Synapse
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An Assessment of Santee Cooper's 2008 Resource Planning

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April 22, 2009

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Executive Summary

Conclusion: Synapse has completed its assessment of Santee Cooper's 2008 resource planning analyses. The source materials for this assessment have included resource planning documents and computer simulation modeling files provided by Santee Cooper. We also have examined materials in the public domain and documents and information we have obtained during our other resource planning assessments.

We have identified serious weaknesses and biases in Santee Cooper's 2008 resource planning analyses that call into question its decision to build the Pee Dee River Units 1 and 2 supercritical pulverized coal-fired generating plants. Our overall conclusion is that Santee Cooper's plan to build two large coal plants encompasses significant financial risks for ratepayers, emerges from a flawed planning process, and is not a necessary course of action. At a minimum, Santee Cooper should re-do its resource planning analyses to incorporate the following:

- Peak load and energy sales forecasts that reflect actual 2008 experience and current economic projections.
- A higher range of possible coal construction costs.
- A wider and higher range of potential CO_2 emissions costs.
- Open-ended treatment of cost effective energy efficiency rather than establishing a pre-set efficiency resource limit. At a minimum, the model should incorporate the potentials for energy efficiency identified by GDS for Santee Cooper and Central Electric Cooperative.
- Sensitivity scenarios that include the potential for adoption of a state or federal Renewable Portfolio Standard.

In particular, we have found the following:

Finding 1. Santee Cooper's plan to build two large coal plants ensures coal will continue to dominate its resource mix for decades. Santee Cooper's existing resource mix is predominantly coal; eighty percent of its energy supply in 2007 came from coal-fired power plants. Its 2008 resource planning analyses reveal that it will continue to be very heavily coal-dependent for decades if it adds one or both of the proposed Pee Dee River coal-fired units and only very limited amounts of energy efficiency and renewable resources.

Finding 2. Santee Cooper is undertaking a very expensive generation expansion program in a period of great economic and financial uncertainty.

Finding 3. A comprehensive system for federal regulation of carbon dioxide (CO_2) and other greenhouse gas emissions is inevitable. It is generally expected that this federal regulation will require steep reductions in greenhouse gas emissions. However, Santee Cooper's 2008 resource planning analyses show that its annual CO_2

emissions will increase, not decrease, if it builds one or both of the proposed Pee Dee River coal plants.

Finding 4. The Pee Dee River coal units would emit approximately eight million tons of CO_2 each year. There currently is no commercially viable technology for capturing CO_2 emissions from a pulverized coal plant like Pee Dee River.

Finding 5. Ratepayers will face significant financial risk associated with the decision to lock in increasing carbon emissions for the coming decades at a time when those emissions will be costly. Unfortunately, Santee Cooper only used a relatively low and narrow range of possible CO_2 emissions costs in its planning analyses. This biased the results in favor of the Pee Dee River coal alternative. Synapse's forecasted range of CO_2 allowance prices represents a more reasonable range of potential costs for carbon emissions and should be used in assessments of the potential costs associated with emissions from the Pee Dee River units.

Finding 6. Santee Cooper's assumed construction costs for the Pee Dee River coal plants are unrealistically low and are significantly lower than other experienced power plant builders and operators are currently projecting for new coal-fired power plants with similar designs. The assumption of low construction costs biases the planning analyses in favor of the Pee Dee River coal alternative.

Finding 7. Circumstances have changed significantly since Santee Cooper decided to undertake the Pee Dee River coal plants, most particularly, the ongoing economic recession and financial crisis. For example, Santee Cooper's actual energy sales in 2008 were two percent lower than its sales in 2007 and eight percent lower than it had projected for the year. These changed circumstances are likely to reduce or defer the need for new generating capacity, such as the Pee Dee River coal plants, and provide more time for Santee Cooper and Central Electric Power Cooperative to adopt and implement aggressive energy efficiency programs. However, Santee Cooper has refused to reconsider its commitment to the Pee Dee River plants in light of these changed economic circumstances.

Finding 8. Santee Cooper used natural gas prices in its planning analyses that were inflated due to the unsupported assumption that adoption of any federal greenhouse gas regulations would significantly increase natural gas prices. This biased the planning analyses against natural gas fired plants and in favor of the coal alternative.

Finding 9. Santee Cooper did not allow its computer model, EGEAS,[1] to add more energy efficiency and/or renewable resources even if those options were less expensive than building new coal, gas and nuclear capacity.

Finding 10. Santee Cooper ignored available cost effective energy efficiency potential. In fact, studies prepared for Santee Cooper and Central Electric Power Cooperative show that there is significantly more achievable cost effective energy efficiency

[1] EGEAS stands for Electric Generation Expansion Analysis System.

potential than the relatively modest amounts assumed by Santee Cooper in its 2008 resource planning analyses.

Finding 11. Santee Cooper's proposed generation resource plan entails excessive uncertainty and risk for ratepayers.

- Uncertainty as to coal and nuclear power plant construction costs and schedules.
- Uncertainty as to the availability of financing in capital markets and financing costs.
- Uncertainty whether projected loads (internal and off-system) will materialize.
- Uncertainty as to the greenhouse gas emissions reductions that ultimately will be required as a result of federal, regional or state action, and the cost of compliance with likely future regulations.
- Uncertainty whether post-combustion carbon capture and sequestration will prove to be technically viable as a retrofit for pulverized coal plants like the proposed Pee Dee River Units.
- Uncertainty as to the costs and economic viability of post-combustion carbon capture and sequestration for pulverized coal plants, if it does prove technically viable.
- Uncertainty as to whether the federal government will adopt a national Renewable Portfolio Standard.
- Uncertainty as to future coal prices and whether there will be supply disruptions that will affect plant performance and fuel prices.
- Uncertainty whether the regulations for current criteria pollutants (such as NO_x, SO_2 and mercury) will be made more stringent.

In light of these significant risks, it would be better to adopt a resource plan that allows for (1) the postponement of decisions concerning large capital expenditures for new coal-fired power plants and (2) the flexibility to modify course as circumstances change. Adoption of a plan that maximizes Santee Cooper's near-term commitment to capital-intensive coal and nuclear power plant investments is the wrong choice in today's uncertain economic and financial conditions.

Finding 12. More than 80 proposed coal-fired power plants have been cancelled or delayed in recent years by public and investor-owned utilities or have been rejected by state regulatory commissions or agencies due, in large part, to uncertainties regarding construction costs and future CO_2 emissions costs. However, Santee Cooper has so far failed to reconsider its 2006 decision to proceed with the Pee Dee River coal plants in light of the considerations evaluated by other utilities.

FINDINGS

Finding 1. Santee Cooper's plan to build two large coal plants ensures coal will continue to dominate its resource mix for decades. Santee Cooper's existing resource mix is predominantly coal; eighty percent of its energy supply in 2007 came from coal-fired power plants. Its 2008 resource planning analyses reveal that it will continue to be very heavily coal-dependent for decades if it adds one or both of the proposed Pee Dee River coal-fired units and only very limited amounts of energy efficiency and renewable resources.

Santee Cooper is very heavily dependent upon coal-fired generation, with as much as 81.4 percent of its energy supply coming from coal as recently as 2007.

Table 1. Santee Cooper's historic dependence on coal.

Year	Coal As A Percentage of Energy Supply (%)
2007	81.4
2006	77.2
2005	72.9
2004	75.2
2003	75.7
2002	74.5
2001	79.8
2000	83.5
1999	81.6
1998	77.9
1997	80.3
1996	78.8
1995	75.7
1994	81.3

In October 2007, the Santee Cooper Board of Directors established a goal of obtaining forty percent (40%) of its gross electric generation needs from non-greenhouse emitting resources, biomass fuels, energy efficiency and conservation by 2020.[2] However, the results of Santee Cooper's 2008 resource planning modeling analyses show this goal will be unattainable with the addition of both Pee Dee River coal-fired power plants and with only the modest amounts of energy efficiency and renewable resources included in its resource plans. It will also be difficult to attain even if the Authority builds only one of the Pee Dee River units without adding any new nuclear capacity.

In fact, coal would continue to provide 81 percent to 86 percent of Santee Cooper's energy supply in 2015 if its adds Pee Dee River Unit 1 in 2013 or 2014, according to Santee Cooper's 2008 resource planning analyses. If it builds both of the proposed Pee Dee River units, between

2 Resolution dated October 19, 2007.

78 and 84 percent of the Authority's energy supply would be coal-fired in 2020 and 2024, the last year for which we were provided detailed modeling output files.

If it builds only one of the Pee Dee River units, approximately 73-84 percent of Santee Cooper's energy supply would come from coal until 2017. The addition of the new nuclear capacity in 2016 and 2018 would reduce this reliance to near the 60 percent goal established for 2020 by the Santee Cooper Board of Directors. But even then, coal and gas together would still represent slightly more than 60-63 percent of Santee Cooper's energy mix in 2020.

Renewable resources and landfill gas contribute a minor portion of Santee Cooper's energy supply in its 2008 resource planning analyses – with renewable resources (other than hydro) providing approximately 5 percent of its energy supply in 2020, hydro power providing 3 percent and landfill gas less than one percent. As this report will discuss below, Santee Cooper also includes only very modest contributions from energy efficiency in its resource planning analyses.

In the past, a heavy reliance on coal may not have presented a problem other than constituting a highly undiversified resource base. However, at this time in the electric industry, Santee Cooper's current and projected heavy dependence on coal-fired generation is risky for both its wholesale and retail customers for a number of reasons: the potential for higher fuel prices and coal supply disruptions; the potential for substantial carbon emission compliance costs; and the potential for the federal government to mandate further reductions in other non-greenhouse gas coal plant emissions such as SO_2, NO_x, mercury and small particulates.

Standard & Poor's has expressed concern that "Santee Cooper's significant and increasing reliance on coal-fired generation leaves it exposed to efforts to regulate emissions."[3] This concern certainly appears to be well placed. A utility like Santee Cooper, that will be reliant on coal for 60 percent to 80 percent of its energy as late as 2020 and 2024 faces substantial financial risk from the coming regulation of greenhouse gas emissions and the expected federal mandates for significant reductions of those emissions.

Finding 2. Santee Cooper is undertaking a very expensive generation expansion program in a period of great economic and financial uncertainty.

Santee Cooper is proposing to undertake a multi-billion dollar construction program that will include new coal and nuclear power plants. A capital investment program of this magnitude could be expected to strain Santee Cooper's financial resources even in normal times. However, Santee Cooper proposes to begin this investment program in a time of extreme economic and financial crisis, as well as tremendous uncertainty in costs associated with new coal investment. This commitment to significant capital investment arises just when economic conditions heighten the sensitivity of utility customers to rate increases

The current economic recession represents a near term challenge for utilities, and exacerbates risks that Santee Cooper and other electric utilities face. In fact, according to the Wall Street rating agency Standard and Poor's, the "worst economic slump since World War II" will present significant challenges to U.S. electric cooperatives and public power utilities just as "prospects

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[3] *South Carolina Public Service Authority, CP: Wholesale Electric*, Standard & Poor's, July 16, 2007, p. 3-4.

for regulation of greenhouse gas emissions have never been higher and capital needs abound."[4] Standard & Poor's also believes that "the worst of the [economic] downturn is still ahead" and that "the downturn is likely to be relatively prolonged, and recovery should be sluggish."[5]

The primary recession-related challenges identified by Standard and Poor's include: "declining energy sales, regional capacity surpluses that render some units uncompetitive and limit the ability to make budgeted margins on off-system sales, increasing payment delinquencies and bad debt expense, which could stress liquidity and coverage levels; and political pressure to hold down rates and/or provide increasing levels of support to help plug the budget gaps of municipal governments."

At the same time that the economic recession strains utilities like Santee Cooper, the financial crisis and ongoing credit crunch create uncertainty as to their ability to raise needed capital and what the costs of borrowing will be for the capital they need to undertake proposed projects. Standard & Poor's has warned that "The financial market turmoil poses a challenge for public power utilities in the midst of large-scale capital projects that have no other source of funds, and could face construction delays, and higher borrowing costs whether they obtain short- or long-term financing."

Entergy Louisiana is an example of a utility that has suspended construction of a proposed coal plant to allow available capital to be used on other projects:

> In addition, the changes in the U.S. and world economies have caused great turmoil in the capital markets. This turmoil has affected both the cost of capital and the timing of its availability….When engaging in a large project such as the [coal-fired Little Gypsy] Repowering Project, which will drive the timing of the need for capital, there could be a constraint in obtaining – at the time it is needed and at rates that are attractive economically – the capital that is needed to fund the Repowering Project as well as [the Company's] other resource needs. Given the uncertainties in the economics of the Repowering Project, it would seem to be a more prudent use of capital for [Entergy Louisiana] to plan to fund those other projects and retain additional liquidity while delaying the Repowering Project until additional clarity can be gained regarding the Project economics.[6]

What this means is that Santee Cooper may find itself seriously weakened due to the economic recession at the very time it seeks to finance its multi-billion construction program. It also may be forced to pay much higher costs to borrow capital from the market for its proposed investments in new coal and nuclear power plants.

In fact, there is some evidence that obtaining capital for new coal-fired power plants will be very difficult in the current environment. For example, last fall, the developers of the proposed

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4 Standard and Poors' – Public Finance; "Will the Recession Pull the Plug on U.S. Public Power Companies and Electricity Co-ops?" March 4, 2009.

5 Standard & Poor's, *U.S. Public Power Outlook: 2009 Could Provide Some Shocks*, January 20, 2009, at page 4.

6 <u>Ibid</u>, at pages 6-8.

Highwood Generating Station in Montana were reported to have difficulty obtaining funding for their project.[7] The developers have since announced that they will build a natural gas-fired plant at the site instead of a coal plant.

Finding 3. A comprehensive system for federal regulation of carbon dioxide (CO_2) and other greenhouse gas emissions is inevitable. It is generally expected that this federal regulation will require steep reductions in greenhouse gas emissions. However, Santee Cooper's 2008 resource planning analyses show that its annual CO_2 emissions will increase, not decrease, if it builds one or both of the proposed Pee Dee River coal plants.

Corporate, government, and financial leaders anticipate imminent greenhouse gas regulation in the U.S., and that greenhouse gas emission restrictions will pose substantial challenges and create significant new costs for the owners of coal-fired power plants. For example, in its January 28, 2008 assessment of the *Top 10 U.S. Electric Utility Credit Issues for 2008 and Beyond*, Standard & Poor's noted that "the single biggest challenge regulated electric utilities will tackle is the discharge of carbon dioxide (CO_2) into the air"[8]

Standard & Poor's subsequently issued a report on *The Credit Cost of Going Green for U.S. Utilities*, in March 2008, in which it concluded that:

> The debate is over. Not the one concerning climate change, but the one about whether the U.S. will act to limit greenhouse gas emissions to address the possibility that human activities are harming the planet. By now it's a foregone conclusion that the U.S. will pass laws that call for significant reductions in carbon dioxide (CO_2). The only uncertainty is the details of how much and by when….So for electric utilities, the credit question is not so much whether higher costs related to controlling emissions are coming, but rather when and how high they'll actually go.[9]

More recently, in its January 2009 Electric Industry Outlook, Moody's Investors Services also has warned that:

> The prospect for new environmental legislation—particularly concerning carbon dioxide—represents the biggest emerging issue for electric utilities, given the volume of carbon dioxide emissions and the unknown form and substance of potential CO_2 legislation.[10]

Moody's also emphasized that the credit risk for utilities arises from the uncertain costs and format of emissions regulation, acceleration of potential climate change legislation, as well as

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7 "Funding questions linger as power plant breaks ground," Great Falls Tribune, October 19, 2008.

8 *To 10 U.S. Electric Utility Credit Issues for 2008 and Beyond*, Standard & Poor's, January 28, 2008, at page 2.

9 *The Credit Cost of Going Green,* Standard & Poor's, March 2008, at page 15.

10 *Moody's Global Infrastructure – Industry Outlook: "U.S. Investor-Owned Electric Utilities;"* Moody's Investors Services. January 2009.

possibility that rate regulators will balk at rising costs when consumers reach their tolerance level for cost increases, particularly in light of recessionary pressures.

The Obama Administration indicated in its recently released Federal budget that it would seek to establish a cap-and-trade system to reduce greenhouse gas emissions to 14 percent below 2005 levels by 2020 and to 83 percent below 2005 levels by 2050. Purchasing emissions allowances through such a cap-and-trade system will increase the cost of running power plants that emit CO_2, particularly those that are coal-fired due to the high carbon content of coal.

The Administration's proposal is just one of several. There are two likely avenues for federal regulation of greenhouse gases. Congress could pass legislation, or the U.S. Environmental Protection Agency could adopt regulations to limit greenhouse gas emissions. Both paths are currently under active consideration.

Leaders in both the House and Senate also are pursuing plans for aggressive legislative action on climate change during this session. To date, the most substantive legislative proposals have focused on establishing a cap on carbon emissions and allowing affected emitters to trade emission allowances; however, another option would be to establish a tax on greenhouse gas emissions. Legislative proposals in the 111th Congress include an emissions cap with aggressive reduction targets. Proposals announced by Representatives Markey and Waxman, and Representative Van Hollen have included greenhouse gas reduction targets for 2050 of 83% and 85% (respectively) below 2005 emission levels.

While Congress debates climate change legislation, the EPA is poised to take the next step towards regulating greenhouse gases under the Clean Air Act. In 2007, the U.S. Supreme Court determined that carbon dioxide is an "air pollutant" under the Clean Air Act, and that EPA has the authority to regulate it.[11] The EPA has now circulated its draft finding, for review by the White House, that greenhouse gas emissions endanger public health and welfare.[12] The Obama Administration has stated its preference for a legislative solution to addressing climate change; however, EPA's regulatory authority provides an alternate option should Congress fail to act.

Figure 1, below, shows the emissions trajectories that would have been mandated by the proposals that were introduced in the 110th U.S. Congress. These proposals increasingly aimed for emissions reductions of 60 percent to 80 percent from current levels by 2050, as does the plan recently announced by the Obama Administration. These targets reflect scientific consensus regarding reductions necessary to stabilize atmospheric CO_2 concentrations at levels that may avoid the most dangerous impacts of climate change.

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11 In this case, Massachusetts and 11 other states sued the US EPA for failing to regulate greenhouse gas emissions from the transportation sector. The Court found that EPA has the standing, the authority, and the obligation to regulation greenhouse gas emissions. The court found that EPA's refusal to do so or to provide a reasonable explanation of why it could not regulate was arbitrary, capricious and otherwise not in accordance with law. The Supreme Court also found that the "harms associated with climate change are serious and well recognized."

12 "White House begins review of EPA endangerment proposal," Greenwire, March 23, 2009.

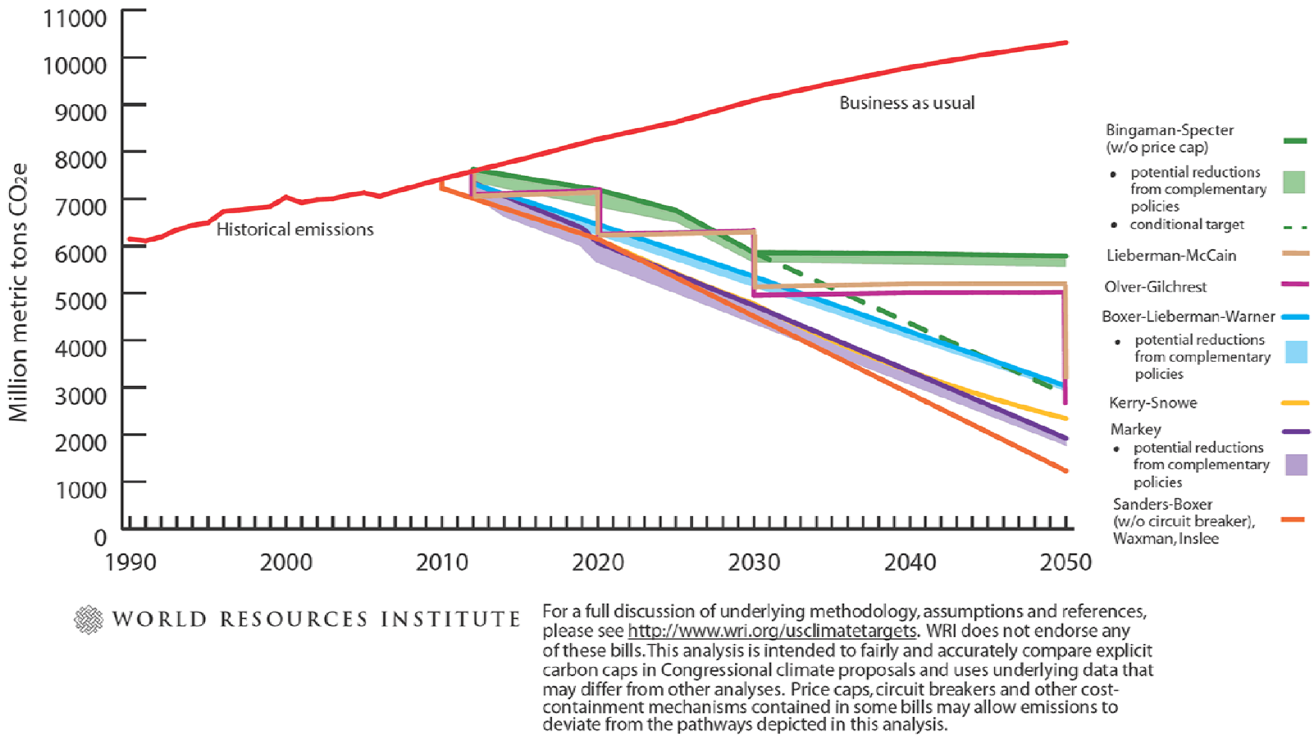

Figure 1. Emissions reductions that would have been required under the climate change bills that were introduced in the 110th U.S. Congress.

The plan announced by the Obama Administration, as well as the two recent legislative proposals, would require emissions reductions that approximate the steepest reductions shown in Figure 1. The Edison Electric Institute (EEI) recently issued "Global Climate Change Points of Agreement" that included an agreement that long-term targets (i.e. 2050) should be 80% reduction below current levels.[13] Given the plans that have been announced in recent months, and the proposals that were introduced in the previous Congress, the general trend towards strong federal action to address climate change is clear; and it would be a mistake to ignore it in long-term decisions concerning electric resources. Over time the proposals are becoming more stringent as evidence of climate change accumulates and as the political support for serious governmental action grows.

Unfortunately for Santee Cooper's customers, the resource plan adopted by Santee Cooper not only is inconsistent with these evolving federal climate change policies – it is contrary to these evolving policies because it would lead to higher, not lower, annual CO_2 emissions. By building the Pee Dee River coal-fired power plants, Santee Cooper would be locked into decades of high CO_2 emissions just at a time when those emissions will become costly. These costs would become the burden of ratepayers.

The evidence for this conclusion is found in the results of the EGEAS resource planning model used by Santee Cooper. EGEAS reports the annual CO_2 emissions for each generating resource in the output files for each scenario examined. As shown in Figure 2 below, Santee Cooper's annual CO_2 emissions would increase between 2007 and 2024 in each of the EGEAS scenarios

[13] Edison Electric Institute, "EEI Global Climate Change Points of Agreement," January 14, 2009

that Santee Cooper provided to Synapse. In some scenarios, these increases are rather dramatic (as high as 30 percent) due to the addition of both Pee Dee River units. In other scenarios, Santee Cooper's annual CO_2 emissions would be only slightly higher in 2024 than they were in 2007 – reflecting the building of either no new coal plants or only one of the Pee Dee River units and the addition of ownership interests in two nuclear units. In none of the scenarios modeled by Santee Cooper do its annual CO_2 emissions decline from 2007 through 2024.

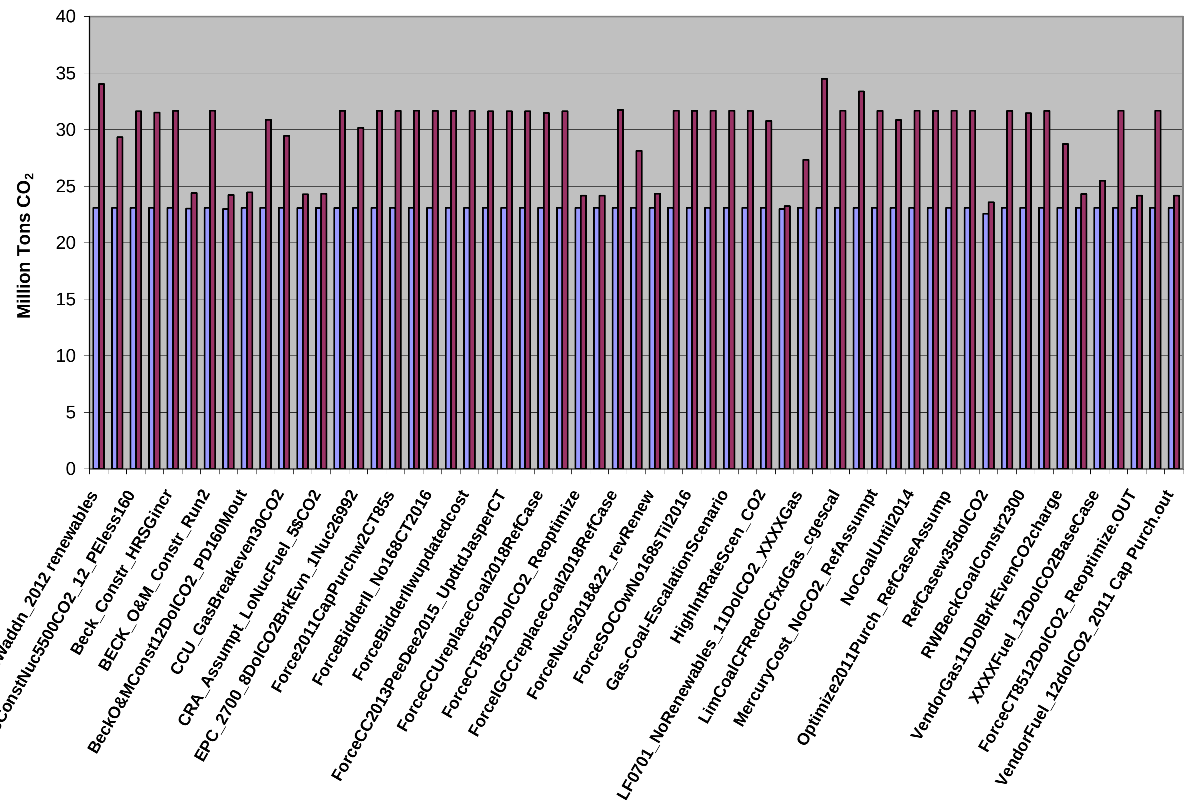

Figure 2. Emissions of CO_2 in 2007 and 2024 in EGEAS scenarios modeled by Santee Cooper.[14]

The increasing annual CO_2 emissions shown in its own modeling analyses will expose Santee Cooper to substantial costs and significant financial risk. These costs and risks could be quite difficult to manage, especially for a utility that already is heavily coal-dependent.

Figure 3, below, provides an illustrative example of Santee Cooper's future annual CO_2 emissions in one of the scenarios that includes construction of both Pee Dee River units and compares that trajectory to the emissions reductions that would be required under the Obama Administration's recently announced cap-and-trade system.

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14 The blue bars in Figure 2 represent Santee Cooper's CO_2 emissions in 2007. The black bars represent its projected CO_2 emissions in 2024.

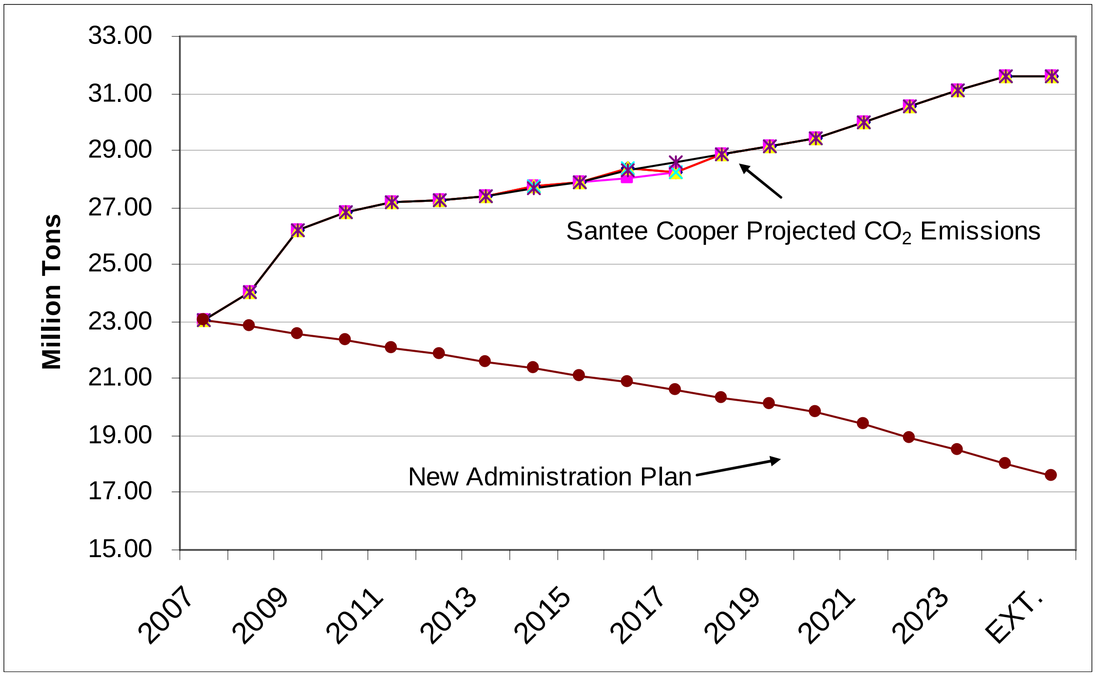

Figure 3. Example of a Santee Cooper CO_2 emissions trajectory with 2 Pee Dee River Units –EGEAS scenario with R.W. Beck recommended construction costs with Pee Dee River net of sunk costs, \$5,500 nuke, and \$12 CO_2– versus emissions reductions that would be required under Administration's recently announced plan.[15]

Figure 4, below, provides an example of Santee Cooper's annual CO_2 emissions in a scenario in which only Pee Dee River Unit 1 is built and where ownership interests in two nuclear units are added in place of Pee Dee River Unit 2. Santee Cooper's annual CO_2 emissions in this scenario would continue to be significant higher in 2020 and 2024 than federally mandated emissions levels and the gap would appear to be growing.

[15] There are five overlapping emissions trajectories in Figures 3 and 4 because Santee Cooper provided five plans in each modeled scenario. However, the annual CO_2 emissions were relatively close in each plan. So they mostly appear to be a single line.

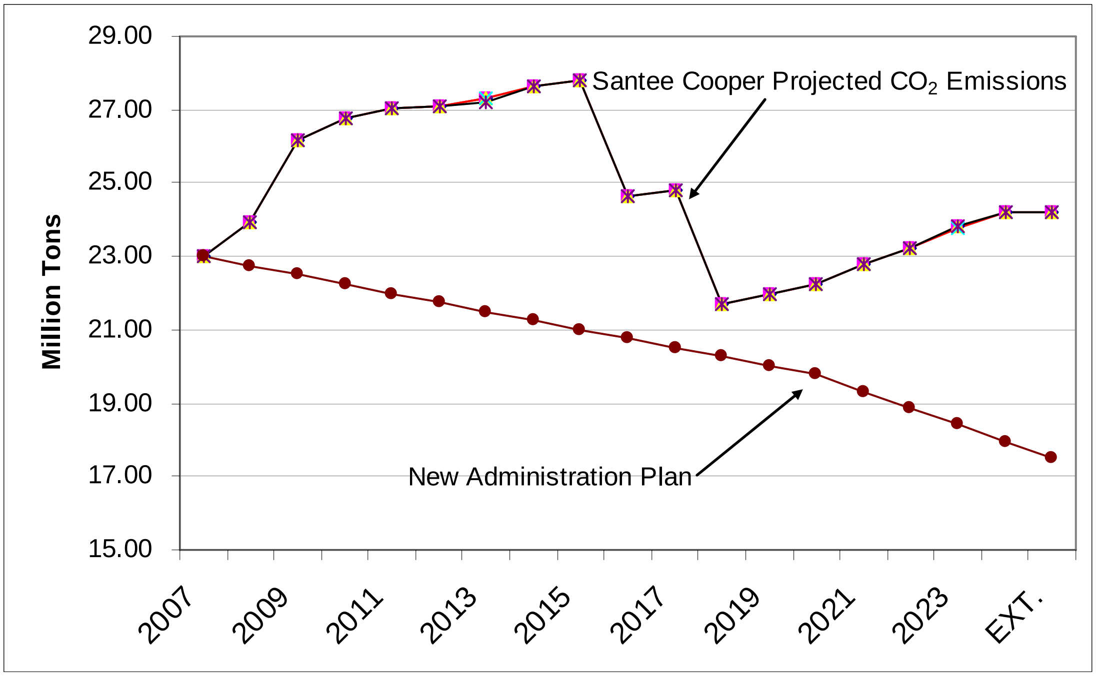

Figure 4. Example of a Santee Cooper CO_2 emissions trajectory with 1 Pee Dee River Unit –EGEAS scenario with Beck recommended construction costs with Pee Dee River cost net of sunk costs, $5,500/kW nuke, $18 CO_2 and vendor gas prices – versus emissions reductions that would be required under Administration's recently announced plan.

As can be seen, adding either one or both of the Pee Dee River coal plants would be inconsistent with national emissions trends under evolving federal climate change policies. Even in those scenarios in which only one Pee Dee River unit is built, Santee Cooper's CO_2 emissions would increase between 2007 and 2024, counter to the national CO_2 emission trends that would be mandated under plans being considered by the Obama Administration and Congress. Building both Pee Dee River units would certainly be a major step in the wrong direction. Santee Cooper should be examining plans and options for reducing, not increasing, its greenhouse gas emissions by building the Pee Dee River coal-fired power plants.

Finding 4. The Pee Dee River coal units would emit approximately eight million tons of CO_2 each year. There currently is no commercially viable technology for capturing CO_2 emissions from a pulverized coal plant like Pee Dee River.

If it operates at an average annual capacity factor of 85 percent, each of the 607 MW Pee Dee River units could emit approximately 4 million tons of CO_2 each year of its likely 60 year operating life. That would mean that both units would emit an additional 500 million tons, in total, of CO_2 into the atmosphere if they are operated for 60 years unless some technological fix, or silver bullet, is developed to capture CO_2 emissions from pulverized coal plants like Pee Dee River and permanently sequester the CO_2 in the ground.

However, there is currently no technology for economically reducing carbon emissions from a power plant that could be added once the timing and stringency of federal emissions limits are known. This is because unlike for other power plant air emissions like sulfur dioxide and oxides of nitrogen, there currently is no commercially demonstrated, economically viable method for the post-combustion removal of CO_2 from pulverized coal plants at full scale. Some technologies are starting to be tested with plans for scale up. But it might be years, if not decades, before there will be commercially viable post-combustion technology for the capture and sequestration of greenhouse gas emissions from pulverized coal-fired power plants like the proposed Pee Dee coal units. The Edison Electric Institute, for example, has said that it does not expect carbon capture and storage technologies to be commercially available until 2020 or 2025. And even that timeline might be overly optimistic.

A number of independent sources such as Duke Energy, the electric industry's Edison Electric Institute, the Massachusetts Institute of Technology and the U.S. Department of Energy's National Energy Technology Laboratory have estimated that adding carbon capture technology would increase the cost of generating power at a pulverized coal-fired plant by 60 percent to 80 percent. If these costs of carbon capture were included, the projected cost of generating power at coal-fired power plants like Pee Dee River would be 12.2 cents to 13.7 cents per kilowatt hour. If shown to be technically and legally feasible, the costs of transporting and permanently sequestering the CO_2 in the ground would be in addition to these costs.

However, the bottom line is that it is not prudent to build a new coal-fired power plant with only a hope that there will be a technology developed at some point that can be retrofitted onto the new plant in order to capture and, ultimately, sequester 90 percent or more of its CO_2 emissions. Because if carbon capture and sequestration technology is not added to Pee Dee River, Santee Cooper's wholesale and retail customers instead would have to pay tens to hundreds of millions of dollars each year to buy allowances to cover the plants' CO_2 emissions.

Finding 5. Ratepayers will face significant financial risk associated with the decision to lock in increasing carbon emissions for the coming decades at a time when those emissions will be costly. Unfortunately, Santee Cooper only used a relatively low and narrow range of possible CO_2 emissions costs in its planning analyses. This biased the results in favor of the Pee Dee River coal alternative. Synapse's forecasted range of CO_2 allowance prices represents a more reasonable range of potential costs for carbon emissions and should be used in assessments of the potential costs associated with emissions from the Pee Dee River units.

Regardless of whether federal restrictions on greenhouse gas emissions ultimately take the form of an emissions cap with tradable allowances, or a tax on emissions, power plant owners (and other emission sources) will bear costs associated with emissions. Since coal is the most carbon-intensive fuel, the compliance costs for a coal-fired power plant are likely to be substantial and must be taken account in such a long-lived investment.

In an interview with the Financial Times, Todd Stern, the U.S. Special Envoy on Climate Change has warned that businesses must not sink money into high-carbon infrastructure unless they are willing to lose their investments within a few years.[16]

[16] http://www.ft.com/cms/s/0/ffb6b5bc-23d3-11de-996a-00144feabdc0.html?nclick_check=1

> In the Obama administration's starkest rebuke yet to industry over global warming, Todd Stern, special envoy for climate change at the state department, said "high-carbon goods and services will become untenable" as the world negotiated a new agreement to cut carbon emissions.
>
> Investors should take note, he warned, that high emissions must be curbed, which would hurt businesses that failed to embark now on a low-carbon path.
>
> "How good will the business judgment of companies that make high-carbon choices now look in five, 10, 20 years, when it becomes clear that heavily polluting infrastructure has become deadly and must be phased out before the end of its useful life?"
>
> Companies investing in such goods and services - such as coal-fired power plants and gas-guzzling cars - could start to incur heavy economic penalties in the near future for their greenhouse gas output.[17]

Some coal plant proponents claim that under a greenhouse gas emissions cap, a significant number or even all of the emissions allowances necessary for operation will be distributed free to generators. While early proposals for allowance distribution were modeled after the acid rain provisions of the Clean Air Act, (i.e., distributing allowances for free to affected entities,) current proposals all include provisions to auction 60% to 100% of allowances. Free allowance distribution to covered entities is considered as a transition mechanism, if at all.

Indeed, the Obama Administration has stated its preference for 100 percent auctioning of allowances in a federal cap-and-trade system, though recently a senior administration official as indicated that the Administration is considering a gradual transition to the full auction.[18] This would be consistent with the recommendations of a number of groups, including, for example, the National Commission on Energy Policy[19] which has recommended that "new coal plants built without [carbon capture and sequestration] not be "grandfathered" (i.e., awarded free allowances) in any future regulatory program to limit greenhouse gas emissions."[20] EEI too includes allowance allocations to merchant coal generation and utilities as a mechanism in a gradual transition to full auction.[21]

Another proposal for federal climate change policy specifically prohibits the distribution of free allowances to power plants licensed after 2009.[22] In the Regional Greenhouse Gas Initiative, the

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17 Ibid.

18 "White House might agree to delay in greenhouse gas rules," Boston Globe, April 9, 2009, page A13.

19 The National Commission on Energy Policy is a bipartisan group of 20 energy experts from industry, government, academia, labor, consumer and environmental protection.

20 *Energy Policy Recommendations to the President and the 110th Congress*, National Commission on Energy Policy, April 2007, at page 21. Available at http://www.bipartisanpolicy.org/files/news/contentFiles/NCEP-Recom-final-single_4773e92b6f5c2.pdf

21 Edison Electric Institute, "EEI Global Climate Change Point of Agreement," January 14, 2009.

22 US Climate Action Partnership, A Blueprint for Legislative Action, January 15, 2009.

first carbon cap that has been implemented in the U.S. for the electric sector, all of the states that are participating have decided to auction 100% of the allowances.

The 2007 Massachusetts Institute of Technology interdisciplinary study on *The Future of Coal* warned:

> There is the possibility of a perverse incentive for increased early investment in coal-fired power plants without capture, whether SCPC or IGCC, in the expectation that the emissions from these plants would potentially be "grandfathered" by the grant of free CO_2 allowances as part of future carbon emissions regulations and that (in unregulated markets) they would also benefit from the increase in electricity prices that will accompany a carbon control regime. Congress should act to close this "grandfathering" loophole before it becomes a problem.[23]

Consequently, as Standard and Poor's has explained, it is reasonable to expect that:

> Customers of those utilities with higher levels of carbon intensity will be more exposed to rate increases than customers of utilities with lower carbon intensity. The magnitude of the rate increases will depend on the level of carbon costs and the extent of management's commitment to the preservation of credit quality.[24]

Numerous modeling analyses of federal policy proposals for mandatory greenhouse gas reductions in the U.S are available (e.g. Energy Information Administration and the Environmental Protection Agency, educational institutions such as the Massachusetts Institute of Technology and Duke University, consulting firms, and various other organizations). A list of these analyses is given in Appendix A. Though these analyses precede the recent legislative proposals from the Administration and Congress, their results are relevant because the greenhouse gas emission reduction targets in recent proposals are comparable to the most stringent targets in the plans that have been modeled.

In total, these modeling analyses examined more than 75 different scenarios. These scenarios reflected a wide range of assumptions concerning important inputs such as: the "business-as-usual" emissions forecasts; the reduction targets in each proposal; whether complementary policies such as aggressive investments in energy efficiency and renewable energy are implemented, independent of the emissions allowance market; the policy implementation timeline; program flexibility regarding emissions offsets (perhaps international) and allowance banking; assumptions about technological progress and the cost of alternatives; and the presence or absence of a "safety valve" price.

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23 *The Future of Coal, Options for a Carbon-Constrained World, an Interdisciplinary MIT Study*, 2007, at page (xiv). Available at http://web.mit.edu/coal/The_Future_of_Coal.pdf.

24 Standard and Poor's, *The Cost of Carbon – Credit Quality Implications for Public Power and Cooperative Utilities*, March 27, 2008, at page 9.

Based on a number of factors, including our assessment of the results of these modeling analyses, Synapse has developed a set of CO_2 price forecasts that we believe provides a reasonable range of possible future CO_2 allowance values. These forecasts are presented in Figure 5:

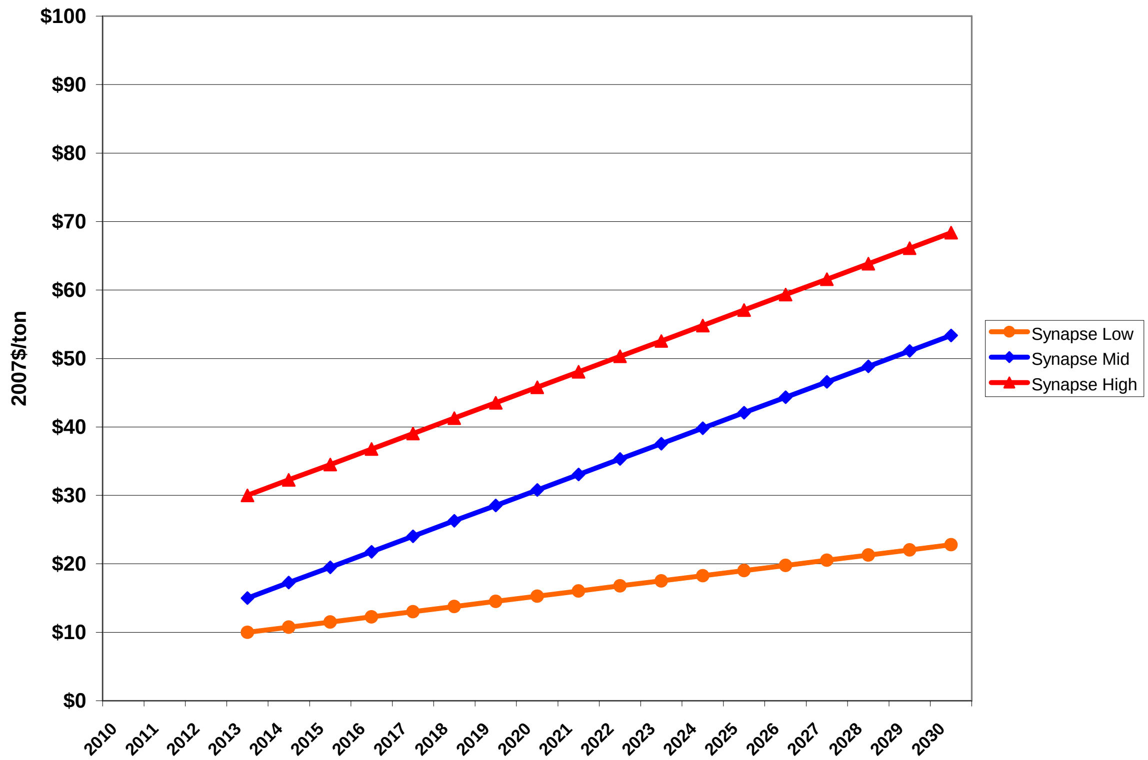

Figure 5. Synapse 2008 CO_2 allowance price forecasts.

The 2008 Synapse CO_2 Price Forecasts shown in Figure 5 are all in 2007 dollars. The Synapse Low CO_2 Price Forecast starts at $10/ton in 2013 and increases to approximately $23/ton in 2030. This represents a $15/ton levelized price over the period 2013-2030, in 2007 dollars. The 2008 Synapse High CO_2 Price Forecast starts at $30/ton in 2013 and rises to approximately $68/ton in 2030. This High Forecast represents a $45/ton levelized price over the period 2013-2030, also in 2007 dollars. Synapse also has prepared a Mid CO_2 Price Forecast that starts close to the low case, at $15/ton in 2013 and climbs to $53/ton by 2030. The levelized cost of this Mid CO_2 price forecast is $30/ton, in 2007 dollars.

Synapse first developed a set of CO_2 price forecasts in the spring of 2006. However, significant developments since that time led Synapse to re-examine and raise those CO_2 price forecasts this past summer to ensure that they reflect an appropriate level of financial risk associated with greenhouse gas emissions.[25] Most importantly, the political support for serious climate change legislation has expanded significantly in federal and state governments, as well as in the public at large, as the scientific evidence of climate change has become more certain. Concurrently, the new greenhouse gas regulation bills under consideration in the 110th U.S. Congress contained

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25 See the July 2008 report *Synapse 2008 CO2 Price Forecasts* available at http://www.synapse-energy.com/Downloads/SynapsePaper.2008-07.0.2008-Carbon-Paper.A0020.pdf

emissions reductions that were significantly more stringent than would have been required by proposals introduced in earlier years. Moreover, an increasing number of states have adopted policies, either individually and/or as members of regional coalitions, to reduce greenhouse gas emissions. Further, additional information has been developed regarding technology innovations in the areas of renewable resources, energy efficiency, and carbon capture and sequestration, leading to greater clarity about the cost of emissions mitigation; however, cost estimates for many of these technologies are still in the early stages. Taken together these developments lead to higher financial risks associated with future greenhouse gas emissions and justify the use of higher projected CO_2 emissions allowance prices in electricity resource planning and selection for the period 2013 to 2030 (as discussed below).

Figure 6, below, compares the range of CO_2 prices that Synapse recommends be used for resource planning with the results of the modeling analyses of the major climate change legislation proposed in the 110th U.S. Congress. As can be seen, the CO_2 prices recommended by Synapse are very reasonable compared to the range of CO_2 emissions allowance prices that could have resulted from adoption of the major greenhouse gas regulatory legislation that was introduced in the last U.S. Congress. In fact, under many possible scenarios, CO_2 allowance prices could substantially exceed the high ends of the price range that Synapse recommends for use in resource planning assessments.

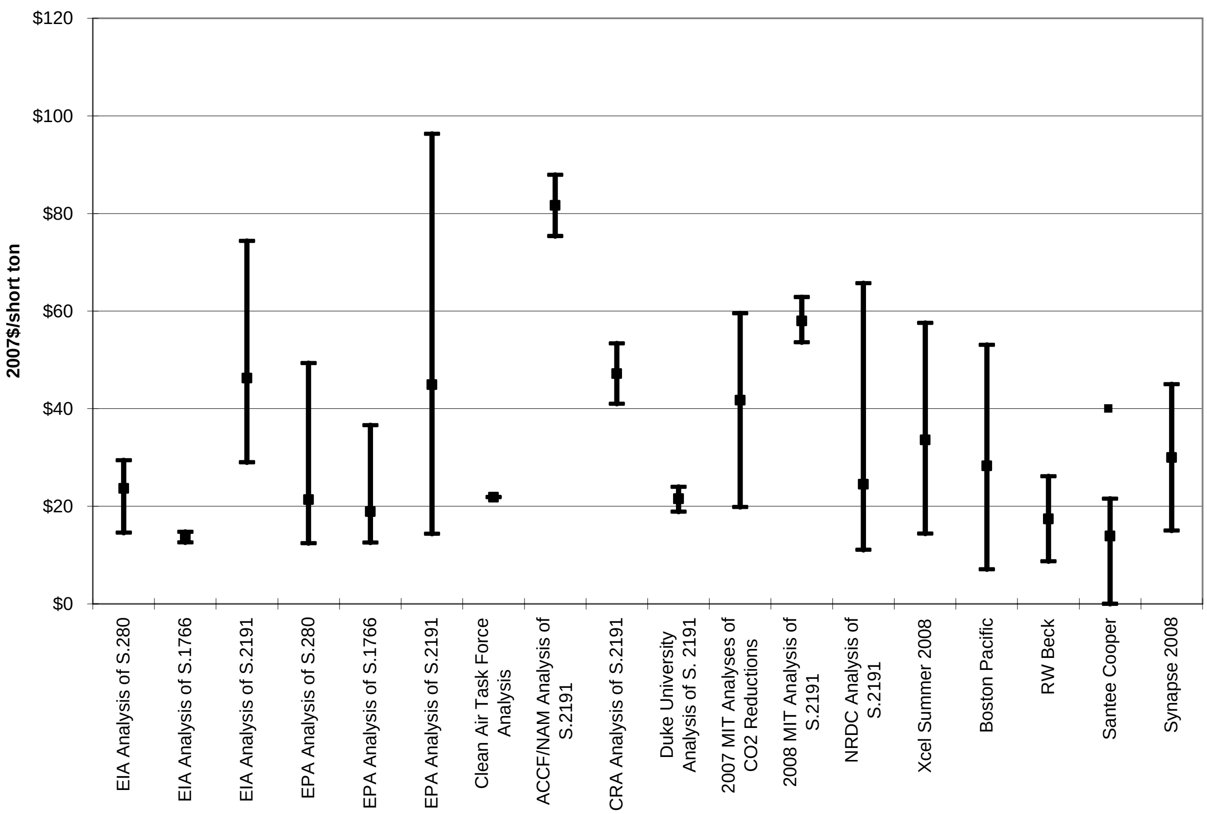

Figure 6. CO_2 prices used by Synapse and Santee Cooper vs. results of modeling analyses of major bills in the 110th U.S. Congress – levelized CO_2 prices (2013-2030, in 2007 dollars).

Figure 6 also presents the range of CO_2 prices used by Santee Cooper in its 2008 resource planning analyses. Clearly, except for a single sensitivity scenario, this range of CO_2 prices was very low compared to the full range of CO_2 emissions allowance prices that could result from adoption of the major greenhouse gas regulatory proposals that are being considered by the federal government.[26] In fact, there are a significant number of possible scenarios where CO_2 emissions allowance prices could be substantially higher than the high ends of the price ranges that Santee Cooper used in its resource planning analyses. Because coal is the most carbon intensive fuel, these low CO_2 prices distorted and biased the analyses in favor of new coal plants. As can be seen from Figure 6, the range of CO_2 prices that R.W. Beck recommended that Santee Cooper use in its resource planning also is very low compared to the full range of possible prices that could result from the adoption of the major proposals for greenhouse gas regulation that have been announced by the Administration or that are being considered in Congress.

Indeed, Santee Cooper assumed in many of the scenarios it examined that it would not have to pay for emissions allowances, that is, that the price of allowances was \$0/ton. The failure to include any price for CO_2 heavily biased the results of these scenarios in favor of Pee Dee River, the coal alternative. The assumption that Santee Cooper would not have to pay any CO_2 prices at any time in the expected 60 year operating lives of the Pee Dee River units relies on one or both of two flawed assumptions: either that there will be no federal regulation of greenhouse gas at any point in the expected 40 to 60 year operating lives of new coal plants like Pee Dee River or that Santee Cooper will receive free allowances for all of the CO_2 emissions from the new plants. Both of these assumptions are unrealistic in the face of the recently announced Administration cap-and-trade plan and legislative trends in the U.S. Congress.

In addition to the numerous modeling scenarios in which Santee Cooper assumed \$0/ton prices for CO_2 emissions, it ran a number of scenarios that assumed CO_2 prices in the range of \$11/ton to \$18/ton. Although more realistic than assuming a \$0/ton price, the high end of this range of CO_2 prices also is significantly below the CO_2 prices that can be expected to result from the substantial reductions in greenhouse gas emissions that are anticipated will be required by federal administrative or legislative action. Also, the costs of any federal program to regulate greenhouse gas emissions will be affected by important details that are still uncertain, such as the timing, goals, and design of the program. Therefore, it is critical to consider a reasonably broad range of CO_2 emissions allowance prices in resource planning in order to achieve decisions that are robust in an uncertain future just as resource planners normally consider a range of fuel prices. Unfortunately, Santee Cooper has not done so.

As was discussed above, carbon capture and sequestration technology is currently not viable, and when it becomes viable, it will be at significant cost to utilities, and therefore, to consumers. But if carbon capture and sequestration technology is not added to the Pee Dee units, Santee Cooper's wholesale and retail customers instead would have to pay tens to hundreds of millions of dollars each year to buy allowances to cover the plants' CO_2 emissions – allowances that would be auctioned as part of the cap-and-trade program. The annual costs for purchasing the allowances for the approximate four million tons of CO_2 that each Pee Dee River coal unit would

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[26] Unfortunately, this single moderate price scenario, with CO_2 at \$35/ton, was distorted by the assumption of very high natural gas prices which biased its results in favor of the coal alternative. In fact, Santee Cooper, itself noted that Pee Dee River was "still viable" in this scenario due to the fact that the "vendor gas price forecast included the effects of CO_2 on gas prices." However, as we will demonstrate in Finding 8, below, there is no persuasive evidence that CO_2 regulation will have a significant impact on natural gas prices. It is nevertheless interesting that the EGEAS model did not select Pee Dee River 2 even in this biased scenario.

emit each year are shown in Figure 7, below. The annual costs in this Figure reflect the Synapse High, Mid and Low CO_2 price trajectories shown in Figure 5, above. Although Figure 7 only goes through 2030, it is reasonable to anticipate that Santee Cooper's customers would have to pay these increasing annual costs right through the end of the operating lives of the Pee Dee River units, or until the capability for carbon capture and sequestration is added to the facility.

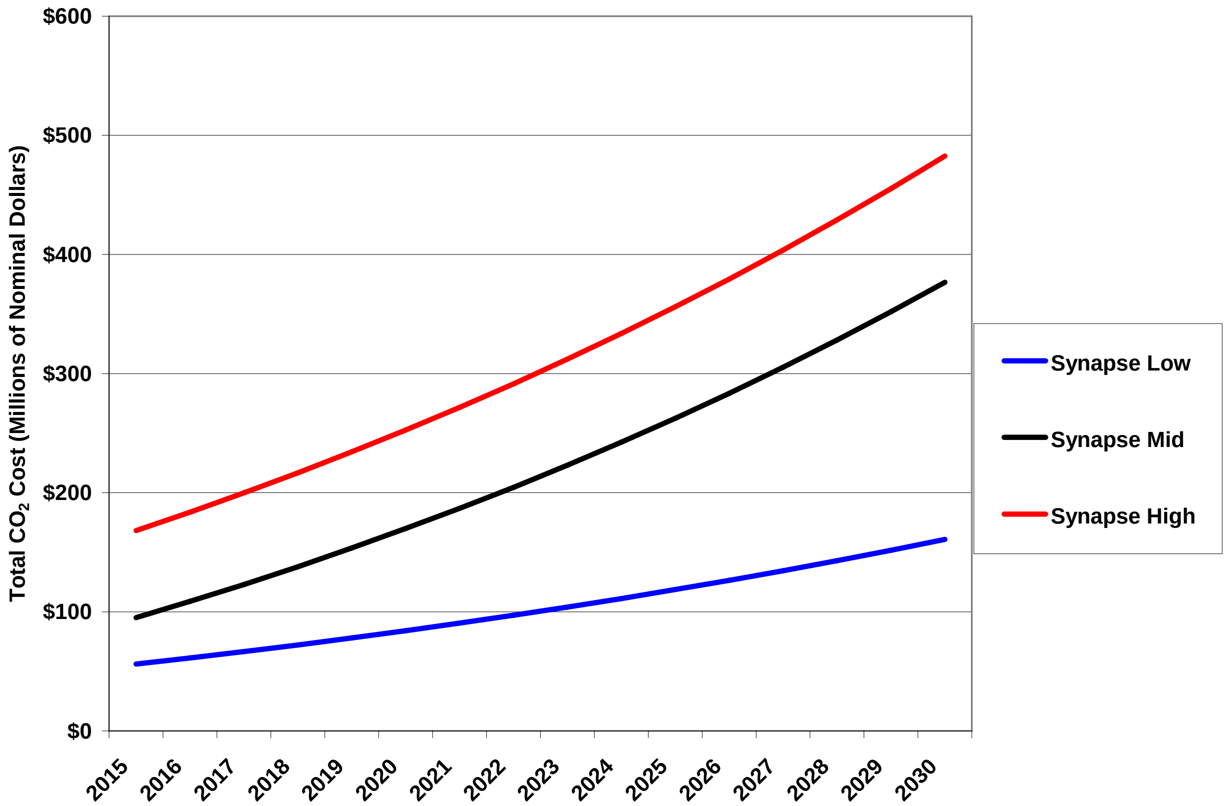

Figure 7. Pee Dee River Unit 1 annual CO_2 costs –operating at an average 85 percent capacity factor (millions of nominal dollars).

Thus, if it builds only one Pee Dee River unit, Santee Cooper's customers may have to pay between \$56 million and \$168 million for the CO_2 emitted by that plant in 2015, and these costs could rise to between \$161 million and \$482 million in 2030. Of course, Santee Cooper's customers would have to pay double these costs if the Authority has to purchase allowances for both Pee Dee River units.

Finding 6. Santee Cooper's assumed construction costs for the Pee Dee River coal plants are unrealistically low. It assumes that it will be able to build the two Pee Dee River coal plants for significantly less than other experienced power plant builders and operators are currently projecting for new coal-fired power plants with similar designs. The assumption of low construction costs biases the planning analyses in favor of the Pee Dee River coal alternative.

Coal power plant construction costs have risen dramatically in recent years as a result of a worldwide competition for design and construction resources, equipment and commodities like concrete, steel, copper and nickel. Terms like "staggering," "soaring" and "skyrocketing" have been used to describe these cost increases. Coal-fired power plants that were estimated to cost $1,500 per kilowatt in 2002 are now projected to cost in excess of $3,500 per kilowatt. The rapid increases in estimated coal plant construction costs are illustrated in Figure 8, below, which shows the increases that were announced in the three years between late 2005 and October 2008 for the proposed Meigs County coal plant in Southern Ohio.

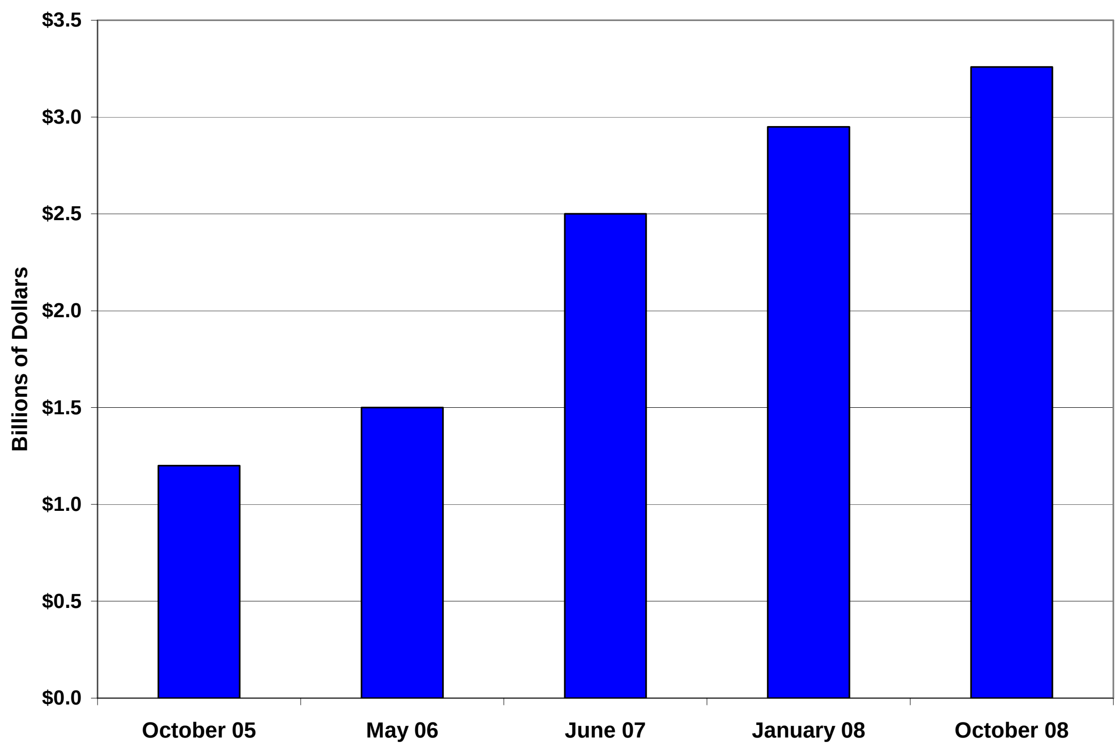

Figure 8. Increases in the estimated cost of building the 960 MW Meigs County Coal Plant (in nominal year dollars, no financing costs).

Like the proposed Pee Dee River Units, the proposed Meigs County plant would be a supercritical pulverized coal plant.

Moreover, almost all other proposed coal-fired power plants have experienced significant cost increases in recent years. For example, the estimated per unit construction cost of Duke Energy Carolina's Cliffside Project increased by 80 percent between the summer of 2006 and June 2007. Similarly, the projected construction cost of Wisconsin Power & Light's proposed Nelson

Dewey 3 coal plant increased by approximately 47 percent between February 2006 and September 2008.

Table 2 compares Santee Cooper's assumed coal-plant construction costs, in nominal dollars without financing costs, with the estimated construction costs of other coal plants that have been proposed to be built in the same relative timeframe as Pee Dee River.

Table 2. Recent Supercritical Coal-Fired Power Plant Cost Estimates (nominal dollars, no financing costs).

Plant	Owner	Date of Estimate	Total Cost	Size	Announced Cost/kW
			(Billions)	(MW)	
Pee Dee River 1	Santee Cooper	2007/2008	$1.24	607	$2,040
Pee Dee River 2	Santee Cooper	2007/2008	$1.22	607	$2,012
R.W. Beck "Typical" Cost	R.W. Beck	Spring-08	$1.49	607	$2,455
Big Stone II	OTP, MDU, CMMPA, MRES, Heartland	June-06	$1.27	500	$2,545
Karn-Weadock	Consumers Energy	September-07	$2.21	800	$2,765
Turk	SWEPCO	Spring-08	$1.52	600	$2,537
Meigs County	AMP-Ohio	October-08	$3.26	960	$3,394
Marshalltown	Iowa Power & Light	September-08	$2.23	630	$3,538

R.W. Beck told Santee Cooper in April 2008 that "the unit cost of construction for supercritical pulverized coal facilities is uncertain and could range between $2,000 to $3,000 per kW, with a typical value of approximately $2,300 per kW […]"[27] This $2,300 per kW cost that R.W. Beck claimed was "typical" was in 2007 year dollars and included the cost of financing. It translates into the approximate $2,450 per kW cost, in nominal dollars without financing costs shown in Table 2 above. However, as can be seen from Table 2, even what Beck calls a "typical" coal plant construction cost is lower than the recently estimated costs for new coal-fired power plants.

Moreover:

- The two highest estimated costs shown in Table 2, that is, the Meigs County and the Marshalltown plants, are the two most recent estimates, having been released in the fall of 2008. The other estimates are older.
- Consumers Energy Company in Michigan has announced that the estimated cost for its proposed Karn-Weadock plant has increased above 2,765 $/kW but will not release a new estimate until later in 2009.
- The Big Stone II construction cost estimate is almost 3 years old. The plant's estimated cost can be expected to rise significantly when a new estimate is released.
- The builder of the Turk Plant, SWEPCO, has said that it already has purchased the equipment and many of the materials for the plant – therefore, its cost is not expected to increase as much as the costs of plants that are not as far advanced in the contract and

27 At pages 14-15.

> purchasing process, such as Pee Dee River. Even so, the cost of the proposed Turk Plant has escalated significantly in the past 18 months.

There are of course no guarantees that the estimated costs of any of the coal plants listed in Table 2 will not continue to increase as a result of the same worldwide competition for power plant design and construction resources, equipment and commodities that has fueled the recent surge in power plant construction costs. For example, a 15 percent increase in the construction cost of Kansas City Power & Light Company's Iatan 2 coal plant was announced in the spring of 2008, nearly three years into construction. This shows that even plants that are under construction are not immune to cost increases.

In the past utilities were able to secure fixed-price contracts for their power plant construction projects. However, it is not possible to obtain fixed-price contracts for new power plant projects in the present environment. The reasons for this change in circumstances have been explained as follows by a witness for the Appalachian Power Company, a subsidiary of American Electric Power, in testimony before the West Virginia Public Service Commission:

> Company witness Renchek discusses in his testimony the rapid escalation of key commodity prices in the [Engineering, Procurement and Construction] industry. **In such a situation, no contractor is willing to assume this risk for a multi-year project.** Even if a contractor was willing to do so, its estimated price for the project would reflect this risk and the resulting price estimate would be much higher.[28] [Emphasis added.]

A fall 2007 assessment of AMP-Ohio's proposed coal-fired power plant similarly noted that the reviewing engineers from Burns and Roe Enterprises:

> agree that the fixed price turnkey EPC contract is a reasonable approach to executing the project. However, the viability of obtaining a contract of this type is not certain. The high cost of the EPC contract, in excess of $2 billion, significantly reduces the number of potential contractors even when teaming of engineers, constructors and equipment suppliers is taken into account. Recent experience on large U.S. coal projects indicates that the major EPC Contractors are not willing to fix price the entire project cost. This is the result of volatile costs for materials (alloy pipe, steel, copper, concrete) as well as a very tight construction labor market. When asked to fix the price, several EPC Contractors have commented that they are willing to do so, but the amount of money to be added to cover potential risks of a cost overrun would make the project uneconomical.[29]

It is true that the prices of the commodities used to build power plants have decreased since the middle of last year (2008). However, there has been no evidence that these recent decreases in commodity prices, and the current economic recession, actually have led to lower projected costs

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28 Ibid, at page 16, lines 16-20.

29 *Consulting Engineer's Report for the American Municipal Power Generating Station located in Meigs County, Ohio*, for the Division of Cleveland Public Power, Burns and Roe Enterprises, Inc., October 16, 2007, at page 11-1.

for long-term construction projects like new coal plants. Indeed, the Engineering News-Record, a respected industry source, recently has reported that both its Building Cost and Construction Cost Indices actually rose between March 2008 and March 2009, as did a power plant-specific construction cost index.[30]

In addition, even though there is now a worldwide economic slowdown, there still is great demand for power plant design and construction resources, equipment and commodities in nations like China and India. At the same time, a number of countries, most particularly the United States and China, have stated their intention to undertake very significant stimulus spending packages on infrastructure repairs and improvements – the Engineering News-Record has reported that these stimulus efforts will pump trillions of dollars into the world economy.[31] Such stimulus spending will increase the demand for the same resources and commodities that are used to build new coal-fired power plants and, therefore, over time can be expected to again lead to higher commodity prices and power plant construction costs. This will be especially true after the current economic downturn ends.

Given the recently estimated costs for other coal-fired power plants, Santee Cooper should rerun its resource planning analyses with a wider range of construction costs, including a high end of at least $3,500 per kW, without financing costs.

We are aware that Santee Cooper has already spent approximately $170 million on the Pee Dee River Project. These sunk costs should be reflected in the analyses and may be the basis for concluding that the ultimate cost of the Pee Dee River units will not be as high as some of the units listed in Table 1. However, when we asked Santee Cooper to provide some details on these expenditures, it refused to provide the requested information.

Finding 7. Circumstances have changed significantly since Santee Cooper decided to undertake the Pee Dee River coal plants, most particularly, the ongoing economic recession and financial crisis. For example, Santee Cooper's actual energy sales in 2008 were two percent <u>lower</u> than its sales in 2007 and eight percent <u>lower</u> than it had projected for the year. These changed circumstances are likely to reduce or defer the need for new generating capacity, such as the Pee Dee River coal plants, and provide more time for Santee Cooper and Central Electric Power Cooperative to adopt and implement aggressive energy efficiency programs. However, Santee Cooper has refused to reconsider its commitment to the Pee Dee River plants in light of these changed economic circumstances.

Santee Cooper used a load and energy sales forecast ("LF0701 with EE") in its 2008 resource planning modeling analyses that was developed in the late fall of 2007. This forecast projected steadily increasing peak loads and energy requirements throughout the period of 2008 through 2024. Santee Cooper's actual 2008 winter peak load of 5,650 MW, experienced in January 2008, was consistent with the peak load projected in late 2007; however, the brunt of the economic recession and financial crisis had not yet hit South Carolina.

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30 March 23, 2009, at pages 32, 37 and 38.

31 <u>Ibid</u>, at page 18.

Santee Cooper began to feel the impact of the economic recession later in the 2008 as its third and fourth quarter sales were 4.4 percent and 5 percent lower than its sales in the same quarters in 2007. Its actual energy sales for the whole year of 2008 were two percent lower than its energy sales during 2007 and approximately eight percent lower than had been projected (in late 2007) for 2008.

Other utilities in South Carolina also experienced declining sales in 2008. For example, Duke Energy Carolina's sales for the third quarter of the year were down 4.3 percent from the same period in 2007. Duke's sales for the entire year were down approximately 1.5 percent from 2007. Given that the economic forecast for South Carolina (and indeed the rest of the nation) for 2009 has been described as grim, it is reasonable to expect that energy sales, and most likely peak loads, will remain flat or even decline further in 2009 and, perhaps, in subsequent years as well.[32] Duke Energy Carolinas, for example, assumes that energy sales in 2009 will not increase from 2008 levels. Jim Rogers, Chairman and CEO of Duke Energy also has said that his customers' reduced consumption reflected more than just the economic recession: "Something fundamental is going on here."[33]

The recent declines in energy sales raise several critical questions for Santee Cooper's resource plans:

- Are the declines in sales merely the result of the economic recession or are there longer-term factors at work?
- When the economy recovers, will Santee Cooper's sales and loads grow at the rates that the Authority projected back in 2007 and will they recover the expected growth that was lost during the recession? For example, will Santee Cooper achieve the 32,000 GWH of energy sales that it previously forecast for 2013 in that year, or one, two, five or more years later?
- What is now Santee Cooper's projected need for new capacity given the reduced sales experienced in 2008 and the likely extended economic recession/slowdown and financial crisis?

In fact, there is evidence that fundamental changes are occurring in Santee Cooper's service area as well. Research conducted by the Coastal Conservation League and presented in Table 3, below, shows that housing starts in Horry County, South Carolina, have dropped quite considerably between 2006 and 2008. This decrease in building permits is likely to affect Santee Cooper's long-term energy sales and peak load growth due to the fact that with fewer people moving into the area, residential demand for electricity can be expected to grow at a slower rate.

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32 Indeed, many economists, including some in the Federal Reserve Bank, believe that the current recession could remain deep for a number of years with a very slow recovery. For example, see the minutes of the January 27, 2009 meeting of the Federal Open Market Committee.

33 *Surprise Drop in Power Use Delivers Jolt to Utilities*, The Wall Street Journal, November 21, 2008.

Table 3. Number of housing starts in Horry County between 2006 and 2008.

	2006	2007	2008	% Change 2006-2008
Single-Family	4129	2650	1359	-67.09%
Single-Family, Attached	667	249	112	-83.21%
(Two) Attached Dwelling Unit	137	88	29	-78.83%
Three- and Four-Family Building	122	6	6	-95.08%

The Authority's declining energy sales between 2007 and 2008 and the reasonable expectation that sales will decline further or, at best, remain flat, in 2009 and perhaps farther into the future, constitute significantly changed circumstances that require Santee Cooper to re-examine its proposed resource plan. This is especially true given the decline in building permits in Horry County.

As part of our investigation, Synapse asked Santee Cooper a number of questions related to possible revisions in its energy sales and/or load forecasts due to actual 2008 loads, sales and the current economic recession. Unfortunately, other than providing its actual 2008 peak load and energy sales, Santee Cooper explicitly refused to provide any of the important information requested in the following questions:

1. Load forecasts: What impact does Santee Cooper currently see the economic slowdown will have on energy sales and loads over the next year or two and over the long term? Has Santee Cooper prepared revised energy and load forecasts since last spring? If so, what are these new forecasts and do they reflect the current economic slowdown? What has been Santee Cooper's historical industrial load growth (e.g. over the past 10 years?)

2. What assessments have been made regarding the Technical Potential, Achievable Potential, and the Cost Effective Potential for Industrial Customers since the fall of 2007?

3. Have Santee Cooper and/or Central developed new forecasts since the forecast designated as "w/EE LF0701?" If yes, what are those new forecasts and are they memorialized in any documents or reports? If yes, please provide the new load and/or energy sales forecast.

4. Has Santee Cooper or Central assessed the impact of their current economic recession on their load and energy sales forecasts? If yes, what were the results of those assessments and are they memorialized in any documents or reports? If yes, please provide the new load and/or energy sales forecast.

Although Santee Cooper refused to answer this request, it has recently provided a load and sales forecast that is dated October 2008. However, it does not appear that this forecast reflects the impact of the current recession and financial crisis. In fact, although the forecast says that demand and energy sales were reduced due to increased lighting standards based on the Energy Independence Security Act of 2007, the near term energy sales in this forecast appear to be about the same as the energy sales projections presented in the late 2007 forecast that was used in Santee Cooper's 2008 resource planning analyses. Projected longer term sales are slightly (2-3 percent) lower, as are projected peak demands.

However, there is no evidence that this October 2008 forecast reflects the actual decline in sales experienced in 2008 or the ongoing recession and financial crisis. In fact, the energy sales projected for 2008 in this forecast were almost 11 percent higher than Santee Cooper's actual sales for the year. Santee Cooper also continues to refuse to provide any load and/or sales forecast prepared since October 2008 or that reflects the impact of the recession and financial crisis.

Santee Cooper has said that it will not start to re-examine its resource plan until the end of 2009 and that it remains committed to its proposed coal power plants. That is imprudent. The declines in energy sales already experienced and the likelihood that further declines in energy sales and loads will occur, can be expected to reduce or delay the need for the capacity and energy from one or both of the proposed Pee Dee River coal-fired units, allowing additional time for Santee Cooper and Central Electric Power Cooperative ("Central") to adopt and implement aggressive energy efficiency measures that can eliminate or defer the need for more expensive coal power plants.

Finding 8. Santee Cooper used natural gas prices in its planning analyses that were inflated due to the unsupported assumption that adoption of any federal greenhouse gas regulations would significantly increase natural gas prices. This biased the planning analyses against natural gas fired plants and in favor of the coal alternative.

It is possible that natural gas demand could be higher due to CO_2 emission regulations and, as a result, natural gas prices could be expected to be somewhat higher than otherwise would be the case. However, the effect is very complicated and will depend on a number of factors such as: how much new natural gas capacity is built as a result of the higher coal-plant operating costs due to the CO_2 emission allowance prices; how much additional energy efficiency and renewable alternatives are added to the U.S. system; the levels and prices of any incremental natural gas imports or sources developed in the U.S.; and changes in electric system dispatch. Indeed, depending on future circumstances there may be some periods in which the prices of natural gas may be lower as a result of CO_2 regulations. Thus it is very difficult to determine, at this time, the amount by which natural gas prices might change due to CO_2 emission regulations.

Instead of looking at the results of the publicly available modeling analyses that have studied the impact of greenhouse gas regulation on natural gas prices or assuming a range of possible natural gas changes that reflect this uncertainty, Santee Cooper merely assumed in its 2008 planning analyses that the adoption of even relatively low CO_2 prices would lead to a substantial (i.e., approximately 15 percent) increase in natural gas prices. This assumption of a significant increase in the price of natural gas in those scenarios with CO_2 prices biased the analyses against any alternatives that include natural gas-fired generation and in favor of the coal alternatives.

As noted earlier in this Report, Synapse has reviewed the results of the modeling analyses that evaluate the CO_2 emissions allowance prices and other impacts of greenhouse gas regulatory legislation. As part of this work, we have looked at the publicly available data on the impact that CO_2 regulatory legislation could have on natural gas prices.

Figure 9, below, shows the levelized percentage changes in natural gas prices (i.e., increases or decreases from the base case with no regulation of greenhouse gas emissions) in scenarios reflecting the major climate change proposals in the U.S. and the levelized CO_2 prices in those scenarios. The data presented in Figure 9 has been developed from the results of modeling by the Joint Program at the Massachusetts Institute of Technology ("MIT") on the Science and

Policy of Global Change, the U.S. EPA, and the Energy Information Administration ("EIA") of the Department of Energy , and cover multiple climate change proposals in the 110th U.S. Congress: Senate Bill S.280 (the McCain-Lieberman bill), Senate Bill S.1766 (the Bingaman-Specter bill) and Senate Bill S.2191 (the Lieberman-Warner bill).

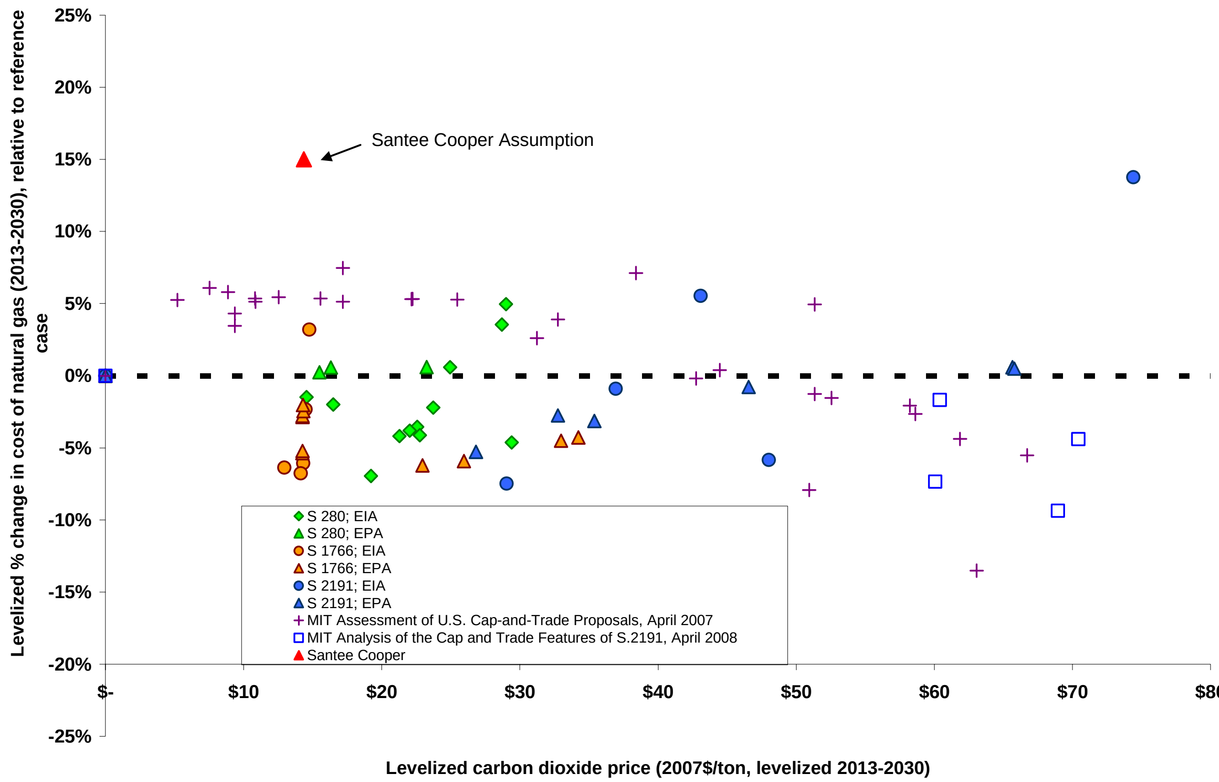

Figure 9. The relationship between CO_2 emissions allowance prices and natural gas prices.

As shown clearly in Figure 9, Santee Cooper has assumed that there would be a very significant increase in the levelized price of natural gas at a relatively low levelized CO_2 price. This assumption is not supported by the results of the independent modeling analyses of carbon dioxide regulation. Instead, as can be seen from Figure 9, in all but one of the scenarios studied, federal regulation of greenhouse gas emissions would have a much smaller impact on natural gas prices than Santee Cooper has assumed – and that single scenario featured a levelized CO_2 price of approximately $75/ton, a far higher price than Santee Cooper has assumed in its planning analyses. In fact, in some scenarios, the models forecast that the adoption of greenhouse gas regulation might lead to lower natural gas prices as natural gas usage and demand declined due to its greenhouse gas emissions. Thus, there is no evidence to support Santee Cooper's assumption in its 2008 resource planning analyses that federal regulation of greenhouse gas emissions would inevitably lead to substantial increases in the price of natural gas, particularly at relatively low CO_2 prices.

Finding 9. Santee Cooper did not allow its computer model, EGEAS, to add more energy efficiency and/or renewable resources even if those options were less expensive than building new coal, gas and nuclear capacity.

When performing its EGEAS modeling, Santee Cooper essentially restricted the choices in its 2008 resource planning analyses to a limited range of fossil and nuclear alternatives. The amounts of demand side and renewable resources assumed in each scenario were pre-set so that the model could not select additional amounts of these resources when the costs of fossil or nuclear resources increased – either due to higher construction costs or the addition of a price for CO_2 emissions.

A better method, and one that other utilities and Synapse have used, is to allow the model to select the optimal amounts of demand side and renewable resources in each scenario based on their assumed costs and availability. In this way, the model can produce a lowest cost plan that will add more demand side and renewable resources when the costs of the fossil and nuclear alternatives rise. However, there seems to be no evidence that Santee Cooper allowed the EGEAS model to do this in its 2008 resource planning analyses. The Company's modeling output files show differences in the timing of the addition of the same fossil units, rather than showing a mix of fossil, renewable, and demand side resources. Consequently, Santee Cooper has not shown that its preferred generation plan, which includes one or both of the Pee Dee River coal-fired units, represents the lowest cost plan for its customers.

Finding 10. Santee Cooper ignored available cost effective energy efficiency potential. In fact, studies prepared for Santee Cooper and Central Electric Power Cooperative show that there is significantly more achievable cost effective energy efficiency potential than the relatively modest amounts assumed by Santee Cooper in its 2008 resource planning analyses.

GDS Associates, Inc., prepared an "Electric Energy Efficiency Potential Study" for Santee Cooper, dated January 2008. Although GDS noted a number of areas where information was not sufficient or did not exist,[34] the Study found significant potential for achievable cost effective energy efficiency among the residential and commercial customers served by Santee Cooper.

In fact, using the Total Resource Cost Test, GDS found that incorporating the achievable cost effective potential for energy efficiency could reduce annual electric use by 1.7 percent to 8.8 percent by 2017. See Table 4, below. GDS also found that the net present value savings to Santee Cooper and/or its customers from identified energy efficiency measures range from $58 million to $291 million, depending on the long-term market penetration assumption and given the assumed financial incentive and program administration cost level.

[34] At page 11.

Table 4. Summary of achievable cost effective potential for three market penetration scenarios.

	Achievable Cost Effective Potential MWh Savings by 2017 - 20% Market Penetration Scenario	2017 MWh Sales Forecast for this Sector	Percent of Sector 2017 MWh Sales Forecast
Residential	45,020	2,185,047	2.1%
Commercial	153,169	2,884,066	5.3%
Industrial	30,394	8,105,000	0.4%
Total	228,583	13,174,113	1.7%
	Achievable Cost Effective Potential MWh Savings by 2017 - 50% Market Penetration Scenario	2017 MWh Sales Forecast for this Sector	Percent of Sector 2017 MWh Sales Forecast
Residential	208,965	2,185,047	9.6%
Commercial	382,923	2,884,066	13.3%
Industrial	75,984	8,105,000	0.9%
Total	667,872	13,174,113	5.1%
	Achievable Cost Effective Potential MWh Savings by 2017 - 80% Market Penetration Scenario	2017 MWh Sales Forecast for this Sector	Percent of Sector 2017 MWh Sales Forecast
Residential	425,151	2,185,047	19.5%
Commercial	612,676	2,884,066	21.2%
Industrial	121,575	8,105,000	1.5%
Total	1,159,402	13,174,113	8.8%

GDS further concluded that it was reasonable to expect that Santee Cooper could save ten percent of the projected 2017 peak loads through energy efficiency.[35] GDS concluded it could achieve these load savings if it performed at a level comparable to the average of the top twenty energy efficiency utilities in the United States.

GDS found that Santee Cooper could achieve market penetration rates for energy efficiency programs of between 20 percent and 80 percent of its affected customers in the long-term and presented persuasive evidence that these long-term market penetration rates can be achieved. This evidence included:

- Examples of U.S. Efficiency Programs with high market penetration rates.
- Efficiency expert input on the maximum achievable penetration rates.
- Survey responses from electric utilities in the Southeast regarding energy efficiency program market penetration.[36]

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35 At page 19.

36 At pages 28 to 31.

- A number of lessons learned from America's leading energy efficiency programs.[37]

In addition, GDS presented a number of what it termed "Non-energy benefits of energy efficiency programs." These non-energy benefits included:

- Reliability – due to the distributed nature of energy efficiency investments.
- Comfort in homes and offices.
- Increased competitiveness of businesses.
- Reduced operating costs that translate to increased productivity and jobs.
- Reduced electric sector emissions due to lower power demand.[38]

Although GDS presented a range of market penetration rates of between 20 and 80 percent, and calculated that energy efficiency could potentially produce savings for Santee Cooper and/or its customers of between $58 million to $291 million, Santee Cooper assumed a much lower market penetration rate for its 2008 resource planning analyses. In fact, Santee Cooper's work papers show that it assumed that it would achieve only one-half of the low end of the savings found to be achievable and cost effective by GDS.

Table 5. Achievable cost effective potential savings.

	Achievable Cost Effective Potential MWh Savings by 2017
GDS 20% Market Penetration Scenario	228,583
GDS 50% Market Penetration Scenario	667,872
GDS 80% Market Penetration Scenario	1,159,402
Used by Santee Cooper in 2008 Resource Planning Scenarios	120,000

Also, where GDS had assumed that Santee Cooper could reduce its 2017 peak loads by approximately 10 percent through implementation of well-designed and aggressive energy efficiency programs, Santee Cooper assumed that its summer 2017 peak load would be reduced by only 30 MW (or about 3 percent) and its winter 2017 peak load would be reduced by only 40 MW (or only about 3-4 percent).

Moreover, it is quite possible that GDS underestimated the potential amounts of achievable cost effective energy efficiency in Santee Cooper's service area. We asked Santee Cooper several times for the avoided costs used by GDS.[39] However, so far the Authority has not provided the requested avoided costs. If the avoided costs used by GDS in its assessment are below the cost of supply side alternatives such as Pee Dee River, there may be more achievable cost effective energy efficiency in Santee Cooper's service area than is shown in the GDS study.

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37 At pages 31 and 32.

38 At pages 11 and 12

39 The GDS Study merely says that it used avoided costs that were provided by Santee Cooper.

GDS also prepared an assessment for Central Electric Power Cooperative in the fall of 2007 of the potential for achievable cost effective energy efficiency savings.[40] Tables 6.A and 6.B below present the results of this assessment.

Table 6.A. Achievable cost effective energy sales savings by 2017.

	Savings (GWh)
20% Market Penetration Scenario	800
50% Market Penetration Scenario	2,278
80% Market Penetration Scenario	4,008
Used by Santee Cooper in 2008 Resource Planning Analyses	1,065

Table 6.B. Achievable cost effective peak load savings by 2017.

	Savings in Winter Peak (MW)	Savings in Summer Peak (MW)	Savings in Winter Peak (%)	Savings in Summer Peak (%)
20% Market Penetration	194	186	4.1	4.2
50% Market Penetration	565	522	11.9	11.8
80% Market Penetration	980	916	20.6	20.6
Used by Santee Cooper in 2008 Resource Planning Analyses	452	256	9.5	5.8

GDS concluded that the net present value savings (in 2008 dollars) from achievable cost effective energy efficiency measures ranged between $391 million (20% market penetration) to $1.1 billion (50% market penetration) to $1.8 billion (80% market penetration).

Despite these potential savings, Santee Cooper assumed in its 2008 resource planning analyses that Central would only achieve savings in 2017 near the low end of the range identified by GDS (1,065 GWh) with relatively modest savings of 256 MW of summer peak loads and 452 MW in winter peak loads. Clearly, the results of the GDS assessment suggest that Central could achieve significantly greater savings in energy sales and peak loads, with substantial cost savings for ratepayers.

As with Santee Cooper, the GDS assessment for Central does not indicate the avoided costs used in the study. So it is possible that the avoided costs used by GDS in the Central study were lower than the costs of the supply side alternatives used in Santee Cooper's resource planning analyses. Consequently, it is possible there is more achievable cost effective energy efficiency in Central's service area than is shown in the GDS Study.

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40 *Energy Efficiency Potential Study for Central Electric Power Cooperative, Inc,* prepared by GDS Associates, Inc., Final Report, Updated, September 21, 2007.

Finding 11. Santee Cooper's proposed generation resource plan entails excessive uncertainty and risk for ratepayers.

Risk and uncertainty are inherent in all enterprises. However, Santee Cooper's preferred generation resource plan with its very heavy reliance on billions of dollars of investments in new coal and new nuclear power plants is fraught with a large number of significant uncertainties and risks for ratepayers:

- Coal and nuclear power plant construction costs and schedules.
- The availability of financing in capital markets and financing costs.
- Uncertainty whether projected loads (internal and off-system) will materialize.
- the greenhouse gas emissions reductions that ultimately will be required as a result of federal, regional or state action, and the cost of compliance (through allowance prices) with likely future regulations.
- whether post-combustion carbon capture and sequestration will prove to be technically and economically viable as a retrofit for pulverized coal plants like the proposed Pee Dee River Units.
- the costs of post-combustion carbon capture and sequestration for pulverized coal plants, if it does prove technically viable.
- whether the federal government will adopt a national Renewable Portfolio Standard.
- future coal prices and whether there will be supply disruptions that will affect plant performance and fuel prices.
- whether the regulations for current criteria pollutants (such as NO_x, SO_2 and mercury) will be made more stringent.

Finding 12. More than 80 proposed coal-fired power plants have been cancelled or delayed in recent years by public and investor-owned utilities or have been rejected by state regulatory commissions or agencies due, in large part, to uncertainties regarding construction costs and future CO_2 emissions costs.

Public and investor-owned utilities and state regulatory commissions and officials have recognized the risks associated with new coal plant investments under current circumstances and have chosen to cancel, delay or reject more than 80 proposed coal-fired power plants.

In fact, more than twenty five proposed coal-fired plants have been cancelled in the three years since 2006. More than forty others have been delayed. Although some proposed plants have been approved, state regulatory Commissions in North Carolina, Florida, Virginia, Oklahoma, Washington State, Oregon, and Wisconsin have rejected proposed power plants. The Secretary of Health and Environment of the State of Kansas also has rejected permits for two 700 MW coal-fired power plants.

Regulators have cited several reasons for cancelling new coal construction. For example, the July 2007 decision of the Florida Public Service Commission denying approval for the 1,960

MW Glades Power Project was based on concern over the uncertainties of plant construction costs, coal and natural gas prices, and future environmental costs, including carbon allowance costs.[41]

In April of 2008, the Virginia State Corporation Commission rejected a proposed coal plant citing uncertainties of costs, technology, and unknown federal mandates.[42] The Commission concluded that "… [Appalachian Power Company] has no fixed price contract for any appreciable portion of the total construction costs; there are no meaningful price or performance guarantees or controls for this project at this time. This represents an extraordinary risk that we cannot allow the ratepayers of Virginia in [Appalachian Power Company's] service territory to assume."[43]

The Commission also noted the uncertainties surrounding federal regulation of carbon emissions, and carbon capture and sequestration technology and costs, and observed that the Company was asking for a "blank check."[44] On this basis, the Commission concluded that "We cannot ask Virginia ratepayers to bear the enormous costs – and potentially huge costs – of these uncertainties in the context of the specific Application before us."[45]

Then, in November 2008, the Public Service Commission of Wisconsin rejected a coal-fired power plant that had been proposed by Wisconsin Power & Light. The Commission decided that the $1.26 billion project was too costly when weighing it against other alternatives such as natural gas generation and the possibility of purchasing power from existing sources.[46] The Commission also said that "Concerns over construction costs and uncertainty over the costs of complying with future possible carbon dioxide regulations were all contributing factors to the denial."[47]

At the same time, a large number of investor-owned and public power utilities have cancelled or delayed new coal-fired generating facilities. For example:

- Westar Energy announced in December 2006 that it was deferring site selection for a new 600 MW coal-fired power plant due to significant increases in the facility's estimated capital cost of 20 to 40 percent, over just 18 months.

  This prompted Westar's Chief Executive to warn: "When equipment and construction cost estimates grow by $200 million to $400 million in 18 months, it's necessary to

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41 Order No. PSC-07-0557-FOF-EI, Docket No. 070098-EI, July 2, 2007.

42 Final Order in Case No. PUE-2007-00068, April 14, 2008. Available at http://scc.virginia.gov/newsrel/e_apfrate_08.aspx.

43 Id, at page 5.

44 Id, at page 10.

45 Id, at page 10.

46 The estimated cost of the proposed coal plant was $1.26 billion for a 326 MW facility.

47 *PSC Rejects Wisconsin Power & Light's Proposed Coal Plant*, issued by the Public Service Commission of Wisconsin on November 11, 2008.

proceed with caution."[48] As a result, Westar Energy suspended site selection for the coal-plant and is considering other options, including building a natural gas plant, to meet growing electricity demand. The company also explained that:

> most major engineering firms and equipment manufacturers of coal-fueled power plant equipment are at full production capacity and yet are not indicating any plans to significantly increase their production capability. As a result, fewer manufacturers and suppliers are bidding on new projects and equipment prices have escalated and become unpredictable.[49]

- Tenaska Energy cancelled plans to build a coal-fired power plant in Oklahoma in July 2007 because of rising steel and construction prices. The Company's general manager of business development explained that:

> ... coal prices have gone up "dramatically" since Tenaska started planning the project more than a year ago.
>
> And coal plants are largely built with steel, so there's the cost of the unit that we would build has gone up a lot… At one point in our development, we had some of the steel and equipment at some very attractive prices and that equipment all of a sudden was not available.
>
> We went immediately trying to buy additional equipment and the pricing was so high, we looked at the price of the power that would be produced because of those higher prices and equipment and it just wouldn't be a prudent business decision to build it.[50]

- The publicly-owned Great River Energy Generation & Transmission Cooperative ("GRE") in Minnesota announced in September 2007 its withdrawal from the proposed Big Stone II Project. According to GRE, four factors contributed most prominently to the decision to withdraw, including uncertainty about changes in environmental requirements and new technology and the fact that "The cost of Big Stone II has increased due to inflation and project delays."[51]

- Similarly, in the spring of 2008, Associated Electric Cooperative, Inc., the wholesale power supplier for 57 electric cooperatives in Missouri, Southeast Iowa, and northeast Oklahoma, delayed its plans to build the Norborne 660 MW coal-fired power plant due to increasing costs and other uncertainties. According to AECI:

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48 Available at http://www.westarenergy.com/corp_com/corpcomm.nsf/F6BE1277A768F0E4862572690055581C/$file/122806%20coal%20plant%20final2.pdf.

49 Id.

50 Available at www.swtimes.com/articles/2007/07/09/news/news02.prt.

51 See www.greatriverenergy.com/press/news/091707_big_stone_ii.html.

> The Norborne project costs have significantly increased in less than three years and are now estimated at $2 billion due to worldwide demand for engineering, skilled labor, equipment and materials.
>
> The U.S. Department of Agriculture Rural Utilities Service, a traditional funding source for rural electric cooperatives, is currently unable to finance baseload generation for cooperatives. Although AECI's AA credit rating is one of the strongest ratings among all electric utilities nationally, seeking private lending would further increase project costs.[52]
>
> There also is increasing uncertainty in the regulatory environment, and Congress continues to debate the environmental and economic impact of reducing greenhouse gas emissions, making the cost of reducing carbon dioxide from power plants unknown.[53]

At the same time, AECI noted that it would continue to look at energy efficiency initiatives, natural gas, renewable and nuclear resources to address future generation needs.

Current circumstances are causing more utilities to reconsider their earlier decisions to build coal plants. For example:

- In February 2009, NV Energy, Inc. announced the postponement, due to increasing environmental and economic uncertainties, of its plans to construct a coal-fired power plant in eastern Nevada. The company has said that it will not proceed with construction of the coal plant until the technologies that will capture and store greenhouse gasses are commercially feasible, which it believes is not likely before the end of the next decade.[54]
- Then in early March 2009, Alliant Energy cancelled its plan to build a proposed 649 MW coal-fired plant in Marshalltown, Iowa. According to Alliant, the decision to cancel the project was based on a combination of factors including "the current economic and financial climate; increasing environmental, legislative and regulatory uncertainty regarding regulation of future greenhouse gas emissions" and the terms placed on the proposed power plant by regulators.[55]
- On April 9, 2009, the Board of Tri-State Generation & Transmission, which supplies wholesale power to 18 electric distribution cooperatives in Colorado and 26 in Wyoming,

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52 The Rural Utilities Service of the U.S. Department of Agriculture announced in early March 2008 that it was suspending the program through which it makes loans to rural cooperatives to build new coal-fired power plants. In a letter to Congress, the Administrator of Utility Programs for the Department of Agriculture indicated that loans for new base load generation plants would not be made until the RUS and the federal Office of Management and Budget can develop a subsidy rate to reflect the risks associated with the construction of such plants.

53 http://www.aeci.org/NR20080303.aspx.

54 NV Energy Press Release, dated February 9, 2009.

55 http://www.alliantenergy.com/Newsroom/RecentPressReleases/023120.

New Mexico and Nebraska, voted to shift its focus from building 2 or 3 proposed coal plants to natural gas, renewable energy and efficiency.[56]

- In late 2007 the Louisiana Public Service Commission approved Entergy Louisiana's proposal for the Little Gypsy Repowering Project that would convert an existing natural gas-fired plant into one that burns coal. However, in March 2009, the Louisiana Commission ordered the company to suspend on-going project activities and to demonstrate that the project was still viable.[57] The estimated cost of the project had increased up from an initial $910 million to $1.76 billion.

  In response, Entergy Louisiana has requested a three year extension for the suspension of on-going project activities based on its conclusion that "Given current forecasts of natural gas prices, it now appears that the [combined cycle gas turbine] alternative may be more economic than the [coal-fired] Repowering Project across a range of assumptions."[58] Entergy also explained in detail the changed circumstances that had led it to the conclusion that project activities should be suspended:

  > Perhaps the largest change that has affected the Project economics is the sharp decline in natural gas prices, both current prices and those forecasted for the longer-term. The prices have declined in large part as a result of a structural change in the natural gas market driven largely by the increased production of domestic gas through unconventional technologies. The decline in the long-term price of natural gas has caused a shift in the economics of the Repowering Project, with the Project currently – and for the first time – projected to have a negative value over a wide range of outcomes as compared to a gas-fired (CCGT) resource.
  >
  > The proposed changes in various energy policies by the Obama administration also could have significant effects on the future economics of the Repowering Project. While this administration has only been in office since mid-January, it is becoming more likely that a Renewable Portfolio Standard ("RPS") soon could be implemented. An RPS will require utilities such as [Entergy Louisiana] to incorporate various new technologies into their long-term resource portfolios, including the potential for baseload resources such as biomass facilities and various other intermittent resources such as wind or solar powered generation. The effects of an RPS could mandate that up to 25% of a utility's total energy requirements be provided by renewable resources….

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56 "Tri-State changes course, says it will develop gas, renewables over coal," Denver Business Journal, April 11, 2009. Available at http://www.bizjournals.com/denver/stories/2009/04/06/daily99.html.

57 http://blog.nola.com/tpmoney/2009/03/psc_orders_entergy_louisiana_t.html

58 *Report and Recommendation Concerning the Little Gypsy Unit 3 Repowering Project*, submitted y Entergy Louisiana on April 1, 2009, at page 12.

> With regard to CO_2 legislation, while the Commission and the Company certainly anticipated that CO_2 regulation would be in place over the life of this Project and incorporated CO_2 compliance costs into its evaluation, there seems to be an emerging momentum to implement CO_2 legislation during the next one to two years. If this occurs, it will allow the Company to gain much greater certainty regarding the cost of compliance with CO_2 legislation and how it will affect the Project economics. CO_2 costs, as the Company has always made clear, are an important factor in the Project economics, and while the possible implementation of CO_2 legislation is not the reason to delay the Project, one of the benefits of the longer-term delay will be greater level of certainty regarding this cost.[59]

These are only a few examples of the many public and investor-owned utilities, as well as utility regulators, that have decided in recent years to cancel or significantly delay proposed coal-fired power plants.

Conclusion.

In light of the significant risks associated with Santee Cooper's resource plan that includes the building of two Pee Dee River coal-fired power units, it would be better to adopt a resource plan that allows for (1) the postponement of decisions concerning large capital expenditures for new coal-fired power plants and (2) the flexibility to modify course as circumstances change. Adoption of a plan that maximizes Santee Cooper's near-term commitment to capital-intensive coal and nuclear power plant investments is the wrong choice in today's uncertain economic and financial conditions. At a minimum, Santee Cooper should re-do its resource planning analyses to incorporate the following:

- Peak load and energy sales forecasts that reflect actual 2008 experience and current economic projections.
- A higher range of possible coal construction costs.
- A wider and higher range of potential CO_2 emissions costs.
- Open-ended treatment of cost effective energy efficiency rather than establishing a pre-set efficiency resource limit. At a minimum, the model should incorporate the potentials for energy efficiency identified by GDS for Santee Cooper and Central Electric Cooperative.
- Sensitivity scenarios that include the potential for adoption of a state or federal Renewable Portfolio Standard.

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[59] Ibid, at pages 6-8.

Appendix A: List of Analysis of Proposed Federal Greenhouse Gas Legislation

The Energy Information Administration of the U.S. Department of Energy's ("EIA") assessment of the *Energy Market and Economic Impacts of S. 280, the Climate Stewardship and Innovation Act of 2007* (July 2007). Available at http://www.eia.doe.gov/oiaf/servicerpt/csia/pdf/sroiaf(2007)04.pdf.

The October 2007 Supplement to the EIA's assessment of the *Energy Market and Economic Impacts of S. 280, the Climate Stewardship and Innovation Act of 2007*. Available at http://www.eia.doe.gov/oiaf/servicerpt/biv/pdf/s280_1007.pdf

The EIA's assessment of the *Energy Market and Economic Impacts of S. 1766, the Low Carbon Economy Act of 2007* (January 2008). Available at http://www.eia.doe.gov/oiaf/servicerpt/lcea/pdf/sroiaf(2007)06.pdf

The EIA's assessment of the *Energy Market and Economic Impacts of S. 2191, the Lieberman-Warner Climate Security Act of 2007* (April 2008). Available at http://www.eia.doe.gov/oiaf/servicerpt/s2191/pdf/sroiaf(2008)01.pdf.

The U.S. Environmental Protection Agency's ("EPA") *Analysis of the Climate Stewardship and Innovation Act of 2007 – S. 280 in 110th Congress* (July 2007). Available at http://www.epa.gov/climatechange/economics/economicanalyses.html.

The EPA's *Analysis of the Low Carbon Economy Act of 2007 – S. 1766 in 110th Congress* (January 2008). Available at http://www.epa.gov/climatechange/economics/economicanalyses.html.

The EPA's *Analysis of the Lieberman-Warner Climate Security Act of 2008 – S. 2191 in 110th Congress* (March 2008). Available at http://www.epa.gov/climatechange/economics/economicanalyses.html.

Assessment of U.S. Cap-and-Trade Proposals by the Joint Program at the Massachusetts Institute of Technology ("MIT") on the Science and Policy of Global Change (April 2007). Available at http://web.mit.edu/globalchange/www/MITJPSPGC_Rpt146.pdf.

Analysis of the Cap and Trade Features of the Lieberman-Warner Climate Security Act – S. 2191 by the Joint Program at MIT on the Science and Policy of Global Change (April 2008). Available at http://mit.edu/globalchange/www/MITJPSPGC_Rpt146_AppendixD.pdf.

The Lieberman-Warner America's Climate Security Act: A Preliminary Assessment of Potential Economic Impacts, prepared by the Nicholas Institute for Environmental Policy Solutions, Duke University and RTI International (October 2007). Available at http://www.nicholas.duke.edu/institute/econsummary.pdf.

U.S. Technology Choices, Costs and Opportunities under the Lieberman-Warner Climate Security Act: Assessing Compliance Pathways, prepared by the International Resources Group for the Natural Resources Defense Council (May 2008). Available at http://docs.nrdc.org/globalwarming/glo_08051401A.pdf.

The Lieberman-Warner Climate Security Act – S. 2191, Modeling Results from the National Energy Modeling System – Preliminary Results, Clean Air Task Force (January 2008). Available at http://lieberman.senate.gov/documents/catflwcsa.pdf.

Economic Analysis of the Lieberman-Warner Climate Security Act of 2007 Using CRA's MRN-NEEM Model, CRA International, April 2008. Available at http://www.nma.org/pdf/040808_crai_presentation.pdf.

Analysis of the Lieberman-Warner Climate Security Act (S. 2191) using the National Energy Modeling System (NEMS/ACCF/NAM), a report by the American Council for Capital Formation and the National Association of Manufacturers, NMA, March 2008. Available at http://www.accf.org/pdf/NAM/fullstudy031208.pdf.