# Facilities Study Report

# For

# Physical Interconnection of

# PJM Generation Interconnection Request

# Project ID AE2-223

# McLean 345kV

Rev.2 August 2025

## Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff. The Transmission Owner (TO) is Commonwealth Edison (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 wind Generating Facility located in, McLean County, IL with a designated PJM Project ID of AE2-223. The installed facilities will have a total Maximum Facility Output (MFO) of 150 MW with 19.5 MW of this output being recognized by PJM as Capacity.

### 2. POINT OF INTERCONNECTION (POI)

The Generating Facility will interconnect with the Commonwealth Edison transmission system via a direct connection into the TSS 92 McLean 345kV substation.

This project will share interconnection facilities and the Point of Change in Ownership with Z2-087 and AF2-225. The combined output of the Generating Facilities at the Point of Interconnection is 500MW.

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 be located at the first dead-end structure inside TSS 92 McLean fence line.

### 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. The PD is responsible for construction of the additional 150MW of wind generation. The PD is also responsible for one (1) 345kV circuit breaker, one (1) generator step-up transformer (GSU), and (2) disconnects.

4.2. At AE2-223 Bright Stalk II Wind Farm, in general, Project Developer relaying, etc. to follow section 6.1 (Design F) of latest version of ComEd interconnections guidelines ( for Generators at Transmission Level) Rev2 Effective fate 12/16/21, with the following project specific notes (where applicable):

- Install Revenue Metering Equipment at the output terminal of AE2-223 generation facility including revenue meter and CT/PT.

- Install fiber optic cable link to provide communication link to transmit revenue meter data to the ComEd SCADA system.
- New 345kV gas circuit breakers to auto trip and isolate for critical gas level
- New 345kV Tie Line terminal relay types to be the same as ComEd terminal relays. This includes relay firmware versions
- ComEd Protection and Control Engineering must review all Project Developer relay protection design drawings and relay settings.
- Project Developer equipment impedance and/or test data must be provided to ComEd Protection and Control Engineering to model in a short circuit program.
- Project Developer to include over/under frequency and voltage protection at wind farm collector bus. Suggested settings will be provided by ComEd. Under-frequency settings are to comply with MAIN Guide 1B.
- Dual bus protection for 34.5kV bus.
- Dual TRFM protection and site protection must be compliant with NERC & PJM requirements.
- Metering is required to be installed per ComEd & PJM standards.
- SCADA interface to ComEd will be required.
- Witness testing by ComEd or a Designated Authority will be required and must be pre-scheduled at least 90 days in advance.

4.3. Project Developer to provide transformer test reports for 345kV - 34.5kV step up transformers, for ComEd short circuit modeling. Test reports must include %Z impedance and load loss.

4.4. 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:

- Connected CTs (where available)
- PT secondary (where available)
- DC control circuits
- Auxiliary trip relays
- Circuit breaker trip coils (where available)
- Communication circuitry

4.5 The PD will be responsible to purchase real estate or obtain the necessary right-of-way easement to install the 345kV transmission line to TSS 92 McLean substation.

4.6 New Gas Circuit breaker control for loss of SF6 gas condition should be as follows (see Engineering practice EP-5206E and relay specifications):

- For an open SF6 circuit breaker, when SF6 gas drops to the critical level, the close circuit of breaker shall be opened, and motor operated disconnects on both sides of CB shall be opened
- For a closed SF6 gas circuit breaker, when SF6 gas drops to the critical level, the circuit breaker shall be opened, and motor operated disconnects on both sides of CB shall be opened and the close of the circuit breaker shall be opened.

4.7 All changes to topology, including generation, must be modeled during the Phase 1

study for PRC-027 compliance. A protection system coordination study is required for new BES buses or when there is a 15% (or greater) change in the fault current for an existing BES bus. Settings changes may be required per the outcome of this coordination study.

4.8 The PD is to provide two, physically diverse, Single Mode Fiber paths between TSS 92 McLean Interconnection Substation and TSS 957 Bright Stalk II Wind Farm.

4.9 The PD will be responsible to request and bear the cost of any outages required on existing transmission or distribution lines that may be required for the transport of any large equipment, i.e. turbines, rotors, turbine structures, etc.

4.10 PD to provide limiting Transmission Facility ratings for their portion of 345kV L94805, 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.

## B. Transmission Owner Facilities Study Results

### 1. Project Description

Not Applicable

### 2. STAND ALONE NETWORK UPGRADES

Not Applicable

### 3. NETWORK UPGRADES

*The Network Upgrades will include, but not be limited to, the following.*

Relay Upgrades

1) At TSS 92 McLean, modify the existing SEL-411L/311L System 1 & 2 relays to add the current contributions from the new 345kV circuit breaker. CT ratio must be the same as existing TR1 which is at least 1200A primary current, an accuracy class of C800, and an overall CT ratio of 1200:5.

2) At TSS 92 McLean modify the load rejection design per GDD4003 to modify the transfer trip to include the new 345kV gas circuit breaker.

3) At TSS 92 McLean install a new SEL-3350 RTAC along with the following:

a) One pair of serial fiber connections for each Project Developer RTU data exchange

b) Move serial connections to and from Project Developer sites (including Bright Stalk and Blooming Grove) from existing RTAC.

### 4. OTHER SCOPE OF WORK

Design, procurement and construction to upgrade the Point of Interconnection metering CT/PTs within ComEd's TSS 92 McLean. Existing CT/PT's will need to be replaced to accommodate new generation.

Metering to be provided for revenue and AMI purposes.

Upgrade ComEd SCADA system to integrate revenue meter installed at the output terminal of generation facility for AE2-223 and to communicate wholesale energy output (Hourly compensated net MWH and Hourly compensated net MVARH).

## 5. MILESTONE SCHEDULE FOR COMPLETION OF TO WORK

Facilities outlined in this report are estimated to take 36 months to construct, from the time the Generation 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 | 6 |
| Permitting | 6 | 12 |
| Construction | 24 | 36 |

## 6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

6.1 This study is based on the System Impact Study Report for PJM Generation Interconnection New Service Request Project AE2-223 McLean 345kV. The steady-state voltage study for stability analysis will be performed by PJM during the Facility Phase. The PJM study could identify upgrades to the ComEd system that would become part of this project's scope of work. It is assumed that all associated network upgrades, as listed in the above Phase 2 System Impact study, are complete prior to this New Service Request Project being placed in service.

6.2 The schedule is based on GIA contract being executed by all parties and the deposit received.

6.3 ComEd cost estimates assume that work will be performed during normal weekdays and with no overtime.

6.4 Transmission line outages for the tap construction have not been identified, but generally are available in spring (March to May) and fall (September to November). These outages are controlled by PJM.

6.5 The PD will be responsible to request and bearing the cost for relocation of existing transmission or distribution lines (including structures) that may be required for transmission line crossings, the transport of any large equipment, such as cranes, etc. The backfeed date identified in earlier sections is not yet approved. Formal submittal of this request to ComEd's TSO for ultimate review by PJM can be made 7 months prior to the back feed request date.

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

6.7 Upgrades are subject to change based on detailed design development

6.8 Costs are based on 2024 rates and do not reflect a potential increase in Labor or Material costs.

6.9 ComEd cost estimate is valid for six (6) months after Facilities Study release by PJM.

6.10 This Facilities 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 the completion of a new FS.

6.11 Project Developer to upload as-built drawings to ComEd drawing system (Meridian).

6.12 Single fiber routing has not been included in this study.

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

6.14 Both (1) all real property conveyed in fee to ComEd must be remediated to and (2) all real property to which real property rights are transferred to ComEd (as determined in ComEd's discretion) must be remediated to IEPA's Tiered Approach to Corrective Action.

6.15 This facilities study report (FSR) assumes that generator output and plant auxiliary power consumption can both be metered with revenue accuracy as described. The final revenue metering configuration and equipment will be confirmed, and may be revised, during detailed engineering following execution of the Generation Interconnection Agreement (GIA).

6.16 It is assumed that dual Single Mode Fiber cables, owned and maintained by Project Developer, are already in place for System 1 and System 2 Relays between TSS 92 McLean and TSS 948 Bright Stalk Wind for L94805 will also reach TSS 957 Bright Stalk Wind II.

## 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 AE2-223 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.

7.1 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 primary revenue meter and CT/PT combo unit shall be installed, at PD's expense, at the interconnection substation on ComEd side of the Point of Interconnection.

ComEd shall own, operate, maintain, inspect, and test all the metering equipment as set forth in 'Testing of Metering Equipment' section of this Interconnection Service Agreement, at the PD's expense.

7.2 REAL-TIME METERING FOR PJM:

The PD 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 Disconnects, in conformance with the requirements listed in PJM Manuals M-01 and M-14D.

### 8. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

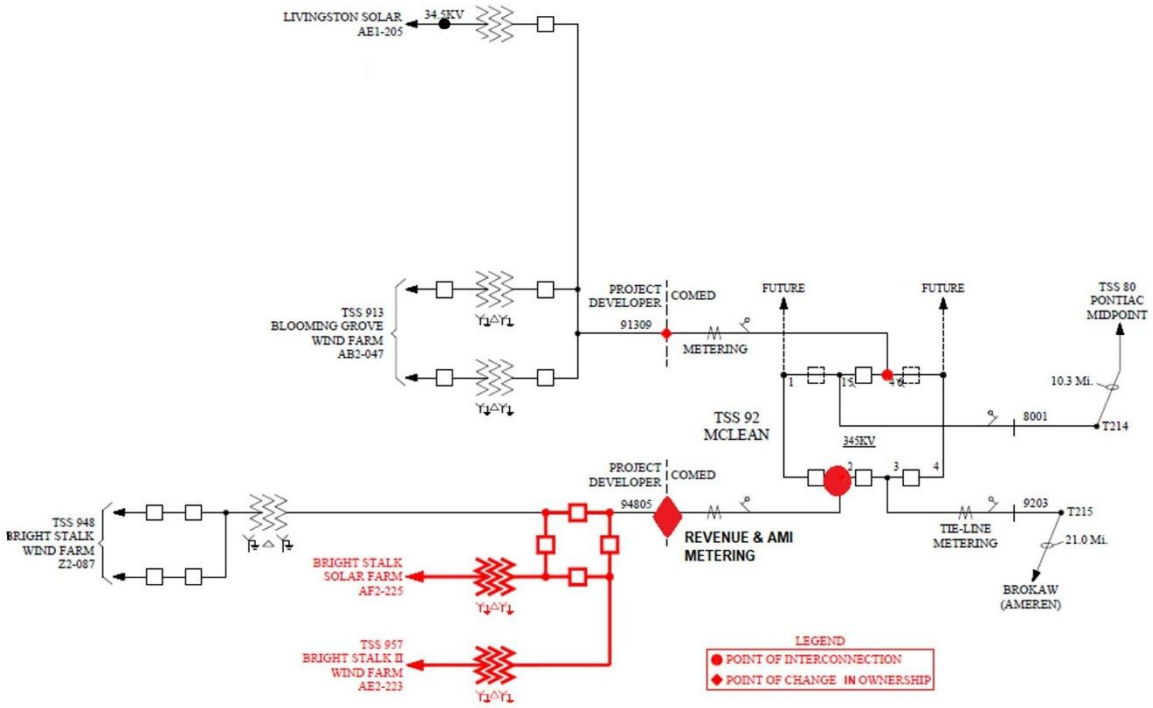
No additional easements, access rights, or temporary or permanent real property rights or acquisitions were identified as required for network upgrades to the ComEd system or for the project to interconnect at this location within this study. However, as further needs are assessed in detailed engineering, 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

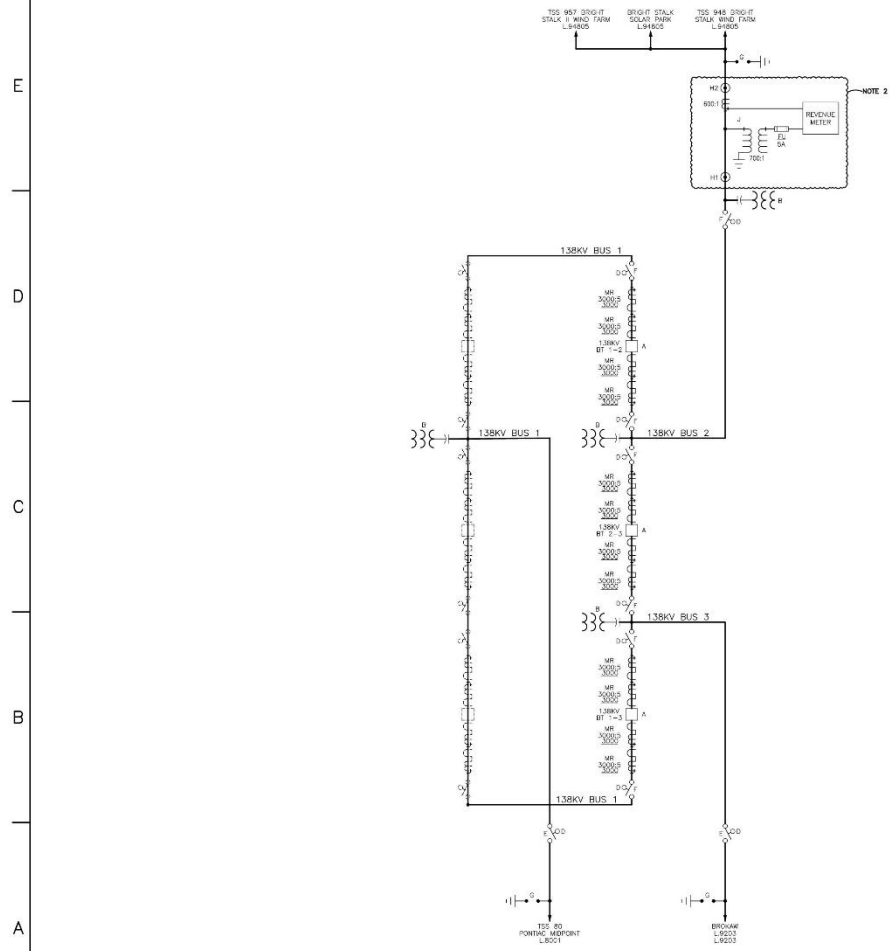
No environmental concerns and/or permitting requirements were identified as needed by this study. However, should detailed engineering and design and/or construction activities identify the need for an environmental study and/or permit requirements, the developer is fully responsible for the costs related 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

1) Attachment #1: One Line Diagram


LIVINGSTON SOLAR
AE1-205
34.5KV
TSS 913
BLOOMING GROVE
WIND FARM
AB2-047
PROJECT
DEVELOPER
COMED
91309
METERING
FUTURE
FUTURE
TSS 80
PONTIAC
MIDPOINT
10.3 Mi.
TSS 92
MCLEAN
345KV
8001
T214
PROJECT
DEVELOPER
COMED
94805
REVENUE & AMI
METERING
TSS 948
BRIGHT STALK
WIND FARM
Z2-087
BRIGHT STALK
SOLAR FARM
AF2-225
TSS 957
BRIGHT STALK II
WIND FARM
AE2-223
TIE-LINE
METERING
9203
T215
21.0 Mi.
BROKAW
(AMEREN)
LEGEND
POINT OF INTERCONNECTION
POINT OF CHANGE IN OWNERSHIP

92E-4000




## EQUIPMENT LIST

| ITEM | DESCRIPTION |
|---|---|
| A | 138KV, 3000A, ESKA SIEMENS SF6 CIRCUIT BREAKER, CATID #1672440 |
| B | TRENCH 138KV CCVT, 7968D-115/66.4V & 115/66.4V, CATID #427002 |
| C | TRENCH 138KV CCVT WITH CARRIER ACCESSORIES, 7968C-115/66.4V & 115/66.4V, CATID #427003 |
| D | 125V DC, SOUTHERN STATES MOTOR OPERATOR, CATID #1540652 |
| E | 138KV, 2000A, SOUTHERN STATES, VERTICAL BREAK, CATID #400721 |
| F | 138KV, 3000A, SOUTHERN STATES, VERTICAL BREAK, CATID #1589573 |
| G | 138KV, SURGE ARRESTER, CATID #1665342 |
| H | WAVE TRAP, 2000A, 70-209KHZ, DUAL FREQ. 0.265MH, VERTICAL, CATID #413828 |
| J | TRANSFORMER, COMBINATION, VOLTAGE AND CURRENT, 650KV BIL, 138KV, GRD Y/80.5 KV CIRCUIT, TRENCH 115-650-138-3025, CATID #1660199 |

NOTES:
1. THIS PROJECT, AE2-233 IS DEPENDANT ON THE COMPLETION OF TSS 92 MCLEAN, PROJECT DIAGRAM XXX-XXX.
2. REVIEW AND UPDATE IF THE REQUIRED REVENUE METER ON THE COMED SIDE OF INTERCONNECTION TO MEASURE POWER FLOW FROM CUSTOMER FACILITIES TO COMED TRANSMISSION SYSTEM. THE REVENUE METER SHALL BE SIZED TO PROPERLY MEASURE THE WHOLESALE POWER GENERATED BY CUSTOMER FACILITIES PLUS THE WHOLESALE POWER DISCHARGE FROM THE BATTERY STORAGE, AS WELL AS METERING POWER SUPPLIED FROM THE COMED SYSTEM FOR GENERATOR AUX POWER REQUIREMENTS WHEN THE GENERATION AND STORAGE ARE OFFLINE.

| REV | DATE | DESCRIPTION | TECH. | ENG. |
|---|---|---|---|---|
| 2A | XX/XX/24 | ISSUED FOR INFORMATION | DK | DK |

comed AN EXELON COMPANY
Commonwealth Edison Co.
Chicago, Illinois

ONE LINE DIAGRAM
138KV SWITCHYARD

TSS 92 MCLEAN

| SCALE | NONE | DATE | 08/08/24 |
|---|---|---|---|
| DRAWN BY | D&M | | |
| ENG. BY | D&M | | |

DC 02
DC —

THIS MATERIAL IS THE PROPERTY OF COMED AND CONTAINS PROPRIETARY INFORMATION WHICH MAY NOT BE DUPLICATED, USED OR DISCLOSED OTHER THAN AS EXPRESSLY AUTHORIZED BY COMED.

92E-4000

BURNS McDONNELL
200 W. ADAMS STREET, SUITE 2700
CHICAGO, IL 60606

THE REGISTRANT OF THE NEWLY APPLIED SEAL ONLY ASSUMES RESPONSIBILITY FOR THE CURRENT REVISION.

BURNS & MCDONNELL'S ILLINOIS DEPR REGISTRATION NUMBER IS 184-001310