BEFORE THE
LOUISIANA PUBLIC SERVICE COMMISSION

APPLICATION OF ENTERGY LOUISIANA, LLC, FOR APPROVAL TO REPOWER THE LITTLE GYPSY UNIT 3 ELECTRIC GENERATING FACILITY AND FOR AUTHORITY TO COMMENCE CONSTRUCTION AND FOR CERTAIN COST PROTECTION AND COST RECOVERY	)	**DOCKET NO. U-30192**

DIRECT TESTIMONY OF DAVID A. SCHLISSEL ON BEHALF OF THE ALLIANCE FOR AFFORDABLE ENERGY, LOUISIANA ENVIRONMENTAL ACTION NETWORK, SIERRA CLUB, GULF RESTORATION NETWORK, SAL K. GIARDINI, JR., EARLENE ROTH, AND WARREN PIERRE

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SEPTEMBER 14, 2007

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1. Introduction

Q. What is your name, position and business address?

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

Q. Please describe Synapse Energy Economics.

A. Synapse Energy Economics ("Synapse") is a research and consulting firm specializing in energy and environmental issues, including electric generation, transmission and distribution system reliability, market power, electricity market prices, stranded costs, efficiency, renewable energy, environmental quality, and nuclear power.

Synapse's clients include state consumer advocates, public utilities commission staff, attorneys general, environmental organizations, federal government and utilities. A complete description of Synapse is available at our website, www.synapse-energy.com.

Q. Please summarize your educational background and recent work experience.

A. I graduated from the Massachusetts Institute of Technology in 1968 with a Bachelor of Science Degree in Engineering. In 1969, I received a Master of Science Degree in Engineering from Stanford University. In 1973, I received a Law Degree from Stanford University. In addition, I studied nuclear engineering at the Massachusetts Institute of Technology during the years 1983-1986.

Since 1983 I have been retained by governmental bodies, publicly-owned utilities, and private organizations in 28 states to prepare expert testimony and analyses on engineering and economic issues related to electric utilities. My recent clients have included the New Mexico Public Regulation Commission, the General Staff of the Arkansas Public Service Commission, the Staff of the Arizona Corporation Commission, the U.S. Department of Justice, the Commonwealth of Massachusetts, the Attorneys General of the States of Massachusetts, Michigan,

New York, and Rhode Island, the General Electric Company, cities and towns in Connecticut, New York and Virginia, state consumer advocates, and national and local environmental organizations.

I have testified before state regulatory commissions in Arizona, New Jersey, Connecticut, Kansas, Texas, New Mexico, New York, Vermont, North Carolina, South Carolina, Maine, Illinois, Indiana, Ohio, Massachusetts, Missouri, Rhode Island, Wisconsin, Iowa, South Dakota, Georgia, Minnesota, Michigan, Florida and North Dakota and before an Atomic Safety & Licensing Board of the U.S. Nuclear Regulatory Commission.

A copy of my current resume is attached as Exhibit DAS-1.

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

A. I am testifying on behalf of the Alliance for Affordable Energy ("AAE"), Louisiana Environmental Gulf Network, Sierra Club, Gulf Restoration Network, Sal K. Giardini, Jr., Earlene Roth, and Warren Pierre.

Q. Have you testified previously before this Commission?

A. No.

Q. What is the purpose of your testimony?

A. Synapse was retained by the Alliance for Affordable Energy to evaluate the proposal by Entergy Louisiana, LLC ("Entergy Louisiana" or "the Company") to repower the Little Gypsy Unit 3 electric facility as a circulating fluid bed ("CFB") generating unit that would burn a mixture of petroleum coke (petcoke) and coal. This testimony presents the results of our analyses.

Q. Please summarize your conclusions.

A. My conclusions are as follows:

1. The Fundamental and PROSYM analyses presented by Entergy Louisiana to justify the Repowering Project as the lowest cost option reflect an unreasonably range of potential carbon dioxide (CO_2) emissions allowance

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costs. In particular, the "Reference Case" scenarios examined by the Company which assume $0/ton CO_2 prices (that is, no federal legislation regulating greenhouse gas emissions) are highly unrealistic and unlikely.

2. The Commission should rely on the Synapse forecasts of likely CO_2 emissions allowance prices when it considers the relative economics of the proposed Repowering Project.

3. The Fundamental and PROSYM analyses presented by Entergy Louisiana do not reflect a reasonable range of alternatives to the Repowering Project. For example, these studies do not reflect any demand side management or renewable resources as part of a portfolio of alternatives to the repowering of Little Gypsy Unit 3.

4. Given the experience of other power plant projects and the worldwide demand for power plant design and construction resources, commodities and labor, it is reasonable to expect that the cost of the Repowering Project will increase before the project is completed.

5. The results of the Company's Fundamental Analysis do not show that the Repowering Project would be the lower cost option under reasonable assumptions regarding future construction costs, CO_2 costs and natural gas prices. For example, the repowering of Little Gypsy Unit 3 as a CFB plant would be the higher cost option if the construction cost of the Repowering Project increases by another 10 or 20 percent even if the Company's unreasonably low forecasts of CO_2 prices are used.

6. The results of the PROSYM analysis suggest that the Fundamental Analysis significantly overstates the economic benefits of the Repowering Project.

7. Although Entergy Louisiana's PROSYM analysis shows a net present value benefit to the Repowering Project, that analysis unrealistically reflects $0/ton CO_2 prices. Even if the Company's unreasonably low base or high CO2 prices were reflected in the analysis, the Repowering Project would be the higher cost option.

8. Even though Entergy Louisiana's PROSYM analysis shows a net present value benefit to the Repowering Project during the years 2012 through 2036, the CCGT alternative would be the lower cost option, on a cumulative net present value basis, through the year 2031.

For these reasons, the Commission should reject Entergy Louisiana's request for approval to repowering Little Gypsy Unit 3 and for authority to commence construction and for certain cost protection and cost recovery.

Q. In general, are you in favor of the repowering of older, less efficient power plants?

A. Yes. I believe that the repowering of older generating facilities often can provide economic and environmental benefits. Unfortunately, that does not appear to be the case with Entergy Louisiana's proposed repowering of the Little Gypsy Unit 3 as a CFB coal-fired unit.

2. The Appropriate Carbon Dioxide Emission Allowance Prices To Use In Evaluating Proposed Electric Generating Projects

Q. How does Entergy Louisiana view the prospects for carbon regulation?

A. Entergy Louisiana witness Schott has testified that "The Company believes that future climate change legislation is possible, and based upon recent activity, increasingly probable."[1]

Q. Do you agree with this assessment?

A. I believe that it is not a question of "if" with regards to federal regulation of greenhouse gas emissions but rather a question of "when." In addition, we agree with Entergy Louisiana witness Schott that there are uncertainties as to the design and details of the CO_2 regulations that ultimately will be adopted and implemented.[2]

Q. What mandatory greenhouse gas emissions reductions programs have begun to be examined in the U.S. federal government?

A. To date, the U.S. government has not required greenhouse gas emission reductions. However, a number of legislative initiatives for mandatory emissions reduction proposals have been introduced in Congress. These proposals establish carbon dioxide emission trajectories below the projected business-as-usual emission trajectories, and they generally rely on market-based mechanisms (such

[1] Direct Testimony of Matthew J. Schott, Jr., at page 26, lines 13-14.
[2] Direct Testimony of Matthew J. Schott, Jr., at page 24, line 9, to page 25, line 4.

as cap and trade programs) for achieving the targets. The proposals also include various provisions to spur technology innovation, as well as details pertaining to offsets, allowance allocation, restrictions on allowance prices and other issues. Some of the federal proposals that would require greenhouse gas emission reductions that had been submitted in Congress are summarized in Table 1 below.[3]

Table 1. Summary of Mandatory Emissions Targets in Proposals Discussed in Congress[4]

Proposed National Policy	Title or Description	Year Proposed	Emission Targets	Sectors Covered
McCain Lieberman S.139	Climate Stewardship Act	2003	Cap at 2000 levels 2010-2015. Cap at 1990 levels beyond 2015.	Economy-wide, large emitting sources
McCain Lieberman SA 2028	Climate Stewardship Act	2003	Cap at 2000 levels	Economy-wide, large emitting sources
McCain Lieberman S 1151	Climate Stewardship and Innovation Act	2005	Cap at 2000 levels	Economy-wide, large emitting sources
National Commission on Energy Policy (basis for Bingaman-Domenici legislative work)	Greenhouse Gas Intensity Reduction Goals	2005	Reduce GHG intensity by 2.4%/yr 2010-2019 and by 2.8%/yr 2020-2025. Safety-valve on allowance price	Economy-wide, large emitting sources
Jeffords S. 150	Multi-pollutant legislation	2005	2.050 billion tons beginning 2010	Existing and new fossil-fuel fired electric generating plants > 15 MW
Carper S. 843	Clean Air Planning Act	2005	2006 levels (2.655 billion tons CO_2) starting in 2009, 2001 levels (2.454 billion tons CO_2) starting in 2013.	Existing and new fossil-fuel fired, nuclear, and renewable electric generating plants > 25 MW
Feinstein	Strong Economy and Climate Protection Act	2006	Stabilize emissions through 2010; 0.5% cut per year from 2011-15; 1% cut per year from 2016-2020. Total goal would be 7.25% below current levels.	Economy-wide, large emitting sources

[3] Table 1 is an updated version of Table ES-1 on page 5 of Exhibit DAS-3.

[4] More detailed summaries of the bills that have been introduced in the U.S. Senate in the 110th Congress are presented in Exhibit DAS-2.

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Rep. Udall - Rep. Petri	Keep America Competitive Global Warming Policy Act	2006	Establishes prospective baseline for greenhouse gas emissions, with safety valve.	Energy and energy-intensive industries
Carper S.2724	Clean Air Planning Act	2006	2006 levels by 2010, 2001 levels by 2015	Existing and new fossil-fuel fired, nuclear, and renewable electric generating plants > 25 MW
Kerry and Snowe S.4039	Global Warming Reduction Act	2006	No later than 2010, begin to reduce U.S. emissions to 65% below 2000 levels by 2050	Not specified
Waxman H.R. 5642	Safe Climate Act	2006	2010 – not to exceed 2009 level, annual reduction of 2% per year until 2020, annual reduction of 5% thereafter	Not specified
Jeffords S. 3698	Global Warming Pollution Reduction Act	2006	1990 levels by 2020, 80% below 1990 levels by 2050	Economy-wide
Feinstein- Carper S.317	Electric Utility Cap & Trade Act	2007	2006 level by 2011, 2001 level by 2015, 1%/year reduction from 2016-2019, 1.5%/year reduction starting in 2020	Electricity sector
Kerry-Snowe	Global Warming Reduction Act	2007	2010 level from 2010-2019, 1990 level from 2020-2029, 2.5%/year reductions from 2020-2029, 3.5%/year reduction from 2030-2050, 65% below 2000 level in 2050	Economy-wide
McCain-Lieberman S.280	Climate Stewardship and Innovation Act	2007	2004 level in 2012, 1990 level in 2020, 20% below 1990 level in 2030, 60% below 1990 level in 2050	Economy-wide
Sanders-Boxer S.309	Global Warming Pollution Reduction Act	2007	2%/year reduction from 2010 to 2020, 1990 level in 2020, 27% below 1990 level in 2030, 53% below 1990 level in 2040, 80% below 1990 level in 2050	Economy-wide
Olver, et al HR 620	Climate Stewardship Act	2007	Cap at 2006 level by 2012, 1%/year reduction from 2013-2020, 3%/year reduction from 2021-2030, 5%/year reduction from 2031-2050, equivalent to 70% below 1990 level by 2050	US national
Bingaman–Specter S.1766	Low Carbon Economy Act	2007	2012 levels in 2012, 2006 levels in 2020, 1990 levels by 2030. President may set further goals ≥60% below 2006 levels by 2050 contingent upon international effort	Economy-wide

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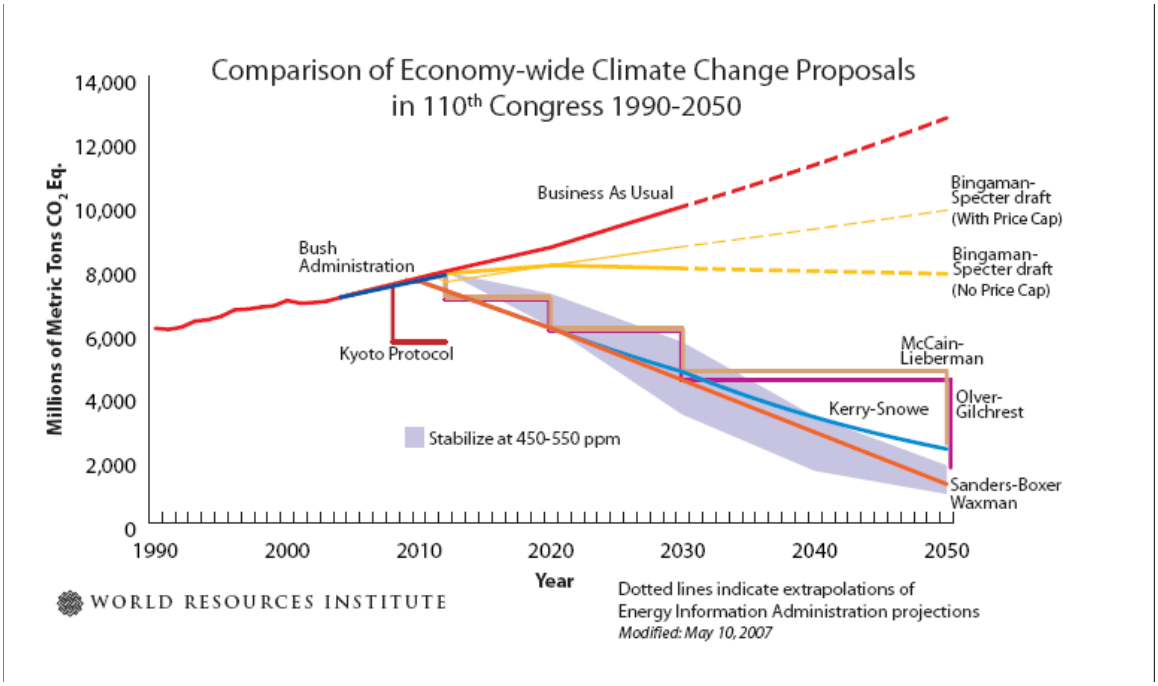
In addition, Senators Lieberman and Warner have issued a set of discussion principles for proposed greenhouse gas legislation. This legislation would mandate 2005 emission levels in 2012, 10% below 2005 levels by 2020, 30% below 2005 levels by 2030, 50% below 2005 levels by 2040, and 70% below 2005 levels by 2050.

The emissions levels that would be mandated by the bills that have been introduced in the current Congress are shown in Figure 1 below:

Figure 1: Emissions Reductions Required under Climate Change Bills in Current US Congress



The shaded area in Figure 1 above represents the 60% to 80% range of emission reductions from current levels that many now believe will be necessary to stabilize atmospheric CO_2 concentrations by the middle of this century.

Many of the bills that have been introduced in the 110th Congress call for emissions reductions to levels that are far below the levels that Entergy Louisiana considered in the development of its base and high CO_2 price forecasts.

Q. Are individual states also taking actions to reduce greenhouse gas emissions?

A. Yes. A number of states are taking significant actions to reduce greenhouse gas emissions. Table 2 below lists the emission reduction goals that have been adopted by states in the U.S. Regional action also has been taken in the Northeast and Western regions of the nation.

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Table 2: Announced State and Regional Greenhouse Gas Emission Reduction Goals

State	GHG Reduction Goal	Western Climate Initiative member (15% below 2005 levels by 2020)	Regional Greenhouse Gas Initiative member (Cap at current levels 2009-2015, reduce this by 10% by 2019)
Arizona	2000 levels by 2020; 50% below 2000 levels by 2040	yes	
California	2000 levels by 2010; 1990 levels by 2020; 80% below 1990 levels by 2050	yes	
Connecticut	1990 levels by 2010; 10% below 1990 levels by 2020; 75-85% below 2001 levels in the long term		yes
Delaware			yes
Florida	2000 levels by 2017, 1990 levels by 2025, and 80 percent below 1990 levels by 2050		
Hawaii	1990 levels by 2020		
Illinois	1990 levels by 2020; 60% below 1990 levels by 2050		
Maine	1990 levels by 2010; 10% below 1990 levels by 2020; 75-80% below 2003 levels in the long term		yes
Maryland			yes
Massachusetts	1990 levels by 2010; 10% below 1990 levels by 2020; 75-85% below 1990 levels in the long term		yes
Minnesota	15% by 2015, 30% by 2025, 80% by 2050		
New Hampshire	1990 levels by 2010; 10% below 1990 levels by 2020; 75-85% below 2001 levels in the long term		yes
New Jersey	1990 levels by 2020; 80% below 2006 levels by 2050		yes
New Mexico	2000 levels by 2012; 10% below 2000 levels by 2020; 75% below 2000 levels by 2050	yes	
New York	5% below 1990 levels by 2010; 10% below 1990 levels by 2020		yes
Oregon	Stabilize by 2010; 10% below 1990 levels by 2020; 75% below 1990 levels by 2050	yes	
Rhode Island	1990 levels by 2010; 10% below 1990 levels by 2020; 75-80% below 2001 levels in the long term		yes
Utah		yes	
Vermont	1990 levels by 2010; 10% below 1990 levels by 2020; 75-85% below 2001 levels in the long term		yes
Washington	1990 levels by 2020; 25% below 1990 levels by 2035; 50% below 1990 levels by 2050	yes	

Q. Is it reasonable to believe that the prospects for passage of federal legislation for the regulation of greenhouse gas emissions have improved as a result of last November's federal elections?

A. Yes. As shown by the number of proposals being introduced in Congress and public statements of support for taking action, there certainly are an increasing numbers of legislators who are inclined to support passage of legislation to regulate the emissions of greenhouse gases.

Nevertheless, my conclusion that significant greenhouse gas regulation in the U.S. is inevitable is not based on the results of any single election or on the fate of any single bill introduced in Congress.

Q. Have recent polls indicated that the American people are increasingly in favor of government action to address global warming concerns?

A. Yes. A summer 2006 poll by Zogby International showed that an overwhelming majority of Americans are more convinced that global warming is happening than they were even two years ago. In addition, Americans also are connecting intense weather events like Hurricane Katrina and heat waves to global warming.[5] Indeed, the poll found that 74% of all respondents, including 87% of Democrats, 56% of Republicans and 82% of Independents, believe that we are experiencing the effects of global warming.

The poll also indicated that there is strong support for measures to require major industries to reduce their greenhouse gas emissions to improve the environment without harming the economy – 72% of likely voters agreed such measures should be taken.[6]

Other recent polls reported similar results. For example, a Time/ABC/Stanford University poll issued in the spring of 2006 found 68 percent of Americans are in

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[5] "Americans Link Hurricane Katrina and Heat Wave to Global Warming," Zogby International, August 21, 2006, available at www.zogby.com/news.

[6] Id.

favor of more government action to address climate change.[7] In addition, a September 2006 telephone poll, conducted by NYU's Brademas Center for the Study of Congress, reported that 70% of those polled stated that they were worried about global warming.[8]

At the same time, according to a recent public opinion survey for the Massachusetts Institute of Technology, Americans now rank climate change as the country's most pressing environmental problem—a dramatic shift from three years ago, when they ranked climate change sixth out of 10 environmental concerns.[9] Almost three-quarters of the respondents felt the government should do more to deal with global warming, and individuals were willing to spend their own money to help.

Q. What CO_2 prices has Energy Louisiana used in its modeling of the proposed Little Gypsy repowering project?

A. Entergy Louisiana presented a "Reference Case Analysis" that assumed $0/ton CO_2 prices.[10] The Company also prepared sensitivity analyses assuming what it calls base CO_2 and high CO_2 emissions allowance prices.[11]

Q. Is it prudent and reasonable to assume no CO_2 emissions allowance prices in the Reference Case Analysis?

A. No. It is not prudent to project that there will be no regulation of greenhouse gas emissions at any point over the next thirty or more years. As I will discuss later in this testimony, federal regulation of greenhouse gas emissions is highly likely in the near future. States also have started to take actions to reduce greenhouse gas

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7 "Polls find groundswell of belief in, concern about global warming." Greenwire, April 21, 2006, Vol. 10 No. 9. See also Zogby's final report on the poll which is available at http://www.zogby.com/wildlife/NWFfinalreport8-17-06.htm.

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

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

10 Exhibit APW-11.

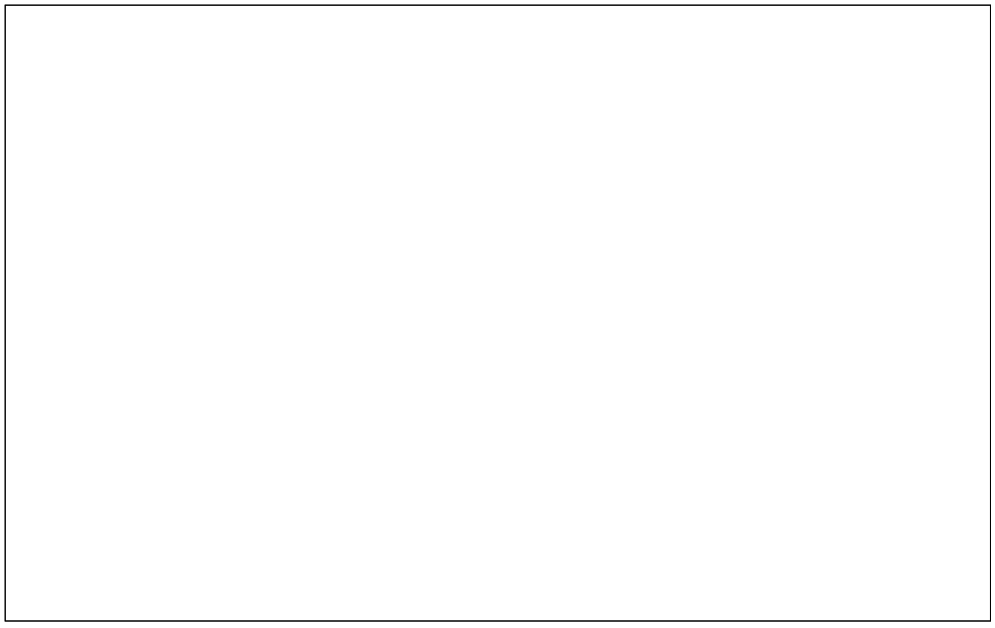
11 Direct Testimony of Anthony P. Walz, at page 34, lines 3-8.

emissions both on their own and as part of regional initiatives. Moreover, given all of their public statements about the dangers posed by global climate change and the necessity of addressing that threat, I find it hard to accept that Entergy believes that this is a reasonable scenario.

Q. Have you seen any projections of what Entergy's future CO_2 emissions would be under the Company's reference case assumption that there will be no regulation of greenhouse gas emissions?

A. Yes. As shown in Figure 2 below, the results of the PROSYM analysis discussed by Entergy Louisiana witness Walz show that Entergy's CO2 emissions would **[Redacted]** in the scenario with Little Gypsy Unit 3 repowered as a CFB:

Figure 2: Entergy CO_2 Emissions Trajectory with Little Gypsy Unit 3 Repowered as a CFB Coal-Fired Plant



Q. What CO_2 prices did Entergy Louisiana assume in its base and high CO_2 sensitivities?

A. Entergy's base and high CO2 price forecasts are presented in Table 3 below:

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Table 3: Entergy Louisiana CO_2 Price Forecasts

	Entergy Louisiana Base CO_2 Prices Nom$	Entergy Louisiana Base CO_2 Prices 2005$	Entergy Louisiana High CO2 Prices Nom$	Entergy Louisiana High CO2 Prices 2005$
2010				
2011				
2012				
2013				
2014				
2015				
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				
2026				
2027				
2028				
2029				
2030				

Q. How do these forecasts change after 2030?

A. The Company's base CO_2 forecast would **[** **REDACTED** **]** [12] Entergy's high CO_2 price forecast would **[** **REDACTED** **]**.[13]

[12] *CO2 Point of View*, Entergy Corporation, December 13, 2005, provided in the Response to Question AAE 1-2, at pages 27 and 28.

[13] Response to Question LPSC 1-30, at page LR168. A copy of this response is included in Exhibit DAS-8.

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Q. How did Entergy Louisiana develop its base CO_2 price forecast?

A. Entergy Louisiana witness Walz has testified that "The base CO_2 cost assumptions were developed by reviewing various consulting forecasts for CO_2 costs. As such, the base CO_2 assumptions represent a consensus forecast."[14]

Q. When was this base CO_2 price forecast prepared?

A. It appears that this base CO_2 price forecast was developed in **[Redacted]**.[15]

Q. How do the annual prices in Entergy's base CO_2 forecast compare to the forecasts on which the Company has said it relied based?

A. Figure 3 below compares Entergy Louisiana's base CO_2 forecast with the other "consulting" forecasts on which the Company has indicated it relied. As can be seen, Entergy's base CO_2 forecast is significantly lower than all but one of the other forecasts. Thus, it makes no sense to say that Entergy's base CO_2 price forecast represents a consensus with the other forecasts, as Mr. Walz testifies.

[14] Direct Testimony of Anthony P. Walz, at page 34, lines 11-13.

[15] *CO2 Point of View*, Entergy Corporation, December 13, 2005, provided in the Response to Question AAE 1-2, at pages 27 and 28.

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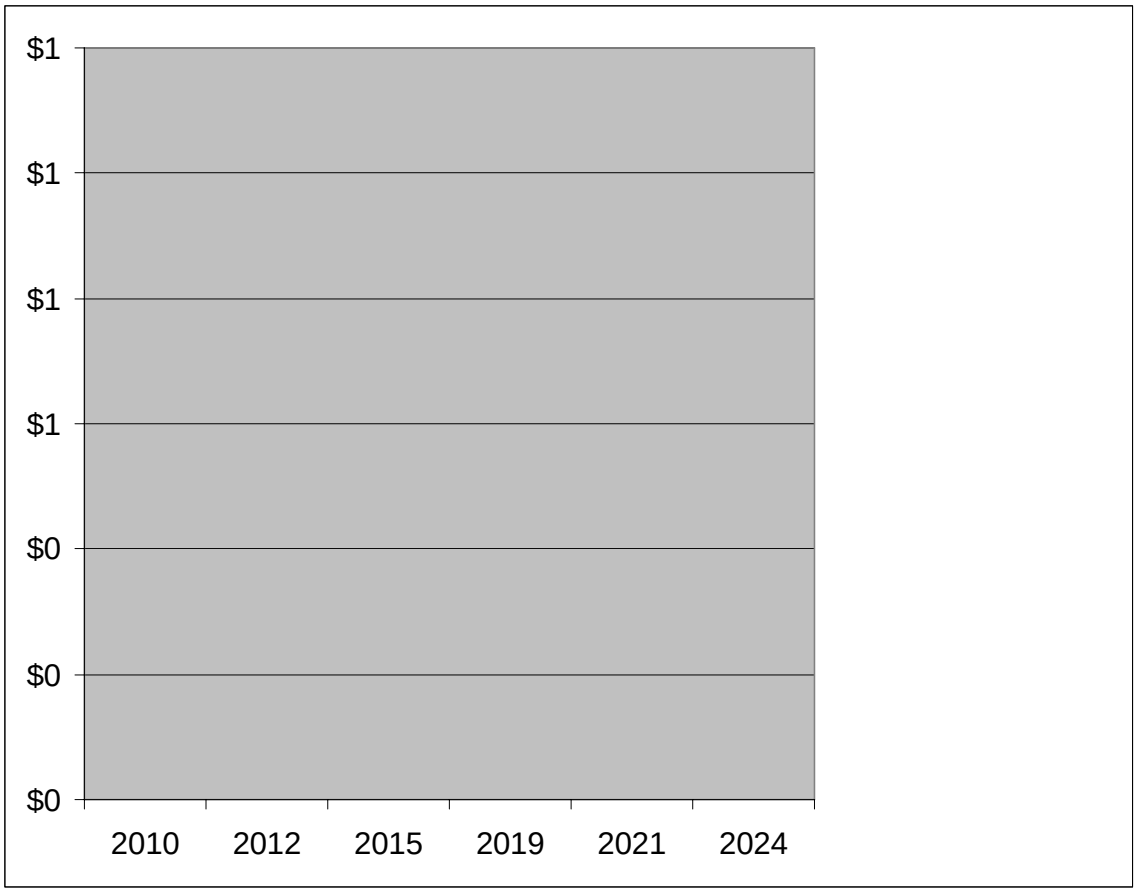
Figure 3: Entergy base CO2 Prices vs. Other Forecasts Considered by Entergy.



Q. How do the emissions levels assumed by Entergy in its base CO_2 forecast compare to the emissions target levels in the bills that have been introduced in the current U.S. Congress?

A. Entergy's base CO_2 price forecast assumes that starting **[**

REDACTED **]** These emissions levels are substantially less stringent than the emissions target levels in the bills that have been introduced in the current U.S. Congress. For example, as shown in Table 1 above, the current McCain-Lieberman bill, Senate Bill 280, would mandate that emissions be at 1990 levels by 2020 and 20% below 1990 levels by 2030. Similarly, the legislation proposed by Senators Feinstein and Carper,

Senate Bill 317, would require CO_2 emissions be reduced to 2001 levels by 2015 and 13% below 2001 levels by 2026. Even the legislation recently proposed by Senators Bingaman and Specter, which include safety-valve prices, would require that emission levels be reduced to 1990 levels by 2030.

Q. Entergy Louisiana witness Schott has testified concerning reductions in greenhouse gas emissions intensity and has presented as an exhibit a March 2006 EIA report entitled "*Energy Market Impacts of Alternative Greenhouse Gas Intensity Reduction Goals.*"[16] Are you aware of any major bill being considered in the current Congress that would regulate the greenhouse gas intensity of power plant emissions rather than mandating that overall emissions levels be reduced?

A. No. The draft proposal that was circulated by Senator Bingaman in 2006 would have regulated greenhouse gas emission intensity. However, this approach was abandoned in the bill that Senators Bingaman and Specter actually introduced in July 2007. This bill would require that overall greenhouse gas emissions levels be capped at 2012 levels in 2012 and then be reduced to 2006 levels in 2020 and 1990 levels by 2030.

Q. Is it reasonable to consider this Entergy forecast a "base" CO_2 price forecast, as Entergy Louisiana has claimed?

A. No. It is much too low to be a base CO_2 price forecast. It might be reasonable as a low CO_2 price forecast except for the fact that it assumes that CO_2 emissions allowance prices **[REDACTED]**.[17]

Q. How did Entergy develop its high CO_2 price forecast?

A. Entergy Louisiana's high CO_2 price forecast is based on an **[REDACTED]**.[18]

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[16] Direct Testimony of Matthew J. Schott, Jr., at page 25, line 17, to page 26, line 2.

[17] *CO2 Point of View*, Entergy Corporation, December 13, 2005, provided in the Response to Question AAE 1-2, at pages 27 and 28.

Q. Is this a reasonable "high" CO_2 price forecast?

A. No. Although the forecast is far more reasonable than the Company's base CO_2 price forecast, it still is too low to be considered the high end of a reasonable range of possible future CO_2 emissions allowance prices. In particular, Entergy's high CO_2 price forecast does not reflect the emissions allowance prices that could result from a number of the bills that have been introduced in Congress which propose very significant emissions reductions.

Q. What carbon dioxide values are being used by utilities in electric resource planning?

A. Table 6.1 on page 41 of 63 of Exhibit DAS-3 presents the carbon dioxide costs, in \$/ton CO_2, that were being used as of 2006 by a number of utilities for both resource planning and modeling of carbon regulation policies.

Q. Are you aware of any recent regulatory commission decisions concerning the levels of carbon dioxide emissions prices that utilities should consider when planning how to supply energy to their customers?

A. Yes. The New Mexico Public Regulation Commission recently ordered that utilities should consider a range of CO_2 prices in their resource planning. This range runs from \$8 to \$40 per metric ton, beginning in 2010 and increases at the overall 2.5 percent rate of inflation. This range includes significantly higher CO_2 prices than the base and high CO_2 prices used by Entergy Louisiana in its analyses of the Little Gypsy repowering project.[19]

Q. Has Synapse developed a carbon price forecast that would assist the Commission in evaluating the proposed repowering of Little Gypsy Unit 3?

A. Yes. Synapse's forecast of future carbon dioxide emissions prices are presented in Figure 4 below.

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[18] Response to LPSC 1-30, at page LR167.

[19] A copy of the New Mexico Public Regulation Commission Order is included as Exhibit DAS-4.

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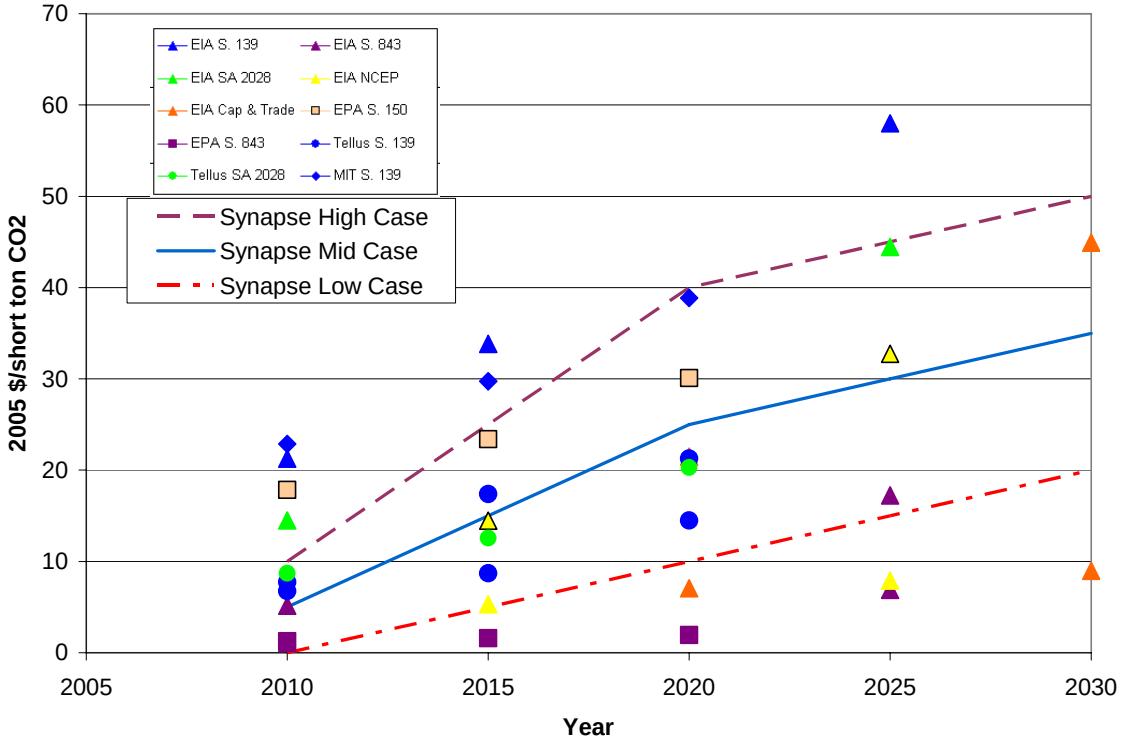
Figure 4. Synapse Carbon Dioxide Prices



Q. What is Synapse's carbon price forecast on a levelized basis?

A. Synapse's forecast, levelized[20] over 20 years, 2011 – 2030, is provided in Table 4 below.

Table 4: Synapse's Levelized Carbon Price Forecast (2005$/ton of CO_2)

Low Case	Mid Case	High Case
$8.23	$19.83	$31.43

Q. When were the Synapse CO_2 emission allowance price forecasts shown in Figure 4 developed?

A. The Synapse CO_2 emission allowance price forecasts were developed in the Spring of 2006.

Q. How were these CO_2 price forecasts developed?

A. The basis for the Synapse CO_2 price forecasts is described in detail in Exhibit DAS-3, starting on page 41 of 63.

In general, the price forecasts were based, in part, on the results of economic analyses of individual bills that had been submitted in the 108th and 109th Congresses. We also considered the likely impacts of state, regional and international actions, the potential for offsets and credits, and the likely future trajectories of both emissions constraints and technological program.

Q. Are the Synapse CO_2 price forecasts shown in Figure 4 based on any independent modeling?

A. Yes. Although Synapse did not perform any new modeling to develop our CO_2 price forecasts, our CO_2 price forecasts were based on the results of independent modeling prepared at the Massachusetts Institute of Technology ("MIT"), the Energy Information Administration of the Department of Energy ("EIA"), Tellus, and the U.S. Environmental Protection Agency ("EPA").[21]

Q. Do the triangles, squares, circles and diamond shapes in Figure 4 above reflect the results of all of the scenarios examined in the MIT, EIA, EPA and Tellus analyses upon which Synapse relied?

A. As a general rule, Synapse focused our attention either on the modeler's primary scenario or on the presented high and low scenarios to bracket the range of results.

For example, the blue triangles in Figure 4 represent the results from EIA's modeling of the 2003 McCain Lieberman bill, S.139. Synapse used the results from EIA's primary case which reflected the bill's provisions that allowed: (a)

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[20] A value that is "levelized" is the present value of the total cost converted to equal annual payments. Costs are levelized in real dollars (i.e., adjusted to remove the impact of inflation).

[21] See Table 6.2 on page 42 of 63 of Exhibit DAS-3.

allowance banking; (b) use of up to 15 percent offsets in Phase 1 (2010-2015) and up to 10 percent offsets in Phase II (2016 and later years). The S.139 case also assumed commercial availability of advanced nuclear plants and of geological carbon sequestration technologies in the electric power industry.

Similarly, the blue diamonds in Figure 4 represent the results from MIT's modeling of the same 2003 McCain Lieberman bill, S.139. MIT examined 14 scenarios which considered the impact of factors such as the tightening of the cap in Phase II, allowance banking, availability of outside credits, and assumptions about GDP and emissions growth. Synapse included the results from Scenario 7 which included allowance banking and zero-cost credits, which effectively relaxed the cap by 15% and 10% in Phase I and Phase II, respectively. Synapse selected this scenario as the closest to the S.139 legislative proposal since it assumed that the cap was tightened in a second phase, as in Senate Bill 139.

At the same time, some of the studies only included a single scenario representing the specific features of the legislative proposal being analyzed. For example, SA 2028, the Amended McCain Lieberman bill set the emissions cap at constant 2000 levels and allowed for 15 percent of the carbon emission reductions to be met through offsets from non-covered sectors, carbon sequestration and qualified international sources. EIA presented one scenario in its table for this policy. The results from this scenario are presented in the green triangles in Figure 4.

Q. Do you believe that technological improvements and policy designs will reduce the cost of CO_2 emissions?

A. Yes. Exhibit DAS-3 identifies a number of factors that will affect projected allowance prices. These factors include: the base case emissions forecast; whether there are complimentary policies such as aggressive investments in energy efficiency and renewable energy independent of the emissions allowance market; the policy implementation timeline; the reduction targets in a proposal;

program flexibility involving the inclusion of offsets (perhaps international) and allowance banking; technological progress; and emissions co-benefits.[22] In particular, Synapse anticipates that technological innovation will temper allowance prices in the out years of our forecast.

Q. Could carbon capture and sequestration be a technological innovation that might temper or even put a ceiling on CO_2 emissions allowance prices?

A. Yes.

Q. Does Entergy see carbon capture technology as a currently commercially viable way to mitigate CO_2 emissions from pulverized coal plants like the Little Gypsy project?

A. No. Entergy has expressed the following position concerning the technical feasibility of both CO_2 capture and CO_2 sequestration for the emissions from the Little Gypsy project:

> To date, carbon capture and sequestration has not been demonstrated commercially on any power plant in the United States. Even today, pilot scale projects are only now being developed in the United States. The Company does not believe that this technology is commercially and reliably viable on a utility scale at the current level of technology development. Significant research and development in the performance, cost, and reliability of carbon capture technology remains to be completed. In addition, further research is also required on underground sequestration of carbon, including costs, permitting, and technological advancement such as appropriate geological formations and appropriateness for long term storage of carbon dioxide and the transportation of CO_2 gas.[23]

Q. Do you agree with this assessment?

A. I agree with this view of the current status of carbon capture and sequestration technology although I would note that there is some experience with the piping of

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[22] Exhibit DAS-3, at pages 46 to 49 of 63.
[23] Response to Question No. LPSC 1-18. A copy of this response in included in DAS-8.

CO_2 gas for enhanced oil recovery and industrial use in certain geographical areas.

Q. Is there any consensus when carbon capture and sequestration technology will become commercially viable for plants like a repowered Little Gypsy Unit 3?

A. No. I have seen estimates that carbon capture and sequestration technology may be proven and commercially viable from as early as 2015 to 2030 or later.

Q. What are the currently estimated costs for carbon capture and sequestration at pulverized coal facilities?

A. Hope has been expressed concerning potential technological improvements and learning curve effects that might reduce the estimated cost of carbon capture and sequestration. However, I have seen recent estimates that the cost of carbon capture and sequestration could increase the cost of producing electricity at coal-fired power plants by 60-80 percent, on a $/MWh basis. A very recent study by the National Energy Technology Laboratory ("NETL") projects that the cost of carbon capture and sequestration would be $75/tonne[24] of CO_2 avoided, in 2007 dollars, for pulverized coal plants. This translates in to $65/ton of CO_2 avoided, in 2005 dollars. The March 2007 "Future of Coal Study" from the Massachusetts Institute of Technology estimated that the cost of carbon capture and sequestration would be about $28/ton although it also acknowledged that there was uncertainty in that figure.[25] The tables in that study also indicated significantly higher costs for carbon capture for pulverized coal facilities, in the range of about $40/ton and higher.[26]

However, even when the technology for CO_2 capture matures, there will always be significant regional variations in the cost of storage due to the proximity and

[24] A tonne or metric ton is a measurement of mass equal to 1,000 kilograms or 1.1 tons.
[25] *The Future of Coal, Options for a Carbon-Constrained World*, Massachusetts Institute of Technology, March 2007, at page xi.

quality of storage sites. **[**

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].[27]

Q. Has Entergy included any carbon capture and sequestration equipment or features in the current design for the repowered Little Gypsy facility?

A. No.[28]

Q. Do the Synapse CO_2 price forecasts reflect the potential for the inclusion of domestic offsets and, perhaps, international offsets in U.S. carbon regulation policy?

A. Yes. Even the Synapse high CO_2 price forecast is consistent with, and in some cases lower than, the results of studies that assume the use of some levels of offsets to meet mandated emission limits. For example, as shown in Figure 4, the highest price scenarios in the years 2015, 2020 and 2025 were taken from the EIA and MIT modeling of the original and the amended McCain-Lieberman proposals. Each of the prices for these scenarios shown in Figure 4 reflects the allowed use of offsets.

Q. How do the Synapse CO_2 price forecasts compare to the forecast used by Entergy Louisiana in its recent analyses of the proposed repowering of Little Gypsy?

A. The Synapse and Entergy Louisiana CO_2 price forecasts are shown in Figure 5 below. As this Figure demonstrates, the Company's base CO_2 price forecast is similar to our Synapse low forecast and the Company's high CO_2 price forecast is similar to our mid-forecast.

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[26] Id, at page 19.
[27] Response to LPSC 1-30, at page LR168.
[28] Response to AAE 1-47.

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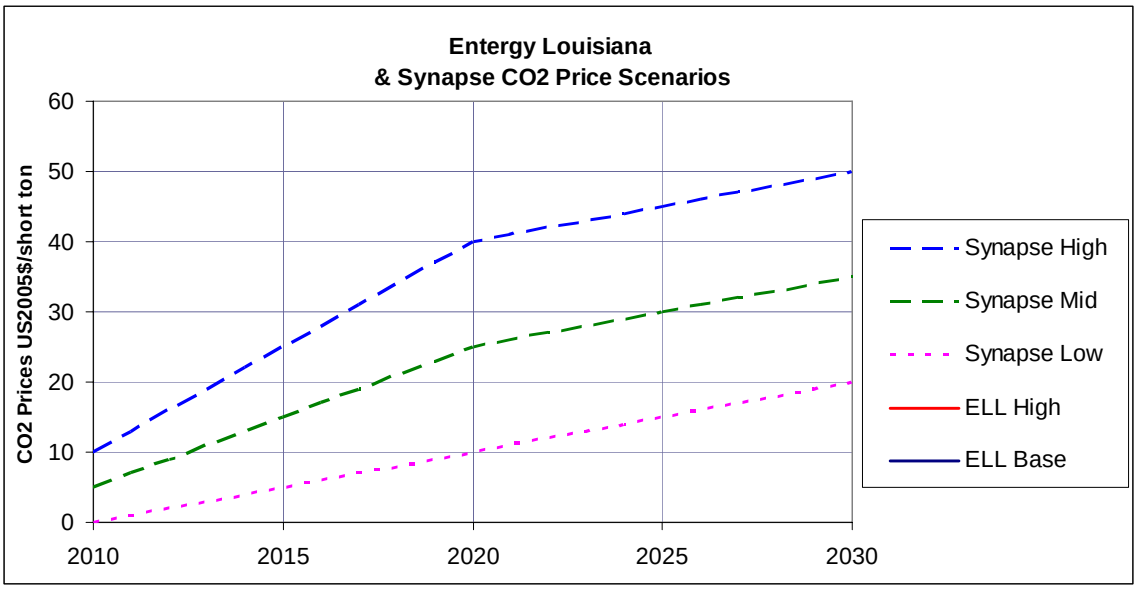
Figure 5: Synapse and Entergy Louisiana CO_2 Price Forecasts



Q. Have you seen any recent independent forecasts of future CO_2 emissions prices that are similar to the Synapse forecast?

A. Yes. The recent MIT study on *The Future of Coal* contained a set of assumptions about high and low future CO_2 emission allowance price. Figure 6 below shows that the CO_2 price trajectories in the MIT study are very close to the high and low Synapse forecasts.

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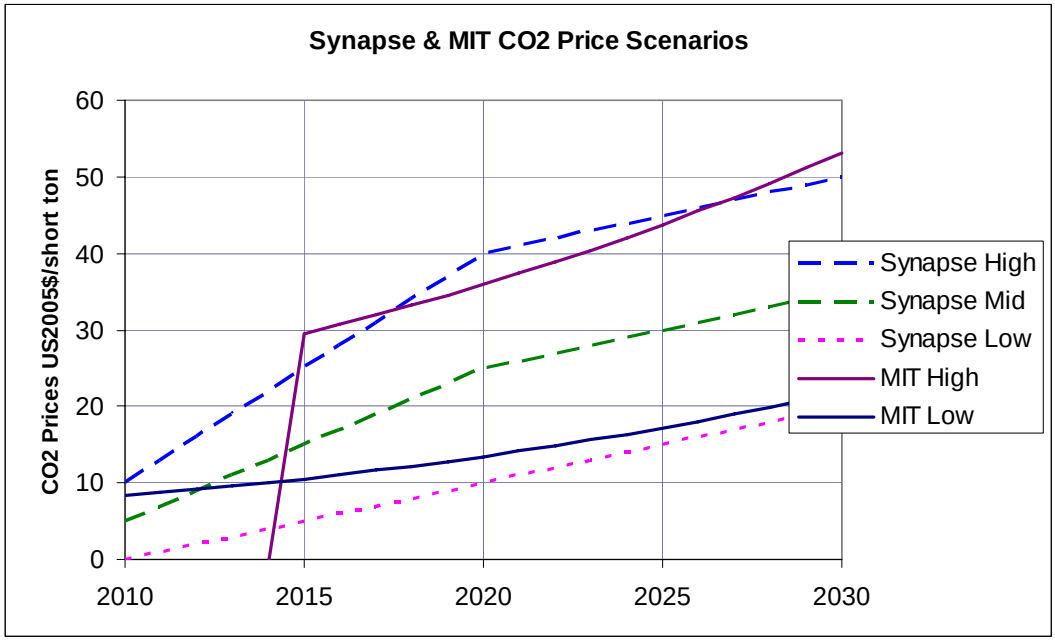
Figure 6: CO_2 Price Scenarios – Synapse & MIT March 2007 Future of Coal Study



Q. Do you believe that the Synapse CO_2 price forecasts remain valid despite being based, in part, on analyses from 2003-2005 which examined legislation that was proposed in past Congresses?

A. Yes. Synapse believes it is important for the Commission to rely on the most current information available about future CO_2 emission allowance prices, as long as that information is objective and credible. The analyses upon which Synapse relied when we developed our CO_2 price forecasts were the most recent analyses and technical information available when Synapse developed its CO_2 price forecasts in the Spring of 2006. However, new information shows that our CO_2 prices remain valid even though the original bills that comprised part of the basis for the forecasts expired at the end of the Congress in which they were introduced.

Most importantly, many of the new greenhouse gas regulation bills that have been introduced in Congress are significantly more stringent than the bills that were being considered prior to the spring of 2006. As I will discuss below, the

increased stringency of current bills can be expected to lead to higher CO_2 emission allowance prices. The higher forecast natural gas prices that are being forecast today, as compared to the natural gas price forecasts from 2003 or 2004, also can be expected to lead to higher CO_2 emissions allowance prices.

Q. Do the Synapse carbon price forecasts presented in Figures 4 and 6 reflect the emission reduction targets in the bills that have been introduced in the current Congress?

A. No. Synapse developed our price forecasts late last spring and relied upon bills that had been introduced in Congress through that time. The bills that have been introduced in the current US Congress generally would mandate much more substantial reductions in greenhouse gas emissions than the bills that we considered when we developed our carbon price forecasts. Consequently, we believe that our forecasts are conservative.

Q. Have you seen any analyses of the CO_2 prices that would be required to achieve the much deeper reductions in CO_2 emissions that would be mandated under the bills currently under consideration in Congress?

A. Yes. An *Assessment of U.S. Cap-and-Trade Proposals* was recently issued by the MIT Joint Program on the Science and Policy of Global Change. This *Assessment* evaluated the impact of the greenhouse gas regulation bills that are being considered in the current Congress.

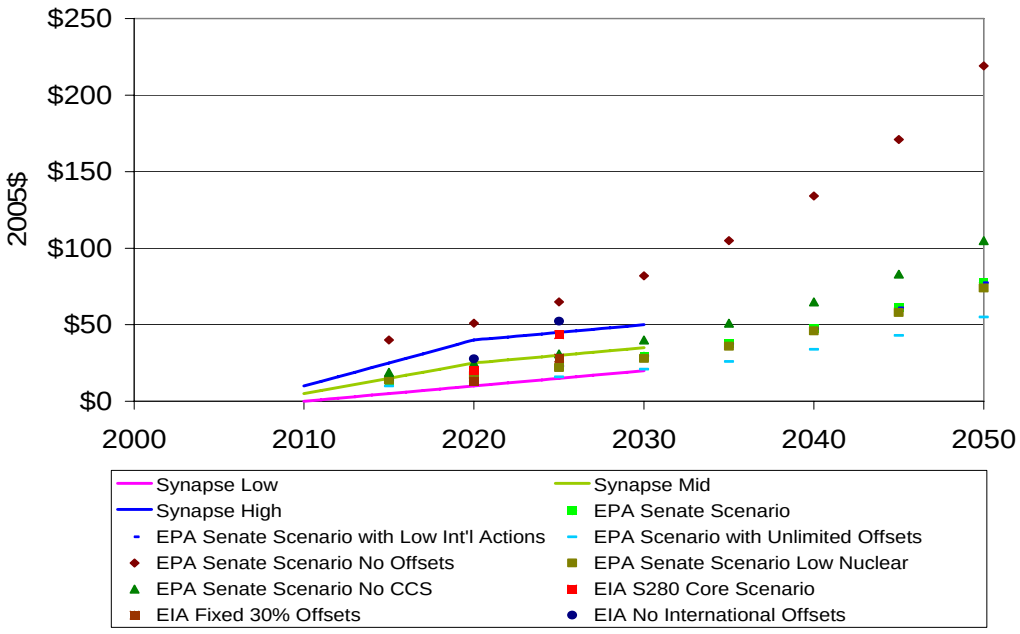
Twenty nine scenarios were modeled in the *Assessment*. These scenarios reflected differences in such factors as emission reduction targets (that is, reduce CO_2 emissions 80% from 1990 levels by 2050, reduce CO_2 emissions 50% from 1990 levels by 2050, or stabilize CO_2 emissions at 2008 levels), whether banking of allowances would be allowed, whether international trading of allowances would be allowed, whether only developed countries or the U.S. would pursue

greenhouse gas reductions, whether there would be safety valve prices adopted as part of greenhouse gas regulations, and other factors.[29]

In general, the ranges of the projected CO_2 prices in these scenarios were higher than the range of CO_2 prices in the Synapse forecast. For example, twelve of the 29 scenarios modeled by MIT projected higher CO_2 prices in 2020 than the high Synapse forecast. Fourteen of the 29 scenarios (almost half) projected higher CO_2 prices in 2030 than the high Synapse forecast.

Figure 7 below compares the three Core Scenarios in the MIT *Assessment* with the Synapse CO_2 price forecasts.

Figure 7: CO_2 Price Scenarios – Synapse and Core Scenarios in April 2007 MIT *Assessment of U.S. Cap-and-Trade Proposals*



[29] The scenarios examined in the MIT *Assessment of U.S. Cap-and-Trade Proposals* are listed in Exhibit DAS-5.

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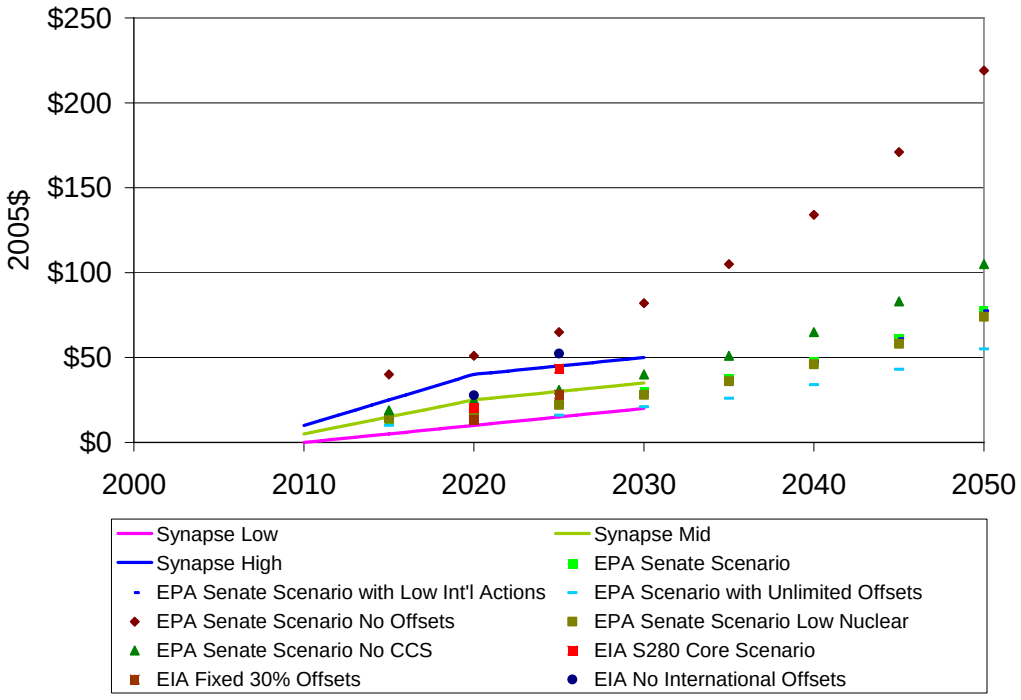
Q. Have you compared the Synapse CO_2 emissions allowance price forecasts to any other assessments of current bills in Congress?

A. Yes. Both EPA and the Energy Information Agency (EIA) of the Department of Energy have analyzed the impact of the current version of the McCain-Lieberman legislation (Senate Bill 280).[30] Figure 8 below shows that the Synapse CO_2 price forecasts are consistent with the range of scenarios examined in the EPA and EIA assessments:

Figure 8: Synapse CO_2 Price Forecasts and Results of EPA and EIA Assessment of Current McCain Lieberman Legislation



[30] *Energy Market and Economic Impacts of S. 280, the Climate Stewardship and Innovation Act of 2007*, Energy Information Administration, July 2007 and *EPA Analysis of the Climate Stewardship and Innovation Act of 2007, S. 280 in 110th Congress*, July 16, 2007.

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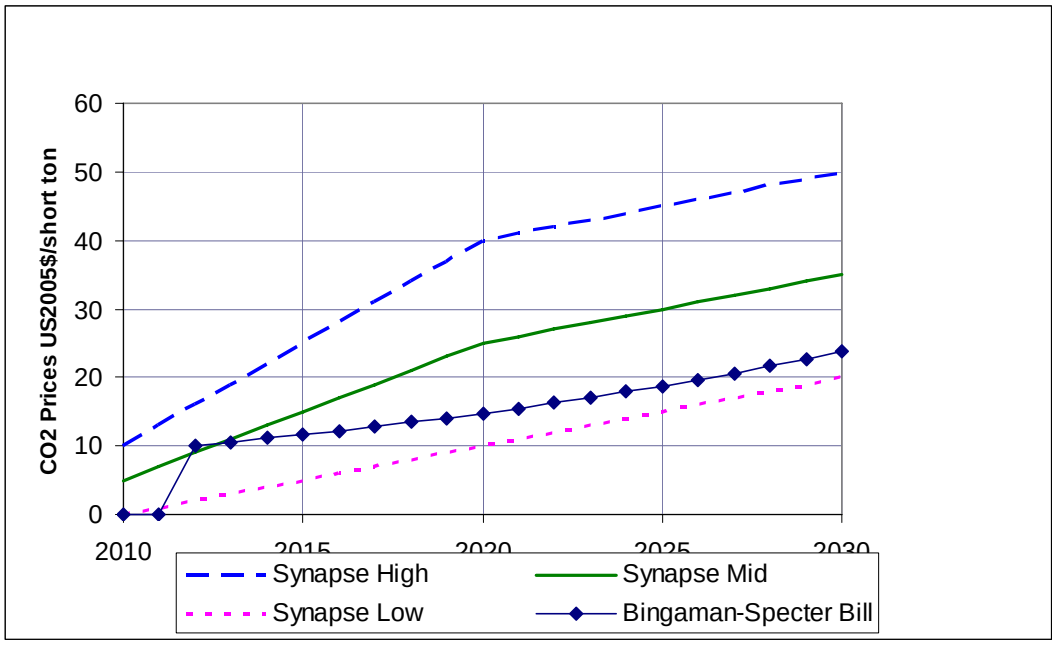
Q. How do the Synapse CO_2 forecasts compare to the safety valve prices in the bill introduced by Senators Bingaman and Specter?

A. As shown in Figure 9 below, the safety valve prices in the legislation introduced by Senators Bingaman and Specter fall between the Synapse mid and low forecasts.

Figure 9: Synapse CO_2 Price Forecasts and Safety Valve Prices in Bingaman-Specter Legislation in 110th Congress



Q. What are you recommendations concerning the CO_2 prices that the Commission should use in evaluating the proposed repowering of Little Gypsy Unit 3 as a CFB?

A. Given the uncertainty associated with the legislation that eventually will be passed by Congress, we believe that the Commission should use the wide range of forecasts of CO_2 prices shown in Figure 4 above to evaluate the relative economics of the proposed Repowering Project.

Q. How much additional CO_2 would the repowered Little Gypsy Unit 3 emit into the atmosphere?

A. The repowered Little Gypsy Unit 3 would emit approximately 4 million tons of CO_2 annually.[31]

Q. What would be the annual costs of greenhouse gas regulations to Entergy Louisiana and its ratepayers under the Synapse CO_2 price forecasts if the Company proceeds with its plan to repower Little Gypsy Unit 3 as a CFB plant?

A. The range of the incremental annual, levelized cost to the Company and its ratepayers from greenhouse gas regulations would be:

Synapse Low CO_2 Case: 4 million tons of CO_2 · \$8.23/ton = \$33 million

Synapse Mid CO_2 Case: 4 million tons of CO_2 · \$19.83/ton = \$79 million

Synapse High CO_2 Case: 4 million tons of CO_2 · \$31.43/ton = \$126 million

3. The Probable Economic Impact of the Proposed Repowering Project

Q. Do the results of the Fundamental Analysis presented by Entergy Louisiana witness Walz show that repowering Little Gypsy Unit 3 as a CFB is the lowest cost, lowest risk option for the Company and its ratepayers?

A. No. The Fundamental Analysis is critically flawed in a number of ways that result in its being biased in favor of the repowering alternative:

- All of the Reference Case comparisons in the Fundamental Analysis that assume \$0/ton CO_2 prices (that is, no federal or state regulation of greenhouse gas emissions) are extremely unrealistic and unlikely.
- Entergy Louisiana did not evaluate any demand side management or renewable resources as part of a portfolio of alternatives to the repowering of Little Gypsy Unit 3.

[31] This reflects an 85 percent average annual capacity factor and CO_2 emissions of 2150 lbs/MWh.

- As I explained earlier, given the uncertainties concerning future CO_2 prices the range reflected in the two CO_2 forecasts considered as sensitivities in the Fundamental Analysis is too narrow. In particular, the Company's "base" and "high" sensitivity CO_2 price forecasts are unreasonably low.

- The current cost estimate for the Repowering Project assumes the use of a number of existing site facilities. However, the cost estimate for the alternative CCGT facility does not. Instead, the Company assumes that the alternative CCGT facility would be built at a Greenfield site.

Q. Did Entergy Louisiana include any costs for carbon capture and sequestration in its Fundamental Analysis for either the Repowering Project or the CCGT alternative?

A. No.

Q. Did Entergy Louisiana reflect in the Fundamental Analysis any of the performance penalties that can be expected from the addition and use of carbon capture technology for either the Repowering Project or the CCGT alternative?

A. No. It is generally accepted that the addition and operation of carbon capture equipment is expected to have an adverse impact on power plant performance. For example, operation of carbon capture equipment is expected to require substantial amounts of energy. As a result, the power plant is expected to experience an energy penalty of between 10 percent and 29 percent as a result of adding the carbon capture technology resulting in a significant decrease in the plant's net power output.[32] However, Entergy Louisiana did not reflect any such performance penalties in its Fundamental or PROSYM analyses.

[32] For example, see *Update on Clean Coal Technologies and CO2 Capture &* Storage, a June 27, 2007 presentation to the Oregon Public Utility Commission by Neville Holt, EPRI Technical Fellow, Advanced Coal Generation Technology. Available at http://www.puc.state.or.us/PUC/meetings/pmemos/2007/062707/OregonPUCCCTCCS62707.ppt

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Q. Have you seen any evidence that Entergy Louisiana considered demand side management or renewable resources as potential alternatives, even in part, for the repowering of Little Gypsy Unit 3?

A. No. Entergy Louisiana essentially has focused on fossil alternatives. I have seen no evidence that it seriously considered and in detail investments in demand side management or renewable options as part of the resource planning for the repowering project. Indeed, the Company has indicated that it has not even studied the potential for energy efficiency or renewable resources in its service territory at any time in the past decade.[33]

Q. What is the significance of this failure to seriously consider demand side management and renewal resources?

A. Because Entergy Louisiana has failed to consider a wide range of alternatives, the Company cannot demonstrate that there is not a lower cost, lower risk alternative than repowering Little Gypsy Unit 3. Such lower cost, lower risk plans might include a portfolio of additional investments in demand side management, some self-build or purchased wind or renewable resources, and some natural gas-fired capacity.

Q. Has Entergy Louisiana estimated the savings associated with construction the Little Gypsy Project as a repowering of Unit 3 rather than constructing the unit as a stand-alone CFB project?

A. No. Entergy Louisiana has said that it has not prepared an estimate that compares the cost of the Little Gypsy Repowering Project with the cost of a Greenfield CFB project.[34] However, the Company generally believes that a repowering project

[33] Responses to Questions AAE 1-16 and AAE 1-17. Copies of these responses are included in Exhibit DAS-8.

[34] Response to Question LPSC 1-10. A copy of this response is included in Exhibit DAS-8.

would be less costly than a Greenfield CF project because certain systems and components of the existing facility will be reused.[35]

Q. Does the Company's estimate for the cost of the alternative CCGT facility similarly reflect savings from the reuse of existing facilities at the Little Gypsy site?

A. No.[36]

Q. Has the Company studied the potential cost of repowering Little Gypsy Unit 3 as a CCGT facility?

A. No.[37]

Q. Is it reasonable to expect that the cost of repowering Little Gypsy Unit 3 as a CCGT would be lower than the cost of building a new CCGT unit at a greenfield site?

A. Yes. In general, for the same reasons that Entergy Louisiana expects savings in the cost of the repowering project, it is reasonable to expect that the cost of repowering Little Gypsy as a CCGT would be lower than the cost of building a new unit at a greenfield site.

Q. Is it reasonable to expect that the cost of the Repowering Project will increase above the current $1.55 billion estimate?

A. Yes. Entergy Louisiana witness Long has noted that rising commodities and labor prices have led to significant increases in power plant construction costs in recent years.[38] It is reasonable to expect that the worldwide demand for power plant design and construction resources which underlies much of these

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35 Id.
36 Response to Question AAE 1-19. A copy of this response is included in Exhibit DAS-8.
37 Response to Question AAE 1-20. A copy of this response is included in Exhibit DAS-8.
38 Direct Testimony of Jonathan E. Long, at page 29, lines 4-7, and at page 29, line 17, to page 30, line 5.

commodity and labor price increases, will continue to lead to further cost increases in the future.

Q. Is it generally accepted that domestic U.S. and worldwide competition for power plant design and construction resources, commodities, and manufacturing capacity have led to significant increases in power plant construction costs in recent years?

A. Yes. Soaring power plant construction costs have been the subject of a number of studies, assessments and articles in papers and magazines, as well as testimony sponsored by companies that are proposing to build new fossil-fired generating plants.

For example, in testimony filed at the North Carolina Utilities Commission on November 29, 2006, Duke Energy Carolinas emphasized the significant impact that the competition for resources had been having on the costs of building new power plants. This testimony was presented to explain the approximate 47 percent ($1 billion) increase in the estimated cost of Duke Energy Carolinas' proposed coal-fired Cliffside Project that the Company announced in October 2006.

In fact, Duke Energy Carolinas' witness noted in testimony to the North Carolina Utilities Commission that:

> The costs of new power plants have escalated very rapidly. This effect appears to be broad based affecting many types of power plants to some degree. One key steel price index has doubled over the last twelve months alone. This reflects global trends as steel is traded internationally and there is international competition among power plant suppliers. Higher steel and other input prices broadly affects power plant capital costs. A key driving force is a very large boom in U.S. demand for coal power plants which in turn has resulted from unexpectedly strong U.S. electricity demand growth and high natural gas prices. Most integrated U.S. utilities have decided to pursue coal power plants as a key component of their capacity expansion plan. In addition, many foreign companies are also expected to add large amounts of new coal power plant capacity. This global boom is straining supply. Since coal power plant equipment suppliers and bidders also supply other types of

> plants, there is a spill over effect to other types of electric generating plants such as combined cycle plants.[39]

Mr. Rose further noted that the actual coal power plant capital costs as reported by plants already under construction exceed government estimates of capital costs by "a wide margin (i.e., 35 to 40 percent). Additionally, current announced power plants appear to face another increase in costs (i.e., approximately 40 percent addition."[40] Thus, according to Mr. Rose, new coal-fired power plant capital costs have increased approximately 90 to 100 percent since 2002.

A June 2007 report by Standard & Poor's, *Increasing Construction Costs Could Hamper U.S. Utilities' Plan to Build New Power Generation*, similarly noted:

> As a result of declining reserve margins in some U.S. regions … brought about by a sustained growth of the economy, the domestic power industry is in the midst of an expansion. Standing in the way are capital costs of new generation that have risen substantially over the past three years. Cost pressures have been caused by demands of global infrastructure expansion. In the domestic power industry, cost pressures have arisen from higher demand for pollution control equipment, expansion of the transmission grid, and new generation. While the industry has experienced buildout cycles in the past, what makes the current environment different is the supply-side resource challenges faced by the construction industry. A confluence of resource limitations have contributed, which Standard & Poors' Rating Services broadly classifies under the following categories
>
> - Global demand for commodities
> - Material and equipment supply
> - Relative inexperience of new labor force, and
> - Contractor availability
>
> The power industry has seen capital costs for new generation climb by more than 50% in the past three years, with more than 70% of this increase resulting from engineering, procurement and

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[39] Direct Testimony of Judah Rose for Duke Energy Carolinas, North Carolina Utilities Commission Docket No. E-7, SUB 790, at page 4, lines 2-14. Mr. Rose's testimony is available on the North Carolina Utilities Commission website.

[40] Ibid, at page 6, lines 5-9, and page 12, lines 11-16.

> construction (EPC) costs. Continuing demand, both domestic and international, for EPC services will likely keep costs at elevated levels. As a result, it is possible that with declining reserve margins, utilities could end up building generation at a time when labor and materials shortages cause capital costs to rise, well north of $2,500 per kW for supercritical coal plants and approaching $1,000 per kW for combined-cycle gas turbines (CCGT). In a separate yet key point, as capital costs rise, energy efficiency and demand side management already important from a climate change perspective, become even more crucial as any reduction in demand will mean lower requirements for new capacity.[41]

More recently, the president of the Siemens Power Generation Group told the New York Times that "There's real sticker shock out there."[42] He also estimate that in the last 18 months, the price of a coal-fired power plant has risen 25 to 30 percent.

A September 2007 report on *Rising Utility Construction Costs* prepared by the Brattle Group for the EDISON Foundation similarly concluded that:

> Construction costs for electric utility investments have risen sharply over the past several years, due to factors beyond the industry's control. Increased prices for material and manufactured components, rising wages, and a tighter market for construction project management services have contributed to an across-the-board increase in the costs of investing in utility infrastructure. These higher costs show no immediate signs of abating.[43]

The report further found that:

- Dramatically increased raw materials prices (e.g., steel, cement) have increased construction cost directly and indirectly through the higher cost of manufactured components common in utility infrastructure projects. These cost increases have primarily been due to high global demand for commodities and manufactured goods, higher production and

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41 *Increasing Construction Costs Could Hamper U.S. Utilities' Plans to Build New Power Generation*, Standard & Poor's Rating Services, June 12, 2007, at page 1. A copy of this report was provided in response to Question LPSC 1-4 and is included in Exhibit DAS-8.

42 "Costs Surge for Building Power Plants, *New York Times*, July 10, 2007.

43 *Rising Utility Construction Costs: Sources and Impacts*, prepared by The Brattle Group for the EDISON Foundation, September 2007, at page 31. A copy of this report is attached as Exhibit DAS-6.

transportation costs (in part owing to high fuel prices), and a weakening U.S. dollar.

- Increased labor costs are a smaller contributor to increased utility construction costs, although that contribution may rise in the future as large construction projects across the country raise the demand for specialized and skilled labor over current or project supply. There also is a growing backlog of project contracts at large engineering, procurement and construction (EPC) firms, and construction management bids have begun to rise as a result. Although it is not possible to quantify the impact on future project bids by EPC, it is reasonable to assume that bids will become less cost-competitive as new construction projects are added to the queue.

- The price increases experienced over the past several years have affected all electric sector investment costs. In the generation sector, all technologies have experienced substantial cost increases in the past three years, from coal plants to windpower projects…. As a result of these cost increases, the levelized capital cost component of baseload coal and nuclear plants has risen by $20/MWh or more – substantially narrowing coal's overall cost advantages over natural gas-fired combined-cycle plants – and thus limiting some of the cost-reduction benefits expected from expanding the solid-fuel fleet.

- The rapid increases experienced in utility construction costs have raised the price of recently completed infrastructure projects, but the impact has been mitigated somewhat to the extent that construction or materials acquisition preceded the most recent price increases. The impact of rising costs has a more dramatic impact on the estimated cost of proposed utility infrastructure projects, which fully incorporates recent price trends. This has raised significant concerns that the next wave of utility investments may be imperiled by the high cost environment. These rising construction costs have also motivated utilities and regulators to more actively pursue energy efficiency and demand response initiatives to reduce the future rate impacts on consumers.[44]

[44] Id, at pages 1-3.

Q. Do you agree that with these reviews of the current market conditions affecting the costs of proposed coal-fired power plants like the Little Gypsy Repowering Project?

A. Yes. These reviews of the factors affecting the estimated costs of new coal-fired generating facilities appears reasonable and are consistent with other information we have seen.

Q. Is it reasonable to expect that these same current market conditions also will lead to increases in the estimated costs of other supply-side alternatives such as natural gas-fired or wind facilities?

A. Yes.

Q. Entergy Louisiana Exhibit APW-18 shows that a 10% increase in the cost of the Repowering Project would reduce the net present value benefit of the Repowering Project versus the CCGT alternative in the Fundamental Analysis by $190 million.[45] Is it reasonable to expect that the construction cost of the Repowering Project could increase by more than 10%?

A. Yes. Although the current project cost estimate does increase some contingencies, we believe that given recent history of large construction projects and current market conditions, it is reasonable to assume that the actual cost of completing the Little Gypsy Repowering Project may be more than 10 percent higher than the current cost estimate. This is especially true because all project bids have not been let and construction has not even started.

Q. What would be the results of the Fundamental Analysis if all of the flaws that you have identified were corrected?

A. Unfortunately, we have not had enough time to redo the Fundamental Analysis to reflect the inclusion of demand side management and renewable resources as part

[45] Exhibit APW-18.

of a portfolio of alternatives to the Repowering Project. Nor have we had the time or the information to estimate the cost of repowering Little Gypsy as a CCGT.

However, Table 5 below shows what the results of the Fundamental Analysis would be if we made the modest assumption that the construction costs of both the Repowering Project and CCGT alternative facility increase by 10 percent and 20 percent and/or if we assume that future CO_2 prices will be moderately higher (that is, $10/ton) than the Company's high CO_2 price sensitivity.

Table No. 5: Results of the Fundamental Analysis Assuming Increased Construction Costs and Alternative CO_2 Prices

Scenario	No CO_2 Costs	Company Base CO_2 Price Sensitivity	Company High CO_2 Price Sensitivity	Alternative CO_2 Price Sensitivity
	Benefit/(Cost) to Repowering Project			
	(millions 2006$)			
$5.00/mmBtu Gas Price	($424)	($80)	($1,330)	($1,630)
$5.00/mmBtu Gas Price + 10% increase in cost of Repowering Project and CCGT Alternative	($564)	($220)	($1,470)	($1,770)
$5.00/mmBtu Gas Price + 20% increase in cost of Repowering Project and CCGT Alternative	($704)	($360)	($1,610)	($1,910)
$7.00/mmBtu Gas Price	$461	$82	($443)	($743)
$7.00/mmBtu Gas Price + 10% increase in cost of Repowering Project and CCGT Alternative	$320	($60)	($580)	($880)
$7.00/mmBtu Gas Price + 20% increase in cost of Repowering Project and CCGT Alternative	$180	($200)	($720)	($1,020)
$8.00/mmBtu Gas Price	$904	$530	$0	($300)
$8.00/mmBtu Gas Price + 10% increase in cost of Repowering Project and CCGT Alternative	$760	390	($140)	($440)
$8.00/mmBtu Gas Price + 20% increase in cost of Repowering Project and CCGT Alternative	$620	$250	($280)	($580)

Each of the figures in the parentheses in Table 5 means that the Repowering Project would be more expensive in that scenario, in 2006 dollars, than the alternative CCGT facility. Thus, as can be seen from this Table, there are a large

number of reasonable scenarios in which the Repowering Project would be a significantly higher cost option. Clearly, the Company's Fundamental Analysis shows that there is a substantial economic risk associated with pursuing the Repowering Project.

Q. Haven't you just presented a series of worst case analyses in Table 5 above?

A. Not at all. Given the very high cost escalation that has been experienced by power construction costs in recent years, it is not unreasonable to expect that the cost of both the Repowering Project and the CCGT alternative could increase by significantly more than 20 percent by the time that design, procurement and construction actually are completed by 2011/2012. It also is possible that future CO_2 emissions allowance prices will be higher than that alternative prices that underlie the figures shown in the right-hand column of Table 5.

Q. Have you seen any evidence that the levelized Fundamental Analysis presented by Entergy Louisiana witness Walz overstates the economic benefits of the proposed Repowering Project?

A. Yes. The reference case in the Fundamental Analysis, with a $7/mmBtu gas price and a $0/ton CO_2 price shows a $461 million net present value benefit to the repowering of Little Gypsy Unit 3 as compared to the CCGT alternative.[46] However, the results of the Company's PROSYM analysis, which appear to reflect the same main assumptions, shows only a $94 million net present value benefit to the Repowering Project.[47]

[46] Exhibit APW-11.
[47] Exhibit APW-19.

Q. Is it reasonable to expect that the difference in the results of the two analyses in due to the differences in the length of the analyses, that is 30 years for the levelized Fundamental Analysis and 25 years for the PROSYM analysis?

A. No. The difference in the number of years considered in each analysis might have some effect but would not result in such a startling difference between the two analyses. It is more likely that the PROSYM simulation modeling more accurately reflects the Entergy Louisiana system and, consequently, the relative costs of the different projects than the simplistic levelized methodology used in the Fundamental Analysis.

Q. Do the results of the PROSYM Analysis presented by Entergy Louisiana witness Walz then show that repowering Little Gypsy Unit 3 as a CFB is the lowest cost, lowest risk option for the Company and its ratepayers?

A. No. The single scenario presented by Mr. Walz is significantly flawed in several ways. First, the PROSYM analysis does not reflect any CO_2 emissions allowance prices.[48] As I have discussed earlier in this testimony, it is reasonable to assume that there will be federal regulation of greenhouse gas emissions in the near future. The costs of such greenhouse gas regulations should be considered in any evaluation of the economics of pursuing fossil-fired generating alternatives. Second, the PROSYM analysis presented by Mr. Walz does not examine the potential for including energy efficiency and/or renewable resources as part of a portfolio of alternatives to repowering Little Gypsy Unit 3 as a CFB. Third, Mr. Walz only presents the results of a single PROSYM base case comparison that does not reflect the risk of higher fuel costs or higher construction costs for either the repowering of Little Gypsy Unit 3 or the CCGT alternative.

[48] Direct Testimony of Anthony P. Walz, at page 42, line 1.

Q. Did Entergy Louisiana include any costs for carbon capture and sequestration in the PROSYM Analysis for either the Repowering Project or the CCGT alternative?

A. No.

Q. Did Entergy Louisiana reflect in the PROSYM Analysis any of the performance penalties that can be expected from the addition and use of carbon capture technology for either the Repowering Project or the CCGT alternative?

A. No.

Q. Do you have any other observations about the results of the single PROSYM analysis presented by Mr. Walz?

A. Yes. I have two other observations. First, the results of Mr. Walz' PROSYM analysis are present valued to 2011 dollars. The $94 million net present value benefit for the Little Gypsy Repowering Project would translate into about $65-70 million in 2006 dollars.

In addition, as shown on Table 6 below, although the results of the PROSYM analysis show an overall net present value benefit to the Repowering Project, the CCGT alternative actually would be the less expensive option until the year 2031, or for the first 19 years of the analysis.

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Table 6: PROSYM Break-even Analysis (in 000$)

	With Little Gypsy			With CCGT					
Year	Total PROSYM Fuel and Purchased Power	Incremental Non-fuel Revenue Requirement	Total	Total PROSYM Fuel and Purchased Power	Incremental Non-fuel Revenue Requirement	Total	Benefit/(Cost) of Little Gypsy over CCGT	Annual Present Value Benefit (Cost)	Cumulative Present Value Benefit (Cost)
					(000$)				
2012	4,730,986	245,874	4,976,860	4,861,385	59,992	4,921,377	(55,483)	($51,089)	($51,089)
2013	5,045,099	241,976	5,287,075	5,171,743	58,839	5,230,582	(56,493)	($47,900)	($98,989)
2014	5,333,784	234,650	5,568,435	5,463,829	56,881	5,520,711	(47,724)	($37,261)	($136,249)
2015	5,645,756	227,719	5,873,475	5,775,373	55,015	5,830,388	(43,087)	($30,976)	($167,226)
2016	5,999,053	221,152	6,220,204	6,143,604	53,234	6,196,838	(23,366)	($15,468)	($182,694)
2017	6,349,523	214,924	6,564,447	6,496,735	51,533	6,548,268	(16,179)	($9,862)	($192,556)
2018	6,858,595	209,011	7,067,606	7,015,509	49,905	7,065,414	(2,192)	($1,230)	($193,786)
2019	7,359,647	203,391	7,563,038	7,522,847	48,345	7,571,192	8,154	$4,214	($189,572)
2020	7,718,341	198,042	7,916,383	7,885,442	46,849	7,932,291	15,908	$7,571	($182,001)
2021	8,143,810	192,751	8,336,561	8,319,821	45,366	8,365,187	28,626	$12,545	($169,456)
2022	8,638,338	187,474	8,825,812	8,823,774	43,885	8,867,660	41,847	$16,887	($152,569)
2023	9,072,190	223,213	9,295,403	9,260,730	52,036	9,312,766	17,362	$6,451	($146,118)
2024	9,567,306	217,966	9,785,273	9,764,396	50,562	9,814,958	29,685	$10,157	($135,961)
2025	10,095,273	213,737	10,309,010	10,300,341	49,326	10,349,667	40,657	$12,809	($123,152)
2026	10,592,794	208,522	10,801,316	10,807,107	47,858	10,854,965	53,649	$15,564	($107,589)
2027	11,217,218	204,325	11,421,543	11,440,854	46,628	11,487,482	65,939	$17,614	($89,974)
2028	11,850,089	199,144	12,049,233	12,080,559	45,167	12,125,727	76,494	$18,816	($71,159)
2029	12,369,227	194,980	12,564,207	12,607,545	43,945	12,651,490	87,282	$19,769	($51,389)
2030	13,144,046	189,834	13,333,880	13,389,429	42,491	13,431,921	98,041	$20,447	($30,942)
2031	13,758,743	184,707	13,943,450	14,015,212	41,041	14,056,253	112,803	$21,663	($9,279)
2032	14,319,249	180,597	14,499,846	14,580,151	39,830	14,619,980	120,134	$21,244	$11,966
2033	15,001,530	177,075	15,178,605	15,270,528	38,755	15,309,283	130,678	$21,279	$33,244
2034	15,691,512	176,142	15,867,654	15,969,328	38,288	16,007,616	139,962	$20,986	$54,230
2035	16,301,806	174,228	16,476,035	16,583,457	37,591	16,621,048	145,013	$20,021	$74,251
2036	17,051,901	173,335	17,225,236	17,344,543	37,132	17,381,675	156,439	$19,888	$94,140
					Net Present Value				
	$81,821,143	$2,174,120	$83,995,262	$83,575,446	$513,956	$84,089,402	$94,140		

Q. Given these results, is it reasonable to assume that the resource plan that includes the CCGT alternative would have been the lower cost plan in the PROSYM if Entergy Louisiana had included CO_2 emissions allowance prices?

A. Yes. The PROSYM analysis should properly be rerun to reflect reasonable forecasts of CO_2. However, there has not been time or resources for us to do that in this case.

Nevertheless, it is possible to approximate the effect of including CO_2 prices by multiplying the corrected annual CO_2 emissions for the Repowering and CCGT alternative plans looked at by Entergy Louisiana by the annual CO2 price assumed by the Company in its base and high CO_2 price forecasts. The results of this calculation are shown in Exhibit DAS-7.

As shown in Exhibit DAS-7, the Company's plan that includes the repowering of Little Gypsy as a CFB plant would be more expensive than building a new CCGT facility by $247 million, net present value, under the Company's base CO_2 price forecast and by $682 million, net present value, under the Company's high CO_2 forecast.

Q. Why do you say that you included the "corrected" annual CO_2 emissions under the Repowering and alternative CCGT plans considered by Entergy Louisiana in its PROSYM analysis?

A. When we looked at the input and output files for the PROSYM analysis, we discovered that Entergy had input a very, very low CO_2 emission rate/MWh for the repowered Little Gypsy plant. We revised this assumption to reflect the information from Entergy Louisiana that indicated that the repowered plant would emit a much higher 2151 lbs of CO_2 per MWh.

Q. Entergy Louisiana witness Walz discusses the benefits of the proposed repowering of the Little Gypsy Unit for supply diversity.[49] Do you agree that supply diversity is an issue that the Commission should consider as it evaluates the proposed repowering project?

A. Yes. I think supply diversity is a very important consideration. However, I don't believe that repowering Little Gypsy Unit 3 as CFB coal-fired plant is a reasonable option for increasing Entergy's supply diversity.

Q. Why is considering a company's generation mix the appropriate way to evaluate its fuel diversity?

A. Because the issue of fuel diversity is a matter of the amount of each type of fuel that the company burns, and the cost consequences of burning that fuel. Simply

[49] For example, see pages 14 through 16 of the Direct Testimony of Anthony P. Walz.

looking at its capacity mix does not offer any information about the utilization of that capacity.

Q. Is fuel diversity a broader issue than merely deciding whether to build a coal- or gas-fired generating unit?

A. Yes, it should be. Implementing demand side management programs and building or buying power from low carbon-emitting renewable resource facilities also would increase a company's supply diversity. Investments in demand side management and renewable resources would provide real benefits in terms of supply diversity by reducing Entergy's dependency on coal, oil and gas.

Q. Entergy Louisiana stresses the uncertainties associated with the price of natural gas. Are there any similar uncertainties associated with the building and operation of new coal-fired generating facilities?

A. Yes. There are a number of potential uncertainties associated with coal-fired facilities that the Commission should consider as it evaluates the proposed Repowering Project. The primary uncertainty is associated with the potential for greenhouse gas regulations. As I have noted earlier in this testimony, there is a significant potential that substantial CO_2 emissions allowance prices will be set as part of a cap-and-trade plan for reducing carbon dioxide emissions by perhaps 60% to 80% by the middle of this century.

Rising power plant construction costs also are a significant uncertainty associated with adding new coal-fired generating units such as a repowered Little Gypsy Unit 3.

Q. Does this conclude your testimony?

A. Yes.

AFFIDAVIT

STATE OF MASSACHUSETTS

COUNTY OF MIDDLESEX

NOW BEFORE ME, the undersigned authority, personally came and appeared, David Schlissel, who after being duly sworn by me, did depose and say:

The above and foregoing in his sworn testimony in this proceeding and that he knows the contents thereof, that the same are true as stated, except as to matters and things, if any stated on information and belief, and that as to those matters and things, he verily believes them to be true.

David A. Schlissel

SOWRN TO AND SUBSCRIBED BEFORE ME
THIS 14th **DAY OF** September, **2007**

Melissa Dawn Whited
NOTARY PUBLIC

My commission expires January 10, 2014

The Commonwealth of Massachusetts
On this 14th day of September 2007,
before me, the undersigned notary public, personally appeared
David A. Schlissel
proved to me through satisfactory evidence of identification, which were known to me
to be the person whose name is signed on the preceding or attached document and
acknowledged to me that he/she signed it voluntarily for its stated purpose.
Melissa Dawn Whited
MELISSA DAWN WHITED, Notary Public
My Commission Expires January 10, 2014