Generation Interconnection
Feasibility Study Report
Queue Position X3-024

The Interconnection Customer (IC) has proposed a 1.82 MWE (0.69 MWC; 1.82 MW MFO) solar powered generating facility to be located in Cape May Court House, New Jersey. PJM studied X3-024 as a 1.82 MW injection into the Atlantic City Electric Company (ACE) system at the Court #1 12.9kV substation and evaluated the project for compliance with reliability criteria for summer peak conditions in 2015. The planned in-service date, as stated in the Attachment N, is June 1, 2012.

Point(s) of Interconnection

The IC requested the Point of Interconnection (POI) for X3-024 to be a 12.47 kV distribution level interconnection.

X3-024 will interconnect with the Atlantic City Electric Company system at the Court Substation T3 transformer using NJ0384.

Point(s) of Interconnection Discussion

Description of Atlantic City Electric (ACE) policy

The existing 12 kV circuit local to the solar site is NJ0384 from Court Substation.

ACE limits voltage fluctuation on a distribution circuit to 0.58% per installation without a detailed time-based study. If a detailed time-based study is performed, a higher voltage fluctuation may be permitted. Further upgrades may also be identified.

An initial screen of this project showed that it will cause voltage fluctuations of 2%. Distribution feeder work has been included in this report to reduce this fluctuation to less than 0.58%. If a detailed study is performed, this work will be re-assessed.

As a result, the project will interconnect with the Atlantic City Electric system at Court Substation T3 transformer using NJ0384.

Direct Connection Requirements

Transmission Owner Scope of Work

The scope of work and estimated costs for the direct connection facilities is as follows:

1. Recondcutor 2,100 ft. of single-phase #4 Copper to three-phase 477 AAC.
2. A utility operated recloser equipped with the proper relaying and communications will be installed at the solar site.
3. Utility grade primary metering will be required at the solar site.
4. A detailed, time-based study may be performed during later study phases.

5. Protection, Planning, and other engineering departments will perform studies, design work, and prepare engineering estimates.

The estimated cost to perform this work is:

Estimated Costs			
Court Substation T3			
Reconductoring	0.4	Miles	$225,000
Recloser w/ Relaying and Communications			$50,000
Utility Grade Metering			$20,000
Detailed Time Based Study			$30,000
Various Departments Work			$20,000
Subtotal Cost			$345,000
Subtotal Cost with 18% Overheads			$407,100
Approximate Total Cost with 15% Contingency			$468,165

The estimated time to complete the work is **12 months** after a fully executed interconnection agreement.

Additional Operating Requirements

1. The Interconnection Customer will be required to make provisions for a voice quality phone line within approximately 3 feet of each PHI metering position to facilitate remote interrogation and data collection.

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.

The IC will be required to install metering and telemetry equipment to provide revenue metering and real-time telemetry data to PJM. The requirements for this equipment are listed in Appendix 2, Section 8 of Attachment O to the PJM Tariff, as well as PJM Manuals 01 and 14D. Protective relaying and metering design and installation must comply with PHI's Applicable Standards.

The Interconnection Customer will purchase and install all metering instrument transformers as well as construct a metering structure per PHI's specifications. The secondary wiring connections at the instrument transformers will be completed by the Interconnection Customer's contractors and inspected by PHI, while the secondary wiring work at the metering enclosure will be completed by PHI's meter technicians. The metering control cable and meter cabinets will be supplied by PHI and installed by the Interconnection Customer's contractors. PHI'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.

Inverter Requirements and Capabilities

The inverter at the DG location shall have the following capabilities:

1. Voltage flicker reduction through set non-unity power factor settings between 0.95 lead and 0.95 lag

It is the responsibility of the developer to obtain inverters that can operate with these requirements while also meeting all applicable requirements of IEEE and UL standards such as but not limited to IEEE 1547 and UL 1741.

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.

Dynamic Analysis

ACE will commence a time-based dynamic study during the System Impact Study phase to evaluate the project's impact on the ACE distribution system. Once complete, the results of the study will be reviewed and the proposed project will be evaluated for protection and coordination issues. Other required upgrades may be identified at that time.

System Protection

Protective relaying and metering design and installation must comply with PHI's applicable standards. Any other costs determined by system protection as a result of the short circuit studies will be supplied in the near future.

Other Charges

PHI reserves the right to charge the Interconnection Customer Operation and Maintenance expenses to maintain the Interconnection Customer's Attachment Facilities, including metering and telecommunications facilities which are owned by PHI.

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.

None

Potential Congestion due to Local Energy Deliverability

(PJM also studied the delivery of the energy portion of the surrounding generation. Any potential 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 Transmission Interconnection Request. Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full deliverability for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which analyzes all overload conditions associated with the identified overloaded element(s). As a result of the aggregate energy resources in the area, the following violations were identified:

These are ***not*** required reliability upgrades.
None