CLEAN LINE
ENERGY PARTNERS

January 30, 2014

Bradley K. Borum
Director of Electricity
Indiana Utility Regulatory Commission
PNC Center, Suite 1500 East
101 West Washington Street
Indianapolis, IN 46204

Dear Mr. Borum:

On November 1, 2013, Duke Energy Indiana ("Duke") filed its Integrated Resource Plan ("IRP"), a document that outlines the overall direction of resource procurements for the 20-year planning horizon. Pursuant to 170 IAC 4-7-2, interested parties are permitted to submit comments on Indiana Michigan Power's IRP within 90 days from its filing date. Clean Line Energy Partners LLC ("Clean Line") respectfully submits these comments.

Respectfully,

Cary Kottler
General Counsel, Clean Line Energy Partners LLC
cell 713-412-1682
tel 832-319-6320
CKottler@cleanlineenergy.com

I. Background

As new environmental regulations make existing power generation fleets more expensive, and wind turbine technology continues to improve, high capacity factor wind has become more competitive with other new and existing sources of energy. To access the highest value wind, and thus the least expensive wind energy, an expansion of the electric transmission grid is needed. Clean Line hopes to play an instrumental role in accelerating the delivery of high capacity factor wind power from the central United States to distant load centers by developing long-distance transmission lines.

Clean Line will employ high-voltage direct current ("HVDC") technology to move power as efficiently as possible over long distances, for a total delivered energy price that is competitive with all other types of new generation. Clean Line and its subsidiaries are developing two HVDC transmission line projects that could deliver low-cost, clean energy to Duke and other utilities in the region. The first project, the Grain Belt Express Clean Line ("Grain Belt Express"), is a 750-mile transmission line that originates near Dodge City, Kansas and extends to the Sullivan 765 kV substation in southwestern Indiana. Grain Belt Express is a multi-terminal HVDC project with three converter stations. One converter station will be in western Kansas, where new wind generating facilities will connect to it via alternating current ("AC") lines. The two other converter stations will enable delivery of electricity to the existing AC grid through interconnections with the Midcontinent Independent System Operator, Inc. ("MISO") in Missouri, and with the PJM Interconnection, L.L.C. ("PJM") in Indiana. In May 2013, the Indiana Utility Regulatory Commission ("IURC") granted Grain Belt Express Clean Line LLC a Certificate of Public Convenience and Necessity in Indiana. Grain Belt Express Clean Line LLC also obtained requisite regulatory approvals in Kansas, including a permit to construct the 370-mile Kansas portion of the project in November 2013 and a certificate to operate as a public utility in Kansas in

December 2011. Grain Belt Express expects to be delivering electricity to MISO and PJM as early as 2018.

The second project, the Rock Island Clean Line ("Rock Island"), is a 500-mile HVDC transmission line that will deliver 3,500 megawatts of wind power from northwest Iowa to the 765 kV Collins substation near Chicago. Rock Island Clean Line LLC has obtained negotiated rate authority from the Federal Energy Regulatory Commission ("FERC") to negotiate transmission service agreements with customers. In addition, Rock Island Clean Line LLC has applied to the Illinois Commerce Commission to become a public utility and certificate the portion of the route in Illinois. Rock Island Clean Line LLC has also initiated a similar proceeding for the Iowa portion of the route with the Iowa Utilities Board. Rock Island expects to begin delivering electricity to PJM as early as 2017.

Each of the Grain Belt Express and Rock Island Clean Line projects is expected to deliver approximately 18 million megawatt-hours of renewable energy per year. The economic benefits of the projects include reducing wholesale electricity prices, while providing a low-cost option to meet growing demand for renewable energy. Grain Belt Express and Rock Island will also provide a substantial opportunity for economic development from the manufacturing, construction, and operation of the transmission line and associated wind farms. The projects will increase the geographical diversity of the wind power in the MISO and PJM transmission systems, thereby reducing net variability of wind energy, facilitating wind integration, and improving grid reliability. Both projects will also have a positive impact on the environment by reducing the need for energy generated by power plants that emit carbon dioxide, SO_2, NO_x, and mercury. Further, the projects will reduce water withdrawal and evaporation required for cooling thermal power plants.

II. Comments

A. The IRP should consider high capacity factor wind energy from out of state because of its low cost.

Most of Duke's pricing information is kept confidential and proprietary in its IRP, so it is difficult to comment on its assumptions and assumed wind pricing. In its IRP, Duke should consider wind power that can be generated in regions with high capacity factor wind, such as western Kansas.

In January 2014, Grain Belt Express completed a Request for Information ("RFI") for wind generators located in and around western Kansas, to determine the level of interest in Grain Belt Express. Over 13,500 MW of wind farm projects under development responded to the RFI. As part of their responses, generators provided indicative power purchase agreement pricing, which is their own calculation of their levelized cost of energy. As can be seen in Table 1 and 2, the lowest-priced 4,000 MW of wind generation was priced at an average of $20/MWh flat in nominal dollars with the Production Tax Credit ("PTC"), and $47/MWh flat in nominal dollars without the PTC.

Table 1: Cost of Wind Energy Delivered by Grain Belt Express with the PTC

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	Nominal Price ($/MWh)	2013 Real Price ($/MWh)
Wind Energy Price	20	17
Clean Line Tariff Price	15- 20	13-17
Delivered Energy Cost	35- 40	30- 34

[1] The Grain Belt request for information requested flat nominal prices for 25-year PPAs. To better compare to inputs in real dollars, Clean Line converted these flat nominal prices to real 2013 dollars assuming 2% annual inflation and discount rate of 9%.

Table 2: Cost of Wind Energy Delivered by Grain Belt Express without the PTC

Table 2: Cost of Wind Energy Delivered by Grain Belt Express without the PTC[2]		
	Nominal Price ($/MWh)	2013 Real Price ($/MWh)
Wind Energy Price	47	39
Clean Line Tariff Price	15- 20	13- 17
Delivered Energy Cost	62- 67	52- 56

The cost to deliver to Indiana, through the Grain Belt Express, would be about $15 to $20/MWh flat. Adding this cost to the wind energy price would result in an overall delivered energy cost with the PTC of $35 to $40/MWh. The overall delivered cost is competitive with other new sources of generation and should be considered in Duke's IRP.

B. Out of state wind offers increased capacity factors.

In its IRP, Duke credits wind with a capacity value of 9% of the nameplate capacity[3][4] and notes that "wind and solar resources appear to be more economic than they would be if the comparison was performed on peak kW basis."[5] First, Duke should consider that out of state wind can contribute to meeting peak demand. Based on Clean Line's meteorological program in western Kansas and detailed analysis of hourly production data, Clean Line believes the actual capacity contribution of western Kansas wind delivered by Grain Belt Express will be about 40% during peak summer hours ending in 3, 4, 5 and 6 in local prevailing time. Second, Duke should also consider high capacity factor wind imported from outside of Indiana as an affordable way to meet its energy needs. A study by Lawrence

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[3] Duke Energy Indiana 2013 Integrated Resource Plan, Nov. 1, 2013, p 75

[4] The peak capacity value assigned to wind in Indiana is in accordance with the capacity value assigned to Indiana in MISO's Local Resource Zones, https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/SPM/20121206%20CSPM/20121206%20CSPM%20Item%2003%20LOLE%20and%20Wind%20Capacity.pdf

[5] Duke Energy Indiana 2013 Integrated Resource Plan, Nov. 1, 2013, p 75

Berkeley National 2011 found that installed wind farms in the Heartland region that includes Kansas had 33 percent higher average capacity factors than wind farms in the Great Lakes region that includes Illinois, Indiana and Ohio.[6] The most cost effective 4,000 MWs of responses to the Grain Belt Express' RFI averaged a 52% capacity factor. Duke should study high capacity factor wind from out of state because the actual output of the wind farms can contribute significantly to Duke's energy needs, on peak and off peak as well.

C. Out of state wind also increases the geographic diversity of wind generation in the MISO footprint.

Duke currently has a 20-year power purchase agreement with an Indiana wind farm, and as Duke looks to expand its renewable portfolio, it should consider the benefits of geographically diverse wind. Geographically dispersed wind farms produce energy at different times, and therefore create smaller ramps on the grid. For example, the times when the wind is blowing in western Kansas, the western terminus of the Grain Belt Express, are almost completely statistically independent from times when the wind blows in the best wind resource locations in Indiana. The wind often blows in the Grain Belt Express resource area when it is not blowing heavily in Indiana, and vice versa.

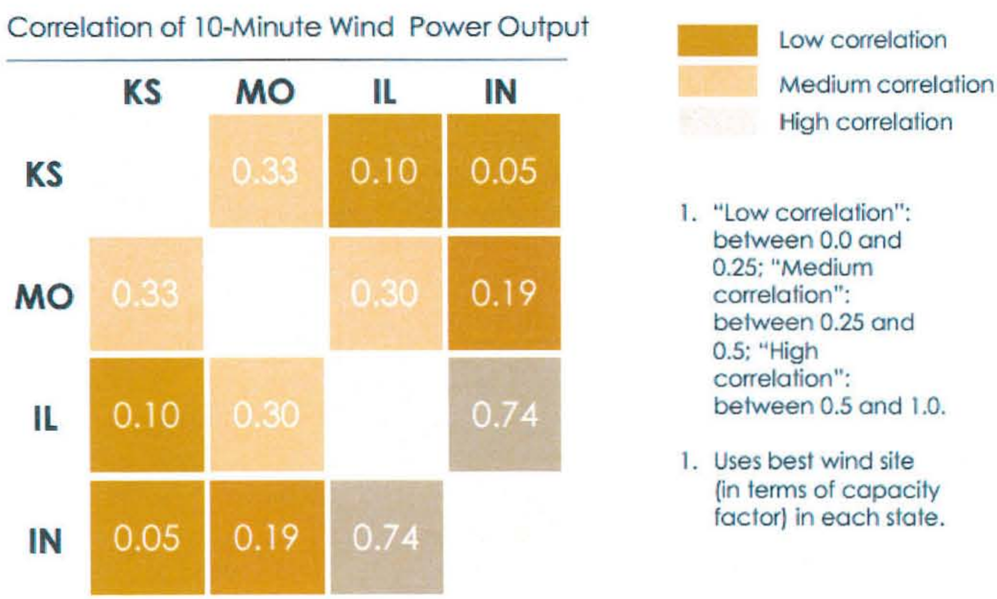
The exhibit below created from NREL's Eastern Wind Integration and Transmission Study (EWITS) demonstrates the benefits of geographic diversification. Using numerical weather models that capture the way weather patterns move across the United States, the EWITS study developed a time series of the output at wind farms across the United States. The exhibit shows the correlation coefficients between wind power generated at modeled wind farms in western Kansas and modeled wind farms situated in the best wind resource areas in Indiana, Illinois, and Missouri. As can be seen from the chart,

[6] LBNL, "2011 Wind Technologies Market Report." p. 53. Available at: http://www1.eere.energy.gov/wind/pdfs/2011_wind_technologies_market_report.pdf (last visited August 31,2012). Hereinafter referred to as "2011 Wind Technologies Market Report."

the Kansas wind resource that will be connected to the Grain Belt Express has a very low correlation with wind in Illinois and Indiana.

A geographically diverse portfolio of wind farms will result in steadier production and smaller ramps than a portfolio of wind farms in the same geographic locations, thus reducing the need for additional cycling capability from thermal generation. Clean Line recommends that Duke study out of state wind and its ability to contribute more consistent power including at peak load in Indiana.

Correlation (r-value) of 10-minute wind generation



III. Conclusion

When properly analyzed, the delivered cost of high capacity factor wind energy is competitive with, and is often lower than, the cost of energy sources. For these reasons, Duke should further consider more wind energy at lower prices and with higher capacity values in its IRP.