Q. WHAT ABOUT THE ARGUMENT THAT NOMINAL EXPENSE WILL INCREASE WITH THE RATE OF INFLATION?

A. Assuming that this is a possibility, when I applied the EIA's average inflation rates to the fixed and variable O&M expenses, they increased by $1.06/MWh. This accounts for approximately 1/3 of the difference between my O&M estimates and those of Mr. Berry who used a 2.5% per year inflation rate.

Q. IN SUMMARY, HOW DOES KANSAS WIND + DC TRANSMISSION COMPARE TO COMBINED CYCLE GENERATION?

A. My rebuttal testimony to this point has presented a step-by-step comparison of my calculations to those of Mr. Berry. The following table shows the components of my calculations for Kansas Wind + DC transmission, Missouri Wind, which will be discussed in a following section of my rebuttal testimony, and Combined Cycle generation.

Levelized Cost Components for Geneation Alternatives

Alternatives	Capacity Costs		O&M Costs		Fossil Fuel		Capacity Adder	Trans Adder	Loss Adder	**Total**
	Returns	Prop TX	Fixed	Var	Fuel Cost	CO2				
Kansas Wind	$34.63	$0.00	$0.00	$11.73	$0.00	$0.00	$19.30	$22.00	$4.61	$92.26
Missouri Wind	$46.17	$0.00	$0.00	$11.73	$0.00	$0.00	$40.84	$0.00	$0.00	$98.73
Combined Cycle	$12.19	$1.29	$2.08	$3.37	$54.44	$12.60	$0.00	$0.00	$0.00	$85.97

These levelized costs show that Combined Cycle is the most cost-effective generation alternative for meeting Ameren Missouri's need for base-load generation. However, these comparisons are based on expected forecasts and do not include an analysis of various risk factors.

2. <u>RISK FACTORS IN COMPARING WIND TO COMBINED CYCLE</u>

Q. WHAT ARE THE RISK FACTORS THAT NEED TO BE EVALUATED IN COMPARING KANSAS WIND TO COMBINED CYCLE GENERATION?

A. The major risk factors are related to federal government policy including: 1) Will the congress continue to promote renewable generation by providing a production tax credit; and 2) Will proposed CO2 rules by the EPA be put in place, and if so, what will be the cost of CO2 allowances?

Q. HOW SHOULD THE MISSOURI COMMISSION TREAT THESE RISK FACTORS IN ITS EVALUATION OF THE ECONOMIC VIABILITY OF KANSAS WIND VIA THE CLEAN LINE DC TRANSMISSION PROJECT?

A. The Missouri Commission has three basic alternatives:

1. **Business as Usual** – Use only the government policies currently in effect.
2. **Likely Changes** – Use policies the government is currently working on that favor wind.
3. **Aggressive Changes** – Use policies the government may implement in favor of wind.

For Business as Usual, the CO2 cost would be removed from the combined cycle alternative and production tax credits for wind would not be included. This approach would set combined cycle levelized costs at $73.37/MWh compared to Kansas Wind at $92.26/MWh; a difference of $18.89/MWh.

For Likely Changes, the CO2 mid-range costs would be added to the cost of the combined cycle costs increasing those costs to $85.97/MWh; still $6.29/MWh cheaper than Kansas Wind, and this difference is greater than the $5/MWh difference allowed by Missouri legislation for requiring 15% of generation coming from renewable resources.

For Aggressive Changes, the CO2 high-range costs would be included for combined cycle costs, increase those costs to $92.82/MWh, and the Production Tax Credits for wind would be included, decreasing Kansas wind cost to $76.57/MWh. Thus, aggressive federal

policy would lead to the Kansas Wind via the DC Transmission project to be economically viable.

Obviously, various combinations of these three basic alternatives can also be considered. However, in two out of three of the basic alternatives, Kansas Wind via the DC Transmission project is not competitive with natural gas fired combined cycle generation.

Q. ARE THERE OTHER RISK FACTORS THE MISSOURI COMMISSION COULD TAKE INTO ACCOUNT?

A. Of course all of the costs are estimates and forecasts that are uncertain. On the Combined Cycle side the forecasted price of natural gas is one of the most significant in terms of uncertainty. On the Kansas wind side the capacity factor used for Kansas wind generation is also subject to uncertainty. I see these uncertainties as offsetting risks in comparing the two alternatives.

E. KANSAS WIND + DC TRANSMISSION VS. MIDWEST ISO WIND

Q. WHAT IS THE BASIS FOR THE NEED RELATED TO WIND IN MISSOURI?

A. Missouri legislation requires 15% of generation to come from renewable resources as long as the cost of renewable energy does not exceed $5/MWh from non-renewable resources.

Q. DOES MR. BERRY'S TESTIMONY SHOW THERE IS A NEED FOR KANSAS WIND + DC TRANSMISSION?

A. No, it does not. Mr. Berry's testimony shows that the Kansas Wind project is less costly than a Missouri Wind project having a much lower capacity factor of 30%. In addition, Mr. Berry found renewable solar energy as being more costly. While I found higher levelized costs for Kansas Wind + DC Transmission and Missouri Wind, I came to the same conclusion as Mr.

Berry. However, using low capacity factor wind as the only wind alternative does not show a need for the Kansas Wind project.

Q. WHAT OTHER WIND ALTERNATIVES SHOULD MR. BERRY HAVE EVALUATED IN SHOWING A NEED FOR THE KANSAS WIND PROJECT?

A. Mr. Berry should have also evaluated wind coming from high capacity factor regions within the Midwest ISO. Moreover, if Ameren Missouri can meet its renewable energy requirements from these alternatives at a lower cost than from the Kansas Wind + DC Transmission, then there is no need for that project.

Q. HAVE YOU PERFORMED AN ANALYSIS OF LEVELIZED COSTS FOR WIND COMING FROM THE MIDWEST ISO?

A. Yes, I have. First, the wind map of the United States shows the northwest region of Iowa and the eastern region of South Dakota have higher capacity factor wind than what can be found in the best wind regions of Missouri. Second, I calculated the levelized costs for wind generation (including capacity adders) at various capacity factors from 30% up to 50%. By adding $5/MWh to the levelized cost of combined cycle at $85.97/MWh, wind would have to be under $91/MWh to meet the need for renewable energy in Missouri.

The following table shows that wind with a capacity factor as low as 35% would meet this need. This comparison only includes the cost of generation, not any added cost for AC transmission service, transmission losses, or any production tax credits. Notice also that Missouri wind is treated differently as it gets a 25% added renewable energy credit. Comparing Missouri wind to the wind at 30% capacity factor, the capacity costs are lower by 1/1.25, but the capacity adder is higher by 1.25. While Missouri wind is slightly less costly

than non-Missouri wind at the same capacity factor, it still will not meet the $5/MWh limit when compared to combined cycle generation.

Levelized Costs with Capacity Adders
for Alternative Capacity Factors

Capacity Factors	Capacity Costs	O&M Expense	Levelized Costs	Capacity Adder	Total
30%	$57.71	$11.73	$69.44	$32.67	$102.11
MO 30%	$46.17	$11.73	$57.89	$40.84	$98.73
35%	$49.47	$11.73	$61.19	$27.89	$89.09
40%	$43.28	$11.73	$55.01	$24.31	$79.32
45%	$38.47	$11.73	$50.20	$21.53	$71.72
50%	$34.63	$11.73	$46.35	$19.30	$65.65

Q. WHAT ADDITIONAL COSTS NEED TO BE CONSIDERED WHEN EVALUATING MIDWEST ISO WIND?

A. There are two alternatives to be considered for Midwest ISO wind: 1) Energy-Only resource; and 2) Energy and Capacity resource. If Ameren Missouri were to take Midwest ISO wind as an Energy-Only resource, then it would have to add capacity in the form of additional combustion turbines. If, instead, Ameren Missouri were to take Midwest ISO wind as an Energy and Capacity resource, then it would have to add firm transmission service for the delivery of that capacity to its load.

1. <u>ENERGY-ONLY RESOURCE</u>

Q. WHAT IS AN ENERGY-ONLY RESOURCE?

A. An energy-only resource is one for which the utility foregoes the capacity of that resource and does not take firm transmission service.

Q. WHAT IS THE ADDED COST IF WIND LOCATED WITH THE MIDWEST ISO IS TAKEN BY AMEREN MISSOURI AS AN ENERGY-ONLY RESOURCE?

A. In order to compare energy-only wind resources to the Kansas Wind + DC Transmission, both alternatives need to be evaluated in terms of equivalent generation capacity levels. To make this calculation consistent with comparisons already made to Combined Cycle generation, the energy-only wind resource would need to add the full capacity of the Combined Cycle unit but at the cost of a Combustion Turbine unit. The following table shows this comparison for a range of capacity factors for energy only wind resources located within the Midwest ISO.

Levelized Costs for Energy Only from Wind and Capacity from Combustion Turbines

Capacity Factors	Capacity Costs	O&M Expense	Levelized Costs	Capacity Adder	Total	Difference
30%	$57.71	$11.73	$69.44	$36.07	$105.51	($17.86)
MO 30%	$46.17	$11.73	$57.89	$45.09	$102.99	($15.34)
35%	$49.47	$11.73	$61.19	$31.22	$92.41	($4.76)
40%	$43.28	$11.73	$55.01	$27.58	$82.58	$5.06
45%	$38.47	$11.73	$50.20	$24.74	$74.94	$12.71
50%	$34.63	$11.73	$46.35	$22.48	$68.83	$18.82
Kansas DC	Does Not Include Losses				$87.65	

Q. WHAT IS THE SIGNIFICANCE OF THE DIFFERENCES SHOWN BETWEEN KANSAS WIND + DC TRANSMISSION AND ENERGY-ONLY WIND LOCATED IN THE MIDWEST ISO?

A. First, a capacity factor above 35% is needed in order for energy-only wind located in the Midwest ISO to be competitive with Kansas Wind + DC Transmission. Second, an Energy-Only resource is not eligible for receiving an allocation of Financial Transmission Rights. This means that Ameren Missouri would receive the locational marginal price (LMP) for the energy from the energy-only resource at the location of that resource, and would pay the LMP at the locations of their loads. The difference between these two prices times the

energy from the energy-only resource (the congestion costs) would be paid by Ameren Missouri to the Midwest ISO if the price at the generator is below the price at the load. The previous table shows the dollars per MWh available to Ameren Missouri for the average annual differences between the prices at the energy only wind resource and its load.

Q. ARE THE DIFFERENCES FROM $5/MWh TO JUST UNDER $19/MWh SUFFICIENT TO COVER POTENTIAL CONGESTION COSTS?

A. While congestion costs are very specific to the locations of the generator and load, an analysis of the clearing prices for the Midwest ISO's FTR markets show a very high probability that the differences are sufficient to cover congestion costs. Seasonal FTRs are bought and sold for peak and off-peak periods. The following table shows the results from the 2013 markets over all four seasons. This table gives the number of FTRs sold in 2013 that are between the $/MWh shown in the first column for each corresponding capacity factor.

Annual 2013 FTR Results

$/MWh	50% CF	45% CF	40% CF
$18.82	30	38	45
$12.71	49	56	90
$5.06	594	685	744
$2.50	910	983	1,062
$0.00	37,358	37,179	37,000
Total	38,941	38,941	38,941
% Below	**99.92%**	**99.76%**	**97.74%**

The cells with the reddish hue show the number sold that would not have been covered by the cost difference between Kansas Wind + DC Transmission and Energy-Only wind from the Midwest ISO. The bottom row shows the percent of FTRs for which the cost differences

would more than cover the cost of the FTRs. The worst case scenario is 40% capacity factor wind which has the lowest percentage of cases covered; yet, even in that case, the percentage of FTRs transacted that would be covered by the cost difference is just under 98%.

Q. DOES THIS PROVIDE SUFFICIENT EVIDENCE THAT KANSAS WIND IS NOT LIKELY TO BE COMPETITIVE WITH WIND LOCATED IN THE MIDWEST ISO?

A. From an economic perspective, yes it does. However, if Ameren Missouri is required to take firm transmission service from its wind resources, then one must consider the added cost of transmission rather than the added cost of generation capacity.

2. <u>AC FIRM TRANSMISSION SERVICE</u>

Q. IN THE MIDWEST ISO IS THERE AN ADDED TRANSMISSION COST FOR RESOURCES LOCATED OUTSIDE THE UTILITY'S TRANSMISSION ZONE?

A. If the utility wants firm transmission service from any resource, it is possible that some additional transmission charges could be added to the utility. Those charges will vary by location, and this is important as resources located outside the utility's transmission zone are likely to have larger additional transmission charges than those located with the utility's transmission zone.

Q. DO YOU HAVE AN ESTIMATE OF ADDED TRANSMISSION CHARGES FOR AC WIND ALTERNATIVES?

A. Because firm transmission service is resource and load specific, it is not possible to provide a definitive estimate. However, I can provide information about transmission planning that is useful for purposes of estimating a reasonable range for these added transmission costs.

AC transmission service is provided in the Midwest ISO through zonal and region-wide rates. These rates collect the annual revenue requirements for the existing transmission

system in each year. As transmission is added, the annual revenue requirements for the new investment will be added to those of the existing system. Therefore, it is important to understand how investment in new transmission occurs.

The Midwest ISO performs transmission planning on a regular basis. In order to simplify generic terms are used to describe the transmission planning process (various RTO's use different technical terms).

1. **Generation Interconnection:** Generation owners request to be connected to the transmission system, and the RTO determines if upgrades are needed to maintain the reliability of the transmission system. The Generators must pay for these upgrades upfront, but are eligible for refunds over time.
2. **Resource and Load Integration:** With the addition of new generation resources and new load, the RTO determines what upgrades are needed to maintain reliability of the transmission system, meet public policy needs or improve the efficiency of the regional markets.
3. **Transmission Service Requests:** Transmission customers request additional firm transmission service (point-to-point or network service), and the RTO determines if upgrades are needed to maintain the reliability of the transmission system. The transmission customers are directly assigned the cost of these upgrades, and in some RTOs are eligible for refunds as these upgrades are used to meet the transmission needs of future transmission service requests.

Q. HOW DO THESE THREE PLANNING PROCEDURES APPLY TO THE QUESTION OF ADDED AC TRANSMISSION COST FOR WIND LOCATED OUTSIDE OF AMEREN MISSOURI'S TRANSMISSION ZONE?

A. First, it is important to understand that Generation Interconnection and Resource and Load Integration cost apply to all generation resources. The primary purpose of Resource and Load Integration is to provide an overall optimal power network. Thus, RTO's must anticipate where new generation resources and loads are most likely to be located, and design the system to best integrate those added resources and loads into the regional power market. Generation Interconnection costs will depend on the robustness of the transmission system in the vicinity of where the resources are located, which depends on how well the RTO is able to forecast the future location of these resources. While these costs can vary by various configurations of resource and load locations, there is no reason to believe Generation Interconnection costs will vary because new resources are located within a transmission zone (close to the load) compared to being located outside a transmission zone (distant from the load). While it may seem that Resource and Load Integration costs would be less for generation resources located close to load, keep in mind that RTOs run energy markets that optimize the use of generation resource across the entire footprint. In order to optimize the use of generation resources (even if located within load zones), the RTO must add transmission to reduce the congestion that exists between load zones. Thus, any cost advantage of locating resources close to loads is reduced by the addition of transmission to reduce market congestion.

This leaves Transmission Service Requests for firm transmission service. Whether a new resource is located within a utility's zone or outside that zone, if the utility wants to designate that resource for network transmission service, it must submit a request to the RTO and the RTO determines whether or not upgrades are needed.

Q. WOULDN'T A TRANSMISSION SERVICE REQUEST NEED TO BE SUBMITTED FOR ALL RESOURCES REQUESTING FIRM TRANSMISSION SERVICE?

A. Yes, a transmission service request would need to be submitted for Kansas Wind + DC Transmission as well as for Midwest ISO wind. However, there is likely to be a higher cost for firm transmission service from a resource located outside the utility's transmission zone than for a resource located within the utility's transmission zone.

This difference is recognized in the Southwest Power Pool where a safe harbor amount of $180,000/MW of generation capacity is used to capture the typical cost of designating a new resource for firm network transmission service located within the utility's transmission zone. In the SPP, the utility will only be directly assigned costs that exceed this safe harbor limit. The rationale behind the safe harbor limit is that transmission service for designated network resources located outside the utility's transmission zone are likely to be more costly, and the utility should be directly assigned these additional costs rather than allowing those costs to be rolled into transmission rates. These are the added costs that should be considered for wind located outside of Ameren Missouri's transmission zone.

Q. WHAT IS THE MINIMUM LEVEL OF ADDED AC TRANSMISSION COST TO MAKE THE DC TRANSMISSION NEEDED?

A. First notice that the Kansas Wind + DC Transmission cannot meet the Missouri renewable energy requirements unless it has production tax credits. Assuming there are production tax credits, the following table shows what the added transmission costs would have to be to make the Kansas Wind project competitive with AC wind projects.

Minimum Added Transmission Costs

Capacity Factors	PTC	Total	Total	% of DC $/MWh
30%	$16.51	$85.59	NC	NC
MO 30%	$16.51	$82.22	NC	NC
35%	$16.51	$72.57	NC	NC
40%	$16.51	$62.81	$8.33	37.85%
45%	$16.51	$55.21	$15.92	72.38%
50%	$16.51	$49.13	$22.00	100.00%
Kansas DC	$16.51	$71.13	$22.00	

Notice that with production tax credits (PTC) of $16.51/MWh, the Kansas Wind + DC Transmission's cost drops to $71.13/MWh. Also, notice that, without any added transmission costs, wind having capacity factors above 35% are lower cost than wind from the Kansas Wind + DC Transmission. Taking the difference in these costs gives the maximum added transmission costs that the various alternatives can have and still be competitive with the Kansas Wind + DC Transmission. These calculations were made without losses, implicitly assuming the losses on all wind projects would be comparable. AC wind at 40% capacity factor would be less expense than Kansas Wind + DC Transmission if the added AC transmission costs are no more than 38% of the DC transmission costs. At a 45% capacity factor this ceiling increases to 72%, at 50% capacity factor the ceiling is 100% of the transmission cost for the Clean Line DC transmission project.

Q. ARE SUCH HIGH ADDED AC TRANSMISSION COSTS LIKELY?

A. The cost of the AC to DC convertors at the source and the DC to AC convertors at the sink make up approximately 25% of the total cost of the Grain Belt DC transmission line. AC transmission does not require convertors, thus it is not likely that added AC transmission would cost as much as DC Transmission.

3. ADDED AC TRANSMISSION COSTS FOR MIDWEST ISO WIND

Q. CAN YOU CALCULATE A POSSIBLE ADDED COSTS FOR WIND LOCATED OUTSIDE OF AMEREN MISSOURI'S TRANSMISSION ZONE?

A. Each case for transmission service is different and depends on the circumstances at a specific location. However, using the SPP $180/kW as a safe harbor for firm transmission service from a designated resource located within the utility's transmission zone, if the cost for firm transmission service outside the zone was two and one half this level, the total cost would be $450/kW, which is approximately 74% of the cost of the Clean Line DC transmission (i.e., the cost of the Clean Line DC transmission project minus the cost of the DC-AC and AC-DC convertors). Comparing this to the $180/kW for firm transmission within the utility's transmission zone, the added cost would be $270/kW. I would consider $270/kW an upper bound on added costs and $180/kW a lower bound. Since $270/kW is an investment cost, it needs to be levelized to make a comparison. Those levelized costs, including 5% losses, are shown on the following table where transmission costs are added to levelized wind costs without and with the production tax credit.

Levelized Cost with Incremental Transmission at $270/kW

Capacity Factors	Inc Trans Costs	LCOE with Δ Transmission	
		Without PTC	With PTC
30%	$13.57	$121.05	$103.67
35%	$11.63	$105.41	$88.03
40%	$10.18	$93.67	$76.29
45%	$9.05	$84.55	$67.17
50%	$8.14	$77.25	$59.86
DC	$23.16	$92.26	$74.88

Without the production tax credit, the addition of incremental transmission costs and 5% losses move the capacity factor needed for wind energy to be no more than $5/MWh above

Combined Cycle generation at $91/MWh from 35% to just over 40%. With the production tax credit, AC delivered wind having just above a 40% capacity factor is more cost effective than Kansas Wind + DC Transmission.

Q. WHAT DOES THIS COMPARISON OF MIDWEST ISO WIND TO KANSAS WIND + DC TRANSMISSION SHOW CONCERNING THE NEED OF THE DC TRANSMISSION FOR MEETING MISSOURI RENEWABLE ENERGY REQUIREMENTS?

A. While the $270/kW is an estimate, it shows the potential for non-Missouri wind located in the Midwest ISO region to meet the requirements of Missouri statutes on renewable energy requirements even without production tax credits. On the other hand, Kansas Wind + DC Transmission cannot meet the requirement of Missouri statutes absent the production tax credit. Based on a reasonable estimate for added transmission costs for wind located in the Midwest ISO footprint, but not in Missouri, wind having capacity factors in the range of above 40% are more cost-effective alternatives than Kansas Wind + DC Transmission.

Q. WHAT DOES THIS COMPARISON OF MIDWEST ISO WIND TO KANSAS WIND + DC TRANSMISSION SHOW CONCERNING THE ECONOMIC VIABILITY OF KANSAS WIND + DC TRANSMISSION?

A. There is little question that with environmental restrictions on air pollutants becoming stronger that energy from renewable resources will become very important for replacing fossil fuel generation. However, all utilities, investor-owned, municipals and co-operatives will want to acquire energy from wind resources at the lowest possible cost. The comparison of Kansas Wind + DC Transmission to Midwest ISO wind clearly indicates that Midwest ISO wind is the lower cost alternative.

II. REBUTTAL OF THE DIRECT TESTIMONY OF GARY MOLAND

A. OVERVIEW

Q. WHAT PORTIONS OF GARY MOLAND'S DIRECT TESTIMONY ARE YOU ADDRESSING?

A, Mr. Moland's direct testimony is very short, and I will be addressing his entire testimony.

Q. WHAT IS THE STATED PURPOSE OF MR. MOLAND'S DIRECT TESTIMONY?

A. Mr. Moland presents the assumptions and results of a model used to measure the economic and environmental impacts of the DC Transmission project.

Q. BRIEFLY, WHAT ARE MR. MOLAND'S FINDINGS?

A. Mr. Moland finds that by adding the wind generation from the DC Transmission projects, wholesale electricity prices for energy drop in Missouri, lower overall production costs and reduce emissions.

Q. DO YOU HAVE ANY DISAGREEMENT WITH THESE FINDINGS?

A. No, I do not. It is a well-accepted fact in the electricity industry that energy from wind will lower prices, production cost and emissions. Mr. Moland's study simply confirms that fact. However, had Mr. Moland performed a similar study with wind energy from the Midwest ISO region, he would have made similar findings.

Q. DID MR. MOLAND PROVIDE ANY COMPARISONS TO WIND ENERGY FROM THE MIDWEST ISO?

A. No, he did not. Instead at page 5 of his direct testimony Mr. Moland argues *"This benefit study is unique in that the economic feasibility of the Project and the new wind generation resources that will utilize it are directly intertwined, such that one cannot be reasonably modeled without the other. The Project serves no purpose without the new wind resources*

and the new wind resources would not be developed without the transmission access afforded by the Grain Belt Express Project."

Q. DO YOU DISAGREE WITH MR. MOLAND'S ARGUMENT?

A. If Mr. Moland had instead said that *"Kansas wind energy cannot be physically delivered to the destinations in Missouri and Indiana except by a DC Transmission project,"* I would agree with him. DC transmission that is directly connected to generation does provide for the delivery of the energy physically produced at the generation source minus transmission losses.

However, I found his statement to be somewhat misleading and confusing. Moreover, Mr. Moland provides no evidence to support his claim that the new wind resources in Kansas would not be developed absent the DC Transmission project. Even if his statement were true, it only bears on this case to the extent that Kansas Wind + DC Transmission is the most overall cost-effective way of meeting Missouri's renewable energy needs.

On the other hand, if Mr. Moland's statement is meant to imply that other new wind resources in the Midwest ISO cannot be developed to meet the need for renewable energy in Missouri, then I totally disagree.

B. STUDY FUTURES AND ASSUMPTIONS

Q. DO YOU AGREE WITH THE STUDY FUTURES USED IN MR. MOLAND'S STUDY?

A, I did not totally agree with some of his futures. I did agree with his treatment of wind to meet state mandates in three of his futures (Business as Usual, Slow Growth and Robust Economy). Mr. Moland then includes a Green Economy future with Carbon cap and trade and federal renewable energy standards. I would have preferred the three futures described

previously in my testimony related to government policy: 1) Business As Usual; 2) Likely Changes; and 3) Aggressive Changes. If a slow or robust economy is used, I would have added the slow economy to the government policy in business as usual (which is what Mr. Moland did), but for the robust economy future I would have used the government policy in the likely changes future. Finally, the addition of the PATH transmission project to the east coast in the robust economy future appears to make sense as it was cancelled because of low load growth. However, as an analyst I would want to confirm the cost-effectiveness of this project before including it in a future.

Q. DID YOU AGREE WITH MR. MORLAND'S MODEL ASSUMPTIONS?

A. Mr. Moland uses Ventex's modeling data for generation, load and fuel cost forecasts, and updated information on the existing and proposed upgrades to the transmission system. Ventex data is recognized in the industry as a reasonable data source, and I have no reason to disagree with this data or the data used for the transmission system.

C. METRICS FOR MEASURING ECONOMIC BENEFIT

Q. WHAT METRICS DID MR. MOLAND USE FOR HIS ECONOMIC ANALYSIS?

A. Mr. Moland used: 1) the wholesale electricity cost to Missouri loads; 2) the production costs of generators in eastern US; and 3) the wholesale electricity prices in Missouri.

Q. ARE THESE THE USUAL METRICS USED FOR EVALUATING ECONOMIC BENEFIT?

A. No, they are not. Both the Southwest Power Pool and the Midwest ISO use the Adjusted Production Cost (APC) metric to measure economic benefit between a base and change case. APC can be measured for a grouping as small as a utility's transmission zone (e.g., Ameren Missouri) or several utilities within a single transmission zone. APC can also be measured

for a grouping as large as an RTO (e.g., Midwest ISO) or groupings of RTOs. While it can be applied to a state, this is usually done by applying to utilities and then allocating the results to multiple states served by utilities.

APC is made up of three components: 1) Production Costs; 2) Purchased Power Costs (Purchases) from energy purchased by the utility from the RTO energy market; and 3) Revenues from Sales (Sales) of energy by the utility to the RTO energy market; where APC = Production Costs + Purchases – Sales. These three components are calculated each hour for each utility. Energy purchased or sold is calculated as the difference between the utility's load and its generation. Purchases are monetized using the prices paid by the load, and sales are monetized using the prices paid to generators.

Q. WHY IS THE APC METRIC USED BY RTOS?

A. Using APC as a metric allows RTOs to measure the economic benefits specific to each zone within the RTO as well as the overall economic benefits to their footprint.

Q. HOW WOULD USING THE APC METRIC HAVE IMPROVED MR. MOLAND'S MEASURES OF BENEFITS?

A. Had Mr. Moland used the APC metric he would have been able to measure the specific benefits to Ameren Missouri as well as the other utilities in Missouri.

D. METRICS USED FOR ENVIRONMENTAL BENEFITS

Q. WHAT METRICS DID MR. MOLAND USE FOR ENVIRONMENTAL BENEFITS?

A. Mr. Moland used: 1) SO_2; 2) NO_x; 3) Hg; 4) CO_2; and 5) H_2O usage.

Q. WHAT WERE MR. MOLAND'S FINDINGS?

A. Mr. Moland found that all emission and water usage were reduced with the introduction of added wind generation.

Q. DO YOU AGREE WITH MR. MOLAND'S FINDINGS?

A. As stated previously, it is an accepted fact in the electric industry that emissions and water usage will decrease with added wind generation. This is because wind generation has the lowest energy costs, is therefore loaded before fossil generation and reduces emissions and water usage associated with fossil generation. What might be of greater interest is whether wind generation from within the Midwest ISO has the same impact?

Q. CAN THESE REDUCTIONS IN EMISSION AND WATER USAGE BE MEASURED FOR SPECIFIC UTILITIES?

A. Yes. Both emissions and water usage is generation plant specific, and by measuring these metrics for each utility's generators and reductions can be determined on a utility-by-utility basis. What would have been of interest is whether the DC Transmission project results in greater reductions in emissions and water usage for Missouri utilities when compared to wind generation from the Midwest ISO located outside of Missouri.

III. RECOMENDATIONS

Q. WHAT IS YOUR RECOMMENDATION TO THE MISSOURI COMMISSION?

A. As an economist, I must evaluate all of the potential benefits of Kansas Wind + DC transmission against the potential costs. A possible indirect benefit of Kansas Wind + DC transmission is that it provides an alternative source of renewable energy. However, my rebuttal testimony demonstrates that under reasonable assumptions and forecasts Kansas Wind + DC transmission would not be competitive with other alternatives available to Ameren Missouri to meet its need for energy and capacity, including meeting its renewable energy requirements from Missouri legislation. Thus, at best, the availability of what is likely to be a less than competitive alternative is a marginal benefit.

Comparing the marginal benefit of the Kansas Wind + DC transmission to the cost for Missouri land owners who would have to give up portions of their properties to provide the land needed to bring the DC project to fruition, my recommendation to the Commission is to deny the applicant's request for a certificate of convenience and necessity ("CCN") to operate in the state of Missouri.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Grain Belt Express Clean Line LLC for a Certificate of Convenience and Necessity Authorizing it to Construct, Own, Operate, Control, Manage, and Maintain a High Voltage, Direct Current Transmission Line and an Associated Converter Station Providing an interconnection on the Maywood-Montgomery 345 kV Transmission Line	)	Case No. EA-2014-0207

AFFIDAVIT OF MICHAEL S. PROCTOR

STATE OF MISSOURI)
) **ss**
COUNTY OF COLE)

Michael S. Proctor, being first duly sworn on his oath, states:

1. My name is Michael S. Proctor. I am currently an independent consultant. My home address is 2172 Butterfield Drive, Maryland Heights, MO 63043.

2. Attached hereto and made a part hereof for all purposes is my Rebuttal Testimony on behalf of Show Me Concerned Landowners, consisting of 42 pages, all of which have been prepared in written form for introduction into evidence in the above-referenced docket.

2. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and accurate to the best of my knowledge, information and belief.

Michael S Proctor
Michael S. Proctor

Subscribed and sworn to before me this 9th day of September, 2014.

Pamela S. Backers
Notary Public

My commission expires: 7/12/18

Pamela S. Backers
Notary Public - Notary Seal
STATE OF MISSOURI
Cole County
Commission # 14398160
My Commission Expires 7/12/2018