# *Generation Interconnection*
# *Feasibility Study Report*
# *Queue Position W1-060*

The Interconnection Customer (IC) has proposed a 20 MWE (7.6 MWC) solar powered generating facility consisting of ground mounted fixed panel solar arrays to be located in Carneys Point Township, Salem County, New Jersey. PJM studied W1-060 as a 20 MW injection into the Atlantic City Electric (ACE) system at the Carneys Point 69kV substation. The project was evaluated for compliance with reliability criteria for summer peak conditions in 2014.

## Point of Interconnection

W1-060 will interconnect to the Atlantic City Electric distribution system via a new 69/12 kV substation to be built on property provided by the IC at no cost to ACE. The new substation will be owned and operated by ACE.

## 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 near the W1-060 site. The estimated cost to perform this work is **$6,484,000.**
2. Create a transmission loop (approximate distance of 1.74 miles) to the new substation. The estimated cost to perform this work is **$1,131,000.**

3. Construct two (2) new 12 kV feeders with PAC overhead conductor from the new substation to the generating site. It is expected that some poles will require replacing. The estimated cost to perform this work is **$150,000.**
4. Install a utility operated recloser with relaying and communication equipment for each feeder. The estimated cost to perform this work is **$100,000.**
5. Install utility grade metering for each feeder. The estimated cost to perform this work is **$40,000.**
6. Install SCADA to Control Center for each feeder. The estimated cost to perform this work is **$20,000.**
7. Perform a Dynamic Study. The estimated cost to perform this work is **$30,000.**
8. Perform system protection planning, engineering, and transfer trip work. Transfer trip to be installed in locations where a generator installation could be islandized with a minimum load that is less than 3 times the size of generator capacity. The estimated cost to perform this work is **$20,000.**

The estimated cost to perform this work is **$7,975,000** and will take an estimated **24 – 36 months** to complete after receipt of a fully executed Interconnection Service Agreement (ISA) and Interconnection Construction Service Agreement (CSA).

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

**Interconnection Customer Scope of Direct Connection Work**

The Interconnection Customer (IC) assumes full responsibility for design and construction of all facilities associated with the W1-060 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.

## 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 be completed during the System Impact Study phase of W1-060.

AC injection into the grid must follow a ramp up rate that does not negatively affect the distribution system. An inverter capable of dynamic VAR output with Droop and Time Delay settings will be required. Further study will be required to review the impact to the grid under all output scenarios and grid load profiles. The proposed project will be reviewed for protection and coordination issues and any other required upgrades will be identified in future studies.

**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 CRLS CR2-SHRMAN#2 69 kV line (from bus 228252 to bus 228226 ckt 1) loads from 99.73% to 100.15% (DC power flow) of its emergency rating (56 MVA) for the single line contingency ('FAIR-NEWP'). This project contributes approximately 0.42 MW to cause the thermal violation.