

**STATE OF ILLINOIS**

**ILLINOIS COMMERCE COMMISSION**

**Grain Belt Express Clean Line LLC )  
)  
Application for an Order Granting Grain Belt Express )  
Clean Line LLC a Certificate of Public Convenience )  
and Necessity pursuant to Section 8-406.1 of the Public )  
Public Utilities Act to Construct, Operate and Maintain )  
a High Voltage Electric Service Transmission Line and )  
to Conduct a Transmission Public Utility Business in )  
Connection Therewith and Authorizing Grain Belt )  
Express Clean Line Pursuant to Sections 8-503 and )  
8-406.1(i) of the Public Utilities Act to Construct the )  
High Voltage Electric Transmission Line. )**

**Docket No. 15-0277**

**REBUTTAL TESTIMONY OF**

**DAVID BERRY**

**ON BEHALF OF**

**GRAIN BELT EXPRESS CLEAN LINE LLC**

**GRAIN BELT EXPRESS EXHIBIT 11.13**

**August 7, 2015**

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1                                   **I.       Witness Introduction and Purpose of Testimony**

2   **Q.     Please state your name, present position and business address.**

3   A.     My name is David Berry. I am the Executive Vice President – Strategy and Finance of  
4           Clean Line Energy Partners LLC (“Clean Line”). Clean Line is the ultimate parent  
5           company of Grain Belt Express Clean Line LLC (“Grain Belt Express”), the Petitioner in  
6           this proceeding. My business address is 1001 McKinney Street, Suite 700, Houston,  
7           Texas 77002.

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

9   A.     Yes, I previously submitted prepared direct testimony identified as Grain Belt Express  
10          Exhibit 11.0 and accompanying exhibits identified as Grain Belt Express Exhibits 11.1  
11          through 11.12.

12   **Q.     What is the purpose of your rebuttal testimony?**

13   A.     My testimony responds to issues raised in the testimonies of witnesses representing  
14          Illinois Commerce Commission (“Commission”) Staff and landowner groups  
15          participating in this docket.

16   **Q.     Please summarize your testimony.**

17   A.     My testimony is organized into three parts:

- 18           •   **Section II** discusses the need for the Grain Belt Express Project (the “Project”) to  
19           transport low-cost renewable energy from western Kansas to Illinois, Indiana and  
20           other states that demand such energy. While the Project is not intended to remedy  
21           a specific electric reliability shortfall in Illinois, it is indispensably necessary for  
22           wind generators in Western Kansas to access markets in Illinois and elsewhere in  
23           the MISO and PJM regions. Further, renewable portfolio standards (“RPS”) in

24 Illinois and other states, along with other drivers of demand, make the Project a  
25 needed addition to the electric grid.

26 • **Section III** addresses how Grain Belt Express will finance the Project without any  
27 adverse consequences. I reiterate Grain Belt Express' willingness to agree to the  
28 condition presented in my direct testimony, and recommended by Ms. Janice  
29 Freetly of Commission Staff. The condition requires Grain Belt Express to file  
30 financing agreements that cover the full Project cost prior to installing physical  
31 facilities on landowner property in Illinois.

32 • **Section IV** addresses the cost-effectiveness of the Project, and how the Project  
33 promotes the development of an effectively competitive electricity market that  
34 operates efficiently, is equitable to all customers and is the least cost means of  
35 meeting these objectives. In particular, I respond to Staff witness Mr. Richard  
36 Zuraski's questions on Grain Belt Express' economic modeling in this  
37 proceeding. I also provide a critique of the alternative economic analysis  
38 prepared by Landowners Alliance of Central Illinois ("LACI") witness Dr.  
39 Michael Proctor. My testimony shows that when corrected, Dr. Proctor's model  
40 actually supports the cost-effectiveness of the Project.

41 **Q. In addition to your prepared rebuttal testimony, which is identified as Grain Belt**  
42 **Express Exhibit 11.13, are you presenting any other rebuttal exhibits?**

43 A. Yes, I am presenting additional exhibits identified as Grain Belt Express Exhibits 11.14  
44 through 11.19, which were prepared under my supervision and direction.

45 **II. The Project Meets the Need for Transmission Service to Move Low-Cost**  
46 **Wind Generation to Illinois and Other States**

47 **a. Response to Staff Witnesses Mr. Yassir Rashid**

48 **Q. Staff witness Yassir Rashid testifies that, from an electric reliability standpoint, the**  
49 **Project is not “necessary to provide adequate, reliable, and efficient service to Illinois**  
50 **ratepayers.” (Staff Ex. 1.0, p. 8) What is your response?**

51 **A.** Mr. Rashid does not dispute the fact that Grain Belt Express’s loss of load expectation  
52 (“LOLE”) study (Grain Belt Express Ex. 6.0) shows that the Project will improve  
53 resource adequacy and electric reliability. Mr. Rashid points out, however, that the  
54 LOLE study does not show that this improvement in reliability “justifies the \$2.2 billion  
55 price tag of the project.” But the purpose of an LOLE analysis is not to justify the cost of  
56 the Project; rather, its purpose is to quantify the Project’s reliability effects. The LOLE  
57 analysis shows that the Project provides a substantial reliability benefit by reducing the  
58 probability of a loss of load by over 20%. (*Id.*, p. 11) This is an appropriate benefit for  
59 the Commission to consider, along with the other benefits described by Grain Belt  
60 Express witnesses. Other analyses, presented in the testimony of other Grain Belt  
61 Express witnesses and in my testimony, compare the cost of the Project to alternatives.

62 Mr. Rashid goes on to suggest that the Project is not “necessary to provide adequate,  
63 reliable, and efficient service to the public utility’s customers”-- one of two alternative  
64 criteria under Section 8-406.1(f)(1) of the Illinois Public Utilities Act. Mr. Rashid  
65 interprets the statutory criterion to mean that (1) the Project must cure a specific  
66 reliability deficiency and (2) the benefit from curing the reliability deficiency exceeds the  
67 Project’s costs. However, the statutory criterion is that a project is “necessary to provide

68 adequate, reliable and efficient service to the public utility's customers." 220 ILCS 5/8-  
69 406.1((f)(1). Grain Belt Express' customers are the shippers that use the Project, which  
70 are likely to be wind generators in western Kansas and entities purchasing electricity  
71 from them. These customers have no other viable alternative to the Project to obtain  
72 "adequate, reliable and efficient" transmission service to move low-cost wind power from  
73 western Kansas to Illinois and neighboring states.

74 **b. Response to LACI Witness Ms. Kendra Davis**

75 **Q. LACI witness Ms. Davis contends that the Project is not necessary because of**  
76 **Ameren's Illinois Rivers transmission line. (LACI Ex. 2.0, p. 7) Do you agree?**

77 A. No. The Illinois Rivers transmission line is one of MISO's Multi Value Projects  
78 ("MVP"). As I discussed in my direct testimony at pages 27-29, the MISO MVP lines do  
79 not address the need for transmission service from western Kansas wind generators nor  
80 do they address the need in PJM for renewable energy. The Grain Belt Express Project  
81 addresses both of these needs. Further, the Illinois Rivers transmission line is included in  
82 the analyses conducted by Mr. Robert Cleveland and Dr. Karl McDermott in their direct  
83 testimonies (Grain Belt Express Ex. 3.0 and 4.0). Even with the Illinois Rivers line  
84 already in service, Mr. Cleveland's and Dr. McDermott's analyses show large economic  
85 benefits from the Project, in the form of substantial price reductions in the Illinois  
86 electricity market.

87 **c. Response to Intervenor Witness Mr. Michael Severson**

88 **Q. In his direct testimony, Michael Severson argues that Illinois is not actually**  
89 **experiencing growth in the demand for electricity from renewable resources, due to**  
90 **problems with the Illinois RPS. What is your response?**

91 A. In this section of my testimony, I will provide a response to each of Mr. Severson's  
92 points, showing that his statements about the Illinois RPS not working are exaggerated.  
93 But as an initial matter, I do not agree that any current "glitches" in the operation of the  
94 Illinois RPS eliminate the need for the Project or show that there is not a need for  
95 increased supplies of low-cost renewable energy in Illinois. As Mr. Severson repeatedly  
96 points out, energy and RECs are often bought and sold separately. A decreased demand  
97 for RECs does not remove the demand for lower cost energy.

98 As I discussed in my direct testimony at pages 21-24, numerous other factors  
99 support the demand for the low-cost energy generated by high capacity factor wind  
100 resources, such as those the Project will connect to the Illinois electricity market. The  
101 final Section 111(d) rule on carbon dioxide emissions from power plants, issued on  
102 August 3, 2015, calls for Illinois to reduce, by 30%, its total power plant carbon  
103 emissions by the year 2030 (as compared to 2012); alternatively, Illinois could reduce the  
104 rate of power plant emissions per MWh by 44%.<sup>1</sup> Other environmental regulations are  
105 making it more expensive to operate and generate electricity from fossil-fueled power  
106 plants—making electricity from renewable resources even more competitive. Renewable  
107 energy is now cost-competitive against other new sources of generation and projected  
108 market prices for power. Aside from cost, there are benefits in buying the energy  
109 generated by renewable energy resources, even if the RECs were not needed. Renewable

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<sup>1</sup> The final rule will be published shortly in 40 CFR Part 60. Available at <http://www2.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants#rule-history>. Hereinafter "Final Clean Power Plan Rule".

110 energy is not subject to fuel-price volatility, does not have fuel-supply concerns from  
111 railroad or pipeline constraints, and improves air quality. Even if the Illinois RPS were to  
112 prove partially ineffective, none of these factors which help to drive the demand for  
113 electricity from renewable resources would disappear.

114 **Q. Is Mr. Severson correct, at p. 12 of his direct testimony, that the growth of**  
115 **municipal aggregation in Illinois has diminished the demand for RECs?**

116 A. No. Under the Illinois process, a municipality conducts a referendum to authorize the  
117 municipality to choose an alternative retail electric supplier (“ARES”) to be the default  
118 electricity supplier rather than the incumbent electric utility. The result is that a  
119 sometimes significant group of customers switches suppliers, increasing the ARES’  
120 market share and decreasing the incumbent utility’s share of load. However, this switch  
121 in suppliers does not eliminate RPS requirements applicable to any of the load being  
122 served.

123 Both incumbent utilities and ARES are subject to the Illinois RPS. With respect  
124 to the applicable RPS percentage of their load, ARES must either (1) procure renewable  
125 resources or RECs or (2) make alternative compliance payments (“ACP”) to the Illinois  
126 Power Agency (“IPA”) for the IPA to use to procure RECs. Therefore, municipal  
127 aggregation does not ultimately change the amount of RECs or renewable energy that  
128 must be procured by load serving entities (or the IPA) to meet the RPS requirement. On  
129 the contrary, and as discussed in my direct testimony at pages 15-16, in many cases the  
130 municipality imposes a requirement that the ARES must procure renewable resources in  
131 excess of the RPS requirement, which means that the municipal aggregation actually  
132 increases the demand for renewable resources.

133 **Q. Why does Mr. Severson think that the migration to ARES reduces the number of**  
134 **RECs that must be purchased?**

135 A. Mr. Severson gives two reasons. First, he states that ARES can “self-supply” renewable  
136 resources. (MEZ Ex. 1.0, p. 12) The ARES could either own a wind farm or other  
137 qualifying renewable resource or purchase the renewable energy and/or RECs from the  
138 owner of the wind farm or other renewable resource. But this possibility does nothing to  
139 reduce the demand for renewable energy or RECs. The ARES just procures the  
140 necessary RECs through direct ownership of, or purchase from, the producing source.  
141 Nothing prevents an ARES from buying energy and RECs delivered by wind generators  
142 on Grain Belt Express, or even owning connected wind farms in western Kansas.

143 Second, Mr. Severson points out that ARES must make ACPs to the IPA equal to  
144 50% of their RPS obligations, and can elect to make additional ACP’s in lieu of  
145 purchasing RECs. Again, this changes the mechanism by which RECs are purchased—  
146 the IPA is to purchase the RECs using the ACP funds instead of the ARES purchasing the  
147 REC directly. But it does not change the total amount of RECs to be purchased.

148 **Q. What about the technical glitch in the RPS law, described by Mr. Severson, which**  
149 **has limited REC purchases by the IPA?**

150 A. As I understand it, the IPA has taken the view that, due to limitations in the statute, it can  
151 only procure RECs using the ACPs it has collected from ARES in connection with a  
152 separate procurement of renewable resources for ComEd or Ameren, the incumbent  
153 electric utilities. Due to municipal aggregation and other load switching from ComEd  
154 and Ameren to ARES, in several recent years there has not been a need for a renewable

155 resources procurement event for the electric utilities. Therefore, there has been no way  
156 for the IPA to purchase RECs using the ACP funds.

157 We should not assume, however, that this glitch will last forever. As Mr.  
158 Severson acknowledged, the Illinois General Assembly has seen several attempts to fix  
159 this glitch in the RPS law. The simplest fix would do nothing more than authorize the  
160 use of already collected ACP funds for their intended purpose. Bills introduced in the  
161 General Assembly during 2015 that would revise the Illinois RPS and eliminate this  
162 obstacle include HB 2607/SB 1485 and HB 3328/SB 1879. It is reasonable to believe  
163 that a fix will occur prior to the Project's projected in-service date of 2019 or 2020.

164 Further, the substantial switch of customers from the electric utilities to ARES  
165 through municipal aggregation programs was driven in large part by a temporary price  
166 difference. The market electricity prices at which ARES could supply power were lower  
167 than the prices the electric utilities charged their eligible retail customers--which  
168 incorporated costs of older, legacy power supply contracts with higher supply prices.  
169 These legacy contracts have now largely expired, and the price difference between utility  
170 service and ARES service has largely disappeared. As a result, a substantial number of  
171 customers are switching back from ARES to ComEd and Ameren, and some  
172 municipalities are electing to suspend or abandon their aggregation programs as they no  
173 longer see the opportunity for significant cost savings for their citizens. The City of  
174 Chicago is the most prominent example of a municipality that adopted an aggregation  
175 program, obtained ARES contracts to supply its citizens, but has now reverted back to  
176 ComEd as the provider of last resort. This "re-migration" lowers the amount of ACPs  
177 paid to the IPA, which would be subject to the glitch described above. The re-migration

178 also accelerates the date at which the IPA will need to conduct a procurement event for  
179 renewable resources or RECs on behalf of ComEd and Ameren, and in connection with  
180 this procurement for the utilities, IPA could also conduct a REC procurement using its  
181 ACP funds.

182 Further still, and as I noted above, ARES only are required to make ACPs for  
183 50% of their RPS demand.<sup>2</sup> For the other 50% of the ARES' RPS obligation, the ARES  
184 can choose to purchase RECs. If there is an abundant supply of low-cost wind energy  
185 from the Project and other sources, I expect that ARES could buy RECs for a lower price  
186 than the ACP, as the ACP is based on the price paid by the IPA to buy RECs on behalf of  
187 ComEd and Ameren. ARES are profit-maximizing entities seeking to supply their  
188 customers at the lowest possible cost in a competitive environment, so there is every  
189 reason to expect they will buy RECs if it is more affordable than paying the ACP. As I  
190 described in my direct testimony at page 16, the ARES are not subject to the same  
191 geographic preference for Illinois or adjacent states. RECs from the wind energy  
192 delivered by the Project into PJM and MISO will be registered in the PJM or MISO REC  
193 tracking system, which qualifies these RECs for the ARES to use to comply with the  
194 RPS.

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<sup>2</sup> Some of the legislative proposals would alter or eliminate the portion of the ARES' RPS obligation that they would be required to meet through ACPs. For example, HB 3328/SB 1879 would require ARES to meet 75% of their RPS obligation relating to the load of customer classes that have not been declared "competitive" (primarily residential customers), but would not require ARES to make ACPs for any portion of their RPS obligation relating to the load of customers in classes that have been declared competitive. HB 2607/SB 1485 would eliminate the RPS for ARES and would instead require the electric utilities to procure RECs to meet the RPS requirement for the entire delivery services load in their service areas.

195 **Q. Mr. Severson points out that the IPA entered into some long-term power purchase**  
196 **agreements (“PPAs”) with wind farms in 2010. Is this significant for estimating**  
197 **future demand under the RPS? (MEZ Ex. 1.0, p. 14)**

198 A. The 2010 long-term PPAs cover only a portion of the utilities’ RPS requirements. For  
199 example, I understand that the energy contracted to be supplied to ComEd through the  
200 long-term PPAs represented about 3% of ComEd’s forecasted energy requirements to  
201 serve its eligible retail customers.<sup>3</sup> For the reasons discussed above, ComEd’s eligible  
202 retail customer load has declined, but the point is that the long-term PPAs are contracts to  
203 supply a finite portion of the utilities’ RPS requirements. Customers that have switched  
204 to ARES from ComEd still will require renewable energy or RECs to meet the applicable  
205 RPS requirement. Under the Illinois RPS, the renewables requirement steps up over time  
206 to a maximum of 25% in 2025, creating increasing demand for renewable energy and  
207 RECs over the next 10 years. Because the demand is increasing, the existing long-term  
208 PPAs will meet less of the overall need.

209 **Q. Is Mr. Severson correct that the Illinois RPS has a preference for generation located**  
210 **in Illinois or adjacent states?**

211 A. This preference, which I acknowledged in my direct testimony, applies to the RPS  
212 obligations of ComEd and Ameren. However, as I noted above, this geographic

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<sup>3</sup> ICC Docket 3-0546, Order on Rehearing (June 17, 2014), at 20.

213 preference does not apply to RECs purchased by ARES. Moreover, if purchasing RECs  
214 from adjoining states is not cost-effective,<sup>4</sup> the IPA can look to lower-cost sources.

215 As I discussed in my direct testimony, the REC market is regional. An abundant  
216 supply of RECs in the region will reduce prices for RECs in Illinois and adjacent states,  
217 because these prices are linked to prices in other neighboring states. Even if ComEd and  
218 Ameren do not actually purchase RECs from the wind generators connected to the  
219 Project due the RPS' geographic preference, their customers can benefit from lower REC  
220 prices caused by the Project enabling an abundant supply of low-cost RECs.

221 **Q. How do you respond to Mr. Severson's contention that the Project is not the least-**  
222 **cost way to meet the Illinois RPS? (MEZ Ex. 1.0, p. 19)**

223 A. In Section IV of my direct testimony, I addressed the question of least cost by comparing  
224 the cost of electricity delivered by the Project to the cost of electricity generated by wind  
225 farms in Illinois. I found that the energy delivered by the Project is lower cost. A lower  
226 cost of generating renewable energy leads to a lower cost of RECs because more of the  
227 project costs can be recovered from selling energy and capacity at a given market price,  
228 leaving a smaller amount that must be covered by REC sales. Mr. Severson provides no  
229 evidence to dispute my analysis. He merely points out the large cost of the Project in

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<sup>4</sup> As defined in the Illinois statute, in-state or "adjacent" state RECs are not "cost-effective" if their purchase would cause the RPS rate cap to be exceeded (as happened in a recent year) or if they exceed benchmark prices for renewable resources in the region established by the IPA's procurement administrator in conjunction with the IPA staff, Commission Staff and the procurement monitor and subject to review and approval by the Commission. 20 ILCS 3855/1-75(c)(1).

230 absolute dollars, but the Project also provides a large supply of low-cost power and  
231 RECs.

232 Mr. Severson has it backwards. The Project's large size is actually a large reason  
233 for its cost-effectiveness. A large HVDC line moves many times more power than a set  
234 of smaller, less expensive AC lines, and offers a cheaper cost of transmission. Dr. Galli  
235 performs this comparison on pages 12-14 of his direct testimony.

236 **Q. Is Mr. Severson correct that there is nothing to prevent Grain Belt Express from**  
237 **altering its plans in the future to recover the costs of the Project from Illinois**  
238 **ratepayers? (MEZ Ex. 1.0, p. 20)**

239 A. No. Regional transmission organization ("RTO") cost allocation is the only feasible  
240 process through which an interstate transmission line like the Project can recover its costs  
241 from ratepayers. A condition on Grain Belt Express' certificate, proposed in my direct  
242 testimony at page 69, states that Grain Belt Express will not recover its costs from Illinois  
243 ratepayers through RTO cost allocation processes or similar processes without first  
244 obtaining the Commission's approval in a new proceeding that Grain Belt Express would  
245 initiate. While we do not expect to initiate a new proceeding related to cost allocation, if  
246 one did occur, we would expect to be required to demonstrate to the Commission that any  
247 costs recovered from Illinois retail ratepayers would be outweighed by benefits to those  
248 customers.

249 **Q. Mr. Severson criticizes Staff witness Mr. Zuraski for stating that Grain Belt Express**  
250 **cannot recover costs from ratepayers. (MEZ Ex. 3.0, p. 7-8) Is his criticism valid?**

251 A. No. Again, Mr. Severson ignores the cost allocation condition I discussed above. Grain  
252 Belt Express has agreed not to recover costs directly from retail ratepayers without

253 coming back for a new proceeding to modify its certificate to allow this. Mr. Severson  
254 appears to say that ratepayers will still pay for the Project indirectly through retail prices,  
255 but this is an incomplete and misleading statement.

256 Whether through a specific power purchase agreement or through the MISO and  
257 PJM power pools, the electricity delivered by the Project will be purchased by load  
258 serving entities that will then resell the electricity to retail customers. (Some of the  
259 electricity may be purchased directly by retail customers, as I explained in my direct  
260 testimony.) Load serving entities will make a payment to the sellers of this energy, who  
261 in turn will use that payment to pay for transmission service on the Project. As I show in  
262 section IV of my direct testimony and section IV of this testimony, the projected  
263 proceeds from selling energy delivered by the Project into the PJM market are sufficient  
264 to cover the cost of delivering power on the Project, including the cost of generation and  
265 the cost of transmission.

266 In the above example, load serving entities (and by extension, their retail  
267 customers) are indirectly paying for transmission service on the Project, but this payment  
268 works to their benefit. The load serving entity's actual costs are based on some  
269 combination of (1) the price paid for energy delivered by the Project (which is lower than  
270 alternative sources of supply) and (2) the market price paid for electricity (which, as Dr.  
271 McDermott and Mr. Cleveland show in their direct testimonies, are lower because of the  
272 Project). Because the load serving entity is paying less (and able to charge its customers  
273 less) than if the Project were not built, the load serving entity's retail customers see lower  
274 bills.

275 **Q. What is your response to Mr. Severson’s claim that Illinois retail customers will end**  
276 **up paying for the transmission line because retail suppliers will simply pass through**  
277 **the charges they pay to Grain Belt Express? (MEZ Ex. 1.0, p. 21-22)**

278 A. I am unaware that retail electric suppliers commonly pass through, as a separate “add-on”  
279 expense, the costs of transmission for a particular source of power supply (such as the  
280 transmission cost for electricity generated by the Kansas wind farms). But the billing  
281 arrangement is beside the point. The Project offers retail electricity providers who do  
282 purchase transmission capacity on or energy delivered by the Project an opportunity to  
283 buy delivered energy at a lower cost (*i.e.*, power supply costs plus Grain Belt Express  
284 transmission cost) than is otherwise available. In a competitive market, retail providers  
285 in turn will pass these savings on to their retail customers. How retail providers bill their  
286 lower costs to customers (whether by a single all-in price or by separately billing energy  
287 and transmission charges) does not alter the fact that the customers realize savings from  
288 the Project. Further, as I noted above, the low-cost energy delivered by Grain Belt  
289 Express will lower wholesale prices for all retail providers, even those who do not  
290 purchase transmission capacity on or energy delivered by the Project.

291 **Q. If retail customers are not the direct customers of the Project, does that mean that**  
292 **Grain Belt Express just serves the interests of western Kansas wind generators or**  
293 **Illinois retail providers? (MEZ Ex. 2.0, p. 3, 7-8)**

294 A. No. If suppliers of electricity can find lower cost ways to serve load, either through  
295 cheaper generation or procurement options, then they are able to lower costs to  
296 customers. In a competitive market, most of these savings will flow through to  
297 consumers, but even if wind generators or retail electric suppliers keep some of the

298 surplus created by the Project's lower-cost supply, the benefits to consumers will remain  
299 substantial.

300 **Q. What about the possibility, described by Mr. Severson, that Grain Belt Express**  
301 **follows the lead of Exelon in seeking State-mandated subsidies to compensate for**  
302 **low market prices? (MEZ Ex. 3.0, p. 6-7)**

303 A. This possibility is far-fetched. Grain Belt Express is not in same position as Exelon to  
304 request (and potentially obtain) legislatively-enacted State-mandated subsidies. Grain  
305 Belt Express is not seeking any State subsidies or State-mandated subsidies; and as I have  
306 explained, Grain Belt Express has agreed not to recover costs through federally-regulated  
307 RTO cost allocation without coming back to the Commission for permission to do so.

308 **Q. In light of the variability of wind generation, is it "absurd," as Mr. Severson**  
309 **suggests, that Grain Belt Express and its connected wind farms would be able to**  
310 **schedule energy and deliver it in Illinois when it is needed? (MEZ Ex. 1.0, pp. 17-18)**

311 A. No, not at all. The MISO and PJM power pools, to which Grain Belt Express will  
312 deliver, today manage over 16,000 MW of wind power. MISO and PJM balance this  
313 variability with other, dispatchable resources. This existing wind power is consumed, in  
314 real-time, by customers who are using electricity. MISO and PJM have not experienced  
315 any significant problems with grid stability due to higher levels of wind power, despite  
316 Mr. Severson's undocumented claim otherwise. (*Id.*, p. 23)

317 In focusing on wind power's variability, Mr. Severson fails to distinguish between  
318 wind power forming part of a generation portfolio and wind generation being the only  
319 source of power. I agree that it would be problematic to serve all of a large load only  
320 with wind power. But serving part of a given load with wind power is technically

321 feasible, and in the case of high capacity factor wind power, economically beneficial.  
322 Further, Mr. Severson appears to claim that consumers do not actually use renewable  
323 energy because they just purchase RECs. He is mistaken. Every time a REC is  
324 generated, a MWh of electricity must be generated, and someone actually has to buy and  
325 someone has to use the electricity associated with the REC.

326 Mr. Severson apparently does not understand the controllable nature of HVDC  
327 lines. At page 18 of his direct testimony, he contends that congestion, electrical  
328 impedance, voltage fluctuations and loop flows limit the ability of the Project to actually  
329 deliver power to MISO and PJM. These are concerns on the AC system, but the Project's  
330 HVDC line itself is fully controllable. The Project's technology actually can move wind  
331 energy, as generated, to the MISO and PJM market. This is a substantial benefit from  
332 using HVDC that Mr. Severson ignores.

333 **Q. Is Mr. Severson correct that wind energy does not replace conventional generation**  
334 **on a MWh for MWh basis? (MEZ Ex. 1.0, p. 23)**

335 A. No. By definition, wind energy must displace other sources on a MWh for MWh basis.  
336 At any point in time total generation less electric losses must equal total load. This is the  
337 equation that the MISO and PJM power pools must always keep in balance. While it is  
338 true that wind power, because of its variability, cannot totally displace conventional  
339 generation, it can replace part of that generation and in the process reduce fuel  
340 expenditures to generate electricity, reduce electric prices and reduce emissions.

341 Mr. Cleveland's PROMOD analysis (Grain Belt Express Ex. 3.0) models the  
342 security-constrained economic dispatch of MISO and PJM. It also takes into account the  
343 variability of wind power, the ramping constraints of other generators, and the need to

344 keep generation and load in balance. The PROMOD analysis shows that the wind power  
345 delivered by the Project can displace other, more expensive generators, to the benefit of  
346 the public in the form of lower wholesale electric prices.

347 **Q. Why can't Illinois customers just buy RECs, eliminating the need for new**  
348 **transmission infrastructure? (MEZ Ex. 1.0, pp. 25-26)**

349 A. Again, there is no way to generate a REC without a place for a renewable generator to  
350 interconnect and a way to move its power to a buyer. The better the market to which the  
351 renewable generator can connect (i.e., the higher the revenues it can obtain from  
352 electricity sales into that market), the fewer dollars the generator needs from REC sales—  
353 which drives down REC prices. The SPP market is smaller, less liquid and lower-priced  
354 than the MISO and PJM markets to which the Project delivers. Later in this testimony, in  
355 my response to Dr. Michael Proctor, I describe why it would be economically and  
356 technically infeasible to connect over 4,000 MW of new generation to the existing grid in  
357 western Kansas.

358 **Q. Do the renewable energy demand forecasts you presented in your direct testimony**  
359 **need to be modified due to geographic and technological restrictions in state RPS**  
360 **laws? (MEZ Ex. 1.0, pp. 22-23)**

361 A. My calculations did not account for geographic or technological restrictions, because  
362 their purpose was to illustrate the significant regional demand for renewable energy and  
363 RECs. The regional demand is relevant because RECs are a regional market. The supply  
364 and demand of renewable energy and RECs throughout MISO and PJM affects the  
365 availability and the price of renewable energy and RECs in Illinois. Further,  
366 technological restrictions do not change the overall size of the market, and most RPS

367 demand can and will be met by the lowest-cost renewable energy technology, which is  
368 high capacity factor wind energy like that delivered by the Project.

369 Even when technological and geographic restrictions are explicitly considered, the  
370 wind energy delivered by Grain Belt Express can meet a substantial portion of the  
371 regional RPS demand. I provide an estimate of that demand in Grain Belt Express  
372 Exhibit 11.14. In this exhibit, I counted only those RPS for which the wind energy  
373 delivered by the Project would create eligible RECs that load serving entities could use to  
374 comply with the RPS. I excluded all demand that requires a specific technology other  
375 than wind energy, and I excluded all demand with geographic restrictions that exclude the  
376 Project's delivered energy from western Kansas generators. In some states, such as  
377 Michigan, a portion of the RPS can be met with energy delivered by the Project, but the  
378 remaining amount of the RPS must be met by resources with a geographic restriction that  
379 excludes the Project's delivered energy. In these states, I counted only the demand that  
380 could be met by the Project. This exhibit shows an estimated 106.8 million MWh  
381 demand for RECs in MISO and PJM states in 2020, and 136.4 million MWh of demand  
382 by 2025, which are eligible to be met by the delivered renewable energy and RECs from  
383 the Grain Belt Express Project.

384 As I noted on page 21 my direct testimony, total renewable energy generation in  
385 the MISO and PJM states during 2014 was 85.6 million MWh. Wind generation in  
386 western MISO states comprised over 43% of this amount,<sup>5</sup> and this generation is

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<sup>5</sup> Data from the Energy Information Administration ("EIA"), based on wind generation in Iowa, Minnesota, North Dakota, South Dakota and Montana. Data available at

387 ineligible to meet many of the RPS that Grain Belt Express can help meet because it  
388 physically delivers energy to PJM.<sup>6</sup> Therefore, there will be a significant RPS demand  
389 for renewable energy and RECs from the Grain Belt Express, in excess of current  
390 generation supply, which Grain Belt Express is eligible to meet.

391 **Q. Is it “naïve,” as Mr. Severson suggests, to claim that Grain Belt Express won’t**  
392 **reduce power prices in Illinois, because overall prices are rising? (MEZ Ex. 1.0, pp.**  
393 **24-25)**

394 A. No. The relevant point is not whether power prices will increase or decrease in absolute  
395 terms, but that across a wide range of assumptions, the Project results in reduced prices as  
396 compared to prices without the Project. In his direct testimony, Mr. Cleveland modeled  
397 four different assumptions scenarios of future demand and market conditions in his  
398 PROMOD analysis. These scenarios included ranges of assumptions on fuel prices and  
399 the presence of emission pricing. The analysis showed that the decrease in wholesale  
400 power prices from the Project is robust across a number of scenarios—meaning  
401 wholesale power prices are lower with the Project than without. The Project provides  
402 significant wholesale price reduction benefits, regardless of the overall trend in prices.

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<http://www.eia.gov/electricity/data/browser/#/topic/0?agg=2.0.1&fuel=06d8&geo=0005vmudl04&sec=g&freq=A&start=2001&end=2014&ctype=linechart&ltype=pin&rtype=s&pin=&rse=0&maptype=0>.

<sup>6</sup> The Pennsylvania, New Jersey, Maryland, Washington DC and Delaware RPS all require either physical delivery to PJM or an interconnection with PJM.

403 **Q. Will Grain Belt Express have monopoly-pricing power, as Mr. Severson suggests,**  
404 **because western Kansas wind generators have no other way to get their power to**  
405 **market? (MEZ Ex. 1.0, p. 26)**

406 A. No. First, Mr. Severson's testimony is internally contradictory. Mr. Severson also states  
407 that Kansas wind generators could profitably connect to the existing transmission system  
408 and sell their power in western Kansas. Both claims cannot be true, because if generators  
409 had a cheaper, alternative transmission solution to the Project, they would use it, and  
410 would not be captive customers of Grain Belt Express.

411 Second, in order to obtain negotiated rates, Grain Belt Express had to make a  
412 showing to FERC that it did not have market power. Grain Belt Express' transmission  
413 rates are overseen by FERC, and any customer could file a rate complaint. This  
414 possibility will discipline any exercise of pricing power that Grain Belt Express may  
415 have.

416 Third, the Project's order of operations of development is that western Kansas  
417 wind generators will sign long-term transmission service agreements (10 years or longer)  
418 with Grain Belt Express before they build their generation projects. This will lock in  
419 their rate for a long period. Either the rate will be fixed over the contract term or it will  
420 have specified, predictable periodic escalators. Grain Belt Express could not change this  
421 rate mid-course. Further, the long-term price that Grain Belt Express can charge will be  
422 constrained by the market price of energy and RECs and the cost of alternative generation  
423 sources.

424 **Q. Do you agree with Mr. Severson that because the Illinois market is already**  
425 **competitive, the Project is unneeded? (MEZ Ex. 1.0, p. 26)**

426 A. No, this is not a reasonable view. It applies the Public Utilities Act in a way that makes it  
427 impossible to add beneficial projects simply because a market is already functioning  
428 adequately. Further, this interpretation ignores the fact that to remain competitive, a  
429 market must always evolve and allow new entrants that provide lower-cost supply.

430 The Commission recently addressed this question in the Grand Prairie Gateway  
431 transmission line certificate case, Docket 13-0657. The Commission stated that it  
432 believed Illinois was currently part of an effectively competitive market; however, in  
433 evaluating ComEd's proposed transmission project, the Commission did not stop there.  
434 The Commission stated that even if a competitive market exists, projects that introduce  
435 new efficiencies to the market can meet the statutory criterion of promoting the  
436 development of an effectively competitive electricity market.<sup>7</sup> Grain Belt Express has  
437 demonstrated it adds new efficiencies by lowering power prices, adding a significant new  
438 supply of low-cost generation, reducing overall fuel expenditures and hedging against  
439 fuel cost volatility, reducing the variability of wind resources through geographic  
440 diversification, and reducing fossil fuel emissions.

441 **d. Response to CCPO Witness Natalie Locke**

442 **Q. Ms. Locke states that Grain Belt Express has “admitted” that carbon-emitting**  
443 **sources of energy will flow on the line. (CCPO Ex. 6.0, p. 18) What is your response?**

444 A. Ms. Locke provides no citation for her claim, but I can only assume she refers to the fact  
445 that the Project cannot deny service to a fossil-fueled generator due to FERC open access

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<sup>7</sup> ICC Order in Docket No. 13-0657. pp. 21-22.

446 obligations. But that does not mean it is likely or plausible that a fossil-fueled generator  
447 will buy service. As I showed in my direct testimony at pages 8-9, economics work  
448 against using the Project to ship natural gas-fired power from western Kansas to PJM. It  
449 is cheaper to burn the gas closer to load, rather than convert the gas to electricity in  
450 western Kansas and ship the electricity to PJM on the Project.

451 Almost all of the thermal power plants in western Kansas are owned by vertically-  
452 integrated utilities for the purposes of serving their own load. This includes the Holcomb  
453 coal-fired power plant mentioned specifically by Ms. Locke. The existing plant is owned  
454 by Sunflower Electric Cooperative and is approximately 80 miles from the Project's  
455 converter station location. Sunflower Electric Cooperative has discussed expanding the  
456 plant, but after almost a decade of litigation and debate, the expansion is still on hold.  
457 Neither the Holcomb plant nor any other fossil generator submitted a transmission service  
458 request to Grain Belt Express in the capacity solicitation I described in my direct  
459 testimony. Illinois and other states in MISO and PJM are seeing large numbers of coal  
460 retirements due to lower natural gas prices, the cost of complying with environmental  
461 regulation, and competition from lower-cost renewable energy. In light of these  
462 challenges for MISO and PJM coal plants with existing and already-paid-for transmission  
463 arrangements, it is unreasonable that coal generation in Kansas would see favorable  
464 economics when it must pay for transmission service on the Project. It is also  
465 unreasonable that a new coal plant, such as the Holcomb expansion, could be successful  
466 in MISO or PJM when already-paid for plants in those markets cannot.

467 **III. Grain Belt Express Can Successfully Finance the Project without Adverse**  
468 **Consequences**

469 **a. Response to Staff Witness Janice Freetly**

470 **Q. Is Grain Belt Express willing to accept the condition proposed by Commission Staff**  
471 **Janice Freetly in her verified statement (ICC Staff Ex. 3.0)?**

472 A. Yes. This condition, which matches the one proposed in my direct testimony, assures the  
473 Commission that before any physical construction of transmission structures occurs on  
474 easements in Illinois, Grain Belt Express will have the financing in place for the entire  
475 construction cost of the Project. I discussed this condition in greater detail on p. 84-88 of  
476 my direct testimony.

477 **b. Response to LACI Witness Dennis Sagez**

478 **Q. Mr. Sagez suggests that if a landowner or other party has a claim against Grain Belt**  
479 **Express, it will not have any assets against which to recover damages. (LACI Ex.**  
480 **1.0, p.3) What is your response?**

481 A. It is correct that Grain Belt Express has limited assets today. But before Grain Belt  
482 Express begins to actually perform physical construction to build the Project, it will have  
483 secured financing commitments to complete the Project, as required by the financing  
484 condition described above. When the Project is actually under construction or in  
485 operations, Grain Belt Express will own a substantial infrastructure project with assets  
486 and financial commitments of over two billion dollars, and with substantial contracted  
487 cash flows. Any landowners with legitimate claims for damages that Grain Belt Express  
488 fails to pay could recover against these assets and cash flows. Further, during  
489 construction and operations, Grain Belt Express will maintain substantial property,

490 casualty and liability insurance coverage, not only because this is a prudent business  
491 practice but also because it will be a requirement of the Project's lenders.

492 **Q. Mr. Sagez goes on to suggest that Grain Belt Express should provide additional**  
493 **detail about the cost to develop the Project and which investors will provide it.**  
494 **(LACI Ex. 1.0, p. 6) Can you provide additional detail?**

495 A. Yes. It will cost Grain Belt Express approximately \$13 million to finish developing the  
496 Project, including obtaining all the necessary permits. Grain Belt Express will then need  
497 to expend about \$50 million on pre-construction activities such as right-of-way  
498 acquisition and final engineering, before it raises the permanent equity and debt capital  
499 for the Project. These pre-construction expenditures will need to be funded by equity  
500 investment (although some pre-construction expenditures may be reimbursed to the  
501 equity investors upon the close of permanent financing).

502 Clean Line, Grain Belt Express' parent company, recently secured a new,  
503 additional investor, Bluescape Resources ("Bluescape"). Through a subsidiary,  
504 Bluescape will invest an initial \$17 million in Clean Line, which will be used to develop  
505 the Grain Belt Express Project and Clean Line's other projects. Bluescape also has the  
506 option to invest an additional \$33 million in Clean Line. In addition, Clean Line could  
507 obtain additional equity financing from its other two major equity investors, ZAM  
508 Ventures or National Grid USA, or Clean Line could bring on additional equity investors,  
509 as we have been able to do in the past. As Clean Line's projects achieve additional  
510 regulatory, permitting and commercial milestones and thus achieve greater certainty of  
511 execution, it will become progressively easier to attract capital to the business.

512 **Q. Mr. Sagez also suggests that Grain Belt Express should provide more detail about**  
513 **wind developer interest in the Project and the level of commitment. (Sagez Direct,**  
514 **p. 7-8) Can you provide this detail?**

515 A. Yes. Grain Belt Express Exhibit 11.15 is a table listing the respondents to Grain Belt  
516 Express's 2015 capacity solicitation described in my direct testimony. Each of these  
517 respondents has provided Grain Belt Express with a requested amount of service (the  
518 total requests were over 20,000 MW), a term of service (all requests were for at least 20  
519 years), a price for service (all but one price submission was within the range suggested by  
520 Grain Belt Express), and a proposal on certain other business terms. These shippers also  
521 have expressed their desire to negotiate a transmission service agreement with Grain Belt  
522 Express, and Grain Belt Express has begun initial negotiations with shippers towards  
523 such commitments. However, before it can enter into definitive transmission service  
524 contracts, Grain Belt Express needs to have established a construction schedule and in-  
525 service date and an approved route, among other things, which require the receipt of  
526 regulatory approvals including the requested authority from this Commission

527 **c. Response to CCPO Witnesses Natalie Locke and Kendall Cole**

528 **Q. At page 25 of her direct testimony, Ms. Locke criticizes Clean Line for forming**  
529 **multiple limited liability companies ("LLC") through which to own its projects.**  
530 **Why has Clean Line formed these companies?**

531 A. First, I note that Grain Belt Express Clean Line LLC, the Applicant in this proceeding,  
532 will own the entirety of the Project and is already a public utility (or the equivalent) in  
533 Kansas and Indiana. Grain Belt Express Clean Line LLC will own all of the Project's  
534 assets, hold all of the Project's contracts, and be party to the easement agreements on all

535 property on which it owns structures. For some other Clean Line projects, it has been  
536 necessary to form subsidiaries to receive utility status in multiple states, based on the  
537 laws in those states. Clean Line formed Plains and Eastern Clean Line Oklahoma LLC to  
538 apply for public utility status in the State of Oklahoma, while its sister company Plains  
539 and Eastern Clean Line LLC is the public utility in Tennessee.

540 Another reason for forming a single purpose company to own each project is that  
541 this is the preferred financing structure for project lenders and investors, who do not wish  
542 to be exposed to any risks or liabilities from projects other than the risks associated with  
543 the project that is the subject of their investment. I discuss this preference in my direct  
544 testimony at p. 73-74. For the Grain Belt Express Project, we have also created a holding  
545 company, Grain Belt Express Clean Line Holdings LLC, for the purposes of owning  
546 equity interests in the Applicant in this proceeding, Grain Belt Express Clean Line LLC.  
547 This allows for additional flexibility in the debt and equity financing of the Project,  
548 because investors could purchase equity and debt in the holding company, and the  
549 holding company could contribute the funds to the Applicant. Clean Line has  
550 implemented similar holding company structures for its other transmission line projects.  
551 This holding company structure is commonly used and accepted in project finance and in  
552 the capital markets generally.

553 **Q. Ms. Locke also claims that Grain Belt Express intends to sell easements to National**  
554 **Grid prior to constructing the Project. (CCPO Ex. 6.0, p. 9) Is there any truth to**  
555 **her claim?**

556 A. No. Grain Belt Express has no intention to sell any easements to National Grid. Nor  
557 would the sale make any sense. Grain Belt Express's easements are limited to the

558 purposes of building, owning and operating the Project. Grain Belt Express, not National  
559 Grid, is asking the Commission for the right to build, own and operate the Project in  
560 Illinois. National Grid would not be able to build the Project unless it requested and  
561 obtained a certificate in its own name. National Grid would have no interest in acquiring  
562 transmission easements for a line it is not authorized to build.

563 The only evidence Ms. Locke provided in support of this claim was testimony by  
564 Clean Line president Michael Skelly and Rudolph Wynter of National Grid in the Rock  
565 Island case before the Commission.<sup>8</sup> In that testimony, Mr. Skelly and Mr. Wynter stated  
566 that National Grid USA had the option to invest additional equity, and acquire the  
567 existing equity interests, in Rock Island Clean Line LLC. This option has since been  
568 modified, and it never applied to any of the assets, including the easements, of any Clean  
569 Line subsidiary. The option only applied to acquisition of the equity interests in the  
570 project companies.

571 **Q. Mr. Kendall Cole asserts that the Project's real purpose is to supply electricity to**  
572 **National Grid. (CCPO Ex. 4.0, p. 1) What is your response?**

573 A. This assertion is not correct. National Grid USA serves electric customers in the New  
574 York and New England regional grids, which are not part of MISO or PJM, where the  
575 Project will deliver power. National's Grid retail customers and wholesale operations are  
576 located a great distance from the Project's delivery points. National Grid did not submit  
577 a transmission service request in Grain Belt Express' capacity solicitation, and if it ever

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<sup>8</sup> CCPO Response to Grain Belt Express Data Request 1.23.

578 did submit a request, which I consider highly unlikely, the request would be treated like  
579 any other request and subject to FERC oversight pursuant to federal transmission open  
580 access rules.

581 **Q. Has Grain Belt Express included the cost of network upgrades in its estimate of the**  
582 **Project cost? (CCPO Ex. 6.0 p. 15)?**

583 A. Yes. Ms. Locke states, without citation, that the Missouri Public Service Commission  
584 found otherwise.<sup>9</sup> However, Grain Belt Express has always included network upgrade  
585 costs in its economic analyses at both the Missouri Public Service Commission and in  
586 this proceeding.

587 **IV. The Project Promotes the Development of an Effectively Competitive**  
588 **Electricity Market and Is Lower Cost than Feasible Alternatives**

589 **a. Response to Staff Witness Richard Zuraski**

590 **Q. In his direct and rebuttal testimonies, Mr. Zuraski offers his opinion that the Grain**  
591 **Belt Express Project will promote the development of an effectively competitive**  
592 **electricity market because it is lower cost than alternatives. What is your response?**

593 A. I agree with his conclusion. In this proceeding, Grain Belt Express prepared levelized  
594 cost of energy (“LCOE”) and present value revenue requirements (“PVRR”) based on  
595 Mr. Zuraski’s approach in the Rock Island proceeding. Mr. Zuraski subsequently  
596 performed his own analysis, discussed in his rebuttal testimony, which resulted in the  
597 same conclusion.

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<sup>9</sup> I assume she is referring to paragraph 35 of the Missouri Public Service Commission Order, which stated that transmission upgrades in addition to the \$2.2 billion construction estimate for the Project will be necessary to connect the Project to MISO and PJM and that “the cost of these transmission upgrades is currently unknown.”

598 **Q. Did Mr. Zuraski suggest that you make any changes to your economic modeling?**

599 A. Yes, Mr. Zuraski suggested that I add property taxes after year ten of the operations of  
600 Kansas wind generators. I had originally modeled that these generators are exempt for  
601 the life of their operations. My assumption was correct at the time my direct testimony  
602 was filed, but the Kansas legislature subsequently scaled back the statutory property tax  
603 abatement.<sup>10</sup> I agree with Mr. Zuraski and also Dr. Proctor that this is an appropriate  
604 update to my model. (ICC Staff Ex. 3.0, p. 5; LACI Ex. 3.0, p. 6)

605 **Q. How does this change affect the results of your LCOE and PVRR analyses?**

606 A. Only slightly. I updated my LCOE and PVRR analyses using the property tax estimates  
607 for Kansas wind generation that Mr. Zuraski used in his rebuttal testimony. The LCOE  
608 of the energy delivered by Grain Belt Express increases in cost by approximately  
609 \$1/MWh. The LCOE and PVRR of Grain Belt Express' delivered energy remains lower  
610 cost than Illinois wind, a new combined cycle gas plant, and projected market prices from  
611 PJM in a very large majority of the scenarios studied. Grain Belt Express Exhibit 11.16  
612 provides additional detail on these results.

613 **Q. Did Mr. Zuraski have any other questions about Grain Belt Express' economic**  
614 **modeling?**

615 A. Yes. While Mr. Zuraski agreed with the conclusion of Grain Belt Express' analysis, he  
616 suggested that we attempt to incorporate the possibility that other generators modify their

---

<sup>10</sup> Kansas Senate Bill 91 became law on May 28, 2015. This enactment retains the property tax exemption for renewable energy sources to the first 10 years of their operation and afterward they are to be assessed as commercial property at 25% of their then current value.

617 investment decisions in response to lower wholesale power prices. In particular, he asked  
618 that Grain Belt Express examine the impact of lower prices on retirement decisions about  
619 Exelon's nuclear plants in Illinois.<sup>11</sup>

620 **Q. How has Grain Belt Express responded to Mr. Zuraski's question described above?**

621 A. In our rebuttal testimony, we have responded in four ways.

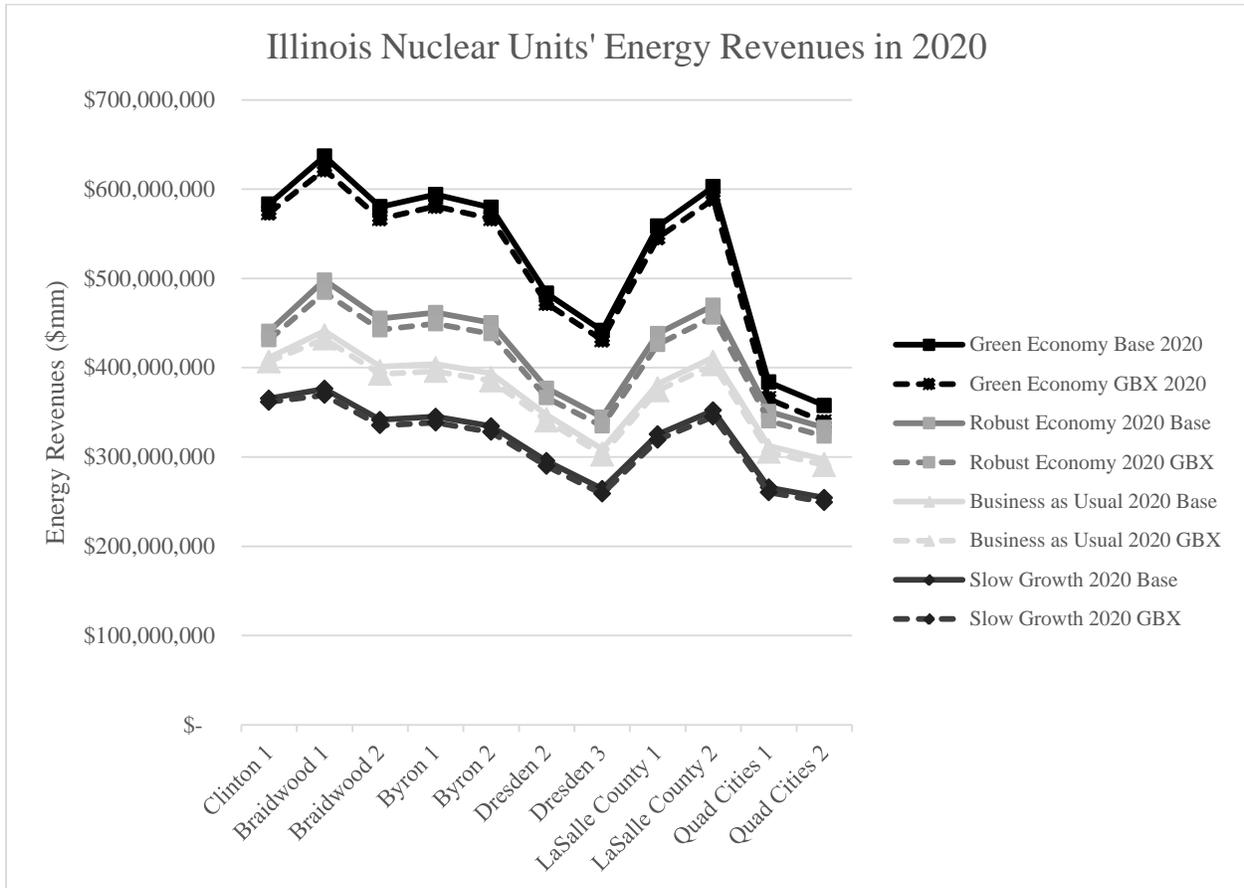
- 622
- 623 • In this section of my rebuttal testimony, I analyze the effect of the Project on  
624 Exelon's nuclear plants. I conclude that it is highly unlikely the Project would be  
625 a determinative factor in any retirement decisions.  
626
  - 627 • In Dr. McDermott's rebuttal testimony, he explains that changes in the behavior  
628 of other generators may reduce the number of years of wholesale power price  
629 savings, but the benefit remains significant.  
630
  - 631 • Also in this section of my rebuttal testimony, I explain the impact of fewer years  
632 of wholesale power pricing savings on my LCOE and PVRR analyses.  
633
  - 634 • In Dr. Loomis' rebuttal testimony, he explains that it would be problematic to  
635 attempt to measure the economic impact of the closure of the Exelon plants (even  
636 assuming such closures were "caused" by the Grain Belt Express Project), as it  
637 would be just one of many tertiary economic impacts from the Project.  
638

639 **Q. What is the effect of the Project on the wholesale energy revenues received by**  
640 **Exelon's nuclear plants in Illinois?**

641 A. Based on the PROMOD analysis performed by Mr. Cleveland in his rebuttal testimony  
642 (which he performed at my request), I analyzed the impact of the Project on the 2020  
643 energy revenues of all the nuclear plant in Illinois. The results of my analysis are shown  
644 below.

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<sup>11</sup> Mr. Zuraski indicated that he had no other specific power plants in mind that Grain Belt Express should study. (ICC Staff Response to Grain Belt Express Data Request 1.1)



645

646 **Q. What conclusions can be drawn from the graph?**

647 A. The graph shows all four assumption scenarios developed by Dr. McDermott and Mr.  
 648 Cleveland for the year 2020. The “Base” cases (solid lines) represent the energy  
 649 revenues for the Illinois nuclear units, by unit, without the Project. The “GBX” cases  
 650 (dotted lines) show the energy revenues for the Illinois nuclear units with the Project.  
 651 The difference between the two lines represents the nuclear plant’s decrease in revenue  
 652 based on the addition of the Project and the resulting lower wholesale power prices.

653 The effect of the Project on existing nuclear plants’ revenues is limited, a 1-2%  
 654 reduction in plant-level energy revenue. Further, the choice of assumption scenario has a  
 655 far greater impact on the nuclear plants’ revenues than the presence or the absence of the

656 Project. As detailed on Grain Belt Express Exhibit 3.2, each of the four assumption  
657 scenarios defines a set of fuel prices, emissions prices, load growth and other inputs to  
658 the PROMOD model. The change in energy revenues from one scenario to a different  
659 scenario is many times larger than the change from adding the Project in any scenario.  
660 This tells us that, compared to other factors, the Project should have a very limited, if  
661 any, impact on any retirement decisions made by Exelon. Any decision to retire a  
662 nuclear plant would be the result of a large number of cumulative factors, which could  
663 include the various external factors that define the four assumptions scenarios: low fuel  
664 prices, the absence of emissions pricing, slow load growth. Other external factors behind  
665 a retirement decision could include the absence of policy support, a decrease in capacity  
666 revenues or an increase in operating expenses.

667 **Q. In addition to the effect on energy revenues, are there other factors that should be**  
668 **considered in analyzing the economics of nuclear plants that might be retired?**

669 A. Yes. The key factor in retirement decisions is whether a plant can make net operating  
670 revenues—i.e., revenues reduced for fuel costs and other operating expenses. Financial  
671 analysts often call this measurement earnings before interest, income taxes and  
672 depreciation (“EBITDA”). EBITDA excludes the cost of debt financing because even if  
673 a plant cannot support its debt load or make distributions to equity shareholders, the debt  
674 and/or equity can be restructured and the plant can then continue to operate at a profit.  
675 EBITDA excludes the cost of plant depreciation because the capital cost of a nuclear  
676 plant is a sunk cost. Because they have already been expended, capital costs do not affect  
677 decisions about whether to keep a plant operating.

678 **Q. In addition to energy revenues, what other factors need to be calculated to**  
679 **determine the net operating revenues of a nuclear unit?**

680 A. In addition to energy revenues, a nuclear power plant relies on capacity payments from  
681 the market operated by the RTO. This increases net operating revenue. However, the  
682 plant must also pay its operating costs, including fuel costs, staffing, and other  
683 maintenance costs. Both of these factors should be included in determining net operating  
684 revenues.

685 **Q. Were you able to estimate the capacity payments and operating expenses for**  
686 **Exelon's Illinois nuclear plants?**

687 A. Yes, I was able to use capacity revenues from the most recent capacity auctions in MISO  
688 and PJM.<sup>12</sup> I consulted fleet-wide operating costs for Exelon's nuclear plants, as reported  
689 by Exelon in its recent securities filings, which averaged \$19 per MWh.<sup>13</sup> Data on the  
690 operating costs of Exelon's individual nuclear plants are not publicly available.<sup>14</sup>  
691 Therefore, I also examined the EIA's information on the average operational costs for

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<sup>12</sup> The clearing capacity price for the MISO-IL zone was \$150 per MW-day. <https://www.misoenergy.org/Library/Repository/Report/Resource%20Adequacy/AuctionResults/2015-2016%20PRA%20Results.pdf>. The clearing capacity price for the PJM was \$120 per MW-day. (<http://www.pjm.com/markets-and-operations/rpm.aspx>.)

<sup>13</sup> Exelon's 10-K, p. 131, available from their web site at <http://www.exeloncorp.com/performance/investors/secfilings.aspx>, reports a nuclear production cost of \$19.33 per MWh for its fleet. This includes fuel, labor, contracting and other miscellaneous costs.

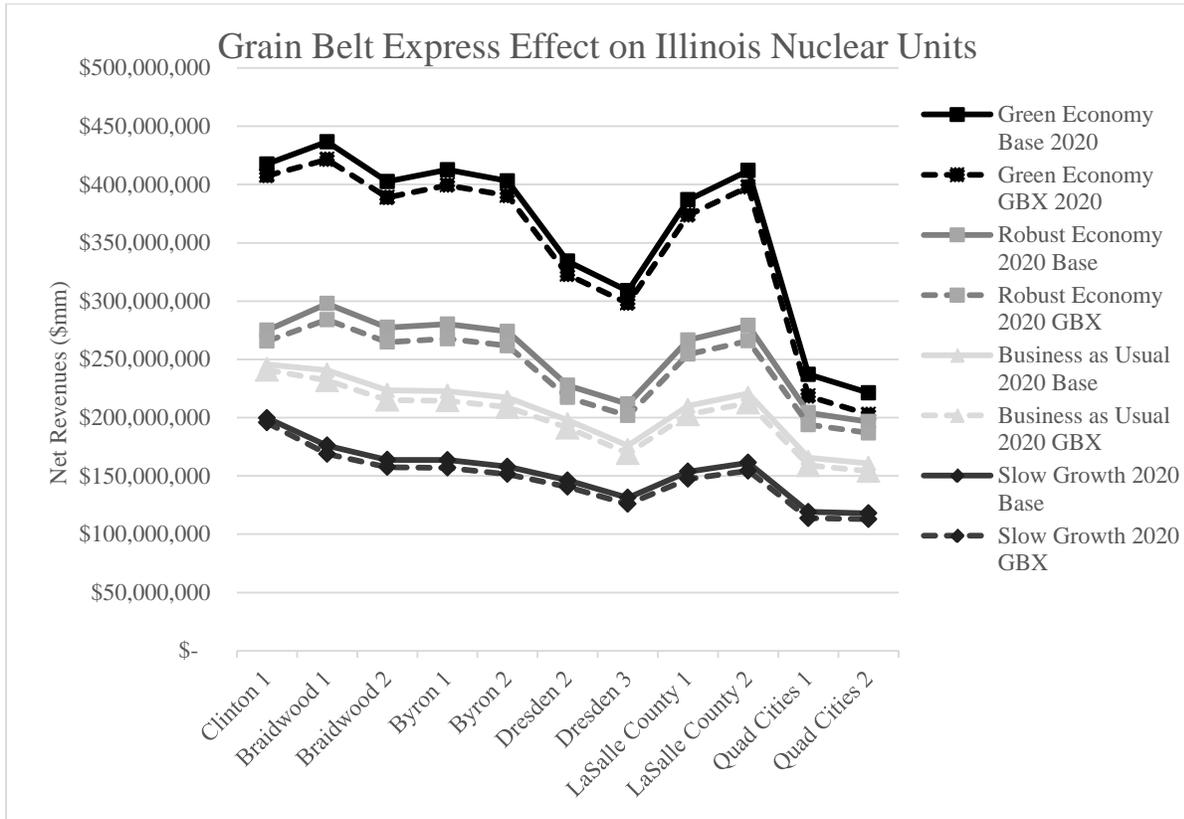
<sup>14</sup>A recent report by several Illinois government state agencies confirmed the absence of publicly available, unit-specific operating data at p. 28-29. (Hereinafter the "HR 1146 Report." Available at <http://www.icc.illinois.gov/electricity/hr1146.aspx>).

692 nuclear plants in the United States, which was \$25 per MWh.<sup>15</sup> To be more conservative,  
 693 I used the higher EIA figure as the basis of my analysis.

694 **Q. What did your analysis show?**

695 A. Adding in capacity revenue and subtracting estimated operating costs, I derived estimates  
 696 of these plants' net revenues, depicted below. I calculated these revenues without the  
 697 Project. Using the same assumptions and methodology, I then calculated the net  
 698 revenues with the lower wholesale power prices caused by the Project.

699



700

<sup>15</sup> Based on responses to the 2012 Form EIA-860 and as cited in the HR 1146 Report, p. 24.

701 **Q. What is your conclusion from the above graph?**

702 A. As with the prior graph, I show the net revenues for each nuclear unit under all four  
703 assumption scenarios. The solid lines represent the net revenues without the Project, the  
704 dotted lines represent the net revenues with the Project, and the differences between the  
705 solid and dotted lines represent the decrease in net revenues for the plant in a given  
706 assumption scenario due to the lower wholesale power prices caused the Project. Again,  
707 the Project has a relatively small impact. The lower wholesale power prices from the  
708 Project decreased net revenues by 3-4% at each generation plant. However, each plant  
709 was still able to make a net profit (even using the EIA figure for all U.S. nuclear plants'  
710 operating costs, which is 31% higher than the Exelon-specific cost data). This suggests  
711 that the risk of plant retirements being caused by the Grain Belt Express Project is small.

712 **Q. Is it possible that Exelon's nuclear generation units will receive additional support**  
713 **from market mechanisms or public policy, decreasing the chance that these plants**  
714 **will retire?**

715 A. Yes, there are three major areas in which Exelon has received or may receive additional  
716 support.

717 ○ PJM implemented reforms to its capacity markets to transition to a "Capacity  
718 Performance" system between now and 2020. FERC recently approved changes  
719 to the PJM capacity market that will provide higher payments to nuclear power  
720 plants, whose on-site fuel supply and high reliability make them a higher quality  
721 capacity product than many other generators.<sup>16</sup> Exelon will be able to obtain

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<sup>16</sup> Order on Proposed Tariff Revisions in Dockets ER15-623-000, EL15-29-000, ER15-623-001, and EL15-41-000 (June 10, 2015). 151 FERC ¶ 61,208. While FERC required PJM to make some additional changes to tariff language in a subsequent compliance filing, FERC accepted the core of PJM's Capacity Performance reforms.

722 higher revenues from selling into the Capacity Performance market beginning  
723 with the capacity auction later this year.

724  
725 ○ On August 3, 2015, the U.S. Environmental Protection Agency issued a final rule  
726 concerning regulation of carbon dioxide emissions from existing power plants  
727 under Section 111(d) of the Clean Air Act. The final Section 111(d) rule calls for  
728 Illinois to reduce its total power plant carbon emissions by 30% by 2030  
729 compared to 2012 (or alternatively, to reduce the rate of power plant emissions  
730 per MWh by 44%).<sup>17</sup> Importantly, the target for Illinois assumes that all nuclear  
731 plants remain in operation. Whether through a price on carbon in the wholesale  
732 market, a “cap and trade” program, or some other mechanism, the Section 111(d)  
733 regulation will boost the revenues of non-emitting nuclear power plants.

734  
735 ○ A statewide “low carbon emissions portfolio standard,” introduced by Exelon in  
736 the current General Assembly, would provide additional economic support to the  
737 nuclear fleet in Illinois.<sup>18</sup>

738

739 **Q. Is it possible that Exelon will retire one or more nuclear plants before the Grain Belt**  
740 **Express Project enters operation?**

741 A. It is reported that Exelon’s Chief Executive Officer has recently stated that, without  
742 additional State support, Exelon may close the Quad Cities reactor later this year.<sup>19</sup> I  
743 have no information to verify whether this will occur. However, because it is four to five  
744 years until the Grain Belt Express Project comes online, the Project has little to do with  
745 any retirements decisions made this year.

746 **Q. If Exelon or other operating or proposed generators do modify their plans, e.g. by**  
747 **retiring earlier than expected or by delaying a new project, in response to lower**

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<sup>17</sup> Final Clean Power Plan Rule.

<sup>18</sup> HB 3293/SB 4285.

<sup>19</sup> See <http://www.chicagobusiness.com/article/20150729/NEWS11/150729783/exelon-likely-closing-quad-cities-nuclear-plant>.

748 **power prices caused in part by the Project, how would it affect the LCOE and**  
749 **PVRR analyses presented in your direct testimony?**

750 A. Any such changes are best modeled through a decreased number of years of locational  
751 marginal price (“LMP”) savings to the public. In his rebuttal testimony, Dr. McDermott  
752 provides a range of benefits (in the form of electricity price reductions) based on varying  
753 assumptions as to when other market participants would alter their plans in response to  
754 the Grain Belt Express Project. I used this range of benefits to prepare the modified  
755 analyses discussed below.

756 With respect to the LCOE analysis, there is no impact, since by definition the model  
757 only looks at the cost of a particular generation source, without regard to effects on other  
758 power plants. With respect to the PVRR analysis, there is some impact. Following Mr.  
759 Zuraski’s approach in the Rock Island proceeding (Docket 12-0560), I treated the LMP  
760 savings as a benefit from building the Project. Lower LMP savings do result in a lower  
761 *absolute* benefit. However, reduced LMP savings do not affect the *relative* PVRR of the  
762 Project, the Illinois wind and the combined cycle gas alternative. Because all three  
763 alternatives are assumed to have the same LMP impact, a change in LMP savings does  
764 not affect which alternative yields the lowest PVRR.<sup>20</sup>

765 Considering reduced LMP savings does slightly decrease the number of scenarios in  
766 which the Project is cheaper than market power purchases based on projected power

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<sup>20</sup> This simplifying assumption follows Mr. Zuraski’s approach in the Rock Island case. In fact, a combined cycle gas plant would be likely to generate lower LMP savings than the wind generation options, since the combined cycle plant has a substantial fuel cost, while wind generation has zero marginal cost.

767 prices (80% of scenarios with five years of LMP savings (Figure 5 of Grain Belt Express  
768 Exhibit 11.17) vs. 63% with only 1 year of LMP savings (Figure 4 of Grain Belt Express  
769 Exhibit 11.17). However, that there would be only a single year of LMP savings is a very  
770 conservative assumption, and the Project is still cheaper for ratepayers than market prices  
771 in a majority of scenarios. Further detail on these sensitivities to the PVRR model is  
772 shown on Grain Belt Express Exhibit 11.17.

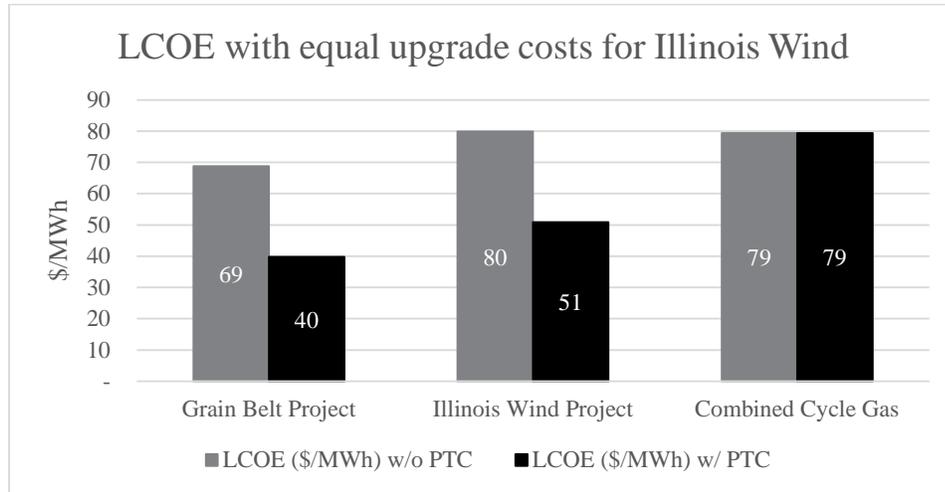
773 **Q. Turning back to the comparison between Grain Belt Express' delivered energy and**  
774 **Illinois wind, do you agree with Mr. Zuraski, at p. 5-6 of his rebuttal testimony (ICC**  
775 **Staff Ex. 5.0), that the Grain Belt Express Project can compete with Illinois wind**  
776 **even if Kansas wind plus the Grain Belt Express Project has a slightly higher**  
777 **levelized cost?**

778 A. Yes, I do. To be clear, however, my model shows (along with Mr. Zuraski's model,  
779 presented in his rebuttal testimony) that the Project's delivered energy will be the lower-  
780 cost alternative. In addition to its lower cost, Kansas wind generation provides  
781 geographic diversification to the PJM grid, which will reduce variability from wind  
782 power and enable more wind power to be integrated into the grid. (See Grain Belt  
783 Express Ex. 11.0, p. 30-33, and Grain Belt Express Ex. 11.5) This important benefit is  
784 not captured in the LCOE and PVRR analyses, and therefore these models understate the  
785 value of Kansas wind and the Project.

786 Further, the scarcity of good (i.e. windier) sites for wind farms is a much bigger  
787 constraint in building new wind generation in Illinois than in Kansas. As more wind  
788 generation is built in Illinois, subsequent projects will necessarily be built at less windy  
789 sites. In addition, the cost to interconnect new wind farms in Illinois will increase over

790 time. Wind generators are rapidly picking off the low-hanging fruit of windy sites with  
791 good access to existing transmission. In contrast, there are effectively limitless windy  
792 sites in western Kansas, and the Project can assure that these wind sites have access to  
793 transmission.

794 The Grain Belt Express Project, as Mr. Zuraski, Dr. Proctor and I have modeled  
795 it, includes both an HVDC link from western Kansas to MISO and PJM and a substantial  
796 765 kV upgrade in Indiana to ensure this power flows freely and reliably into PJM. The  
797 Illinois wind alternative studied by Dr. Proctor, Mr. Zuraski and myself is not burdened  
798 with this extra transmission upgrade cost. However, similar upgrade facilities would  
799 likely be needed to connect over 4,000 MW of new wind generation in Illinois. This is  
800 another way in which Dr. Proctor's model, Mr. Zuraski's model, and my model all do not  
801 reflect the full costs of the Illinois wind generation option, and thereby understate the  
802 competitiveness of Kansas wind generation delivered by the Project compared to the  
803 Illinois wind generation option. To reflect this bias, I ran additional scenarios in which I  
804 added the Project's PJM upgrade costs to the capital costs of the Illinois Wind alternative.  
805 The results of the updated PVRR analysis are shown in Grain Belt Express Exhibit 11.18,  
806 and the resulting change to my LCOE analysis is shown below:



807

808 **Q. Do you agree with Mr. Zuraski, at p. 4-5 of his rebuttal testimony (ICC Staff Ex.**  
809 **5.0), that the Project can still provide benefits even if it is slightly more expensive**  
810 **than a combined cycle as plant?**

811 A. Yes, I do, though again, my analysis shows that the Project's delivered energy is likely  
812 the cheaper alternative. I also agree that both new wind and new gas generation are  
813 likely to be part of the changing electric mix. No grid can operate with 100% variable  
814 wind energy. By the same token, betting everything on natural gas, which has a history  
815 of price volatility and supply disruptions, is widely acknowledged to be an unwise  
816 choice. There is room for substantial additions of both supply options.

817 **Q. Mr. Zuraski points out, at p. 1-2 of his rebuttal testimony, that you have**  
818 **conservatively assumed that wind energy receives no value for its dependable**  
819 **capacity. What is your response?**

820 A. Given the lack of market history around the new PJM capacity rules, it would be difficult  
821 to model these revenues with any precision. However, wind will surely contribute some  
822 capacity value. The LOLE analysis presented in Grain Belt Express's direct case

823 estimates the wind generation delivered by the Project adds dependable capacity equal to  
824 28% of its nameplate capacity.<sup>21</sup> If this value is used along with the same capacity price I  
825 used for natural gas generators, then the LCOE and PVRR of the Grain Belt Express  
826 Project's delivered energy both improve relative to the combined cycle gas alternative.  
827 Additional detail on these results is provided in Grain Belt Express Exhibit 11.19.<sup>22</sup>

828 **b. Response to LACI Witness Michael Proctor**

829 **Q. What is your general response to the direct testimony of Dr. Michael Proctor on**  
830 **behalf of LACI?**

831 A. I take issue with several aspects of his testimony. First, his LCOE model has a  
832 calculation error regarding the capacity factor for Kansas wind generation. Correcting  
833 this error changes the conclusion of his analysis, i.e. the Project's delivered energy is  
834 calculated to be cheaper than Illinois wind generation and cheaper than a new combined  
835 cycle gas plant. This is without changing any of his incorrect input assumptions, which I  
836 discuss below. Second, unlike my model and Mr. Zuraski's model, Dr. Proctor's model  
837 does not consider the market revenues of the Project or the LMP savings to Illinois  
838 ratepayers in any fashion, and therefore is not the best tool for evaluating whether the  
839 Project promotes market competition. Third, Dr. Proctor considers an additional  
840 alternative—adding wind from the MISO region without building any new

---

<sup>21</sup> Grain Belt Express Ex. 6.0 at p. 11.

<sup>22</sup> In Exhibit 11.19, I only compared the Project's delivered energy against combined cycle gas generation and market power purchases. I omitted the Illinois wind alternative because Grain Belt Express has not performed an LOLE analysis for Illinois wind generation, which would be necessary to perform the proper comparison between the two wind alternatives.

841 transmission—but he does not show that this alternative is feasible from a transmission  
842 perspective. Without an estimate of transmission costs, the alternative is just a theoretical  
843 exercise and should not be given any weight. When a reasonable estimate of  
844 transmission costs is included, the MISO wind alternative is not competitive with the  
845 Project, even if it were feasible (which I do not believe it is). Fourth, some of Dr.  
846 Proctor’s changes to my assumptions are unreasonable. When more reasonable  
847 assumptions are used, his model strongly supports the cost-effectiveness of the Project.

848 **Q. What calculation errors did Dr. Proctor make in his model?**

849 A. He mistakenly used a capacity factor of 50% for the Kansas wind generation when  
850 calculating Grain Belt Express’ transmission charge. In his testimony, he claimed to use  
851 a capacity factor of 52%.

852 **Q. What happens to Dr. Proctor’s conclusions when these corrections are made?**

853 A. I reran Dr. Proctor’s model with this correction changing no other assumptions. Though  
854 the impact is relatively small, I found that the Grain Belt Express Project’s delivered  
855 energy was less expensive than both Illinois wind and combined cycle gas generation.  
856 This is significant because, while there are other problems with the methodology and  
857 assumptions in Dr. Proctor’s model which bias it against the Grain Belt Express Project,  
858 merely making this minimal correction results in his model showing that the Project is  
859 cost-effective compared to the other alternatives.

860

861

*Impact of transmission cost correction to Proctor's LCOE totals*

Alternatives	Original Proctor Total	Transmission Cost Calculation Correction	Proctor Total
Grain Belt	\$94.49	-\$0.90	<b>\$93.59</b>
Illinois Wind	\$95.66	\$0.00	<b>\$95.66</b>
Combined Cycle	\$94.20	\$0.00	<b>\$94.20</b>

862

863 **Q. Why is Dr. Proctor's model not the best tool to use in this proceeding?**

864 A. I will set aside his assumptions for now, and focus only on the methodology of his  
865 analysis. Dr. Proctor proposes to replace my analysis with a "traditional, utility revenue  
866 requirements" model. (Proctor Direct, p. 3) My calculations are based on the model  
867 prepared by Mr. Zuraski in the Rock Island case (Docket 12-0560), on which the  
868 Commission placed principal reliance in its order in that case. My analysis, following  
869 Mr. Zuraski's approach, modifies the "traditional utility revenue requirements" model to  
870 take into account projected market revenues. The inclusion of market revenues is  
871 appropriate in light of the competitive Illinois electric market and the statutory criterion  
872 for a certificate that the proposed transmission line will promote the development of an  
873 effectively competitive electricity market. Considering whether a Project can be  
874 supported by market-based revenues is important to establish that it contributes to a  
875 functioning, competitive electric market. Further, including the present value of LMP  
876 savings in the PVRR analysis is appropriate because these savings are a real benefit to all  
877 consumers in Illinois, even those who do not buy power delivered by the Project. Dr.  
878 Proctor's analysis did not consider the cost of the Project's delivered energy compared to

879 wholesale power prices, nor did it consider the LMP savings to Illinois consumers in any  
880 fashion.

881 Another flaw in Dr. Proctor's methodology is that he assesses a cost to wind  
882 energy plants based on building a dedicated capacity resource to back up the wind  
883 generation in times of peak demand. (Proctor Direct, p. 7-8) Effectively, Dr. Proctor  
884 proposes that every wind generator must pay for a simple cycle gas generator of equal  
885 capacity. This is at odds with the contemporary realities of wind integration, where wind  
886 forecasting, existing power plants, and load management all combine to accommodate  
887 the variability of wind power and integrate it into overall grid operations. Dr. Proctor's  
888 "capacity adder" is not an actual cost assessed by PJM or MISO to wind farms or their  
889 power purchasers. To the contrary, PJM and MISO, where Grain Belt Express will  
890 deliver power, balance variability and plan to meet peak demand on a system-wide basis  
891 taking into account all generation resources. They do not pair off variable and  
892 dispatchable resources one by one. Further, because of the controllable nature of the  
893 Project's HVDC technology, the wind power delivered by the Project will be directly  
894 delivered to MISO and PJM, where it can be integrated by PJM and MISO through the  
895 dispatch of the many flexible resources these RTOs have across their systems.

896 Dr. Proctor's capacity adder is an outdated planning convention used by certain  
897 regulated, vertically integrated utilities to plan for their reserve margin. It is inapposite  
898 for an Illinois analysis, as most of Illinois' load-serving entities are not vertically  
899 integrated. Further, the purpose of my analysis was not to plan for a predetermined  
900 reserve margin, but to determine which of the options considered is the least-cost way to  
901 supply energy to Illinois.

902 **Q. Is Dr. Proctor’s MISO wind alternative, described in his rebuttal testimony, a viable**  
903 **alternative to the Project?**

904 A. No, for numerous reasons that I discuss below.

905 **Q. Did Dr. Proctor present any transmission analyses to determine if it was feasible to**  
906 **add a large amount of new wind generation in the windy areas of MISO?**

907 A. No, Dr. Proctor did not present any transmission analysis to determine if wind generation  
908 from northwest Iowa, Minnesota or the Dakotas could actually be interconnected to the  
909 grid in those locations and then moved to load and population centers. The only evidence  
910 he could provide in support of the feasibility of this analysis was a five year old study by  
911 MISO that was a conceptual transmission analysis. Many of the transmission lines in  
912 MISO’s five year old study were not actually approved for construction.<sup>23</sup>

913 In his LCOE, Dr. Proctor assumes that new wind farms in western MISO have no  
914 additional cost for transmission construction. It is both unremarkable and irrelevant to find  
915 that MISO wind power that is (erroneously) assumed not to need new transmission to deliver  
916 its output is cheaper than Kansas wind power that does need new transmission through the  
917 Project. The fact is that there is not enough existing transmission to support the necessary  
918 amount of high capacity factor wind generation. Dr. Proctor concedes, at p. 25 of his  
919 rebuttal testimony, that MISO’s “approved MVP projects will not provide delivery of the  
920 needed renewable energy from the best wind sites without the further construction of  
921 backbone facilities.” Dr. Proctor makes an incomplete and biased comparison when he

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<sup>23</sup> LACI Response to Grain Belt Express Data Request 3.3 Attachment 1.

922 compares a MISO wind alternative without the new backbone facilities to the Grain Belt  
923 Express Project, whose capital costs include a major new HVDC line and a new 765 kV line  
924 in Indiana.

925 **Q. What is wrong with Dr. Proctor's position that wind generators can just sell to the**  
926 **MISO market, and use this market to "financially" move the power to Illinois?**

927 A. To sell power to the MISO grid, wind farms must actually connect to the grid, and the  
928 SPP and MISO interconnection processes charge generators for the needed upgrades.  
929 These upgrades would add a substantial cost to the MISO wind alternative that Dr.  
930 Proctor does not reflect in his model and that would significantly increase the LCOE of  
931 this alternative.

932 Dr. Proctor's attempt to use my analysis of congestion from existing MISO wind  
933 farms to Ameren Missouri, which I prepared for the Grain Belt Express case at the  
934 Missouri Public Service Commission, is misguided because that analysis is inapplicable  
935 to the issue we are discussing here. I performed this analysis in the Missouri case to  
936 show that there was already transmission congestion between the windy parts of MISO  
937 and the Ameren Missouri load. The analysis tells us nothing about the transmission  
938 congestion costs between the wind generation locations in western MISO and Illinois  
939 load. Moreover, if 4,000 MW of new wind farms could be added in western MISO and  
940 were connected to the MISO grid, it would greatly increase the congestion and loss costs  
941 that were the subject of my analysis in the Missouri case.

942 In summary, Dr. Proctor's analysis ignores three significant costs to his MISO  
943 wind alternative: (1) the cost of interconnection upgrades to actually be able to connect to  
944 the grid in western MISO; (2) additional congestion and loss costs from Ameren

945 Missouri's service territory to load in Illinois; and (3) the further increase in congestion  
946 and loss costs based on the addition of a large amount of new wind generation in western  
947 MISO.

948 **Q. Is it possible to estimate these costs that Dr. Proctor ignored?**

949 A. Though it is possible to estimate the first two costs, the third is very difficult to quantify  
950 without a detailed transmission analysis, which Dr. Proctor did not perform. As an  
951 approximation of interconnection costs, I used the same cost (in \$/MW) for the PJM  
952 interconnection upgrades for the Project, and applied this to the MISO wind generation.  
953 This likely understates the actual cost, since the 765 kV PJM network where the Project  
954 interconnects is more robust than the 345 kV grid in western MISO where Dr. Proctor's  
955 theoretical generation would interconnect. A more robust existing network leads to lower  
956 upgrade costs. To estimate the second cost, I looked at the historical congestion and  
957 losses from western MISO to Illinois load, and found that they were about \$15 per  
958 MWh—about \$4 per MWh higher than what Dr. Proctor calculated to Missouri.<sup>24</sup>

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<sup>24</sup> I used the same wind farms, time period and calculation methods as the analysis I presented to the Missouri Public Service Commission, which Dr. Proctor discussed in his rebuttal testimony. I then updated this analysis by comparing LMPs from western MISO wind farms with the average of historical LMPs for the MISO Illinois and the PJM ComEd Illinois areas. The difference between these two sets of prices, weighted by hourly wind generation, is the \$15.17/MWh figure in the nearby table.

PJM pricing data available at <https://dataminer.pjm.com/dataminerui/pages/public/lmp.jsf>.

MISO pricing data available at:  
<https://www.misoenergy.org/Library/MarketReports/Pages/MarketReports.aspx> (search for Historical Annual Real-Time LMPs)

959 **Q. What happens to Dr. Proctor’s western MISO wind alternative when you add these**  
 960 **additional costs?**

961 A. Using Dr. Proctor’s model from his rebuttal testimony, the MISO wind alternative  
 962 becomes more expensive than the Project’s delivered energy, as depicted below:

Alternatives	Rebuttal Proctor Total*	Transmission Cost Calculation Correction	Proctor Total	Add Interconnection Upgrades	Add Historical Congestion Costs	Corrected Total
Grain Belt	\$94.61	-\$0.90	<b>\$93.70</b>	\$0.00	\$0.00	<b>\$93.70</b>
MISO Wind	\$79.85	\$0.00	<b>\$79.85</b>	\$3.29	\$15.17	<b>\$98.32</b>
Combined Cycle	\$94.20	\$0.00	<b>\$94.20</b>	\$0.00	\$0.00	<b>\$94.20</b>

\* In Dr. Proctor's rebuttal testimony model, the Kansas wind installation cost was increased from \$1,750/kW (as it was in the direct testimony model) to \$1,755/kW, resulting in the difference in the Grain Belt LCOE

963  
 964 The increase in congestion and losses due to a large injection of power in western MISO  
 965 is a substantial cost that would need to be added to the model for the sake of  
 966 completeness. But even excluding this cost, Dr. Proctor’s own model shows that the  
 967 Project is a more cost-effective solution than MISO wind generation.

968 **Q. Is Dr. Proctor’s analysis of MISO financial transmission right (“FTR”) auctions**  
 969 **relevant?**

970 A. No. These results do not tell us anything about the actual differences in power prices  
 971 between wind farms in MISO and load in Illinois or the cost to move power from wind  
 972 farms in MISO to load in Illinois. First, the FTR auction only includes the “congestion”  
 973 component of differences in LMPs, not the differences in the loss component. Shippers  
 974 moving power from distant wind farms are exposed to differences in the loss components  
 975 of LMPs; therefore FTRs only provide partial coverage. Second, the FTR auction covers  
 976 only a short period of time—usually one to two years. Over the lifetime of a generation  
 977 asset, congestion patterns can change considerably, and there is a history of increased

978 congestion from windy areas to load centers. Third, FTRs cover a “block” of power – 24  
979 hours a day by seven days a week. Congestion costs for wind farms are relevant at the  
980 times when the wind blows and power is actually produced, and when it must be moved  
981 to load. Fourth, and most importantly, the FTR auction covers all of MISO. The  
982 aggregate results Dr. Proctor discusses do not specifically relate to distant wind farms  
983 with high capacity factors and Illinois load centers where power would actually be used.

984 **Q. What about the possibility that Kansas wind generators or Illinois load serving entities**  
985 **can just sell power from the Kansas wind plants into SPP, rather than moving the**  
986 **power through the Project to PJM? (LACI Ex. 3.0, p. 22)**

987 A. This option is infeasible because there is not sufficient interconnection capacity in the  
988 SPP grid, and adding the necessary interconnection capacity would require significant  
989 capital investment that the wind plant operators would have to pay for. The highest  
990 voltage line in western Kansas is 345 kV, which can accommodate much less power than  
991 can the Project, a 600 kV HVDC line. The most recent major expansion of the SPP grid  
992 in western Kansas, a new 345 kV line built by ITC, was dimensioned around 605 MW of  
993 new wind generation being added in the vicinity of the Project’s western converter  
994 station.<sup>25</sup> Much of this capacity has already been used by new wind projects built since  
995 the transmission expansion was designed. Further, most load serving entities in SPP have  
996 already purchased large quantities of wind power and have limited appetite to purchase  
997 more. Moreover, the major load centers in SPP are hundreds of miles from western

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<sup>25</sup> SPP Priority Projects Report, p. 11. Available at <http://www.spp.org/section.asp?pageID=125>.

998 Kansas, and reaching them would require a substantial and expensive program of new  
999 transmission construction.

1000 **Q. Is any wind generation company actually pursuing the business plan Dr. Proctor**  
1001 **suggests, that is, building thousands of MW of new wind generation in western**  
1002 **MISO or western Kansas, paying for interconnection upgrades on the AC grid, and**  
1003 **taking the substantial congestion risk to move this power through multiple RTOs to**  
1004 **markets in Illinois and other eastern states?**

1005 A. No. Due to our development of the Rock Island Clean Line project (which begins in  
1006 northwest Iowa) and the Grain Belt Express Project, I am very familiar with the activities  
1007 of wind generation companies in western MISO and western Kansas. No wind  
1008 generation company or set of companies is pursuing Dr. Proctor's alternative, which, as I  
1009 have shown, lacks technical and economic feasibility. Dr. Proctor's "western MISO  
1010 wind generation" and "western Kansas wind with AC transmission" alternatives are  
1011 purely theoretical and no one is actually proposing to do them. In contrast, the Project is  
1012 an actionable proposal in front of this Commission with the backing of actual capital,  
1013 competent investors, an experienced development team, and interested customers that are  
1014 experienced, capable wind generation developers.

1015 **Q. In addition to property taxes for Kansas wind generation and the capacity cost**  
1016 **adder for wind, which you have already discussed, Dr. Proctor proposed alternative**  
1017 **assumptions with respect to inflation, capital costs, wind generation capacity**  
1018 **factors, and the cost of the Project. Are these changes appropriate?**

1019 A. No. I discuss each of Dr. Proctor's proposed changes below.

1020 **Q. Is Dr. Proctor's change to the inflation assumption of the model reasonable?**

1021 A. No, his inflation rates of 1.6-1.7% are less reasonable than my assumed rate of 2.5%. Dr.  
1022 Proctor suggests he is using Energy Information Administration inflation rates. (Proctor  
1023 Direct, p. 3). However, he is not actually using an inflation forecast actually published by  
1024 EIA. Instead, he derives an inflation rate by comparing nominal and real natural gas  
1025 price forecasts and then applies it to other costs, such as plant operating and maintenance  
1026 costs. This is a problematic way of estimating inflation rates.

1027 Dr. Proctor's assumed inflation rate from 2019-2040 ranges from 1.63% to  
1028 1.72%. This range is well below consensus inflation expectations. The Livingston  
1029 Survey, published by the Federal Reserve Bank of Philadelphia, polls leading economists  
1030 on their expectations for 10-year inflation. That forward-looking expectation has ranged  
1031 from 2.2 to 2.5% over the last thirteen years of surveys.<sup>26</sup> It has never been below 2.2%.  
1032 Moreover, historical inflation since 2000 has averaged 2.4%.<sup>27</sup> This is much closer to my  
1033 inflation assumption (2.5% per year) than to Dr. Proctor's assumption.

1034 **Q. What is the impact on the analysis of Dr. Proctor's unduly low inflation**  
1035 **assumption?**

1036 A. The inflation rate does not affect the price of fuel for the combined cycle gas generation  
1037 alternative, since both Dr. Proctor and I used EIA's nominal gas price forecasts.  
1038 However, a low inflation rate decreases the ongoing costs for maintaining (and any cost  
1039 of the emissions from) the combined cycle gas plant. Too low an inflation assumption

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<sup>26</sup> Available at <https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey/>.

<sup>27</sup> <http://www.bls.gov/cpi/cpid1506.pdf>, table 24.

1040 makes the combined cycle gas alternative artificially less expensive than the two wind  
1041 energy alternatives.

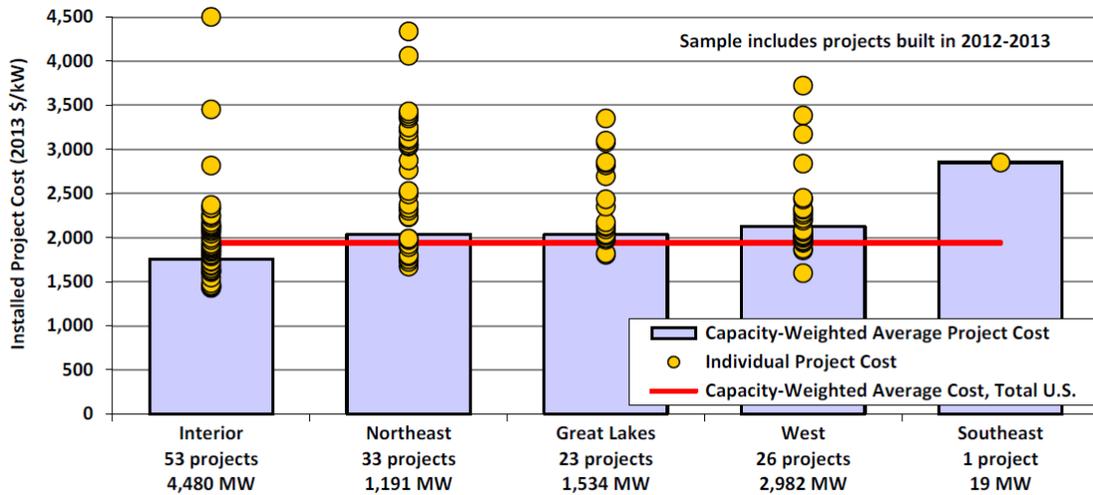
1042 **Q. Are Dr. Proctor's changes to wind generation capital costs reasonable?**

1043 A. No, because they are contrary to industry experience and to the very data that Dr. Proctor  
1044 uses as the basis for his assumption.

1045 Dr. Proctor states that the same capital costs should be used for both Illinois and  
1046 Kansas wind energy. (Direct Testimony, p. 7) I have experience building and financing  
1047 wind farms in both states. Compared to Illinois, Kansas has lower labor costs, lesser  
1048 siting constraints, better soil conditions (thereby reducing foundation costs), and better  
1049 access roads (reducing the cost of new road construction and the cost of access to  
1050 construction sites). In addition, the turbines used in lower wind-speed environments like  
1051 Illinois are often more expensive (per MW) than those in Kansas. This is because bigger  
1052 blades and taller towers are needed to produce a reasonable amount of energy in lower-  
1053 wind sites. Bigger blades and taller towers lead to more energy, but higher capital costs  
1054 per unit of capacity.

1055 The government data Dr. Proctor cites in his testimony in support of his  
1056 assumption of equal capital costs across regions actually show that his assumption  
1057 unreasonable. Dr. Proctor claims that DOE's 2013 Wind Technologies Market Report  
1058 ("WTMR") does not contain a comparison of the capital costs of wind projects in the  
1059 Interior region (including Kansas) and the Great Lakes region (including Illinois). But it  
1060 does, as shown below.

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Source: Berkeley Lab

Figure 42. Installed wind power project costs by region: 2012–2013 projects

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The WTMR, prepared by researchers at the Lawrence Berkley National Laboratory, shows that the capital costs of wind farms in the Interior region averaged \$1,755 per kW. On the other hand, the capital costs of wind farms in the Great Lakes region averaged \$2,033 per kW.<sup>28</sup> These were the values I used in my PVRR and LCOE analyses for Kansas and Illinois wind, respectively. Dr. Proctor did not read this report correctly and used a single capital cost assumption across all regions. Unlike Dr. Proctor’s assumptions, my assumptions are consistent with the data, and therefore are more reasonable.

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<sup>28</sup> I rounded these assumptions to the nearest \$10 per kW (i.e., I increased the Kansas wind capital cost to \$1760 per kW and decreased the Illinois wind capital cost to \$2030 per kW). This rounding resulted in a very small advantage to Illinois wind in the analysis.

1071 Dr. Proctor goes on to claim that wind capital costs should increase with the full  
1072 amount of inflation rather than the 1.0% rate of increase I used in my analysis. But the  
1073 increase I used is appropriate and in fact conservative. In recent years, wind costs have  
1074 been declining in nominal dollars due to more efficient manufacturing and economies of  
1075 scale in both generator size and the number of turbines produced. Dr. Proctor himself  
1076 acknowledges that “[w]ith the development of new technologies in converting wind to  
1077 electrical energy and economies of scale in wind turbine size, it is likely for the  
1078 foreseeable future that renewable energy is in a decreasing cost industry.” (Proctor  
1079 Rebuttal, p. 14-15)

1080 **Q. Dr. Proctor decreases the capacity factor of Kansas wind generation in his model. Is**  
1081 **this a reasonable change?**

1082 A. No, it is not. The only support for this adjustment is the allegation that Grain Belt  
1083 Express “admits that average wind speeds in the area they are proposing in western  
1084 Kansas for the possible location of wind farms only supports (sic) a 52% capacity factor.”  
1085 This is incorrect. Though Dr. Proctor provides no citation, I assume he refers to the  
1086 Request for Information from wind generation companies that Grain Belt Express  
1087 conducted almost two years ago. Turbine technology has since improved, as Dr. Proctor  
1088 acknowledges. In my direct testimony at page 11, I explained how I calculated the  
1089 production profile for new wind farms located in western Kansas using actual  
1090 meteorological data and existing turbine power curves. This calculation was provided as  
1091 a workpaper to Staff (and to LACI in response to a “me-too” data request). I stand by my  
1092 calculation, which yields a capacity factor of 55%. A 55% capacity factor is reasonable  
1093 today based on current technology and more than reasonable for the 2019 timeframe (the

1094 starting point of the economic studies). Turbine technology continues to improve due to  
1095 larger blades, taller towers, improved materials, and more sophisticated controls.

1096 **Q. Dr. Proctor increases the transmission cost of the Project by 20%. Is this a**  
1097 **reasonable change?**

1098 A. No. This change is arbitrary and unsupported. Dr. Proctor provides no basis for this  
1099 increase other than uncited “research” by SPP about cost increases on transmission  
1100 projects. (Proctor Direct, p. 6-7) In response to a data request to supply this research, Dr.  
1101 Proctor produced two documents, neither of which supported the claims in his  
1102 testimony.<sup>29</sup> The first was a trade press article from *RTO Insider* that reported anecdotal  
1103 evidence about cost overruns on SPP transmission projects approved as part of the 2015  
1104 regional transmission plan. The only specific projects discussed in the article are line  
1105 rebuilds, lower voltage upgrades, and voltage conversion projects. None of these have  
1106 relevance to the construction of a long-distance HVDC line. The second document was  
1107 an SPP report on transmission projects, which did not contain any research on historical  
1108 transmission cost overruns nor any conclusion that a 20% overrun was typical or to be  
1109 expected. Dr. Proctor’s claim that his increase to the Project cost is based on SPP  
1110 research is misleading and must be discarded.

1111 The Project cost estimate for the Grain Belt Express Project already includes  
1112 adders for contingency in various components of the estimate to account for potential  
1113 capital cost increases due to, for example, inflation in materials costs, increases in labor

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<sup>29</sup> LACI Response to Grain Belt Express Data Request 2.5.

1114 rates, or weather delays. At this point, the volumes of commodities, number of  
 1115 structures, and amount of labor reflected in the estimate are unlikely to change materially.  
 1116 Adding yet further contingency to a cost estimate that already includes contingency and  
 1117 escalation factors is double-counting. Further, Dr. Proctor did not add any contingency  
 1118 factor to the capital cost estimates for the other alternatives considered in the analyses,  
 1119 singling out Grain Belt Express for this revised assumption.

1120 Additionally, as Mr. Zuraski notes in his rebuttal testimony, I already considered  
 1121 a 20% capital cost increase in the Project as one of the scenarios in my leveled cost and  
 1122 revenue requirements analyses. The Project still had a lower PVRR than Illinois wind in  
 1123 83% of all scenarios and lower PVRR than new combined cycle gas generation (also in  
 1124 83% of all scenarios). (Grain Belt Express Ex. 11.0, p. 43-44).

1125 **Q. What happens if you rerun Dr. Proctor’s financial model with the more reasonable**  
 1126 **assumptions you describe above?**

1127 Beginning with the corrected LCOE model from Dr. Proctor, the effect of each of the  
 1128 changes described above are given in the table below.

*Impact of changes to Proctor’s assumptions on the LCOE totals*

Alternatives	Proctor Total*	Incorporate lower rate of increase and regional cost adjustment for wind capex	Change inflation assumptions to 2.5%	Change Kansas wind capacity factor to match calculations in Grain Belt Express Ex. 11.0	Remove 20% adder to transmission costs	Corrected Total
Grain Belt	<b>\$93.59</b>	-\$0.84	\$2.76	-\$5.21	-\$3.56	<b>\$86.73</b>
Illinois Wind	<b>\$95.66</b>	\$7.78	\$3.41	\$0.00	\$0.00	<b>\$106.85</b>
Combined Cycle	<b>\$94.20</b>	\$0.00	\$3.70	\$0.00	\$0.00	<b>\$97.90</b>

\* Includes correction to transmission costs by adjusting to 52% capacity factor as discussed above

1130  
 1131 **Q. At pages 6-9 of his rebuttal testimony, Dr. Proctor suggests that Grain Belt Express**  
 1132 **could enter the market but then go out of business because of competition from**  
 1133 **other energy sources. Is this plausible?**

1134 A. No. As an initial matter, Grain Belt Express will finance the Project on the strength of  
1135 long-term contracts that lock in a price for transmission service for ten or more years. In  
1136 addition, once it is built, Grain Belt Express only needs to attract enough revenue to  
1137 cover its operating expenses to stay in business. Even in the highly unlikely event the  
1138 Project could not pay off its debt, the debt could be restructured, and the Project could  
1139 continue operating. As a merchant transmission line, Grain Belt Express and its investors  
1140 take the risk that the Project is economic. If other sources of power turn out to be  
1141 cheaper at some later point in time (which we have no basis to believe today will  
1142 happen), and if as a result of this change, Grain Belt Express earns less revenue, the loss  
1143 rests with Grain Belt Express and its investors, not the public. The Project will continue  
1144 to operate and provide needed transmission service to wind generators, even if it must do  
1145 so at a lower level of profitability.

1146 **Q. Is Dr. Proctor correct, at page 8 of his direct testimony, that there will be substantial**  
1147 **costs for customers in the MISO portion of Illinois to purchase energy delivered by**  
1148 **the Project?**

1149 A. No. Dr. Proctor appears only to consider the Project's PJM delivery point. The Project  
1150 also has a 500 MW delivery point in MISO, from which any MISO load serving entity  
1151 could purchase power. Further, the PJM grid at the Project's point of delivery generally  
1152 has higher prices than the MISO Illinois territory. This means that customers in the  
1153 MISO region of Illinois could sink the power purchased at Grain Belt Express's PJM  
1154 delivery point and buy back power in their own territory for no cost (or even making  
1155 money in the process).

1156 **Q. Is there any foundation to Dr. Proctor’s claim, at p. 10-11 of his direct testimony,**  
1157 **that the workpapers to your direct testimony show that Illinois wind lowers LMPs**  
1158 **by more than the Project?**

1159 **A.** No. Dr. Proctor misread the workpapers. I did not perform this comparison, nor did Mr.  
1160 Cleveland.

1161 **c. Response to Intervenor Witnesses Michael Severson and Don Hennings**

1162 **Q. In his direct testimony, Mr. Severson suggests the Project is not cost-effective.**  
1163 **(MEZ Ex. 1.0, p. 15, 18, 24) CCPO witness Don Hennings also argues that wind**  
1164 **power must be heavily subsidized to be economic. (CCPO Ex. 7.0, p. 2) What is**  
1165 **your response?**

1166 **A.** Mr. Severson did not actually perform an analysis of the Project’s delivered cost  
1167 economics. He anecdotally suggests that wind farm capacity factors are only 35%, but  
1168 western Kansas wind generation capacity factors are in the mid-50s, as I discussed above.  
1169 Mr. Severson and Mr. Hennings claim that wind power depends wholly on the production  
1170 tax credit to be profitable. The production tax credit (“PTC”) has helped the industry  
1171 reduce costs and achieve economies of scale, and it has lowered energy costs for  
1172 consumers. But even without the PTC, the Project can deliver energy at a competitive  
1173 price, as I showed in my LCOE and PVRR analyses—an analysis which Mr. Hennings  
1174 and Mr. Severson provide no evidence to dispute.

1175 Mr. Hennings’ claim that wind power receives subsidies of \$56 per MWh is  
1176 overstated. This figure comes from an outdated and questionable study by the partisan

1177 Institute for Energy Research.<sup>30</sup> The study, dated from 2011, divides the total  
1178 government expenditure on wind power reported by EIA (including tax credits, research  
1179 and development, and one-time grants) by the number of MWh produced by wind energy  
1180 in the year 2010.

1181 This is a flawed metric. Research and development (“R&D”) money is spent not  
1182 on the generation of a particular plant but on improving technology over the long run.  
1183 Investment R&D yields fruits over years and decades, and the cost of R&D bears no  
1184 relation to the amount actually generated by wind power in the year in which the research  
1185 occurred. With respect to cash grants, in 2010, the federal government made a large  
1186 number of one-time grants to new wind farms under a short-lived federal program that  
1187 has ended and will not be available to the owners of the new wind generation plants that  
1188 will be built in Kansas to connect to the Project.<sup>31</sup> These one-time grants supported wind  
1189 farms that will generate for twenty years or more, but many of which were not actually  
1190 generating in 2010. A much more reasonable and accurate accounting of subsidies would  
1191 be to amortize these one-time grants over 20 or more years of production by the wind  
1192 farm that received the grant.

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<sup>30</sup> CCPO Response to Grain Belt Express Data Request 1.8. The Institute for Energy Research has a specific agenda of opposing renewable energy and promoting fossil fuels.

<sup>31</sup> The grants were offered in lieu of the production tax credit. The recipient had to choose one or the other and could not receive both an upfront cash grant and the PTC during operation.

1193           The Institute for Energy Research updated its report in 2013 and found that the  
1194 federal subsidy for wind energy had declined to \$35 per MWh.<sup>32</sup> Though this figure  
1195 remains dubious due to the same accounting problems with one-time grants and R&D  
1196 expenditures that I described above, the new report correctly highlights that subsidies are  
1197 declining as the wind industry grows. The current value of the PTC is \$23 per MWh for  
1198 the first ten years of a wind farm's operations.<sup>33</sup>

1199 **Q. How would you respond to Mr. Severson's suggestion that solar panels or wind**  
1200 **mills could be placed on abandoned coal plant sites, making the Project unneeded?**  
1201 **(MEZ Ex. 1.0, p. 17)**

1202 A. Old, coal-fired plants were not sited at the best solar or wind resource locations, except  
1203 by coincidence in some rare cases. If Mr. Severson's idea is feasible, it is only in limited  
1204 circumstances. In contrast, the wind resource of western Kansas is virtually limitless, and  
1205 the Project enables over 4,000 MW of the lowest cost wind power to reach the MISO and  
1206 PJM systems. As my analyses have shown, new Illinois wind generation is more  
1207 expensive than new Kansas wind generation. The same would remain true if the Illinois  
1208 wind generation were built on the site of a retired coal plant.

1209 **Q. Does this conclude your prepared rebuttal testimony?**

1210 A. Yes, it does.

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<sup>32</sup> Available at <http://instituteeforenergyresearch.org/analysis/eia-subsidy-report-solar-subsidies-increase-389-percent/>.

<sup>33</sup> Internal Revenue Bulletin 2015-20. Available at [http://www.irs.gov/irb/2015-20\\_IRB/ar06.html](http://www.irs.gov/irb/2015-20_IRB/ar06.html).