BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Application of Wisconsin Public Service Corporation for Authority to Construct and Place in Operation a New Multi-Pollutant Control Technology System for Unit 3 of the Weston Generating Station, Marathon County, Wisconsin

Docket No. 6690-CE-197

Rebuttal Testimony of Jeremy Fisher, Ph.D. On Behalf of Clean Wisconsin

December 14, 2012

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INTRODUCTION

Q Are you the same Jeremy Fisher who submitted direct testimony in this docket on November 15, 2012?

A Yes, I am.

Q To whom are you responding in this rebuttal testimony?

A My rebuttal responds to testimony filed by Staff of the Public Service Commission of Wisconsin ("Staff"), in particular the testimony of Mr. Kenneth Detmer and Ms. Carol Stemrich.

Q Which components of Mr. Detmer's testimony are of concern?

A Mr. Detmer touches on a number of topics related to the Wisconsin Public Service Corporation's (the "Company"or "WPS") stated need for the ReACT system, assumptions that informed the Company's present value revenue requirement (PVRR) analysis conducted using EGEAS and MIDAS, and ancillary topics not raised directly by the Company, such as reliability and ratepayer risk associated with acquiring market-based resources.

My two primary concerns with Mr. Detmer's findings are in regard to the Company's stated need for ReACT, and the Company's treatment of natural gas prices.

Q Which components of Ms. Stemrich's testimony are of concern?

A Ms. Stemrich characterizes the ability of energy efficiency to meet the Company's requirements in the absence of Weston 3, and concludes that even savings at a theoretical potential rate would be insufficient to displace a significant fraction of Weston 3 output.

My concerns with Ms. Stemrich's testimony regard the impression that additional energy efficiency cannot be part of a replacement portfolio, the analysis underlying the testimony and the years reviewed, and the scenario reviewed.

1. REACT MAY NOT MEET CURRENT AND ANTICIPATED REGULATIONS

Q How does Staff characterize the Company's need for ReACT?

A Staff witness Mr. Detmer does not provide a critical analysis of the Company's stated need for ReACT, or its future applicability. He states:

> As explained in the application, the proposed project will reduce sulfur dioxide (SO_2), nitrogen oxide (NOx), and mercury (Hg) emissions for compliance with current and anticipated regulations.[1]

As an overall statement, he asserts that:

> The project provides the largest reductions in pollutant[s] possible for the WPSC system and will remain a large part of any future compliance requirements.[2]

Q Do you agree with Mr. Detmer's assessment that ReACT will meet "current and anticipated regulations"?

A I do not. I think Mr. Detmer has simplified a fairly complex topic and, in doing so, potentially mischaracterized both the Company's assessment of ReACT and the ability of this technology to meet future anticipated regulations.

Q Do you disagree with Mr. Detmer regarding "current regulations"?

A I do. As both Mr. Detmer and the Company note, one of the original impetuses for installing a multi-pollutant technology like ReACT was to respond to the Cross State Air Pollution Rule (CSAPR), which is now vacated, and is thus not a "current regulation." Further, Clean Wisconsin witness Mr. Sahu states that "it is absolutely clear that WPS does not need ReACT to meet any of the [current] mercury rules."[3]

I would not consider the ongoing settlement discussions with the EPA regarding the Notice of Violation (NOV) to be a "current regulation." There is no evidence,

[1] Direct-PSC-Detmer-6, lines 9-11.
[2] Direct-PSC-Detmer-3, lines 15-16.
[3] Direct-CW-Sahu-17c, lines 17-18.

aside from the assertions of Company witness Rentmeester, that ReACT will meet the terms of a settlement with the EPA. Settlement discussions are ongoing,[4] and both the Company and EPA have refused to divulge any settlement communications,[5] thus leaving this Commission and interveners no corroborating evidence of the EPA's likely position. Similarly, there is no evidence that a court will approve the proposed settlement or that it would not be challenged.[6] Finally, the terms of the settlement are unlikely to be fully resolved and finalized for a significant period of time. The Company admits in response to 3-CW-21 that "once filed with the court, WPSC expects it will take at least two months but possibly more than a year to receive final court approval, depending on the level of public involvement."[7] As Mr. Sahu noted, if the settlement proposes emissions levels that allow the installation of ReACT, he would expect "public comment on the consent decree …undoubtedly highlighting how these limits are far from BACT."[8]

Q Do you also disagree with Mr. Detmer regarding "anticipated regulations"?

A I do. There are three areas of anticipated regulations that ReACT does not address: (1) potential requirements for Best Available Control Technology (BACT), (2) future National Ambient Air Quality Standards (NAAQS), and (3) water and solid waste effluent rules.

BACT requirements may impact if the ReACT technology is acceptable to the EPA in settling ongoing NOV discussions, or to a court finalizing any consent decree settlement. As Mr. Sahu explains in his direct testimony, "EPA alleged that WPS failed to install Best Available Control Technology (BACT) for SO_2

[4] Direct-WPS-Rentmeester-3c, lines 14-16.
[5] *See* Ex.-CW-Fisher-16c, Company response to 3-CW-4, bullet point four (PSC REF#: 177554). Of note: "As described in past correspondence with Clean Wisconsin, it is WPSC and EPA's position that the settlement communications cannot be produced to Clean Wisconsin without violating the confidentiality agreement."
[6] See testimony of Mr. Sahu (Direct-CW-Sahu-11c, lines 4-14).
[7] Ex.-CW-Fisher-16c.
[8] Direct-CW-Sahu-11c, lines 9-11.

and NOx"[9] and that the Company's anticipated reductions from ReACT do not represent BACT for SO_2 or NOx.[10] Mr. Sahu further notes that "public comment on the consent decree…will undoubtedly highlight how [anticipated ReACT] limits are far from BACT. It is likely that the Court may be persuaded that the settlement, therefore, is not in the best public interest."[11]

Mr. Sahu further explicitly discusses a series of known and anticipated air, water, and solid waste regulations that may not be met by ReACT or could impose significant costs on the Company if ReACT is installed. He notes that:

> WPS itself ranged the various [anticipated] rules as to their impact on Weston… [after CSAPR] the next highest ranking by WPS are the various National Ambient Air Quality Standards (NAAQS) for ozone (for which NOx is a precursor), PM2.5 (for which both SO2 and Nox are precursors), 1-hour SO2, and 1-hour NOx. Thus, one should expect that WPS would be concerned about how any proposed control technology (such as ReACT) would comply with these various NAAQS.[12]

In direct testimony, I stated that "for the two non-air rules, I would have expected the Company to evaluate the impact of these rules on the forward-going costs of continuing to operate Weston 3,"[13] and there is no evidence that the Company included these costs in their analysis.[14]

Therefore, it is my opinion that there is no conclusive evidence that "ReACT will meet current and anticipated regulations" nor that the "project … will remain a large part of any future compliance requirements." In fact, if the Company installs ReACT, and then is required to obtain deeper SO_2 or NOx emissions reductions that cannot be achieved by ReACT, the Company very well may be compelled to

[9] Direct-CW-Sahu-7c, lines 14-15.
[10] Direct-CW-Sahu-8c, lines 11-13 (SO_2), and Direct-CW-Sahu-8d, lines 18-20 (NOx).
[11] Direct-CW-Sahu-11c, lines 9-11.
[12] Direct-CW-Sahu-16c, lines 1-8.
[13] Direct-CW-Fisher-21c, lines 1-3.
[14] Direct-CW-Fisher-22c, lines 15-17.

either install yet additional control equipment, rendering ReACT obsolete or redundant, or retire the unit (despite stranded costs). Under this circumstance, ReACT would play little or no role at all in any future compliance requirements.

Q Does Mr. Detmer address the risk that ReACT may not meet environmental compliance requirements?

A This is not clear. Regarding the obsolescence or redundancy for the Company, Mr. Detmer states that:

> Existing and proposed laws as well as settlement of the U.S. Environmental Protection Agency (EPA) Notice of Violation will require further reductions in all the criteria pollutants that these controls provide.[15] [Emphasis added]

If further reductions are required than are offered by ReACT, this could render ReACT obsolete or redundant.

2. COMPANY GAS PRICE FORECAST IS NOT UNREASONABLY LOW

Q How does Staff characterize the Company's assessment of natural gas resources?

A Mr. Detmer notes that "currently low gas prices favor the economics for gas generation compared to other forms of generation such as coal, nuclear, and renewables. Overall this has lowered or eliminated the economic advantage that coal generation used to have and large capital expenditures for coal units are now harder to justify."[16]

Q Do you agree with Mr. Detmer's assessment of the impact of natural gas prices on the economics of coal?

A I agree that falling gas prices, as well as increasing regulatory stringency regarding coal emissions and wastes, reduced demand, and increasing public awareness and concern about carbon dioxide (CO_2) emissions have all made it

[15] Direct-CW-Detmer-3, lines 16-19.
[16] Direct-PSC-Detmer-4, lines 9-12.

quite difficult to justify large capital expenditures at many existing coal units. I cited a number of studies in my direct testimony that have drawn similar conclusions.[17]

Where I disagree with Mr. Detmer is with respect to the outlook for natural gas prices. I believe that his conclusion regarding the overall economics of ReACT is informed by an unstated opinion regarding the Company's forecast price of natural gas. Specifically, Mr. Detmer implies repeatedly that the Company's low natural gas price forecast is unwarranted, and even that the Company's base forecast is too low.

Q Where does Mr. Detmer state that he thinks the Company's outlook for natural gas prices are too low?

A Mr. Detmer states that he believes the Company's base forecast is lower than might otherwise be expected. For example, in introductory material, Mr. Detmer states that:

> Favorable costs for natural gas will likely lead to increases in natural gas demand for not only electrical generation but other increases in the commercial, industrial, and transportation categories. Why gas costs may increase is discussed later.[18]

I am unable to find any additional explanation later in Mr. Detmer's testimony as to "why gas costs may increase," beyond his discussion of traditional volatility in the natural gas markets.

In addition, Staff requested two additional EGEAS futures for this docket where natural gas prices are increased from the baseline forecast by $1/MMBtu (nominal) in 2014 and $2/MMBtu (nominal) in 2017, respectively.[19] While these are not unreasonable sensitivities, it would be a mistake to consider these alternative baseline considerations without similarly testing sensitivities that

[17] Direct-CW-Fisher-16c, lines 11-16.
[18] Direct-PSC-Detmer-4, lines 19-21.
[19] *See* Ex.-CW-Fisher-17, Staff data requests 7.11 and 7.12, filed on November 6, 2012 (PSC REF#: 175999).

reduce gas prices. By advocating only for upside risk scenarios regarding natural gas prices, Staff appears to be advocating a position that the Company's baseline forecast is generally too low.

Q Does Mr. Detmer explain the reason that Staff requested higher gas-price forecast sensitivities?

A Yes, briefly. At the close of his direct testimony, Mr. Detmer poses a question and answer regarding the justification for these higher price sensitivities. His response is that:

> Natural gas futures are currently at a bargain price compared to historic costs. A look at historical future prices provided in Schedule 10 provides an indication of the volatility over the last 20 years. If the past is any projection of the future, the future may be difficult to predict.[20]

Q Do you think that, in this case, the past is a reasonable projection of the future?

A No. While I have no doubt that the natural gas market will continue to be a more liquid and volatile market than will coal, the underlying price is dictated by the ability of supply to meet demand. In the last three years, the natural gas market in the United States has been completely transformed by the discovery and exploitation of new shale gas reserves. Observers of the fundamental market, such as the U.S. Department of Energy's Energy Information Administration (EIA) and commodity traders such as NYMEX all appear to agree that for the foreseeable future, the base price of natural gas is likely to stay well below historic prices, and certainly far lower than historic forecasts. Mr. Detmer shows the low NYMEX forecast in his Schedule 11.

[20] Direct-PSC-Detmer-15, lines1-4.

Q Does Mr. Detmer provide other justification for the higher natural gas price forecast requests from Staff?

A Yes. Mr. Detmer also compares the price forecasts used in this docket to forecasts used in older dockets:

> Another perspective is to compare gas prices from other dockets over the past several years as futures prices began a downward trend. Schedule 11 provides the estimated gas prices used in the Columbia emission control docket 5-CE-138 and the Oak Creek emission control docket 6630-CE-299.[21]

It is worth noting that Docket 5-CE-138 was filed on February 2009, over three and a half years prior to the NYMEX forecast shown in Mr. Detmer's Schedule 11. Docket 6690-CE-299 was received by this Commission in June 2007, over five years prior to the NYMEX forecast shown in Mr. Detmer's Schedule 11.

It is my opinion that decisions made today should use the most up-to-date information available. By focusing on outdated forecasts, Mr. Detmer risks discarding five years of new information regarding a very changed world.

Q Are there any more recent public forecasts available for comparison against the Company's natural gas price estimate?

A Yes. On December 5, 2012, the EIA published an "Early Release" edition of the 2013 Annual Energy Outlook (AEO). This report will be revised and revisited over the next several months, but its new gas forecast is nonetheless indicative of the agency's current assumptions. In **Figure 1**, below, I have graphed the Company's revised baseline forecast, and high and low sensitivities against the EIA's AEO 2012 reference forecast (dotted line) and the new AEO 2013 early release reference forecast (dashed line).

[21] Direct-PSC-Detmer-15, lines 5-8.

Figure 1. Natural gas price forecasts from WPS in Futures 7, 8 and 9 (revised, high, and low, respectively) and EIA AEO 2012 (June 2012) and EIA AEO 2013 Early Release (December 2013).

Figure 1 demonstrates that the EIA, in its 2013 AEO ER reference case, is now projecting natural gas prices at the Henry Hub will be lower than the prices it had projected in its 2012 AEO reference case (which are moderately consistent with the Company's revised forecast in Future 7) over at least the next ten years.

Q Would you recommend that the Company revise their reference natural gas price forecast in light of the new AEO 2013 Early Release forecast?

A No. However, the AEO 2013 ER reference case forecast suggests that the Company's lower gas-price sensitivity should be considered within a reasonable bound, but that the high price sensitivities are far outside of reasonable interpretations of the market, at least for the next fifteen years or so.

Q What are the implications of these forecasts and comparisons for Staff's testimony?

A Simply stated, while I agree that a healthy degree of skepticism is warranted regarding any forecast, evidence seems to suggest that gas prices and forwards

have continued to collapse, not increase as suggested by Mr. Detmer. Thus, I would be more inclined to review seriously the Company's base-case- and low-gas-price case forecasts, not the sensitivities posed by Staff, and certainly not the high price proposed by the Company.

3. ENERGY EFFICIENCY IS PART OF A VIABLE REPLACEMENT PORTFOLIO FOR WPSC

Q Does Staff review the role of energy efficiency in this docket?

A Yes. Staff witness Carol Stemrich provides testimony exclusively reviewing the Company's opportunity to use energy efficiency to replace the output of the Weston 3 generating station. Ms. Stemrich's testimony is provided to demonstrate compliance with Wis. Stat. § 196.025 ("Duties of the commission") and is meant to be responsive to Wisconsin State energy policy as provided in Wis. Stat. § 1.12(4), that energy conservation and efficiency be considered as a top priority in meeting energy demands.

Q What are Staff's findings pertaining to energy efficiency in this docket?

A Ms. Stemrich concludes that energy efficiency is not a viable replacement option for Weston 3. She states:

> If Weston 3 were to shut down or reduce its level of operation significantly to meet emission reduction requirements, there is not sufficient energy efficiency available to replace this generation. The maximum achievable energy savings in 2012 are less than 5 percent of expected 2012 Weston 3 generation.[22]

Ms. Stemrich finds that energy efficiency savings potentials are marginal relative to the output of Weston 3.

[22] Direct-PSC-Stemrich-4, lines 1-4.

Q Do you agree with Ms. Stemrich's assessment of energy efficiency potential in Wisconsin and its role in providing a replacement portfolio for Weston 3?

A Not at all. First, it is my opinion that Ms. Stemrich appears to address the wrong question – energy efficiency is part of a replacement portfolio, not the singular replacement technology for a retiring unit. Second, Ms. Stemrich may have either confused or confounded annual incremental energy savings expectations with cumulative savings potentials, or was not aware of the expected replacement date of Weston 3 – in either case, her analysis results in a significant devaluation of the role of energy efficiency in this planning case. Finally, I believe that her analysis neglected to review a deeper energy efficiency potential trajectory created by the Energy Center which may be more appropriate for the analysis of potential energy savings available in this docket.

Q How should energy efficiency be viewed in a retrofit versus retire planning case?

A In my direct testimony, I stated that "consideration of [energy efficiency] could have taken the form of either an avoided cost study…or directly into the optimization study as a resource choice."[23] To clarify, bundles or increasing degrees of energy efficiency should be considered one of the portfolio options available to the Company to meet energy demands; in short, it should be on the same footing as other generation resources in the Company's analysis, and it is required to be on a priority footing in the Commission's assessment. By undervaluing the opportunity to invest in additional energy efficiency, Ms. Stemrich effectively reduces the priority of this resource below traditional generating resources.

[23] Direct-CW-Fisher-48c, lines 10-14.

Q How did Ms. Stemrich confuse or confound annual incremental energy savings expectations with cumulative savings potentials?

A Ms. Stemrich noted that she evaluated the energy savings available from a 1.6% reduction, citing a 2009 Energy Center of Wisconsin potential study.[24] The study to which she cites is quite clear that the 1.6% reduction are "annual energy savings" [emphasis in original][25] meaning that each and every year, energy efficiency could be expected to save an additional 1.6% of energy sales – i.e., those savings are added or compounded each year.

The report finds that Wisconsin could reach 1.6% annual incremental savings by 2012, and continue to achieve additional savings at that incremental level through the next years as well. In fact, the report is quite clear in that the "*annual* rate of efficiency gains in 2018 [is] at the same level assumed for 2012. Over time, the *cumulative* impact continues to grow as the constant rate of annual savings accrues." [emphasis in original][26] The report even gives an illustration of total electric energy saved at *13%* of sales in 2018,[27] well above the 1.6% estimated by Ms. Stemrich.

Q Why is the cumulative amount of available energy efficiency savings important to consider in this proceeding?

A The total amount of energy efficiency is important because this is a forward planning case, where the Company is considering the retirement of the Weston 3 asset at the end of 2016, not in 2012 as postulated by Ms. Stemrich. Simply stated, we would expect that at the savings rate put forth by Ms. Stemrich, WPS could reach something like 7.7% savings relative to 2012,[28] about 814,000 MWh

[24] Direct-PSC-Stemrich-3, lines 1-5. Relevant excerpts from this study, Energy Center of Wisconsin, August 2009, "Energy Efficiency and Customer-Sited Renewable Resource Potential in Wisconsin for the Years 2012 and 2018: Final Report" (PSC REF#: 118226), are filed with this testimony as Ex.-CW-Fisher-18.
[25] Ex.-CW-Fisher-18, *abstract* and p. EE-6.
[26] *Id.* p. EE-21.
[27] *Id.* p. EE-21.
[28] $1-(1-1.6\%)^{2017-2012}=7.7\%$

per year – or about 45% of the expected Weston 3 output in 2017.[29] There are a number of potential complications, so a simple analysis is in order.

Q Have you estimated the level of savings that you believe should have been portrayed by Ms. Stemrich?

A Yes. I went back to the Company's EGEAS output to review both annual expected output of the Weston 3 unit (putting aside concerns about Weston 3's expected output that I raised in my direct testimony)[30] and total Company demand as portrayed in the model. Using output from Future 7, Scenario 1 (the Company's revised base case scenario with Weston 3 intact), I estimated the annual estimated growth rate, the annual incremental savings rate (at 1.6%), and the impact of savings that Ms. Stemrich estimated were already in the baseline (84,000 MWh).[31]

I assumed that, because of the savings already in the baseline, additional annual incremental savings amounted to only 1.03%,[32] and applied this value year-by-year through 2016, inclusive.

With these fairly conservative assumptions in place, I found that by the end of 2016, WPS could have secured over 36% of their generation requirement for Weston 3 through efficiency (see **Figure 2**, below).

[29] Ms. Stemrich estimated total sales in 2011 = 10,500,000 MWh = 168,000MWh / 1.6% (see Direct-PSC-Stemrich-3, lines 3-7). 10,500,000 * 7.7% = 814,000 MWh.
[30] See Direct-CW-Fisher-36c through 39c
[31] Ms. Stemrich noted that the Focus on Energy program is already saving energy, and she estimated "annual energy efficiency savings reflected in WPSC's retail sales [as] 84,000 MWh" , a level "expected to continue into the future". (Direct-PSC-Stemrich-2, lines 18-21.)
[32] $\big((demand \cdot savings\ rate) - 84{,}000MWh\big)/demand = 1.03\%$ where *demand* = 14,694,000 MWh in 2011 (according to EGEAS Expansion Plan Summary for F7A01) and savings rate = 1.6%.

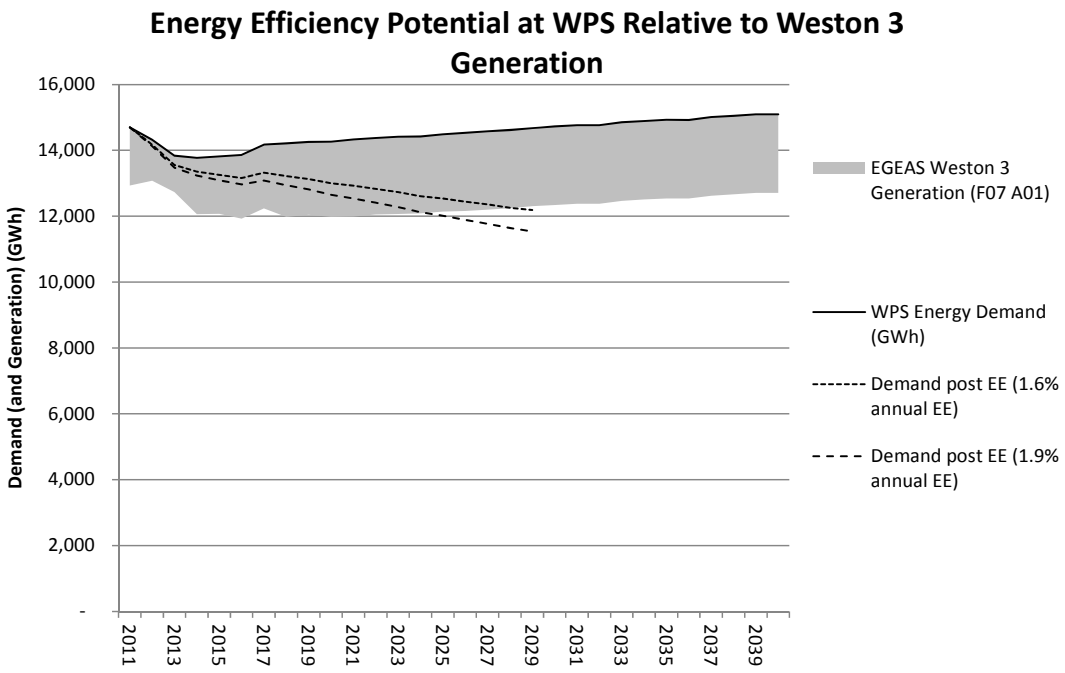

Figure 2. Energy efficiency potential at WPS relative to Weston 3 generation for 1.6% and 1.9% annual incremental energy efficiency.

This calculation depends on a key factor derived by Ms. Stemrich, but not described thoroughly. She estimates that "for the annual savings included in WPSC's 2010 retail sales" she estimated "annual energy efficiency savings reflected in WPSC's retail sales [of] 84,000 MWh."[33] However, it is unclear if this value represents the cumulative amount of savings achieved by 2010, or the annual incremental savings achieved in the year 2010. I have assumed that, consistent with her statement, it is an annual incremental value. If it is a cumulative value, then the decrement in baseline savings are much smaller and the impact of a 1.6% potential is much greater.[34]

Q Is 1.6% an upper bound on the efficiency rate that could be achieved in Wisconsin?

A No. As noted in the document cited by Ms. Stemrich:

[33] Direct-PSC-Stemrich-2, lines 18-21.

[34] For example, if the 84,000 MWh represents cumulative savings over three years (as implied on Direct-PSC-Stemrich-2, lines 14-15), and annual incremental savings are only 28,000 MWh, then a 1.6% savings rate achieves nearly 50% of Weston 3's generation by the end of 2016.

> The Energy Center conducted an analysis to determine the impacts under an environmental scenario which assigned costs to emissions of other pollutants in addition to CO_2 (e.g. SO_2, NOx, and Hg), and reduced the economic discount rate to place a higher value on future energy savings generated by current program efforts.[35]

This "environmental scenario" is probably more representative of the type of scenario that should be run in this case. The installation of ReACT represents a very real price on criteria pollutants. The environmental scenario is represented in the report by a 1.9% annual incremental savings rate. Running the same calculation as above, I estimate that 46% of Weston 3's output in 2016 could be avoided with a 1.9% incremental energy efficiency program through 2016.[36]

Finally, if the output from Weston 3 does not significantly increase in the future, then of course realized savings from an aggressive energy efficiency program could achieve far more relative to the expected output of the unit. At a 1.9% incremental savings rate, energy efficiency in 2016 could cover about 72% of Weston 3's estimated generation from the year 2012.[37] By 2018, a 1.9% incremental savings rate applied in 2012 would exceed the modeled 2012 output of Weston 3.

Q Is it your recommendation that the Company should evaluate energy efficiency spending above and beyond the Focus on Energy program?

A Yes. The Energy Center of Wisconsin potential study finds that there is a great deal of cost effective energy efficiency available to Wisconsin residents, and Ms. Stemrich calculates that the Company is achieving at most half of the estimated baseline "achievable potential." I showed in direct testimony that market procurement of energy and capacity was less expensive than retrofitting Weston 3

[35] Ex.-CW-Fisher-18, p. EE-26.
[36] Again, if the 84,000 MWh estimated by Ms. Stemrich are cumulative, and not annual incremental, the savings from a 1.9% EE rate could be close to 60% of the output of Weston 3.
[37] 896,000 MWh saved at the end of 2016 relative to baseline estimate = 46% of output in 2016 and 72% of output from 2012.

on net;[38] therefore I would hypothesize that the Company could probably achieve a significant amount of cost effective energy and other replacement energy for far less than the cost of retrofitting and continuing to operate Weston 3. It is my opinion that the Company should commission an energy efficiency potential study tailored to the WPS service territory and incorporate the results of such a study effectively into their Weston 3 replacement analysis. I think that the results of such a study would quickly demonstrate that the Company could replace Weston 3 very cost effectively using energy efficiency as one of a number of tools in a replacement portfolio.

Q Does this conclude your testimony?

A It does.

[38] A baseline net present benefit of at least $44 million accrued to ratepayers for replacing Weston 3 with market based energy and capacity, even using other Company assumptions. See Direct-CW-Fisher, Table 5.