Generation Interconnection

Combined Feasibility / Impact Study Report

for

Queue Project AE2-213

THOROFARE 13.2 KV

1.17 MW Capacity / 3.15 MW Energy

July, 2019

1 Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. 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 impact study is performed.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

PJM utilizes manufacturer models to ensure the performance of turbines is properly captured during the simulations performed for stability verification and, where applicable, for compliance with low voltage ride through requirements. Turbine manufacturers provide such models to their customers. The list of manufacturer models PJM has already validated is contained in Attachment B of Manual 14G. Manufacturer models may be updated from time to time, for various reasons such as to reflect changes to the control systems or to more accurately represent the capabilities turbines and controls which are currently available in the field. Additionally, as new turbine models are developed, turbine manufacturers provide such new models which must be used in the conduct of these studies. PJM needs adequate time to evaluate the new models in order to reduce delays to the System Impact Study process timeline for the Interconnection Customer as well as other Interconnection Customers in the study group. Therefore, PJM will require that any Interconnection Customer with a new manufacturer model must supply that model to PJM, along with a $10,000 fully refundable deposit, no later than three (3) months prior to the starting date of the System Impact Study (See Section 4.3 for starting dates) for the Interconnection Request which shall specify the use of the new model. The Interconnection Customer will be required to submit a completed dynamic model study request form (Attachment B-1 of Manual 14G) in order to document the request for the study.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer 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.

2 General

The Interconnection Customer (IC) has proposed an AC coupled Solar-Storage generating facility located in Gloucester, Deptford Township, New Jersey. The installed facilities will have a total capability of 3.145 MW (Solar: 2.625 MW, Storage: 0.52 MW) with 1.17 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is March 02, 2020. This study does not imply a TO commitment to this in-service date.

Queue Number	AE2-213
Project Name	THOROFARE 13.2 KV
Interconnection Customer	Dimension NJ 1 LLC
State	New Jersey
County	Gloucester
Transmission Owner	PSEG
MFO	3.2
MWE	3.145
MWC	1.17
Fuel	Solar; Storage
Basecase Study Year	2022

2.1 Point of Interconnection

AE2-213 will interconnect with the PSEG distribution system at the Thorofare 13.2 kV substation.

2.2 Cost Summary

The AE2-213 project will be responsible for the following costs:

Description	Total Cost
Transmission Owner Facilities	$1,791, 479
Transmission Owner Upgrades	$ 0
Total Costs	$1,791, 479

3 Transmission Owner Scope of Work

Detailed scope, cost, and schedule will be provided in a separate two party Interconnection Agreement (IA) between PSE&G and the Interconnection Customer.

The total estimate for AE2-213 is **$1,791,479**.

Assumptions:

- Civil costs for any manhole and conduit needed at customer's site were not included
- No environmental or permitting costs were identified or included

4 Interconnection Customer Requirements

The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

Specific Operational Power Factor Requirement: The specific operational power factor requirement will be specified in a separate two party Interconnection Agreement (IA) between PSE&G and the Interconnection Customer as this project is considered FERC non-jurisdictional per the PJM Open Access Transmission Tariff (OATT).

PSE&G's Information & Requirements for Electric Service Handbook

http://www.pseg.com/business/builders/new_service/before/pdf/RequirementsElecSvc2005.pdf

PSE&G Customer Equipment Requirements – Primary Service

https://www.pseg.com/business/builders/new_service/before/pdf/pepp/sec03.pdf

5 Revenue Metering and SCADA Requirements

5.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

5.2 PSEG Requirements

The Interconnection Customer will be required to comply with all PSE&G Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "Information and Requirements for Electric Service" document located at the following links:

http://www.pseg.com/business/builders/new_service/before/
http://www.pjm.com/planning/design-engineering/to-tech-standards.aspx

6 Network Impacts

The Queue Project AE2-213 was evaluated as a 3.1 MW (Capacity 1.2 MW) injection at the Thorofare L2 13.2 kV substation in the PSEG area. Project AE2-213 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-213 was studied with a commercial probability of 1.00. Potential network impacts were as follows:

Summer Peak Load Flow

7 Generation Deliverability

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

None

8 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

9 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

10 Potential Congestion due to Local Energy Deliverability

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.

Note: Only the most severely overloaded conditions are listed below. 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 shall study all overload conditions associated with the overloaded element(s) identified.

None

11 Steady-State Voltage Requirements

(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

Not Required

12 Stability and Reactive Power Requirement for Low Voltage Ride Through

(Summary of the VAR requirements based upon the results of the dynamic studies)

Not Required

13 System Reinforcements

None.

Short Circuit

14 Short Circuit

The following Breakers are over duty

None

Attachment 1. Single Line Diagram