Generation Interconnection
Feasibility Study Report
Queue Position X2-024

The Interconnection Customer (IC) has proposed a 2 MW energy only (0 MWC; 2 MW MFO) solar powered generating facility consisting of ground mounted fixed panel solar arrays to be located in Lower Alloways Creek, New Jersey. PJM studied X2-024 as a 2 MW injection into the Atlantic City Electric (ACE) system at the Quinton 12kV 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 Y, is November 01, 2011.

Point(s) of Interconnection

X2-024 will interconnect with the Atlantic City Electric system at a new 69/12kV substation to be constructed adjacent to the Deepwater-Laurel 69kV circuit.

Direct Connection Requirements

Transmission Owner Scope of Direct Connection Work

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

1. Design and construct a new 69/12 kV substation at the PV site. This substation will be built to the Company's (the "Company" referring to ACE, DPL, or PEPCO) specifications for a distribution substation and be owned and operated by the Company. *Note: There are no plans to serve any load from this substation, however it will be built so that it can serve load in the future. The Developer must supply adequate land for the installation of the substation. The land shall be in close proximity to roads and be on buildable high land.*
2. Create a transmission loop by cutting into the Deepwater - Laurel 69 kV line with an approximate total distance of 14 miles to the new substation.
3. Establish one new 12 kV feeder with overhead conductor from the new substation to the PV site.
4. A utility operated recloser equipped with the proper relaying and communications will be required for each feeder serving the PV generator.
5. Utility grade primary metering will be required for each feeder.
6. Perform a detailed time based study.
7. Protection, Planning, and other engineering departments will perform studies, design work, and prepare engineering estimates.
8. Transfer trip may be required.

The estimated cost to perform this work is:

Estimated Costs			
New Substation			
New Substation			$4,404,000
Transmission Feed 69 kV	14	Miles	$9,100,000
Fiber Installation (5 miles of fiber assumed)			$250,000
Standard Feeder Get-a-Way including Recloser		1	$70,000
Utility Grade Metering		1	$20,000
SCADA Integration into EMS		1	$10,000
Detailed Time Based Study			$30,000
Various Departments Work			$20,000
Subtotal Cost			$13,904,000
Subtotal Cost with 18% Overheads			$16,406,720
Approximate Total Cost with 15% Contingency			$18,867,728

The estimated time to complete this work is **24-36 months** for the new substation after receipt of a fully executed interconnection agreement. The proposed transmission path requires new right of way and permitting which may pose significant challenges for the timely completion of the schedule and the completion of the project. ACE cannot guarantee right of way will be granted.

Note: the above cost does not include the Contribution in Aid of Construction (CIAC) tax.

Special Operating Requirements

1. The Interconnection Customer will grant its permission to PJM for PJM to send PHI the following telemetry data that the Interconnection Customer sends to PJM: real time megawatts, megavars, 3 phase volts, 3 phase amperes and status, and interval megawatt-hours, and megavar-hours.

2. 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.

Interconnection Customer Scope of Direct Connection Work

The Interconnection Customer (IC) assumes full responsibility for design and construction of all facilities associated with the X2-024 generating station. Site preparation including grading and an access road, as necessary, is assumed to be by 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 Atlantic City Electric's Applicable Standards.

Inverter Requirements and Capabilities

The Interconnection Customer's inverter should have the following capabilities:

- 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

None

Stability Analysis

Not required due to project size.

Dynamic Analysis

A time-based dynamic study will commence during the System Impact Study phase of the project. 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.

Other Charges

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

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.

1. The (ACE) Deepwater-Carneys Point Tap 69 kV line (from bus 228323 to bus 228320 ckt 1) loads from 100.00% to 100.03% (DC power flow) of its emergency rating (94 MVA) for the operational contingency 'MICK-BRIDG'. This project contributes approximately 0.13 MW to the thermal violation.