BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

In the Matter of the Application of Black Hills Power, Inc. For Authority to Increase Its Electric Rates	**)** **)** **)** **)**	**DOCKET NO. EL09-018**

DIRECT TESTIMONY OF DAVID A. SCHLISSEL ON BEHALF OF THE RESIDENTIAL CONSUMERS COALITION (Bobbie Handley, Lilias Jarding, Carla Kock, and the South Dakota Peace and Justice Center)

PUBLIC VERSION
PROTECTED MATERIALS REDACTED

APRIL 30, 2010

List of Exhibits

Exhibit DAS-1	Current Résumé for David A. Schlissel
Exhibit DAS-2	*Climate Change and Power: Carbon Dioxide Emissions Costs and Electricity Resource Planning*
Exhibit DAS-3	*Synapse 2008 CO_2 Price Forecasts*
Exhibit DAS-4	*Don't Get Burned, the Risks of Investing in New Coal-Fired Generating Facilities*
Exhibit DAS-5	[CONFIDENTIAL] Attachment No. 37.1 to Black Hills Power's Response to Residential Consumers Coalition Data Request No. 37
Exhibit DAS-6	[CONFIDENTIAL] Attachment No. 24.1 to Black Hills Power's Response to Residential Consumers Coalition Data Request No. 24
Exhibit DAS-7	[CONFIDENTIAL] Attachment No. 56.1 to Black Hills Power's Response to Black Hills Industrial Intervenors Data Request No. 56

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

A. My name is David A. Schlissel. I am the President of Schlissel Technical Consulting, Inc., 45 Horace Road, Belmont, MA 02478.

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 General Staff of the Arkansas Public Service Commission, the U.S. Department of Justice, the Attorney General of the State of New York, 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, California, 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 Residential Consumers Coalition ("RCC").

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Q. Have you testified previously before the South Dakota Public Utilities Commission?

A. Yes. I have testified in Docket No. EL05-022.

Q. What is the purpose of your testimony?

A. I have been asked to review the reasonableness of Black Hills Power's 2007 Integrated Resource Plan ("IRP") and the Company's decision to build the Wygen III coal-fired power plant.

This testimony presents the results of my analyses.

Q. Please summarize your conclusions.

A. My conclusions are as follows:

1. The Base or Reference Case Carbon Dioxide ("Carbon" or "CO_2") prices used by Black Hills Power in the 2007 IRP were unreasonably low. The CO_2 prices that Black Hills Power has described as a "High CO_2 Tax Case" or the "Very High CO_2 Case" actually were closer to what the Company should have used as its Base or Reference Case prices.

2. Contrary to the testimony of Black Hills Power witness Tietjen, the estimated carbon or CO_2 prices used in the 2007 IRP have not been validated by government agencies and are not reasonable from today's perspective or at the time the IRP was prepared.

3. At the time that it decided to undertake the Wygen III project, Black Hills Power was extremely dependent on coal-fired generation. Building another coal-fired unit was a very risky decision in light of likely federal regulation of greenhouse gas emissions. Black Hills Power remains extremely dependent on coal-fired generation.

4. Black Hills Power projects that its annual CO_2 emissions will [redacted] percent between 2005 and 2030. This is contrary to developing federal

climate change policies which project 42 percent *reductions* in CO_2 emissions during this same period.

Q. Did Black Hills Power adequately consider the potential financial risks of future CO_2 emissions in its 2007 IRP?

A. No. The Reference Case CO_2 prices (in the form of taxes) that Black Hills Power used in the 2007 IRP were unreasonably low. These CO_2 allowance costs were well below then-current price projections from independent sources including: the Energy Information Administration of the U.S. Department of Energy ("EIA"), the U.S. Environmental Protection Agency ("EPA"), and researchers at the Massachusetts Institute of Technology ("MIT") and Duke University ("Duke").

Q. What is the basis for this conclusion?

A. Figure 1, below, compares the annual Reference Case and High CO_2 Case CO_2 prices used in Black Hills Power's 2007 IRP with the results of the following modeling analyses that were available to Black Hills Power at the time it was preparing its 2007 IRP:

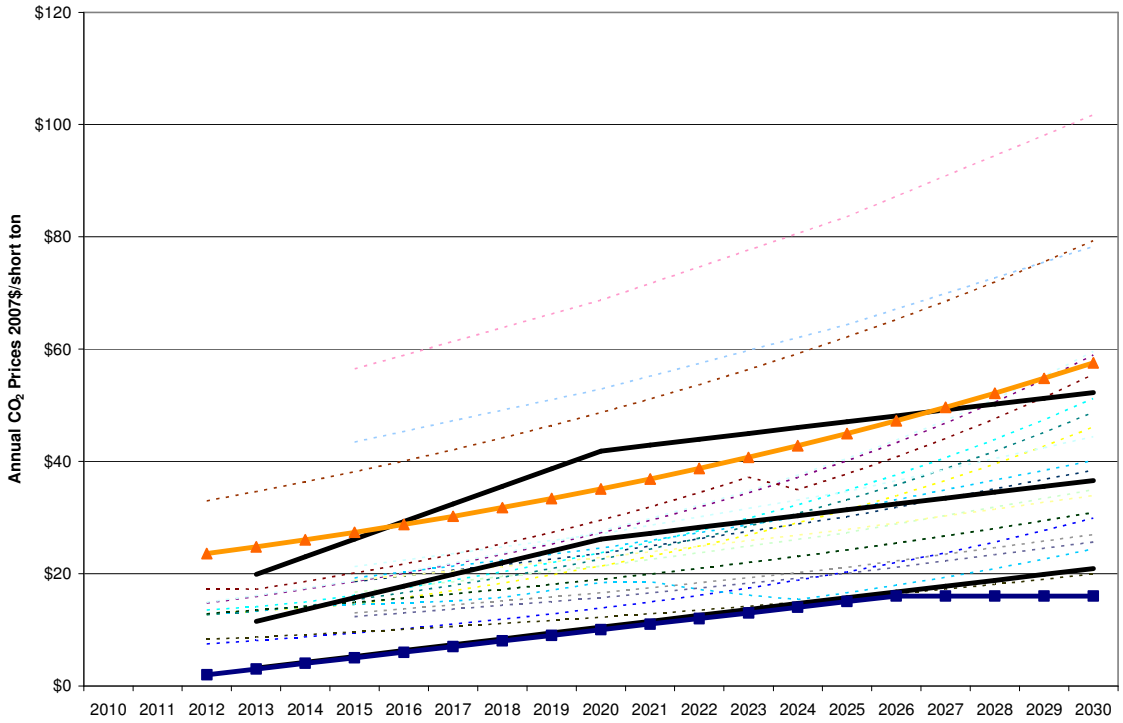
- The EIA's assessment of the *Energy Market and Economic Impacts of S. 280, the Climate Stewardship and Innovation Act of 2007* (July 2007).[1]
- The EIA's October 2007 Supplement to *the Energy Market and Economic Impacts of S. 280, the Climate Stewardship and Innovation Act of 2007*.[2]
- The EPA's *Analysis of the Climate Stewardship and Innovation Act of 2007 – S. 280 in 110th Congress* (July 2007).[3]
- The *Assessment of U.S. Cap-and-Trade Proposals* by the Joint Program at MIT on the Science and Policy of Global Change (April 2007).[4]
- *The Lieberman-Warner America's Climate Security Act: A Preliminary Assessment of Potential Economic Impacts*, prepared by the Nicholas

[1] Available at http://www.eia.doe.gov/oiaf/servicerpt/csia/pdf/sroiaf(2007)04.pdf.
[2] Available at http://www.eia.doe.gov/oiaf/servicerpt/biv/pdf/s280_1007.pdf.
[3] Available at http://www.epa.gov/climatechange/economics/economicanalyses.html.
[4] Available at http://web.mit.edu/globalchange/www/MITJPSPGC_Rpt146.pdf.

Institute for Environmental Policy Solutions, Duke University and RTI International (October 2007).[5]

The dashed lines in Figure 1 are the annual CO_2 prices that were developed in each of the scenarios that were studied by the EIA, the EPA, MIT, and Duke. The solid black lines are the Low, Mid and High CO_2 price forecasts that were developed by Synapse Energy Economics in 2006. The blue lines with the squares represents Black Hills Power's Base CO_2 price forecast. The orange line with triangles represents the Company's High CO_2 prices.

Figure 1: Annual CO_2 Prices – Black Hills Power Reference Case and High CO_2 Prices vs. EPA, EIA, MIT and Duke Analyses and the Synapse Price Forecasts as of 2007

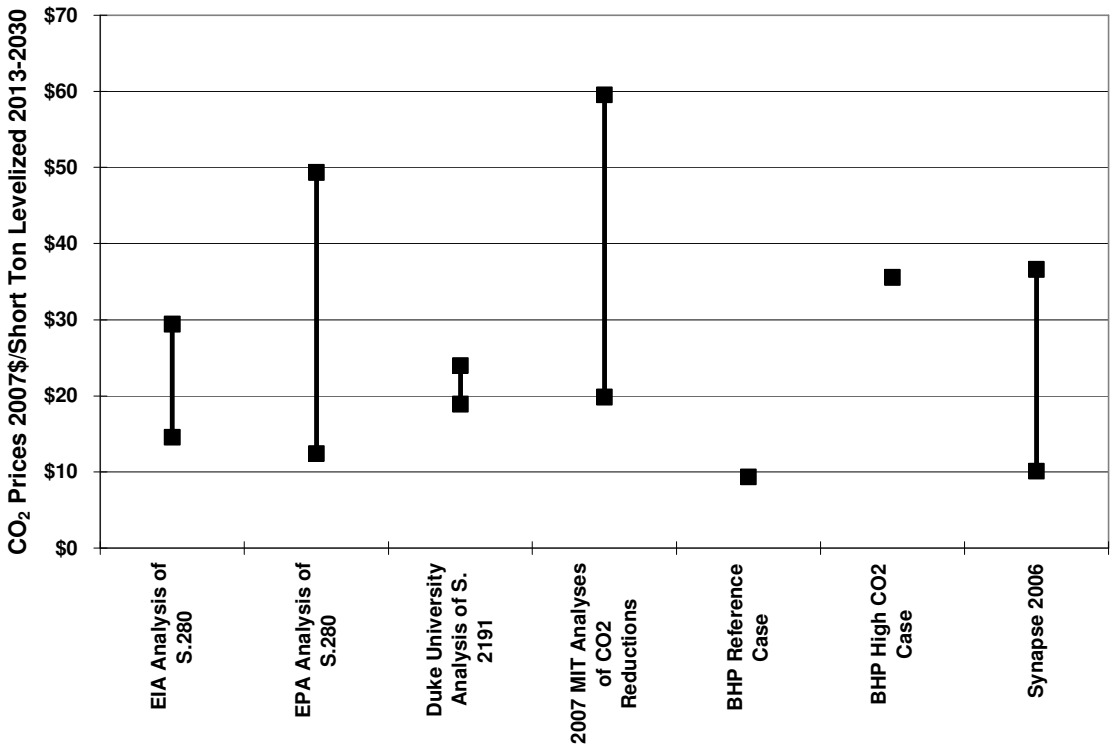


As can be seen from Figure 1, the Company's Reference Case CO_2 prices were lower than any of the projections from the EIA, the EPA, MIT or Duke and were comparable to the Synapse Low CO_2 prices.

[5] Available at http://www.nicholas.duke.edu/institute/econsummary.pdf.

Figure 2, below, presents the same comparison except that the CO_2 prices are presented as the levelized costs for the years 2013 through 2030 (in 2007 dollars). Again, it is clear that the Reference Case CO_2 prices used by Black Hills Power in its 2007 IRP were too low to be used as the main base case CO_2 prices in an IRP.

Figure 2: Levelized CO_2 Prices – Black Hills Power Reference Case CO_2 Prices vs. EPA, EIA, MIT and Duke Analyses and Synapse Price Forecasts as of 2007



Q. What was the impact of Black Hills Power's use of such low CO_2 prices in its Reference Case analyses?

A. The use of such low CO_2 prices biased the analyses in favor of the most carbon intensive alternative, the coal-fired power plant.

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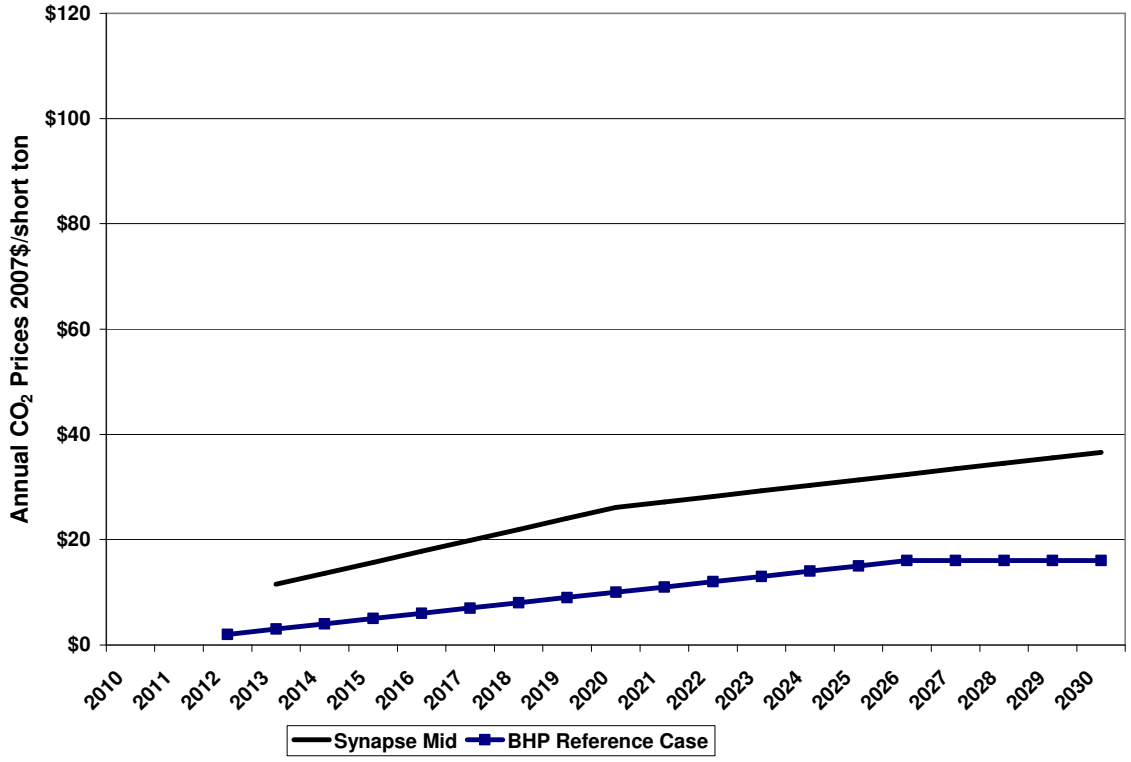
Q. What is the basis for the Synapse Low, Mid and High CO_2 prices that you have included in Figures 1 and 2?

A. Synapse developed a set of three CO_2 price trajectories (Low, Mid and High) in 2006 that we believed were appropriate for use in utility resource planning analyses such as IRPs. The basis for these price trajectories is described in detail in Exhibit DAS-2.

Q. What would have been more reasonable CO_2 prices for Black Hills Power to have used in its IRP Reference Case analyses?

A. Black Hills Power should have used a set of CO_2 prices in its Reference Case analyses similar to the Synapse Mid CO_2 Price Forecast. These two sets of CO_2 prices are compared in Figure 3 below:

Figure 3: CO_2 Prices – Black Hills Power Reference Case CO_2 Prices vs. Synapse Mid CO_2 Price Forecast



Q. Should Black Hills Power have considered a range of CO_2 Prices in its 2007 IRP?

A. Yes. Black Hills Power could have used the Synapse Mid CO_2 Price Forecast as its Base Case, with its own Reference Case CO_2 prices as a low sensitivity and its High CO_2 Case prices as a high sensitivity (as it did). It is important and prudent to consider such a range of possible CO_2 prices given the uncertainties associated with the timing, stringency and design of federal regulation of greenhouse gases.

Q. Should the Commission given any weight to the IRP analyses that used Black Hills Power's Reference Case CO_2 prices?

A. Because they were so low, the Commission should only give minimal weight to any analyses that used Black Hills Power's Reference Case CO_2 prices.

Q. Do you agree with the testimony of Black Hills Power witness Tietjen that the 2007 IRP "bracketed the current estimates of carbon prices being made by governmental agencies?"

A. Although technically correct, Ms. Tietjen's testimony is misleading. It is correct that the Reference Case CO_2 prices used by Black Hills Power in the 2007 IRP were close to or below the lower end of the CO_2 prices developed through 2007 by government agencies and independent studies at MIT and Duke University (as I have shown above) and that the High Case CO_2 prices used by the Company were a reasonable set of high CO_2 prices. However, as I explained above, Black Hills Power should not have used the Reference Case CO_2 prices for the main base case analyses on which the Company would seek to rely. They were far too low for that. Instead, the Reference Case CO_2 prices should have been used as a low sensitivity, as I discussed previously, with a set of CO_2 prices similar to the Synapse Mid CO_2 Price Forecast being used for the main base case analyses.

Q. Do you believe that the carbon prices used by Black Hills Power in its 2007 IRP are valid today?

A. No. The Company's Reference Case CO_2 prices remain at or below both the carbon prices developed in federal and independent assessments of proposed climate change legislation and the prices being used by many utilities and state regulatory commissions in resource planning analyses.

For example, Figure 4, below, compares the CO_2 emissions prices that Black Hills Power used in their 2007 IRP analyses and the current 2008 Synapse CO_2 price forecasts with the results of the independent modeling of the legislation that has been introduced in the U.S. Congress in recent years.

The modeling analyses in Figure 4 includes studies prepared by the EPA, the EIA, MIT, Duke University, the Clean Air Task Force, the American Council for Capital Formation, the National Association of Manufacturers, CRA-

International, Inc., and the Natural Resources Defense Council ("NRDC"). These modeling analyses include:

- The EIA's assessment of the *Energy Market and Economic Impacts of S. 280, the Climate Stewardship and Innovation Act of 2007* (July 2007).[6]
- The EIA's October 2007 Supplement to the *Energy Market and Economic Impacts of S. 280, the Climate Stewardship and Innovation Act of 2007*.[7]
- The EIA's assessment of the *Energy Market and Economic Impacts of S. 1766, the Low Carbon Economy Act of 2007* (January 2008).[8]
- The EIA's assessment of the *Energy Market and Economic Impacts of S. 2191, the Lieberman-Warner Climate Security Act of 2007* (April 2008).[9]
- The EIA's assessment of the *Energy Market and Economic Impacts of H.R. 2454, the American Clean Energy and Security Act of 2009* (August 2009).[10]
- The EPA's *Analysis of the Climate Stewardship and Innovation Act of 2007 – S. 280 in 110th Congress* (July 2007).[11]
- The EPA's *Analysis of the Low Carbon Economy Act of 2007 – S. 1766 in 110th Congress* (January 2008).[12]
- The EPA's *Analysis of the Lieberman-Warner Climate Security Act of 2008 – S. 2191 in 110th Congress* (March 2008).[13]
- The EPA's *Analysis of the American Clean Energy and Security Act of 2009*, *H.R. 2454 in the 111th Congress* (June 2009).[14]
- *Assessment of U.S. Cap-and-Trade Proposals* by the Joint Program at MIT on the Science and Policy of Global Change (April 2007).[15]
- *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).[16]

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6 Available at http://www.eia.doe.gov/oiaf/servicerpt/csia/pdf/sroiaf(2007)04.pdf.
7 Available at http://www.eia.doe.gov/oiaf/servicerpt/biv/pdf/s280_1007.pdf.
8 Available at http://www.eia.doe.gov/oiaf/servicerpt/lcea/pdf/sroiaf(2007)06.pdf.
9 Available at http://www.eia.doe.gov/oiaf/servicerpt/s2191/pdf/sroiaf(2008)01.pdf.
10 Available at http://www.eia.doe.gov/oiaf/servicerpt/hr2454/index.html.
11 Available at http://www.epa.gov/climatechange/economics/economicanalyses.html.
12 Available at http://www.epa.gov/climatechange/economics/economicanalyses.html.
13 Available at http://www.epa.gov/climatechange/economics/economicanalyses.html.
14 Available at http://www.epa.gov/climatechange/economics/pdfs/HR2454_Analysis.pdf.
15 Available at http://web.mit.edu/globalchange/www/MITJPSPGC_Rpt146.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).[17]

- *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).[18]

- *The Lieberman-Warner Climate Security Act – S. 2191, Modeling Results from the National Energy Modeling System – Preliminary Results,* Clean Air Task Force (January 2008).[19]

- *Economic Analysis of the Lieberman-Warner Climate Security Act of 2007 Using CRA's MRN-NEEM Model*, CRA International (April 2008).[20]

- *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 (March 2008).[21]

In total, these modeling analyses examined more than 85 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.

As in Figure 1, above, the Black Hills Power Reference Case CO_2 prices in Figure 4 are shown in blue with square symbols. The Company's High CO_2 Prices are

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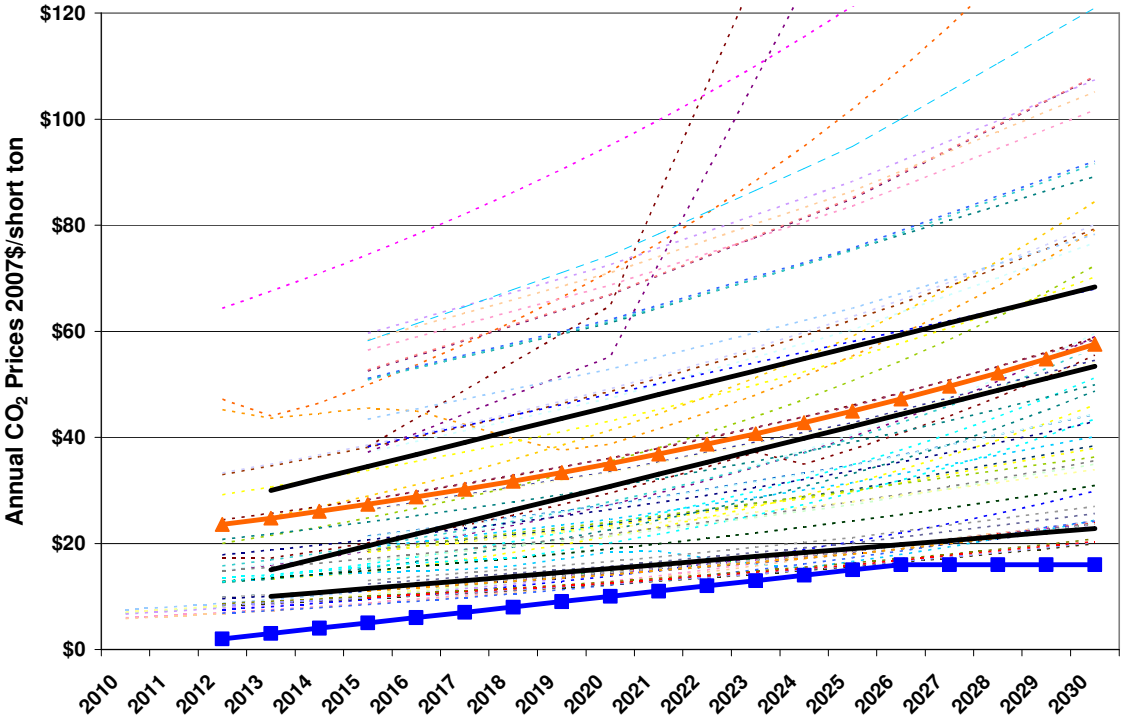
16 Available at http://mit.edu/globalchange/www/MITJPSPGC_Rpt146_AppendixD.pdf.
17 Available at http://www.nicholas.duke.edu/institute/econsummary.pdf.
18 Available at http://docs.nrdc.org/globalwarming/glo_08051401A.pdf.
19 Available at http://lieberman.senate.gov/documents/catflwcsa.pdf.
20 Available at http://www.nma.org/pdf/040808_crai_presentation.pdf.
21 Available at http://www.accf.org/pdf/NAM/fullstudy031208.pdf.

shown in orange with triangle symbols. The 2008 Synapse CO_2 Price Forecasts are in the solid black lines. All of the dashed lines represent the annual CO_2 Costs (in 2007 dollars per short ton) for each of the numerous scenarios studied in the EIA, EPA, MIT, Duke, and other assessments.

Figure 4: Annual Black Hills Power and Synapse 2008 CO_2 Prices Compared to Results of Modeling of Proposed Federal Legislation



As can be seen, the annual CO_2 costs used by Black Hills Power in its 2007 Reference Case IRP analyses are below the annual costs of all of the approximately 85 modeling scenarios that are included in Figure 4.

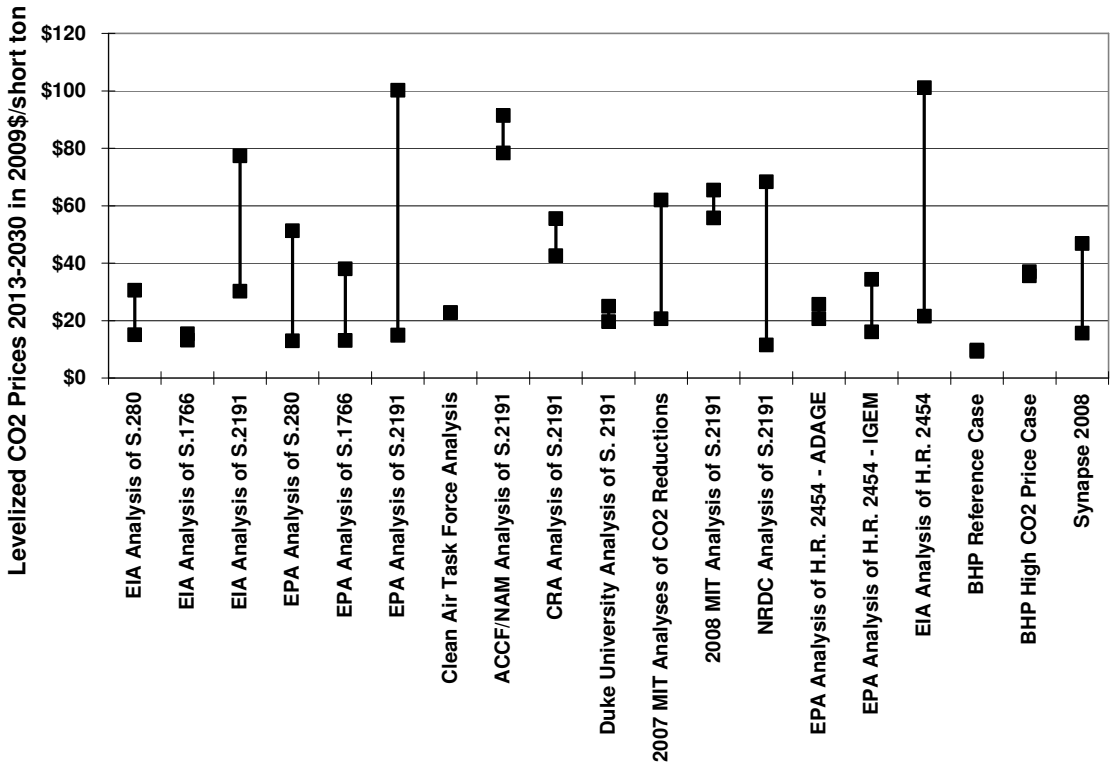
Figure 5, below, then presents the same comparison but in levelized prices for the years 2013 through 2030 (in 2009 dollars per short ton of CO_2).

In Figure 5:

- S.280 refers to the McCain-Lieberman bill introduced in 2007 in the 110th U.S. Congress.

- S.1766 refers to the Bingaman-Specter bill introduced in 2007 in the 110th U.S. Congress.
- S. 2191 refers to the Lieberman-Warner bill introduced in 2007 in the 110th U.S. Congress.
- HR. 2454 refers to the Waxman-Markey bill introduced in 2009 in the current 111th U.S. Congress.

Figure 5: Levelized Black Hills Power and Synapse 2008 CO_2 Prices Compared to Results of Modeling of Proposed Federal Legislation



Figures 4 and 5 confirm that the Reference Case CO_2 prices used by Black Hills Power were too low to represent base case assumptions. Instead, the Company should have assumed a higher set of base case CO_2 prices for its Reference Case analyses and kept its Reference Case CO_2 prices for a low CO_2 price sensitivity. Based on the information in Figures 4 and 5, it now appears that the Company's High CO_2 Case prices are probably more appropriate for the base case analyses and another, higher, set of CO_2 prices should be used in a High CO_2 price sensitivity.

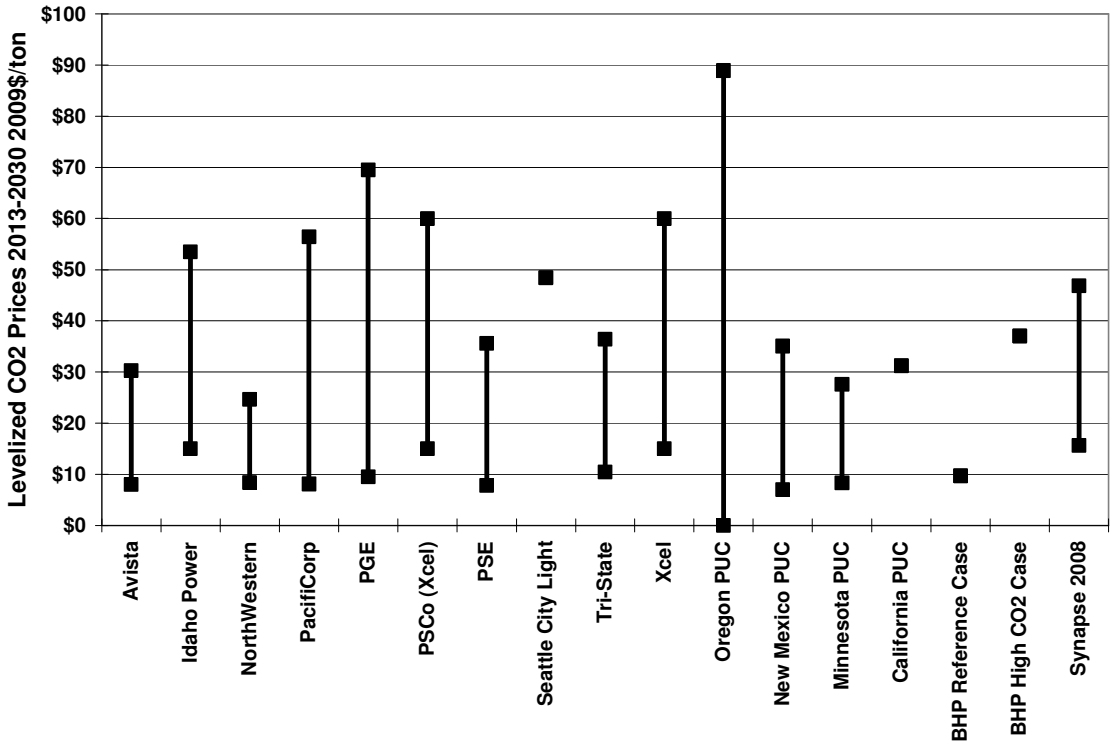
Q. Do Figures 4 and 5 include the modeling of the recent Waxman-Markey bill that has been passed by the U.S. House of Representatives?

A. Yes. The annual CO_2 prices from the recent modeling of the Waxman-Markey bill by the EIA and the EPA are included in Figure 4. In addition, the fourth through sixth bars from the right in Figure 5 provide the ranges of levelized CO_2 prices from that recent modeling of the Waxman-Markey bill.

Q. How do the Reference Case CO_2 prices that Black Hills Power used in its base case IRP analyses compare to the CO_2 prices that other utilities and state regulatory commissions are using in resource planning?

A. As can be seen from Figure 6, Black Hills Power's Reference Case CO_2 prices are at the low end of the ranges of CO_2 prices that other utilities and state regulatory commissions have been using in resource planning in recent years.

Figure 6: Levelized Black Hills Power CO_2 Prices Compared to Prices Used by Other Utilities and State Regulatory Commissions in Resource Planning



Q. Figures 1 and 2, above, include a set of Synapse 2006 CO_2 prices. Figures 3, 4, and 5 then include a set of Synapse 2008 CO_2 prices. Did Synapse revise its CO_2 price forecasts between 2006 and 2008?

A. Yes. Synapse issued a revised CO_2 price forecast in the summer of 2008. A copy of that revised forecast is attached as Exhibit DAS-3.

Q. Please explain why Synapse decided to revise the range of CO_2 prices that it recommends be used in resource planning.

A. Significant developments in the two years between 2006 and 2008 led Synapse to re-examine and revise the CO_2 price forecasts we had developed in 2006 to ensure that these forecasts reflected an appropriate level of financial risk associated with greenhouse gas emissions. Most importantly, the political support for serious climate change legislation had expanded significantly in Federal and State governments, as well as in the public at large, as the scientific evidence of climate change had become more certain. Concurrently, the new greenhouse gas regulation bills under consideration in the 110th U.S. Congress contained emissions reductions significantly more stringent than those that would have been required by proposals introduced in earlier years. Moreover, an increasing number of states had adopted policies, either individually and/or as members of regional coalitions, to reduce greenhouse gas emissions. In addition, between 2006 and 2008, additional information had been developed regarding technology innovations in the areas of renewables, 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 led to higher financial risks associated with future greenhouse gas emissions, justifying the use of higher projected CO_2 emissions allowance prices in electricity resource planning and selection for the period 2013 to 2030.

Q. Are the Synapse CO_2 prices reasonable when compared to the ranges of CO_2 prices that regulatory commissions and utilities use in resource planning?

A. Yes. The Synapse CO_2 prices have been used by a number of regulatory commissions around the nation including the New Mexico Public Regulation Commission, the Minnesota Public Utilities Commission and the California Public Utilities Commission.[22] In addition, other state regulatory commissions and an increasing number of utilities are using ranges of CO_2 prices in resource planning that are comparable to the Synapse CO_2 price forecasts.

Q. What is the goal of the climate change legislation and policies that are being considered in the federal and state governments and in regional agreements?

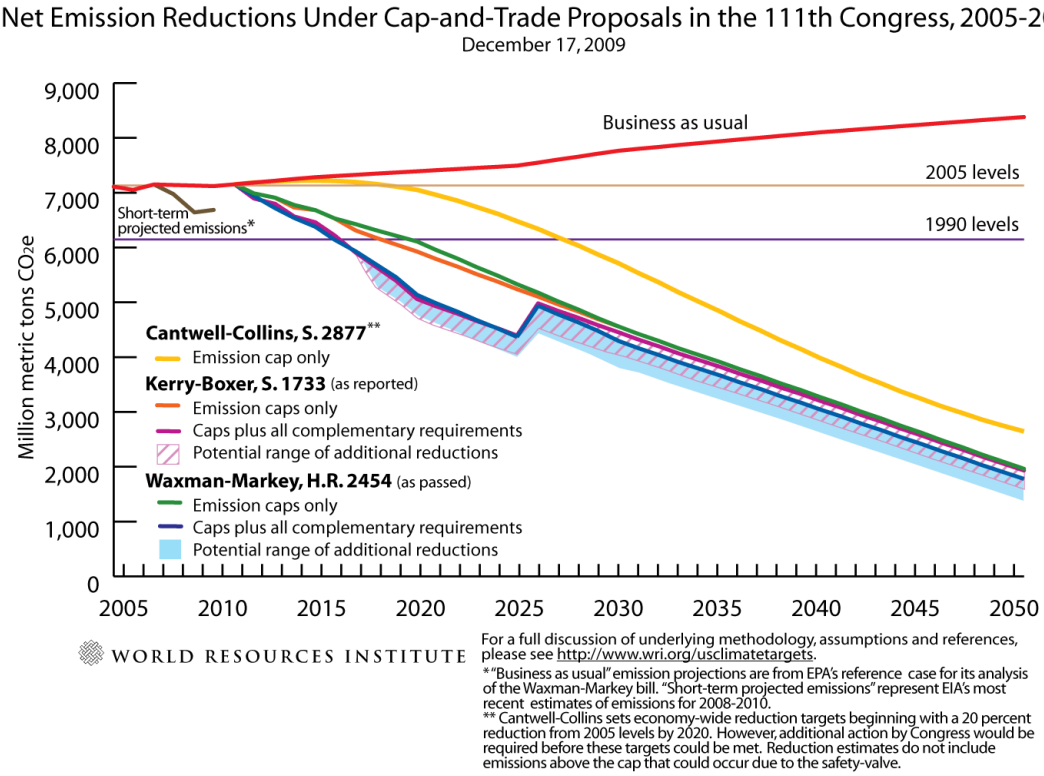
A. The general goal of most of the legislation and policies that are being discussed in the federal and state governments would be to reduce global CO_2 emissions by 60 percent to 80 percent from current levels by the middle of this century. It is generally believed by climate scientists that reductions of this magnitude might enable the world to avoid the most harmful effects of global climate change.

Q. What emissions reductions would be required under the bills that have been introduced in the current 111th U.S. Congress?

A. The emissions levels that would be mandated by some of these bills are shown in Figure 7 below:

[22] For example, the California PUC adopted the Synapse Mid CO_2 prices for a greenhouse gas adder. *See* CPUC Resolution E-4214, issued December 18, 2008, at pages 15 and 16. Available at http://docs.cpuc.ca.gov/word_pdf//FINAL_RESOLUTION/95553.pdf.

Figure 7: Comparison of Legislative Climate Change Targets in the Current 111th U.S. Congress as of December 17, 2009



It is uncertain which, if any, of the specific climate change bills that have been introduced to date in the Congress will be adopted. Nevertheless, the general trend 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.

Q. What would Black Hills Power's annual CO_2 emissions be under its proposed IRP resource plan?

A. The Company's annual CO_2 emissions through 2030 under its IRP Resource Plan are shown in Figure 8, below.

Figure 8: Black Hills Power's Projected Future Annual CO_2 Emissions through 2030[23] [CONFIDENTIAL]

[redacted]

Consequently, Black Hills Power's CO_2 emissions would be [redacted] percent through 2030 at the very time that the legislative proposals in Congress would be mandating reductions in emissions. In other words, Black Hills Power's CO_2 emissions would be [redacted] at a time when the mandated levels of emissions were being reduced.

[23] The source for Black Hills Power's recent CO_2 emissions is Attachment No. 37.1 to the Company's Response to RCC Data Request No. 37. A copy of this response is attached as Exhibit DAS-5 [Confidential]. The source for the Company's projected CO_2 emissions is Attachment No. 24.1 to its Response to RCC Data Request No. 24. A copy of this response is attached as Exhibit DAS-6 [Confidential].

Q. Was Black Hills Power heavily dependent on coal-fired generation even before the Wygen III unit was built?

A. Yes. [redacted] percent of the energy generated by Black Hills Power in 2006 came from coal-fired units.[24] [redacted] percent of the energy generated by the Company came from coal-fired units in 2007.[25]

Q. Is it prudent for a utility that is already extremely heavily dependent on coal to add yet another coal-fired unit?

A. No. Adding even more coal to its generation or fuel mix was not prudent given the significant risks to which the owners of existing and new coal plants are being exposed. These risks include the potential for federally mandated reductions in greenhouse gas emissions, state actions that would adversely affect the need for and the relative economics of coal-fired power plants, uncertainties related to carbon capture and sequestration, more stringent regulation of non-greenhouse gas emissions, and potential construction cost increases. These risks are discussed in more detail in *Don't Get Burned, the Risks of Investing in New Coal-Fired Generating Facilities*, a report that I co-authored in 2008. A copy of this report is attached as Exhibit DAS-4.

Q. Does this complete your testimony?

A. Yes.

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[24] The data on the generation of each of the Company's units was provided in Attachment No. 56.1 to Black Hills Power's Response to Black Hills Industrial Intervenors Data Request No. 56. A copy of this response is attached as Exhibit DAS-7 [Confidential].

[25] Id.