

Facilities Study Report

For

Physical Interconnection of

PJM Generation Interconnection Request

Project ID AG1-483

“Dickerson 230 kV”

Revision 0: December 2024

Revision 1: January 2025

Introduction

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

A. Transmission Owner Facilities Study Summary

1. PROJECT DESCRIPTION

The Project Developer (PD) has proposed a Battery Storage Generating Facility located in Montgomery County, Maryland with a designated PJM Project ID of AG1-483. The installed facilities will have a total Maximum Facility Output (MFO) of 500 MW with 500 MW of this output being recognized by PJM as Capacity.

This project utilizes the capacity from the deactivated Dickerson Generating Facility Unit 1, Unit 2, and Unit 3 and will share a similar Point of Change in Ownership.

2. POINT OF INTERCONNECTION (POI)

The Generating Facility will interconnect with the PEPCO transmission system via a direct connection into the Dickerson 230 kV substation.

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 pole outside the substation fence on the side of the fence towards the previous generation facility. The developer will provide the transmission pole. This will be in the position associated with the previously retired unit 2.

4. SCOPE OF PROJECT DEVELOPER INTERCONNECTION 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).

The PD is responsible for all design and construction-related activities on its side of the PCO. Route selection, line design, right-of-way acquisition, and construction of the direct connect facilities are not included in this report and are the responsibility of the PD. The PD is required to construct and own a 230 kV, 63kA breaker with 3000/5 MRBCTs at their site. The PD will provide line differential relays (GE L90 and SEL-411L – PEPCO will provide relay model numbers during design) at their facility to support line current differentials between their 230kV breaker and the two PEPCO breakers adjacent to the POI at Dickerson. Two fiber paths over single mode 1300 nm fiber between the PD 230kV breaker and the PEPCO Dickerson "D" will be provided by the PD and coordinated with PEPCO UCOMM to support the line differential and communication (including status and control) back to PEPCO. In addition, the IC's breaker is required to use separate current transformers for each line differential relay and have stuck breaker protection, which will provide a DTT signal over the referenced fiber paths back to the PEPCO substation.

The project developer shall provide the control and status of the 230 kV breaker, relay fail alarms, and other points as requested in detail design over SCADA – either via a direct connection to the TO

or via PJM. Information detailing the interconnection to PEPCO facilities is outlined in the “Technical Considerations Covering Parallel Operations of Customer Owned Generation of One (1) Megawatt or Greater and Interconnected with the PHI Power Delivery System.” The costs outlined in this study do not include construction of the 230 kV equipment between the generating facility and the Point in Change of Ownership.

The PD is responsible for obtaining all real estate rights necessary for its facilities. PEPCO will not provide the PD with an easement or the right to use PEPCO real property; instead, the PD should plan to procure any PEPCO land they would pass through between the generation facility and the point of change in ownership. As part of this process, the PD shall provide, for PEPCO review, surveyed site plans that delineate their intended facilities and clearly define the facility's relationship to the existing right of ways and the electrical facilities contained therein.

Transmission Owner will supply a wireless modem for MV90 interrogation. In the event that a wireless modem is unable to reliably communicate, the PD will be required to look into alternative communication technology and gain approval from PEPCO on the alternative.

Inverter Requirements

For the safety and reliability of the transmission system, the Project Developer shall design its non-synchronous generation facility with the ability to maintain a power factor of at least 0.95 leading to 0.95 lagging measured at the Point of Interconnection.

It is the responsibility of the owner to secure the inverter from any unauthorized access (including physical and remote access) which could alter settings or adversely affect the inverter's ability to operate as required. Security measures should include utilizing secure password settings and/or physical locks on cabinet doors.

PEPCO will require the capability to remotely disconnect the generator from the grid by communication from PEPCO's System Operations facility. Such disconnection may be facilitated by a generator breaker or other method depending upon the specific circumstances and evaluation by PEPCO.

B. Transmission Owner Facilities Study Results

The following is a description of the planned Transmission Owner facilities for the physical interconnection of the proposed AG1-483 project to PEPCO transmission system. These facilities shall be designed according to PEPCO Applicable Technical Requirements and Standards. Once built, PEPCO will own, operate, and maintain these Facilities.

1. TRANSMISSION OWNER INTERCONNECTION FACILITIES:

Replace the existing 230 kV take-off structure, associated high strain bus structure, and associated foundations within the fence of the Interconnection Substation, to terminate the Project Developer's generator lead line.

- Two (2) 230 kV take-off structures will be replaced.
 - Replacement of the 230 kV take off structures will require temporary structures, foundation replacements and may trigger the need for a disturbance permit.
- The 230 kV 2U disconnect switch mounted on the takeoff structure will be replaced with a new 2000A motor-operated disconnect switch, which will be paired with two sets of three-phase motor operated ground switches.
- The 230 kV strain bus between the two 230 kV Take Off Structures will be replaced. This will require approximately 1600' of 1590 ACSR 45/7 (two conductors per phase), Six (6) Polymer Insulators, and associated connectors.
- 230kV conductor (1590 ACSR 45/7 (two conductors per phase) will be required between the take-off structure and the first pole (installed by the developer) outside the substation. Six (6) strain insulators and associated connectors will also be required.

2. STAND ALONE NETWORK UPGRADES

None of the upgrades associated with this interconnection are considered stand alone network upgrades.

3. NETWORK UPGRADES

Dickerson Substation Upgrade

The existing substation, Dickerson 230 kV, will be upgraded to interconnect the project with the PEPCO transmission system.

The substation is already laid out for a 230 kV Breaker and a Half and an existing Bay will provide a new 230 kV position. This position was previously used for the Dickerson Gen Unit 2 Tie Line. This position will require retiring existing foundations and structures and installing a new 230 kV breaker, switches, lightning arresters, CCVT, associated structures, foundations, grounding, conduit, cables and relaying. In more detail:

- Remove bus and bus support insulators from breaker bay. Approximately 180' total bus and six (6) 230 kV bus support insulators.
- Remove six (6) single-phase bus support structures and foundations and remove one (1) oil circuit breaker foundation (currently supporting three of the bus support structures).
- Remove switches – Two (2) 230 kV line switches on a common base from a double switch structure and one (1) 230 kV bus switch. Remove existing structures and foundations associated with these switches.
- Install one (1) 230 kV, 63kA gas circuit breaker with 3000/5A MRBCTs on a new foundation.
- Install three (3) 230 kV switches on three (3) new structures and three (3) new foundations. Each switch will have a motor operated three-phase ground switch.

- Install three (3) 230 kV Lightning Arresters on three (3) new single-phase structures and new foundations.
- Install one (1) 230kV CCVT on a new structure and new foundation.
- Install 360' of 1590 ACSR 45/7 (two conductors per phase) as jumpers between switches and breakers.
- Install one (1) lot of conduits, control cables, ground stingers, 230kV connectors and hardware.
- Removing existing electromechanical relays from four existing panels to make room for new relays and associated equipment.
- Install one (1) GE-F60 relay panel for breaker control and stuck breaker system 1 protection.
- Install one (1) SEL-451 relay panel for stuck breaker system 2 protection of new 230 kV CB.
- Install one (1) GE-L90 frontline relay panel for the protection of the gen-tie line.
- Install one (1) SEL-411L backup relay panel for the protection of the gen-tie line.
- Install two (2) fiber distribution panels for line differential and DTT communication to the Interconnection Customer substation. (Fiber and fiber routes will be provided as a Project Developer Interconnection Facility).

The expansion will be designed, built, owned, and operated by PEPCO. PEPCO will obtain the necessary permits at the developer's cost for all work within the Substation fence.

Upgrades to neighboring facilities:

There will be no upgrades to neighboring facilities required by this interconnection.

4. OTHER SCOPE OF WORK

Metering will be installed at Dickerson Substation. Metering is currently planned to be installed on a new structure. This will require:

- 3 metering class CT/PT combo units on 3 new CT/PT structures with foundations
- meter cabinet w/ meter
- associated cables, conduits, and communications.

Metering will also be required on the Developer's side of the PCO, including capabilities to meter the battery system as either a generation source or a load. This will be further described in section 7.

5. MILESTONE SCHEDULE FOR COMPLETION OF PEPCO WORK

Facilities outlined in this report are estimated to take 46-56 months to construct, from the time the Generation Interconnection Agreement is fully executed. This schedule may be impacted by the timeline for procurement of long lead items and the ability to obtain outages to construct and test the proposed facilities.

Description	Start month	Finish month
Preliminary Engineering	1	9
Detailed Engineering	9	26
Procurement	6	48
Construction	29	56

6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

Schedules Risks

- *Weather events and other unforeseen issues can cause substantial outage shifts that may impact this schedule.*
- *Substation equipment has experienced large schedule uncertainty and therefore may cause delays.*

Scope

- *Structures and foundations associated with this interconnection are at the end of life and the addition of new load will cause them to be replaced.*

Estimation

- *Contributions in aid of construction (CIAC) will be provided ahead of construction and will be used for financing for this project. Due to this, the allowance for funds used during construction (AFUDC) is \$0.*
- *The cost and schedule information included herein are good faith estimates developed within the limited period of time of Phase II of the Cycle process, and are subject to change based on a variety of factors.*

Planning / Design

- *Permitting: 12 months (Starting 3 -4 months into engineering design)*
 - *Assumption: No significant permits expected to be required for the project that would take > 12 months to acquire.*
- *Procurement: Currently assuming 180 weeks for breaker procurement.*

- *Assumption: Utilizing 180 weeks as the basis for the current schedule. Assuming that all other material needed for the project will have duration less than breaker.*

Execution

- *Demolition: 1 month*
- *Installation of new Structures and foundations will require outages and will start in advance of the arrival of the Breaker. This duration may extend over one year due to both the amount of work and outage constraints.*
- *Additional Construction will be needed after breaker arrival to install and commission breaker.*
- *Breaker Installation: 2 months*

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 AG1-483 GIA, and in PJM Manuals M01 and M14D. The details of applicable revenue metering requirements are given in the 'PHI Technical Considerations for Generation Parallel Operations' posted on PJM website.

A revenue metering will be installed on the Project Developer side of the Point of Change in Ownership and will be installed, owned and maintained by Project Developer.

The battery system will also at times be connected as a load. The Project Developer shall coordinate provisions with PEPCO to have the battery appropriately metered when it is being served as a load. Load metering may require metering on the low side of the step up transformer.

8. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

The Project Developer is responsible for obtaining all rights necessary for its facilities. PEPCO does not plan to provide the PD with any easements or right of ways, and instead the PD shall pursue a fair market sale of the real estate currently controlled by PEPCO related to this project. As part of this process, the PD shall provide, for PEPCO review, surveyed site plans that delineate their intended facilities and clearly define the facilities relationship to existing right of ways and the electrical facilities contained therein.

9. ENVIRONMENTAL AND PERMITTING

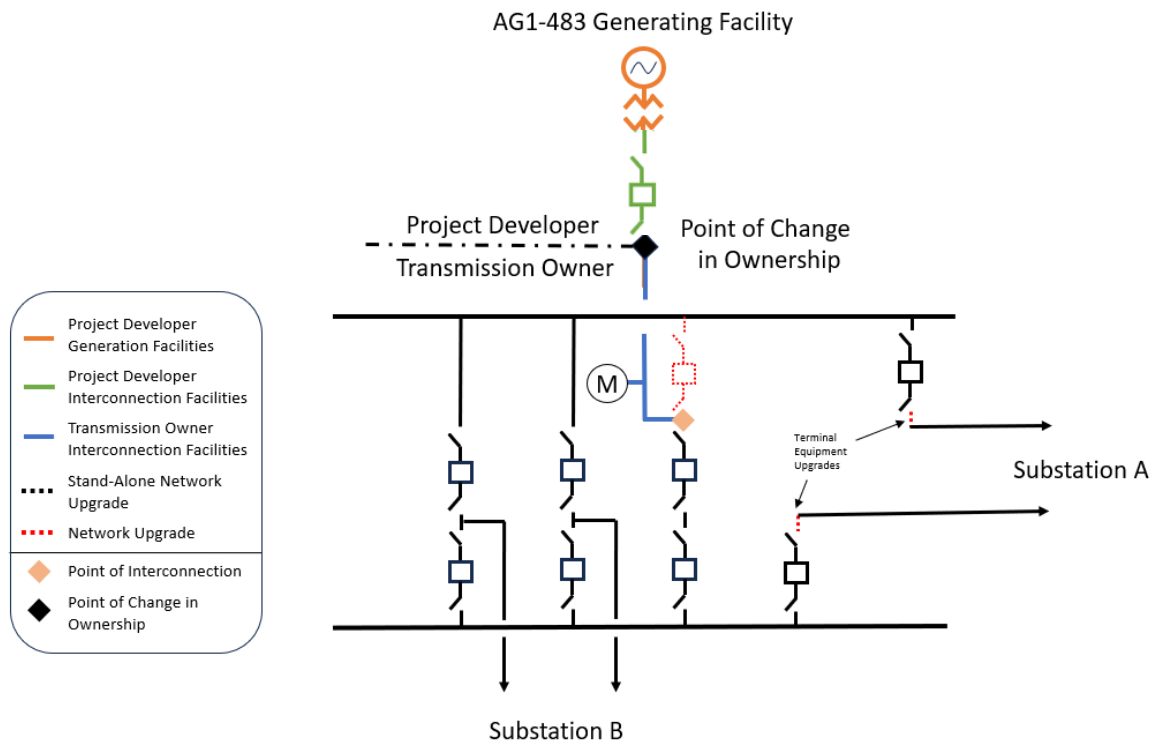
PEPCO will obtain all permits inside the Substation at the cost of the developer Substation. The project developer will be responsible for all permits on the developer's side of the Point of Change in Ownership.

C. APPENDICES

Attachment #1: Single line Diagram for the Physical Interconnection

Attachment #2: Substation General Arrangement

Attachment #1 - Single line Diagram for the Physical Interconnection



Attachment #2 - Substation General Arrangement

