:

- 17 • The CEM model only added a total of        MW of new coal capacity in  
 18 the Base load forecast scenario, and that new coal capacity was not  
 19 selected until the years        .
- 20 • The CEM model did not add        coal in the Company’s CO<sub>2</sub> Tax  
 21 Scenario. The CEM model only added        MW of new coal (in the years  
 22        ) in a combined CO<sub>2</sub> Tax + High Gas Price  
 23 scenario.

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<sup>9</sup> 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.

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

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

8   A.    Yes. The original CEM runs appear to have matched up somewhat more closely  
9       with the portfolios discussed by Ms. Hager. However, even back in the summer of  
10       2006, before the recent 47 percent coal capital cost was announced, the CEM  
11       model only added            MW of new coal capacity in the Base case scenario,  
12       MW of new coal capacity in the CO<sub>2</sub> Tax scenario and            MW in the 20%  
13       Higher Coal Capital Cost scenario.<sup>10</sup> These results would hardly have justified  
14       the addition of the 1600 MW of the Cliffside Project or the inclusion of 1600 MW  
15       of new coal capacity in the portfolios to be examined further in the production  
16       cost modeling.

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

19 A.    Yes. In a December 28, 2006 e-mail response, counsel for Duke indicated that  
20       due to the short time limit, Duke had used the existing portfolios that were used in  
21       the original 2006 Plan and updated the capital costs in the results. Therefore, we  
22       were told that the portfolios discussed by Ms. Hager “best agree with the original  
23       2006 CEM results and not exclusively with the newest CEM runs.” In fact,  
24       according to Duke, “the newest CEM runs for the most part universally show  
25       lower coal due to the higher CAPEX [capital cost] coal costs, so it will be difficult  
26       to exactly match updated CEM with portfolios.” Indeed, we were told that “if  
27       SACE continues to try to match new CEM exactly with the original portfolios, it  
28       will be a fruitless exercise.” As a result, it is unclear what analyses form the basis

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<sup>10</sup> “CEM Expansion Plans LP 07-13-06.xls” file provided in Duke’s response to SACE’s 3<sup>rd</sup> Data Request, Question No. 6.



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

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

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

12 **Q. Is this explanation persuasive?**

13 A.

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18 **Q. Can you tell how much new coal capacity the CEM model would add, and in**  
19 **which years, if it were run in the**  
20 **?**

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

23 However, the results of some scenarios that Duke ran on the CEM model, but are  
24 not discussed in Ms. Hager’s Supplemental Testimony, do offer some insights and  
25 suggest that the model might add even less new coal capacity if it were run in the  
26 .

1 **Q. Please explain.**

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

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

1 **Q. What is the basis for your conclusion that the Company’s methodology for**  
2 **evaluating potential resource portfolios is flawed?**

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

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

16 A. No. The Company’s new modeling analyses examined the same coal, natural gas  
17 and nuclear portfolios.<sup>12</sup> The only new portfolio examined by the Company  
18 included the shared ownership of the Cliffside Project but it still only considered  
19 coal, natural gas and nuclear options.

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

22 A. Yes.

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<sup>11</sup> Direct Testimony of David A. Schlissel and Anna Sommer, at page 6, line 18, to page 7, line 20.

<sup>12</sup> Supplemental Testimony of Janice D. Hager, at page 3, lines 7-11.

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

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

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

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

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

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

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

23 A. Yes.

1 **Q. Duke witness Hager has testified that Duke has evaluated several carbon tax**  
2 **sensitivities/scenarios in its updated analysis.<sup>13</sup> Do these carbon tax**  
3 **sensitivities adequately consider the potential impact of greenhouse gas**  
4 **regulations?**

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

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

20 A. No.<sup>14</sup>

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

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

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<sup>13</sup> Supplemental Testimony of Janice D. Hager, at page 10, line 6, to page 11, line 2.

<sup>14</sup> Duke's response to SACE Fourth Data Request, Question No. 40.a.

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

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

6 A. No.<sup>15</sup>

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

11 A. No. Even though Company witnesses Hager and Rogers testify about the  
12 potential for shared ownership of the Cliffside Project, Duke has refused to  
13 identify the other parties that have expressed interest in owning up to 50 percent  
14 of the Project.<sup>16</sup>

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

19 A. No.

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<sup>15</sup> Duke's response o SACE Third Data Request, Question No. 9.

<sup>16</sup> Duke's response to SACE's Fourth Data Request, Question No. 18.a.

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

3 **Q. Duke witness Hager has testified that the Company has included a sensitivity**  
4 **in its updated analyses with a 50 percent higher carbon tax than its original**  
5 **CO<sub>2</sub> tax sensitivity.<sup>17</sup> Does this address all of the concerns that you have**  
6 **raised in your September 2006 Direct Testimony in this Docket?**

7 A. No. We are pleased that Duke has included a wider and higher range of possible  
8 CO<sub>2</sub> prices. However, the Company's modeling of the impact of potential  
9 greenhouse gas regulations is still inadequate for the following reasons:

- 10 1. As we discussed earlier in this testimony, Duke only applied the CO<sub>2</sub> tax  
11 after it limited the options to coal, gas and nuclear alternatives. Therefore,  
12 it ignores the impact that such a tax would have on the economics of  
13 demand-side measures and renewable options. By applying the tax in this  
14 manner, it results in relatively small reductions in CO<sub>2</sub> emissions.
- 15 2. Duke assumes in its sensitivity analyses that the carbon tax would not be  
16 implemented until 2015 which, as we noted in our Direct Testimony, is  
17 inconsistent with the single piece of draft legislation on which the  
18 Company's carbon tax prices are based. That draft legislation, the draft  
19 Climate and Economic Insurance Act of 2005, had a proposed starting  
20 date of 2010. As we noted in our Direct Testimony, by pushing the  
21 starting date for the CO<sub>2</sub> tax five years out into the future in its carbon tax  
22 sensitivities, Duke reduced the effect of that tax on the costs of fossil-fired  
23 alternatives.<sup>18</sup>

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<sup>17</sup> Supplemental Testimony of Janice D. Hager, at page 10, lines 15-18.

<sup>18</sup> Direct Testimony of David A. Schlissel and Anna Sommer, at page 12, lines 5-13.

1 **Q. Why would increasing the Company's CO<sub>2</sub> tax sensitivity by 50% have little**  
2 **impact on its CO<sub>2</sub> emissions?**

3 A. Analyzing portfolios under CO<sub>2</sub> tax sensitivities will simply serve to make system  
4 costs higher if the model can not choose to increase generation from non or low  
5 CO<sub>2</sub> emitting resources. The model must still meet the load and energy  
6 requirements given to it, so if only gas, nuclear and coal portfolios are analyzed  
7 one would expect to see little difference in the emission profiles of those  
8 portfolios.

9 Figures 1a through 1d below compare the CO<sub>2</sub> emissions from four Duke  
10 portfolios, P1 – Balanced Cliffside, P2 – Balanced Single Unit Cliffside, P3 –  
11 Balanced Cliffside with Retirements, and P6 – Balanced Cliffside Shared  
12 Ownership under the base case assumptions and the same portfolios under the  
13 Company's 150% CO<sub>2</sub> tax sensitivity. Each of these comparisons shows that  
14 there would be little change in Duke's projected CO<sub>2</sub> emissions in each scenario  
15 whether or not there is a CO<sub>2</sub> tax. The prices paid by ratepayers might increase  
16 substantially, but there would be little impact on greenhouse gas emissions.



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**Figure 1a. CO<sub>2</sub> Emissions in Balanced Cliffside Portfolio P1 in Base Case and 150% Carbon Tax Scenarios**

**Figure 1b. CO<sub>2</sub> Emissions in Balanced Cliffside with Retirements Portfolio P3 in Base Case and 150% Carbon Tax Scenarios**

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**Figure 1c. CO<sub>2</sub> Emissions in Balanced Single Unit Cliffside Portfolio P2 in Base Case and 150% Carbon Tax Scenarios**

**Figure 1d. CO<sub>2</sub> 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<sub>2</sub> emissions in each of these Portfolios that the lines

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

3   **Q.    Would Duke have to make significant reductions in its CO<sub>2</sub> emissions under**  
4   **its proposed resource portfolios if Congress ultimately adopted a plan that**  
5   **required absolute reductions in CO<sub>2</sub> emissions as opposed to compliance with**  
6   **a GHG intensity regulation?**

7   A.    Yes. As Figures 1a through 1d above showed, under the Cliffside portfolios  
8        considered by Duke in its modeling analyses, Duke Carolinas is essentially on a  
9        trajectory of increasing CO<sub>2</sub> emissions. This is true even in the 150% carbon tax  
10       sensitivities.

11       A common goal for many of the proposed greenhouse gas regulation bills recently  
12       introduced in Congress is to mandate reductions to a level in a historic year to be  
13       achieved by a given year in the future, for example, 2000 levels in 2010. Since  
14       we have limited information on Duke's CO<sub>2</sub> emissions in years prior to 2006, we  
15       chose to use the most recent historical year available, that is, the year 2000. Duke  
16       assumes that a CO<sub>2</sub> tax would start in 2015. So we asked ourselves, "What would  
17       the Company's CO<sub>2</sub> emissions look like if they had to be reduced to 2000 levels  
18       in 2015 instead? What about in 2010?"

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

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**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**

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

5 A. No. The credible evidence that we have seen since early September 2006  
6 confirms our belief that the federal government will take meaningful action in the  
7 foreseeable future to reduce greenhouse gas emissions and that our Synapse  
8 carbon price forecasts reflects a reasonable range of future CO<sub>2</sub> emission prices.

9 Our Direct Testimony discussed a number of climate change-related bills that had  
10 been introduced in Congress.<sup>19</sup> Since we filed that testimony other proposed  
11 legislation that would impose significant restrictions on greenhouse gas emissions  
12 also have been introduced and discussed in Congress. For example, Senators  
13 Kerry and Snowe also have introduced the “Global Warming Reduction Act of  
14 2006,” S. 4039, which would establish an economy-wide cap and trade program  
15 with a goal of reducing emissions about 65% below 2000.<sup>20</sup> The Senators say the  
16 targets are set at levels that the best science available suggests will keep global  
17 temperatures below the danger point.

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

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<sup>19</sup> Direct Testimony of David A. Schlissel and Anna Sommer, at page 16, line 16, to page 17, line 26.

<sup>20</sup> “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>

<sup>21</sup> Information available from Representative Waxman’s website at:  
<http://www.house.gov/waxman/safeclimate/index.htm>

1 per year through 2020, and annual reductions of about 5% thereafter. By 2050,  
2 emissions will be 80% lower than in 1990.<sup>22</sup>

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

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

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**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

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

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

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

14 Senator McCain also has said that the McCain-Lieberman climate change bill will  
15 be re-introduced in Congress in late January 2007.<sup>25</sup> Senator McCain also  
16 indicated that he believed that the chances of Congress approving meaningful  
17 global warming legislation before 2008 were “pretty good” and that he believed  
18 that “we’ve reached a tipping point in this debate, and it’s long overdue.”<sup>26</sup>

19 At the same time, Senators Bingaman, Boxer and Lieberman sent a letter to  
20 President Bush on November 14, 2006, seeking the President’s commitment to  
21 work with the new Congress to pass meaningful climate change legislation in  
22 2007.<sup>27</sup> Senators Bingaman, Boxer and Lieberman in January will assume the  
23 chairmanship of, respectively, the Senate Energy and Natural Resources

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

<sup>24</sup> Ibid.

<sup>25</sup> “McCain Tees Up Global Warming Bill; Says Bush ‘Coming Around,’” *Energy Daily*, November 17, 2006.

<sup>26</sup> Ibid.

<sup>27</sup> Ibid.



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

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

8 **Q. Your September 2006 Direct Testimony discussed a number of polls that**  
9 **revealed that there is strong support among Americans for government**  
10 **action to address global warming.<sup>28</sup> Have you seen any more recent poll**  
11 **results that confirm this conclusion?**

12 A. Yes. A September 2006 telephone poll, conducted by NYU's Brademas Center  
13 for the Study of Congress, reported that 70% of those polled stated that they were  
14 worried about global warming.<sup>29</sup>

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

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<sup>28</sup> Direct Testimony of David A. Schlissel and Anna Sommer, at page 10, line 24, to page 11, line 10.

<sup>29</sup> Kaplun, Alex: "Campaign 2006: Most Americans 'worried' about energy, climate;" Greenwire, September 29, 2006.

<sup>30</sup> *MIT Carbon Sequestration Initiative, 2006 Survey*,  
<http://sequestration.mit.edu/research/survey2006.html>

1 **Q. Has Duke prepared any assessments of likely future CO<sub>2</sub> regulations costs or**  
2 **a CO<sub>2</sub> tax since the September 2006 hearings in this proceeding?**

3 A. No.<sup>31</sup>

4 **Q. Duke witness Rogers has testified that “as a practical matter, CO<sub>2</sub> regulation**  
5 **will impact “old coal” plants much more heavily than new, state-of-the-art**  
6 **plants such as the Cliffside Project.”<sup>32</sup> Do you agree?**

7 A. No. If CO<sub>2</sub> regulation takes the form of a cap and trade regulation (as is widely  
8 expected), *all* coal plants would be affected regardless of their relative  
9 efficiencies.

10 Indeed, Duke was unable to provide any supporting documents for this claim.<sup>33</sup>

11 The only basis was Mr. Rogers’ “informed personal belief.”<sup>34</sup>

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

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

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<sup>31</sup> Duke’s response to SACE’s Third Data Request, Question No. 7.

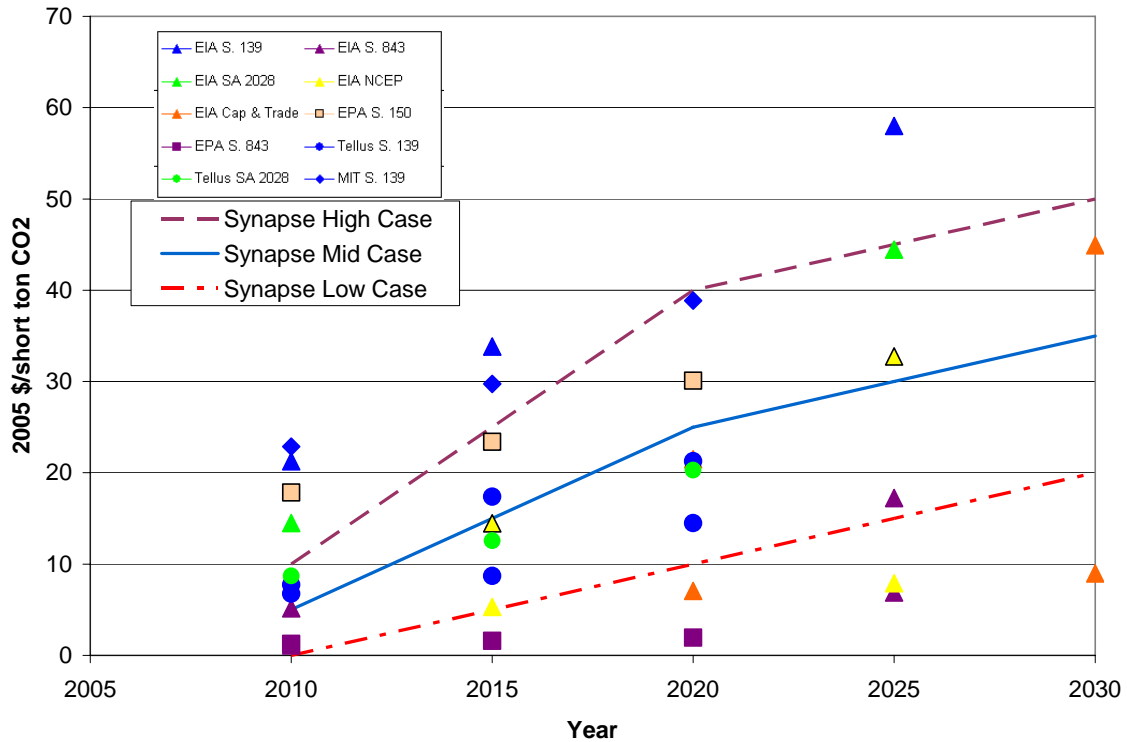
<sup>32</sup> Supplemental Testimony of James E. Rogers, at page 12, lines 1-3.

<sup>33</sup> Duke’s response to SACE’s Fourth Data Request, Question No. 17.

<sup>34</sup> Ibid.

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1 **Figure 3. Synapse Carbon Dioxide Price Forecast**



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

6 A. Yes. For example, Duke has said that the busbar cost of Cliffside will be  
7 approximately \$ /MWh (2012\$).<sup>35</sup> The use of the Synapse middle CO<sub>2</sub> price  
8 forecast of a \$21.30/MWh increase in operating costs would represent a  
9 percent increase in the cost per MWh of Cliffside generation. The use of even the  
10 Synapse low CO<sub>2</sub> price forecast of an \$8.72/MWh alone would represent a  
11 percent increase in the cost per MWh of Cliffside generation.

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<sup>35</sup> Duke’s confidential response to SACE’s 3<sup>rd</sup> Data Request, Question No. 3.

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

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

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

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

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

18 **Q. Duke witness Rogers has testified that “subject to completion of the**  
19 **Company’s ongoing collaborative stakeholder process to develop new energy**  
20 **efficiency programs, and appropriate regulatory treatment of the Company’s**  
21 **energy efficiency investments, Duke Energy Carolinas is willing to commit to**  
22 **invest one percent of its annual revenues in energy efficiency programs.”<sup>36</sup>**  
23 **How should the Commission weigh the impact of this offer?**

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

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<sup>36</sup> Supplemental Testimony of James E. Rogers, at page 13, lines 15-17.

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

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

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

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

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

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

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

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

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

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

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

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

17 The technical potential savings for electric energy efficiency  
18 measures in North Carolina is 33 percent of projected 2017 kWh  
19 sales in the State, and the achievable savings potential (before cost-  
20 effectiveness screening) is 20 percent of projected 2017 kWh sales.

21 Based on cost-effectiveness screening, capturing the achievable  
22 cost-effective potential for energy efficiency in North Carolina  
23 would reduce electric energy use by 14 percent in 2017.<sup>39</sup>

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<sup>37</sup> Page 26 of the Testimony of William Steinhurst on behalf of Citizens’ Action Coalition of Indiana in Cause No. 42612.

<sup>38</sup> For example, see Duke’s response to SACE’s Fourth Data Request, Question No. 37.b.

<sup>39</sup> 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.

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

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

6 A. Appendix D in the GDS Report estimated that a total cost-effective savings of  
7 5,500 MW were achievable by 2017.<sup>41</sup> Twenty two hundred and thirty six (2,236)  
8 of these cost-effective MW savings would be achievable by 2011.

9 **Q. How might this affect Duke's analysis?**

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

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<sup>40</sup> Ibid.

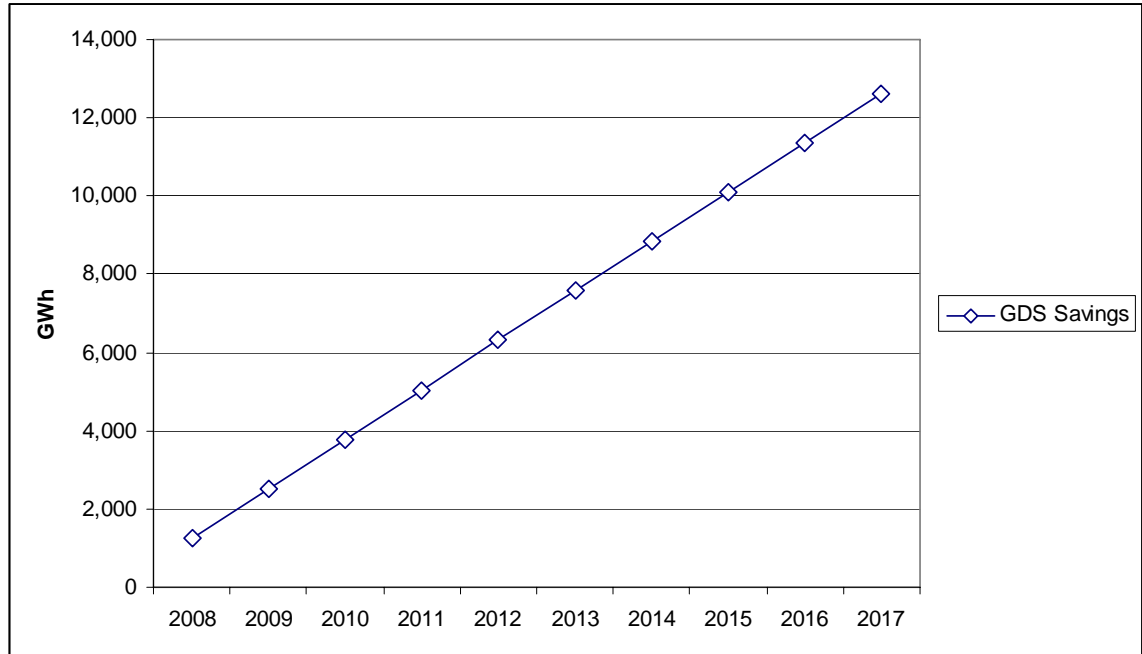
<sup>41</sup> Ibid., at page 145.

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

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



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

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6 **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?**

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8 **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.

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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

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

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

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

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

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

1 **Q. Duke witness Hager has testified that “a partial ownership of [Cliffside]**  
2 **almost always outperforms full ownership.”<sup>43</sup> How would the generation**  
3 **from a single unit of the Cliffside Project compare to this same level of**  
4 **savings from energy efficiency?**

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

13 Please note that Figure 6 includes the projected generation for the first Cliffside  
14 Unit in two of the Company’s Portfolios, P2 and P6. Portfolio P2 represents  
15 Duke’s “Balanced Single Unit Cliffside” Portfolio and Portfolio P6 is the  
16 Company’s “Balanced Cliffside Shared Ownership” Portfolio.

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<sup>43</sup> Supplemental Testimony of Janice D. Hager, at page 11, lines 10-11.

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1                   **Figure 6. Generation from One Cliffside Unit + the Coal Units that Duke**  
2                   **has Said it will consider retiring compared to Potential 13.9**  
3                   **Percent Energy Efficiency Savings**  
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12                   Again, the energy efficiency savings are greater than the energy generated by a  
13                   single Cliffside unit and the old coal units.

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

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

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

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

2 A. La Capra concluded that the State of North Carolina has about 3,400 MW of  
3 renewable energy resources that can be practically developed.<sup>44</sup> This includes  
4 150 MW of landfill gas, 1,100 MW of biomass (wood and agricultural crops  
5 waste), 105 MW of poultry litter, 93 MW of hog waste, 425 MW of hydro  
6 development larger than 10 MW, and 1,500 MW of wind.<sup>45</sup> Unfortunately, some  
7 of the wind is located in the western mountains where development may be  
8 limited due to legal and/or environmental concerns.

9 The La Capra Report also concluded that:

- 10 • North Carolina should have sufficient renewable resources within the  
11 State to support a 5% renewable portfolio standard, ("RPS") whether  
12 efficiency measures are included or not. This would double the current  
13 level of renewable energy generation in the state and about 1,000 MW of  
14 new baseload generation might be avoided.<sup>46</sup> However, in this scenario,  
15 500 MW of intermediate natural gas combined cycle generation would be  
16 needed.<sup>47</sup>

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<sup>44</sup> 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).

<sup>45</sup> Ibid., at page (vi).

<sup>46</sup> Ibid., at page 94.

<sup>47</sup> Ibid.

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- 1           •       A more aggressive 10% RPS without including energy efficiency would  
2                    require the development of 900-2,300 MW of off-shore wind since other  
3                    practical on-land resources would already be developed. If off-shore wind  
4                    projects were not feasible during the forecast period, a 10% RPS would  
5                    only be achievable by including energy efficiency programs, larger hydro  
6                    generation, and development of wind in the western part of the state.<sup>48</sup>
- 7           •       Inclusion of energy efficiency for 25% of an RPS can dramatically reduce  
8                    the cost. The RPS portfolios (5% and 10% RPS) with energy efficiency  
9                    are each estimated to save about half a billion dollars NPV over 20-years  
10                  relative to the Utilities' Portfolio. Essentially, the reduction of load of  
11                  1.25% or 2.5% by the end of the RPS study period creates energy cost  
12                  savings overall for the State.<sup>49</sup>

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

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

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48       Ibid.

49       Ibid.

50       Ibid., at pages (xii) and 80.

51       Ibid.

52       Ibid.

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

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

7 **Q. Does this complete your Testimony?**

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

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