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Issues: Need, Benefits, Economic Feasibility, Financing Plan
Witness: David Berry
Sponsoring Party: Grain Belt Express Clean Line LLC
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MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. EA-2014-0207

SURREBUTTAL TESTIMONY OF

DAVID BERRY
EXECUTIVE VICE PRESIDENT – STRATEGY AND FINANCE

ON BEHALF OF

GRAIN BELT EXPRESS CLEAN LINE LLC

October 14, 2014

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is David Berry. My business address is 1001 McKinney Street, Suite 700, Houston, Texas 77002.

Q. By whom are you employed and in what capacity?

A. I am employed by Clean Line Energy Partners LLC ("Clean Line") as Executive Vice President – Strategy and Finance. Clean Line is the ultimate parent company of Grain Belt Express Clean Line LLC ("Grain Belt Express" or "Company"), the Applicant in this proceeding.

Q. Have you previously submitted prepared testimony and exhibits in this proceeding?

A. Yes, I have previously submitted (1) direct testimony, dated March, 26, 2014, along with accompanying schedules DAB-1 through DAB-7 and (2) additional direct testimony dated June 27, 2014, both in support of the Company's Application for a Certificate of Convenience and Necessity ("CCN") to construct, own and operate the Grain Belt Express Project ("Project"), as defined on page 3 of the Application.

Q. What is the purpose of this surrebuttal testimony?

A. I am responding to issues raised in the rebuttal testimonies of other parties in this proceeding, including witnesses representing Commission Staff, the Missouri Landowners Alliance ("MLA"), the Eastern Missouri Landowners Alliance, d/b/a Show Me Concerned Landowners ("Show Me"). I also address certain comments made at the local public hearings on the Project's CCN and through the Commission's Electronic Filing and Information System ("EFIS").

Q. Please summarize your testimony's organization and conclusions.

A. Section II of my testimony addresses the need for the Project and the benefits the Project

creates for the State of Missouri. This section elaborates on the relationship of the Project with the Southwest Power Pool ("SPP"), Midcontinent Independent System Operator ("MISO"), and PJM Interconnection LLC ("PJM") regional transmission organizations ("RTOs"). These RTOs will ensure the reliability of the Project through the interconnection process, but will not decide whether it is needed. This Commission must decide on the need for the Project as it considers the Company's Application for a CCN.

In addition, Section II summarizes additional studies prepared by Grain Belt Express in response to the request by Commission Staff witness Sarah Kliethermes. In the surrebuttal testimonies of Robert Cleveland and Robert Zavadil, Grain Belt Express provides the studies requested by Ms. Kliethermes. Mr. Cleveland's studies show that the Project will decrease Missouri wholesale power prices and the cost to serve retail customers. This finding remains true even when accounting for lower revenues to utility-owned generation assets for power sales to the MISO and SPP markets. Mr. Zavadil's studies indicate that the Project will not introduce a meaningful amount of new system variability, and therefore will not have a substantial impact on ancillary service rates.

Section III responds to the rebuttal testimony of Show Me witness Dr. Michael Proctor and Commission Staff witness Michael Stahlman regarding the economic feasibility of the Project. First, I update the levelized cost of energy ("LCOE") model presented in my direct testimony to include the results of the Project's recently received PJM System Impact Study. This update responds to, and resolves, concerns expressed by Mr. Stahlman that network upgrades might make the Project economically unfeasible. I then show that when Dr. Proctor's analysis of the Project is corrected, it actually supports

the Grain Belt Express Application. Dr. Proctor's criticisms of my model do not hold up under scrutiny. Many are incorrect, while others improperly portray a minor difference in a calculation method as a "mistake."

In Section IV, I summarize Grain Belt Express' position with respect to the conditions proposed by Commission Staff.

Section V concludes by addressing other issues raised by intervenor rebuttal testimony.

II. PROJECT NEED AND BENEFITS

a. RTOs will assure Project reliability, but the Commission must determine the need

Q. At page 4 of her rebuttal testimony, Staff witness Sarah Kliethermes states that Grain Belt Express should commit not to seek cost allocation from an RTO. Will Grain Belt Express agree to such a condition?

A. Yes. In my Additional Direct Testimony, I stated the Company's willingness to agree to a condition in its CCN that addresses Staff's concern. The proposed text of this condition is given below. The words in **bold** have been added at the suggestion of Commission Staff.

> Grain Belt Express will not recover any Project cost from Missouri retail ratepayers through MISO or SPP regional cost allocation without first obtaining an approval from the Missouri Public Service Commission in a new proceeding initiated by Grain Belt Express. As used in the prior sentence, the Project refers to the approximately 750 mile HVDC transmission line to be built by the applicant, including the HVDC converter stations **and the AC feeder lines connecting the HVDC Project to wind generation facilities**. (Berry Additional Direct Testimony at p. 2)

The condition resolves Staff's concern that the Project could deviate from its shipper-pays or "merchant" business model. Under this condition, Grain Belt Express would file a new application if it wished to seek regional cost allocation that would affect Missouri

ratepayers**.** Absent this new proceeding and Commission approval, Grain Belt Express cannot recover costs from Missouri ratepayers through regional cost allocation, and can only construct and operate the Project under a shipper-pays business model.

To be clear, Grain Belt Express is not seeking – and has no plans to seek – regional cost allocation. SPP, MISO and PJM do not currently have a process in place that would allow for the cost-allocation of an interregional project across their three footprints**.** The condition recommended by Staff, which Grain Belt Express accepts, deals with a hypothetical circumstance based on future policy changes.

Q. In light of the foregoing condition, will Grain Belt Express obtain from an RTO a finding of need, a cost-benefit analysis or similar report?

A. No. SPP, MISO and PJM do not have a process to determine the need for or to analyze the benefits of an inter-regional merchant transmission line. PJM, MISO and SPP have each confirmed to the Company that they do not evaluate the need for merchant projects.[1]

The RTO planning process identifies projects to be paid for according to the cost allocation methods set forth in the tariffs and business practices of the RTO. RTOs do not identify or evaluate proposals to build transmission lines to be paid for by other means, such as the Grain Belt Express Project, which will be paid for by its specific users. The "cost-benefit" methods used by the RTOs compare the expected benefits of a transmission project to its expected costs in the form of increased transmission rates. Such analysis is not necessary for the Grain Belt Express Project since there are no transmission rate increases that need to be compared with potential benefits.

[1] Dr. Gray also agrees that no such process has been used or exists. MLA Responses 1-3 to Grain Belt Express' Second Set of Data Requests.

Q. Will the RTOs be able to assure that the Project is reliable even if Grain Belt Express is not studied for "need" through an RTO process?

A. Yes. As described in the direct and surrebuttal Testimony of Dr. Wayne Galli, the Company is engaged in extensive interaction with SPP, MISO and PJM through their interconnection processes, which assure the reliable interconnection of the Project to the electric grid. The RTOs assure the reliable interconnection of projects like the Grain Belt Express Project under the oversight of FERC and the North American Electric Reliability Corporation (NERC).

Q. In her rebuttal testimony at p. 36, Staff witness Sarah Kliethermes compares the Grain Belt Express Application with other cost-allocated transmission lines that have sought a CCN from the Commission, stating that these other projects based their demonstration of need on the RTO process. Why is this comparison not relevant here?

A. Whereas the Grain Belt Express Project has not – and will not – seek cost allocation, all of the examples Ms. Kliethermes cites are regionally cost-allocated transmission lines. The Lutesville-Heritage line was included by MISO in its transmission plan to solve a particular reliability issue**.** The Iatan-Nashua and Sibley-Nebraska City lines were included in SPP's Balanced Portfolio and Priority Projects, respectively.

Q. Has Grain Belt Express presented the Commission with analysis that is similar to MISO and SPP's analyses of the projects that Ms. Kliethermes discusses?

A. Yes. The Direct Testimony of Company witness Gary Moland and the Surrebuttal Testimony of Company witness Robert Cleveland (who adopts Mr. Moland's testimony) present the Commission with production cost modeling, including demand cost and

adjusted production cost metrics. These analyses are very similar to the analyses contained in the cost/benefit studies of SPP's Priority Projects and MISO's Multi-Value Portfolio ("MVP") projects. The levelized cost of energy model discussed in my direct Testimony and in this surrebuttal testimony quantifies the benefits of accessing higher capacity factor and lower cost wind resources than would be possible without transmission expansion. Both the MVP Projects and the Priority Projects included similar benefits in their cost-benefit analysis.

Finally, the jobs analysis presented by the direct and surrebuttal Testimony of Company witness Dr. David Loomis is similar to the economic impact analysis conducted for the SPP Priority Projects. A detailed comparison of the Grain Belt Express benefit studies in this proceeding with those of the MVP Projects and the SPP Balanced Portfolio and Priority Projects, appears in Schedule DAB-8.1. This schedule shows that the benefits offered by the Project are similar to the SPP Priority Projects and MVP Projects, and that Grain Belt Express has estimated the Project's benefits with techniques similar to those used by the RTOs. And, the Project's benefits will occur without increases in regional transmission rates**.**

b. <u>The Project will lower retail electric rates in Missouri</u>

Q. Staff witness Sarah Kliethermes discusses the impacts of the Grain Belt Express Project on Missouri electric rates in her rebuttal testimony at pages 6-7. Please summarize how the Project will affect electric rates.

A. By assuring an abundant supply of affordable clean energy, the Project will keep generation rates low even as the Missouri's renewable energy standard ("RES"), increasing federal environmental regulation, and coal plant retirements drive changes in the generation fleet. Section III of this testimony addresses in detail why the Project is a

very cost-competitive option to meet Missouri's energy needs. The Project also has a secondary effect on the cost of generation through its reduction of wholesale power prices. The Project will not have a direct effect on transmission rates because its costs will not be recovered from ratepayers through regional cost allocation, but it may eliminate the need for future cost-allocated projects that would enable low-cost wind resources, thereby reducing transmission rates. Finally, the Project's variable energy injection should have a negligible impact on the cost of ancillary services due to the very small amount of additional system variability it causes**.**

Q. What is the direct effect of the Project on the cost to procure generation in Missouri?

A. As described in Section II(B) of my direct testimony and Section III(b) of this surrebuttal testimony, the energy delivered by the Project to Missouri is lowest cost of all alternative generation sources. Therefore, purchasing low-cost wind energy delivered by the Project can reduce the generation component of electric rates. The Project will deliver 2.2 – 2.6 million MWh per year to Missouri. If, for example, its delivered energy is $5 per MWh cheaper than the alternatives, which is more than plausible in light of the LCOE analysis presented in Section III(b) below, the resulting annual savings for consumers are $11-13 million.

In addition to offering a lower cost generation alternative, the Project will lower wholesale market electric prices in Missouri, as shown in Mr. Moland's direct testimony and Mr. Cleveland's surrebuttal testimony.

Q. How will this decrease in wholesale power prices affect the electric rates of retail customers?

A. Generally speaking, lower wholesale power prices will reduce rates.[2] In their rebuttal testimonies, Ms. Kliethermes (pp. 6-7) and Show Me witness Michael Proctor (p. 39) suggest that Grain Belt Express should perform an analysis of the impact of lower wholesale prices on the revenues received from the generation plants owned by Missouri utilities. Robert Cleveland performs this analysis in his surrebuttal testimony, measuring the change in "Adjusted Production Cost" that results from the Project. Adjusted Production Cost is a widely used metric that measures the rate impact of wholesale power market effects, taking into account the revenue received by utility generation plants. Mr. Cleveland's analysis concludes that the decrease in revenue to utility generation plants is substantially less than the savings that are gained from the Project's lower cost to serve load. This responds to and resolves the concerns raised by Ms. Kliethermes and Dr. Proctor. Even accounting for the reduced generation revenues of Missouri utilities, a substantial benefit accrues to Missouri ratepayers.

Q. In her rebuttal testimony, Ms. Kliethermes performed a rough calculation of Adjusted Production Cost for Ameren Missouri, stating at page 9: "I would expect Ameren Missouri's net cost of energy to be higher with the Project than without the Project." What is your response?

A. Ms. Kliethermes admits at page 9 on line 12 that her rough calculation is a "crude analysis" based on the Company's response to a Staff data request, and is not a complete analysis performed by Staff. Her analysis is insufficient to determine the Adjusted Production Cost impacts of the Project. Ms. Kliethermes recommends that the Company

[2] This point is discussed in more detail in my direct testimony on p. 33.

provide additional model results on this topic, which it has done in Mr. Cleveland's surrebuttal testimony.

Ms. Kliethermes' crude analysis is problematic on several accounts**.** She assumes at page 8 of her rebuttal that "most of the generation that will be displaced in the MISO Day Ahead market by the Missouri wind injection would be generated by Ameren Missouri." In fact, the modeling results presented in her rebuttal testimony in the table on page 22 show that Ameren Missouri's generation is only a small fraction of the energy displaced by the Project's Missouri injection. Because MISO dispatches generation on a system-wide basis, plants across the entire MISO footprint, not just where the Project injects power, are re-dispatched in response to the Project's injection of low-cost power. Because Ms. Kliethermes' assumption about how much Ameren Missouri generation would be re-dispatched is incorrect, her estimate of the decrease in Ameren Missouri's off- system sales is not valid.

Additionally, Ms. Kliethermes assumes at page 8, lines 9-10, of her rebuttal testimony that only one-third of the Missouri demand cost savings provided by the Project will accrue to Ameren Missouri customers. This is not based on any actual calculation of how much of the demand cost savings are enjoyed by Ameren customer.

Finally, Ms. Kliethermes does not estimate the fuel cost savings to Ameren Missouri. In contrast, the PROMOD results presented by Mr. Cleveland in his surrebuttal testimony include a detailed calculation of fuel cost savings based on the reduced dispatch of plants and plant-specific heat rates. Because she only counts reduced revenue but not fuel cost savings, Ms. Kliethermes does not arrive at an accurate estimate of the rate impact of the lower wholesale market prices caused by the Project.

Q. In her rebuttal testimony at pages 6 and 24, Ms. Kliethermes suggests that Grain Belt Express is injecting power into an already constrained area of the Missouri grid, and may worsen that congestion. What is your response?

A. Ms. Kliethermes does not define the areas she refers to as "congested" or explain how she reaches this conclusion. There is no evidence that the Palmyra tap, where the Project will inject 500 MW of energy, is a substantially congested area. An historical analysis of MISO LMPs near the point of injection does not show substantial congestion compared to the Ameren Missouri load hub.[3] Further, in Grain Belt Express' production cost modeling, congestion at the Palmyra Tap injection point is not substantial. The average congestion component of LMP in the business-as-usual case is $0.06 per MWh without the Project, and $0.21 per MWh once the Project is added. As described in the Direct Testimony of Wayne Galli, in MISO's feasibility study, no thermal constraints were identified, meaning the Project's power was deliverable to MISO load without any uneconomic redispatch of units or congestion. *See* A.W. Galli Direct Testimony at p. 14 and Schedule AWG-6.

Q. Ms. Kliethermes states at page 17, lines 4-7, of her rebuttal testimony that "Grain Belt Express' results demonstrate that the Missouri converter station does have an impact on increasing the energy component of the LMPs experienced throughout the MISO, by increasing the level of congestion in Missouri." Is her statement correct?

[3] LMP data can be downloaded from the MISO web site. From January 1, 2013 through June 30, 2014, the average LMP at the Audrain generation station was $29.63, compared to $30.17 at the Ameren Missouri load hub – a difference of less than $0.50 per MWh.

A. No, it is not. The Project does not increase the energy component of LMPs. Staff filed a correction to the table on page 16 of her rebuttal testimony on September 26, 2014. The corrected table shows that the energy component of LMP at the Palmyra substation decreases with the addition of the Project.

Q. In interpreting Grain Belt Express' production cost modeling, Ms. Kliethermes claims on page 17, lines 22-23, of her rebuttal testimony that the Project "causes $11 million of uneconomic dispatch." Is this correct?

A. No. Ms. Kliethermes misunderstands the reporting of load congestion costs in Mr. Moland's PROMOD runs in his direct testimony. In the business-as-usual scenario, total annual congestion costs to Missouri load are positive $3,789,851. This means that the cost to serve Missouri demand through the market is $3,789,851 higher due to transmission congestion that exists between Missouri load and the applicable market reference buses.[4]

The addition of the Project causes congestion costs for Missouri load to *decline* to negative $8,065,458. A negative congestion cost indicates that it is *less* expensive to supply the marginal unit of power to Missouri load than to supply power to the applicable reference buses.

Ms. Kliethermes should have interpreted the difference between positive $3,789,851 and negative $8,065,458 as a decrease in congestion costs to load. Instead she attempts to conclude something about overall system congestion based on the changes in Missouri load congestion costs.

[4] The reference bus is an RTO-wide load-weighted bus—i.e., the average price to supply load in a given hour in the entire RTO.

The changes in congestion charges reveal that with the Project it is cheaper to supply energy to load compared to the applicable reference buses. Without the Project, it is more expensive to supply energy to load as compared to the applicable reference buses.

Ms. Kliethermes incorrectly attempts to interpret the absolute value of Missouri load congestion costs as a measure of overall system congestion. She actually miscalculates this figure. The change in magnitude of congestion charges to Missouri load, without regard to whether they are positive or negative, is $4,275,607 (that is, $8,065,458 less $3,789,851), and not $11 million.[5]

In any event, the magnitude of congestion charge to load is not actually a measure of uneconomic dispatch. The total value of uneconomic dispatch cannot be calculated by looking solely at the magnitude of congestion costs to load. Rather, uneconomic dispatch must be measured by the increase in variable production costs (fuel, emissions, and operations) due to transmission congestion. In his surrebuttal testimony, Mr. Cleveland shows that the variable production costs in the Eastern Interconnection actually *decrease* with the addition of the Project. In other words, the generation fleet's operation are more economic, on a unit basis, with the Project than without it.

Q. Does the decrease in congestion charges to load mean that the Project is creating congestion in northeast Missouri, as suggested by Ms. Kliethermes on page 11 of her rebuttal?

[5] On page 17, lines 19-20 of her rebuttal, Ms. Kliethermes appears to misapprehend the congestion components discussed there as "experienced at the Palmyra node." They are actually measured at the Missouri load hub.

A. No. As discussed above, congestion charges to load are not a measure of overall system congestion. Further, load LMPs measure congestion at the point where Missouri electric load occurs – not where the Project injects power in northeast Missouri.

Q. Do you agree with Ms. Kliethermes' statement at page 14, lines 14-15, of her rebuttal that the energy LMP tends to be quite low in the hours when the wind is blowing?

A. No. In the business as usual scenario of Mr. Moland's PROMOD model, the average LMP received by the wind generation delivered to Missouri in our model simulation is only 2% lower than the 24x7 "around the clock" price at Palmyra. In other words, the energy delivered by the Project is comparable in value to a flat block of energy.

Q. Addressing Ms. Kliethermes' concerns at page 11-15, how will the Project affect real-time electric prices or the cost of ancillary services?

A. Ms. Kliethermes states that the variability of the wind generation delivered by the Project could cause increases in real-time electric prices or ancillary service costs. However, as shown by the surrebuttal testimony of Robert Zavadil, the additional variability added to the Ameren and Missouri system is very small compared to the variability that the electric grid already manages. Therefore, the impacts on real-time electric prices and ancillary services – which respond to system variability—will also be small.

Q. At page 11 of her rebuttal testimony, Ms. Kliethermes expresses the concern that the Company's analysis of rate impacts "conflates" the impact of the Missouri converter station and the Indiana converter station. Is her concern valid?

A. No. Both the Missouri and Indiana converter stations are integral aspects of the Project and its business case. The Project is being engineered, marketed, studied and financed

for a 500 MW injection level in Missouri and a 3,500 MW injection level in Indiana. There is no reasonable scenario where the Project would only deliver 500 MW to Missouri and not also deliver 3,500 MW to Indiana. As will be discussed later in my testimony, Grain Belt Express is willing to condition its CCN on installing the Missouri converter station.

Q. At page 19 of her rebuttal, Ms. Kliethermes expresses concern that the Project could cause MISO to order new cost-allocated transmission lines to be built, potentially affecting transmission rates. What is your response?

A. Ms. Kliethermes expresses the concern that the Project will increase congestion in MISO. However, she bases her view on a mistaken interpretation of load congestion costs. A wealth of evidence – MISO's Feasibility Study for the Project, historical LMP analysis, and Mr. Moland's PROMOD analysis – all point to the fact that the Project will not create a large amount of congestion, and therefore Ms. Kliethermes' concern is misplaced.

As Ms. Kliethermes notes, the Project will not directly increase transmission rates because none of its costs will be recovered through regional cost allocation. The Project will enable over 4,000 MW of new wind generation to reach high value markets without any cost allocation to load.

On the other hand, if the Project does not proceed, it is likely that more cost-allocated transmission lines will be needed to connect the cheapest renewable resources to load. Therefore, approving the Project actually has the potential to decrease regional transmission rates.

c. <u>Missouri has a demand for low-cost clean energy</u>

Q. Some witnesses made statements at the local public hearings to the effect that

Missouri does not need the power delivered by the project or that the project has no clear direct benefit to Missouri. Staff witness Natelle Dietrich summarizes similar comments that have been submitted through the EFIS system on pages 4-7 of her rebuttal testimony. What is your response to these concerns?

A. By allowing Missouri utilities to buy the lowest-cost clean energy, the Project provides a clear and direct benefit to the State. As discussed on page 35 of my direct testimony, Missouri relies on coal for close to 80% of its electric mix. To comply with federal environmental regulations – including the newly proposed Clean Air Act 111(d) restrictions on carbon emissions, which as proposed would require Missouri to cut its carbon emissions rate by about 23% in the electric sector – Missouri will look to cleaner energy sources. And, even in the absence of regulation, low-cost, affordable energy provides clear public benefit and is an important element of a sound economy.

As explained in my direct testimony at page 12, and as shown in Schedule DAB-1, Missouri utilities will need 5-6 million additional MWh of renewable energy to comply with their statutory renewable energy targets. Ameren Missouri's recent integrated resource plan (IRP) called for the purchase of 400 MW of new wind power. The IRP states that "wind energy resources exhibit the lowest cost on an LCOE basis among all candidate resource options."[6] In addition to the investor owned utilities, other Missouri load serving entities also have a strong demand for clean energy, even though it is not required by state law. On October 6, 2014, the City Council of Columbia, Missouri, adopted a resolution expressing the Council's support for the Grain Belt Express Project

[6] Ameren Missouri 2014 IRP. Chapter 6, p. 1. Available at https://www.ameren.com/-/media/Missouri-Site/Files/environment/renewables/irp/irp-chapter6.pdf?la=en (last accessed on October 12, 2014).

as an economically feasible renewable energy option to serve the City's customers and help the City fulfill its Renewable Energy Ordinance of 15% renewable energy usage by 2017. Columbia Water & Light, the municipal utility of Columbia, Missouri, recommended that the City Council approve the resolution. This resolution, attached as Schedule DAB-8, states in part that "greater access to low-cost renewable energy such as that anticipated to be delivered by the Project serves the public interest."

d. The Project produces several other economic and environmental benefits

Q. MLA witness Mr. Louis Donald Lowenstein asserts in his rebuttal at page 27 that it is "impossible" to estimate property taxes to be paid by the line. Is this true?

A. No. All taxpayers deal with the uncertainties of future property valuations which are subject to the judgment of taxing authorities. However, the valuations are governed by clear legal standards and procedures that are known to the public. Individuals who are knowledgeable about Missouri property taxes can come to a reasonable estimate of how much Grain Belt Express will pay. Attached as Schedule DAB-9 is a letter to the editor by Randolph County Assessor Richard Tregnago containing his estimates of property taxes the line will pay, as well as the letter he presented to the Commission when he testified at the local public hearing conducted in Moberly on August 14, 2014 (marked as Ex. 20). Mr. Tregnago stated in Ex. 20: "If projections are as stated, then Randolph County may have $31,500,000 of new construction to be assessed locally the first year, then, the project may become State Assessed after that. Annual property tax estimates may exceed $500,000 annually to various districts within [Randolph C]ounty depending on their individual levies." *See also* Transcript, Vol. 5, Local Public Hearing (Aug. 14, 2014) at 25-32.

Q. How do you respond to Mr. Lowenstein's rebuttal testimony at pages 23-26 that some property taxing districts will not receive any revenue from the line?

A. The Company will not pay taxes to a district where it has no taxable property. However, Grain Belt Express will pay property taxes to all districts through which the line passes, a fact which Mr. Lowenstein does not dispute.[7]

Q. How would you respond to Mr. Lowenstein's statement at pages 27-28 of his rebuttal that it is "misleading" for Grain Belt Express to provide property tax estimates based on the cost method of valuation and for only the first year of operations?

A. Mr. Lowenstein appears to be referring to a Company response to an MLA data request that asked for an estimate of property taxes. In preparing this response, the Company used the cost method approach to valuation because it is more objective and less subject to interpretation than an income or market valuation method. Generally, I would expect the cost method to result in a figure that is equal to or lower than that produced by a market value or income methods. In addition, the Company estimated taxes for the first year of operations because this is the year in which we have the most certainty about taxes owed.

Q. What is the chance that the Project could suffer an impairment in the future due to changes in law or the disappearance of tax credits, as Mr. Lowenstein claims at page 10 of his rebuttal?

A. This is very unlikely. The Company's business model, as described in my Direct Testimony at pages 8-9, is to enter into long-term contracts with creditworthy entities.

[7] MLA Response 7 to Second Set of Grain Belt Express Data Requests

These contracts will not have fuel price risk, volume risk or market price risk. While one can imagine a change in law that might impair the Company's assets, the United States provides a stable legal environment in which to do business. The financial markets recognize contracted U.S. infrastructure assets like the Grain Belt Express Project as among the lowest risk assets and therefore some of the least likely to be impaired.

Q. At page 29 of his rebuttal testimony, Mr. Lowenstein cites the *Rural Missouri* newsletter to support his claim that renewable energy is "expensive" and "unreliable." What is your response?

A. The article takes no position against new infrastructure like the Project to enable low-cost renewable energy. On the contrary, the article touts the fact that Associated Electric Cooperative Inc. ("AECI"), which published the newsletter, already relies on power from renewable energy and purchases the output of six wind farms to supply 16% of its electricity.

Further, the article does not say renewables are "unreliable." AECI's experience shows that renewable energy can be reliably integrated. As to the expense of renewables, as shown in the LCOE model in my direct testimony at pages 13-22 and in Section III below, this depends on the location of the renewable resource and the technology used. Wind energy from western Kansas is very cost effective.

III. ECONOMIC FEASIBILITY

a. An updated LCOE model proves the Project's economic feasibility

Q. Have you reviewed the rebuttal testimony of Dr. Michael Proctor?

A. Yes, I have reviewed his testimony in detail, along with the supporting workpapers and calculations Dr. Proctor provided. His testimony presents a levelized cost of energy ("LCOE") analysis at pages 4-27 similar to the one in my direct testimony.

Q. Based on your review of Dr. Proctor's testimony, do you still believe the LCOE results presented in your original testimony are valid?

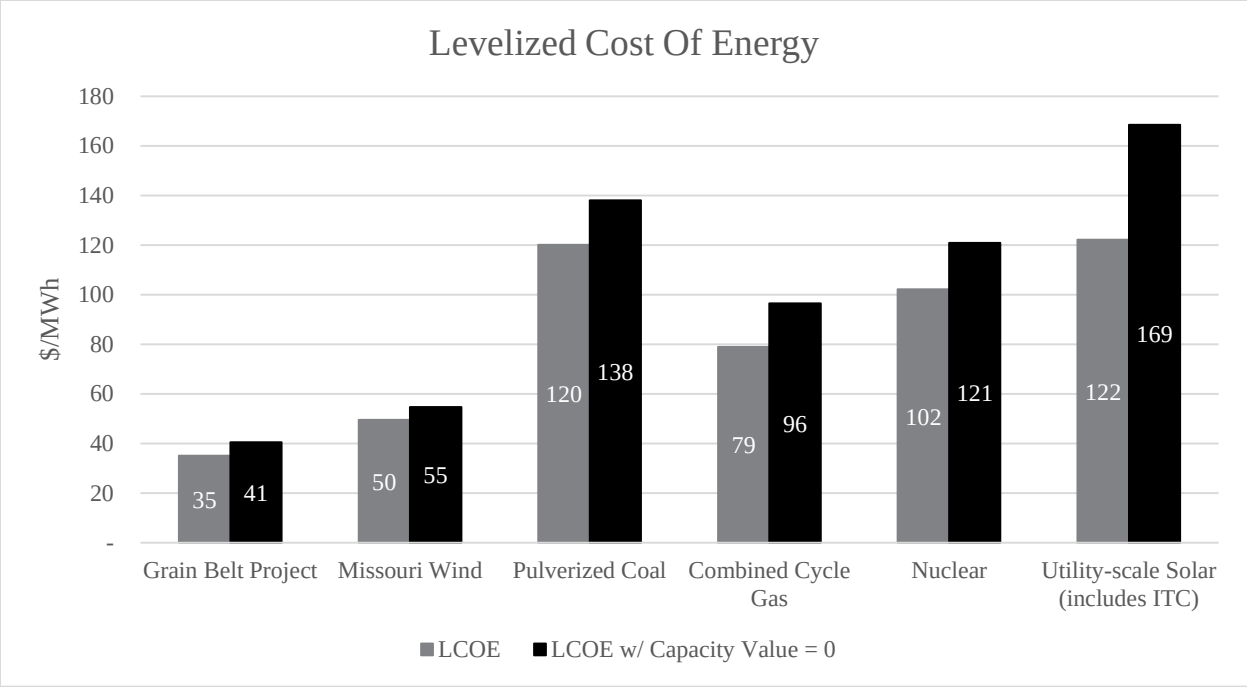
A. Yes. Dr. Proctor did point out one minor correction to the natural gas price forecast used in my model, which I have updated. The result is that the fuel cost of the "combined cycle gas" alternative is about 2% lower than in my original testimony. However, none of Dr. Proctor's other criticisms hold up under scrutiny, as I explain below, and the result of the LCOE analysis in my direct testimony remains true—the Grain Belt Express Project is economically feasible because it is lower cost than other alternatives, including both renewable energy and fossil fuel generation.

Q. Have you made any other changes to the LCOE model presented in your direct testimony?

A. Yes, in response to the rebuttal testimony of Mr. Stahlman at page 7, I have updated the capital cost of the Project to include the results of the PJM System Impact Study that the Company received on October 1, 2014. Dr. Galli's surrebuttal testimony discusses the PJM System Impact Study in more detail.

Q. Did the two changes described above alter the results described in your direct testimony?

A. Not substantially. After applying the changes discussed above, I reran the LCOE model. The LCOE of the Grain Belt Project increased by about 3%, and the "combined cycle gas" alternative decreased by about 2%. The Grain Belt Project's delivered energy remains the lowest cost option in the base case results.



In addition, the Project remains a cost-competitive resource across a wide range of future scenarios. Using the updated LCOE model, I ran sensitivities around the presence of the federal production tax credit for wind energy; higher and lower natural gas prices; the future cost of carbon dioxide emissions (if any); the capacity factor of Kansas wind; and the capacity factor of Missouri wind. I varied these inputs using the ranges listed in Schedule DAB-10. The various combinations of inputs led to 162 different scenarios considered in the LCOE analysis. I found that the Grain Belt Express Project's delivered energy is cheaper than combined cycle gas generation in 89% of all scenarios and also cheaper than Missouri wind generation in 89% of scenarios. Additional detail on these results is presented in Schedule DAB-10.

Q. On pages 7 to 11 of his rebuttal testimony, Staff witness Mr. Stahlman describes several alleged concerns about the economic feasibility of the Project. Do the results of your LCOE model, described above, resolve these concerns?

A. Yes. Mr. Stahlman's first concern is that the Project will need to pay for interconnection

upgrades with SPP, MISO and PJM. All three RTOs have now provided Grain Belt Express with studies describing and estimating the cost of the required interconnection upgrades. In the case of SPP and MISO, no upgrades beyond those at the location of the interconnection are needed. In the case of PJM a new 765 kV line is required, the cost of which is approximately $500 million. I have incorporated this additional cost into my LCOE model, which shows that the Grain Belt Express is economically feasible with the cost of interconnection upgrades included.

Mr. Stahlman's second concern is that Grain Belt Express has not yet fully developed its operational arrangement for the Project. However, Grain Belt Express has obtained estimates for Project maintenance costs from third party vendors and discussed its operational cost assumptions with its major shareholder, National Grid USA. My LCOE model reflects all of these estimates and discussions and shows the Project to be economically feasible. In addition, the annual, operational costs of an HVDC line are usually one percent or less of the overall capital costs and therefore represent a small portion of its total lifecycle costs.

Mr. Stahlman's third concern is that Grain Belt Express has not obtained the rights to inject power into SPP. Injecting energy into SPP is not part of Grain Belt Express' business plan. The LCOE model, discussed above, includes no revenue from East-West transfer capacity to support SPP injections. Nevertheless, the Project is still more economic than alternatives, showing that East-West transmission service is not needed to make the Project economically feasible.

Mr. Stahlman's fourth concern is that demand for wind energy from Missouri customers may not be large. I discuss Missouri's demand for low-cost renewable energy

earlier in this testimony in section II(b). In light of the Missouri RES, interest from municipal customers like Columbia Water & Light, the likelihood of federally mandated carbon reductions, Ameren's recent integrated resource plan calling for 400 MW of new wind purchases, and the excellent economics of the Grain Belt Express Project compared to alternatives, Missouri's demand for low-cost wind energy will be substantial.

Mr. Stahlman's suggestion, at page 11 of his rebuttal testimony, that the demand for the Project may come from Kansas wind generators, not Missouri utilities, presents a false dichotomy. If Kansas wind generators buy transmission service to move their low-cost power to Missouri, they still deliver power to the State of Missouri. The demand for the delivered, renewable energy still comes from Missouri. The Project still lower wholesale power prices and rates in Missouri. And, it is Missourians who consume the low-cost energy delivered by the Project.

In summary, the LCOE model, together with other evidence presented in my direct and surrebuttal testimony, responds to and resolves all four of Mr. Stahlman's concerns about economic feasibility.

Q. Returning to Dr. Proctor's LCOE analysis, what are the principal differences between Dr. Proctor's methodology and your methodology?

A. Dr. Proctor uses a traditional regulated utility revenue requirement model. In his model, all assets are part of a depreciating rate base. He calculates the annual revenue requirement based on this depreciating rate base. The result is a series of annual revenue requirements that vary and decline over time. Dr. Proctor then calculates the present value of these declining revenue requirements, and finally solves for a "levelized" annual revenue figure that yields the same present value.

On the other hand, my model directly calculates the levelized revenue requirement that provides investors with a return on assets equal to their cost of capital. This is the method used by merchant transmission lines and independent power producers that are not rate-regulated public utilities with regulated rate bases.

Q. Which methodology is more appropriate, yours or Dr. Proctor's?

A. I believe my method is more appropriate for analyzing the LCOE of wind projects and the Grain Belt Express Project. To date, most of the wind energy purchased by Missouri utilities has been through power purchase agreements with non-rate regulated wind generation companies, not through utility ownership of regulated generation assets. My methodology is more appropriate for wind farms whose output is purchased through a PPA. In addition, Grain Belt Express will not have a depreciating rate base, and will set a levelized transmission charge to recover its costs from specific users of the line.

Q. Do both of your models take into account the variability of wind energy in comparing to a dispatchable power plant?

A. Yes. The Proctor model adds a cost to wind energy in order to provide backup generation. My model, on the other hand, calculates the capacity value of all resources based on the avoided cost of a simple-cycle gas turbine. In my model, wind has a much lower capacity value than dispatchable resources. My model also includes a "time-of-day" adjustment to the value of energy that values wind energy based on the time of day it is actually generated. Dr. Proctor's does not. In both cases, the models reward dispatchable generation versus wind generation that does not have the same ability to dispatch in peak hours.

Q. Does it matter which model is used for determining which is the lowest cost resource

option?

A. Not necessarily. Both my LCOE model, presented in section III(a) above, and Dr. Proctor's rebuttal testimony indicate that the Project's delivered energy is cheaper than wind generation located in Missouri. Dr. Proctor's rebuttal testimony suggests that combined cycle gas generation is about $6 per MWh, or 7%, less expensive than the Project's delivered wind energy.[8] However, as I will show, once five corrections are made to Dr. Proctor's model, it actually supports the same finding as in my direct testimony – that Grain Belt's delivered energy is less expensive than both Missouri wind and combined cycle gas generation.

b. <u>With five corrections, Dr. Proctor's model supports the Project</u>

Q. Did Dr. Proctor provide you with a copy of his revenue requirement calculations?

A. Yes, he did. He provided me with all of the calculations behind the figures presented in his testimony. Using these workpapers, I was able to run his revenue requirement model incorporating the corrections described below.

Q. What is the first correction to Dr. Proctor's model that you made?

A. Dr. Proctor arbitrarily increased the capital cost of the Project by 30%, which increases the delivered cost of energy. I removed this increase and used the Project's latest capital cost estimate, including the results of the PJM System Impact Study, discussed above.

Q. What was Dr. Proctor's explanation for this increase?

A. At page 18-19 of his rebuttal testimony, Dr. Proctor states without any citation that "[t]he SPP has found preliminary cost estimates for transmission projects to be 30% lower than actual costs." In response to a data request, Dr. Proctor provided as sources a 2011 white

[8] Schedule MSP-1.

paper written by SPP and a presentation entitled "Addressing Cost Estimates and Cost Increases."[9] In reviewing these documents, I found that Dr. Proctor's rebuttal testimony mischaracterizes SPP's conclusions.

Q. Why is the SPP report an inappropriate basis to increase the capital cost of the Project for an LCOE analysis?

A. The documents Dr. Proctor provided say that SPP expects final project costs "to be within a -30% to + 30% variance" from what SPP calls a "Study Estimate." SPP did not say that it had performed a historical review of costs and found an average 30% cost overrun. Further, the "Study Estimate" as defined by SPP occurs before a line route is determined, before a detailed schedule is developed, before environmental constraints are identified, before state approvals are obtained, and before line engineering is completed.[10] Grain Belt Express has a route developed for over two-thirds of the line; a detailed schedule prepared; a detailed understanding of environmental constraints; state approvals in two of the four states; and has already selected its transmission conductor and family of structures. In light of all these differences between what SPP calls a "Study Estimate" and the current state of the Project, the white paper's plus or minus 30% cost range is not applicable. The current status of the Project resembles what SPP calls the "CNPC Project Estimate" or the "NTC Project Estimate," both of which have a plus or minus 20 percent

[9] *See* Show Me Response to Grain Belt Express' Third Set of Data Request; Response 7(e). The PCTF white paper is available at http://www.spp.org/publications/PCTF%20Whitepaper%20Final%2020110719.doc (last accessed October 13, 2014). The presentation entitled " PCTF Presentation to MOPC" is available at http://www.spp.org/publications/PCTF%207_19_11%20Meeting%20Materials.zip (last accessed on October 13, 2014).

[10] PCTF white paper, page 11.

cost target – the same range I used in my direct testimony.[11] When read properly, SPP's research on transmission project costs actually supports the approach taken in my direct testimony, and it does not support Dr. Proctor's approach.

Several other considerations highlight the unreasonableness of Dr. Proctor's 30% increase in the Project cost. The price per mile of line construction assumed in the Project construction budget (about $2.0 million per mile) is 14% higher than the current estimated cost per mile of the double circuit 345 kV SPP Priority Projects, even accounting for post-proposal increases.[12] Double-circuit 345 kV lines usually have slightly larger structures and more conductor than HVDC lines of the Project's voltage level, but their costs are generally analogous. In addition, the capital cost estimate in my financial model already has a substantial contingency in it, equal to about 17% of the line cost. Thus, Grain Belt Express is already taking account of the potential for future cost overruns, and an additional contingency is unwarranted. Finally, Grain Belt Express has a very strong incentive to manage cost overruns because, unlike the regulated public utility transmission owners of the SPP Priority Projects, we do not have a rate base from which to recover cost overruns. Therefore, it is Grain Belt Express and our investors, not the Missouri public that bear the risk of cost overruns.

Q. Did Dr. Proctor apply a construction cost increase to any other alternative in his model?

A. No, he did not.

[11] PCTF white paper, page 12-13.

[12] The current estimate, as of October 13, 2014 is $1.58 million. *See* http://www.spp.org/publications/Q3%202014%20Quarterly%20Project%20Tracking%20Report.pdf (last accessed October 13, 2014) for the underlying cost data.

Q. What is the second correction you applied to Dr. Proctor's model?

A. Dr. Proctor's model does not properly account for potential production tax credits available to wind generators. Both Dr. Proctor's model and my model run scenarios with and without production tax credits. The correction I made only affects scenarios with the production tax credit.

Q. What is the nature of this correction?

A. When calculating the revenue that would not be needed because of the tax credit, Dr. Proctor did not "gross-up" the tax credit for the applicable income tax rate. Basically, he assumed that $1.00 of tax credits is worth $1.00 of revenue. However, investors are taxed on revenue, but not on tax credits. Therefore, $1.00 of tax credits is worth an amount of revenue equal to $1.00 grossed up for taxes, i.e., divided by the quantity of one minus the tax rate.

By way of analogy, an individual who pays a 33% tax rate needs $1.50 of earnings to make up for $1.00 of lost income. The same logic applies for a corporate taxpayer when valuing a tax credit.

Q. What is the third correction you made to Dr. Proctor's model?

A. Dr. Proctor assumes that wind generation operations and maintenance expenses increase by about 5% each year. On the other hand, he assumes that natural gas power plant operations and maintenance ("O&M") expenses never increase. I changed his model to assume that natural gas O&M expenses increase at half the rate of wind power generation, or 2.5% per year.

Q. What basis did Dr. Proctor provide for his O&M assumptions?

A. With respect to the wind operation costs, he performed a review of wind expenses based

on data from an industry report. I did not change his estimate when I reran his model. With respect to natural gas turbines, Dr. Proctor claimed to review "forecast evidence" to conclude that operational costs do not escalate. In response to a data request, Dr. Proctor did not provide any cost data or evidence that he reviewed. Rather, Dr. Proctor state that he could not find a recommended annual increase for its natural gas O&M expenses on the EIA web site.[13] However, EIA does not provide an estimate for wind O&M escalation either, and Dr. Proctor still applied a 5%. The inconsistency should be corrected.

Q. Why do wind O&M expenses for wind farms increase over time?

A. The first reason is the general rate of inflation. Over time, a dollar is worth less, and the cost of labor and materials increases in nominal dollar terms. Second, major maintenance, such as replacing major parts, becomes more common over time as the plant ages and original parts wear out.

Q. Would the same logic apply to thermal power plants?

A. Yes. A major component of all power plant maintenance is labor costs. Workers will demand higher wages each year, at a minimum to keep up with inflation. In addition, thermal power plants, like wind plants, must undergo more frequent and more expensive maintenance because they experience more wear and tear. Major equipment components eventually require replacement, and preventative maintenance and monitoring must be performed more often.

Q. In light of the previous answers, can you discern any reason why Dr. Proctor chose to escalate wind operational costs by 5% and gas power plant operational costs by

[13] Show Me Response 23 to Grain Belt Express' Third Set of Data Request

0%?

A. No.

Q. What is the fourth correction you made to Dr. Proctor's model?

A. Dr. Proctor does not include the effects that property taxes would have to Missouri wind's levelized costs. While Kansas wind projects are exempt from property taxes, Missouri wind farms are not, and so must be included in the analysis.

Q. What is the fifth correction you made to Dr. Proctor's model?

A. Dr. Proctor reduced the Kansas wind capacity factor from 55% to 50%. Western Kansas capacity factors are already over 50%, as shown by the responses to Grain Belt Express' request for information ("RFI"). As Dr. Proctor acknowledges at page 9 of his rebuttal testimony, the best 4,000 MW of respondents to the Grain Belt Express request for information (RFI) reported an average capacity factor of 52%. For the purposes of rerunning Dr. Proctor's model in this section, I have used a 52% assumption, even though in light of improving turbine technology, a 55% figure is certainly reasonable for wind farms built in 2017 and 2018.

Q. Based on the five changes described above, what do the results of Dr. Proctor's model show?

A. They show that the Grain Belt Express Project's delivered energy is less expensive than the alternatives in Dr. Proctor's base case model.

Impact of five corrections to Proctor's LCOE totals

Alternatives	Proctor Total	Transmission Cost Correction	Gas Generation O&M Correction	Property Tax Correction	Capacity Factor Correction	**Corrected Total**	Corrected Total w/ PTC	PTC Correction	**Corrected Total w/ Corrected PTC**
Grain Belt	$92.26	-$3.93	$0.69*	$0.00	-$2.84	**$86.18**	$70.50	-$8.45	**$62.05**
Missouri Wind	$98.73	$0.00	$0.82*	$6.29	$0.00	**$105.84**	$89.33	-$8.89	**$80.44**
Combined Cycle	$85.97	$0.00	$1.71	$0.00	$0.00	**$87.69**	$87.69	$0.00	**$87.69**

** Increases to Kansas Wind and Missouri Wind LCOE is due to a natural gas generation O&M corrections, which affect the capacity adder to wind generation.*

Q. Do you believe that the results above are more reliable than those presented in in subsection III(a) of this testimony?

A. No, I do not. I believe my results are reliable and based on a more reasonable set of assumptions than those of Dr. Proctor's, even when corrected. The above table shows, however, that only a small number of clear errors and inconsistencies in Dr. Proctor's model need to be corrected to support the Project's economic feasibility.

c. MISO wind is riskier and likely more expensive than the Project

Q. At pages 25-27 of his rebuttal, Dr. Proctor includes an alternative of MISO wind from "windier" states like Iowa, Minnesota, and North and South Dakota. What is your response to this alternative?

A. This "alternative" to the Project's delivered energy is unlike all the other alternatives in Dr. Proctor's LCOE analysis because the generation is not located within Missouri or directly delivered to Missouri, the latter being case with the Project. Buying distant wind through the AC system presents a number of risks and costs that are not present by the direct delivery through an HVDC line. These risks include the costs of congestion and losses on the AC system, the risk of curtailment, the cost of interconnection upgrades, and the risk of deliverability for capacity purposes**.** None of these risks are present in using a dedicated HVDC line like the Project. There are so many additional risks and complications to moving wind through the AC system that it may not even properly be considered an "alternative."

In recent years, many utility buyers of wind power have required wind generators to deliver power near to the load served. However, wind generators typically balk at accepting the congestion, losses, curtailment and other risks involved in moving power through the AC system.

Dr. Proctor does not actually perform any transmission analysis to determine the economic cost or the physical infrastructure needed to move a large amount of power from distant MISO wind generation to Missouri. The MISO wind alternative he suggests is therefore incomplete. However, when even some of the additional costs are considered, it becomes clear that distant MISO wind is likely to be more expensive, not less expensive than the Project's delivered energy.

Q. Does buying distant MISO wind present the risk of congestion costs?

A. Yes**.** Congestion costs occur whenever there is a difference in the nodal price of electricity at the point where it is purchased compared to the point where it is consumed. The best wind resources in MISO tend to be in low-load areas with relatively weak grids and large amounts of congestion.

Q. Did Dr. Proctor review the costs associated with buying distant wind through the MISO system?

A. Not really. His only review of these costs was to look at MISO's financial transmission rights or FTR auction results. However, these results are not meaningful for several reasons. First, they only include the "congestion" component of differences in LMPs (locational marginal prices), not the differences in the loss component.[14] Shippers moving power from distant wind farms are exposed to differences in the loss components of LMPs; therefore FTRs only provide partial coverage. Second, the FTR auction covers only a short period of time—usually one to two years. Over the lifetime of a generation asset, congestion patterns can change considerably.

[14] Dr. Proctor has acknowledged this to be true. Show Me Response to Grain Belt Express' Third Set of Data Request; Response 20.

Third, FTRs cover a "block" of power – 24 hours a day by seven days a week**.** Congestion costs for wind farms are relevant only when the wind blows and power is actually produced. Fourth, and most importantly, the FTR auction covers all of MISO**.** The aggregate results Dr. Proctor discusses do not specifically relate to distant wind farms with high capacity factors and Missouri load centers where power is actually used**.** Aggregate FTR auction results are meaningless when studying transmission costs along a specific path.

Q. Is there a more direct way to measure congestion costs?

A. Yes. MISO publishes nodal LMPs for all wind farms and for load hubs. The below chart shows the total congestion costs (including the loss component of LMPs) from a selection of wind farms located in the windiest parts of MISO relative to the Ameren Missouri load hub. These wind farms experience a very high degree of congestion, posing a substantial cost and risk to moving power through the AC system. The cost of this congestion must be added to the MISO wind alternative.

MISO wind average LMPs and components from 2013 to mid-2014 versus Ameren Missouri load hub. The LMPs and components are weighted by aggregate MISO wind generation from 2013 to mid-2014.

$/MWh	Δ LMP	Δ MCC	Δ MLC
Buffalo Ridge (MN)	(10.04)	(8.06)	(1.97)
Moraine (MN)	(13.44)	(11.17)	(2.27)
Eclipse (IA)	(11.56)	(10.34)	(1.22)
Pocahontas Prairie (IA)	(12.24)	(10.74)	(1.50)
Rolling Hill (IA)	(11.66)	(10.36)	(1.30)
Pioneer Prairie (IA)	(5.57)	(5.64)	0.07
Average MN	(11.74)	(9.62)	(2.12)
Average IA	(10.26)	(9.27)	(0.99)

The congestion costs from distant wind farms are not only substantial, they are quite volatile. In some hours, the price of power in windy parts of MISO can go negative. This means that a utility buyer of this wind power must pay the grid to accept it. Directly

delivering power via an HVDC line to Missouri greatly reduces and likely eliminates this risk.

Q. Are there any more corrections to Dr. Proctor's analysis of MISO wind?

A. Yes. As he did with Missouri, Dr. Proctor assumed other MISO wind farms do not pay property taxes. The expense must be added to his model.

Q. Did Dr. Proctor's rebuttal testimony consider MISO wind as an energy resource or a capacity resource?

A. He considered both options. In examining MISO wind as an energy only resource, he ignored electric losses and assumed that no transmission upgrades were needed to deliver the energy to Missouri, and he also assumed no capacity value for the purchased wind energy. In examining MISO wind as a capacity resource, he made a rough estimate of the required interconnection upgrades, but as I mentioned above, it was not actually based on any transmission analysis.

Q. Based on the addition of congestion costs and property taxes, what does Dr. Proctor's model conclude about the cost effectiveness of MISO wind as an energy only resource?

A. I reran Dr. Proctor's model with the five changes discussed in Section III(b) above, along with the addition of congestion costs and property taxes. In his rebuttal testimony at page 28, Dr. Proctor concludes that a capacity factor above 35% is needed in order for energy-only wind located in MISO to be competitive with Kansas wind delivered by Grain Belt Express. In fact, after correcting Dr. Proctor's model and adding in the full costs of property taxes, transmission, congestion and loss charges to the cost of MISO wind,

Kansas wind delivered by DC transmission is always cost competitive with MISO wind. And, as described above, direct delivery by an HVDC line inherently has fewer risks.

Components of Levelized Cost calculations for Missouri and MISO wind alternatives.[15]

Capacity Factors	Capacity Costs	Property Tax	O&M Expense	Levelized Costs	Capacity Adder	Inc Congestion	Total	Difference
Missouri Wind	$46.17	$6.29	$11.73	$64.19	$45.91	$0.00	$110.10	($28.22)
MISO 30%	$57.71	$5.76	$11.73	$75.19	$36.73	$9.27	$121.19	($39.32)
MISO 35%	$49.47	$4.94	$11.73	$66.13	$31.87	$9.27	$107.27	($25.39)
MISO 40%	$43.28	$4.32	$11.73	$59.33	$28.23	$9.27	$96.83	($14.95)
MISO 45%	$38.47	$3.84	$11.73	$54.04	$25.40	$9.27	$88.70	($6.83)
MISO 50%	$34.63	$3.45	$11.73	$49.81	$23.13	$9.27	$82.21	($0.33)
Grain Belt	Does Not Include Losses					$0.00	$81.87	

Q. What if you consider MISO wind as a capacity resource?

A. Accrediting distant MISO wind as a capacity resource would entail building the necessary transmission upgrades to allow the power to be physically deliverable into Missouri. This requires a detailed transmission study from MISO. As Dr. Proctor notes on page 30 of his testimony, "resources located outside the utility's transmission zone are likely to have larger additional transmission charges" and "[b]ecause firm transmission service is resource and load specific, it is not possible to provide a definitive estimate [of costs]."

Q. How does Dr. Proctor estimate the costs of transmission service from distant MISO wind resources to Missouri?

A. On page 35 of his testimony, Dr. Proctor bases his estimate SPP's "safe harbor" for transmission upgrades. I fail to see how SPP's safe harbor is relevant for calculating transmission upgrade costs for MISO wind**.** Further, SPP's safe harbor concerns who

[15] Following Dr. Proctor's convention, losses are excluded from all alternatives in the "energy only" comparison.

pays for upgrades – amounts below the safe harbor are broadly cost allocated rather than allocated to the requesting transmission rights holder. The safe harbor is not an estimate of the actual upgrade costs required.

Q. Setting aside the lack of transmission analysis to support this alternative in Dr. Proctor's testimony, how do the changes to Dr. Proctor's model you have described above affect the comparison?

A. Once the necessary corrections (which I have described above) are made, Dr. Proctor's model shows that the Grain Belt Project alternative is less expensive than the MISO wind alternative.

MISO wind alternatives with additional transmission costs

Capacity Factors	Capacity Costs	Property Tax	O&M Expense	Levelized Costs	Capacity Adder	Inc Trans Costs	Inc Congestion	Losses	LCOE with Δ Transmission	
									Without PTC	With PTC
MISO 30%	$57.71	$5.76	$11.73	$75.19	$33.33	$12.89	$9.27	5%	$137.56	$113.43
MISO 35%	$49.47	$4.94	$11.73	$66.13	$28.55	$11.05	$9.27	5%	$121.05	$96.91
MISO 40%	$43.28	$4.32	$11.73	$59.33	$24.97	$9.67	$9.27	5%	$108.67	$84.53
MISO 45%	$38.47	$3.84	$11.73	$54.04	$22.18	$8.60	$9.27	5%	$99.03	$74.90
MISO 50%	$34.63	$3.45	$11.73	$49.81	$19.95	$7.74	$9.27	5%	$91.33	$67.19
Grain Belt	$33.29	$0.00	$11.73	$45.02	$19.29	$17.57	$0.00	5%	$86.18	$62.05

d. Dr. Proctor's criticisms do not hold up under scrutiny

Q. On pages 4-6 of his rebuttal testimony, Dr. Proctor criticizes the basic methods of the LCOE model presented in your direct testimony. Are these criticisms valid?

A. No. I reviewed his comments in detail and concluded that no additional corrections (beyond the 2% adjustment to natural gas prices, discussed above) were needed to my original analysis.

Q. Dr. Proctor states at page 4 of his rebuttal that "Mr. Berry did not perform his levelized cost analysis in the same way as is typically done for regulated utilities." What is your response?

A. Dr. Proctor fails to explain why my original analysis is wrong simply because I used a method that is not "typically done for regulated utilities." In fact, my method more closely matches the techniques that are used by an independent power producer or by a merchant transmission company like Grain Belt Express.[16]

Dr. Proctor uses a model that is based on a utility with a fully regulated cost of service rate base that owns all the capital assets analyzed. In such a model, the revenue stream received by the owner declines substantially over time as the capital asset is depreciated. After he calculates the declining revenue requirements, Dr. Proctor converts them into a single levelized charge. As he states in his rebuttal testimony at page 5:

> Each year of revenue requirements is discounted to obtain the NPV of the annual revenue requirements over the asset life. The NPV of the revenue requirements are then divided by the sum of the annual discount factors to obtain a "levelized" (same dollar amount each year) revenue requirement.

Both Dr. Proctor and I arrive at a levelized revenue requirement. My approach calculates the revenue requirement directly, while Dr. Proctor's approach goes through the intermediate step of calculating a utility rate base. Dr. Proctor's extra step is not essential or necessary.

Q. Does Dr. Proctor's decision to model declining revenue requirements based on a depreciating rate base lead to materially different results than your LCOE model?

A. No, it does not. Both my methodology and Dr. Proctor's end up with the same answer in terms of the most competitive resource if appropriate assumptions are used. As I have discussed above, once corrected, Dr. Proctor's model actually supports the economic

[16] In Show Me Responses 6 and 7 to Grain Belt Express' Third Set of Data Requests, Dr. Proctor acknowledges he has no experience or direct knowledge of how IPPs and merchant transmission companies price their energy and service.

feasibility of the Project.

Q. Dr. Proctor claims in his rebuttal at page 5, line 14, that you erroneously calculated the "capitalization factor" in your LCOE analysis. Did you perform this calculation correctly?

A. Yes. The capitalization factor was used to convert the present value of revenue requirements into an annual revenue requirement. In my LCOE model, all costs and revenues were discounted back to 2017—the middle year of the Project's three-year construction period. Therefore, the capitalization factor I calculated was also based on discounting the revenue back to 2017. Dr. Proctor asserts that my capitalization factor reflects an extra year of discounting because he thinks everything must be discounted to 2018. In fact, so long as both costs and revenue are discounted back to the same year, it doesn't affect the results.

As seen in Schedule DAB-11, using the value of capitalization factor suggested by Dr. Proctor and discounting costs back to 2018 does not change the resulting LCOE. This demonstrates that while I used a different calculation convention than Dr. Proctor for the capitalization factor, my calculation yielded the correct result**.**

Q. Dr. Proctor objects at page 16, lines 5-11 of his rebuttal to the way you calculate capacity credit because it is not "a standard calculation of levelized costs." What is your response?

A. Setting aside the relative merits of our two capacity credit methods, Dr. Proctor and I agree that it is appropriate for an LCOE model to take into account the high level of availability and reliability that dispatchable generation (such as combined cycle gas generation) has during peak load hours. In addition, my LCOE model performs a further

"time of day" adjustment that values energy based on when it is delivered. As a result, off-peak energy receives a lower value than peak energy based on simulated locational marginal prices. Dr. Proctor's model does not include this adjustment.

Dr. Proctor provides no explanation or source of why his method is "standard." He also asserts (on page 16, line 90 without explanation that my method is "not the treatment that [a utility] would use in making a decision." My experience, which includes following the resource plans of utilities around the country and involvement in power purchase agreements for over 1,000 MW of wind farms, is that many utilities do use the method described in my direct testimony.

By "capacity," Dr. Proctor and I seem to mean the same thing: the ability of a generator to produce electricity during the highest hours of electric demand, when the grid runs the risk of a generation shortage. Capacity can be available even if it is not used. For example, an inefficient combustion turbine might be ready to run on a hot July afternoon but not actually be called upon. This generator still contributes capacity. Capacity is distinct from energy, which is the actual generation of electricity throughout the day and year. All generation resources typically provide both capacity and energy. For variable renewable resources like wind generators, they primarily provide energy, but they also provide capacity to the extent they stand ready to produce electricity during peak load hours. Less efficient combustion turbines mainly provide capacity since their high variable cost means they do not run often.

In a levelized cost of energy analysis (LCOE), determining just the cost of producing energy (as opposed to capacity) requires that the energy and capacity values of each resource be separated**.** My model does this is by assigning a capacity value to each

resource based on its ability to meet peak demand and to be available during the greatest strains on resource adequacy. This capacity value avoids another cost, which is the cost of building an additional peaking unit that contributes the same capacity value. The "avoided cost" of building this peaking unit then reduces the cost that must be recovered through the energy produced by the generating plant.

Q. How does Dr. Proctor's approach different from what you have described above?

A. He assumes that renewable resources must be paired with combustion turbines to generate the same capacity value as a combined cycle gas plant. The cost of the combustion turbine is added to the cost of the renewable energy. It is confusing and somewhat misleading to call this a "levelized cost of energy." Actually, it is a levelized cost of both energy and capacity. In my LCOE model, all generation alternatives generate the same amount of energy, however, higher capacity value resources see a decrease in their cost of energy based on the avoided cost of a peaking plant. In Dr. Proctor's model, all generation resources generate the same amount of capacity, with lower capacity value resources paying the cost for additional peaking units.

Q. Which methodology of capacity credit is more appropriate, yours or Dr. Proctor's?

A. If the goal of the analysis is to fill a demonstrated capacity shortfall, i.e., a reserve margin shortfall, then Dr. Proctor's method may be appropriate. If, on the other hand, the goal of the analysis is to determine which generation alternatives can produce low-cost energy or meet a renewable energy target, as is the intent of the LCOE analysis in my direct testimony, then my method is more appropriate.

Q. Dr. Proctor claims at page 6, lines 3-4 of his rebuttal that you "confuse[d] inflation rates with cost escalation over the asset life" resulting "in an overestimate of the

annual O&M costs for most alternatives." Is this the case?

A. No. Both Dr. Proctor's model and my model are prepared in nominal dollars. As a result, even costs that are assumed to be constant (in real dollars) must increase with an assumed inflation rate. Otherwise, they actually decrease in real dollar terms.

Dr. Proctor's claim that my analysis "confuses" inflation rates with cost escalation obscures the real issue. The Dr. Proctor model assumes that gas generation O&M costs do not increase and actually decline in real dollar value terms as a plant ages. Dr. Proctor provides no support for this assumption which defies economic reality.[17] My model assumes, conservatively from the perspective of Grain Belt Express, that the natural gas generation O&M costs stay constant in real dollar terms.

Q. Did you "improperly" inflate natural gas prices as Dr. Proctor suggests on page 22 of his rebuttal?

A. No. I used the nominal forecast for electric power plant natural gas prices provided by the Energy Information Administration (EIA) of the U.S. Department of Energy. Dr. Proctor uses the real dollar prices, then inflates them based on nominal increase in EIA's Henry Hub natural gas price forecast. A more direct approach is to use the prices that I did. Schedule DAB-12 shows the EIA nominal dollar electric power plant gas price forecast, the forecast used in my model and the forecast used in Dr. Proctor's model.

Q. Dr. Proctor's rebuttal testimony states at various points, including pages 9 and 18, that your levelized cost does not include losses or that "losses need to be taken into account" based on the Project's estimated delivered cost of energy. Did your LCOE model include losses on the Grain Belt Express transmission line?

[17] Show Me Response to Grain Belt Express' Third Set of Data Request; Response 23

A. Yes. My estimate of the delivered cost of the energy from the Project presented in my pre-filed direct testimony included an estimate of losses of 5%, as shown in the workpapers provided to Show Me.[18] Dr. Proctor then adopted this same assumption in his own analysis.

e. Many of Dr. Proctor's assumptions are less reasonable than Grain Belt Express'

Q. In his rebuttal testimony on page 17, Dr. Proctor attributes a capacity credit to Kansas wind generators of 14.5% of their nameplate capacity, compared to the 17.1% assumed in your analysis. Which is more reasonable?

A. A capacity value of 17.1% is a more reasonable assumption. In his direct testimony, Company witness Robert Zavadil performed a loss of load expectation ("LOLE") analysis, using the same basic techniques that MISO uses in its capacity accreditation. Mr. Zavadil calculated a capacity value of 33.0% in his direct testimony at page 8**.** Because there is some uncertainty about future capacity value, I chose a more conservative value of 17.1%, but this could be substantially higher.

Q. What are the problems with Dr. Proctor's capacity value of 14.5%?

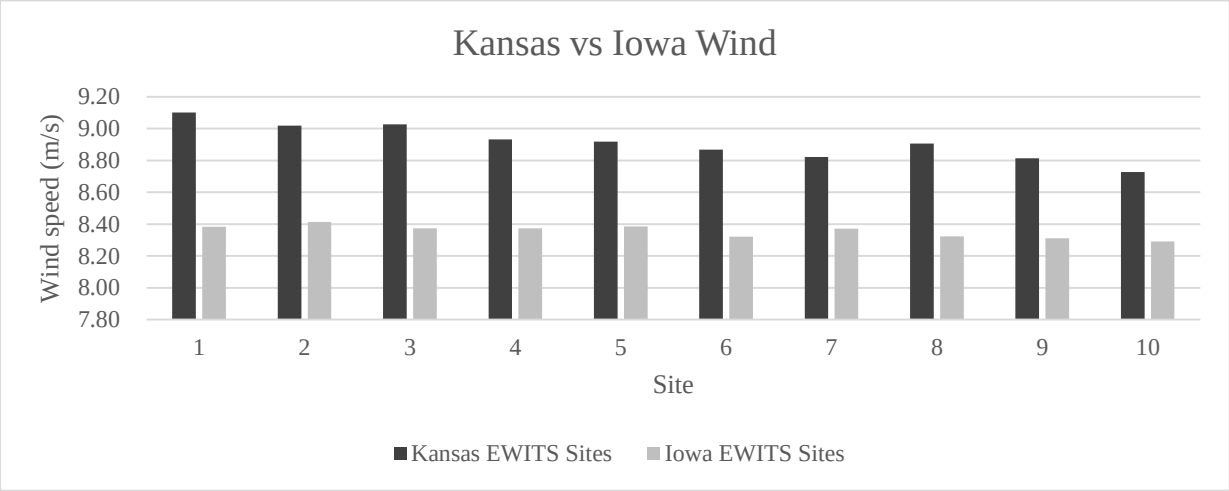
A. Dr. Proctor arrived at his value by averaging the western Minnesota/Dakotas region value (15.8%) with the Iowa region value (13.7%). This rests on his incorrect assumption at page 18 of his rebuttal that "[t]he wind in the northwestern Iowa also has the same annual average wind speeds as western Kansas." Actually, western Kansas has appreciably higher wind speeds.

Schedule DAB-13 shows a wind map for the Kansas and Iowa as developed by AWS Truepower and NREL. The average wind speeds at 80m for northwest Iowa is

[18] Grain Belt Express Response to Show Me Data Request 1.2, Attachment 01.

around 8-8.5 m/s, whereas much of the area surrounding Dodge City, near the proposed converter station, has average wind speeds of around 8.5-9 m/s. The below graph also indicates this difference. The average wind speeds of ten Kansas sites modeled in the Eastern Wind Integration and Transmission Study ("EWITS") near Dodge City is compared against the wind speeds of ten Iowa sites with the highest capacity factors in the state.

Comparing the 3 year average wind speeds over 3 years (2004-2006) of 10 Kansas EWITS sites and the 10 highest capacity factor Iowa EWITS sites



In addition, the MISO capacity values used by Dr. Proctor were calculated in 2012. As will be discussed below, wind capacity factors are improving substantially over time. As capacity factors improve, capacity values will also improve because more wind-generated electricity will be generated during peak load hours. Finally, Dr. Proctor's calculation is not based on any actual modeling of the reliability contribution of the Project's delivered energy. Mr. Zavadil performed this analysis in his direct testimony, and estimated a capacity value of 33% of nameplate capacity, which I have conservatively reduced to 17.1% in my LCOE model.

Q. Dr. Proctor says at page 19 of his rebuttal that your capacity factor assumption of

55% for Kansas wind generation is too high. He uses 50% instead. Is this reduction justified?

A. No, as discussed above, western Kansas capacity factors are already over 50%. Additional improvements in capacity factors between now and when the Project is constructed are extremely likely. General Electric, the country's largest wind turbine supplier, recently submitted guidance to the Tennessee Valley Authority's IRP, which indicated an estimated 4-5% improvement to net capacity factor over the next two to four years**.** A 55% capacity factor assumption is therefore more reasonable than 50%.

Q. Dr. Proctor claims that the inflation rate you use for several variables in your model is too high. What is your response?

A. In my LCOE analysis, I consistently used a long-term inflation rate of 2.5%. In January 2012, the Federal Reserve Bank explicitly established an inflation rate for personal consumption expenditures (PCE) of 2.0%. However, a slightly higher figure is warranted for several reasons. First, PCE inflation has averaged about 0.3% below headline CPI increases over recent years. Second, over long periods of time, one can foresee substantial periods of time when the rate of CPI increase rises above the Federal Reserve's target for a period of time until corrective measures, such as interest rate increases, reduce the inflation rate back in line with the target**.**

The assumed inflation rate is applied consistently across the analysis in my LCOE analysis. In contrast, Dr. Proctor applies an inflation adjustment to some model inputs, like natural gas prices and the PTC value, but not others, like natural gas generation O&M and carbon pricing**.**

Q. Dr. Proctor expresses a concern at page 15 of his rebuttal that the production tax

credit ("PTC") for wind farms may not be available in the future. What is your response?

A. It is appropriate to consider scenarios where the PTC is extended and where it is not**.** We regularly review these scenarios in assessing the business case of the Project. The LCOE analysis presented in my direct pre-filed testimony includes sensitivities with and without the production tax credit. While a PTC renewal is uncertain, Congress has a history of renewing the PTC, with some of the extensions retroactive. Including retroactive extensions, the PTC has been continuously available since 1992.[19]

Without the PTC, the demand for clean energy, including the Missouri renewable portfolio standard ("RPS") and the many other regional RPS I discuss in my direct testimony at pages 22-26, would not simply disappear. The absence of a tax credit would affect all renewable energy technologies, not just the Kansas wind energy connected to the Grain Belt Express Project. The cost of the Project, relative to other clean energy alternatives, would therefore not be affected, and it would remain the low-cost way to meet RPS. And, without the PTC, the Project remains cost-effective. Even Dr. Proctor's analysis shows that the wind energy delivered by the Project is competitive with combined cycle gas generation *without the PTC.* In his model the Project's

[19] Following its initial enactment in the Energy Policy Act of 1992, Pub.L. No. 102-486, 106 Stat. 3020, §1914, the PTC has been extended or renewed by Congress on eight occasions: Ticket to Work & Work Improvement Act of 1999, Pub.L. No. 106-170, 113 Stat. 1922, §507; Job Creation & Worker Assistance Act of 2002, Pub.L. No. 107-147, 116 Stat. 59, §603; Working Families Tax Relief Act of 2004, Pub.L. No. 108-311, 118 Stat. 1181, §313; Energy Policy Act 2005, Pub.L. No. 109-58, 119 Stat. 986, §1301; Tax Relief & Health Care Act of 2006, Pub.L. No. 109-432, 120 Stat. 2944, §201; Energy Improvement & Extension Act of 2008, Pub. L. No. 110-343, 122 Stat. 3808, §101; American Recovery & Reinvestment Act, Pub.L. No. 111-5, 123 Stat. 319, §1101; and American Taxpayer Relief Act of 2012, Pub.L. No. 112-240, 126 Stat. 2340, §407.

delivered energy is about $4/MWh more expensive than combined cycle gas without the PTC. *See* Dr. Proctor Rebuttal at p. 20 (Kansas Wind at $89.76 v. Combined-Cycle at $85.97). However, when the corrections that I discussed in Section III(b) above are applied to the Dr. Proctor model, it shows that the Project's delivered wind energy is cheaper than combined cycle gas generation *even without PTCs.*

In sum, approval of the Grain Belt Express Project would position Missouri to benefit from a PTC extension if it occurs, but also helps assure that Missouri will have access to abundant, low-cost clean energy resources even if the PTC is not extended.

Q. Dr. Proctor objects to the carbon price forecast used in your LCOE model at pages 20-21 of his rebuttal. What is your response?

A. First, my LCOE analysis included a sensitivity on the price of carbon to account for potential uncertainty in the value, so it is incorrect to suggest I used a single price. Second, I used a third-party forecast by the firm Synapse Energy Economics that is expressed in real dollars. Dr. Proctor uses the same forecast in his analysis, but he failed to convert it to nominal dollars properly. Inexplicably, Dr. Proctor escalates the price of carbon dioxide to 2019 with inflation, but applies no inflation adjustment thereafter. The result is a levelized price of carbon that is too low.

Q. Have you rerun Dr. Proctor's model using Grain Belt Express' more reasonable assumptions about capacity value (17.1%) , capacity factor (55%), natural gas price forecasts, inflation, and carbon pricing?

A. Yes, I have. When these assumptions are incorporated, Dr. Proctor's model shows that the Grain Belt Express Project is clearly economically feasible, as is shown in the tables below. The Project alternative is cheaper than sourcing "energy only" from other wind

sources:

Levelized Costs for Wind as an energy-only resource and Capacity from Combustion Turbines

Alternatives	Total	Total w/ PTC
Missouri Wind	$112.80	$85.30
MISO 30%	$121.53	$94.04
MISO 35%	$107.61	$80.12
MISO 40%	$97.17	$69.67
MISO 45%	$89.04	$61.55
MISO 50%	$82.55	$55.06
Grain Belt	$78.02	$50.53

** Does not include transmission losses*

In addition, the Grain Belt Express Project is cheaper than other MISO wind resources when considering them as capacity resources:

Levelized Costs for MISO and Kansas wind resources as energy and capacity

Alternatives	Total	Total w/ PTC
MISO 30%	$136.23	$110.11
MISO 35%	$120.39	$94.27
MISO 40%	$108.51	$82.39
MISO 45%	$99.26	$73.15
MISO 50%	$91.87	$65.76
Grain Belt	$82.13	$56.01

** Includes 5% losses*

Finally, the Grain Belt Express Project is cheaper than Missouri wind combined cycle gas alternatives:

Levelized Cost comparison for generation alternatives.

Alternatives	Total	Total w/ PTC
Grain Belt	$82.13	$56.01
Missouri Wind	$109.39	$81.90
Combined Cycle	$95.01	$95.01

f. An analysis of risk factors favors the approval of the Grain Belt Express

Q. Do you agree with Dr. Proctor's statement at page 24 of his rebuttal that it is appropriate for the Commission to consider the risk implications of different alternatives?

A. Yes**.** It is important to consider ranges of future variables. For this reason, the analysis I presented in direct testimony (and updated in this testimony) included sensitivities around Kansas wind capacity factors, Missouri wind capacity factors, PTCs, carbon prices, and future natural gas prices. As shown on Schedule DAB-4 to my direct testimony and Schedule DAB-10 to this testimony, I varied these input assumptions not only individually but in tandem, resulting in a total of 162 scenarios considered. As Dr. Proctor notes at page 25 of his rebuttal testimony, future natural gas prices over the 30+ years are uncertain. However, his model includes only three scenarios and includes no sensitivities around future natural gas prices. The additional scenarios considered by my model make the results more robust.

Q. Do you agree with Dr. Proctor's assessment at page 25 of his rebuttal that the risks of Kansas wind capacity factors and future natural gas prices are "offsetting"?

A. No, certainly not from the perspective of the Missouri public. If wind power is purchased through a power purchase agreement (PPA) with an independent power producer (IPP), as most wind procured by Missouri utilities has been to date, the IPP takes the risk of

lower than expected energy production, *not the utility and its ratepayers.* The PPA has a price per MWh, and if the wind farm generates less energy, it receives less revenue. The utility typically only pays for what is generated, while the wind farm owner takes the risk of how much energy is produced due to wind conditions. In contrast, both PPAs for natural gas plants and utility-owned natural gas plants allow for fuel cost recovery, meaning consumers ultimately face the risk of fluctuating fuel prices. This means higher than expected natural gas prices will increase the electric bills of consumers.

Q. Is it appropriate for the Commission to approve the Grain Belt Express Project even with some future uncertainty about its cost-effectiveness relative to other alternatives?

A. Yes, for two reasons. First, as mentioned above, the total size of regional RPS requirements is so large that building the Project and building other renewable generation are not mutually exclusive alternatives. Total demand for renewable energy in MISO and PJM states in 2020 will be about 175 million MWh.[20] Cost effectively meeting the regional RPS requirements will not require <u>only</u> the Project <u>or</u> more wind installations in MISO; it will require <u>both.</u> Regional RPS compliance is directly relevant to individual states like Missouri. Since RECs and renewable energy can be bought and sold across states, this must be viewed as a regional market with linked pricing, just like the regional market for wholesale electricity.[21] Similarly, improving air quality and reducing the emissions of coal-fired power plants pursuant to EPA regulations will not require <u>only</u> new combined- cycle gas generation <u>or</u> new renewable generation. It will require <u>both</u>.

[20] Berry direct testimony, page 23.
[21] Berry direct testimony, pages 22-23.

Second, uncertainty is inherent in any cost-benefit analysis. The benefits of new transmission lines accrue over periods of decades, and the cost of transmission projects can also vary due to commodity prices, design factors, schedule, and other considerations. Because of the timeframes and uncertainties involved, utilities and regulators cannot avoid making informed forecasts about the future. The Grain Belt Express Project, however, presents a different circumstance than almost all the other transmission projects that the Commission has approved because Grain Belt Express, not Missouri ratepayers, bear most the risks regarding the Project's costs and benefits. If the Project's anticipated benefits decrease between now and when Grain Belt Express begins construction, the Company must address those market realities. If the Project's cost is higher than expected, Grain Belt Express bears that risk, not Missouri consumers. The Project's shipper-pays business model offers the Missouri public the opportunity to benefit from additional competition without taking the risk that the Project's benefits are lower than expected, or that the Project's costs are higher than expected.

Q. Is your LCOE analysis and Dr. Proctor's analysis based on the same delivered cost of energy to Missouri as to Indiana?

A. Yes, they are. Both of our analyses are conservative with respect to the cost-effectiveness of the Project for Missouri. Depending on market needs, Grain Belt Express can offer a lower transmission price to Missouri because of the shorter length of transmission line from Kansas.

Q. What is the size of this difference?

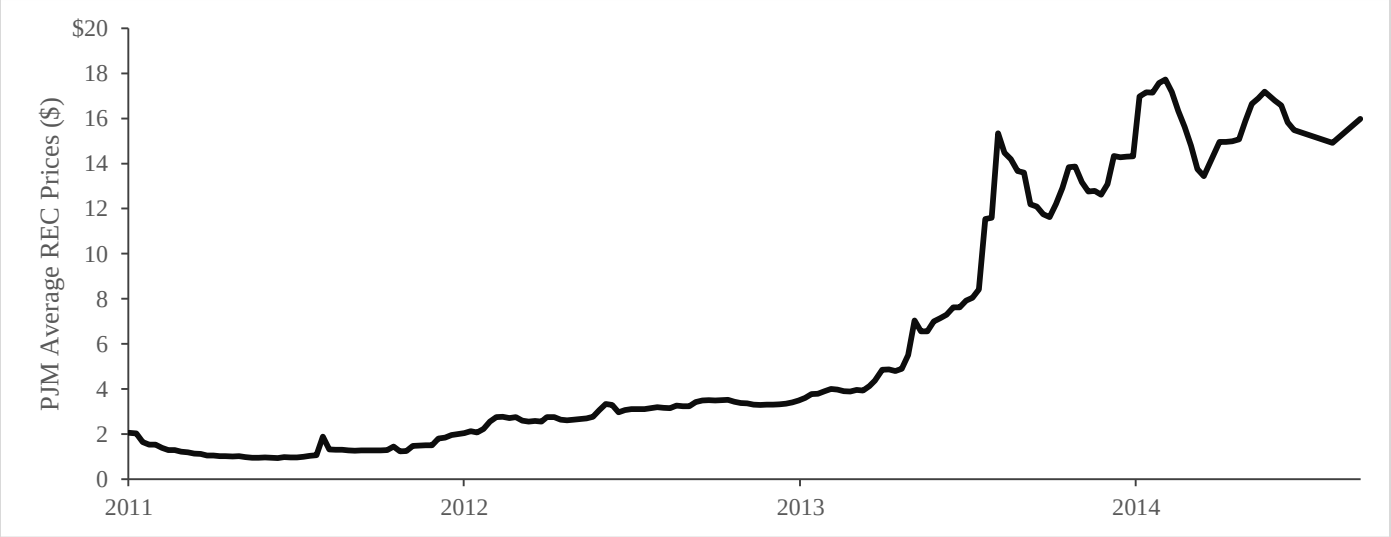
A. Depending on market conditions, the transmission costs to Missouri could be 25-33% lower than to Indiana, resulting in a lower delivered to cost to Missouri of $4-6/MWh.

Grain Belt Express would need to recover this revenue by charging slightly more to shippers that use the Project to move power to PJM.

Q. Why can PJM buyers afford to pay more for renewable power?

A. The PJM market has a huge demand for renewable energy, but has no access to wind with a high capacity factor in its region. This supply-demand imbalance has been driving up PJM renewable energy credit prices. As the following graph shows, these prices have reached $16-18/MWh, which is in the range of the transmission charge on the Grain Belt Express Project to Indiana.

Average historical REC prices of Class 1/Tier 1 Maryland, New Jersey, and Pennsylvania RECs. Source: SNL



Q. Why is PJM's demand for renewable energy important for establishing the economic feasibility of the Project?

A. PJM's huge demand underlines that the Project's transmission capacity from western Kansas to PJM is valuable, and that even if it is necessary to charge less to deliver power to Missouri, the Project can still proceed. However, the analysis in the section of my surrebuttal testimony and Dr. Proctor's model, once corrected, demonstrates that the Project is economically feasible even when the same transmission charge is assessed to

move power to Missouri and to PJM.

IV. STAFF CONDITIONS TO GRAIN BELT EXPRESS CCN

Q. The rebuttal testimony of Daniel Beck summarizes at pages 16-22 the conditions recommended by Commission Staff. Has Grain Belt Express reviewed these conditions?

A. Yes, we have reviewed these conditions in detail, and Grain Belt Express can agree to the majority of the proposed conditions. The Company's position regarding each condition is contained in the surrebuttal testimony of the Company witness with the appropriate expertise. For convenience, my Schedule DAB-14, attached to this surrebuttal, summarizes the conditions proposed by Staff; the Company's position on each condition; and a citation to the Grain Belt Express surrebuttal testimony addressing the condition.

Q. What is the Company's general response to the conditions proposed by Staff?

A. With the modifications we propose in my Schedule DAB-14, Staff's conditions allow Grain Belt Express to proceed with development under continuing Commission oversight without delaying or jeopardizing the benefits the Project can provide to Missouri. The conditions recognize that there is a necessary sequence to the development of a large transmission line following the shipper-pays model, and that it is essential that Grain Belt Express obtain a CCN as a necessary precondition for obtaining financing to construct the Project. Requiring the filing of financing agreements with the Commission after a CCN is granted allows the Commission and Staff to monitor Grain Belt Express without unduly delaying the development of the Project.

Many of the Company's suggested changes to the conditions reflect a desire not to file a large number of documents that require the Commission to affirmatively

"accept" or "approve" what is filed. It is not clear how an acceptance or approval process would work, or whether it would create a series of post-hearing proceedings that would be burdensome, as well as cause uncertainty for the Project. Even without a formal acceptance requirement, the Commission would retain broad authority to review, investigate, or open a new docket with respect to any information filed by Grain Belt Express.

Q. In his rebuttal at page 17, Mr. Beck proposed that a CCN condition that "the cost of the Project and any AC Collector System owned by Grain Belt Express will not be recovered through the SPP cost allocation process or from Missouri ratepayers." What is your response to this condition?

A. Grain Belt Express has no objection to the intent of this condition, but it requires clarification. First, the condition should also reference MISO cost allocation, not just SPP cost allocation. Second, the condition should apply only to Grain Belt Express. If some other entity desires to seek cost recovery (for example, recovery of the cost of buying transmission service), it should be free to do so through the appropriate regulatory process. Since Grain Belt Express has no ability to control other entities, the condition in the Company's CCN should be limited to Grain Belt Express. I have proposed revised text for this condition in Section II of this testimony, above.

Q. Should Grain Belt Express also commit not to recover costs from any transmission system upgrades, as suggested by Ms. Kliethermes in her rebuttal testimony at page 10?

A. No. A commitment not to recover any costs of interconnection upgrades through cost allocation is overly broad and inappropriate. Under the relevant RTO rules, Grain Belt

Express already must pay for the upgrades it needs to assure reliability of the Project's interconnection.[22] However, a single transmission upgrade may address multiple concerns and serve multiple purposes. For example, a new line could alleviate an overload from the Project's interconnection *and* alleviate a pre-existing reliability concern. In such situations, an RTO may allocate part of the cost of the upgrade to Grain Belt Express, and part of the cost of the upgrade through regional cost allocation. The amount allocated to load through regional cost allocation would be commensurate with the benefits provided. And, importantly, it would be the transmission owner that owns the upgrade recovering costs, not Grain Belt Express. Obviously, Grain Belt Express has no control over what another party does or does not recover, or how.

The Commission can rely on the RTOs existing rules that allocate Grain Belt Express its share of upgrades. Consequently, no condition is needed for the case where Grain Belt Express is the sole cause of an upgrade because current RTO rules require the Company to fund the upgrade and cost allocation is not available. If there are multiple causes of the upgrade, then the relevant RTO rules should apply, and the Commission and Staff could monitor any such "multi-purpose" upgrades through the relevant RTO planning process.

Grain Belt Express has no objection, however, to committing not to recover the costs of the feeder lines it will own in western Kansas (as discussed by Ms. Kliethermes in footnote 12 on page 10 of her rebuttal). The single purpose of these lines is to connect wind generation to the Project's Kansas converter station.

[22] The single exception is MISO, which still requires interconnection customers to pay 90% of the cost of network upgrades above 345 kV.

Q. Ms. Kliethermes suggests at page 10 and 41 of her rebuttal that Grain Belt Express should commit only to use 500 MW of capacity of the Missouri converter station. *See* Beck Rebuttal at p. 20. What is your response?

A. Grain Belt Express has no objection to this condition. 500 MW is the intended size of the Missouri converter station. However, as will be discussed below, this condition contradicts another condition recommended by Staff witness Michael Stahlman, which would require Grain Belt Express perform RTO studies on the converter at a 1,000 MW deliver capacity.

Q. Staff proposed two conditions related to the financing of the Project, one sponsored by Mr. Beck in his rebuttal on pages 18-19, and the other by David Murray in his rebuttal at page 10 (also noted by Mr. Beck at page 22 of his rebuttal). What is your response to these conditions?

A. These two conditions can be treated as one**.** The condition proposed by Mr. Murray is less clear with respect to the "projected amount of debt needed to complete the line," while the condition proposed by Mr. Beck more clearly ties the amount of financing needed to the cost to construct the Project. The Company suggests the following text for the combined condition, with the **bold** language representing text added to Mr. Beck's proposed condition to reflect the concepts in Mr. Murray's condition:

> Grain Belt Express will not install transmission facilities for the Grain Belt Express Clean Line Project on easement property until such time as Grain Belt Express has obtained commitments for funds in a total amount equal to or greater than the total project cost. To allow the Commission to verify its compliance with this condition, Grain Belt Express shall file the following documents at such time as Grain Belt Express is prepared to begin to install transmission facilities:
>
> a) On a confidential basis, equity and loan or other debt financing agreements and commitments entered into or obtained by Grain Belt Express or its parent company for the purpose of funding the Grain Belt Express Clean Line Project that, in the aggregate, provide commitments for funds for the total project cost;

b) An attestation certified by an officer of Grain Belt Express that Grain Belt Express has not, prior to the date of the attestation, installed transmission facilities on easement property; or a notification that such installation is scheduled to begin on a specified date;

c) A statement of the total project cost, broken out by the components listed in the definition of "total project cost," above, and certified by an officer of Grain Belt Express, along with a reconciliation of the total project cost in the statement to the total project cost as of the Application of $2.2 billion; and property owned in fee by Grain Belt Express including the converter station sites;

d) A reconciliation statement, certified by an officer of Grain Belt Express, showing that **(1)** the agreements and commitments for funds provided in (a) are equal to or greater than the total project cost provided in (c) **and (2) the contracted transmission service revenue is sufficient to service the debt financing of the project (taking into account any planned refinancing of debt).**

Q. Mr. Murray at page 11 of his rebuttal suggests a condition requiring ZAM Ventures to guarantee Clean Line Investor Corp.'s obligations with respect to its investment in Grain Belt Express. *See also* Beck Rebuttal at p. 22. What is your response?

A. This requirement is not appropriate. First, it imposes a condition on ZAM Ventures requiring it to do something. ZAM Ventures is an investor in Clean Line but not a participant in this proceeding. Second, it is unclear what obligations would be covered by the suggested guarantee. ZAM Ventures invests in Clean Line Energy Partners LLC, which in turn provides the equity capital to Grain Belt Express. The board of directors of Clean Line Energy Partners LLC, not ZAM Ventures, manages the expenditures of and contributes equity capital to Grain Belt Express.

If ZAM Ventures participates in the project financing of Grain Belt Express, the Project's lenders will assure the appropriate credit support is behind the equity commitment. Grain Belt Express is willing to make information about future financings part of its informational filings with the Commission, but the Commission should not mandate specific forms of credit support from investors in Clean Line Energy Partners

LLC. The financial markets will address this issue adequately without additional regulatory requirements.

Q. Staff witness Michael Stahlman recommends at page 18 of his rebuttal that the Commission require Grain Belt Express to complete and make public all RTO studies with the Missouri converter rated at 1,000 MW "and with the potential for exporting energy from the MISO and the PJM, and importing energy into the SPP" before commencing any eminent domain proceedings. *See also* Beck Rebuttal at p.22. What is your response?

A. The condition is unnecessary and inappropriate. Grain Belt Express is willing to make public all the necessary RTO studies prior to commencing construction. This commitment is already in a separate condition proposed by Staff, which Grain Belt Express has accepted. There is no need to duplicate it.

In addition, Grain Belt Express has agreed to another condition that requires it to return to the Commission for permission before increasing the delivery amount of the Missouri converter station above its intended capacity of 500 MW. Therefore, it unnecessary and wasteful to require the Company to complete RTO studies for a hypothetical scenario that is contrary to a condition in its CCN.

Finally, Grain Belt Express has no business plans to use the line to export energy from MISO and PJM into SPP. The Commission should not require Grain Belt Express to study uses of the Project that are not part of its current business plan. The requirement would represent a material delay in the Project's development because it would restart the Project's interconnection studies which already have been underway for four years.

Q. Mr. Stahlman at page 18 of his rebuttal also recommends that any use of eminent domain by Grain Belt Express not occur "until after the actual construction of at least 25% of the completed cost" of the Missouri converter station. *See* Beck Rebuttal at p. 22. What is your response?

A. Mr. Stahlman's condition should not be adopted because it creates ambiguity and unnecessarily complicates the timely completion of the Project. The procurement process and contracts for converter stations do not typically provide a separate price for each station, so calculating the percentage called for by the text condition is problematic. The condition is also unclear regarding the meaning of "construction of at least 25% of the completed cost."

Moreover, the condition links two unrelated issues—the converter station and land acquisition—in a way that does not fit with the Project's schedule. The payment schedule for a vendor providing converter stations is normally weighted toward the middle and end of the construction period. On the other hand, easement acquisition must be completed in advance of a transmission line's construction. Therefore, Staff's condition creating a serious potential for costly delays.[23]

A more direct and effective way to address Mr. Stahlman's concern is to condition the Company's CCN on installing the Missouri converter station, which is an integral part of the Project. Grain Belt Express will agree to install the Missouri converter station and has no objection to formalizing this commitment.

[23] To be clear, Grain Belt Express would only exercise eminent domain authority after exhausting reasonable efforts to obtain easements through voluntary means.

Q. Staff witness Sarah Kliethermes recommends at pages 3-4 of her rebuttal that the Commission order Grain Belt Express to perform a number of studies and provide them for Commission approval "in compliance with the Tartan Criteria and other applicable law." *See also* Beck Rebuttal at p. 19. What is your response?

A. Grain Belt Express believes it has provided Staff and the Commission with the appropriate studies and modeling work to reach the necessary conclusions about the Project. The Company has presented an extensive amount of studies in this proceeding in our direct and surrebuttal testimony. In the course of this proceeding, we also provided Staff with additional model runs which examined the Missouri converter station in isolation (i.e., without the Indiana interconnection) – even though we do not consider this a plausible scenario. And, in response to Ms. Kliethermes' rebuttal testimony, the Company performed additional analysis on ancillary services and the Project's effect on generation owned by Missouri load- serving entities, as discussed in the surrebuttal testimony of Rorbet Cleveland.

With respect to very detailed studies of ancillary services, as discussed in Robert Zavadil's surrebuttal testimony, these are best performed on a regional and RTO-wide basis, not with respect to a specific project. Grain Belt Express has no objection to a condition on its CCN requiring it to provide data and inputs into any future RTO-wide studies of wind integration and ancillary services.

In Schedule DAB-15 I have provided a list of the studies that we have conducted to support the Application**.** All of this modeling work and the clarifications provided in this proceeding are sufficient to allow the Commission to find that Grain Belt Express

meets the Commission's CCN criteria. The additional studies requested by Ms. Kliethermes should not be required.

V. OTHER ISSUES RAISED IN INTERVENOR TESTIMONY

a. The Project must follow the development sequence it has proposed

Q. MLA witness Dr. Jeffery Gray suggests at pages 11 and 17 of his rebuttal that Grain Belt Express must sign capacity contracts in order to demonstrate need for the service and obtain a CCN. What is your response?

A. Dr. Gray's suggestion that Grain Belt Express first obtain capacity contracts and only then seek a permit from the Commission is neither practical nor possible. Without a CCN from the Commission, Grain Belt Express cannot commit to a schedule to provide service on a known route. Only with the Commission's authorization can the Project be built**.** Before entering into large transmission service commitments, shippers, whether generators or load- serving entities, demand to know the schedule on which service can be provided, the route of transmission line, and whether the line can in fact be built.

Further, the Company has presented extensive information regarding the economic feasibility of the Project, including a detailed levelized cost of energy model showing the Project's delivered energy cost compared to other alternatives, as I discuss in Section III, above. This analysis shows that Grain Belt Express is the lowest cost source of clean energy available to Missouri, and in most scenarios is cheaper than conventional generation as well. In addition, as I discuss in my direct testimony at page 15, the Company determined that the average price of energy from the most competitive 4,000 MW of wind suppliers in its RFI was 2.0 cents per kWh.

Grain Belt Express has presented extensive evidence in this proceeding regarding the need for the service by both generators, who need transmission infrastructure to

connect to markets, and load-serving entities, who need low-cost clean energy. Of particular note, Grain Belt Express conducted a request for information (RFI) to which over 13,500 MW of high capacity factor wind projects responded with interest, as discussed in my direct testimony at page 15**.** In addition, the Company has presented extensive information on the substantial renewable energy demand in Missouri and, more broadly, in the MISO and PJM markets, as I describe in my direct testimony at pages 11-12 and 22-23. The Commission can rely on this evidence without creating an unworkable "Catch-22" for Grain Belt Express, which is what would occur if the Commission followed Dr. Gray's suggestion.

Finally, the conditions proposed by Staff, as agreed to by Grain Belt Express, assure that when the Project proceeds to construction, it will have the necessary contracts in place. These contracts are a precondition to project financing and are essential to satisfy the financing conditions on the Company's CCN.

Q. Why must Dr. Gray's recommendations regarding capacity contracts be rejected?

A. If the Commission were to deny the Application without prejudice and require Grain Belt Express to return once it has signed capacity contracts, it would place the Company in an unresolvable "chicken and egg" dilemma. On the other hand, if the Application is granted now, the conditions proposed by Staff assure that the Project will proceed to construction only after contracts have been signed and the construction costs fully financed. Grain Belt Express and its investors, not the public, will bear the risk of having in place adequate contracts and financing for the Project.

b. <u>Grain Belt Express is capable of financing the Project</u>

Q. Do you agree with Staff witness Mr. Murray at page 3 of his rebuttal that Grain Belt Express "has the financial qualifications to be granted a CCN for the

transmission line, and converter stations?"

A. Yes, I do. Mr. Murray came to this conclusion after reviewing the financial strength of the Company's investors and the validity of its financing plan.

Q. MLA witness Jeffrey Gray states at page 17 that the Grain Belt Express financing plan is "aspirational." Is this accurate?

A. No. While the permanent financing for the Project is not in place because it is not yet needed, the Project's financing plan is far from aspirational. Grain Belt Express has a detailed financing plan which was presented in my direct testimony at pages 37-52. The capital markets have a clear history of supporting projects like the Grain Belt Express Project. The management of Grain Belt Express has extensive experience in project finance and is developing the Project to meet investors' requirements. Finally, Clean Line's investors National Grid USA and ZAM Ventures are very capable of supporting the Project financially as it reaches additional milestones.

Q. Dr. Gray argues at pages 18-19 of his rebuttal that some of the transactions cited in your direct testimony are not relevant precedents for Grain Belt Express. Why are these transactions relevant?

A. These transactions demonstrate the successful track record of transmission lines raising many billions of dollars of capital on a project financing basis. Dr. Gray attempts to draw distinctions between different transmission transactions, but none of these differences change the basic fact that the project finance community is eager to invest in properly supported transmission lines with a variety of specific characteristics.

Dr. Gray states that, unlike the Project, the CREZ (competitive renewable energy zone) lines in Texas were rate-regulated. The CREZ transmission owners have the right

to recover their capital and operating costs through rate cases filed at the Texas Public Utility Commission. Grain Belt Express, on the other hand, will recover its capital and operating costs from negotiated contracts with specific shippers. However, there is nothing unusual or untested about large infrastructure projects relying on bilateral contracts to recover their costs. Hundreds of billions of dollars of independent power plants, pipelines, and liquefied natural gas facilities have been financed on the basis of bilateral contracts. In fact, bilateral contracts have some advantages over regulated rate recovery. Bilateral contracts have no risk of disallowed costs or adverse decisions in rate cases, and they have less exposure to risk from changes in energy policy or utility regulation. Both regulated rate recovery and bilateral contracts provide a strong basis for successful project financing.

Dr. Gray argues at page 18 that the Neptune and Hudson underwater HVDC lines are also substantially different from the Project. He points out the Neptune and Hudson lines linked two different points on the AC grid. However, the Grain Belt Express Project also connects three high- voltage substations on the AC grid in SPP, MISO and PJM. The description of the Project as a "generator lead line" is simply inaccurate. Though the Project's primary purpose is to move wind power directly connected to the Kansas HVDC terminal, it is still connected to the AC grid. Dr. Gray points out the Neptune and Hudson projects have a reliability justification, but the Grain Belt Express Project also improves reliability, as explained in the direct and surrebuttal testimony of Company witness Robert Zavadil. While the rationale for the Project is important to grid planners, lenders and investors care primarily about the underlying revenue stream. Dr. Gray points out that Neptune and Hudson had known customers. Grain Belt Express,

too, will have known customers at the time of its financing. Finally, Dr. Gray points out that the Neptune and Hudson projects avoided land-use impacts by being located underwater. This is not entirely correct. Both had an onshore component in highly populated areas. Further, the challenges of embedding transmission cable on the sea floor are substantial and create additional risk to project execution and maintenance. In sum, the successful financing of the Neptune and Hudson projects is relevant to the financing of the Grain Belt Express Project.

c. Renewables will be the primary or exclusive source of power for the Project

Q. On page 13 of her rebuttal testimony, Ms. Reichert asserts that "dirty energy" could be transported on the transmission line. MLA witness Dr. Gray raises a similar concern on p. 15 of his rebuttal testimony. Is there any uncertainty that generators connecting to the Project will be wind generators?

A. No. Dr. Gray's and Ms. Reichert's only argument in support of their position is that Grain Belt Express cannot refuse service requests to non-renewable generators. The Company's inability to prefer renewable energy is hardly unique. To my knowledge, FERC has never approved a preference for renewable generation. Despite this, many billions of dollars of new transmission has been approved and constructed on the basis of enabling low-cost wind.

To the contrary, it is safe to assume the generation connecting to the Project will be high capacity factor wind generation based on (1) the plentiful wind resource in western Kansas, (2) the cost advantage of wind generation in western Kansas versus in other states to the East, (3) the lack of such cost advantage for other generation besides wind, (4) the high level activity of wind developers, (5) the low level of activity of developers of other kinds of power plants in western Kansas, and (6) several precedents

(including the MISO MVP Projects) which made rational assumptions about the location of new wind generation.

Q. What factors did Grain Belt Express consider in deciding to locate the western converter station of the Project in Ford County, Kansas?

A. Grain Belt Express looked for a location near an existing high-voltage transmission line that could provide the needed voltage support and that is in close proximity to an excellent wind resource area that could produce very low-cost wind energy. In determining that Ford County is such a location, the Company relied on wind studies performed by meteorology firms and the Department of Energy's National Renewable Energy Laboratory (NREL), discussions with wind developers, our own management team's experience in developing wind farms in western Kansas, and our experience with transmission constraints in western Kansas that prevent further build out of generation.

Q. What is the level of activity of wind developers in the vicinity of the Project's western converter station?

A. Fourteen developers advancing 26 wind farms totaling more than 13,500 MW responded with interest to Grain Belt Express' RFI. There are even more wind projects under development in the area that did not respond to the RFI.

Q. How does this compare to the development activity of thermal power plants in western Kansas?

A. I am aware that Sunflower Electric Power Corporation, an electric cooperative located in Hays, Kansas, is considering expanding its Holcomb Station coal power plant. The expansion would primarily serve members of the Tristate Generation Cooperative in Colorado, New Mexico, Nebraska and Wyoming. However, this expansion is the subject

of ongoing environmental litigation and a contested permitting process. Further, Sunflower has shown no interest in using the Grain Belt Express to ship power. Other than the Holcomb Station, I have no knowledge of any thermal generation under active development, meaning the developer is acquiring land and working on obtaining permits. Nor am I aware of any plans by owners of existing thermal generation in western Kansas to connect to the Grain Belt Express Project to export power eastward.

Q. In response to Dr. Gray's rebuttal testimony at page 13, why does wind generation have a geographic advantage by locating in western Kansas?

A. Wind speeds are higher in western Kansas and the surrounding region than they are in other locations to the east. These higher wind speeds result in higher capacity factors and lower costs to generate wind energy. In addition, in my experience the cost to construct wind farms is cheaper in western Kansas than in locations farther east. Larger wind farms are possible in western Kansas due to lower population density and higher prevalence of windy land areas. These larger wind farms result in economies of scale in construction. They are cheaper to construct, on a unit cost basis, than a smaller wind farm.

Q. Do any other types of generation resources have a similar geographic advantage compared with western Kansas and the surrounding region?

A. No, they do not, which explains the failure of other kinds of generators to subscribe for long-term capacity on the Grain Belt Express Project. As shown in the LCOE analysis presented in this testimony, only natural gas power plants are cost-competitive with wind generation in western Kansas. However, based on the cost of natural gas, generators do not enjoy a large advantage by locating in Kansas instead of Missouri. From January

2010 until July 2014, average monthly "city gate" natural gas prices were $0.54/MMBtu lower in Kansas than in Missouri.[24] Natural gas heat rates, the measure of how much natural gas is necessary to produce one kilowatt-hour of electricity, typically range from 7,000 to 10,000 BTU/kWh. Using EIA's average price difference as a proxy for the difference in natural gas prices between Missouri and Kansas it would be on average, 0.38 cents to 0.54 cents more expensive per kilowatt-hour to burn natural gas in Kansas than in Missouri to generate electricity. This is much less than Grain Belt Express' anticipated transmission charge. Therefore, there is no economic advantage to burning gas in western Kansas and shipping it east using the project, and no reason to build new gas generation in order to subscribe for long-term capacity on the Grain Belt Express Project.

Q. Responding to Mr. Gray's questions at pages 13-14 regarding the information you provided to Company Witness Gary Moland, what specific assumptions did you make about the generation connected to the Kansas converter station for purposes of Mr. Moland's modeling?

A. I selected ten wind farm sites for which modeled output was available from NREL's Eastern Wind Integration and Transmission Study. I selected sites so that the sum of their capacity is 4,700 MW. I do not believe that the specific sites selected are critical. There is more than enough wind resource potential in western Kansas to fill the Project's capacity many times over. Moreover, the seasonal and diurnal patterns of wind generation in western Kansas are relatively consistent. To prove this, I selected a different set of wind farms in western Kansas that produce the same amount of energy as

[24] EIA. *See* http://www.eia.gov/dnav/ng. Last accessed October 3, 2014.

the original eight I selected. Schedule DAB-16 shows that the production profiles of the two sets of wind farms are substantially similar.

Q. Is it common practice to make assumptions about the location of new generation to study the benefits of planned transmission lines?

A. Yes. For example, in performing the cost-benefit analysis for the MISO MVP lines, MISO made assumptions about the locations of new wind generation based on where the lowest cost generation could be sited. Of note, MISO did not include only wind generation with signed power purchase agreements or interconnection agreements. The location of the new wind generation was based on (1) NREL wind mapping data, similar to the data used by Grain Belt Express in this proceeding, to identify locations where wind generators are likely to be developed, and (2) the estimated costs to produce electricity in particular wind resource regimes. A substantial component of the benefits of the MVP transmission lines is in improving the ability of electricity from remote wind generators to flow to areas where it is demanded.[25]

The Southwest Power Pool, the California Independent System Operator, and the Electric Reliability Council of Texas (ERCOT) have done similar analyses to measure the benefits for transmission lines which have been approved for construction and, in many cases, have gone into service. All of these transmission planners have justified the construction of major new transmission lines to support wind energy by making reasoned assumptions about the location of new wind generation. Importantly, all of these studies relied on wind resource analysis and wind developer activity, not on signed

[25] The MISO MVP benefit study is available at https://www.midwestiso.org/Planning/Pages/MVPAnalysis.aspx. Last accessed October 13, 2014.

interconnection or transmission service agreements. Schedule DAB-17 provides a more detailed overview of these studies.

Q. Staff witness Mr. Beck suggests at page 8, lines 18-20 of his rebuttal that wind projects in western Kansas have not entered construction because they have not obtained financing commitments, not because of a lack of transmission infrastructure. What is your response?

A. Adequate transmission access, along with access to markets with a demand for renewable energy, is a precondition for successful project financing. That wind farms in western Kansas have not obtained project financing does not imply that they do not need transmission and market access**.** In fact, large amounts of capital exist to support wind farm developments with proper transmission and market access, but this capital will only be deployed when the necessary transmission infrastructure is permitted, approved, and its construction underway.

d. Grain Belt Express Clean Line is qualified to sell the service offered

Q. MLA witness Dr. Gray comments at page 19 of his rebuttal that Grain Belt Express is only qualified to provide service to the extent of National Grid's involvement. Do you agree with his assessment?

A. No. Dr. Gray states that Grain Belt Express is not qualified because it has never built a transmission line before. If the Commission were to take this approach, no new entity could ever be authorized to construct a transmission line**.** The actual experience of a legal entity like Grain Belt Express is far less relevant than the qualifications of its management personnel. As detailed in Schedule MPS-1 to Michael Skelly's Direct Testimony, the employees of Clean Line that manage the Grain Belt Express Project have extensive experience in developing, constructing, and operating energy infrastructure in

general, and transmission lines in particular. The experience of Clean Line employees with other companies and on other projects is directly relevant to the successful execution of the Project.

Q. Will National Grid be involved in Grain Belt Express' construction and operations?

A. Yes. As detailed in the testimony of Stanley Blazewicz, Vice President of U.S. Business Development at National Grid USA, National Grid is one of the most experienced HVDC installers and largest network infrastructure owners in the world. It will be deeply involved in the management of the Project's construction and operation. Grain Belt Express will be able to benefit from National Grid's expertise and experience wherever needed.

f. Additional issues

Q. At page 17 of her rebuttal testimony, Ms. Kliethermes recommends that Grain Belt Express study whether it is more beneficial to manage wind variability in SPP prior to shipping the power east to MISO and PJM. What is your response to this suggestion?

A. Grain Belt Express has considered this alternative but does not consider it to be feasible**.** Grain Belt Express has not requested the interconnection rights necessary to interconnect over 4 GW of wind directly to the SPP system. Nor is the system in western SPP strong enough to accommodate such a large interconnection. The interconnection rights needed to manage the wind variability in SPP would therefore not be available even if Grain Belt Express had requested. Further, moving the wind variability to the much larger MISO and PJM markets will allow for a lower cost integration. SPP already has over 3,000 MW of wind generation in the Texas Panhandle, Oklahoma Panhandle and western Kansas region. All of these areas have a correlated wind resource, meaning wind farms

tend to ramp up and down at the same time. In contrast, the wind resources of MISO and PJM are not correlated with the western Kansas wind resource, as discussed in the surrebuttal testimony of Robert Zavadil. Combining geographically diverse wind resources will smooth overall wind variability and reduce integration costs.

Q. MLA witness Jeffery Gray argues at page 16 of his rebuttal that Grain Belt Express should establish financial security for the removal of the transmission line, noting that wind turbines often do so. Do you agree with his recommendation?

A. No, I do not. Grain Belt Express has committed to remove any structures in place when the Project ceases operations and to restore the land subject to easement. This commitment is part of Grain Belt Express's standard easement agreement. An abandoned transmission line is extremely unlikely. For over 100 years, electric transmission lines have been constructed in the United States, and I am unaware of a single transmission line that has been constructed and then abandoned. Nor did Dr. Gray provide any such examples.

Q. Several witnesses who testified at the local public hearings, including Representative Jim Hansen (transcript Vol. 2 at 66), proposed that developing additional wind farms in Missouri would be a more cost-effective method of meeting the RPS than transporting wind power to the state from Kansas. Can you explain the challenges to building new wind projects within the state?

A. The wind resource in Missouri is not as robust as in Kansas. As a result, the cost to build and produce energy from a wind farm in Missouri is significantly more than it would be for a wind farm in western Kansas where wind speeds are much higher. Both my LCOE model and Dr. Proctor's model show Missouri wind to be substantially more expensive

than the energy delivered by the Project. In addition, land use constraints have an impact on the feasibility of developing wind farms. For instance, land parcels in Missouri are generally smaller and have more varied topography than in western Kansas, which reduces suitability for wind farm development. Finally, environmental constraints limit development in some areas of Missouri where the wind resource is the strongest. For example, Element Power was planning to develop the 200 MW Mill Creek Wind Farm project in Holt County Missouri, only to cancel the project due to environmental constraints and the high cost of development.

Q. On page 16 of his testimony, Charles Kruse states, "In my opinion, Grain Belt's plan provides at best only a minimal public good that is far outweighed by the negative impacts of this project on the citizens of Missouri." Do you believe that the Project's benefits to Missouri outweigh the concerns that Mr. Kruse expresses?

A. Yes, I do. While we take very seriously the issues raised by Mr. Kruse about land use impact and eminent domain, we also believe that the Project provides an important and beneficial service to the state. Abundant access to clean and affordable energy sources is an essential public good. The Project can deliver clean energy to Missouri at large scale for a price that is equal to or less than fossil-fuel generation, create jobs in construction and manufacturing, reduce pollution and water usage, and reduce electric rates.

Q. Does this conclude your testimony?

A. Yes, it does.