February 4, 2014

Brad Borum Director of Electricity Indiana Utility Regulatory Commission PNC Center, Suite 1500 East 101 West Washington Street Indianapolis, IN 46204	Marc E. Lewis Vice President – Regulatory and External Affairs One Summit Square P.O. Box 60 Fort Wayne, IN 46801

Wind on the Wires' Corrected Comments on Indiana Michigan Power Integrated Resource Planning Report dated November 1, 2013

Dear Mr. Borum:

Enclosed are Wind on the Wires' comments regarding Indiana Michigan Power's (I&M) integrated resource plan filed on November 1, 2013 ("Plan"). Our comments address the following six points: [1] I&M should evaluate the potential cost savings from wind resources based on typical output curves from sources within and outside of Indiana; [2] sensitivities should be run for utility scale wind resources with and without the federal production tax credit; [3] the capacity factor for utility scale solar should match the actual output of solar resources in Indiana or adjacent states; [4] the plan should increase its CO2 costs to account for upcoming U.S. EPA regulations being implemented in the next couple of years; [5] the variations in Rockport's CO2 emissions need to be evaluated and potentially corrected.

Respectfully submitted,

_____/s_______________
Sean R. Brady
Wind on the Wires

COMMENTS

1. <u>I&M SHOULD EVALUATE THE BENEFITS OF UTILITY SCALE WIND AT PERIODS OTHER THAN THE PEAK</u>

I&M uses a capacity factor for wind of 13%[1], which is based on peak period production. The focus on peak period production, however, fails to account for benefits that occur outside the peak and from potential energy savings due to wind energy sources on the transmission system. A number of reports from well-respected economics consultants and state agencies have analyzed the benefits of wind as an energy source and found that it lowers the production costs of a system and lowers the locational marginal prices. Synapse analyzed the overall economic and emissions effect on PJM ratepayers and reached that conclusion. Synapse evaluated a number of futures that included levels of wind above what is required by the current renewable energy standards in PJM states.[2] Synapse calculated that the renewable portfolio standards in PJM states, when complete, would add approximately 32.1 gigawatts of nameplate capacity to the transmission system. Synapse looked at the economic impacts of increasing the amount of wind used within PJM from 32.1 gigawatts to 65.4 gigawatts.[3] That amount of wind would provide approximately 22% of the energy used in PJM. At that level of wind energy use, Synapse analysis made the following findings:

- wind output displaced coal, gas and oil-fired generation;
- by 2026, the displacement of those fossil-fuel generation sources would result in a production cost savings for PJM of $14.5 to $14.9 billion per year in comparison to the base scenario;
- PJM would experience an increase in its annual revenue requirements but the net savings, due to production cost efficiency gains, were approximately $6.9 billion per year by 2026;
- emission of carbon, SO2 and NOx would all be lower than the base scenario;

[1] <u>Plan</u> at 131, Exhibit 5-1, and at 202, Exhibit 8-9.
[2] Bob Fagan, Patrick Luckow, Dr. David White, Rachel Wilson, Synapse Energy Economics, Inc., "The Net Benefits of Increased Wind Power in PJM" ("<u>Wind Power in PJM</u>"), (May 9, 2013).
[3] <u>Wind Power in PJM</u>, at 2, Table 1 at 4.

- PJM would also experience a reduction in its' load-weighted average annual energy market prices, relative to the base scenario, of approximately $1.74 per megawatt hour.[4]

Similarly, the Illinois Power Agency looked at the impact of the state's renewable portfolio standard in 2011. The IPA found that

> the integration of renewable resources into the power grid has lowered Illinois' average LMPs by $1.30 per megawatt hour – from $36.40 to $35.10. The aggregate result is a savings of $176.85 million in total load payment for generation in Illinois.[5]

The IPA's analysis compared its 2011 energy portfolio that included renewable energy sources to a portfolio without renewable energy sources. In 2011, wind accounted for approximately 78% of the Commonwealth Edison's and Ameren Illinois' renewable portfolio, and therefore, was the largest shaper of the cost savings.[6]

The reports above note that adding more wind to a utilities' energy portfolio could result in net annual savings in electricity production costs and a lower market energy price. These types of analysis have not been performed by I&M, thus the Plan's analysis is incomplete.

Wind on the Wires recommends that **I&M evaluate the potential cost savings from increasing its use of wind resources from within and outside of Indiana. If the analysis demonstrates a savings for I&M customers, then I&M should add wind to its' preferred portfolio, accordingly. Furthermore, the analysis should be conducted in a methodology similar to the employed by Synapse or IPA, as discussed above. The analysis should use the typical output curves for wind farms within Indiana and outside of Indiana, it should evaluate costs with and without the PTC and should account for fuel savings for coal, nuclear and natural gas plants that are offset by wind generation.**

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[4] Wind Power in PJM, at 5, 22.

[5] Illinois Power Agency, "Annual Report: The Costs and Benefits of Renewable Resource Procurement in Illinois Under the Illinois Power Agency and Illinois Public Utilities Acts" ("IPA Renewables Report"), at 3 (March 30, 2012)

[6] IPA Renewables Report, *summation of data in* Figs. 13 and 18.

2. SENSITIVITIES SHOULD BE RUN FOR UTILITY SCALE WIND PRICES WITH AND WITHOUT THE PTC

The Plan models wind resources as having a constant $65/megawatt hour rate and it does not factor in an extension of the federal Production Tax Credit ("PTC") over the twenty year period of analysis.[7] Wind projects qualified for the PTC if they started construction before the end of 2013. Wind projects can take up to 18 months to complete. Therefore, there are some wind projects that qualify for the PTC but may start to operate until the 2d or 3d quarter of 2015. The Plan should account for that and discount the $65 by $22 per megawatt hour for potential wind purchases through first half of 2015.

In addition, the Plan should also perform a second analysis for wind with rates discounted to account for an extension of the PTC, since that is still a viable option.

3. UTILITY SCALE SOLAR CAPACITY FACTOR SHOULD BE BASED ON ACTUAL PRODUCTION DATA FROM SOLAR PLANTS IN INDIANA or ADJACENT STATES

I&M uses a solar capacity factor of 38%[8] which appears to be based on PJMs class average capacity value of solar used for projects with less than 3 years of operational data[9]. This capacity value is used for new solar resources that want to participate in PJMs capacity market. The solar capacity factor used in the Plan should be as accurate as possible. Actual production data for the area I&M will be procuring solar resources is more accurate than the average capacity value of solar for the entire PJM footprint.

Thus, **Wind on the Wires recommends that I&M adjust its solar capacity factor to match actual production from solar facilities in Indiana or adjacent states.**

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[7] Plan at 127.
[8] Plan at 131, Exhibit 5-1, and at 202 for Exhibit 8-9.
[9] PJM "PJMs Support for Variable Resources" (April 2012) *available at*: http://pjm.com/~/media/about-pjm/newsroom/downloads/support-variable-resources.ashx

4. THE PLAN NEEDS TO INCREASE ITS CARBON COSTS TO ACCOUNT FOR EPA'S REGULATIONS FOR COAL COMBUSTION RESIDUALS AND POLLUTION STANDARDS FROM EXISTING POWER PLANTS

The Plan uses a flat $15/metric ton as a proxy for CO2 costs and ran sensitivities at $0 and $25/metric ton.[10] That range of analysis is low given that the U.S. EPA will be issuing emissions rules for new and existing plants in 2016 pursuant to Section 111d of the Clean Air Act, and implementing the Coal Combustion Residuals final rule in 2014.

The CO2 costs used in the Plan are low in comparison to other models. MISO is working on its transmission expansion plan for 2015. That plan includes a Public Policy scenario that looks at the impacts of EPA's carbon in the range of $50 to $75/ ton of CO2. Even the Reference scenario that Duke Energy Indiana is evaluating has a higher range of carbon costs than what the Plan looks at. Duke's Reference scenario evaluates carbon cost ranging from $17 to $50/ton, and its' Environmental Future has carbon costs in the $20 to $75/ton range. [11] An indicator that the range of CO2 costs evaluated by the Plan are not conservative enough is that the $25/metric ton did not cause a change in the Preferred portfolio.[12]

In addition, the Plan does not include costs related to the EPA's Coal Combustion Residuals proposed rule for handling ash from coal power plants. The final rule is expected in 2014.[13] The Plan states that it factors that cost into it analysis[14], however, the only additional cost for EPA regulations is the $15/ metric ton to $25/ metric ton CO2 carbon tax.

It would be prudent for I&M to explore higher costs of carbon to account for potential variations in the costs related to the section 111d rules and the CCR rules. It would also allow I&M to understand at what carbon cost level it would have to change its Preferred portfolio. Thus, **Wind on the Wires recommends that I&M look at a higher range of carbon costs that are in the range of $30 to $50/ton.**

[10] Plan at 190.
[11] "The Duke Energy Indiana 2013 Integrated Resource Plan" (Public) at 10 (November 1, 2013).
[12] Plan at 190.
[13] Plan at 149.
[14] Plan at 149.

5. VARIATIONS IN ROCKPORTS CARBON EMISSIONS NEED TO BE EXPLAINED

Dramatic changes in CO_2 emissions for Rockport 1 and 2 are not explained in the Plan. Appendix F provides a table of air and CO_2 emissions from I&M's plants. There are no explanations for the steady decline in Rockport's emissions from 2016 to 2025, at which time emissions are about one-half of that in 2016, and for the then sharp increase in emissions in 2026.

CO_2 emissions from Rockport 1 decline steadily from 7,400,000 tons in 2016, right after scrubbers are added to reduce NOx emissions, to a low of 2,817,000 tons in 2025 and then CO_2 emissions unexpectedly and dramatically increase in 2026 to 6,587,000 tons. Similarly, the CO_2 emissions from Rockport 2 decline steadily from 7,370,000 tons in 2017 to a low of 3,852,500 tons in 2023 and then CO_2 emissions increase dramatically in 2024 to 4,609,400 tons, and continue to increase to 7,370,900 in 2027 when it unexplainably drops again, this time to 5,166,000 tons and then increases the following year to 7,396,300 tons. There are no clear reasons for these variations – there are no dramatic additions or retirements to the system, and no large variations in demand. The addition of scrubbers and desulfurization controls would reduce operating time and thus emissions for one year but does not explain the prolonged decreases in emissions from 1 and 2 between 2017 and 2026, or the dip in Rockport 2's emissions in 2023, or the increases in emissions from both plants in 2026. See marked-up Appendix F, *infra*.

Thus, **Wind on the Wires recommends that I&M evaluate and correct the variations in carbon emissions from the Rockport plants.**

F. Exhibit 11-1: I&M Projected SO_2, NO_x, Hg & CO_2 Emissions and Ash Production

Indiana Michigan Power Company
Projected SO_2, NO_x, Hg & CO_2 Emissions and Ash Production
2014 - 2033

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
SO_2 Emissions (1000 Tons)																				
Rockport 1	23.1	9.9	11.6	9.9	11.0	10.3	8.8	9.4	5.9	5.9	6.0	4.4	3.6	3.6	3.8	3.7	3.7	3.9	3.6	3.4
Rockport 2	18.6	8.7	10.3	11.4	10.4	9.4	9.6	9.0	6.8	5.9	7.1	6.5	11.0	11.3	7.9	4.0	4.0	4.0	3.6	3.7
Plant Total	41.6	18.6	21.9	21.3	21.4	19.6	18.4	18.4	12.6	11.8	13.1	10.9	14.6	15.0	11.8	7.7	7.6	7.8	7.2	7.1
Tanners Creek 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanners Creek 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanners Creek 3	4.7	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanners Creek 4	12.1	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plant Total	16.8	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_x Emissions (1000 Tons)																				
Rockport 1	5.8	4.2	6.4	5.5	1.2	1.1	0.9	1.0	0.6	0.6	0.6	0.5	1.1	1.1	1.2	1.1	1.1	1.2	1.1	1.1
Rockport 2	4.8	4.8	6.1	6.4	5.8	5.2	1.1	1.0	0.7	0.6	0.8	0.7	1.2	1.2	0.9	1.3	1.2	1.2	1.1	1.2
Plant Total	10.6	9.0	12.5	11.9	7.0	6.4	2.0	2.0	1.4	1.3	1.4	1.2	2.3	2.4	2.1	2.4	2.4	2.4	2.2	2.2
Tanners Creek 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanners Creek 2	-	-	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-	-	-	-	-	-
Tanners Creek 3	1.1	0.6	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-	-	-	-	-	-
Tanners Creek 4	1.8	0.7	0.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plant Total	2.9	1.3	0.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]																				
Rockport 1	186.0	77.4	83.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	75.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rockport 2	149.6	63.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	83.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Plant Total	335.7	141.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	158.2	[illegible]	158.9	157.7	162.0	149.2	147.1
Tanners Creek 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanners Creek 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanners Creek 3	3.0	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanners Creek 4	71.8	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0
Plant Total	74.8	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO_2 (1000 Tons)																				
Rockport 1	6,791.9	4,901.1	7,401.1	6,320.4	7,053.3	6,578.8	5,625.5	6,000.8	3,746.2	3,776.6	3,847.7	2,817.8	6,587.6	6,639.8	6,987.5	6,679.9	6,744.1	7,075.9	6,635.6	6,222.7
Rockport 2	5,611.3	5,629.0	7,032.0	7,372.7	6,711.8	6,069.9	6,263.6	5,886.0	4,407.3	3,852.5	4,609.4	4,232.3	7,135.2	7,370.9	5,166.0	7,396.3	7,228.4	7,271.5	6,577.4	6,810.2
Plant Total	12,403.1	10,530.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	14,010.8	12,153.6	14,076.2	13,972.5	14,347.5	13,213.0	13,032.9
Tanners Creek 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanners Creek 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanners Creek 3	872.8	436.3	-	-	-	-	-	-	-	[illegible]	-	-	-	-	-	-	-	-	-	-
Tanners Creek 4	1,797.7	735.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plant Total	2,670.5	1,171.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ash Production (1000 Tons)																				
Rockport 1	190.1	135.6	204.4	174.6	194.1	181.1	155.0	165.4	103.4	104.2	[illegible]	77.7	250.8	252.8	265.9	254.2	256.7	269.2	252.7	237.0
Rockport 2	157.1	155.7	194.3	203.6	185.4	167.7	172.5	162.2	121.6	106.4	[illegible]	116.7	196.2	202.7	142.1	281.4	275.1	276.7	250.3	259.2
Plant Total	347.2	291.3	398.7	378.2	379.5	348.8	327.5	327.5	225.0	210.6	[illegible]	194.5	447.1	455.5	408.0	535.6	531.8	545.9	502.9	496.3
Tanners Creek 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanners Creek 2	-	-	-	-	-	-	-	-	-	-	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-	-
Tanners Creek 3	36.6	18.3	-	-	-	-	-	-	-	-	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-	-
Tanners Creek 4	46.6	19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	0.0	0.0
Plant Total	83.2	37.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	0.0	0.0

Steady decrease in Rockport 1 and 2 CO2 emissions from 2016 to 2025 and 2018 to 2023, respectively

CO2 emissions nearly double in 2026

Drop in Rockport 2 Emissions in 2023

Note: Rockport is based on I&M portion only (85% Unit 1 & 85% of Unit 2).
Rockport 1 is utilizing a blend of 87% PRB coal and 13% Eastern coal from 2014-25, and from 2026-33 it is utilizing a blend of 20% PRB coal and 80% ILB coal
Rockport 2 is utilizing a blend of 87% PRB coal and 13% Eastern coal from 2014-28, and from 2029-33 it is utilizing a blend of 20% PRB coal and 80% ILB coal
Tanners Creek 1-3 units are utilizing 100% Eastern coal from 2014-33
Tanners Creek 4 is utilizing a blend of 80% PRB coal and 20% Eastern coal from 2014-33

CONCLUSION

WHEREFORE, Wind on the Wires recommends that the Commission and Indiana Michigan Power adopt the recommendations contained herein.

Respectfully submitted,

_____/s_________________

Sean R. Brady
Wind on the Wires

P.O. Box 4072
Wheaton, Illinois 60189-4072
312.867.0609
sbrady@windonthewires.org

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