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Brad Borum Director of Electricity Indiana Utility Regulatory Commission PNC Center, Suite 1500 East 101 West Washington Street Indianapolis, IN 46204	Elizabeth Herriman Associate General Counsel Duke Energy Indiana, Inc. 1000 East Main Street Plainfield, IN 46168

Wind on the Wires' Corrected Comments on Duke Energy Indiana's 2013 Integrated Resource Plan

Dear Ms. Herriman and Mr. Borum:

Enclosed are Wind on the Wires' comments regarding Duke Energy Indiana's ("Duke") integrated resource plan filed on November 1, 2013 ("Plan"). Our comments address the following six points: [1] Duke should evaluate the potential cost savings from wind resources based on typical output curves from sources within and outside of Indiana; [2] Duke should either modify the System Optimizer model to incorporate energy and system benefits of wind sources into its current modelling process; [3] the capacity factor for utility scale solar should match the actual output of solar resources in Indiana or adjacent states; [4] the load growth rate for the Winter period should be positive; [5] the boundaries for natural gas prices should be ±21% of the `natural gas price; [6] the Plan should also add the short period of time in which wind plants can be built to the list of the other plants that are listed.

Respectfully submitted,

_____/s_____
Sean R. Brady
Wind on the Wires

COMMENTS

1. DESIGNING THE IRP FOR THE PEAK PERIOD FAILS TO EVALUATE BENEFITS OF INCREASING DUKE'S PERCENTAGE OF WIND SOURCES

The analysis performed by Duke suffers from a potentially critical flaw, in that the System Optimizer fails to evaluate potential energy savings from incorporating wind energy into the three portfolios[1] beyond the 14% and 15% of total electricity sales to customers. The System Optimizer's primary focus is to develop scenario portfolios that optimize the present value revenue requirement at the peak period.[2] Limiting the portfolio's to peak period capacity benefits fails to account for the energy savings that wind can provide, which a number of reports have found wind energy to provide. In addition, the sensitivity analyses of the Traditional, Blended and Coal Retirement portfolios support the premise that more wind energy than what is currently in those scenario portfolios would benefit Duke.

A. Wind Provides Ratepayer Savings Beyond What is Analyzed by the System Optimizer

The Plan attempts to optimize Duke's energy portfolio by managing capacity at the peak period. This focus, 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. There are a number of reports by economic consulting firms and state agencies that analyze the benefits of wind as an energy source and found that it lowers production costs of a system and lowers the locational marginal prices. Synapse performed such an analysis. It analyzed the overall economic and emissions effect on PJM ratepayers. Synapse looked at a number of futures that included levels of wind above what is required by the current renewable energy standards in

[1] There are three portfolios – Traditional, Blended Approach and Coal Retires.
[2] Plan at 105.

PJM states.[3] Synapse calculated that the renewable portfolios standards for PJM states, when complete, would add approximately 32.1 gigawatts of nameplate capacity to the PJM 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.[4] That amount of wind capacity would provide approximately 22% of the energy used in PJM. At that level of wind energy consumption, Synapse's analysis made the following findings:

- wind output displaced coal, gas and oil-fired generation;
- by 2026, the displacement of those fossil-fueled generation sources resulted 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;
- 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.[5]

Similarly, the Illinois Power Agency looked at the impact of Illinois' 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.[6]

The IPA 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

[3] Bob Fagan, Patrick Luckow, Dr. David White, Rachel Wilson, Synapse Energy Economics, Inc., "The Net Benefits of Increased Wind Power in PJM" ("Wind Power in PJM"), (May 9, 2013).
[4] Wind Power in PJM, at 2, Table 1 at 4.
[5] Wind Power in PJM, at 5, 22.
[6] 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)

the Commonwealth Edison's and Ameren Illinois' renewable portfolio, and therefore, was the largest shaper of the cost savings.[7]

In addition to the independent reports, the sensitivities Duke has run show that rate increases are less sensitive to an increased use of renewable energy than an increase in the use of gas or coal for all of the scenarios (i.e., Low Regulation, Reference and Environmental). To check portfolio performance with respect to changes in some key variables Duke ran sensitivities. The sensitivities Duke evaluated were changes in CO2 costs, in load growth, in amount of renewable energy, and in natural gas and coal prices. Increasing the amount of renewable energy had almost no impact on the Reference and Environmental scenarios revenue requirement, and its largest impact would be a 1% increase in revenue requirement for a Traditional portfolio in a Low Regulation scenario. Natural gas and coal, on the other hand, had much larger impacts on the revenue requirement. Natural gas had changes ranging from 1% to 3% and coal resulted in increases in the revenue requirement of at least 5%.[8] The volatility caused by changes in coal and natural gas in comparison to an increase in renewables indicates that renewables are less risky than fossil fuels and a benefit to Duke's portfolio.

The reports noted above show 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. Duke has not performed a similar analysis in the Plan, thus the Plan lacks data regarding the potential cost savings from adding wind to its energy portfolio beyond the 14% and 15% level and fails to make the case that it has identified the lowest cost portfolio.

Wind on the Wires recommends that **Duke evaluate the potential cost savings from increasing its use of wind resources from within and outside of Indiana, in a methodology similar to the Synapse or IPA reports discussed above. The analysis should use the typical output curves for windfarms within Indiana and outside of Indiana,**

[7] IPA Renewables Report, *summation of data in* Figs. 13 and 18.
[8] Compare Figure 8-J (Plan at 131) to Figure 8-L Natural Gas Price Sensitivity (Plan at 134) and Figure 8-M Coal Price Sensitivity (Plan at 136)).

it should look at costs with and without the PTC and should account for fuel savings for coal and natural gas plants that are offset by wind generation.

B. <u>The System Optimizer Has a Limited Perspective and Needs to be Supplemented with Other Data</u>

The System Optimizer model used by Duke focuses on minimizing the revenue requirements at the peak period.[9] Such an analysis fails to account for potential energy savings from wind sources. As discussed above, there are a number of reports analyzing the benefits of wind as an energy source that lowers production costs of a system and lowers the locational marginal prices. These are factors that are not accounted for by the System Optimizer, since it attempts to minimize the present value revenue requirement by managing the capacity portfolio during peak periods. Therefore, it is likely that the Blended portfolio selected by the System Optimizer can either be improved or it was the incorrect selection.

In addition, there is a question as to whether the System Optimizer needs to be replaced. It is difficult to comment on how to improve this modelling since, there is not much information about the System Optimizer. Some of the potential options are: [1] modify the System Optimizer model to evaluate the energy and system benefits of wind sources; [2] incorporate data into the model from an external report, such as those performed by Synapse or the IPA; [3] use data from an external report or energy model to modify the scenario portfolios selected by the System Optimizer; or [4] replace the System Optimizer model with a more dynamic model that can account for energy and system benefits of wind source.

Thus, Wind on the Wires' recommends that **Duke review how to best incorporate energy and system benefits of wind sources into its current modelling process, as described above, or replace the System Optimizer model with a more dynamic model.**

[9] The resource options only evaluate a source based on its percentage of contribution at the peak. *See* Table 8-A at 107 and Table 8-C at 118-119.

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

For solar, the peak contribution factor input into the System Optimizer was 42%.[10] The Plan identifies that as being the installed capacity of a solar plant. The solar capacity factor used in the Plan should be as accurate as possible. The Plan does not indicate the basis of the 42% installed capacity factor, however, actual production data for the area Duke will be procuring solar resources would be a more accurate capacity factor than the installed capacity factor.

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

3. LOAD GROWTH OF WINTER PERIOD SHOULD MORE CLOSELY PARALLEL THAT OF SUMMER PERIOD

The Plan uses a growth rate for Summer peak demand of 0.9%, whereas the growth rate for the Winter peak is a -0.2%.[11] The factors affecting each tend to indicate that the growth rate for the Winter peak should be positive. Winter is influenced by temperature and wind speed, whereas Summer is influenced by temperature and humidity.[12] There is no further discussion about the results of the temperature data set used by the Plan.

In the near term, Duke is expecting Commercial and Industrial demand to grow for three years, then subsides for a three year period and then the energy demand for those sectors continues to increase over the remaining period of analysis.[13] The Residential sector's electricity demand grows continuously over the entire 20 year period.[14] Therefore, Duke will experience constant demand from its primary sectors whose usage is correlated to temperature.

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[10] Plan at n.11.
[11] Plan at 34.
[12] Plan at 29.
[13] Plan at 34, Fig. 3-B.
[14] Id.

Thus, the Plan lacks a clear reason why the Winter peak is not growing at a positive rate. **Wind on the Wires' recommends that Duke either add the weather dataset to the Plan, so stakeholders can review the material, or make the Winter peak consistent with the Summer peak given the lack of supporting data.**

4. NATURAL GAS PRICE BOUNDARIES SHOULD BE SYMMETRICAL

The Plan doesn't provide its' natural gas price forecasts, so it is difficult to assess the correctness of the gas price boundary conditions of +15%/-21% of mean.[15] Typically, those boundaries are symmetrical, and not asymmetrical as proposed. The Plan attributed the asymmetrical boundary to the fact that it used a forecasted natural gas price higher than the mean value of the nine forecasts it relied upon. The Plan, however, does not explain its reasons for using a gas price higher than the mean. Given the lack of information about its natural gas data, it is hard to assess the correctness of the boundaries that were set. The standard deviation/probability of a variation the Plan using for the forecasted price curve is based on the standard deviations around the mean price curve and not the forecasted natural gas price curve. The gas boundaries should relate to the forecasted natural gas price curve and not the mean natural gas price curve; meaning they should be symmetrical around the forecasted natural gas price curve. In doing so, a conservative approach would use a ±21%, though the more accurate approach would use the average of the +15%/-21%, which would yield ±18%.

Thus, the **Wind on the Wires' recommends that Duke use either ±21% as the boundaries for its' forecasted natural gas price curve or in the alternative ±18%.**

[15] Plan at 65.

5. LEAD TIME FOR CONSTRUCTION

In the Supply-Side Resource Screening section of the Plan, there is a discussion of lead time needed for construction.[16] This section discusses simple-cycle combustion turbine units, natural gas combined cycle units (referenced as "CC"), coal units, and nuclear units, but it fails to identify construction periods for a wind plant. The construction time varies by location and project size, however a project of 200 megawatts can be built in a year to a year and a half.[17]

CONCLUSION

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

Respectfully submitted,

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[16] Plan at 76, "Lead Time for Construction."
[17] Wild Horse Wind farm is a 229 megawatt facility built in fifteen months. See article at http://windsystemsmag.com/article/detail/33/a-case-for-wind-farm-construction,