



Facilities Study Report
For
Physical Interconnection of
PJM Generation Interconnection Request
Project ID AF2-018
Martin County

"Inez 138 kV"

September 2024

Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff Part VII, and, if applicable, the Application and Studies Agreement between the Project Developer and PJM Interconnection, LLC (PJM or Transmission Provider (TP)). The Transmission Owner (TO) is AEP Kentucky Power Company to be abbreviated in the remainder of this report as KPCo. KPCo is an affiliate company of American Electric Power Service Corporation (AEP). All references to AEP include KPCo unless otherwise specified.

A. Transmission Owner Facilities Study Summary

1. PROJECT DESCRIPTION

The Project Developer has proposed a Solar Generating Facility located in Martin County, Kentucky with a designated PJM Project ID of AF2-018. The installed facilities for AF2-018 will have a total Maximum Facility Output (MFO) of 200 MW with 133.9 MW of this output being recognized by PJM as Capacity.

2. POINTS OF INTERCONNECTION AND CHANGE IN OWNERSHIP

The Generating Facility will interconnect with the AEP transmission system via a direct connection into the Inez 138 kV Station.

The Point of Interconnection (POI) for the proposed Generating Facility will be the point where the risers connect the generator lead circuit to the Inez 138 kV Station line termination point. The Point of Change in Ownership (PCO) will be located at the second structure in the 138 kV generator lead circuit outside of the Inez 138 kV Station fence. KPCo will own the spans and structures from the Inez 138 kV Station to the second structure. KPCo will own the second structure, including the jumpers. The Project Developer will own the other span connecting to the Point of Change in Ownership structure from the collector station side, the remainder of the 138 kV generator lead circuit, and associated remaining structures back to the AF2-018 generation collector substation.

The proposed generation interconnection is shown on the single line diagram in Attachment #1.

3. AMENDMENTS TO THE IMPACT STUDY DATA OR IMPACT STUDY RESULTS

No amendments to the impact study data or impact study results are required by AEP.

4. PROJECT DEVELOPER SCHEDULE

The Project Developer's requested in-service date for the generation facility is 12/15/2027.

This report does not imply a Transmission Owner commitment to this date.

5. SCOPE OF PROJECT DEVELOPER FACILITIES

The Project Developer will design, build, own, operate, and maintain the Project Developer Interconnection Facilities on the Project Developer's side of the Point of Change in Ownership (PCO). This includes, but is not limited to:

- One (1) Main Power Transformer (MPT)
- One (1) circuit breaker and associated equipment located between the high side of the MPT and the Point of Change in Ownership
- Generator lead line from the Generating Facility to the Point of Change in Ownership
- Relay and protective equipment, and Supervisory Control and Data Acquisition (SCADA) and telecommunications equipment to comply with the TO's Applicable Technical Requirements and Standards

B. Transmission Owner Facilities Study Results

The following is a description of the Transmission Owner facilities required for physical interconnection of the proposed AF2-018 project to AEP transmission system. These facilities shall be designed according to AEP Applicable Technical Requirements and Standards with a nameplate design ampacity of 3000 A. Once built, AEP will own, operate, and maintain these Facilities.

1. INTERCONNECTION SUBSTATION (EXISTING)

KPCo will upgrade the existing Inez 138 kV Station for interconnection of PJM queue project AF2-018 by completing the following scope (PJM Network Upgrade n8633.0):

- Install one (1) new circuit breaker string with two (2) new 3000A, 40 kA, 138 kV circuit breakers with breaker control relaying in the "A" and "A1" positions.
- Install three (3) new 3000 A circuit breaker disconnect switches.
- Install three (3) new 1-phase capacitor-coupled voltage transformers (CCVTs) on the generator lead circuit to the proposed AF2-018 collector station.
- Extend an existing H-Frame line take-off structure.
- Install dual direct fiber current differential relays for the generation lead to the proposed AF2-018 collector station.
- Update the Bus #1 & #2 protection settings to account for the new breakers.
- Install associated and additional buswork, bus supports, structures, jumpers, insulators, grounding, cables, and foundations.

2. TRANSMISSION LINE TIE-IN

No Transmission line work will be required for this project.

3. TRANSMISSION OWNER INTERCONNECTION FACILITIES:

The KPCo Interconnection Facilities will include, but not be limited to, the following scope:

- Install two (2) custom steel, single circuit, single pole dead end structures (60 feet and 70 feet) on concrete pier foundations with anchor bolt cages at locations situated outside of the station fence on the southeast side of the Inez 138 kV Station.
- Extend (2) associated spans of Aluminum Conductor Steel Reinforced (ACSR) 556.5 KCM 26/7 (Dove) conductor and associated 7#8 Alumoweld Shield Wire from the H-Frame extension takeoff structure at the Inez 138 kV Station to the new dead end structures for the generation lead circuit. The second span will cross under the Inez - Sprigg 138 kV Circuit.

- Extend two (2) underground 48 count fiber optic cables with All Dielectric Self Supporting (ADSS) fiber cable entrances via diverse paths from the Inez 138 kV Station control house to fiber demarcation splice boxes to support direct fiber relaying between the Inez 138 kV Station and Project Developer's collector station. The Project Developer will be responsible for the fiber optic cable extensions from the splice boxes to the collector station.
- Install a standard 138 kV revenue metering package, including three (3) 1-phase meter quality voltage transformers, three (3) 1-phase meter quality current transformers, one (1) Drop-In Control Module (DICM)-installed metering panel with primary & backup meters, and associated surge arresters, jumpers, grounding, cables, structures and foundations, for the generation lead circuit at the Inez 138 kV station.

4. UPGRADE TO NEIGHBORING STATIONS

No Upgrades needed at Neighboring Stations.

5. INSTALLATION OF FIBER CABLE CIRCUITS

No additional AEP fiber-optic cable circuits will be required for this interconnection.

6. COST ESTIMATE OF AEP FACILITIES FOR PHYSICAL INTERCONNECTION

The following tables summarize the total estimated costs according to FERC criteria. The estimated costs are in 2024 dollars. **This cost excludes Federal Income Tax Gross Up charges on Contributions in Aid of Construction (CIAC).** This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 88-129. If at a future date it is determined that the Federal Income Tax Gross charges are required, the Transmission Owner shall be reimbursed by the Project Developer for such taxes. The estimated reimbursement amount is noted in the table below.

6.1 COST ESTIMATE FOR TRANSMISSION OWNER-BUILD OPTION

Work Description	Type of Upgrade	Direct		Indirect		Total	Tax
		Labor	Material	Labor	Material		
Transmission Owner Interconnection Facilities	TOIF	\$1,374,821	\$592,382	\$185,707	\$82,987	\$2,235,897	\$0
New Interconnection Substation	Stand Alone Network Upgrade	\$0	\$0	\$0	\$0	\$0	\$0
Expansion of existing substation	Network Upgrade N8633.0	\$832,581	\$672,502	\$145,330	\$106,710	\$1,757,123	\$0
Interconnection Substation tie-in	Network Upgrade	\$0	\$0	\$0	\$0	\$0	\$0
Remote relay at substation x	Network Upgrade	\$0	\$0	\$0	\$0	\$0	\$0
Remote relay at substation y	Network Upgrade	\$0	\$0	\$0	\$0	\$0	\$0
Fiber Installation in Existing ROW	Network Upgrade	\$0	\$0	\$0	\$0	\$0	\$0
Fiber Installation in New ROW	Stand Alone Network Upgrade	\$0	\$0	\$0	\$0	\$0	\$0
Final Tie in for Fiber installation in New ROW	Network Upgrade	\$0	\$0	\$0	\$0	\$0	\$0
Total Project Costs		\$2,207,402	\$1,264,884	\$331,037	\$189,697	\$3,993,020	\$0

7. MILESTONE SCHEDULES FOR COMPLETION OF AEP WORK

7.1 STANDARD OPTION:

<u>Activity</u>	<u>Dates (See Notes)</u>
Project Engagement*	1
Engineering Start	70
Material Ordering	112
Construction (Grading & Below Grade)	569
Construction (Above Grade)	629
Outage Requests Made By	344
Outage (Structure Foundations)**	709
Outage (Cut-in & Testing)**	760
Ready For Back Feed (ITO In-Service Date)	790

***Day 1 will be determined at the PJM construction project kick off meeting.**

****Scheduled Outages are contingent upon outage availability. Longer duration outages are not available during peak load periods.**

The above schedule is based on typical AEP construction timelines, long lead material availability, and common outage constraints. The facilities outlined in this report, as constructed by AEP, are estimated to take 26 months to complete. Given this construction timeline and a typical period for agreement processing, AEP can support a backfeed date of October 15, 2026, subject to change during the tariff defined Final Agreement Negotiation Phase. The project developer is expected to have the Interconnection Facilities constructed, ready to accept backfeed by the business day prior to the final negotiated backfeed date.

8. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

Note - Any materials purchased, or design decisions made by the Project Developer (relative to any facilities to be owned by AEP) prior to coordination with and approval by the executing AEP team (pursuant to an Engineering and Procurement or Generation Interconnection Agreement) are at the developer's risk and may not meet the specifications required for interconnection with the AEP transmission system.

8.1 SCOPE ASSUMPTIONS:

- Equipment specifications (Breaker ratings, conductor size, etc.) are a result of the desktop functional scoping process observed while conducting this facilities study. These specifications

are subject to change based on the results of the detailed scoping efforts that will take place post-interconnection or engineering and procurement agreements.

- P&C coordination with the Project Developer will be needed throughout the project. The Project Developer will be required to install an AEP-compatible line relaying protection panel at the collector substation using AEP standards to ensure relay coordination and adequate line protection. The AEP design team will ensure that the firmware at the collector station terminal matches the approved firmware at the AEP terminal. Failure to accept the cost of a matching line relay protection panel may change scoping.
- Scopes 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 Project Developer.
- The Project Developer will provide any required additional easements for all facilities and structures.
- The Project Developer will have their construction and required checkout completed prior to the start of the interconnection to the Inez 138 kV Station and any required testing outages.

8.2 SCHEDULE ASSUMPTIONS:

- All transmission outages are subject to PJM and AEP Operations outage scheduling requirements.
- Significant scope of work changes will impact the schedule.
- The above schedule reflects only the work required to interconnect the AF2-018 project. The schedules regarding network upgrades associated with this project, if any, are detailed in the documentation related to the specific network upgrade.
- Slippage by the Project Developer in executing the Generator Interconnection Agreement (GIA) agreement does not equate to a "day for day" slippage in the scheduled back feed and in service dates. Depending on the time of year, planned outages, neighboring projects and maintenance of the grid, outage availability has the potential to shift by weeks or months depending on conditions at the time of the fully executed agreement.

8.3 ESTIMATE ASSUMPTIONS:

- 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 Project Developer.

9. METERING REQUIREMENTS

All metering needed for this interconnection project must meet the metering requirements stated in Appendix 2, section 8 of the AF2-018 GIA, and in PJM Manuals M01 and M14D. The details of applicable metering requirements are provided in the "Connection Requirements for the AEP Transmission System" (Rev. 5, dated December 31, 2023) document, found at:

<https://www.aep.com/requiredpostings/AEPTransmissionStudies>

The primary metering will be installed on the Transmission Owner side of the Point of Change in Ownership and will be owned and maintained by the Transmission Owner.

Any additional generation proposed behind an originating project's PCO that differs in either type or corporate entity from the originating project will require the installation of additional submetering for both the originating project and the uprate for the purpose of settlement. Submetering will require additional space within the originating project's facilities. The meters, routers, Ethernet to fiber converters, and telecom switch(es) will be procured and owned by AEP. The revenue quality instrument transformers, fiber-optic cable connecting the submeters, and any other additional hardware for the required submetering will be procured, installed, owned, and maintained by the Project Developer.

10. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

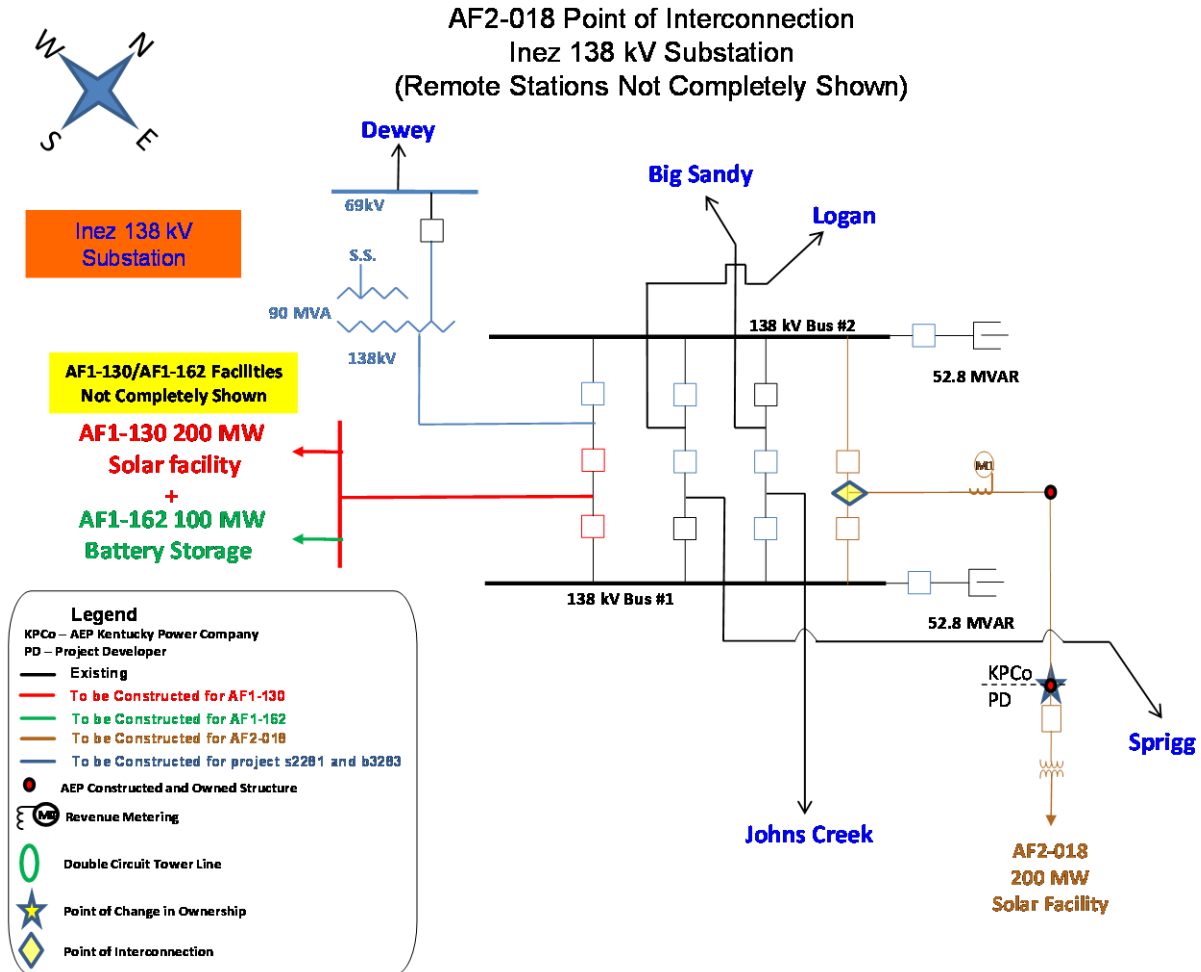
Land requirements for the Interconnection Substation needed for this interconnection project must meet the requirements set forth in "Standards and Expectations for Siting, Real Estate, Right-of-Way, and Environmental Permitting for Transmission Interconnection Projects," Version 3 dated October 31, 2022 at <https://www.aep.com/requiredpostings/AEPTransmissionStudies> posted on AEP website.

11. ENVIRONMENTAL AND PERMITTING

The Project Developer is expected to obtain, at its cost, all necessary permits and provisions for the facilities to be constructed for this interconnection. AEP requires that the standards provided in the "Standards and Expectations for Siting, Real Estate, Right-Of-Way, and Environmental Permitting for Transmission Interconnection Projects", Version 3 dated October 31, 2022 found at: <https://www.aep.com/requiredpostings/AEPTransmissionStudies> be adhered to for all facilities interconnecting with the AEP transmission system.

C APPENDICES

Attachment #1: Single line Diagram for the Physical Interconnection



Attachment #2: POI Map

