Generation Interconnection

Combined Feasibility / System Impact Study Report

for

Queue Project AF2-273

SLIGO 25 KV

0 MW Capacity / 3 MW Energy

July 2020

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1 Introduction

This System Impact Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 205, as well as the System Impact Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The AF2-273 customer will be an interconnection to Central Electric Rural Cooperative's facilities. The IC is responsible to contact Central Electric Rural Cooperative for the scope, cost and schedule for this physical interconnection. This report only identifies the effects on the transmission system.

2 Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, 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 System Impact Study is performed.

The System Impact 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.

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.

3 General

The Interconnection Customer (IC), has proposed a Solar; Storage generating facility located in Clarion County, Pennsylvania. The installed facilities will have a total capability of 3 MW with 0 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is August 01, 2021. This study does not imply a Central Electric Rural Cooperative commitment to this in-service date.

Final attachment facilities and local upgrades (if required) along with terms and conditions to interconnect AF2-273 will be specified in a separate two party Interconnection Agreement (IA) between Central Electric Rural Cooperative and the Interconnection Customer as this project is considered FERC non-jurisdictional per the PJM Open Access Transmission Tariff (OATT).

From the transmission perspective, no network impacts or system reinforcements were identified as detailed in the "Network Impacts" section below.

Queue Number	AF2-273
Project Name	SLIGO 25 KV
State	Pennsylvania
County	Clarion
Transmission Owner	APS (Central Electric Rural Cooperative)
MFO	3
MWE	3
MWC	0
Fuel	Solar; Storage
Basecase Study Year	2023

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

The AF2-273 customer will be an interconnection to Central Electric Rural Cooperative's facilities. The IC is responsible to contact Central Electric Rural Cooperative for the scope, cost and schedule for this physical interconnection. This PJM report only identifies the effects on the transmission system as an injection into the Sligo 138 kV bus. See One Line in Attachment 1.

5 Cost Summary

The AF2-273 customer will work with Central Electric Rural Cooperative for the scope, schedule and cost of the work to physically interconnect to their system.

6 Transmission Owner Scope of Work

The AF2-273 customer will work with Central Electric Rural Cooperative for the scope, schedule and cost of the work to physically interconnect to their system.

7 Schedule

The AF2-273 customer will work with Central Electric Rural Cooperative for the scope, schedule and cost of the work to physically interconnect to their system.

8 Transmission Owner Analysis

Central Electric Rural Cooperative to provide the analysis of their lower voltage system as a result of this interconnection.

9 Interconnection Customer Requirements

Central Electric Rural Cooperative to provide any specific interconnection requirments.

10 Revenue Metering and SCADA Requirements

10.1 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.

10.2 Meteorological Data Reporting Requirements

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Back Panel temperature (Fahrenheit)
- Irradiance (Watts/meter2)
- Ambient air temperature (Fahrenheit) – (Accepted, not required)
- Wind speed (meters/second) – (Accepted, not required)
- Wind direction (decimal degrees from true north) – (Accepted, not required)

10.3 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

http://www.pjm.com/planning/design-engineering/to-tech-standards/

11 Summer Peak Analysis

The Queue Project AF2-273 was evaluated as a 3 MW (Capacity 0 MW) injection at the Sligo 138 kV substation in the APS area. Project AF2-273 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-273 was studied with a commercial probability of 100.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

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

None

11.2 Multiple Facility Contingency

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

None

11.3 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

11.4 Steady-State Voltage Requirements

None

11.5 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

11.6 System Reinforcements

None

11.7 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

None

11.8 Queue Dependencies

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

None

11.9 Contingency Descriptions

None

12 Light Load Analysis

Not required for this project.

13 Short Circuit Analysis

The following Breakers are overdutied:

None

14 Stability and Reactive Power

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

No impacts.

15 Affected Systems

15.1 NYISO

None

16 Attachment 1: One Line Diagram