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Comments of Grain Belt Express LLC on Ameren Missouri's
2025 Integrated Resource Plan Annual Update

Grain Belt Express LLC ("Grain Belt Express") offers the below comments on the Union Electric Company d/b/a Ameren Missouri's ("Ameren") 2025 Annual Integrated Resource Plan Update.

I. Background

1. On October 17, 2024, the parties to File No. EA-2024-0237 (Ameren's Castle Bluff CCN proceeding) entered into a Unanimous Stipulation and Agreement ("Stipulation"). The Stipulation was approved by the Commission on October 30, 2024.

2. The Stipulation included certain provisions related to requests by Grain Belt Express for Ameren to include certain studies in its 2025 Annual IRP update. Specifically, the Stipulation at Paragraph 5.h. states:

> In its next annual integrated resource planning ("IRP") update (currently anticipated to be filed by October 1, 2025), Ameren Missouri will run its IRP model and report on the results with Kansas wind and solar included as a supply-side resource, using data for generic Kansas wind and solar resources, plus an ownership and delivery cost based on discussions between Ameren Missouri and Grain Belt Express. If a firm delivery cost cannot be provided by Grain Belt, Ameren Missouri will use a range of delivery costs to account for uncertainties in what the actual ownership and delivery costs may be, as determined by the parties. A firm delivery cost shall be provided by Grain Belt within 30 days of a final Commission Order in this proceeding or, if such a firm delivery cost cannot be provided within such time frame, a range will be provided by Grain Belt Express within that time frame. The estimated delivery cost for Kansas supply-side resources should reflect the same base year for cost and inflation assumptions as the estimated delivery cost of MISO supply-side resources. Further, the estimated delivery cost of MISO supply-side resources should include realistic assumptions regarding generation tie line costs and affected system costs. Either in its supply side resource analysis or in its assessment of alternative resource plans, Ameren Missouri shall also weigh the reliability, resiliency and operational benefits of the HVDC transmission facilities themselves, including but not limited to those

outlined in Exhibit 11, Schedule AP- 2 2, Section 6 "Operational Improvement Value of HVDC Resources" in Docket No. EA-2023-0017.

3. The specific requirements for the analysis were to: (i) use generic data for Kansas wind and solar resources; (ii) utilize an ownership and delivery cost based on discussions between Ameren and Grain Belt Express;[1] (iii) use the same base year and inflation assumptions for delivery costs for both Kansas resources and MISO resources; and (iv) MISO resource delivery costs should include realistic assumptions for tie-line costs and affected system costs.[2]

4. The Stipulation also required Ameren, either in its supply side resource analysis or in its assessment of alternative resource plans, to "weigh the reliability, resiliency, and operational benefits of the HVDC transmission facilities themselves, including but not limited to those outlined in Exhibit 11, Scheduled AP-2, Section 6 'Operational Improvement Value of HVDC Resources' in Docket No. EA-2023-0017." As noted in its 2025 IRP Annual update, Ameren retained the services of Charles River Associates ("CRA") to evaluate the reliability and resiliency benefits of the HVDC line and Kansas resource portfolio. The CRA Report is attached to Ameren's 2025 IRP Annual Update as Appendix B.

5. On September 30, 2025, Ameren filed a Request for Variance in File No. EA-2024-0237, noting that the study required by the Stipulation had been completed, but that Ameren wished to provide Grain Belt Express an opportunity to review the study prior to it being filed with

[1] Consistent with the Stipulation, Grain Belt Express provided a range of delivery costs for Kansas resources to Ameren on November 27, 2024.

[2] Grain Belt Express provided suggested assumptions for tie-line costs and affected system costs on June 26, 2025, which were used by Ameren in its analysis.

its 2025 IRP Annual Update. Ameren requested a variance to allow an additional 30 days to submit the Grain Belt Express analysis portion of its 2025 IRP Annual Update. Grain Belt Express did not object to the request for waiver or extension and it was granted by the Commission on October 14, 2025.

6. On October 30, 2025, Ameren filed its 2025 IRP Annual Update with the results of its Grain Belt Express study.

II. Grain Belt Express Response to Ameren's Analysis

7. As the Commission is aware, once constructed, the Grain Belt Express Project will be capable of delivering a total of up to 2,500 megawatts ("MW") of power into the MISO and AECI grids at delivery points in Missouri, and will (a) allow large amounts of energy from southwestern Kansas to access the MISO markets and compete to serve customer load, (b) support development of generating facilities where the resources are such that electricity can be generated at significantly lower cost and greater output than currently available in Missouri, (c) enable low-cost energy to access the Missouri electricity markets and reduce wholesale and retail electric prices, and (d) help customers in Missouri meet their various carbon reduction goals. This Commission has previously recognized that "Grain Belt remains the best option for low-cost renewable energy delivered into MISO" and that "the [Grain Belt] Project will provide a better fit to local capacity needs than local solar resources."[3]

8. Ameren's modeling pursuant to the Stipulation should have resulted in similar

[3] File No. EA-2023-0017, Report and Order, pp. 20–23.

conclusions, yet Ameren's 2025 IRP Annual Update yielded surprisingly divergent results. Grain Belt Express was provided with an initial draft of Ameren's study in mid-September and, since then, has worked with Ameren personnel to assess and understand Ameren's modeling and assumptions of the Grain Belt Express project and those conversations have resolved several outstanding issues. Nevertheless, Grain Belt Express continues to view certain aspects of Ameren's modeling and assumptions as either incomplete, inaccurate, or unreasonably skewed, resulting in inaccurate results that will increase electric rates for Missouri consumers if not corrected. These errors are discussed in greater detail below.

9. Ameren's analysis of Grain Belt Express concluded that the "economics of generic Kansas renewable resources delivered by HVDC do not appear to provide net benefits to customers" based on the assumptions used in the Company's analysis and that "displacing MISO resources with Kansas resources and including reasonable costs for delivery would result in a significant increase in costs to customers."[4] Grain Belt Express has identified numerous flaws and biases in the analysis performed by Ameren, all of which appear designed to skew results in favor of perpetuating Ameren's current Preferred Resource Plan ("PRP").

10. As documented by Grain Belt Express' Comments in Ameren's 2023 triennial IRP proceeding (File No. EO-2024-0020), Ameren's IRP fundamentally misapplied the Commission's rules and regulations governing public utility resource planning ("Chapter 22") by excluding an entire category of available supply-side resources—*i.e.*, western Kansas renewable resources—

[4] Ameren's 2025 Integrated Resource Plan Update, at p. 54 (Oct. 30, 2025).

without any analysis or explanation. Instead, Ameren limited its IRP to the study of resources within MISO, despite a shovel-ready project capable of delivering western Kansas renewable resources directly into Ameren's service territory. Although Ameren has now studied western Kansas renewable resources, it has only done so reluctantly and, unfortunately, inaccurately.

A. Ameren's Use of Winter Capacity Results in Missed Savings for Consumers Relative to the PRP

11. Ameren structures its analysis using winter capacity accreditation to determine how many MISO resources would be displaced by Grain Belt Express-delivered resources. While Grain Belt Express is aware that Ameren has a winter peaking system to consider, placing the exclusive focus on winter capacity accreditation does not result in a holistic view of Ameren's capacity position and overall portfolio of supply side resources. Rather, this focus creates an arbitrary constraint on Ameren's analysis of Grain Belt Express and ignores the potential savings associated with other resource adequacy planning strategies, as further outlined below.

12. Ameren's use of winter capacity as the metric to compare portfolios of Kansas and MISO resources has two notable impacts. First, Ameren reasons that, because solar has an accredited winter capacity value of essentially zero, there is no reason to consider whether a smaller amount of high-quality Kansas solar would displace a larger amount of MISO solar, thereby saving customers money. While Ameren concludes that building 375 and 600 MW of Kansas wind would obviate the need to build 483 and 773 MW of MISO wind, respectively, it performed no similar assessment for solar.[5] By omitting this aspect of the analysis, Ameren failed

[5] *Id.* at pp. 52–53.

to fully account for the benefits of the higher capacity value, the higher capacity factor, and lower capital cost of Kansas resources. Second, by only considering options that would result in the same amount of winter accredited capacity (i.e., no reductions), Ameren created an unnecessary constraint that may leave potential savings for customers on the table. While Grain Belt Express agrees that consideration of winter capacity is appropriate, such consideration need not and should not exclude simultaneous analysis of potential savings to Missouri consumers. As discussed in its Annual Update and its recent application to build the Big Hollow Energy Center, Ameren is moving to significantly increase its accredited capacity. As detailed in testimony in the Big Hollow proceeding, if all projects in Ameren's Preferred Resource Plan are approved, Ameren is projected to be substantially "long" on winter accredited capacity between 2031 and 2040, ranging from an excess of 638 MW to 1,773 MW.[6] In this context, a small net reduction in Ameren's winter capacity position (e.g. 60 MW, as described in the example below) is not material.

13. Reframing Ameren's analysis to remove these arbitrary constraints shows that Kansas resources delivered via Grain Belt Express could displace a substantial amount of Ameren's proposed local development at lower cost to Missouri ratepayers. For example, as shown in the enclosed workpapers,[7] 600 MW of generic Kansas wind resources and 200 MW of generic

[6] File No. EA-2025-0238 (Big Hollow CCN proceeding), Direct Testimony of Matt Michels, p. 22, fig. 11.

[7] Grain Belt Express relied on two workpapers in the development of these comments. Due to size limitations of the Commission's Electronic Filing and Information System, only one of the two workpapers has been filed concurrently herewith. That workpaper is provided in its native Excel format and is titled "Exhibit A - GBX Study Comment Workpapers." The other workpaper, titled "Exhibit B - Wind-Solar Revenues for GBX incl Plans D-F + Arb Est," is available upon request.

Grain Belt Express
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Kansas solar resources could replace 1000 MW of generic MISO wind resources and 700 MW of generic MISO solar resources, generating net benefits of ** [redacted] ** for Missouri consumers. This means that resources delivered via a mere 500 MW share of Grain Belt Express could displace essentially *all* of Ameren's planned post-2030 renewable development (500 MW solar, 1000 MW wind) and 200 of the 1,700 MW of planned solar development between 2024 and 2030, all at lower cost to Missouri consumers.[8]

14. The ability of Grain Belt Express to create savings for consumers comes from the ability to access Kansas resources with high-capacity factors, geographic diversity, and time-shifted availability, which result in higher accredited capacity valuations in the MISO market. The higher quality of Kansas resources means that less needs to be built to achieve similar reliability outcomes. Specifically, the example above (i.e., 600 MW of generic Kansas wind and 200 MW of generic Kansas solar replacing 1000 MW of generic MISO wind and 700 MW of generic MISO solar) results in a benefit of ** [redacted] **.[9] This portfolio also provides an additional increase in capacity that can be monetized by selling into the MISO planning resource auction. Specifically, the example portfolio results in a net increase in accredited capacity in non-winter seasons (+99 MW summer, +118 MW spring, +161 MW fall) and a slight decrease in winter (-60 MW). This

[8] *See* Annual Update at 3, fig. 1.1 (showing PRP timeline).

[9] *See* Exhibit A, GBX Study Comments Workpapers. This value is calculated by summing the avoided MISO resource capital costs and associated interconnection cost; the avoided revenues from those resources in the MISO market; the capital costs of the Kansas resources; and expected market revenues.

Grain Belt Express
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generates an additional benefit of ** [redacted] **.[10]

15. Possessing an ownership share of Grain Belt Express also produces benefits that offset the additional capital cost. Specifically, being able to arbitrage between markets (i.e., buying power in SPP at lower prices and selling in MISO at higher prices using excess capacity on the line) can create benefits for Ameren customers. Grain Belt Express estimates that the arbitrage revenue from a 500 MW share of Grain Belt Express would provide benefits of ** [redacted] **.[11] Although Ameren also acknowledges the arbitrage benefit of the line, their analysis significantly undervalues this benefit as discussed further in Section III below. In addition, as described in the annual update, if MISO were to assign a capacity accreditation to the line itself that could be used to meet Ameren's resource adequacy obligations, which would reduce NPVRR by ** [redacted] **. Although MISO is continuing to evaluate this issue and others in its ongoing stakeholder process related to High Voltage Direct Current issues, Grain Belt Express views accreditation of the line's capacity as highly probable, particularly if Ameren and the Commission ask MISO to prioritize this issue. However, even if the accredited capacity value of the line itself is not considered, delivering Kansas resources via Grain Belt Express would still deliver

[10] This assumes an average value of capacity in MISO at $100/MW-day, which Grain Belt Express views as conservative given Ameren's capacity price projections. *See* Annual update at 46–47 (showing capacity price forecasts from CRA).

[11] As detailed in the workpapers, this value was estimated using Ameren's projections of available capacity on the line with 600 MW of Kansas wind and 200 MW of Kansas solar. The analysis used MISO price information provided by Ameren and projected SPP prices from Wood Mackenzie. The analysis assumed the full available capacity of the line was used for arbitrage when the price spread between SPP and MISO exceeded $8, which serves as a proxy for expected import/export fees.

significant benefits for Missouri consumers.

16. Finally, these resource savings must be considered against the capital cost of the 500 MW share of Grain Belt Express. Pursuant to the terms of the Stipulation, in November 2024, Grain Belt Express provided a range of delivery costs for use in the 2025 update analysis. In its analysis, Ameren used the middle of the provided range. However, based on the most up to date information regarding expected construction costs, Grain Belt Express believes that using the low-end of that range would be more appropriate. For the purposes of the example considered here, using the low-end results in an assumed capital cost that is ** [redacted] ** less than what Ameren used in its analysis. Accordingly, when the benefits discussed herein for this example are netted against the capital cost of the 500 MW share of Grain Belt Express, that results in a net benefit of ** [redacted] ** relative to the PRP.

B. Grain Belt Express Also Provides Important Non-Monetary Benefits That Should be Given Additional Consideration

17. Relying on Grain Belt Express and a smaller number of Kansas resources versus local MISO solar and wind resources will also significantly reduce the impact of Ameren's generating portfolio on Missouri agricultural land. Ameren's 500 MW of projected solar capacity alone would likely encumber a range between 2,500 to 3,500 acres of land in Missouri.[12] This encroachment on Missouri's agricultural land, coupled with growing anti-solar sentiment both locally and at the state level, with calls for a solar moratorium, county caps, and other aggressive

[12] *See, e.g.*, https://seia.org/initiatives/land-use-solar-development/ and https://docs.nrel.gov/docs/fy13osti/56290.pdf, noting that a utility-scale solar project may require between 5 and 7 acres of land per MW of generating capacity.

anti-solar siting constraints, suggest that siting solar in neighboring states is a more attractive and more certain option for Missourians.

18. In contrast, the Grain Belt Express project is designed to have a minimal impact to land within Missouri. In Phase I for the HVDC Main Line, approximately 9 acres will be taken out of agricultural production. For Phase I Tiger Connector approximately 0.2 acres will be taken out of agricultural production. And for Phase II HVDC Main Line, approximately 7 acres will be taken out of agricultural production.[13]

19. As demonstrated in the CRA report, Grain Belt Express will also provide significant reliability benefits to Missouri ratepayers. The report concluded that the "findings presented in [Exhibit 11, Schedule AP-2] are supported by both a growing body of external research and real-world use cases, confirming that HVDC infrastructure, particularly those utilizing Voltage Source Converter (VSC) technology, offers substantial system-wide advantages across multiple transmission planning regions."[14] Specifically, the report confirms that Grain Belt Express' VSC HVDC technology will indeed provide black-start capabilities, supporting independent energization of the grid.[15] CRA also confirmed that, as a VSC HVDC line, Grain Belt Express will be able to provide independent and flexible active and reactive power control, which improves power quality and avoids overloads on AC networks, as well as additional operation benefits including dynamic voltage support, emergency power modulation, and damping of

[13] *See* File No. EA-2023-0017, Report and Order, October 12, 2023, at p. 42.
[14] CRA Report, at p. 20.
[15] CRA Report, at pp. 20–21.

electromechanical oscillations.[16]

20. These benefits are particularly important considering expected data center growth in Missouri. Large-scale AI training jobs that use tens of thousands of Graphics Processing Units face major power management challenges because their power usage fluctuates dramatically. These alternating phases lead to large, rapid power swings, which grow more severe as training scales up. HVDC Converter stations are uniquely positioned to address this issue by leveraging the fast dynamic control capabilities of the converter station for voltage and reactive power management, reducing the need for localized reactive compensation or reinforcement.[17]

21. Finally, CRA also analyzed the impact of Grain Belt Express under extreme weather scenarios. CRA's analysis shows that the addition of Grain Belt Express significantly improved outcomes under extreme events for Missouri customers – reducing the size (in MW) of outages by approximately 50% and reducing the total expected unserved energy by 48%, 54%, and 30% in 2030, 2035, and 2040, respectively.[18] Winter storms Uri and Elliot both placed immense stress on the system and showcased the importance of building not just for expected conditions, but considering extreme scenarios as well. Since then, numerous reports have documented the "insurance" value provided by robust access to interregional transmission during

[16] CRA Report, at pp. 21–22.
[17] *See, e.g.*, Power Stabilization for AI Training Datacenters, available at https://arxiv.org/html/2508.14318v2#S6.
[18] CRA Report, at p. 22.

such events.[19]

III. Additional Issues with The Study Undervalue the Benefits of Grain Belt Express and Associated Kansas Generation

22. In addition to the fundamental issue described above, a number of other discrete issues result in undervaluing the benefits of Grain Belt Express and associated Kansas generation.

23. First, Ameren's analysis of Grain Belt Express significantly undervalues the benefit associated with bidirectional service on Grain Belt Express. In its 2025 IRP update narrative, Ameren provides an estimated NPV of arbitrage benefit at $33 million. To determine the arbitrage value, CRA looked at available capacity for 500 MW of Grain Belt Express in every hour (i.e., 500 after subtracting the capacity used to transmit Kansas wind and solar) and multiplied the available capacity by the SPP-MISO price differential in each hour where the differential was positive, i.e., buying at a lower price in MISO price and selling greater than SPP price).[20] The NPV was calculated at approximately $65 million, and Ameren assumed half of that would accrue to the owner of the line and the other half would accrue to the resource owners in SPP.

24. Grain Belt Express' analysis shows a significantly higher estimated NPV for these benefits of ** [redacted] **.[21] As a threshold matter, Grain Belt Express disagrees with the

[19] *See e.g.*, Grid Strategies, The One-year Anniversary of Winter Storm Uri: Lessons Learned and the Continued Need for Large-Scale Transmission (Describing how new, large-scale transmission capacity reduces the adverse impacts of extreme weather events), available at https://gridstrategiesllc.com/wp-content/uploads/the-one-year-anniversary-of-winter-storm-uri-lessons-learned-and-the-continued-need-for-large-scale-transmission.pdf.

[20] The details of how this arbitrage value was calculated were provided by Ameren personnel via email and are not included in the IRP update filing.

[21] For simplicity, both Grain Belt Express' estimate of arbitrage benefit and Ameren's estimate

assumption that the arbitrage benefit would be split between generator owner and the owner of the transmission (i.e., Ameren). Engaging in arbitrage entails scheduling an import transaction from SPP into MISO. While one could structure a transaction to split the profit between transmission rights holder and particular generator(s), the more straightforward economic approach would be for the transmission rights holder to buy energy in the SPP market at the market clearing price and re-sell that energy in the MISO market. By doing that, the transmission rights holder would keep all the profit, less any applicable fees and charges for imports/exports. With respect to the difference in magnitude of Grain Belt Express' estimates, Ameren has not provided a sufficient explanation.

25. Second, it remains unclear how Ameren accounted for the additional capacity provided by Kansas resources. In response to a request from Grain Belt Express, Ameren personnel provided additional information via email on how it accounted for capacity sales from its resources, including Kansas resources, in calculating its NPVRR. However, at the time of this filing, Grain Belt Express has not yet been able to fully replicate Ameren's results.

26. Third, Ameren used 90 MW rather than 100 MW for Ameren's share of incremental Grain Belt Express resource adequacy value in its analysis. Ameren should have used 100 MW as that represents one-fifth of the total incremental accredited capacity value for the line itself as calculated in the study shared with Ameren.

27. Fourth, the CRA study, which was commissioned by Ameren to evaluate the

only considers the potential value of arbitrage from SPP into MISO. However, there could be additional benefit from arbitrage in the other direction.

reliability and resiliency benefits of Grain Belt Express' HVDC line and the Kansas resource portfolio, inappropriately used an 11-year window to analyze the benefits of Grain Belt Express.[22] An 11-year window is well below the industry standard for transmission investments, considering that SPP's Integrated Transmission Planning (ITP) process, MISO's Transmission Expansion Plan (MTEP), and Ameren's own IRP, all use a 30-40-year analysis. CRA's use of an 11-year window will necessarily result in a significant understatement of the benefits provided by Grain Belt Express.

28. Fifth, CRA utilized nameplate equivalent capacity when comparing generic Kansas wind and solar with Illinois/Missouri wind and solar. Kansas wind and solar have higher production values and will generate more MWhs for the same amount of installed capacity when compared to local MISO resources. Stated differently, the higher quality of Kansas resources lowers the amount of resources that need to be procured and a greater amount of Illinois/Missouri installed capacity will be required to match the generation profile of the Kansas resources with less nameplate capacity. There are significant capital expenditure savings resulting from needing to procure fewer resources, and these savings are not captured in the CRA analysis.

29. Sixth, CRA did not use an appropriate Kansas wind resource in its modeling, which will naturally skew the results of the analysis. Grain Belt Express' wind resources are located in southwest Kansas, while CRA's modeled wind resource is located in Northern Kansas. While not obligated to study a specific Grain Belt Express wind site, in order to model more representative

[22] *See* CRA Report, p. 18, tbl. 8 (showing benefits from 2029 to 2040).

wind for Kansas, Ameren should have at least directed CRA to utilize western and/or southwestern Kansas wind resources given the material variation within the state. Had CRA studied a location in western Kansas, such analysis would have provided more accurate representation of the benefits of the Grain Belt Express associated wind and solar resources.

IV. Conclusion

30. Although Ameren attempts to frame Grain Belt Express as uneconomic (and therefore unworthy of further consideration), the facts show that is simply not the case. When studied without arbitrary constraints and with full consideration of all relevant benefits, Kansas resources delivered via Grain Belt Express show a significant *decrease* in cost to Ameren's ratepayers. Providing a fulsome and unbiased analysis of unique resources like Grain Belt Express and associated generation is critical given the steadily increasing cost of electric service for Missouri consumers and the increasing difficulty of siting wind and solar in Missouri. Indeed, a more fulsome analysis that considers other combinations of resources *could reveal even greater benefits* than the several hundred million dollars in potential savings that Grain Belt Express has identified here.