

***Generation Interconnection
Combined Feasibility and System Impact
Study Report***

For

***PJM Generation Interconnection Request
Queue Position Y3-101***

“Cedar 12 kV”

August 2013

Preface

The intent of a Combined Feasibility/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 (cost allocation) with other projects will be identified in the Combined Report.

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 may be 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

Stafford Park Solar 3, LLC, the Interconnection Customer (IC), has proposed a 5.7 MW Maximum Facility Output (MFO); 1.9 MW Capacity solar generating facility to be located in Stafford, New Jersey. PJM studied the Y3-101 project as a 5.7 MW injection into the Atlantic City Electric Company's (ACE) system at a tap of the Cedar-Barnegat 69 kV circuit and evaluated it for compliance with reliability criteria for summer peak conditions in 2017. The proposed in-service date, as stated in the Attachment N, is December 31, 2014.

Point of Interconnection

Y3-101 will interconnect with the ACE transmission system at a new 69 kV three (3) breaker ring bus substation to be constructed adjacent to the #1 Cedar – Barnegat 69 kV circuit. The Point of Interconnection (POI) will be located at a disconnect switch just beyond the fence line of the new substation (see Attachment 1).

Direct Connection Requirements

Transmission Owner Scope of Work

Substation Engineering Estimate:

Scope: Construct a 69 kV three-breaker ring bus substation, inclusive of a terminal position for the queue project on the #1 Cedar – Barnegat 69 kV circuit.

Estimate: \$4,000,000

Construction Time: 24 – 36 months

Note that it is assumed that the Developer would be responsible for land acquisition for all the new facilities, including the substation. The Developer would also be responsible for the necessary permits to construct these facilities (zoning, storm water management, environmental, etc.) as well as site clearing/grading and entrance road construction. These costs are not included in the estimate.

Transmission Engineering Estimate:

Scope: Install two (2) self-supporting steel poles on foundations, conductor and associated hardware to cut the #1 Cedar – Barnegat 69 kV circuit and loop it into and out of the new substation.

Estimate: \$200,000

Construction Time: 24 months

Note: A breaker is required within 500 feet of the POI.

Interconnection Customer Scope of Work

The Interconnection Customer (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 PHI'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.

The Interconnection Customer 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 Interconnection Customer'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 Interconnection Customer's contractors. ACE's meter technicians will program and install two solid state multi-function meters (primary & backup) for the new metering position. Each meter will be equipped with load profile, telemetry, and form-c pulse outputs. The ownership of metering equipment purchased or installed by the IC shall be transferred to the Interconnected Transmission Owner at time of commercial operation, unless the IC asserts its right to install, own and operate the metering system.

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, a line recloser, or other method depending upon the specific circumstances and the evaluation by ACE.

2. It is the Interconnection Customer's responsibility to send the data that PJM and ACE requires directly to PJM. The Interconnection Customer will grant permission for PJM to send to ACE the following telemetry that the Interconnection Customer sends to PJM: real time MW, MVAR, volts, amperes, generator/status, and interval MWH and MVARH.
3. The Interconnection Customer will be required to make provisions for a voice quality phone line within approximately 3 feet of each Company metering position to facilitate remote interrogation and data collection.
4. 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.

Inverter Operation

The inverter at the IC's generating facility location shall have the following capabilities:

- Voltage flicker reduction through dynamic VAR or fixed PF response
- Ramp rate control
- SCADA communications
- Curtailment or other mitigation ability if high voltage were to occur
- Low voltage and system disturbance ride through
- Ability to receive and respond to a transfer trip signal
- Ability to adjust PF or VARs based on utility signal
- Ability to Adjust Real Power Output based on utility signal

The inverter shall operate in accordance with the IEEE 1547 series of standards that have been approved. While inverters should be capable of voltage stabilization thru dynamic VAR response and capable of low voltage and system disturbance ride through, neither of these capabilities shall be implemented until such time that the IEEE 1547 series of standards are revised and approved to include standards for these capabilities. At such time as these revised standards become available, the PV owner/operator shall cooperate with the Company (the 'Company' referring to ACE, DPL, or PEPCO) to implement these capabilities with settings acceptable to the Company. Until such time, the inverters shall operate at a fixed power factor between 0.95 leading and 0.95 lagging which will be supplied by the Company.

Transmission Network Impacts

Potential transmission network impacts are as follows:

Generator Deliverability

*(Single or N-1 contingencies for the **Capacity** portion only of the interconnection)*

None

Multiple Facility Contingency

*(Double Circuit Tower Line, Line with Failed Breaker and, Bus Fault contingencies for the **Full** energy output.*

None

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. “Network Impacts”, identified for earlier generation or transmission interconnection projects in the PJM Queue)

None

Short Circuit

No issues identified.

Stability Analysis

Not required due to project size.

Light Load Analysis

Light Load Studies to be conducted during later study phases (applicable to wind, coal, nuclear, and pumped storage projects).

New System Reinforcements

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

None

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. The costs identified below represent the total to complete the reinforcement, not necessarily this project’s cost. Actual cost allocations will be deferred until the System Impact Study is performed.

None

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

ATTACHMENT 1

Y3 – 101
#1 Cedar – Barnegat 0777
New 69kV Ring Bus

