

***Generation Interconnection
Feasibility Study Report***

For

***PJM Generation Interconnection Request
Queue Position AD2-025***

Hillsborough 13 kV

August 2018

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. 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 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.

General

The Interconnection Customer (IC), has proposed a battery storage facility located in Somerset County, New Jersey. The installed facilities will have a total capability of 2 MW with 0 MW of this output being recognized by PJM as capacity. The proposed in-service date for this project is November 30, 2018. **This study does not imply a PSE&G commitment to this in-service date.**

Attachment facilities and local upgrades (if required) along with terms and conditions to interconnect AD2-025 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). From the transmission system perspective, no network impacts were identified in the Feasibility Study, however this project will require an Impact Study for PJM to complete additional analyses (as described in the Network Impacts section of the report).

Point of Interconnection

AD2-025 will interconnect with the PSE&G distribution system along the Sunnymead SUN8022 13kV circuit.

Cost Summary

The AD2-025 project will be responsible for the following costs:

Description	Total Cost
Transmission Owner facilities	\$ 108,110
Transmission Upgrades	\$ 0
Total Costs	\$ 108,110

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 after the conclusion of the Impact Study phase.

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Line Tap on the Sunnymeade Rd 13.2kV circuit to the AD2-025 Point of Interconnection including costs associated with 13.2kV Metering Package	\$ 108,110
Total Direct Connection Facility Costs	\$ 108,110

Interconnection Customer Requirements

1. 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.
2. The power factor requirement is as follows: Due to the high voltage in the PSEG 13.2kV distribution zone during certain times, The Interconnection Customer shall design its Customer Facility with the ability to maintain a power factor of at least 0.95 leading to 0.95 lagging measured at the Point of Interconnection. 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).
3. Specific Operational Power Factor Requirement: PSEG will complete a technical analysis during the Impact Study Phase to determine the specific Power Factor requirement.
4. PSE&G's Information & Requirements for Electric Service Handbook
http://www.pseg.com/business/builders/new_service/before/pdf/RequirementsElecSvc2005.pdf
5. PSE&G Customer Equipment Requirements – Primary Service
https://www.pseg.com/business/builders/new_service/before/pdf/pepp/sec03.pdf

Revenue Metering and SCADA Requirements

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 Sections 24.1 and 24.2.

Public Service Electric and Gas (PSE&G) 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>

Network Impacts

The Queue Project AD2-025 was evaluated as a 2.0 MW (Capacity 0.0 MW) injection at the Sunnymede Rd. 13.2kV substation in the PSEG area. Project AD2-025 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-025 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2021

Generator Deliverability

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

None.

Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck 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

(Summary of impacted circuit breakers)

None.

Steady-State Voltage Requirements

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

Steady State Voltage Studies to be conducted during later study phases

Stability and Reactive Power Requirement for Low Voltage Ride Through

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

Stability Studies to be conducted during later study phases

PSEG Voltage Requirements and Analysis

PSEG's Voltage Analysis Study to be conducted during later study phases

Winter Analysis - 2021

Winter Studies to be conducted during later study phases

Light Load Analysis - 2021

Light Load Studies to be conducted during later study phases

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.

None.

New System Reinforcements

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

None.

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

None.

Attachment 1. Single Line Diagram

