Exhibit No. 8

Grain Belt Express LLC – Exhibit 8
Carlos Rodriguez
Surrebuttal Testimony
File No. EA-2023-0017

Exhibit No.:	
Issue(s):	Physical and Operating Characteristics of the Project, RTO Interconnection Issues
Witness:	Carlos Rodriguez
Type of Exhibit:	Surrebuttal Testimony
Sponsoring Party:	Grain Belt Express LLC
File No.:	EA-2023-0017
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MISSOURI PUBLIC SERVICE COMMISSION

FILE NO.

EA-2023-0017

SURREBUTTAL TESTIMONY

OF

CARLOS RODRIGUEZ

ON

BEHALF OF

GRAIN BELT EXPRESS LLC

MAY 15, 2023

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I. INTRODUCTION

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

A. My name is Carlos Rodriguez, and I am Senior Vice President of Interconnections and Grid Analysis at Invenergy LLC ("Invenergy"). My business address is One South Wacker Drive Suite 1900, Chicago, IL, 60606.

Q. Have you previously submitted testimony in this proceeding?

Yes, I submitted direct testimony on August 24, 2022 and accompanying exhibits/schedules identified as Schedules CR-1 through CR-3.

Q. What is the purpose of your surrebuttal testimony?

A. I am testifying to address issues discussed in the rebuttal testimony submitted by Missouri Public Service Commission ("MPSC" or "Commission") Staff Witnesses Alan Bax, Michael Stahlman, and Claire Eubanks on April 19, 2023. I also respond to Staff's Report, filed on April 19, 2023, and several public comments submitted at Public Hearings held March 6–8, 2023 in accordance with the Commission's *Order Setting Local Public Hearings and Directing Notice,* issued February 8, 2023.

II. UPDATES ON INTERCONNECTION STUDIES, AGREEMENTS, AND COSTS

Q. Could you please provide an update on the MISO interconnection requests?

A. MISO has completed all studies for the MHCP requests (H104 and H105) and all results for those are final. With regard to the injection requests (J1488 and J1490), which are part of the DPP3 2019-Central Cluster, MISO provided draft results for the system impact study in January 2023. MISO provided a final report on March 30th, 2023. The only MISO study pending completion at this point is the facilities study, which was expected to be completed in May 2023. However, MISO has communicated that there is a delay in the completion of the facilities study

and the new estimated date is June 2023. After the facilities study is completed, the next step is to sign a transmission connection agreement, which is expected to happen in July 2023.

Q. What are the expected upgrade costs?

A. The network upgrade costs related to the MHCP requests (H104 and H105) are $144,248,000. This number is final and will be included in the transmission connection agreement. The network upgrade costs related to the injection positions (J1488 and J1490) are $154,959,241, inclusive of affected system studies. This is based on the latest MISO DPP3 report released on March 30th, 2023. This number may be revised after the completion of the facilities study, expected in June.

Q. Could you provide an update on the PJM interconnection requests?

A. An update per queue position is provided below.

AF1-088 (1,000 MW Energy/1,000 MW capacity, injection/withdrawal): PJM completed the feasibility study in January 2020 and the system impact study was completed in February 2022. It is important to point out that PJM filed language to reform its interconnection procedures on June 14, 2022, with FERC approving the filing on November 29, 2022. The effective date of the filing was January 3, 2023, and implementation of the new procedures will begin on the Transition Date (meaning, the date of the official implementation of the queue reform procedures) currently anticipated in July 2023. The filing encompasses a new interconnection process framework and transition mechanism for projects currently in the queue. The new framework will move from a serial process to a cluster-based study process. PJM has completed the studies for all projects in queue windows AD2 and prior to be grandfathered under the current procedures, which is the prerequisite for establishing the Transition Date. PJM also will grandfather projects into the existing process in queue windows AE1-AG1 that contribute to Network Upgrades of less than or

equal to $5 million. PJM will study the remaining AE1-AG1 projects in a transitional cluster under the new rules to be completed in 2025. PJM will then study projects in AG2-AH1 in a second transitional cluster under the new rules to be completed in 2026. All projects in AH2 and beyond will be subject to the new rules. Based on the approved PJM interconnection process framework, it is expected that Grain Belt Express queue position AF1-088 will enter the first transitional cluster for restudy, which is expected to be completed in 2025. The interconnection costs and network upgrades identified in this future transitional cluster will likely be different than what has been identified by PJM for AF1-088 due to updated cost allocation procedures through the clustered study approach.

AF2-008 (1,000 MW Energy/500 MW capacity, injection): PJM completed the feasibility study in July 2020 and the system impact study was completed in April 2022. Based on the approved PJM interconnection process framework, it is expected that Grain Belt Express queue position AF2-008 will enter the first transitional cluster for restudy, which is expected to be completed in 2025. The interconnection costs and network upgrades identified in this future transitional cluster will likely be different than what has been identified by PJM for AF2-008 due to updated cost allocation procedures through the clustered study approach.

AH1-084 (500 MW Energy/500 MW capacity, injection): PJM has not started the studies for this queue position. Based on the approved PJM interconnection process framework, it is expected that Grain Belt Express queue position AH1-084 will enter the second transitional cluster, which is expected to be completed in 2026.

AH1-085 (500 MW Energy/500 MW capacity, withdrawal): PJM has not started the studies for this queue position. Based on the approved PJM interconnection process framework, it is

expected that Grain Belt Express queue position AH1-085 will enter the second transitional cluster, which is expected to be completed in 2026.

Q. What are the expected upgrade costs?

A. The expected upgrade costs are as follows:

AF1-088 (1,000 MW Energy/1,000 MW capacity, injection/withdrawal): The system impact study identified a total of $200,029,000 in interconnection costs, including $3,517,000 in total physical interconnection costs and $196,512,000 in allocation towards system network upgrades. However, the interconnection costs and network upgrades identified in the future transitional cluster will likely be different than what has been identified by PJM for AF1-088 due to updated cost allocation procedures through the clustered study approach.

AF2-008 (1,000 MW Energy/500 MW capacity, injection): The system impact study identified a total of $164,875,800 in interconnection costs, including $45,000 in total physical interconnection and $164,830,800 in allocation towards system network upgrades. However, the interconnection costs and network upgrades identified in the future transitional cluster will likely be different than what has been identified by PJM for AF2-008 due to updated cost allocation procedures through the clustered study approach.

AH1-084 (500 MW Energy/500 MW capacity, injection): The interconnection costs and network upgrades will be identified within the future transitional cluster.

AH1-085 (500 MW Energy/500 MW capacity, withdrawal): The interconnection costs and network upgrades will be identified within the future transitional cluster.

Q. Do you have any updates on the SPP interconnection agreement?

A. The fully executed interconnection agreement with ITC and SPP that was signed on October 17th, 2016 is currently being negotiated for an amendment to change the commercial

operation date, update the HVDC technology from line commutated converter (LCC) to voltage sourced converter (VSC), update the interconnection costs, and include the increase in project size to 5 GW. At the same time, the increase to 5 GW is being studied as part of the SPP Transmission Working Group (TWG) process. To this date, the steady state study for the 4 GW VSC project has been completed and the results were presented to TWG on June 7, 2022. The next steps for the 4 GW project were to perform short circuit and stability studies and present the results to TWG for approval. However, in August 2022, SPP developed new HVDC criteria that would apply to any new HVDC project. When Grain Belt requested the increase in project size to 5 GW, SPP directed Grain Belt to follow the new HVDC criteria and redo the steady state study for 5 GW, as well as all the studies that are part of the new criteria. The new criteria comprise of three studies: a feasibility study, a planning study, and a design study. In this regard, Grain Belt developed a scope of work for the feasibility study and for the planning study. The scope of work for both studies was approved by SPP TWG on May 2, 2023. The expectation is that the studies will be completed by the end of 2023 to early 2024.

Q. What are the expected upgrade costs?

A. The cost of upgrades for the SPP/ITC interconnection is estimated at $16,973,215.

Q. Do you have any updates on the AECI interconnection agreement?

A. The AECI interconnection agreement was executed in December 2021 and amended in November 2022. AECI continues to engineer and procure the interconnection facilities and network upgrades for the interconnection of the Grain Belt Project. To this date, Grain Belt has posted a total of $22,721,000 in security to AECI and has paid a total of $8,019,054 in cash to cover invoices for work completed.

Q. What are the expected upgrade costs?

A. The total cost of upgrades for the AECI interconnection are $98,618,000, including interconnection facilities, network upgrades, and affected systems upgrades in the MISO system.

Q. Staff Witness Shawn Lange, on Pages 11–12 of his Rebuttal Testimony, expresses concern that because the interconnection studies have not been completed the full range of interconnection upgrade costs is unknown. How do you respond?

A. Based on the current status of the interconnection processes in the different RTOs and AECI, most of the interconnection upgrade costs for phase I of the project (Kansas to Missouri) are final at this time. The costs for the interconnection in Indiana to PJM for phase II will be final once PJM completes the transitional cluster that Grain Belt will be a part of. See details below.

SPP: ITC has updated the costs and the $16,973,215 is final and will be included in the amended interconnection agreement.

AECI: The interconnection process with AECI was completed and the $98,618,000 costs are final since December 2021.

MISO: The interconnection studies for the MHCP queue positions (H104 and H105) are complete and the $144,248,000 costs are final. The interconnection process for the injection positions (J1488 and J1490) is close to completion with MISO already completing the last phase of the system impact studies (DPP3) on March 30, 2023. From these studies MISO provided a specific list of final network upgrades that will not change. Along with that, MISO provided planning level cost estimates for a total of $98,259,507, excluding the AECI affected system study costs, which are a total of $56,699,734 and are final. Therefore, the only costs that need to be refined are the $98,259,507, which MISO will provide as a result of the facilities study that is underway and expected to be completed in June 2023.

PJM: The costs for AF1-088 and AF2-008 will be final once PJM completes the transitional cluster study in 2025. The costs for AH1-084 and AH1-085 will be final once PJM completes the transitional cluster study in 2026.

III. RESPONSE TO STAFF'S CONCERNS REGARDING INTERCONNECTION COSTS

Q. On page 5, lines 8–10 of his Rebuttal Testimony, Staff Witness Alan Bax states that the Project's "system improvements will be part of Ameren Missouri's revenue requirement in relation to the operating zone associated with the formula rate set by the Federal Energy Regulatory Commission." Staff Witness Michael Stahlman makes similar statements in his Rebuttal Testimony.[1] How do you respond?

A. That is not correct. The cost of improvements to Ameren Missouri's system to connect the Project will be borne by Grain Belt Express. MISO's open access transmission tariff is clear on this point:

> MHVDC Connection Customer [here, GBX] shall be responsible for the costs of all upgrades to allow full output of the proposed MHVDC Transmission Line, including any costs associated with Injection Rights, as identified by the stability, steady state and other studies identified in Sections 3.2.2 and/or 3.2.3.3 of these MHCP.[2]

As defined by the MHCP, Grain Belt Express is a MHVDC Connection Customer, and the Project is a MHVDC Transmission Line. As a result, and as set forth in the above paragraph, Grain Belt Express *shall* be responsible for the costs of *all* upgrades of the Project.

[1] Michael Stahlman Rebuttal Testimony, p. 8:17–19 ("As mentioned by Staff witness Alan Bax, any improvements made by Ameren Missouri would become part of Ameren Missouri's load zone revenue requirement for FERC formula rates.")

[2] MISO Tariff, Attachment GGG § 3.2.4 ("Att. GGG"); *see also* Att. GGG, App. 2 (Transmission Connection Agreement) § 5.4.2.2 (regarding MHVDC Connection Customer's responsibility for payment of operation and maintenance costs associated with Transmission Owner Connection Facilities))

Q. Mr. Bax notes that Grain Belt Express and Ameren Missouri have not entered into an agreement regarding "required system improvements that will be needed" for injection of energy into MISO's system like Grain Belt Express has with AECI. How do you respond?

A. MISO has completed all studies for the MHCP requests (H104 and H105) and all results for those are final. MISO has already tendered the TCA for negotiations and Grain Belt is actively engaged in negotiations with MISO and Ameren. The TCA is expected to be executed once the facilities study (the only remaining study) for the injection requests is completed by MISO, in the June 2023 timeframe.

IV. RESPONSE TO STAFF'S CONCERNS REGARDING INJECTION RIGHTS

Q. Staff Witness Michael Stahlman on page 4, lines 11–13 of his Rebuttal Testimony, asserts, "It is possible that Invenergy would not seek full injection rights, thus placing the burden of any interconnection costs on either the generators injecting into MISO or the customers using the project." Mr. Stahlman makes similar assertions on page 6, lines 3–6 and page 7, lines 3–8. How do you respond?

A. The premise behind Mr. Stahlman's assertion is incorrect. Grain Belt Express has requested injection rights for 1,500 MW into MISO and as discussed above, the process to procure these rights is nearly complete. As I note above, the studies for the MHCP requests (H104 and H105) are complete. The only pending item from the DPP3 is the Facilities Study, which was expected to be completed in May 2023, but is now expected in June of 2023 due to delays on MISO and Ameren's end. Grain Belt Express and MISO are in active communication about its status. Finally, Grain Belt Express has already committed to providing Staff with interconnection

studies as they are completed[3] and would agree to continue providing those studies as a condition to this approval.

V. RESPONSE TO STAFF'S CONCERNS REGARDING BIDIRECTIONAL FLOW

Q. Mr. Stahlman asserts on page 4, lines 1–10 that Invenergy will need to submit a new application for bidirectional flow because its current application is for unidirectional flow and bidirectional flow would be a substantial modification. How do you respond?

A. Section 3.2.1 of Attachment GGG to the MISO Tariff establishes:

> MHVDC Transmission Connection Service is provided to physically interconnect an MHVDC Transmission Line to the Transmission System with or without Injection Rights. MHVDC Transmission Connection Service does not confer on any entity any transmission service rights or generator interconnection rights with respect to the Transmission System. MHVDC Connection Customers may procure Transmission Service pursuant to Module B of the Tariff. MHVDC Connection Customers are not eligible to procure Interconnection Service under the Tariff, but may obtain Injection Rights on the Transmission System as set forth in Section 3.2.3 of these MHCP and Attachment X of the Tariff.

As defined, injection rights are established separately through the Generator Interconnection Process, as outlined in Attachment X to the MISO tariff. Withdrawal rights are established through the procurement of transmission service via Module B of MISO's Tariff. If a GBX customer were to desire to withdraw power from MISO in the future and submit a Transmission Service Request (TSR), either independently or through Grain Belt Express, MISO performs analyses on the request to ensure the request is feasible, and if so, allocates those rights. If a TSR were infeasible, the TSR would be denied or the customer would be given an option to fund upgrades to allow the request to become feasible. Once Transmission Service is acquired, the customer can transact in

[3] Case No. EA-2016-0358, Report and Order on Remand, p. 51 (Mar. 20, 2019)). Ordering Paragraph 2 of the Report and Order on Remand ("Report & Order on Remand") requires Grain Belt Express to adhere to the conditions in Exhibit 206. Exhibit 206 provides that "Grain Belt Express will provide Staff with completed RTO Interconnection Agreements and any associated studies." Report & Order on Remand, Att. 1.

the MISO market within the bounds of their Transmission Service. Regardless, that service is provided separate from the MHVDC connection service and will not require the Project to file a new interconnection request under Attachment GGG.

As it would be difficult for GBX to foresee what kind of market transaction a future customer may desire, GBX has not submitted a request to MISO for Transmission Service to withdraw energy from their market at this time. A future GBX customer does have that option, and if they exercise that option, GBX's Transmission Connection Service established under Attachment GGG does not change, and hence no changes are necessary to the Transmission Connection Agreement between MISO, GBX, and Ameren.

Q. On Page 12 of her Rebuttal Testimony, Staff Witness Claire Eubanks references a MISO quote that characterizes the Project as a long generator lead line. How do you respond?

Ms. Eubanks quotes from a filing made by MISO in EL-22-0083, which states:

> Invenergy's proposal in MISO is centered on Injection Rights and is for the unidirectional flow only. Essentially, Invenergy has only requested to operate the GBX Line as a long generator lead line.

It is incorrect to characterize the Grain Belt Project as a long generator lead line. Even though Grain Belt has not requested withdrawal rights from MISO, the project has the technical capabilities for bidirectional flow. Therefore, GBX customers can request withdrawal rights in the future by acquiring Transmission Service via Module B of the MISO tariff. In addition, the GBX facilities will have networked connections in between the MISO point of interconnection and the applicable generators, eliminating the option of using the GBX assets as just a generator lead line.

VI. RESPONSE TO STAFF'S CONCERNS ABOUT THE PROJECT'S BLACK START CAPABILITIES

Q. On pages 16–17 of her Rebuttal Testimony, Ms. Eubanks expresses concerns about studies necessary to designate the Project a black start resource. How do you respond?

A. As witness Eubanks notes, it is true that in order for the Project's facilities to provide black start/system restoration service, a transmission owner would need to perform engineering studies to confirm the Project's black start/system restoration value, recommend inclusion in a black start/system restoration plan and enter into the necessary arrangement with Grain Belt Express.

However, I disagree with Ms. Eubanks' conclusion that the Commission should not rely on the Project as a potential black start/system restoration resource. Though registration, studies, and agreements are necessary for the Project to be used as a black start/system restoration resource, the Project is operationally capable of providing this service, as outlined in the Guidehouse Report submitted with Anthony Petti's Direct Testimony (Schedule AP-2).[4] Furthermore, black start/system restoration needs will continue to evolve in coming years and potentially increase due to retirements of large local MISO base load units. The fact the Project will be operationally capable of acting as a black start/system restoration resource certainly makes it a relevant factor to the Commission's ultimate determination of whether the Project is in the public interest. Additional assets capable of providing black start/system restoration services in Missouri are clearly in the public interest. Therefore, Grain Belt Express believes the Commission should give the Project's black start/system restoration capability the weight that it is due.

[4] *See* Anthony Petti Direct Testimony, Schedule AP-2, p. 33–34 (Apr. 19, 2023) (providing real-life examples of VSC HVDC being used as a black start resource). Schedule AP-2 is the Guidehouse Report.

Q. On Page 17 of her Rebuttal Testimony, Ms. Eubanks recommends the Commission Order Grain Belt Express "to provide notice to Staff that the Project has been designated a system restoration resource if that designation occurs in the future." How do you respond?

A. Grain Belt Express does not object to the recommendation to provide notice, but such notice may be subject to or limited by external confidentiality protections limiting disclosure of certain documents or information.

VII. RESPONSE TO STAFF'S RECOMMENDATIONS FOR DEFINING MATERIAL CHANGE

Q. On page 9 of Mr. Stahlman's Rebuttal Testimony, he recommends adding further clarification on what constitutes a material change. What is the scope of your response?

A. Mr. Stahlman's recommends the following items be defined as a material change: (1) a change in the converter station location or point(s) of interconnection, (2) a modification of 100 MW in converter station design size, (3) a change of a half billion dollars in estimated cost; or (4) a change to injection rights and withdrawal rights.

Rolanda Shine's Surrebuttal Testimony addresses a change of a half billion dollars in estimated cost. Aaron White's Surrebuttal Testimony addresses changes to converter station location or point(s) of interconnection and modifying converter station design size by 100 MW. My response addresses changes to injection rights and withdrawal rights.

Q. What is Grain Belt Express' position on the need to establish an explicit definition for "material change"?

A. Mr. Stahlman's bright line definitions for "material change" are not necessary because, as indicated by the current Amendment Application, Grain Belt Express will file an

updated application with the Commission if there are design and engineering changes that are materially different from the certificated Project. Mr. Stahlman has not demonstrated why defining material changes is necessary, given Grain Belt Express' demonstration of compliance with the current condition.

Q. How do you respond to Mr. Stahlman's recommendation that material change should be defined as "a change of 100 MW of obtaining the injection rights of the full 1,500 MW into MISO and 1,000 MW into AECI, or a change in 100 MW of obtaining the rights to withdraw from MISO a [sic] currently proposed 0 MW"?[5]

A. First of all, a bright line definition is not necessary, as explained above. However, with regard to injection rights, if the point of interconnection ("POI") is changed or the injection rights of the project are increased beyond what is memorialized in the Transmission Connection Agreement ("TCA"), this would require a new interconnection request via Attachment X of the MISO tariff and a TCA amendment thereafter and therefore, it could be a material change for the purpose of the Commission's condition. With regard to withdrawal rights, since those are obtained via transmission service, as long as the withdrawal amount remains within the project's technical capability as reflected in its interconnection agreements with AECI and/or MISO, it should not be a material change.

VIII. CONCLUSION

Q. Does this conclude your testimony?

A. Yes, it does.

[5] Michael Stahlman's Rebuttal Testimony, p. 9 (Apr. 19, 2023) ("Stahlman Rebuttal Testimony").

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Grain Belt Express LLC for an Amendment to its Certificate of Convenience and Necessity Authorizing it to Construct, Own, Operate, Control, Manage, and Maintain a High Voltage, Direct Current Transmission Line and Associated Converter Station	))))))	File No. EA-2023-0017

AFFIDAVIT OF CARLOS RODRIGUEZ

1. My name is Carlos Rodriguez, I am Senior Vice President of Interconnections and Grid Analysis at Invenergy LLC ("Invenergy"). My business address is One South Wacker Drive Suite 1900, Chicago, IL, 60606.

2. I have read the above and foregoing Rebuttal Testimony and the statements contained therein are true and correct to the best of my information, knowledge, and belief.

3. Under penalty of perjury, I declare that the foregoing is true and correct to the best of my knowledge and belief.

Carlos Rodriguez
Senior Vice President of Interconnections and Grid Analysis
Invenergy LLC

Date: 5/12/23

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