Generation Interconnection

Facilities Study Report

For

Queue Project AD1-070/AG1-076

Fostoria Central 138 kV

Hancock County, Ohio

February 2022

1 Facilities Study Summary

1.1 Project Description

The Interconnection Customer (IC), Hancock Energy, LLC, proposes to install PJM Project AD1-070, a 205 MW (36 MW Capacity) solar generating facility in Hancock and Seneca counties in Ohio (Figure 2). The point of interconnection for the generating facility will be via a direct connection to the Fostoria Central 138 kV station (Figure 1).

The AG1-076 project is an increase to the Interconnection Customer's AD1-070 project, which will share the same point of interconnection. The AG1-076 queue position is a 0 MW uprate (46 MW Capacity uprate) to the previous project. The total installed facilities will have a capability of 205 MW with 82 MW of this output being recognized by PJM as Capacity.

1.2 Amendments/Changes to the Impact Study Report

1. The IC requested a technology change from wind to solar, which was approved by PJM. The MFO and CIR are not affected by this change.
2. The original System Impact Study was retooled to reflect withdrawal of earlier queue requests. Based on the results of this re-tool, documented in the revised AD1-070 System Impact Study report dated April 2021, the Ottawa-Lakeview 138 kV and Lakeview-Greenfield 138 kV constraints in ATSI previously attributed to this queue position no longer apply. No power flow criteria violations are now identified for the AD1-070 queue position.

1.3 Interconnection Customer Schedule

PJM and AEP understand that the Interconnection Customer has requested the following schedule dates:

Receive back feed power from AEP: 05/15/2025

Generation Commercial Operation Date: 12/31/2025

Acknowledgement of the Interconnection Customer's requested back feed and commercial operation dates does not imply AEP's commitment to or guarantee of these dates.

1.4 AEP's Scope of Work to Facilitate Interconnection

- AEP's Fostoria Central 138 kV, the station will have to be expanded by adding one (1) 138 kV circuit breaker.

- Associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will be required at the Fostoria Central 138 kV station. AEP reserves the right to specify the final acceptable configuration considering design practices, future expansion, and compliance requirements.

- AEP will build and own the first four (4) transmission line structures exiting the Fostoria Central 138 kV station, to which AEP's transmission line conductor will attach and terminate at the POI to enable extension of 138 kV transmission line for the generation-lead going to the AD1-070/AG1-076 site.

- It is understood that the Interconnection Customer is responsible for all of the connection costs associated with interconnecting the PJM project AD1-070/AG1-076 to the AEP transmission system. The cost of the customer's generating facility and the costs for the line connecting the generating facility to AEP's transmission system (Beyond the POI structure) are not included in this report; these are assumed to be the Customer's responsibility.

- The customer will be responsible for constructing two diverse fiber-optic connections from their telecom equipment to the point of interconnection.

1.5 Description of Transmission Owner Facilities Included in the Facilities Study

1.5.1 Direct Connection Work

- No Direct Connection work will be required for this project.

1.5.2 Non-Direct Connection Work

- AEP will install one (1) additional 138 kV circuit breaker and one line connection for the IPP at the Fostoria Central 138 kV station.
- AEP will review the protection and control setting at the Fostoria Central 138 kV station.
- AEP shall install associated line protection and control equipment, 138 kV line risers, and SCADA at the Fostoria Central 138 kV station.

1.5.3 Attachment Facilities Work

- Two diverse fiber paths are required along the attachment line. AEP will extend the fiber-optic cables from the points of transition (POI structure) into the Fostoria Central 138 kV control house. The customer will be responsible for the fiber work on the IPP side of the points of transition.
- AEP will Install 138 kV revenue metering at the Fostoria Central 138 kV station.
- AEP will build and own the first four (4) transmission line structures exiting the Fostoria Central 138 kV station, to which AEP's transmission line conductor will attach and terminate at the POI to enable extension of 138 kV transmission line for the generation-lead going to the AD1-070/AG1-076 site.

1.5.4 Network Upgrade Work

- None

1.6 Total Cost of Transmission Owner Facilities Included in the Facilities Study:

Attachment Facilities	$1,486,503.00
Direct Connection Facilities	$846,403.00
Non-Direct Connection Facilities	$0.0
Network Upgrade Facilities	$0.0
Total Cost	$2,332,906.00

The estimates do not include the impact that delays in obtaining ROW, permits, or other approvals may have.

1.7 Summary of Schedule Milestones for Completion of Transmission Owner Work Included in Facilities Study:

Standard Process

Typical Schedule for Scope Indicated (Actual schedule to be determined at PJM project kick off meeting)

Activity	Dates(See Notes)
Engineering Start	Day 1*
Material Ordering	Starts Day 60
Construction (Grading & Below Grade)	Starts Day 356
Construction (Above Grade)	Starts Day 416
Outage Requests Made By	Day 144
Outage (Structure Foundations)**	Starts Day 356

Outage (Cut-in & Testing)**	Starts Day 515
Ready For Back Feed (Interconnected Transmission Owner In-Service Date)	Day 545

***Day 1 will be determined at the PJM project kick off meeting.**
****Scheduled Outages are contingent upon outage availability. Longer duration outages are not available during peak load periods.**

Notes Regarding the Schedule

- **All transmission outages are subject to PJM and Interconnected Transmission Owner outage scheduling requirements.**
- **Significant scope of work changes will impact the schedule.**

Assumptions (Standard Process)

- **ISA and ICSA executed by 11/30/2021**
- **Estimates provided are based on a table top process without the benefit of the results of site specific engineering studies (e.g., soil borings, environmental survey, ground grid, etc.), unless otherwise provided by the Interconnection Customer.**
- **System conditions must allow scheduled outages to occur. Additionally clearance outages may be needed for surrounding infrastructure.**
- **All transmission outages are subject to PJM and AEP Operations outage scheduling requirements.**
- **The Interconnection Customer will provide any required additional easements to all facilities and structures**
- **The customer will have their construction and required checkout completed prior to the start of the cut-in and testing outage.**
- **Based on current scoping requirements we have assumed no coordination concerns will arise with an existing AEP project at AEP's Fostoria Central station.**
- **The overall COD is expected to be on or before 12/31/2025. Back feed by May 15, 2025 should be sufficient to support this overall COD.**
- **At the completion of this study the length of the developer's generator lead line was yet to be finalized but indicated by the developer to be between 1.5 and 2.5 miles. AEP assumes the final line length will not pose any major scope changes.**
- **AEP's line exits to the POI will have to cross under an existing AEP 345 kV line and at this time we assume clearance can be met so no 345 kV work will be needed.**
- **Assumed 4 structures is sufficient to exit AEP's station and get to a POI that satisfies both AEP and the developer's needs.**
- **Assumed 5 months for engineering design**
- **Assumed the last 30 days leading to ISD is primarily spent doing fiber, relay, and communications checks.**

- **Settings are approximately 4 months of coordination with the developer's engineer, and AEP has received an up to date Short Circuit model for the project from PJM prior to the start of coordination.**
- **Assumptions were made based on preliminary conversations with the developer on relay coordination and length of fiber path.**
- **Possibility to coordinate OPSB filings to ensure accuracy between parties.**

Transmission Outage Plan

No transmission outage plan has been specified at this time

Note that all 138 kV and above outages are subject to PJM and AEP Operations BES outage-scheduling requirements.

2 Transmission Owner Facilities Study Results

2.1 Transmission Lines – New

- AEP will build and own the first four (4) transmission line structures exiting the Fostoria Central 138 kV station, to which AEP's transmission line conductor will attach and terminate at the POI to enable extension of 138 kV transmission line for the generation-lead going to the AD1-070/AG1-076 site.

2.2 Transmission Line – Upgrades

- No transmission line upgrades will be required for this project.

2.3 Substation Facilities – New

- No new substation facilities will be required for this project.

2.4 Substation Facilities – Upgrades

- AEP will need to expand the existing Fostoria Central 138 kV station to facilitate the connection of the generation lead going to the PJM project AD1-070/AG1-076. To accomplish this, one (1) additional circuit breaker will be installed. Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will also be required.

- Due to the new generation source being added, nearby Protective relay-settings for the remainder of the Fostoria Central 138 kV substation will have to be reviewed and updated to account for the addition of the AD1-070/AG1-076 generation source.

2.5 Metering & Communications

Standard 138 kV metering will be installed at the Fostoria Central 138 kV station. A standard station communication scheme will be used. All metering equipment shall meet the requirements as specified by AEP in the "AEP Metering and Telemetering Requirements for AEP Transmission Customers" document (SS-490011). Communication requirements are published in the "AEP SCADA RTU Requirements at Transmission Interconnection Facilities" (SS-500000).

AEP will need to update the telecom equipment at the Fostoria Central 138 kV station for SCADA/EMS functionality. Fiber-optic cable will be extended to the AEP/AD1-070/AG1-076 point of interconnection.

The Generation Interconnection Agreement does not in or by itself establish a requirement for American Electric Power to provide power for consumption at the developer's facilities. A separate agreement shall be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand, and proper metering equipment in installed. The metering work above and cost indicated below does not include any potential work or cost to address metering requirements of the local service provider. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

2.6 Environmental, Real Estate, and Permitting issues

The Interconnection customer is expected to obtain, at its' cost, all necessary permits and provisions for the IPP station and generation lead line connecting to the POI outside the Fostoria Central 138 kV station.

2.6.1 System Modeling & Operating Requirements

In addition to the IPP modeling requirements imposed by PJM as part of the Generation Interconnection process, the following system modeling parameters will need to be supplied by the Interconnection Customer to AEP:

- **Modeling parameters are required as outlined in the "Connection Requirements for the AEP Transmission System." These requirements can be accessed at: https://aep.com/requiredpostings/AEPTransmissionStudies**

2.7 Summary of Results of Study

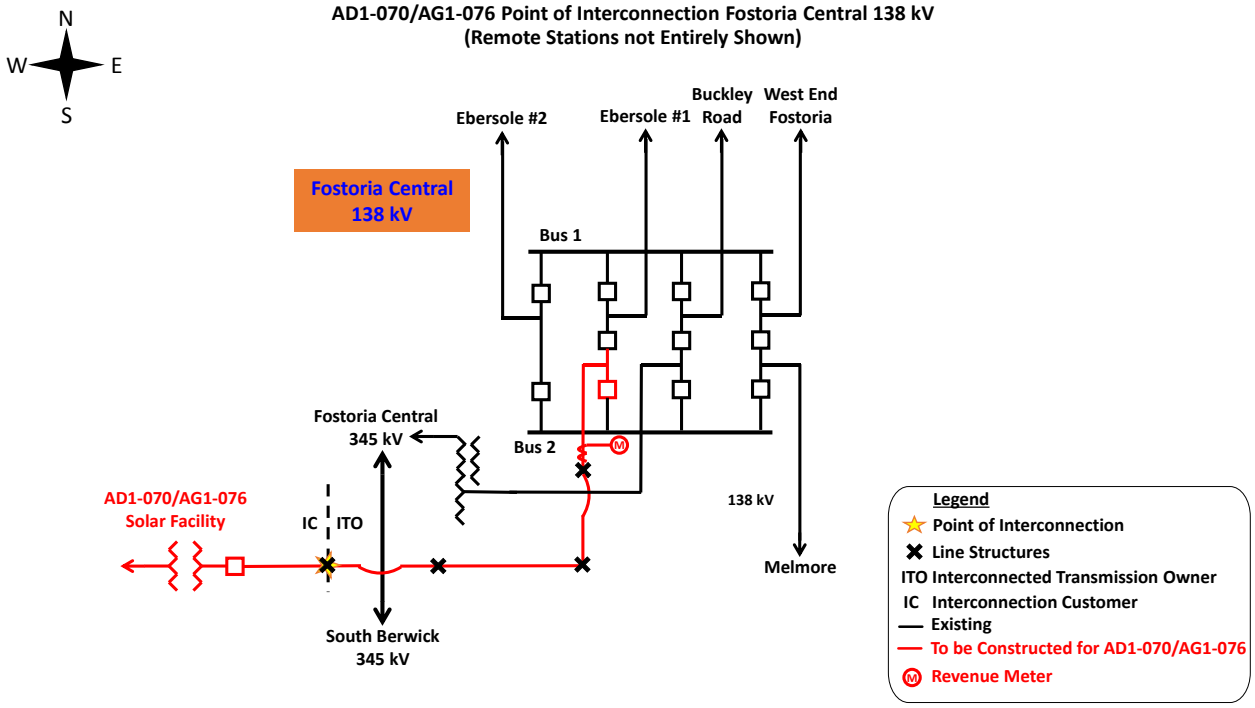
Cost Estimates for AEP

Task	Network Upgrade Number	Engineering	Material	Construction	Other	TOTAL
Install 1 138 kV circuit breaker and install associated P&C equipment	N7963	$137,447.33	$304,931.33	$256,703.33	$147,321.00	$846,403.00
Dual fiber connection	N7962	$22,839.00	$33,120.00	$120,974.00	$38,266.00	$215,199.00
138 kV Revenue Metering	N7962	$48,606.67	$101,757.67	$107,824.67	$52,663.00	$310,852.00
Generator lead first 4 spans exiting the POI station, including the first 4 structures.	N7962	$126,147.00	$251,925.00	$413,271.00	$169,109.00	$960,452.00
TOTAL		$335,040.00	$691,734.00	898,773.00	$407,359.00	$2,332,906.00

2.8 Information Required for Interconnection Service Agreement

Description	DCF Facility	NUF Facility	ATF Facility	TOTAL
Direct Material	$0	$304,931.33	$386,802.67	**$691,734.00**
Direct Labor	$0	$394,150.67	$839,662.33	**$1,233,813.00**
Indirect Material	$0	$64,259.68	$81,754.63	**$146,014.32**
Indirect Labor	$0	$83,061.32	$178,283.37	**$261,344.68**
TOTAL	$0	$846,403.00	$1,486,503.00	**$2,332,906.00**

Figure 1: Point of Interconnection One-Line Diagram



The Point of Interconnection ('POI') is at the fourth structure southwest of the Fostoria Central 138 kV station. AEP owns the first four spans from the Fostoria 138 kV station to the fourth structure, including the jumpers and fourth structure. The first structure is inside the station fence, the remaining three will be on AEP-owned property, but outside the fence. The Interconnection Customer (IC), Hancock Energy, LLC, owns the span connecting to the POI, the 138 kV generator lead line, and remaining structures back to the AD1-070/AG1-076 generation collector station.

Figure 2: Point of Interconnection Map