Generation Interconnection

Combined Feasibility / System Impact Study Report

for

Queue Project AE2-273/AE2-274

SIEGFRIED-HAUTO 69 KV

0.8 MW Capacity / 0 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 uprate to the existing U4-014/AC1-087 Solar generating facility located in Carbon County, Pennsylvania. AE2-273 and AE2-274 projects request a Capacity only increase to the existing Facility of 0.4 MW each. AE2-273 and AE2-274 were evaluated a single combined project, for a total requested Capacity only increase of 0.8 MW. The installed facilities after the uprate will have a total capability of 20 MW with 8.4 MW of this output being recognized by PJM as Capacity.

The table below provides a summary of the project capability:

	MFO (MW)	CIR (MW)	MWE (MW)
Existing U4-014/AC1-087	20	7.6	20
Proposed AE2-273/AE2-274 Increase	0	0.8	0
Total installed	20	8.4	20

The proposed in-service date for this project is October 10, 2019. This study does not imply a TO commitment to this in-service date.

Queue Number	**AE2-273/AE2-274**
Project Name	SIEGFRIED-HAUTO 69 KV
Interconnection Customer	PA Solar Park, LLC
State	Pennsylvania
County	Carbon
Transmission Owner	PPL
MFO	20
MWE	0
MWC	0.8
Fuel	Solar
Basecase Study Year	2022

2.1 Point of Interconnection

AE2-273/AE2-274 will interconnect with the PPL transmission system as an uprate to U4-014/AC1-087 which taps the Siegfried to Hauto 69kV line.

2.2 Cost Summary

The AE2-273/AE2-274 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$0
Direct Connection Network Upgrade	$0
Non Direct Connection Network Upgrades	$0
Total Costs	$0

In addition, the AE2-273/AE2-274 project may be responsible for a contribution to the following costs

Description	Total Cost
System Upgrades	$0

3 Attachment Facilities

None.

4 Direct Connection Cost Estimate

None.

5 Non-Direct Connection Cost Estimate

None.

6 Interconnection Customer Requirements

There is no change to the Interconnection Customer Requirements for the Existing Facilities.

7 Revenue Metering and SCADA Requirements

7.1 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.

7.2 PPL Requirements

There is no change to the Interconnection Customer Requirements for the Existing Facilities.

8 Network Impacts

The Queue Project AE2-273/AE2-274 was evaluated as a 0.8 MW (Capacity 0.8 MW) uprate to U4-014/AC1-087 which is at the PA Solar 69kV substation in the PPL area. Project AE2-274 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-273/AE2-274 was studied with a commercial probability of 1.00. Potential network impacts were as follows:

Summer Peak Load Flow

9 Generation Deliverability

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

None

10 Multiple Facility Contingency

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

None

11 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

12 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

13 Affected Systems

None.

Short Circuit

14 Short Circuit

The following Breakers are over duty

None.

Attachment 1 – Single Line Diagram