BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Application of Wisconsin Power & Light Company and Wisconsin Electric Power Company for a Certificate of Authority to Install a Selective Catalytic Reduction System on Unit 5 at the Edgewater Generating Station, Sheboygan County, Wisconsin	**)**	**DOCKET NO. 05-CE-137**

SURREBUTTAL TESTIMONY OF DAVID A. SCHLISSEL ON BEHALF OF JOHN MUIR CHAPTER OF THE SIERRA CLUB

CONTAINS REDACTED MATERIALS

JANUARY 12, 2010

List of Exhibits

Exhibit 4.10 (DAS-S1)	SB 450/AB 649, Sections 287 and 289
Exhibit 4.11 (DAS-S2)	[WPL Confidential] [redacted] provided in response to CUB/CW Request for Production Nos. 14 and 15 from their Third Set of Discovery.
Exhibit 4.12 (DAS-S3)	[WPL Confidential] [redacted] provided in response to CUB/CW Request for Production Nos. 14 and 15 from their Third Set of Discovery.
Exhibit 4.13 (DAS-S4)	Press Release from the Office of the Governor, dated January 7, 2010.
Exhibit 4.14 (DAS-S5)	MACT Consent Decree
Exhibit 4.15 (DAS-S6)	EPA Notice and Finding of Violations, dated December 14, 2009.
Exhibit 4.16 (DAS-S7)	Sierra Club Notice of Intent, dated December 21, 2009
Exhibit 4.17 (DAS-S8)	Comments from Sierra Club, dated June 29, 2009
Exhibit 4.18 (DAS-S9)	DNR Response to Comments, dated August 14, 2009
Exhibit 4.19 (DAS-S10)	Progress Energy December 1, 2009 filing at the North Carolina Utilities Commission

1. Introduction

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. Have you previously filed testimony in this proceeding?

A. Yes. I filed Direct Testimony on December 8, 2009.

Q. What is the purpose of this Surrebuttal Testimony?

A. I will be responding in this Surrebuttal Testimony to points made by WEPCO witness Knitter and WPL witnesses Bauer, Friedman and Guelker.

Q. Do WPL or WEPCO provide any persuasive evidence in their Rebuttal Testimony that the Commission should approve a certificate for the proposed Edgewater Unit 5 NO_x Reduction Project?

A. No.

WEPCO Witness Knitter

Q. Mr. Knitter testifies that WEPCO's CO_2 price forecast falls between the Synapse Low and the Synapse High CO_2 price forecasts.[1] Do you agree?

A. No. As Mr. Knitter describes in his Rebuttal Testimony WEPCO used a two-tier pricing scheme for CO_2 allowances: "We used this two-tier pricing of CO_2 allowances in our EGEAS modeling, using $2 per allowance (adjusted annually for inflation) for the first tier and a forecast of market prices for the second tier."[2] The first tier of CO_2 allowances--that is those with the much lower prices -- represent the allowances that WEPCO assumed would be allocated pursuant to the system outlined by the Governor's Task Force on Global Warming: "For a

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[1] Rebuttal Testimony of Jeff Knitter, at page R2.3, lines 8-12.
[2] Rebuttal Testimony of Jeff Knitter, at page R2.2, lines 32-34.

transition period of up to 10 years, a substantial majority of available allowances (such as 90 percent) needed by industry and Wisconsin utilities … should be allocated to such entities in Wisconsin at a fixed fee (such as $2 per allowance) adjusted annually for inflation and the remainder of the allowance should be auctioned."

Mr. Knitter Figure 1 (on page R2.3 of his Rebuttal Testimony) presents only what he calls the "second tier" prices for those CO_2 emissions allowances that WEPCO would have to purchase from the market. It does not reflect the costs of the millions of allowances that WEPCO has assumed it would be allocated each year at much lower prices. Consequently, Mr. Knitter's Figure 1 is misleading and does not really present the overall CO_2 prices used by WEPCO in its EGEAS modeling.

A more accurate representation of the CO_2 prices that WEPCO used in its EGEAS modeling would reflect the average prices that the Company would have to pay for all CO_2 allowances including both those allowances that the Company has assumed it would receive at very low prices for emissions below its assumed system cap and those remaining allowances it would have to purchase at market prices. As I have discussed in my Direct Testimony, a review of the information provided in the output files for WEPCO's EGEAS modeling analyses suggests that those average prices would be substantially lower than even the Synapse Low CO_2 price forecast.

Q. Why is it significant that Mr. Knitter's Figure 1 ignores the low cost allowances that WEPCO has assumed it would be allocated for emissions below its system cap?

A. As shown in Table S1 below, WEPCO has assumed that it will receive a very high percentage of the CO_2 emissions allowances that it would need through 2037 at very low cost far below the Company's projected market prices. This assumption has distorted the results of WEPCO's EGEAS modeling analyses in

favor of the installation of the proposed emissions control equipment at Edgewater Unit 5.

Table S1: WEPCO Base Emissions as Percentage of Total Emissions

Year	Base Emissions (Below WEPCO's Adjusted Cap) (Tons)	Total Emissions (Tons)	Base Emissions as % of Total Emissions
2014	17,362,241	24,494,526	71%
2020	15,452,395	23,880,288	65%
2030	11,090,959	16,783,836	66%
2037	8,909,965	17,674,526	50%

Consequently, as late as 2030, WEPCO is assuming that it will receive 66 percent, or approximately two-thirds, of the CO_2 emissions allowances that it will need at extremely low prices as a result of the allocation process suggested by the Governor's Task Force on Global Warming.

Q. Does WEPCO appear to fully follow the recommendations of the Task Force on Global Warming?

A. No. The portion of the Task Force's recommendations that Mr. Knitter quotes says that the allocation of available allowances at a fixed fee should be assumed "[f]or a transition period of up to the first ten (10) years."[3] However, WEPCO (and WPL as well) have assumed that the company would continue to be allocated substantial numbers of low priced CO_2 emissions allowances throughout the entire period 2012 through 2037. This is contrary to the recommendation of the Task Force on Global Warming that WEPCO says its methodology relies upon.

[3] Rebuttal Testimony of Jeff Knitter at page R2.2, lines 22-23.

Q. Are you aware of any proposed federal legislation that would establish a two-tier pricing scheme for CO_2 emissions allowances such as that assumed by WEPCO in its EGEAS modeling in this proceeding?

A. No. I have not seen any proposal that has been seriously considered in the U.S. Congress or that has been modeled by the U.S. EPA, EIA or any other independent organization that has included a two-tier pricing scheme for CO_2 emissions allowances similar to that used by WEPCO and WPL in this proceeding. The Waxman-Markey bill that has been passed by the U.S. House of Representatives certainly does not include such a two-tier pricing scheme. Likewise, the state law proposal that came out of the Global Warming Task Force recommendations, State Senate Bill 450/Assembly Bill 649, does not provide for the two tiered pricing system or the very low cost allocation of allowances assumed by WPL and WEPCO for the CO_2 prices in their EGEAS modeling analyses.[4]

Moreover, as I have discussed in my Direct Testimony, even if allowances under the assumed system cap were allocated at the extremely low prices that WEPCO has assumed, it would be proper to reflect in the EGEAS modeling the full opportunity costs of such allocated allowances.[5] These full opportunity costs would be market prices at which the allowances could be sold.

Indeed, as I have noted in my Direct Testimony, WEPCO and WPL assume that they could sell at market prices any unused emissions allowances that each company would be allocated at the low tier-one prices and has included the substantial credits that it would receive from such sales in its EGEAS modeling. Consequently, each company acknowledges the opportunity cost associated with such allocated allowances, thereby undermining the low CO_2 price forecasts they use in their EGEAS modeling.

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[4] Exhibit 4.10 (DAS-S1), SB 450/AB 649, Section 289 (creating § 299.04).
[5] See the Direct Testimony of David A. Schlissel, at page D4.16, line 6, to page D4.17, line 24.

Q. Mr. Knitter testifies that WEPCO's analysis reflects the opportunity cost of CO_2 emissions as you recommend.[6] Is this correct?

A. Only to a limited extent. It may be true that the Company has reflected the opportunity cost of those allowances it has to purchase for the emissions above its assumed annual adjusted emissions caps. However, as is shown on page 2 of 7 of Mr. Knitter's Exhibit 2.6, the prices of the first tier of CO_2 allowances assumed by WEPCO (that is, those below the cap) are significantly lower than the Company's assumed market prices. For example, the allowance prices that the Company assumed for 2016 for CO_2 emissions below the cap are only $1.06 per thousand pounds as compared to a market price of $9.67 per thousand pounds. This also is true for each year of the analysis through 2037. Thus, WEPCO cannot credibly argue that it has assumed the full opportunity costs for CO_2 emissions. It has not.

WPL Witness Bauer

Q. Does WPL use a two-tiered pricing scheme for CO_2 emissions similar to that used by WEPCO?

A. Yes. What Mr. Bauer has termed "WPL's Second Method" uses a two-tiered pricing scheme for CO_2 emissions similar to that used by WEPCO. In this "Second Method" WPL assumes that allowances for its Base CO_2 Emissions below its assumed annual system emissions limits would be allocated at much lower prices than the market prices at which the Company must purchase allowances for the Remaining Emissions above the assumed system limits.

This can be seen from Mr. Bauer's Exhibit 1.5 (RDB-4). For example, in 2015, WPL assumes a price of $2 per ton for each allowance for the Base Emissions below its assumed system limit of 12,828,191 tons and $14.63 per ton for each allowance for the Remaining Emissions above that assumed system limit.

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[6] Id, at page R2.4, lines 1-3.

Q. Mr. Bauer says that the "true price of purchased CO_2 allowance prices used by WPL for emissions exceeding its assumed system limit is $12.63/ton, $25.59/ton, $66.20/ton and $118/ton in each of 2014, 2020, 2030 and 2037.[7] What are the prices that WPL uses for the Base Emissions below the assumed system limit in each of these years?

A. Table S2 below presents the prices that WPL uses in each of the years 2014, 2020, 2030 and 2037 for the Base Emissions below its assumed annual system emissions limits in each of these years and for the Remaining Emissions above these system limits. These figures have been taken directly from Mr. Bauer's Exhibits 1.5 and 1.12.

Table S2: WPL's Second Method – Assumed Prices for Emissions Below and Above the Assumed System Cap

Year	Allowance Cost for Base CO_2 Emissions Below Assumed System LimitCap (per Ton)	Allowance Cost for Remaining CO_2 Emissions Above Assumed System Limit (per Ton)
2014	$2.00	$12.63
2020	$2.34	$25.59
2030	$3.01	$66.20
2040	$3.55	$118.52

Thus, WPL assumes that it will pay dramatically less for each of the Base Emissions allowances that it obtains in each of these years than it would have to pay if it had to purchase these allowances in the market. In making this assumption, WPL completely ignores the full opportunity cost of these allowances.

Q. Why is it significant that WPL assumes such lower prices for its Base Emissions allowances?

A. As shown in Table S3 below, the Base Emissions (that is, those emissions below the Company's assumed system emissions limits) represent a very high

[7] Rebuttal Testimony of Randy Bauer. at page R1.33, lines 14-18.

percentage of its total emissions. Consequently, the use of dramatically lower allowance prices for these emissions significantly reduces the cost of future operation of Edgewater Unit 5 and biases the Company's EGEAS modeling analyses.

Table S3: WPL Base Emissions as Percentage of Total Emissions

Year	Base Emissions (Below the Assumed System Limit) (Tons)	Total Emissions (Tons)	Base Emissions as % of Total Emissions
2014	12,828,191	13,955,805	92%
2020	11,417,089	11,508,101	99%
2030	8,194,648	8,853,775	93%
2037	6,583,171	7,822,708	84%

Thus, in 2020, for example, WPL assumes that it will be allocated 99 percent, or nearly all, of the emissions allowances it needs, for the price of only $2.34 per ton. WPL assumes that even as late as 2037 it will still be allocated 84 percent of the CO_2 emissions allowances it needs at prices far below the Company's assumed market prices. This is an unreasonable assumption and is contrary to the recommendation of the Task Force on Global Warming that recommends that the allocation of allowances at a fixed lower price be limited to a transition period of up to ten (10) years.

Q. What are the average prices that WPL uses for CO_2 emissions allowances under its Second Method?

A. Table S4 below presents the same information as was included in Table S2 above except that we also have included weighted average prices for CO_2 emissions in 2014, 2020, 2030 and 2037. These weighted average prices reflect the prices of all of the Company's emissions in each year, including both the Base Emissions below and the Remaining Emissions above its assumed system emissions limits. The emissions prices and annual emissions used to calculate these weighted average prices were taken directly from Mr. Bauer's Exhibit 1.12.

Table S4: WPL's Second Method – Weighted Average Allowance Prices for All System Emissions Including Base and Remaining Emissions

Year	Allowance Cost for Base CO_2 Emissions Below Assumed System LimitCap (per Ton)	Allowance Cost for Remaining CO_2 Emissions Above Assumed System Limit (per Ton)	Average CO_2 Price Used in WPL Second Method (per Ton)	Synapse Low CO_2 Price (per Ton)
2014	$2.00	$12.63	$2.86	$12.68
2020	$2.34	$25.59	$2.52	$21.05
2030	$3.01	$66.20	$7.71	$40.22
2040	$3.55	$118.52	$21.77	$47.81

Thus, the average price under WPL's Second Method for each CO_2 emissions allowance in 2020, for example, is only $2.52 per ton. This reflects that WPL assumes it would receive 99 percent of the total 13,956,805 allowances it needs that year at a cost of only $2.34 per ton and that it will only have to purchase a very small number of allowances at the projected market price of $25.59. The same is true in all of the other years of the period 2014 through 2037.

Q. Mr. Bauer disputes your conclusion that the CO_2 prices used in what he terms "WPL's Second Method" were significantly lower than even the Synapse Low CO_2 Price Forecast.[8] Does his evidence show that your conclusion was wrong?

A. No. As indicated in Table S4 above, the evidence in Mr. Bauer's own Exhibit 1.12 shows that the CO_2 prices used in "WPL's Second Method" are indeed significantly lower than even the Synapse Low CO_2 Price Forecast when the large numbers of very low-priced emissions allowances that WPL assumes it would receive for the Base Emissions below its assumed system limits are included. In other words, Mr. Bauer's evidence confirms that the conclusion in my Direct Testimony was correct.

[8] Rebuttal Testimony of Randy Bauer, at page R1.34, lines 2-10.

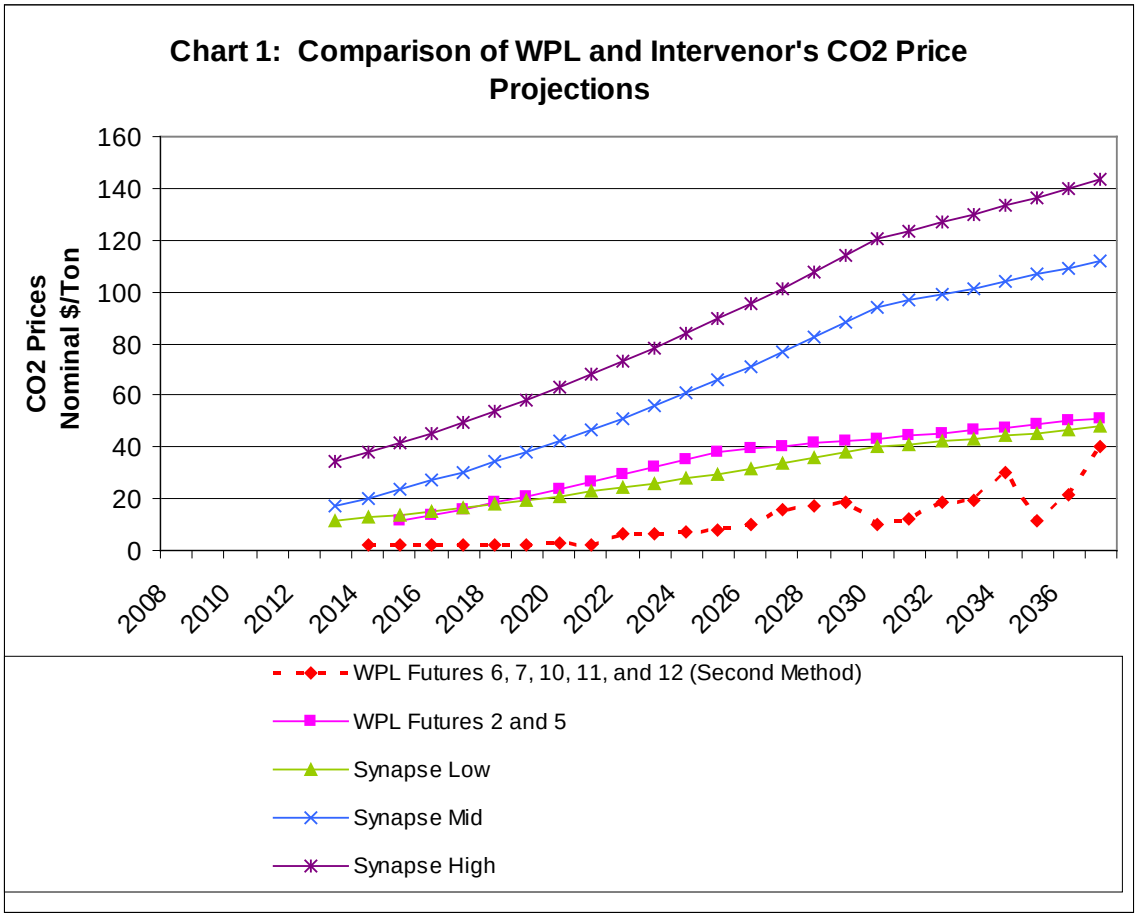
Q. Does Mr. Bauer's Chart 1 correctly represent the CO_2 prices used in WPL's EGEAS analyses for Futures 6, 7, 10, 11 and 12?

A. No. The line in Chart 1 that Mr. Bauer has labeled as "WPL's Second Method" does not reflect the cost of all of the CO_2 emissions allowances that WPL would have to purchase in its Futures 6, 7, 10, 11 and 12 scenarios. As I have explained above, the line does not include the prices of all of the Base Emissions allowances that WPL assumes it would be allocated for the emissions below its assumed system limits. It only reflects the costs of the relatively small portion of allowances that WPL would have to purchase from the market. Consequently, Mr. Bauer's Chart 1 misrepresents (that is, significantly overstates) the annual costs of emissions allowances used in its Futures 6, 7, 10, 11 and 12 EGEAS analyses.

Q. Have you revised Mr. Bauer's Chart 1 to reflect the costs of all of the CO_2 emissions allowances that WPL would have to purchase in its Futures 6, 7, 10, 11 and 12 EGEAS analyses?

A. Yes. Figure S1 below revises Mr. Bauer's Chart 1 to include the average cost per ton that WPL uses in its Futures 6, 7, 10, 11 and 12 EGEAS analyses. These average prices include the costs of all of the allowances that WPL would need for its CO_2 emissions not just the relatively small fraction of the allowances that WPL would have to purchase in the market.

Figure S1: Revised Bauer Chart 1 Reflecting Prices of All CO_2 Allowances Used In WPL Futures 6, 7, 10, 11 and 12 (WPL's Second Method)



Q. Mr. Bauer claims that WPL's Futures 2 and 5 CO_2 prices range from approximately $10-$25 per ton, in 2009 dollars, and that this range is the approximate range reflected by the EIA analysis of Senate Bill S.280 in Figure 2 in your Direct Testimony and the Northwestern utility bar in Figure 3.[9] Is this comparison valid?

A. No. Mr. Bauer's comparison is not valid for a number of reasons.

[9] Rebuttal Testimony of Randy Bauer at page R1.35, lines 1-6.

First, Mr. Bauer is comparing apples and oranges. The range of CO_2 allowance prices that he cites for WPL's Future 2 and 5 are the annual costs of allowances for individual years in the period between 2013 and 2037. He then inappropriately compares these annual costs with the costs in my Figures 2 and 3 which are the levelized costs for the entire period 2013 through 2030 for the different scenarios studied by the EIA. For this reason, his comparison has absolutely no probative value. The comparable levelized cost for the CO_2 allowances prices that WPL used in its Future 2 and 5 EGEAS analyses is $15.27 per ton, not up to $25 per ton as Mr. Bauer implies.

Second, Mr. Bauer wants the Commission to accept that WPL's Future 2 and 5 CO_2 prices are reasonable because they simply fall within the ranges of CO_2 prices developed in the EIA's analysis of Senate Bill S. 280 back in 2003 and/or used by another utility. But that misses the point of my Figures 2 and 3. What is important about the ranges of CO_2 prices presented in Figures 2 and 3 in my Direct Testimony is that so many independent analyses and so many regulatory commissions and utilities considered a wide range of scenarios and CO_2 prices in their analyses in order to reflect the uncertainties associated with the cost, details and timing of federal regulation of greenhouse gas emissions. The single set of CO_2 prices that WPL has used in its Futures 2 and 5 EGEAS modeling in this proceeding unreasonably assumes that its low CO_2 prices are correct and does not allow for any uncertainty. It also is clear from Figures 2 and 3 in my Direct Testimony that many other independent analyses, regulatory commissions and utilities examine much higher CO_2 costs in resource planning modeling than WPL has assumed in its Futures 2 and 5 EGEAS analyses.

Q. Mr. Bauer also claims that the range of CO_2 allowance prices used in WPL's Second Method fall within the approximate range reflected by the 2007 MIT Analyses bar in your Figure 2 and the Xcel Energy bar in your Figure 3.[10] Is this comparison valid?

A. No. This comparison is not valid for at least three reasons.

First, the CO_2 prices that Mr. Bauer cites for WPL's Second Method, that is, from approximately $13 to $60 per ton, in 2009 dollars, are just for the allowances that WPL assumes it would have to purchase from the market, which is only a relatively small fraction of WPL's projected emissions. As I have explained above, these prices do not reflect the cost of the large numbers of Base Emissions allowances that WPL assumes it would be able to obtain at extremely low prices. In other words, the range of CO_2 prices cited by Mr. Bauer dramatically overstates the allowance costs that WPL actually assumes in its Futures 6, 7, 10, 11 and 12 EGEAS analyses.

Second, Mr. Bauer again compares apple and oranges. The $13 to $60 per ton figures cited by Mr. Bauer are the annual CO_2 allowance prices for individual years between 2015 and 2037 while the prices in Figures 2 and 3 are the levelized prices for the entire period between 2013 and 2030 for the scenarios examined in the 2007 MIT Study. For this reason, his comparison is simply wrong and has no probative value.

Third, again Mr. Bauer wants the Commission to accept that WPL's Futures 2 and 5 CO_2 prices are reasonable because they simply fall within the ranges of CO_2 from the 2007 MIT Analyses and from Xcel Energy. Again Mr. Bauer misses the key point of Figures 2 and 3 in my Direct Testimony. What is important about the ranges of CO_2 prices presented in Figures 2 and 3 in my Direct Testimony is that so many independent analyses and so many regulatory commissions and utilities

[10] Id, at page R.135, lines 7-13.

considered a wide range of scenarios and CO_2 prices in their analyses in order to reflect the uncertainties associated with the cost, details and timing of federal regulation of greenhouse gas emissions. The single set of very low CO_2 prices that WPL has used in its Futures 6, 7, 10, 11 and 12 EGEAS modeling in this proceeding is unreasonable because it assumes that those low prices are certain and does not allow for any uncertainty in CO_2 prices.

It also is clear from Figures 2 and 3 in my Direct Testimony that many other independent analyses, regulatory commissions and utilities examine much higher CO_2 costs in resource planning modeling than WPL has assumed in its Futures 6, 7, 10, 11 and 12 EGEAS analyses.

Q. Mr. Bauer dismisses Intervenors' Plan 4-I because it includes the retirement of Edgewater Unit 3, stating that "WPL is not currently planning to retire Edgewater Unit 3."[11] Does this testimony change your opinion that Plan 4-I is a reasonable alternative?

A. No. State and federal actions to require utilities to reduce their greenhouse gas emissions are inevitable and should be addressed in this docket. In fact, just last week, the Recommendations of the Governor's Task Force on Global Warming requiring reductions of greenhouse gases (GHGs) were introduced as bills in the Wisconsin State Senate and State Assembly. The GHGs reduction goals in these bills are as follows: (1) in 2014, the net GHGs emissions are not greater than emissions in 2005; (2) in 2022, the net GHGs are at least 22 percent less than emissions in 2005; and (3) in 2050, net GHGs are at least 75 percent less than emissions in 2005.[12] Retiring Edgewater 3 will be a start to meeting these, or other, reduction requirements. This is consistent with WPL's own "Carbon

[11] Rebuttal Testimony of Randy Bauer, at page R.139, lines 9-11.
[12] Exhibit 4.10 (DAS-S1), SB 450/AB 649, Section 287 (creating § 299.03(2)).

Reduction Plan" that it introduced in the Nelson Dewey CPCN proceeding, Docket, 6680-CE-170.[13]

[redacted][14]

[redacted][15]

WPL Witness Friedman

Q. Do you argue "Throughout [your] testimony" that various studies suggest that natural gas prices might actually decline under new federal regulation of greenhouse gas emissions, as Mr. Friedman claims?[16]

A. No. I do present the results of the approximately 75 scenarios that have been modeled by the U.S. EPA, EIA and others and it is true that in many of these scenarios natural gas prices are projected to decline over time as a result of federal regulation of greenhouse gas emissions.[17] However, Mr. Friedman ignores that fact that I specifically recommended that scenarios in which natural gas prices would decrease over time not be modeled at this time: "Although the results of the modeling that I have discussed suggests that natural gas prices actually could be lower over time as a result of CO_2 regulation, to be conservative I would recommend that such scenarios not be run at this time."[18]

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13 Exhibit 4.7 (DAS-7).
14 Exhibit 4.11 (DAS-S2), at page 5.
15 Exhibit 412 (DAS-S3). at page 7.
16 Rebuttal Testimony of Richard E. Friedman, at page R1.20c, lines 14-20.
17 See, for example, the Direct Testimony of David A. Schlissel, at pages D.4.27 and D4.28.
18 Id, at page D4.35, lines 5-8.

Q. Mr. Friedman claims that the reason why the data from the EIA's recent modeling of the Waxman-Markey bill passed by the U.S. House of Representatives, H.R. 2454, shows natural gas prices decreasing is because most of the scenarios studied by the EIA assumed significant additions to the number of nuclear power plants in the U.S.[19] Did the EIA model any scenarios in which there were not significant nuclear additions?

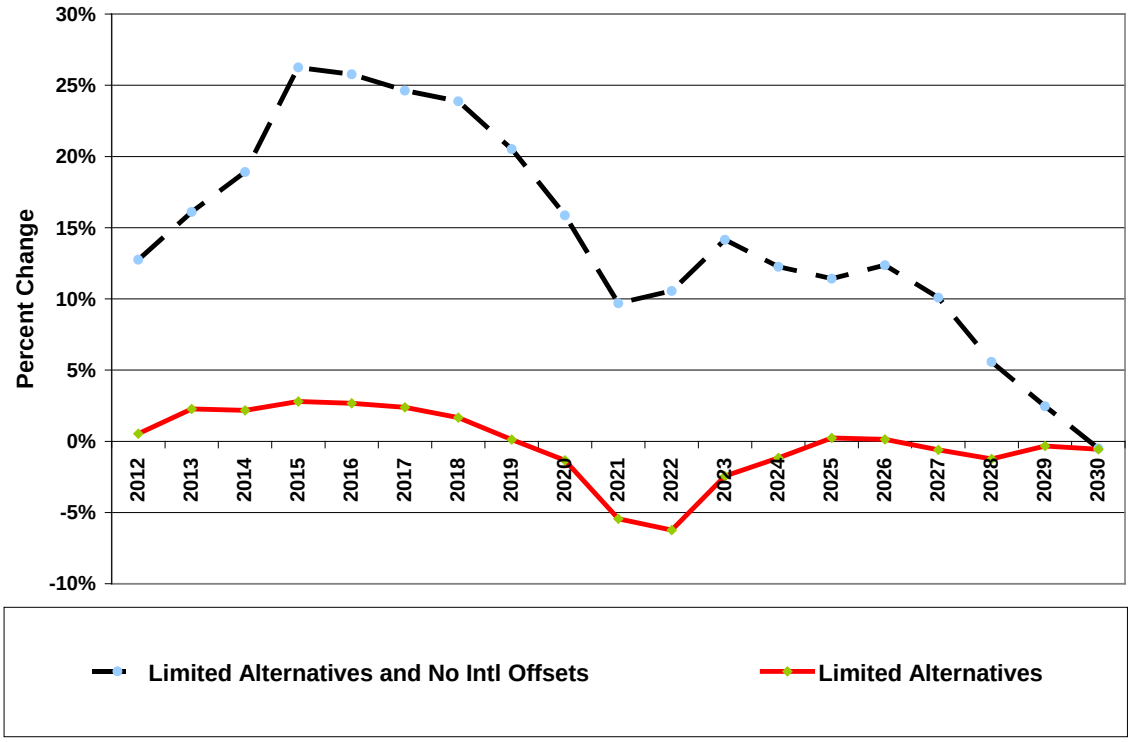
A. Yes. The EIA modeled several "Limited Alternatives" scenarios in which the additions of nuclear capacity, dedicated biomass and coal plants with carbon capture and sequestration were constrained. In one of these "Limited Alternatives" scenarios, the use of international offsets also was prohibited.

Q. What impact did the proposed Waxman-Markey bill have on natural gas prices in these scenarios?

A. The annual changes in natural gas prices in each of the two "Limited Alternatives" scenarios modeled by the EIA as compared to the base case without any CO_2 regulation are presented in Figure S2 below.

[19] Rebuttal Testimony of Richard E. Friedman at page R1.21c, lines 20-24.

Figure S2: Changes from Base Case Natural Gas Prices in EIA "Limited Alternatives" Modeling Scenarios



As can be seen from Figure S2, natural gas prices did not increase very much compared to the reference case prices in the EIA "Limited Alternatives" scenario that constrained new nuclear, biomass and coal plant with CCS additions.[20] In fact, over time natural gas prices were projected to decrease, as compared to the reference case, because of the cost of the fuel's CO_2 emissions.

In fact, as can be seen from Figure S2, natural gas prices were only projected to increase significantly in the scenario which added a prohibition on the use of international offsets to the "Limited Alternatives" scenario. But even then, the gas prices in this combined scenario were significantly higher than the reference case gas prices only in a few initial years – they then began to decrease over time relative to the reference case gas prices. Even in this drastic scenario, gas price

[20] The reference case examined by the EIA did not assume regulation of CO_2 emissions.

increases never reached 30 percent and in most of the years were below 15 percent. Clearly, the results of the EIA's modeling of these two "Limited Alternatives" scenarios contradict WPL's claim that natural gas prices would increase by between 10 and 30 percent in *every year* of the period 2014-2037 as a result of federal regulation of CO_2 emissions.

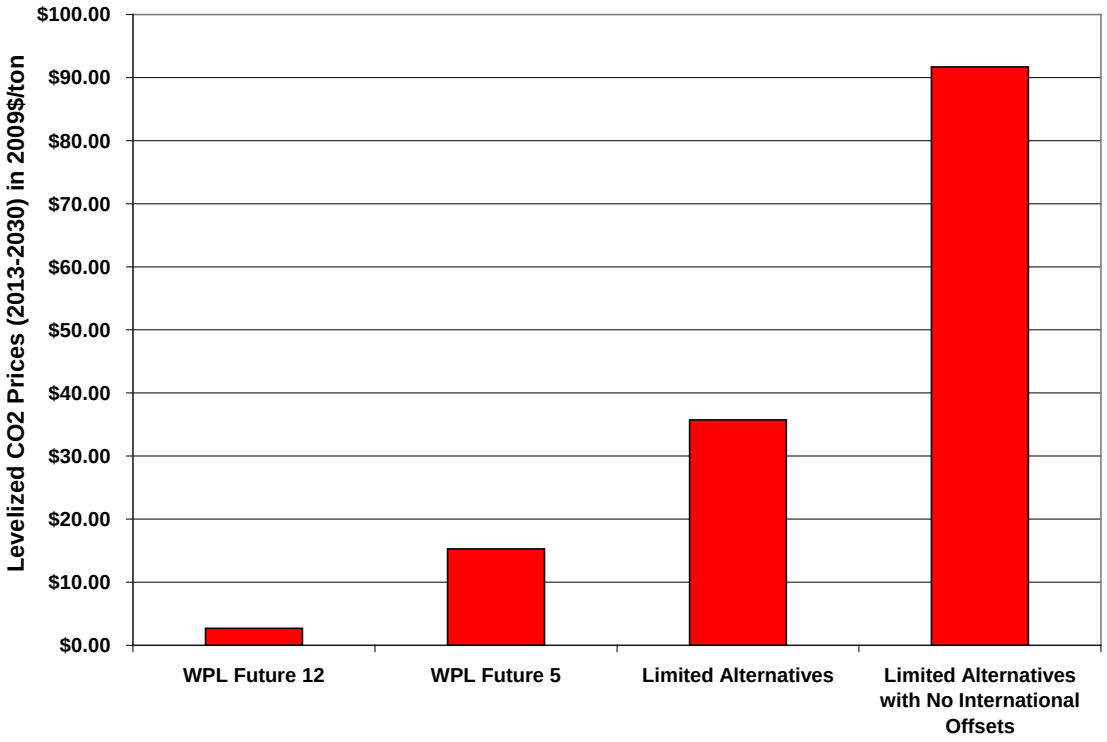
Q. Would the use of international offsets be prohibited or allowed under the Waxman-Markey bill?

A. No. The Waxman-Markey bill and the Kerry-Boxer legislation under consideration in the U.S. Senate both would allow the significant use of international offsets. Therefore, the gas price impacts would be expected to track the lower line in Figure S1. However, the results of the EIA's modeling show that even if carbon regulation is enacted without international offsets, it is not reasonable to expect that natural gas prices will increase by 30 percent in any year, let alone every year.

Q. How do the CO_2 prices in the two Limited Alternatives scenarios from the Waxman-Markey Bill, H.R. 2454, compare to the CO_2 prices that WPL has used in its EGEAS modeling?

A. Figure S3, below, compares the levelized CO_2 prices for the two Limited Alternatives scenarios from the EIA's modeling of H.R. 2454 with the CO_2 prices used by WPL in its Futures 5 and 12 EGEAS modeling analyses. As can be seen quite clearly, the CO_2 prices that would be expected to result from adoption of either of the two Limited Alternatives scenarios under H.R. 2454 would be dramatically higher than WPL has assumed in EGEAS modeling analyses.

Figure S3: CO_2 Prices from Two Limited Alternatives in EIA Modeling of H.R. 2454 vs. CO_2 Prices Used by WPL in its EGEAS Modeling in this Proceeding

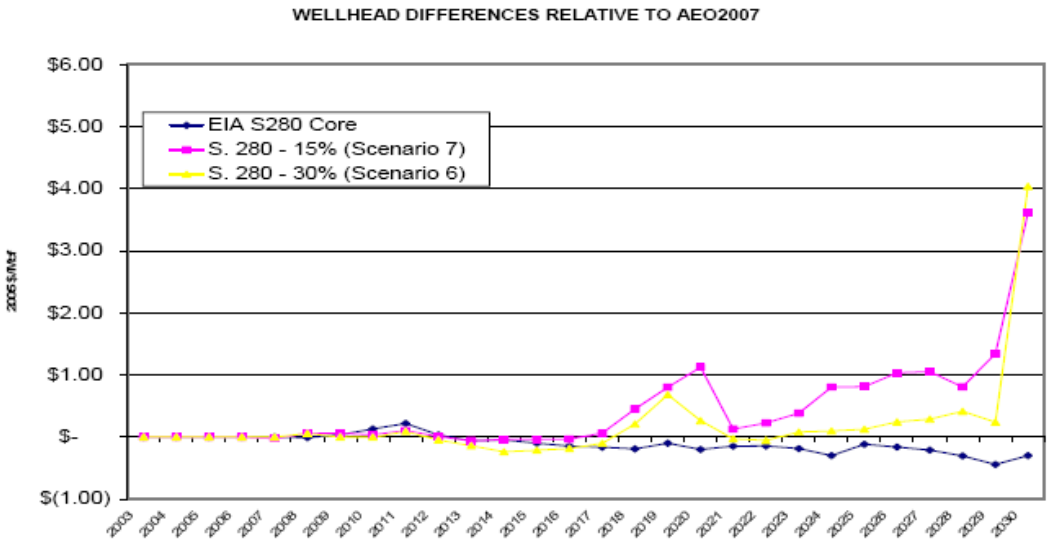


WPL and WEPCO want the Commission to believe that there would be significant increases in the demand for and the price of natural gas from a federal regulatory program that resulted in only very low CO_2 prices. Figures S2 and S3 above and Figures 6 and 7 in my Direct Testimony show that there is no evidence to support a link between low CO_2 prices and significant increases (10% or 30%) in natural gas prices.

Q. Do the results of the October 2007 National Gas Council study discussed by Mr. Friedman support his claim that "it is completely reasonable to expect increases in the price of natural gas in the 30% or higher range if a significant CO_2 price scenario is assumed?"[21]

A. No. The following figure is copied from page of the National Gas Council study included as Mr. Friedman's Exhibit

Figure 9: Changes in Wellhead Gas Prices (relative to *AEO2007*) for Scenarios (Real 2005$)



As can be seen, the wellhead gas prices in the National Gas Council's modeling of what it calls the EIA S280 Core scenario remain about the same as the prices in the reference case (no greenhouse gas regulation) through approximately 2013. Thereafter, the gas prices in the EIA S280 Core scenario decrease below the prices in the no greenhouse gas reference case.

The wellhead gas prices in the National Gas Council's modeling of the two other scenarios included in its October 2007 similarly remain about the same as the prices in the reference case (without greenhouse gas regulation). The prices in

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[21] Rebuttal Testimony of Richard E. Friedman, at page R.123c line 7, to page R1.24c, line 2, and page R.26c, lines 5-7.

these two scenarios then spike up to about 15 percent above the reference case prices in 2020 but then drop back down. They begin to increase above the reference case gas prices again in 2023 or so but only really spike again in 2029-2029.

However, it is clear from this figure that in none of the three scenarios modeled by the National Gas Council do the natural gas wellhead prices increase by 30 percent (or even 10 percent) above the reference case prices in *every* year of the analysis.

In fact, in one of the three scenarios the gas prices remain at or below reference case levels. In the second scenario, the wellhead gas prices only climb above reference case levels starting in 2026, except for a three year period from 2019-2021 when they rise to perhaps 7% to 10% above reference case levels. The wellhead gas prices in the third scenario again remain about the same as the reference case prices through 2018 and then only spike by more than 15 percent above reference case levels in the last two years of the analysis, 2029 and 2030. None of these results support the assumption made by WPL that federal greenhouse gas regulation will lead to dramatically higher natural gas prices in every year of the period 2013 or 2014 through 2037. Thus, Mr. Friedman's testimony lacks any factual or analytical support.

Q. Mr. Friedman claims that the results of the National Gas Council study show a "57% price impact" on natural gas prices from the adoption of federal regulation of greenhouse gas emissions.[22] Is this an accurate representation of the results of the National Gas Council study?

A. No. As I note above, and as can be seen in the figure I have copied from the Gas Council study, the study found that natural gas prices would spike only in a few years of the period through 2030. Even if the Commission accepted these results,

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[22] Id,, at page R1.26c, at lines 7-9.

they do not support Mr. Friedman's claim, and WPL's assumption, that natural gas prices would be 30 percent higher in each year of the analysis. Indeed, in many years, gas prices in the scenarios which reflected federal regulation of greenhouse gas emissions remained the same as (or were lower than) the prices in the no regulation scenario. Mr. Friedman misrepresents the results of the National Gas Council study.

Q. Does the National Gas Council study reflect the substantially higher domestic U.S. natural gas reserves that have been announced in recent months and/or the substantially lower future gas prices in the NYMEX futures and the AEO forecast?[23]

A. It appears that the answer to this question is no. The National Gas Council study does not reflect the substantially higher estimate of domestic U.S. natural gas reserves that have been released in recent months or the substantially lower current and projected natural gas prices. This is not surprising because the study was prepared during 2007 and released in October of that year.

Q. Are there any reasons why the Commission should not give significant weight to the results of the National Gas Council study?

A. Yes. The results of the study are stale, as explained in my previous answer. In addition, the National Gas Council study mentions that a total of seven scenarios were modeled for each of seven focus areas.[24] However, the results of only three of these scenarios were presented in the study. This raises serious questions about the results of all of the other scenarios that the National Gas Council did not discuss in its study and in what ways those results differ what it did publish. Moreover, the study does not present all of the underlying modeling data on which it is based. Without this underlying modeling data, it is not possible to confirm the results presented in the study.

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[23] See the Direct Testimony of David A. Schlissel, at page D4.31, line 5, to page D4.34, line 12.
[24] Exhibit 1.6 (REF-1 A), at page 8.

Q. Mr. Friedman has quoted testimony from Federal Reserve Chairman Bernanke for evidence as to developments in the natural gas market.[25] Are there any important developments in the natural gas market that Dr. Bernanke does not discuss?

A. Yes. Dr. Bernanke's speech from June 2006 did not discuss, or predict would be a better term, the huge increases in natural gas supplies that have been announced this year. Although the sections of Dr. Bernanke's speech that Mr. Friedman has quoted in his testimony appear to present an accurate history of natural gas prices and production through the point in time when it was given, that is, more than three years ago, I don't see their relevance to today's gas market or to the issues before this Commission.

Q. Are there any sections of Dr. Bernanke's June 2006 that are relevant to today's gas market and to the issue of the future availability and price of natural gas?

A. Yes. Dr. Bernanke makes the following, and apparently correct, predictions a mere two paragraphs after the section of his speech quoted in Mr. Friedman's testimony:

> Thus, natural gas prices are likely to remain elevated for at least the coming few years. It is possible, however, that within a decade new supplies from previously untapped areas of North America could boost available output here, while imports of LNG will increase to more substantial levels as countries seek to bring their isolated natural gas reserves to market. Given time, these developments could serve to lower natural gas prices in the United States significantly. Nonetheless, because of the higher costs of producing these supplies relative to the traditional sources of natural gas, as well as the elevated cost of other energy sources such as oil, natural gas prices seem unlikely to return to the level of the 1990s.[26]

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[25] Rebuttal Testimony of Richard E. Friedman, at page R1.24c line 3, to page R1.25c, line 11.
[26] Exhibit 1.7 (RFB-1B), at page 2.

Q. Do you have any comment on Mr. Friedman's testimony that given the supply and demand relationships for natural gas, the enactment of significant CO_2 legislation that effectively restricted or eliminated coal as a fuel source for electric generation would lead to significant increase in natural gas demand?[27]

A. Yes. Mr. Friedman posits an unrealistic set of circumstances. There is no serious legislative or regulatory proposal before Congress or the EPA that would severely and immediately restrict or eliminate coal as a fuel source for electric generation. Instead, the proposals that have been and are being considered in Congress and the EPA would call for the gradual reduction of CO_2 emissions over the next four decades. An important step toward achieving these reductions will be the displacement or retirement, again over time, of some existing coal-fired generation. It is reasonable to expect, moreover, that some of this existing coal-fired generation will be replaced by energy efficiency and renewable resources, and perhaps, in some areas, nuclear generation – as well as by some additional natural gas-fired generation. However, no serious proposal that has been or is being considered by the U.S. Congress or the EPA, and certainly not the Waxman-Markey or the Kerry Boxer bills currently being considered in Congress, would sharply reduce or eliminate coal from the resource mix overnight by 2013 or anytime in the next few decades.

Mr. Friedman testifies that an increase of 30 percent in natural gas prices in "not at all unreasonable considering the driver which is the potential elimination, or at least sharp reduction, of coal from the resource mix without a substantial addition of either nuclear or renewable generation to replace the displaced coal generation."[28] Again he posits a completely unrealistic situation.

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[27] Rebuttal Testimony of Richard E. Friedman, at page R1.28c, lines 9-13.
[28] Id,, at page R1.28, lines 9-13.

Q. Do you have any additional response on Mr. Friedman's testimony that "it is completely reasonable to expect increases in the price of natural gas in the 30% or higher range if a significant CO_2 price scenario is assumed?"[29]

A. Yes. The very low CO_2 prices that WPL has assume in its EGEAS modeling can, in no way be described as "significant CO_2 price scenarios." As I've shown in Figures 2 and 3 in my Direct Testimony, the set of CO_2 prices used by WPL in its EGEAS modeling is very low compared to the ranges of CO_2 prices (1) from the independent modeling of legislation considered in the U.S. Congress and (2) that have been used for resource planning by regulatory commissions and utilities around the nation.

Q. Does Mr. Friedman acknowledge in his Rebuttal Testimony that is unlikely that a significant monetization of CO_2 costs will occur overnight?

A. Yes. At page R1.30c of his Rebuttal Testimony Mr. Friedman testifies that:

> I believe that while there may be movement towards some form of CO_2 cost or tax, it is extremely unlikely that any implementation would occur without a gradual phase-in over time.

Q. Do you agree with this statement in Mr. Friedman's Rebuttal Testimony?

A. Yes. That is why I believe that the Applicants' assumption that natural gas prices will increase by 10 or 30 percent starting in 2013 and remain above reference case levels in every year throughout the study period is very unrealistic. There is a gradual phase-in over time of significant caps of CO_2 emissions, and consequently CO_2 prices, in the proposed Waxman-Markey bill and in every piece of proposed climate change legislation with which I'm familiar.

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[29] Id, at page R1.26, lines 5-9.

Q. Mr. Friedman cites a recommendation of the Cost Allocation and Resource Planning (CARP) working group of the Organization of MISO States as support for a conclusion that an increase in the cost of natural gas, driven by carbon regulation, could match or exceed the 30 percent potential increase that he finds "not unreasonable."[30] What CO_2 prices did the CARP recommend be used as modeling inputs in the same analyses that Mr. Friedman discusses?

A. CARP recommended that a CO_2 price of $50/ton be used in its mid scenario along with an assumed $6.22/MBtu natural gas price.[31] CARP also recommend a high scenario that included the 40 percent higher natural gas price mentioned by Mr. Friedman. However, this high scenario also included a *$100/ton* CO_2 price which is much, much higher than WPL assumes in this proceeding and is significantly above the Synapse high CO_2 price trajectory.[32] The two prices—high gas and high CO2—need to be paired, a fact which WPL ignores.

As I've noted in my Direct Testimony, WPL wants the Commission to accept that even low CO_2 prices will lead to significant increases in natural gas prices. However, there is absolutely no evidence to support this unreasonable claim.[33]

Q. Does the CRA International paper cited by Mr. Friedman represent an objective assessment of the possible impact on the U.S. economy as a consequence of stringent environmental legislation?[34]

A. No.

First, it was commissioned by the American Petroleum Institute.[35] There is absolutely no way that it can credibly be called an objective assessment.

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30 Rebuttal Testimony of Richard E. Friedman, at page R1.26c, lines 10-23.
31 See www misostates.org/LINK2RegonalTransmissionPlanningUnderAlternativeFutures.pdf and www.misostates.org/Attachment1CARPVOutcomesRevised.pdf.
32 Id.
33 See the Direct Testimony of David A. Schlissel, at pages D4.26 to D.35.
34 Rebuttal Testimony of Richard E. Friedman, at page R1.29c, lines 6-24.

Second, and perhaps more importantly, the CRA report simply does not address environmental regulation at all (or CO_2 costs or climate change legislation). Instead, the CRA International paper cited by Mr. Friedman addresses the proposed energy policy legislation then before Congress but not environmental regulation or climate change legislation. This is clear from page iv of Mr. Friedman's Exhibit 22 which states that the CRA report:

> examined the following current provision in the congressional bills: a mandatory oil savings program, a renewable portfolio fuels standard (RFS), oil industry tax increases, a "price gouging" provision, a renewable portfolio standard (RPS) for the electric power sector, more stringent CAFÉ standards, and various proposed access restrictions on domestic production of oil and natural gas."[36]

The CRA paper, consequently, has absolutely no relevance to any of the issues in this proceeding.

Q. WPL witness Friedman dismisses energy efficiency as an alternative to older, inefficient coal-fired units.[37] Are you aware of any recent efforts in the State of Wisconsin to adopt new energy efficiency requirements in order to reduce carbon emissions from fossil-fired power plants?

A. Yes. On January 6, 2010, Wisconsin State Senate Bill 450 and Assembly Bill 649 were introduced at the request of Governor Doyle. Section 287 of the bill creates a new Section 299.03(3m), which states:

> It is the goal of this state to reduce the statewide consumption of electricity in each year by an amount not less than the product of the public service commission's projection of the statewide consumption of electricity for the year and the following percentages:
>
> 1. In 2011, 1 percent.
>
> 2. In 2012, 1.25 percent.

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35 http://www.api.org/Newsroom/study-hurt-economy.cfm.
36 Exhibit 1.9 (REF-1D), at page iv and pages 1 and 2.
37 Rebuttal Testimony of Richard E. Friedman, at page R1.21, lines 5-7.

3. In 2013, 1.5 percent.

4. In 2015 and each year thereafter, 2 percent.[38]

In announcing the bill, referred to as "The Clean Energy Jobs Act," Governor Doyle's press statement explained that the bill implements the recommendations of the Global Warming Task Force. As the Governor's release explained, "[t]he cheapest way to lower carbon emissions is through energy conservation. By setting achievable conservation goals, this bill will help reduce energy costs in businesses and homes across the state."[39]

WPL Witness Guelker

Q. Mr. Guelker argues that installing a baghouse on Edgewater Unit 3 is "not reasonable." Do you agree?

A. No. Mr. Guelker's testimony is misleading. He prefaces his testimony about installing a baghouse on Edgewater unit 3 with the caveat "to the extent that Intervenors' Plan 1 assumes that the installation of a baghouse at Edgewater 3 is required to comply with NR 446…"[40] He then goes on to discuss the Wisconsin mercury rule in NR 446. He omits the portions of my testimony where I identified the forthcoming MACT standards for hazardous air pollutants as another basis for assuming the need for some pollution controls at Edgewater 3. Under a proposed Consent Decree filed in the United States District Court for the District of Columbia, EPA is required to sign final regulations of hazardous air pollutants no later than November 16, 2011. The Consent Decree is attached as Exhibit 4.14 (DAS-S5). These regulations would be effective immediately under 42 U.S.C. § 7412(d)(10), but EPA could allow up to 3 years for facilities to come into compliance under 42 U.S.C. § 7412(i)(3). Therefore, at the latest, Edgewater 3 would be subject to a MACT standard by 2015.

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38 Exhibit 4.10 (DAS-S1), SB 450/AB 649, Section 287 (creating § 299.03(3m)).
39 Exhibit 4.13 (DAS-S4), Press Release, Office of the Governor, 1/7/2010.
40 Rebuttal Testimony of Eric J. Guelker, at page R1.9, lines 15-16.

Recently, both the United States Environmental Protection Agency and the Sierra Club have notified WPL of violations of various Clean Air Act requirements at the Edgewater plant. These notices are attached as Exhibits 4.15 (DAS-S6) and 4.16 (DAS-S7), respectively. While the EPA's Notice of Violation does not include claims regarding Edgewater Unit 3 at this time, the Sierra Club's Notice of Intent does. EPA can amend or add to its Notice of Violation, or can require pollution controls on Unit 3 as mitigation for violations at Edgewater 4 and 5. My overall conclusion, which Mr. Guelker does not directly engage or dispute, is that a baghouse on Unit 3 is a good placeholder for likely future pollution controls that may include more than merely a baghouse on that unit.

Q. Mr. Guelker testifies that WPL could designate Edgewater 3 as a "large coal-fired" unit under NR 446.12(2) and comply with the Wisconsin mercury rule by averaging Edgewater 3 with "other WPL-operated coal-fired EGUs."[41] Do you agree?

A. No. First, as I note above, this assumes that no other pollution controls, including mercury and other hazardous air pollutant regulations will apply to Edgewater unit 3. A multi-unit averaging provision in Wisconsin law is irrelevant if the forthcoming federal regulations do not allow the same flexibility. Moreover, Mr. Guelker does not explain why WPL may claim 100% of the emissions, or the emission reductions, from the "WPL-operated" units pursuant to NR 446.13(2)(b). Those units—which presumably include Edgewater 4 and 5 and Columbia 1 and 2 are owned in part by other utilities who may be counting on their ownership shares of those units for multi-unit averaging also.

[41] Rebuttal Testimony of Eric J. Guelker, at page R1.10, line 4, through page R1.11, line 3.

Q. WPL filed proposed Supplemental Rebuttal Testimony from Mr. Guelker on January 11, 2010, in which he testifies the EPA's Notice of Violation and the Sierra Club's Notice of Intent to Sue do not negate the need for an SCR on Edgewater 5.[42] Do you have any response to that testimony?

A: Yes. Assuming the supplemental testimony is allowed, it is important to note that, in addition to pollution controls for NO_x at Edgewater unit 5 in response to any litigation by the EPA or the Sierra Club, pollution controls could also be required for SO_2, CO_2, mercury, particulate matter, and other pollutants.[43] The Wisconsin DNR has agreed that the maximum hourly heat input, gross generation (400 MW), and fuel usage from the original PSD permit are enforceable conditions, which is the basis of one of the claims against WPL for violations at Edgewater unit 5.[44] Thus, the likely litigation supports Intervenors' Plan 4-I, which assumes an SCR on unit 5 by 2012 and a baghouse and scrubber on unit 5 by 2014. While it is not certain what specific pollution controls will be required, Plan 4-I provides reasonable placeholder pollution controls that may be required under future reduction requirements.

Moreover, again as the DNR agreed, the permit limits the gross generation at Edgewater unit 5 to 400 MW, yet all of the modeling has presumed that Edgewater unit 5 would operate at higher capacity value. The assumed additional capacity, outside allowable permit limits, likely biases the modeling in favor of Plan 1, the installation of controls, over Plan 2, in which Unit 5 is retired. This is yet another example of a flaw in the Applicants' EGEAS modeling.

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42 Supplemental Direct Testimony of Eric J. Guelker, at page SD1.2

43 See e.g., Exhibit 4.16 (DAS-S7) (Sierra Club's Notice of Intent).

44 Exhibit. 4.17 (DAS-S8), at pages 7 through 13 (6/29/2009 Comments from Sierra Club) and Exhibit 4.18 (DAS-S9), ¶ 3 (8/14/2009 DNR Response to Comments).

Q. In your direct testimony, you refer to other utilities that have opted to retire existing coal units rather than install pollution controls. Do you have an update on that testimony?

A. Yes. In my direct testimony I discussed the announcement by Progress Energy in North Carolina that it would close 1,500 MW of its existing coal by 2017.[45] On December 1, 2009, Progress Energy asked the North Carolina Utilities Commission for approval to begin that retirement process of the first 550 MW. Progress Energy cited the expense of having to comply with mercury MACT and HAP compliance, among other air pollution reductions that will be required under federal and state law.[46]

Q. Does this complete your Surrebuttal Testimony?

A. Yes.

[45] Schlissel Direct, D4.41c, lines 14-16.
[46] Exhibit 4.19 (DAS-S10).