Midwest Energy Inc.

Interconnection Facilities Study for ERAS-2025-019

April 20, 2026

Contents

Study Overview

At the request of Southwest Power Pool (SPP), Midwest Energy (Midwest) developed this generation Interconnection Facilities Study (IFS) for request ERAS-2025-019 based on the results of Expedited Resource Adequacy Study 2025-001 (ERAS-2025-001). As studied in ERAS-2025-001, ERAS-2025-019 is a solar generation facility totaling 80 MW of generation interconnecting to the North Kinsley 115 kV bus. The proposed commercial operation date of the generation is December 15th, 2028, according to the SPP GI Queue.

The purpose of this study is to provide estimated costs of facilities required for interconnection of the proposed generation to Midwest's transmission system and to identify scope and estimated costs for network upgrades required on Midwest's transmission system to allow the generation to run at the full requested capacity. Additional network upgrades required for facilities of other transmission owners are not included in this study and will be identified by SPP.

Interconnection Facilities and Network Upgrades

ERAS-2025-019 has proposed to interconnect at Midwest's North Kinsley 115 kV substation. North Kinsley is presently served by a radial 115 kV line connected to a single source at the St. John 115 kV substation. Load is also served from additional taps on the radial 115 kV line at Edwards, Pawnee, and Larned 115 kV substations. A map of the area 115 kV system can be found in Figure 1.

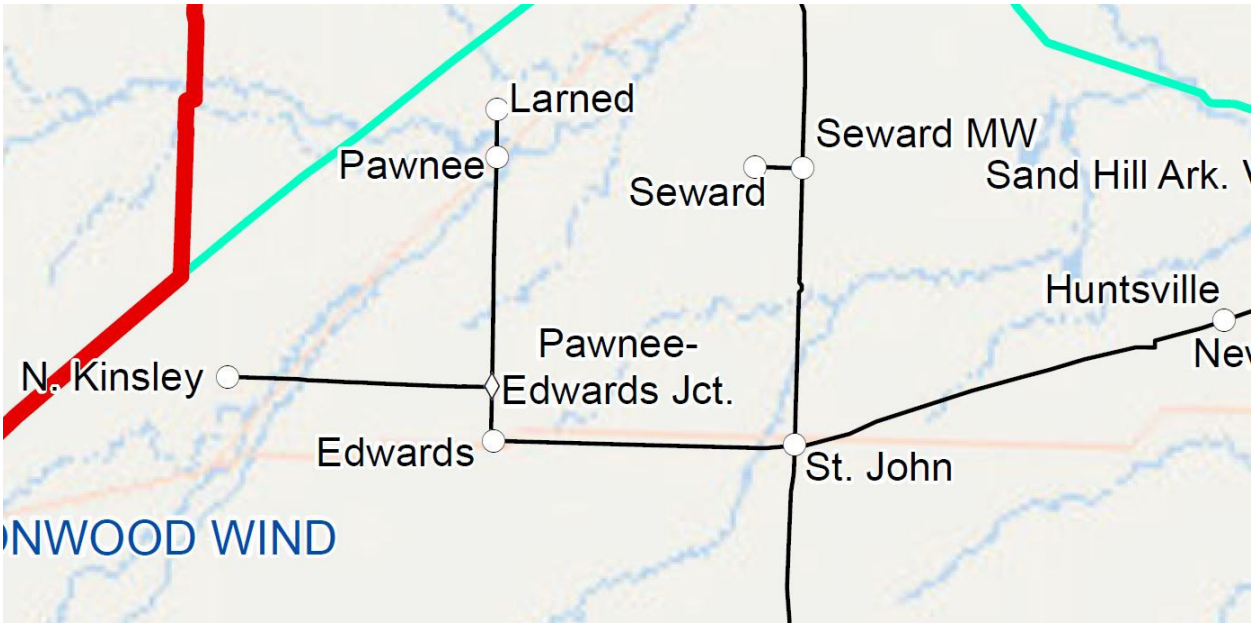


Figure 1 - Area 115 kV Map

The North Kinsley 115 kV bus is a radial or straight bus configuration containing the 115 kV line from St. John, one 115/34.5 kV transformer, and one 115 kV capacitor bank. There is no 115 kV breaker or other interrupting device on the 115 kV line, and the 115/34.5 kV transformer has only fuses. The 115 kV bus is also bounded closely by roads on the west and north sides. An aerial image of the North Kinsley 115 kV substation can be found in Figure 2.

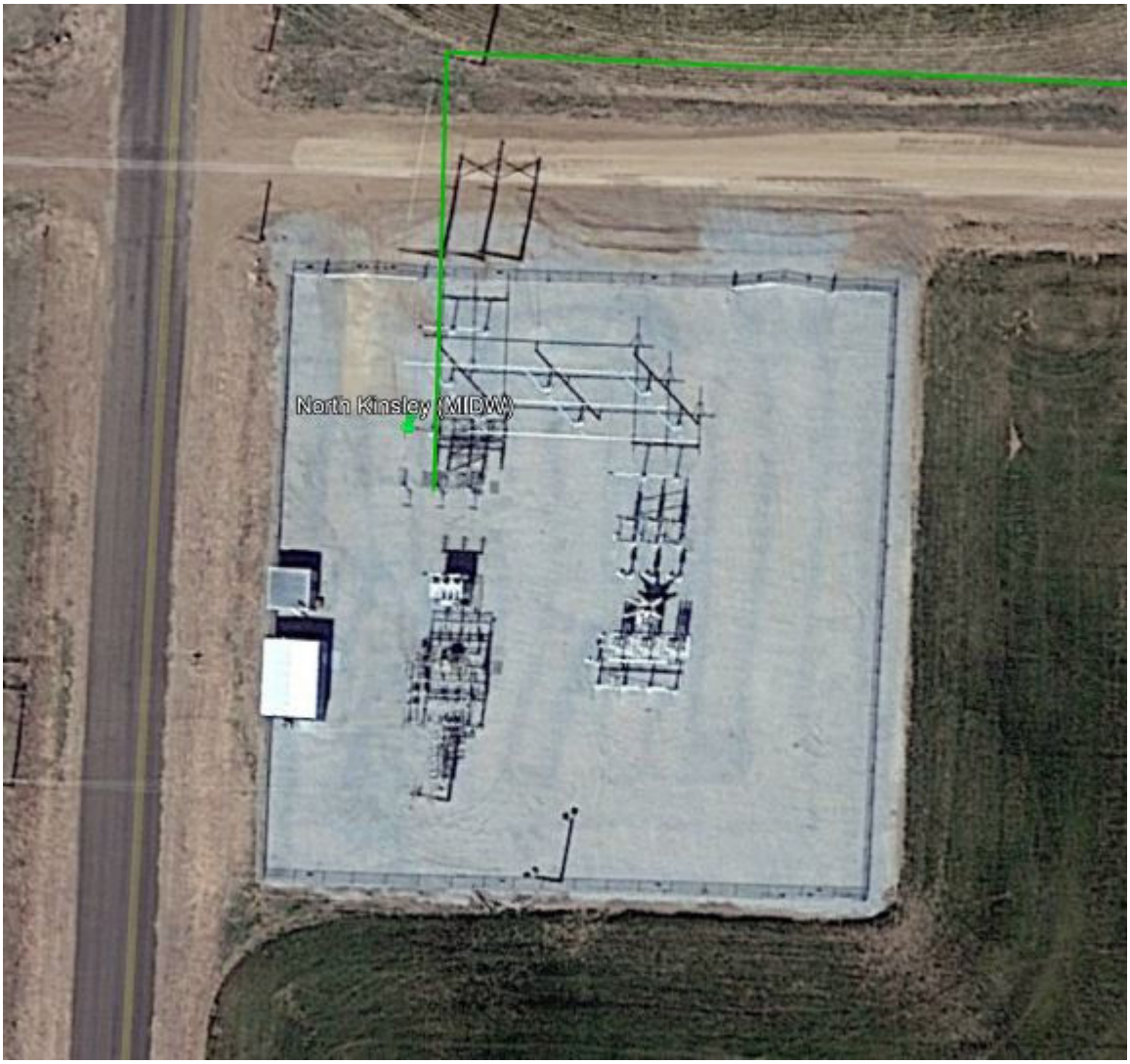


Figure 2 - North Kinsley 115 kV substation

Because of the 115 kV physical bus arrangement, electrical arrangement with lack of protection and control devices, and physical constraints around the substation, it will be necessary to construct a new site for interconnection of ERAS-2025-019. The new interconnection station will be constructed as a three-position ring bus in close proximity to the existing North Kinsley 115/34.5 kV substation. The existing 115 kV line from St. John will be re-terminated into the new ring bus, and a tie from the new ring bus to the existing North Kinsley substation will be constructed. The proposed arrangement of the new interconnection station is shown in Figure 3.

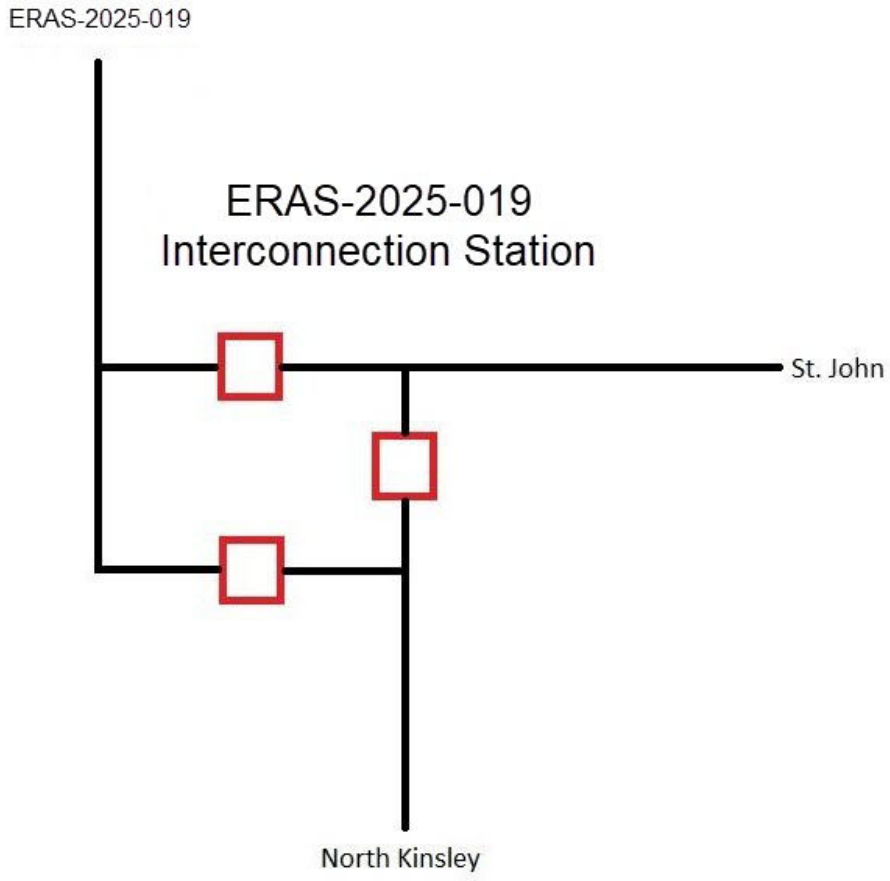


Figure 3 - Proposed ERAS-2025-019 Interconnection Station

Additional Network Upgrades will be required for the existing 115 kV transmission line and the 115 kV line terminals at the St. John, Edwards, and Pawnee substations. The Summer Normal Rating of the 115 kV line between North Kinsley and Pawnee-Edwards Jct. is currently 77 MVA due to ground clearance limitations and will not support the full 80 MW requested generation. In order to increase ground clearance, H-Frame transmission structures will need to be replaced to allow Midwest to increase the rating of the 115 kV line to 89 MVA which is the maximum Summer Normal Rating allowed by Midwest's Facility Rating Method in compliance with NERC Reliability Standard FAC-008-5.

Network Upgrades will also be required for the 115 kV line terminals at St. John, Edwards, and Pawnee. The existing 115 kV line serves only load, and the protection settings will need to be evaluated to make sure they are coordinated correctly with the added generation source at North Kinsley. Power line carrier communication will also need to be installed to allow implementation of a directional comparison blocking scheme to ensure the line does not trip at St. John for faults on the ERAS-2025-019 generator lead.

A summary of costs for both Interconnection Facilities and Midwest identified Network Upgrades can be found in Table 1.

Table 1 - Interconnection Facility and Network Upgrade Cost Estimate

Description	Total Cost
Engineering Labor	$410,130.00
Construction Labor	$2,583,819.00
Property Acquisition	$58,590.00
Material	$3,786,671.70
Contingency	$2,051,763.21
Total Interconnection Facilities and Network Upgrades	$8,890,973.91

Project Timeline

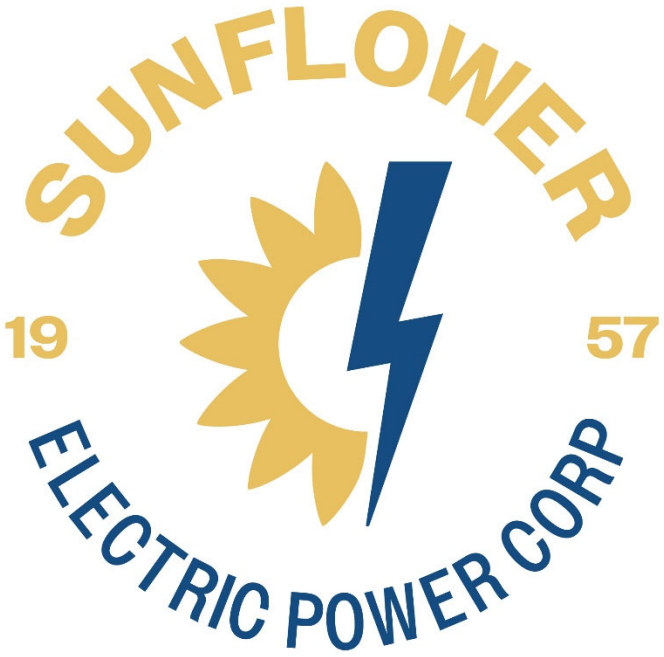
The SPP GI Queue states the proposed commercial operation date is December 15, 2028. The requested in-service date may not be feasible due to the extensive nature of the Network Upgrades required in this IFS and long lead times of required equipment and materials. Specific construction schedule and milestones will be determined during the Generator Interconnection Agreement negotiations.

Fault Analysis

In addition to the power flow and stability analyses detailed in ERAS-2025-01, Midwest reviewed the short circuit analysis to determine if the addition of the proposed generation caused fault levels on the Midwest Energy transmission system to exceed interrupting device capabilities. The results of the fault analysis indicate that fault levels in the area are not significantly increased by the addition of ERAS-2025-019. There are no system fault levels that exceed fault interrupting ratings of existing equipment on Midwest's transmission system.

Sunflower
ELECTRIC POWER CORP

Interconnection Facilities Study
for ERAS-2025-001 Network Upgrade:
Build the HOLCOMB7 to HOLCOMB3 345 kV Transformer 2



April 20, 2026

TABLE OF CONTENTS

STUDY OVERVIEW:

The Southwest Power Pool has requested a Facility Study for a Network Upgrade from Sunflower Electric Power Corporation (Sunflower). The Network Upgrade identified includes a new 345/115 kV transformer at the existing Holcomb Substation.

The cost of Sunflower's portion of building a new 345/115 kV transformer at the existing Holcomb Substation and associated upgrades is estimated at $26,301,311 (UID: 172046).

SPP's ERAS-2025-001 identified Network Upgrades included with this Facilities Study are associated with the following:

- ERAS-2025-015
  - $13,150,655.50
- ERAS-2025-017
  - $13,150,655.50

The purpose of this study is to provide estimated costs of facilities required for interconnection of the proposed generation to Sunflower's transmission system and to identify scope and estimated costs for network upgrades required on Sunflower's transmission system to allow the generation to run at the full requested capacity.

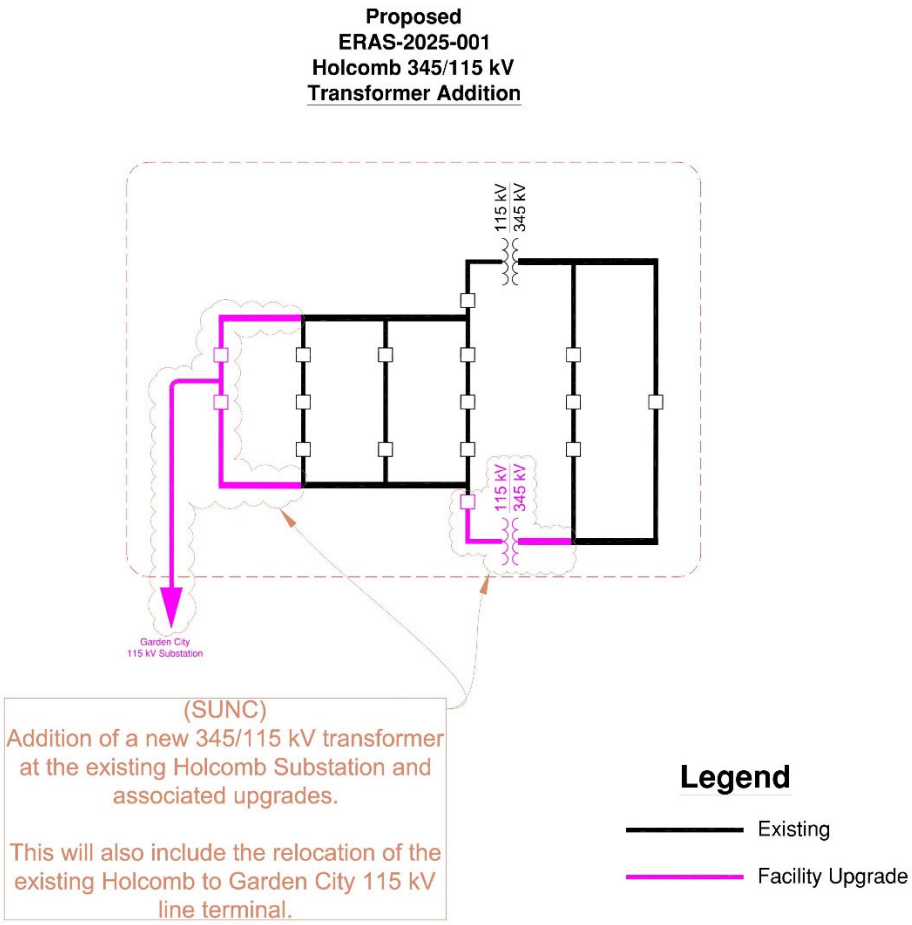
Additional network upgrades required for facilities of other transmission owners are not included in this study and will be identified by SPP.

SHARED NETWORK UPGRADES:

Network Upgrades included in this study consist of adding a new 345/115 kV transformer at the existing Holcomb Substation required by SPP. The new 345/115 kV transformer and associated upgrades shall be constructed and maintained by Sunflower.

The proposed arrangement for upgrades for ERAS-2025-001 is shown in Figure 1.

Figure 1: One-line Diagram Facilities for ERAS-2025-001



INTERCONNECTION COSTS:

Summary of interconnection costs for both Interconnection Facilities and Sunflower identified Network Upgrades can be found in the following table.

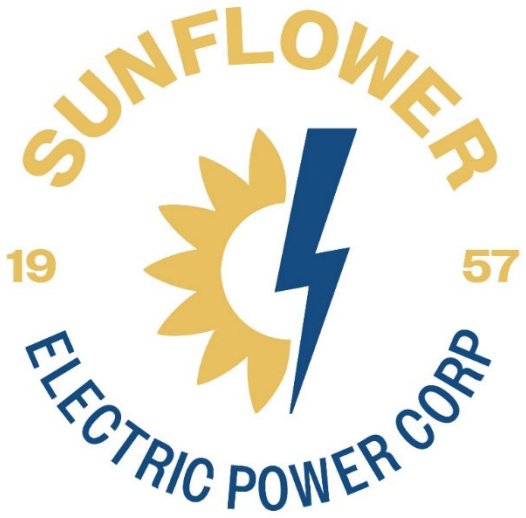
Upgrade Type	UID	Upgrade Name/Description	DISIS Cost Estimate	DISIS Lead Time
Current Study	172046	**Build the HOLCOMB7 to HOLCOMB3 345 kV Transformer 2** Construct the addition of a new 345/115 kV transformer at the existing Holcomb Substation required for **ERAS-2025-015**	$13,150,655.50	40
Current Study	172046	**Build the HOLCOMB7 to HOLCOMB3 345 kV Transformer 2** Construct the addition of a new 345/115 kV transformer at the existing Holcomb Substation required for **ERAS-2025-017**	$13,150,655.50	40
		Total Interconnection Cost:	**$26,301,311**	

PROJECT TIMELINE:

Specific construction schedule and milestones will be determined during the Generator Interconnection Agreement negotiations. Sunflower is estimating an engineering and construction schedule for this project as approximately 40 months. Other factors associated with clearances; equipment procurement delays and work schedules could cause additional delays. This is applicable after all required agreements are signed and internal approvals are granted.

Sunflower
ELECTRIC POWER CORP

Interconnection Facilities Study
for ERAS-2025-001 Network Upgrade:
Rebuild the SEWARD 3 to ST-JOHN3 115 kV Line 1



April 20, 2026

TABLE OF CONTENTS

STUDY OVERVIEW:

The Southwest Power Pool has requested a Facility Study for a Network Upgrade from Sunflower Electric Power Corporation (Sunflower). The Network Upgrade identified includes a rebuild of the St. John to Seward 115 kV transmission line to achieve a minimum rating of 115 MVA.

The cost of Sunflower's portion of rebuilding of the St. John to Seward 115 kV transmission line is estimated at $14,690,000 (UID: 172061).

SPP's ERAS-2025-001 identified Network Upgrades included with this Facilities Study are associated with the following:

- ERAS-2025-032
    - $14,690,000

The purpose of this study is to provide estimated costs of facilities required for interconnection of the proposed generation to Sunflower's transmission system and to identify scope and estimated costs for network upgrades required on Sunflower's transmission system to allow the generation to run at the full requested capacity.

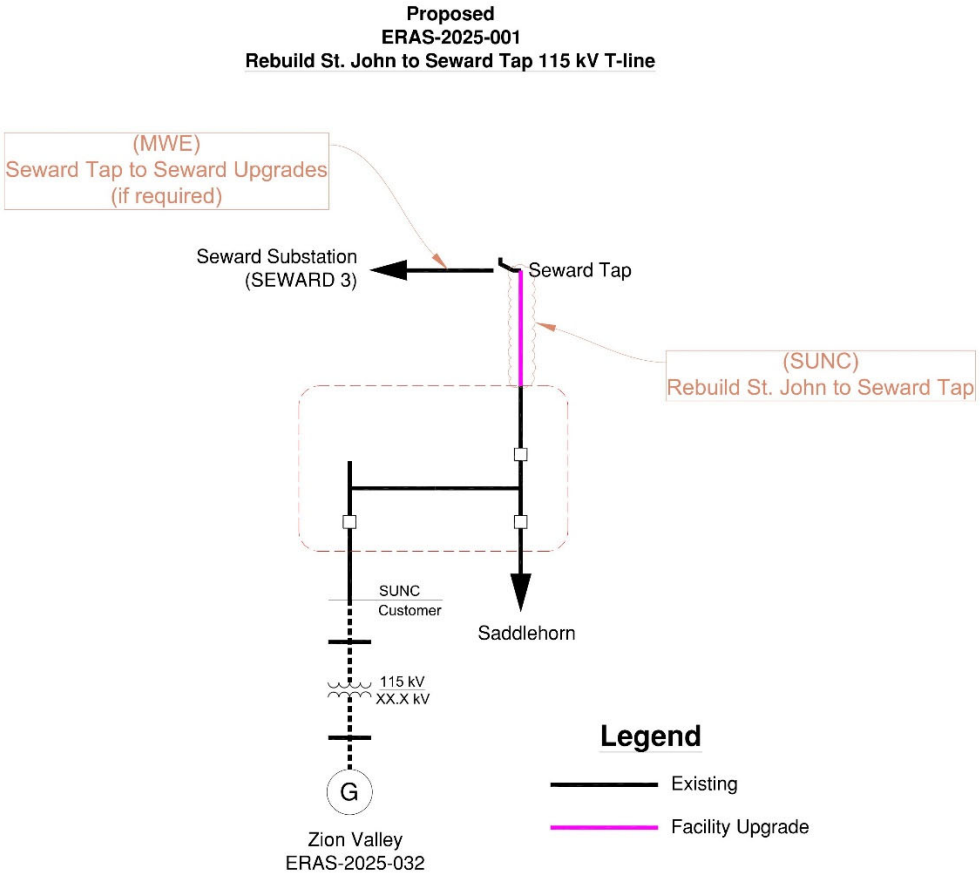
Additional network upgrades required for facilities of other transmission owners are not included in this study and will be identified by SPP.

INTERCONNECTION FACILITIES AND NON-SHARED NETWORK UPGRADES:

Network Upgrades included in this study consist of rebuilding the St. John to Seward 115 kV transmission line required by SPP. The rebuild and associated upgrades shall be constructed and maintained by Sunflower.

The proposed arrangement for upgrades for ERAS-2025-001 is shown in Figure 1.

Figure 1: One-line Diagram Facilities for ERAS-2025-001



INTERCONNECTION COSTS:

Summary of interconnection costs for both Interconnection Facilities and Sunflower identified Network Upgrades can be found in the following table.

Upgrade Type	UID	Upgrade Name/Description	DISIS Cost Estimate	DISIS Lead Time
Interconnection	170805	**Rebuild the SEWARD 3 to ST-JOHN3 115 kV Line 1** Rebuilding of the St. John to Seward 115 kV transmission line to achieve a minimum rating of 115 MVA	$14,690,000	40
		Total Interconnection Cost:	**$14,690,000**	

PROJECT TIMELINE:

Specific construction schedule and milestones will be determined during the Generator Interconnection Agreement negotiations. Sunflower is estimating an engineering and construction schedule for this project as approximately 40 months. Other factors associated with clearances, equipment procurement delays and work schedules could cause additional delays. This is applicable after all required agreements are signed and internal approvals are granted.

Midwest Energy Inc.

Network Upgrade Study for ERAS-2025-001

April 20, 2026

Contents

Summary

At the request of the Southwest Power Pool (SPP), Midwest Energy (Midwest) performed a facility study for network upgrades identified in the Expedited Resource Adequacy Study (ERAS-2025-001) in accordance with the SPP Generator Interconnection Procedures (GIP) Section 8.11 for the following Network Upgrades:

- Replace the SEWRDMW3 to SEWARD 2 115kV Transformer 1

Network Upgrade Scope

The study performed by SPP for ERAS-2025-001 showed the Seward 115/69kV Transformer overloaded in a post-contingency state. The most severe contingency for the Seward Transformer as a monitored element is the loss of Sunflower's Great Bend Tap – Seward 115kV line. This is not a valid P1 contingency because it would result in a simultaneous loss of Midwest's 'SEWARD 3 – SEWARDMW3' 115kV line. However, it is a valid P2.1 contingency for which non-consequential load loss is not allowed. The emergency rating of the Seward 115kV/69kV transformer is 45 MVA. The transformer was loaded at 106.62% of its emergency rating in the ERAS-2025-001 study. The provided estimate includes Engineering design and all materials and labor needed to replace the existing transformer with a transformer with higher ratings. See figure 1 on the next page. The substation cable trench runs alongside the existing transformer pad. To install a larger transformer pad, the cable trenches will have to be relocated. These costs are included in the estimate.

Figure 1: Seward 115kV/69kV Transformer and Cable Trench

Upgrade Costs

Network Upgrade	Cost (2026 Dollars)
Replace the SEWRDMW3 to SEWARD 2 115kV Transformer 1 (Estimated Cost includes materials, equipment, labor, engineering, contingency costs, and taxes)	$6,486,381.72

Project Lead Time

Project in-service date is anticipated to be 30 months after the issuance of an NTC from SPP. This is dependent upon the transformer delivery lead time. Manufacturer lead times will be determined and evaluated should this project move forward for construction.

Interconnection Facilities Study

Costs associated with ERAS-2025-001 Replace the existing SIBLEY 345/161kV transformer

April 2026

Introduction

This report summarizes the scope of the Interconnection Facilities Analysis for Network Upgrade(s) to determine costs related to the addition of the SPP-GI ERAS-2025-001 Interconnection Request(s). Evergy, as a TO, is receiving an unprecedented amount of GI interconnect requests. The cost estimates and interconnect information supplied are based on current system configuration. There are many cases of multiple GI's requesting POIs at the same substation. Ongoing changes in Evergy's transmission system configuration could affect the required system upgrades and costs necessary to meet any particular GI interconnect request in the future.

Southwest Power Pool Generation Interconnection Request:

Per the SPP Generator Interconnection Procedures (GIP), SPP has requested that Evergy perform an Interconnection Facilities Study (IFS) for Network Upgrade(s) in accordance with the Scope of Interconnection Facilities Study GIP Section 8.10 and the Interconnection Facilities Study Procedures in accordance with GIP Section 8.11 for the following Interconnection Request(s):

Upgrade Type	UID	Upgrade Name	DISIS Cost Estimate	DISIS Lead Time
Current Study	172063	Replace the SIBLEY 7 to SIBLEY 5 345kV Transformer 1	$ 13,571,142.00	48 months

Replace Sibley 345/161 kV Transformer (Current Study) (Evergy)

345/161kV Substation

Network Upgrades to replace the Sibley 345/161 kV Transformer 1. This estimate includes the replacement of the existing transformer with the standard MVA size accommodating the 510 MVA minimum rating. UID 172063

Total Cost

The total cost estimate for this Network Upgrade is:

$	0	Transmission Line
$	12,391,128	Substation
$	40,591	AFUDC
$	1,139,421	Contingency
$	13,571,142	Total

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

Time Estimate

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

Engineering Time	48	Months
Procurement Time	48	Months
Construction Time	48	Months
Total Project Length	48	Months

Figure 1 – Sibley 345/161kV Substation