Facilities Study Report

For

Physical Interconnection of

PJM Generation Interconnection Request

Project ID AF2-226

“Katydid Road 345 kV”

August 2025

Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff. The Transmission Owner (TO) is ComEd.

Revision History:

Version	Date	Description of Changes
1.0	**December 2024**	**Initial Issue**
2.0	**August 2025**	**Administrative updates**

A. Transmission Owner Facilities Study Summary

1. PROJECT DESCRIPTION

The Project Developer (PD) has proposed a storage Generating Facility located in, Lasalle County, IL with a designated PJM Project ID of AF2-226. The installed facilities will have a total Maximum Facility Output (MFO) of 50 MW with 20 MW of this output being recognized by PJM as Capacity.

2. POINT OF INTERCONNECTION (POI)

The Generating Facility interconnects to the ComEd transmission system through a direct connection to the TSS 196 Katydid Rd 345 kV substation.

This project will share Interconnection Facilities and the Point of Change in Ownership with O22 (Top Crop I and Top Crop II) and AF2-319. The combined output of the Generating Facilities at the Point of Interconnection is 400MW.

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

3. POINT OF CHANGE IN OWNERSHIP

The Point of Change in Ownership will remain at the first dead-end structure on the TSS 196 Katydid – TSS 985 Top Crop 1 345 kV line L98501 within the TSS 196 Katydid substation.

4. SCOPE OF PROJECT DEVELOPER INTERCONNECTION FACILITIES

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

4.1 At TSS 985 Top Crop 1, in general, the following are project specific notes:

4.1.1. New 345 kV AF2-226 collector substation facilities shall comply with all applicable portions of PJM Protection Standards (PJM Manual 7) and PJM Transmission and Substation Design Subcommittee Technical Requirements.

4.1.2. New 345kV L91801 generator lead line from the generating facility 345 kV side to the existing L91801.

4.1.3. Project Developer shall provide limiting Transmission Facility ratings for their portion of 345KV L91801, in accordance with NERC FAC-008, FERC Order 881 and PJM Operational requirements for normal and emergency ratings from -55F

to 130F in 5F increments.

4.1.4. All Developer Interconnection Facilities shall comply with applicable requirements of Exelon Utilities Transmission Facility Interconnection Requirements dated January 1, 2024 and ComEd Interconnection Guidelines (For Generators at Transmission Level) dated December 16, 2021. The ComEd Interconnection Guidelines (For Generators at Transmission Level) dated December 16, 2021 and Exelon Utilities Transmission Facility Interconnection Requirements dated January 1, 2024 are available on the PJM website.

4.1.5. One (1) Project Developer Owned 34.5 kV circuit breaker.

4.1.6. Project Developer to provide test reports for any privately owned transformers, including the equipment's %Z impedance and load loss, and the impedance and length of the generator lead line from the generating facility to Top Crop 1.

4.1.7. Project Developer shall provide shunt reactive compensation as required by the PJM Interconnection studies

4.1.8. At AF2-226 collector station, in general, Project Developer to follow section 6.1 (Design F) of the latest version of ComEd Interconnection Guidelines for Generators at Transmission Level (Rev 2: Effective 12/16/2021).

4.1.9. ComEd Protection and Control Engineering must review all Project Developer relay protection design drawings and relay settings.

4.1.10. Project Developer equipment impedance and/or test data must be provided to ComEd Protection and Control Engineering to model in a short circuit program. Examples include lines, transformers (include percent impedance and load loss), wind turbines, and inverters.

4.1.11. Modify 345 kV L98501 relay protection schemes to accommodate new interconnection AF2-226. Line terminal relay types to be the same as ComEd terminal relays. This includes relay firmware versions.

4.1.12. The Project Developer Facility shall be designed to remain in service (not trip) for voltages and times as specified for the Eastern Interconnection in Attachment 1 of NERC Reliability Standard PRC-024-1, and successor Reliability Standards, for both high and low voltage conditions, irrespective of generator size, subject to the permissive trip exceptions established in PRC-024-1 (and successor Reliability Standards).

4.1.13. The Project Developer Facility shall be designed to remain in service (not trip) for frequencies and times as specified in Attachment 2 of NERC Reliability Standard PRC-024-1, and successor Reliability Standards, for both high and low frequency condition, irrespective of generator size, subject to the permissive trip exceptions established in PRC-024-1 (and successor Reliability Standards).

4.1.14. The wind, solar or non-synchronous generation facility shall provide SCADA capability to transmit data and receive instructions from the Transmission Provider to protect system reliability. The Transmission Provider and the wind, solar or non-synchronous generation facility Project Developer shall determine what SCADA information is essential for the proposed wind, solar or non-synchronous generation facility, taking into account the size of the facility and its characteristics, location, and importance in maintaining generation resource adequacy and transmission system reliability in its area.

4.1.15. Dual bus protection for 34.5kV bus.

4.1.16. Installation of a breaker failure relay and scheme including DTT per standards outlined in PJM manual 7 and ComEd standards for the 34.5 kV circuit breakers.

4.1.17. The Project Developer will install a SCADA system for interface with ComEd's SCADA system. Install 345 kV standard interconnection metering and telemetry to ComEd TSO including CB status, MW, MVAR, MWh and voltage values. Project Developer to co-ordinate updated metering/breaker status data exchange with ComEd SCADA Engineering.

4.1.18. Power output from the Project Developer site shall be in accordance with the power quality standards contained in the IEEE Standard 519. The generating units and all associated equipment at the Project Developer site shall not introduce any distortion of ComEd's waveform or telephone or carrier interference that is inconsistent or conflicts with such standard.

4.1.19. Dual TRFM protection and site protection must be compliant with NERC & PJM requirements.

4.1.20. Metering is required to be installed per ComEd & PJM standards.

4.1.21. Witness testing by ComEd or a Designated Authority will be required and must be pre-scheduled at least 90 days in advance.

4.1.22. Project Developer to send a Transfer Trip to TSS 196 Katydid Rd for TR 34.5 kV CB Breaker Failure. Ability to isolate 87L and DTT functions is required. Example scheme/settings can be provided by ComEd.

4.1.23. For any new equipment connected to the BES (Bulk Electric System rated at 100kV or above) the associated primary/System 1 and secondary/System 2 protective schemes to have a minimum redundant:

4.1.23.1. Connected CTs (where available)

4.1.23.2. PT secondary (where available)

4.1.23.3. DC control circuits

4.1.23.4. Auxiliary trip relays

4.1.23.5. Circuit breaker trip coils (where available)

4.1.23.6. Communication circuitry

4.1.24. ComEd shall supply and own any AMI meter devices. Project Developer shall be responsible for conveying access for any ComEd AMI metering equipment.

4.1.25. An Interconnection Project Developer with a proposed new facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

4.1.26. Install a dual SCADA/AMI meter fitting at the output terminal of the battery storage system to measure the power flow to and from the ComEd transmission system. The dual SCADA/AMI meter and associated instrument transformers shall be sized to properly measure the wholesale power requirement for charging and discharging the battery storage system. The Project Developer

shall provide appropriate telemetry from the dual SCADA/AMI meter to the ComEd SCADA system to provide meter data.

B. Transmission Owner Facilities Study Results

The following is a description of the planned Transmission Owner facilities for the physical interconnection of the proposed AF2-226 project to ComEd transmission system. These facilities shall be designed according to ComEd Applicable Technical Requirements and Standards. Once built, ComEd will own, operate, and maintain these Facilities.

1. TRANSMISSION OWNER INTERCONNECTION FACILITIES:

An existing 345 kV dead-end structure and foundation within the fence of the Interconnection Substation, to terminate the Project Developer's generator lead line.

Existing line conductor from the dead-end structure to the bus position in the switchyard of the interconnection substation TSS 196 Katydid Road.

This dead-end structure and foundation are included in O22 (see assumptions in Section 6)

All Transmission Owner Interconnection Facilities shall comply with applicable requirements of Exelon Utilities Transmission Facility Interconnection Requirements dated January 1, 2024 and ComEd Interconnection Guidelines (For Generators at Transmission Level) dated December 16, 2021. The ComEd Interconnection Guidelines (For Generators at Transmission Level) dated December 16, 2021 and Exelon Utilities Transmission Facility Interconnection Requirements dated January 1, 2024 are available on the PJM website.

The proposed generation interconnection is shown in Appendix # 1

2. STAND ALONE NETWORK UPGRADES

N/A

3. NETWORK UPGRADES

N/A

4. OTHER SCOPE OF WORK

4.1 ComEd to review and update existing TSS 196 Katydid Rd relay, meter, & SCADA settings for incorporation of new AF2-226 project.

4.2 ComEd shall update CAPE model.

4.3 ComEd shall Review and Update if required the AMI and Revenue Metering equipment. The review will take into consideration the new total generation output including auxiliary power requirements to be provided by Project Developer. The metering equipment will be sized to properly meter the output when the generation is online as well as the power supplied by ComEd for generator auxiliary power requirements when the generation is offline. All metering equipment shall be in accordance with ComEd Standards. Revenue grade metering must meet the requirements established by the published EED interconnection guidelines. Metering shall include registration of the generation output and auxiliary power usage.

4.4 Existing POI metering has been evaluated to ensure that it meets the upper limit of generation output from the additional outputs of AF2-226 and AF2-319.

5. MILESTONE SCHEDUE FOR COMPLETION OF [TO] WORK

Facilities outlined in this report are estimated to take 18 months to construct, from the time the Generator Interconnection Agreement is fully executed. This schedule may be impacted by the timeline for procurement and installation of long lead items, the ability to obtain outages to construct and test the proposed facilities.

Description	Start month	Finish month
Detailed Design	1	5
Permitting	-	-
Construction	5	18

6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

6.1 This Facilities Study report assumes the completion of installations specified in PJM New Service Request Project O22 Facilities Study available from PJM website.

6.2 This Facilities Study report assumes the new Project Developer 345kV circuit breakers shall be located within the same substation as L98501 privately owned terminal and line relaying specified in the O22 Facilities Study.

6.3 ComEd estimate does not include costs of design and construction of AF2-226 battery storage, and transmission in Project Developer scope of work. ComEd estimated schedule is based on GIA contract being executed by all parties.

6.4 This cost estimate assumes that all work will be performed during normal weekdays and with no overtime.

6.5 ComEd cost estimate is valid for one (1) year after Facilities Study released to PJM.

6.6 Transmission line outages for construction have not been identified, but generally are available from September to May. These outages are controlled by PJM.

6.7 The Project Developer will be responsible to request and bear the cost for relocation of existing transmission or distribution lines (including structures and other facilities) that may be required for transmission line crossings, the transport of any large equipment, such as turbines, rotors, turbine structures, cranes, etc.

6.8 This study assumes that there will be no additional right-of-way and/or easement work required.

6.9 This Facility Study is time dependent. If the project is not into construction within one year of the issuance, the FS will be void and the project re-studied, requiring completion of a new FS.

6.10 All upgrades to facilities included in this document will be required to meet latest ComEd standards.

6.11 Upgrades are subject to change based on detailed design development.

6.12 It is assumed that ComEd facilities included in this document will not require a sound study or flood mitigation.

7. REVENUE METERING REQUIREMENTS

All revenue metering needed for this interconnection project must meet the metering requirements stated in Appendix 2, section 8 of the AF2-226 GIA, and in PJM Manuals M01 and M14D. The details of applicable revenue metering requirements are given in the ComEd Interconnection Guidelines posted on PJM website.

The revenue metering will be installed on the ComEd side of the Point of Change in Ownership will be installed, owned, and maintained by ComEd.

This revenue metering is included in O22 (see assumptions in Section 6)

This Facilities Study Report assumes that the initial interconnection, which is PJM New Service Request Project O22, will include installation of metering equipment (including CT/PTs). Inability of the metering equipment to accurately meter necessary power flow may require additional metering installation..

- REVENUE METERING FOR PJM AND COMED
  - The revenue meter measures the wholesale energy output (Hourly compensated net MWH and Hourly compensated net MVARH) of the Generating Facility.
  - The metering equipment, including revenue meter and CT/PT shall be installed, at Project Developer's expense, at the interconnection substation on ComEd side of the Point of Change in Ownership.
  - ComEd shall own, operate, maintain, inspect, and test all the metering equipment as set forth in 'Testing of Metering Equipment' section of the PJM Tariff, at the Project Developer's expense.
- REAL-TIME METERING FOR PJM
  - The Project Developer shall install, own, operate, maintain, inspect, and test real-time metering equipment to measure and transmit directly to PJM the real time MW, MVAR, voltage and status of electrical equipment such as circuit breakers and Motor Operated Disconnect switches, in conformance with the requirements listed in PJM Manuals M-01 and M-14D, at the Project Developer's expense.
- RETAIL METERING FOR COMED
  - The AMI Meter measures the energy consumption by the Project Developer at transmission level and hence shall be designed to measure low MW flow.
  - The metering equipment including AMI Meter and CT/PT shall be installed at the interconnection substation on ComEd side of the POI, at the Project Developer's expense.
  - ComEd shall own, operate, maintain, inspect, and test all the metering equipment as set forth in the 'ComEd Interconnection Guidelines'.
- BATTERY TERMINAL AMI METERING FOR COMED
  - FERC Order 841 designates inflow to charge battery storage facility as wholesale power. To separately measure the power inflow to charge the battery and bill it at wholesale rate, the Project Developer needs to install the following equipment.

- Advanced Metering Infrastructure (AMI) equipment including AMI Meter and Current Transformer/Potential Transformer (CT/PT) at the output terminal of the battery storage facility to measure power flow from transmission system to charge the battery storage facility.
- Fiber cable to provide communication link to transmit AMI meter data to the ComEd SCADA system.

8. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

Land requirements for the Interconnection Substation needed for this interconnection project must meet the requirements in the ComEd Interconnection Guidelines posted on PJM website.

No additional easements, access rights, or temporary or permanent real property rights or acquisitions were identified as required for network upgrades to the ComEd system or for the project to interconnect at this location within this study. However, as further needs are assessed in detailed engineering, design and/or construction activities, if it is determined that there is a need for easements, access rights, or temporary or permanent real property rights or acquisitions, the developer is fully responsible for the costs to acquire these required land rights. Also, as necessary, the schedule will be adjusted accordingly to account for the necessary time to obtain these required land rights. All easements, access rights, or temporary or permanent real property rights or acquisitions shall comply with all ComEd requirements as detailed in “Land requirements for Interconnection Substations”.

9. ENVIRONMENTAL AND PERMITING

No environmental concerns and/or permitting requirements were identified as needed by this study. However, should detailed engineering and design and/or construction activities identify the need for an environmental study and/or permit requirements, the developer is fully responsible for the costs related to any environmental study, any actions to address the identified environmental impacts and the permits. Also, the schedule will be adjusted accordingly to account for the necessary time to perform the environmental study, address the identified environmental impacts and to obtain the permits, if applicable. All environmental studies, actions to address environmental impacts and permit actions shall comply with all ComEd requirements as detailed in "ComEd Environmental Requirements for Third Party Developers”, and with all local, city, county, state, and federal requirements.

C. APPENDICES

Attachment #1: Single line Diagram for the Physical Interconnection