Generation Interconnection System Impact Study Report

For

PJM Generation Interconnection Request Queue Position AE1-179

"South Millville-Newport 69 kV"

August 2019
Revised March 2022

Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation will be deferred until the System Impact Study is performed.

The System Impact Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The Interconnection Customer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

Buckshutem Solar I, LLC, the Interconnection Customer (IC), has proposed a 59.7 MW Energy (35 MW Capacity) solar generating facility to be located coordinates: Latitude: 39.3494000, Longitude: -75.0524000. PJM studied the AE1-179 project as an injection into the Atlantic City Electric Company (ACE) transmission system at a tap of the Silica (PSSE bus # 228222) to South Millville (PSSE bus #228228) 69 kV circuit and evaluated it for compliance with reliability criteria for summer peak conditions in 2022. The project was studied at a commercial probability of 100%. The planned in-service date, as requested by the IC, is September 30, 2021. This date may not be attainable due to required PJM studies (Facilities) and the Transmission Owner's construction schedule.

Revisions

- March 2022: Revised report to reflect changes due to re-tools and stability study results.

Point of Interconnection

The Interconnection Customer requested a transmission Point of Interconnection (POI) be evaluated for the AE1-179 project. The AE1-179 project will connect with the ACE transmission system at a new to be constructed 69 kV substation adjacent to the existing South Millville – Newport 69 kV line (see Attachment 1).

The Point of Interconnection (POI) will be located at an IC owned breaker within 500 feet of the newly constructed substation.

Transmission Owner Scope of Attachment Facilities Work

Substation Interconnection Estimate

Scope: Build a new 69 kV substation with a 3-position ring bus. Two of the positions on the ring bus will be transmission line terminals for the tie-in of existing ACE Line 0762. The other position will be a terminal configured for the interconnection of the AE1-179 generation.

Estimate: $4,700,000
Construction Time: 32-48 months

Major Equipment Included in Estimate:

- Control Enclosure, 47’ x 16’ Qty. 1
- Power Circuit Breaker, 69 kV, 2000A, 40kA, 3 cycle Qty. 3
- Line Switch, 69 kV, 2000A, Manual, Arcing horns Qty. 2
- Disconnect Switch, 69 kV, 2000A, Manual Wormgear, Arcing Horns Qty. 6
- CT/VT Combination Units, 69 kV Qty. 3
- CVT, 69 kV Qty. 9
- Disconnect Switch Stand, High, 69 kV, Steel Qty. 8
- CT/VT Stand, Single Phase, High, 69 kV, Steel Qty. 3
- CVT Stand, Single Phase, High, 69 kV, Steel Qty. 9
- SSVT, 69 kV/240-120 V Qty. 1
- Relay Panel, Transmission Line, FL/BU (20”) Qty. 2
- Bus Differential, 69 kV Qty. 1
- Control Panel, 69 kV Circuit Breaker (10”) Qty. 3
- Take-off structure, 69 kV Qty. 3
- Bus Support Structure, 3 phase, 69 kV, Steel Qty. 8
- 69 kV Al tub bus Lot

Estimate Assumptions:

- The required land is available for use.
- Developer responsible for land purchase for the substation, price is not included.
- Site clearing and grading performed by Developer.

Required Relaying and Communications

New protection relays are required for the new terminals.

Front line and back-up line protection will be required. A relay panel for the generator bus will be required with front line and back-up protection.

New protection relays are required for the new line terminals. Frontline and Backup line protection will be required. A relay panel will be required for each transmission line (2 total).

A breaker control relay on a breaker control panel will be required for the control and operation of each new 69 kV circuit breaker (3 total).

The project will require re-wiring and adjustment of existing relay schemes at South Millville and Newport to accommodate the new 69 kV substation.

Metering

A three phase 69 kV revenue metering point will need to be established within the IC facility at the POI.

The IC will purchase and install all metering instrument transformers, as well as construct a metering structure per ACE's specifications. The secondary wiring connections at the instrument transformers will be completed by the IC's contractors and inspected by ACE, while the secondary wiring work at the metering enclosure will be completed by ACE's meter technicians. The metering control cable and meter cabinets will be supplied by ACE and installed by the IC's contractors. ACE's meter technicians will program and install two solid state multi-function meters (Primary & Backup) for each new metering position. Each meter will be equipped with load profile, telemetry, and DNP outputs. The IC will be provided with one (1) meter DNP output.

The IC will be required to make provisions for a POTS (plain old telephone service) line within approximately three (3) feet of each ACE metering position to facilitate remote interrogation and data collection.

Interconnection Customer Scope of Direct Connection Work

The IC is responsible for all design and construction related to activities on their side of the Point of Interconnection. Site preparation, including grading and an access road, as necessary, is assumed to be by the IC. Route selection, line design, and right-of-way acquisition of the direct connect facilities is not included in this report, and is the responsibility of the IC. Protective relaying and metering design and installation must comply with ACE's applicable standards. The IC is also required to provide revenue metering and real-time telemetering data to PJM in conformance with the requirements contained in PJM Manuals M-01 and M-14 and the PJM Tariff.

ACE requires that an IC circuit breaker is located within 500 feet of the ACE substation to facilitate the relay protection scheme between ACE and the IC at the Point of Interconnection (POI).

Inverter Requirements

- The Interconnection Customer shall design is 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.

Special Operating Requirements

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

2. ACE reserves the right to charge the Interconnection Customer operation and maintenance expenses to maintain the Interconnection Customer attachment facilities, including metering and telecommunications facilities, owned by ACE.

Summer Peak Analysis - 2022

Transmission Network Impacts

Potential transmission network impacts are as follows:

Generator Deliverability

None

Multiple Facility Contingency

None

Contribution to Previously Identified Overloads

None

Summer Peak Load Flow Analysis Reinforcements

System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)

None

Short Circuit

No issues identified.

Stability Analysis

Completed. Please see report sent on March 2, 2022 delivered with the Facilities Study Report and the Interconnection Service Agreement.

Light Load Analysis - 2022

To be performed during later study phases (as required by PJM Manual 14B).

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request. Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

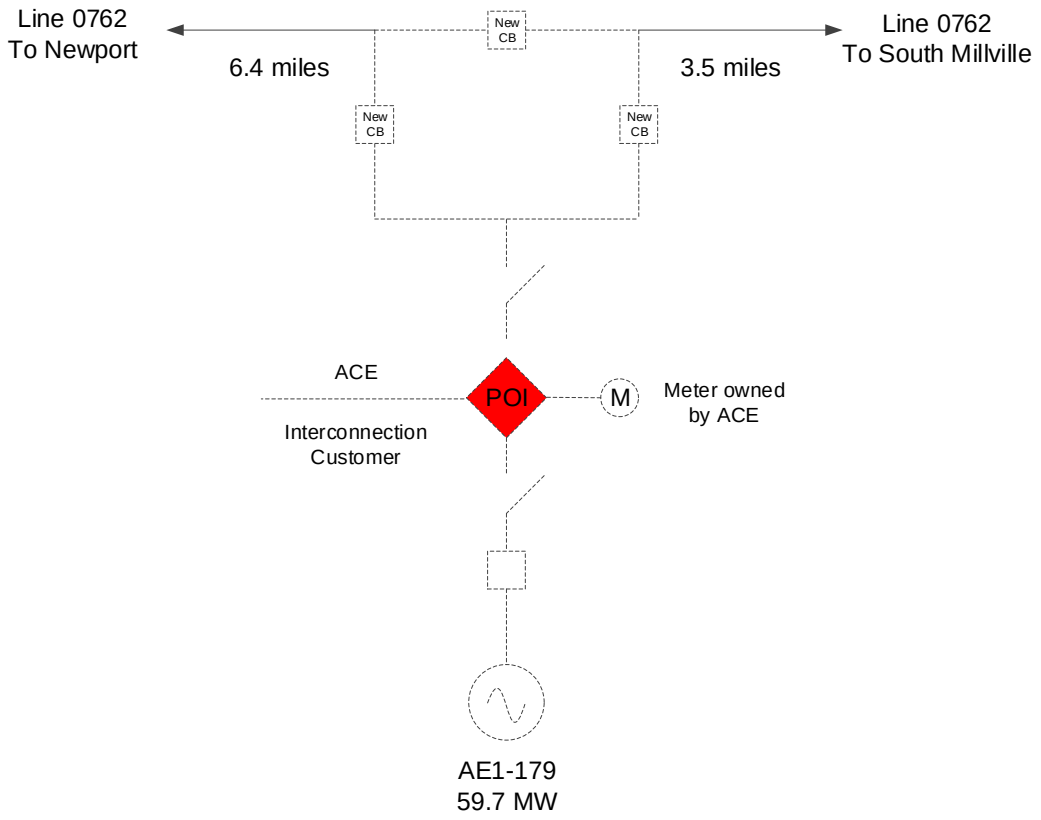
None

Atlantic City Electric Costs

Cost estimates will further be refined as a part of the Facilities Study for this project. The Interconnection Customer will be responsible for all costs incurred by ACE in connection with the AE1-179 project.

Attachment 1

AE1-179
South Millville – Newport 69 kV
New 69 kV Substation



An Interconnection Customer circuit breaker will be required no more than 500 feet from the ACE substation.

POI Point of Interconnection