BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Grain Belt Express Clean Line LLC for A Certificate of Convenience and Necessity Authorizing it to Construct, Own, Operate, Control, Manage and Maintain a High Voltage, Direct Current Transmission Line and an Associated Converter Station Providing an Interconnection on the Maywood - Montgomery 345 kV Transmission Line	)	Case No. EA-2016-0358

Initial Brief of Wind On The Wires and The Wind Coalition

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Wind on the Wires and The Wind Coalition (jointly referred to as "WOW-TWC"), by and through its attorney, pursuant to Section 240-2.140 of the Commission's Rule of Practice (4 CSR 240-2.140) and upon the schedule agreed upon by the parties, respectfully submits its Initial Brief in the above captioned matter.

WOW-TWC's brief addresses three criteria for granting a certificate of convenience and necessity for the Missouri facilities of the transmission line proposed by Clean Line. More specifically, our brief will address the need for project, its economic feasibility, and the public interest served by the transmission line ("Grain Belt Express Project" or "GBE Project").

I. INTRODUCTION AND STATEMENT OF POSITION

The Grain Belt Express Project is a unique transmission line that brings the benefits of wind energy in the heartland of the United States to the ratepayers in the Midwest and East Coast. The GBE Project is a high voltage direct current ("HVDC") transmission line approximately 750 miles in length. It originates in southwestern Kansas near Dodge City, crosses Kansas and Missouri to an interconnection location in northeastern Missouri along Ameren Missouri's Maywood to Montgomery 345 kV transmission line. From there the GBE Project continues across the remainder of Missouri and across Illinois to American Electric Power's ("AEP") Sullivan substation in southwestern Indiana. This final point of interconnection provides direct access to the 765 kV network in PJM via two 345/765 kV transformers in AEP's Sullivan 765 kV substation. The GBE Project will be capable of delivering up to 3,500 megawatts ("MW") of power to the PJM market and up to 500 MW of power to the Midcontinent ISO

("MISO") market through interconnections with the existing transmission grid in Indiana and Missouri, respectively.[1] The project's forecasted in-service date is as early as 2021.[2] Approximately, 206 miles of the approximately 780 mile HVDC transmission line will be in Missouri.[3]

WOW-TWC supports the Grain Belt Express Project due to its unique ability to deliver wind from the one of the best wind resource areas in our country to two of our country's largest wholesale electricity markets -- MISO and PJM. The Project provides multiple needs, for both Missouri and a large portion of the country. The GBE Project is **needed** by Missouri Joint Municipal Electric Utility Commission (MJMEUC) to deliver low cost energy and capacity that will replace a power contract ending in 2021. It is also needed to deliver renewable energy to utilities in MISO, PJM and Missouri for use in compliance with state renewable portfolio standards and federal clean air requirements. Finally, the GBE Project is the most effective pathway for delivering low cost renewable energy from Kansas into MISO and PJM, no similar transmission line is currently being proposed.

The line is **economically feasible** because it delivers wind energy into Missouri, MISO and PJM at prices equal to or lower than what is currently available. The GBE Project is in the **public interest** because: it improves electric market efficiency across a large area, thus reducing wholesale electric prices in MISO, PJM and Missouri; it can be used as a cost effective replacement of energy lost due to the retirement of generating

[1] Exh. 108, Direct Testimony of Dr. Wayne Galli on Behalf of Grain Belt Express Clean Line LLC, at 6 (Aug. 30, 2016).

[2] *Id*. at 35.

[3] Exh. 100, Direct Testimony of Michael Skelly on Behalf of Grain Belt Express Clean Line LLC, at 3-4 (Aug. 30, 2016).

plants in the next 10-15 years; it minimizes electricity price volatility due to changes in fossil fuel prices; it delivers renewable energy that can diversify a utility's existing renewable generation portfolio; when the renewable energy delivered via the GBE Project offsets coal or natural gas plant operations it provides environmental benefits by reducing emissions regulated by the EPA and it reduces water consumption by coal plants; and it can help large energy customers meet their goals in corporate renewable energy and sustainability plans. Overall, the GBE Project has the unique ability to improve electric market efficiency across most of the Eastern Interconnect because it delivers clean energy at rock bottom market prices for the markets to which the energy is being delivered.

II. CRITERIA FOR CERTIFICATE OF CONVENIENCE AND NECESSITY

The key legal standard for granting the Certificate of Convenience and Necessity ("CCN") is captured within Section 393.170.1 (Mo. Rev. Stat. §393.170.1 (2016)). The CCN will allow facilities to be installed in Missouri, which includes approximately 206 miles of HVDC transmission line and a converter station in Ralls County, Missouri, that will interconnect with the Ameren Missouri transmission line connecting the Maywood and Montgomery 345 kV substations.[4]

The Commission has traditionally used five factors to determine whether to grant a certificate of convenience and necessity: (1) there must be a need for the service the applicant proposes to provide; (2) the applicant must be qualified to provide the proposed service; (3) the applicant's proposal must be economically feasible; (4) the

[4] Exh. 100, Direct Testimony of Michael Skelly on Behalf of Grain Belt Express Clean Line LLC at 3-4 (Aug. 30, 2016).

applicant must have the financial ability to provide the service; and (5) the proposed service must promote the public interest. *In re Entergy Arkansas, Inc.*, Order Granting Certificate of Convenience and Necessity, No. EA-2012-0321 (Mo. P.S.C. 2012); *In re Tartan Energy Co.*, 3 Mo. P.S.C. 173, 177 (1994).

III. ARGUMENT

A. Need for Service

1. The GBE Project is Needed By MJMEUC

Three members of MJMEUC have entered into transmission service agreements (TSA) with Grain Belt Express for rights to deliver an aggregate of 100 megawatts of power to Missouri Public Energy Pool No. 1 (MoPEP), Kirkwood Municipal Utility and City of Hannibal.[5] The power delivered via the GBE would replace the energy and capacity MJMEUC members currently receive from plants in Illinois.[6] MJMEUC reached this decision after weighing other alternatives.[7] The power delivered by GBE is needed to meet a projected shortfall of resources in 2021 and beyond.[8]

MJMEUC evaluated multiple options for meeting its projected shortfalls but the use of GBE and a power purchase agreement with Infinity Wind was the best offer they could find under current market prices.[9] The GBE would be able to deliver power to MJMEUC at costs less than the contract it is replacing, and less than renewable

[5] TR. 980:21 - 981:15.
[6] Exh. 475, Rebuttal Testimony of Duncan Kincheloe on behalf of The Missouri joint Municipal Utility Commission (MJMEUC) at 4:13-19 (Jan. 24, 2017); Exh. 476, Rebuttal Testimony of John Grotzinger on behalf of The Missouri joint Municipal Utility Commission (MJMEUC) at 3:3-7 (Jan. 24, 2017).
[7] Exh. 476, Rebuttal Testimony of MJMEUC Witness Grotzinger at 3:9.
[8] *Id*. at 3:20 to 4:3.
[9] Exh. 476, Rebuttal Testimony of MJMEUC Witness Grotzinger at 7:19-23.

resources delivered from MISO or from SPP. It provides an annual savings of $10 million compared to the 100 MW contract it would replace, an annual savings between $9 and $24 million compared to a wind project in MISO, and $8 million annual savings compared to a 200 MW delivery of renewable power from SPP.[10] The lower power prices will lower energy costs to all 35 members of MJMEUC.[11] In addition, the lower wholesale rates for energy and capacity will stabilize rates over an extended period of time for all MJMEUC members.[12]

MoPEP offers a renewable product for its wholesale members, with delivery starting in 2017.[13] This offering was oversubscribed, thus there is an unmet demand for additional renewable energy products that the GBE could provide.[14]

2. The GBE Project is Needed to Deliver Low Cost Wind Energy to Meet State Renewable Energy Requirements

There are six states plus the District of Columbia in the PJM and MISO footprints that have renewable energy standards (RES) with unmet requirements. The GBE Project's converter stations in Missouri and Western Indiana provide PJM and MISO states access to low cost wind energy. The table below estimates the incremental wind capacity needed to meet state RES requirements in 2025:[15]

[10] *Id*. at 8:2-18 and 9:12-16; Sched. JG-3, JG-6 and JG-7.
[11] *Id*. at 9:10.
[12] *Id*. at 11:9-13.
[13] *Id*. at 10:1-3.
[14] *Id*. at 7-15.
[15] *Id*., schedule MG-5.

		State	Estimate
PJM	3,430 MW	**DC**	320
		DE	80
		MD	880
		NJ	1,120
		PA	1,030
MISO	880 MW	**MO**	770
		MN	110
TOTAL:	**4,310 MW**		

Ameren Missouri is the only electric utility that is subject to the Missouri RES that needs to procure renewable energy to comply with the 15% RES target. It appears that Ameren Missouri has a need for approximately 4,000,000 megawatt-hours ("MWh") of non-solar renewable energy credits ("RECs").[16] Clean Line estimates that approximately 2,200,000 to 2,600,000 MWhs per year could be delivered into Missouri at the Ralls County converter station.[17] If that energy is not entirely purchased by Ameren Missouri it could be purchased by and used for RES compliance elsewhere in MISO.

Basic economic principles dictate that adding additional renewable energy to a market will reduce prices for renewable energy credits by providing Missouri utilities with more options for compliance. Wind energy delivered via the GBE Project will be eligible for compliance with RES requirements in most MISO and PJM states. Missouri utilities are competing with utilities in all of these states for low-cost renewable energy and RECs. The GBE Project's delivery of renewable energy into Missouri and Indiana allows the energy from Kansas to be used by utilities in PJM and MISO for compliance

[16] *Id*. at 3.

[17] Exh. 104, Direct Testimony of David Berry on Behalf of Grain Belt Express Clean Line LLC, at 39:1 (August 30, 2016).

with their renewable energy standards. Because renewable energy can be delivered across the seam between MISO and PJM, with or without the GBE Project in place, REC prices in PJM can affect REC prices in MISO. The additional wind energy delivered by this project would tend to reduce the price of RECs being sold in either the MISO and PJM markets. While the Missouri RPS does not limit Missouri utilities to purchasing renewable energy from these markets, lowering REC prices in those regions will provide Missouri utilities with more low-cost options for REC purchases. The savings from lower cost RECs would be passed on directly to Missouri consumers and consumers of those utilities that purchase renewable energy from the GBE Project.

The GBE Project offers a low, if not the least, cost option for complying with RESs in Missouri, MISO and PJM. In Missouri, the RES has a cost cap within which the utility needs to procure renewable energy credits equivalent to 15% of the utility's energy sales.[18] Grain Belt Express witness Dave Berry testified that even with adjustments proposed by opponents of the line "Kansas wind power delivered via Grain Belt Express is the lowest-cost wind resource compared to both Missouri and Iowa wind resources."[19] The levelized cost of energy is basically a forecast or estimate of the cost a utility would pay for wind energy through a power purchase agreement.[20] The levelized cost of wind energy delivered from Kansas to the Grain Belt Express injection point in Missouri, as calculated by Mr. Berry, would be in the range of $22 to $28 per

[18] Exh. 675, at 11.

[19] Exh. 105, Surrebuttal Testimony of David Berry on Behalf of Grain Belt Express Clean Line LLC, at 5:9-10 and 7:10-13 (February 21, 2017).

[20] Exh. 104, Direct Testimony of GBE Witness Berry, at 27-28.

MWh.[21] This is much lower than actual wind power purchase agreement prices from other Plains states (which were at $27 per MWh from 2013 to 2016) or from other areas of MISO (which were at $40 per MWh from 2013 to 2015).[22] Thus, the Grain Belt Express Project would provide competitively priced wind resources into Missouri, MISO and PJM that utilities could capitalize upon in complying with their respective RESs.

3. The GBE Project is Needed to Efficiently Deliver Kansas Wind Energy Across the Country

Delivering low cost wind power from Kansas into eastern Missouri and PJM can most efficiently be accomplished using a DC line -- the GBE Project. There is a lack of transmission infrastructure in Missouri and in the central Midwest to efficiently deliver wind energy from the Plains states to large demand centers in MISO and PJM.[23] The Plains states have some of the best wind resources in the country[24], and the lack of new transmission is inhibiting the economic opportunities of wind generators. The GBE Project would provide an economically feasible opportunity to bring wind generation to states with high electricity demand in PJM and MISO, including Missouri. Infinity Wind Power witness Matt Langley, explained that "without the [GBE] Project, there is not a sufficient pathway for the power to flow from Kansas to MJMEUC."[25]

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[21] Exh. 104, Direct Testimony of GBE Witness Berry, at 29-30, with and without wind's value of capacity.

[22] Exh. 675, Rebuttal Testimony of WOW-TWC Witness Goggin at 7.

[23] *Id.* at 29:594-601.

[24] *Id*. at 5.

[25] Exh. 875, Rebuttal Testimony of Matt Langley on Behalf of Infinity Wind Power at 4 (Jan. 24, 2017).

There are no cost effective transmission pathways from SPP into PJM and none are being studied but for the GBE Project.[26] No transmission projects have been built between SPP and MISO since SPP was created in 2004.[27] Thus, currently there is no outlet for Kansas wind energy. Transmission is essential if the wind energy resources in Kansas and the Plains states are to be fully utilized in meeting the renewable energy needs of the U.S.[28] The western Kansas area and the plains states in general possess wind resources that are many times greater than their electricity demand, so transmission is needed to move the energy from these wind energy resources to load centers elsewhere.[29] Kansas is on the western edge of the Eastern Interconnection, making export west exceedingly unlikely. Opportunities to move Kansas renewable energy eastward to load centers over existing transmission are virtually non-existent due to widespread congestion. Areas north and south of Kansas also have very large wind energy resources and relatively low electricity demand, so delivering the wind energy from Kansas to those states is not a viable solution. Given the large electricity demand in Missouri, MISO and PJM, building a long-distance HVDC line to deliver wind energy resources in western Kansas to consumers in those states is an ideal solution.[30]

The AC system is not a comparable alternative to the GBE Project for delivering energy from Kansas into eastern Missouri and PJM. To deliver wind power across multiple RTOs using the existing AC transmission system would result in pancaking of transmission cost charges that pose significant risk for uncontrolled cost increases that

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[26] Exh. 675, Rebuttal Testimony of WOW-TWC Witness Goggin at 30:620-623.

[27] *Id*., at 8, *citing* International Transmission Co., Comments of International Transmission Company d/b/a ITC Transmission, Michigan Electric Company, LLC, ITC Midwest LLC and ITC Great Plans, LLC, at 2-3 (July 1, 2014), *filed in* Missouri PSC Docket EW-2014-0156.

[28] *Id*. at 9:176-178.

[29] *Id*. at 9:178-182, and sched. MG-3.

[30] *Id*. at 9:182-190.

are passed on to either the generator or end use customer. To deliver electricity from western SPP to PJM using the existing AC transmission system, there are two main costs -- firm point-to-point transmission delivery rates and congestion costs. Firm transmission rates to the SPP/MISO border and from there to the PJM/MISO border are known, however, they are volatile over extended periods of time. For SPP, the cost of firm transmission rights have continuously increased since 2005, sometimes dramatically. Since most power purchase agreements for wind are for twenty years, trying to estimate the increase in price of firm transmission rights in two RTOs and still produce a competitive price for delivery of your product is extremely difficult. Moreover, there is no mechanism for a generator to hedge its financial exposure to continual increases in firm point-to-point transmission rates over twenty years.[31]

The congestion cost is the difference in price between the wind farm and the SPP/MISO border and from the SPP/MISO border to the MISO/PJM border. This cost can be hedged by utilizing financial transmission rights ("FTRs"), but usually the nameplate capacity of a wind project cannot be completely hedged via the free allocation of FTRs that come with a firm transmission path. So a wind generator will be left with some financial risk exposure with regards to both the unhedged portion and the variable cost of purchasing additional FTRs. In addition, there is risk related to future congestion along the route for the twenty year duration of the power purchase agreement. Congestion will change over time as new transmission lines are built and new generation interconnects to the system. Like firm transmission rights, the ability to

[31] Exh. 675, Rebuttal Testimony of WOW-TWC Witness Goggin, at 30:628-31:638.

properly assess the potential future costs of congestion is extremely difficult to nearly impossible.[32]

The GBE Project is the most cost-effective method (*see infra* §III.B. Economic Feasibility) for the long-distance delivery of these extremely high-quality wind resources.[33] The benefit of the GBE Project is that it delivers wind energy from one of the best wind resource locations in the country to the highest need markets for renewable energy -- MISO and PJM.[34] The GBE Project is needed because ratepayers are not exposed to cost uncertainties related to firm point to point transmission over time and congestion costs by providing a known cost for transmission capacity for a fixed term.

B. Economic Feasibility: The GBE Project Delivers Wind Energy into Missouri, MISO and PJM at Prices Equal to or Lower Than What is Currently Available

The GBE Project is economically feasible because the wind generation it can deliver to states in PJM and MISO, including Missouri, is less expensive than Missouri wind, power purchase agreements in the PJM area, and alternative ways to procure energy. GBE witness Berry estimates the cost of delivered energy (inclusive of the transmission fee) vis the GBE Project would be in the range of 2.2 to 2.8 cents per kWh[35], which is below the average cost of wind PPAs signed in the Great Lakes and

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[32] Exh. 675, Rebuttal Testimony of WOW-TWC Witness Goggin, at 31:640-651.
[33] *Id*.
[34] *Id*. at 12-13.
[35] Exh. 104, Direct Testimony of GBE Witness Berry, at 29-30, with and without wind's value of capacity.

Northeast region in 2013.[36] It is also less than the levelized cost of a new combined cycle natural gas plant.[37]

Energy and REC prices in PJM are higher than the price of delivered energy via the GBE, thus it is economically feasible for PJM entities to purchase GBE capacity.[38] The PJM Market has a higher demand for renewable energy[39] and larger wholesale energy market than MISO. Because of market supply-demand dynamics, PJM has a higher cost of energy and RECs that makes the 2.2 to 2.8 cents per kWh a very good strike price, even at slightly higher prices[40].

The delivered price of energy from Kansas into eastern Missouri is comparable to, if not at the lower end of, Ameren Missouri's retail electric rates:

	Winter Rates (¢ per kWh)	Summer Rates (¢ per kWh)
Large Primary Service	3.02	3.41
Small Primary Service	3.66 to 6.30	5.05 to 10.00
Large General Service	3.80 to 6.51	5.23 to 10.34
Small General Service	4.65 to 8.06	10.81
Residential Service	5.73 to 8.58	12.08

While the retail rates in the table likely cover administrative fees to provide local services, the 2.2 to 2.8 cents per kWh is still comparable to Missouri electricity rates and is indicative of the GBE Project being economically feasible in Missouri.[41]

Energy delivered via the GBE Project is also cost competitive with wind energy delivered from within MISO. Lawrence Berkley National Laboratories prepares a report

[36] Exh. 675, Rebuttal Testimony of WOW-TWC Witness Goggin, at 25.
[37] *Id.*, at 24; *see also* Exh. 105, Surrebuttal Testimony of GBE Witness Berry at 21-23 for comparison to new natural gas combined cycle plant.
[38] Exh. 105, Surrebuttal Testimony of GBE Witness Berry at 14-15.
[39] Exh. 104, Rebuttal Testimony of GBE Witness Berry at 40.
[40] Exh. 105, Surrebuttal Testimony of GBE Witness Berry at 15:1-15:6 and 21-23.
[41] Exh. 676, Cross-Surrebuttal Testimony of Michael Goggin Submitted on Behalf of Wind on the Wires and The Wind Coalition, at 9-10 (Feb. 21, 2017).

each year on the wind market based on actual data. For 2013 through 2016 the price of wind energy from Kansas and western MISO states -- such as Iowa, Minnesota, North Dakota and South Dakota -- have wind PPA prices ranging from $18 per MWh to $38 per MWh.[42] Unlike wind via the GBE Project, wind from within MISO to Missouri is subject to congestion. Thus Kansas wind delivered via the GBE Project is likely to be better than MISO wind or at worst competitive with MISO wind PPA prices. MJMEUC included Iowa wind in its review of alternatives and found Iowa wind to range from $22 per MWh to $45 per MWh.[43]

C. Public Interest: The GBE Project and Wind Energy it Delivers can Lower Electricity Costs and Provide Environmental Benefits

The public has an interest in the GBE Project's ability to help Missouri, PJM and MISO states meet their electricity and state REC needs at a lower cost than if the line were not built. No other transmission line is being proposed that is or could be considered an alternative to the Grain Belt Project. In addition, the additional wind energy resources the GBE Project enables will reduce air pollution and enhance environmental quality.

1. GBE Project and Wind Energy Can Keep Wholesale Electric Prices Low for Missouri

The GBE Project is designed to deliver approximately 500 MW of low-cost wind generation from Kansas into Missouri. The increase in energy supply the GBE Project

[42] Exh. 675, Rebuttal Testimony of WOW-TWC Witness Goggin, sched. MG-3.
[43] Exh. 476, Rebuttal Testimony of John Grotzinger on Behalf of The Missouri Joint Municipal Utility Commission (MJMEUC) at 7:19-8:6, sched. JG-6 (Jan. 24, 2017).

provides to Missouri will tend to lower the wholesale price of electricity in the state. In his direct testimony, GBE witness Copeland provided the total cost savings and locational marginal price reductions for Missouri in 2022 for five different business scenarios -- Business as Usual, Limited Growth, High Growth, Generation Shift and Green Economy. They are summarized in the following table[44]:

Scenario	Total Cost Savings ($M)
Business As Usual	$40
Limited Growth	$16
High Growth	$63
Generation Shift	$76
Public Policy	$223

These findings are generally consistent with savings predicted in numerous studies that WOW-TWC witness Goggin has analyzed (and discussed in more detail in Mr. Goggin's testimony) when adding wind and transmission to existing transmission systems.[45]

2. Low Cost Wind Energy Delivered by the GBE Project Can Cost Effectively Replace a Portion of the Energy Produced by Retiring Generating Plants

A large number of generating plants are either reaching the end of their useful lives or can no longer economically compete in the market. That generation will need to be replaced and the wind energy delivered via the GBE Project offers a low cost replacement for a significant portion of the energy needs those plants provide.

PJM and MISO both have aging generating fleets that will see significant retirement over the next 10 to 15 years. PJM and MISO forecast that 17 to 23 GW of

[44] Exh. 106, Direct Testimony of J. Neil Copeland on Behalf of Grain Belt Express Clean Line LLC, amended sched. JNC-02 at 1 of 4 (March 10, 2017).
[45] Exh.675, Rebuttal Testimony of WOW-TWC Witness Goggin, at 20-24.

generating capacity could retire by 2032.[46] Federal law to reduce carbon pollution would cause additional retirements, mostly of coal plants. While the Executive Order issued on March 28th places the Clean Power Plan under review by the Environmental Protection Agency, the EPA has not yet revised or revoked the carbon emission regulation (80 Fed. Reg. 64662-64964). Under that carbon regulation policy, PJM and MISO forecast that as much as an additional 19 GW of generating capacity could retire in PJM and an additional 5 GW generating capacity could retire in MISO by 2032.[47]

It is in the public interst to use the energy delivered via the GBE Project as replacment for a portion of the retired generation because its cost of energy is comparable to or lower than any alternative form of generation.[48] The levelized cost of energy (LCOE)[49] for the wind energy delivered by the GBE project would be in the range of 2.2 to 2.8 cents per kWh.[50] That is less than the LCOE of a new combined cycle natural gas plant. It is also less than the generation weighted average levelized wind power purchase agreement price for the Great Lakes region of 3.8 cents per kWh in 2015, as indicated in schedule MG-3 and confirmed by the project-specific data for MISO discussed above. Wind energy transferred through the GBE Project would provide access to lower-cost renewable energy.

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[46] In 2016, PJM had 76 GW of coal plants generation and MISO had 59 GW of coal plant generation. Exh.675, Rebuttal Testimony of WOW-TWC Witness Goggin at 14.

[47] Exh.675, Rebuttal Testimony of WOW-TWC Witness Goggin at 13-14.

[48] *Id*. at 24.

[49] The LCOE takes into account all costs of generating energy, including capital costs, operating costs, taxes, cost of debt, return on equity, available subsidies, and the necessary transmission additions so as to make the price comparable to other forms of generation..

[50] Exh. 104, Direct Testimony of GBE Witness Berry, at 27:16 - 31:2.

3. The GBE Project Can Reduce Fuel Price Volatility and Risk A Utility is Exposed to Through its Generation Portfolio

Missouri electric ratepayers have a legal right to just and reasonable rates. 393.130.1 RSMo. Wind energy delivered via the GBE Project can protect ratepayers from fuel price fluctuations. Thus, the public has an interest in the significant hedging value the GBE Project can provide against fossil fuel price fluctuations.[51] A recent Lawrence Berkeley National Laboratory report concluded that

> Comparing the wind PPA sample to the range of long-term gas price projections reveals that even in today's low gas price environment, and with the promise of shale gas having driven down future gas price expectations, wind power can still provide long-term protection against many of the higher-priced natural gas scenarios contemplated by the EIA [United States Energy Information Administration]."[52]

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[51] Exh. 675, Rebuttal Testimony of WOW-TWC Witness Goggin, at 26.

[52] *Id*., at 18-19, *citing* Lawrence Berkeley National Laboratory, Revisiting the Long-Term Hedge Value of Wind Power in an Era of Low Natural Gas Prices, page i,(March 2013) *available at* http://emp.lbl.gov/sites/all/files/lbnl-6103e.pdf.

An example of long term value of wind as a hedge against natural gas prices is presented in the graph in Schedule MG-7:

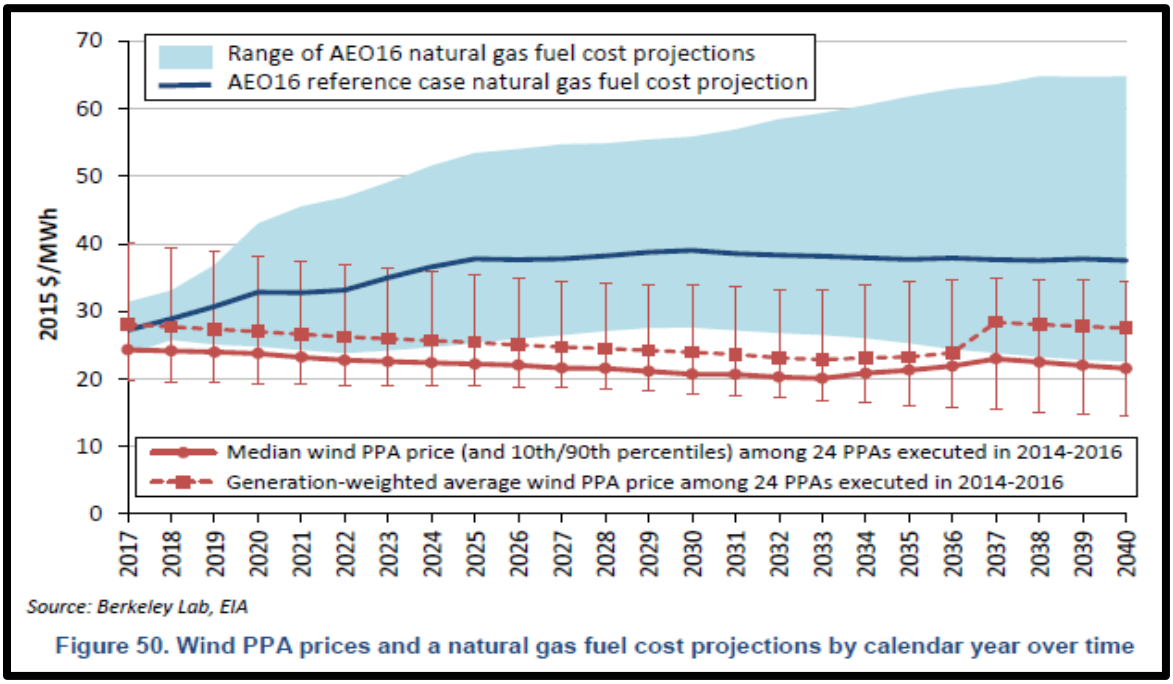

Figure 50. Wind PPA prices and a natural gas fuel cost projections by calendar year over time

The conclusion WOW-TWC witness Goggin draws from the chart above is that the wind PPA prices are highly likely to be lower than the cost of natural gas generation over the life of a 20 year PPA contract.[53] The fact that wind prices are constant for a long period and at a price lower than what is forecasted for natural gas makes wind a favorable hedge. This provides rate stability for a utility's ratepayers.

Transmission is also an important mechanism to protect consumers against unpredictable volatility in the price of fuels used to produce electricity. Transmission can alleviate the negative impact of fuel price fluctuations on consumers by making it possible to buy power from other regions and move it efficiently on the grid. This increased flexibility helps to modulate swings in fuel price, as it makes demand for fuels

[53] Exh. 675, Rebuttal Testimony of WOW-TWC Witness Goggin, at 26.

more responsive to price as utilities are able to respond to price signals by decreasing use of an expensive fuel and instead importing cheaper power made from other sources.[54]

Going forward, a robust transmission grid can provide valuable protection against a variety of uncertainties in the electricity market. Fluctuations in the price of fossil fuels are likely to continue, particularly if the electric sector becomes more reliant on natural gas. Further price risk associated with the potential enactment of environmental policies place a further premium on the flexibility and choice provided by a robust transmission grid. As a result, transmission should be viewed as a valuable hedge against uncertainty and future price fluctuations for all consumers.[55]

4. The GBE Project Diversifies the Portfolio of Generation Used to Meet Energy Demands

Wind energy resources in Kansas are such a significant distance from Missouri, MISO, and PJM that the Kansas wind farm's energy can complement the wind resources in Missouri, Illinois and PJM. There is a difference in timing between the wind resource output profiles for Kansas and those of Missouri, PJM and MISO, that when they are combined into one generating portfolio they provide a more constant amount of wind energy being purchased by the utility over a given period of time. This is especially beneficial for the RTO, because it is responsible for balancing all of the energy being injected into the grid from generating resources in its footprint.[56]

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[54] Exh.675, Rebuttal Testimony of WOW-TWC Witness Goggin, at 25.
[55] *Id.*, at 26-27.
[56] *Id.*, at 32.

5. The GBE Project is Beneficial to Large Energy Customers Because it can Help them Cost Effectively Meet their Renewable Energy or Sustainability Plan Goals

Large electric users that have a renewable energy or sustainability plan are looking for opportunities to purchase low cost renewable energy and the GBE Project can help meet that need. Over the past few years the wind industry has seen a large increase in demand for direct purchase of renewable energy by large retail consumers, many of whom prefer direct purchases of wind energy relative to buying renewable energy credits.[57] The availability of wind energy has become an important factor for many corporations in deciding where to site large energy-use facilities, like data centers. For example, Facebook recently chose to site a $1 billion data center in Texas and not Ohio because favorable policies, like the transmission expansion to Texas's Competitive Renewable Energy Zones (CREZ), provided more access to wind energy in Texas than in Ohio.[58] The availability of low-cost wind energy delivered via the Grain Belt Express Project would help make Missouri attractive for corporations looking to invest in new facilities.

A number of states in PJM allow for electric retail competition, which gives commercial and industrial customers the ability to forgo using the utility and allows such customers to directly contract with a competitive electric supplier who can provide electricity from a generation mix that fits with the customers renewable energy and

[57] Exh. 675, Rebuttal Testimony of WOW-TWC Witness Goggin at 10.
[58] *Id*.

sustainability goals.[59] The delivery of wind energy via the GBE Project into PJM provides increased renewable energy for the retail electric suppliers attempting to provide green or low carbon electricity products to meet the demands of commercial and industrial customers. Moreover, increasing the amount of renewable power in Missouri can attract commercial and industrial companies who have renewable energy or sustainability goals.[60]

A local example of the large customer demand for renewable energy was presented by MJMEUC witness Grotzinger. MoPEP allowed a renewable product to be offered to their retail customers. The product was for 60,000 MWh and offered at a small premium over other resource mixes. The product was quickly fully subscribed, with customers asking for additional renewable products. Based on Mr. Grotzinger's experience with this offering he believes there is still a demand for more renewable-focused electric service in the MoPEP service territory. In addition, MJMEUC sees the renewable service as a way to attract commercial and industrial businesses to their service territory, because "we have observed that industrial retail customers of our wholesale customers are placing renewable energy goals in their corporate procurement policies."[61] The GBE Project gives MJMEUC members the opportunity to meet corporate renewable and sustainability goals and attract new companies to their service territory.[62]

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[59] Exh 900, Rebuttal Testimony and Exhibits of Steve W. Chriss on Behalf of Wal-Mart Stores, Inc., at 7 (Jan 24, 2017).

[60] *Id*.

[61] Exh. 476, Rebuttal Testimony of MJMEUC Witness Grotzinger, at 10:18-19.

[62] *Id.*

Thus the increased amount of renewable energy the GBE Project can deliver into PJM, MISO and Missouri benefits the public by giving corporations more options for reaching their renewable energy and sustainability goals with lower cost clean energy. The higher volume of renewable energy that can be used by a commercial or industrial customer attracts them to large electric users to areas that offer access to renewable energy services, such as MoPEP.

6. Efficient Delivery of Kansas Wind Energy Across the Country is a Public Interest

This topic is discussed in detail in section III.C. (*supra*) as a needed service. If this topic is not considered a need under the Tartan criteria, WOW-TWC adopts by reference the argument set forth in section III.C. in support of delivery of Kansas wind energy to Missouri, MISO and PM as being a public interest.

7. The GBE Project Can Reduce Air Pollutants Regulated by the EPA and Increase Water Conservation in MISO and PJM

An increased amount of wind energy production can save water and reduce emissions of SO_2, NOx and CO_2. Wind energy requires virtually zero water to produce electricity, while most conventional forms of electricity generation consume hundreds of gallons of water per MWh produced. A US Department of Energy report concluded that producing 20% of America's electricity from wind energy would conserve 4 trillion

gallons of water cumulatively through the year 2030.[63] Thus the GBE Project would produce water savings across PJM and MISO when the energy it delivers offsets production from coal plants within their footprints. Given that wind delivered via the converter station in Missouri will displace fossil generation in MISO, and that analysis using EPA's AVoided Emissions and geneRation Tool (AVERT) tool[64] indicates Missouri has a large share of the region's marginal fossil generators that would have their output reduced by introducing new wind generation into MISO, it is likely that Missouri will receive a significant share of these total benefits. These water savings would be particularly valuable in an agricultural state like Missouri.

GBE witness Copeland found that the GBE Project would reduce SO_2 emissions in the range of 9,500 to 25,000 tons in 2022 (depending on the future used), annual NO_x emissions reduction in the range of 9,000 to 22,000 tons in 2022, and annual CO_2 emissions reduction in the range of 12 to 19 million tons in 2022.[65] These results are consistent with results WOW-TWC witness Goggin reaches using EPA's AVoided Emissions and geneRation Tool (AVERT).[66] AVERT uses empirical power system data and a statistical algorithm to identify which of a region's power plants will have their output displaced by the addition of wind energy. These reductions are of benefit to the general public.

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[63] Exh.675, Rebuttal Testimony of WOW-TWC Witness Goggin, at 27-28, *citing* U.S. Dep't of Energy, 20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply at 16 (Executive Summary) (2008), *available at* http://www.20percentwind.org/ .

[64] *Id*. at 27, *citing* AVERT *available at* http://epa.gov/statelocalclimate/resources/avert/index.html

[65] Exh. 106, Direct Testimony of GBE Witness Copeland, amended sched. JNC-02 at sht 4 of 4.

[66] Exh. 675, Rebuttal Testimony of WOW-TWC Witness Goggin, at 28.

IV. CONCLUSION AND REQUESTED RELIEF

Wherefore, Clean Energy Intervenors respectfully requests that the Commission find that the Grain Belt Express Project [1] is needed, [2] is economically feasible, and [3] is in the public interest, and request the Commission grant Grain Belt Express a certificate of convenience and necessity to construct, own, control, manage, operate and maintain a high voltage, direct current transmission line in Missouri and an associated converter station providing an interconnection on the Maywood 345 kV transmission line.

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