

***Generation Interconnection
Combined Feasibility - Impact Study Report***

For

***PJM Generation Interconnection Request Queue
Position Z2-014***

Benedict – Patton 46kV

December 2014

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) is proposing a 1.35MW uprate to existing wind facility (V3-030) to be located in Cambria County, PA and has requested to be studied as a 1.35 MW Capacity resource interconnecting into the Penelec area. This will bring the facility up to 30.6 MW Energy (5.25 MW Capacity). This means that the remaining 25.35 MW can be curtailed should a system reliability constraint occur. The IC has proposed in-service date is for December 31, 2015.

This Generation Interconnection Feasibility Study provides analysis results to aid the IC in assessing the practicality and cost of incorporating the facility into the PJM system. This study was limited to load flow analyses of probable contingencies. If the IC elects to pursue a System Impact Study, a more comprehensive analysis will be performed.

Point of Interconnection

Z2-014 will interconnect with the Penelec transmission system connecting to existing Carrolltown 46kV substation in between Benedict 46kV and Patton 46kV switching stations.

Attachment Facilities

No Attachment Facilities are required. The single line is shown below in **Figure 1**.

Direct Connection

No Direct Connection upgrades are required.

Non-Direct Connection

No Non-Direct Connection upgrades are required.

Revenue Metering and SCADA Requirements

For PJM: IC 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.

For Penelec:

The Interconnection Customer will be required to comply with all FE Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "FirstEnergy Requirements for Transmission Connected Facilities" document located at the following links:

<http://www.firstenergycorp.com/feconnect>

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

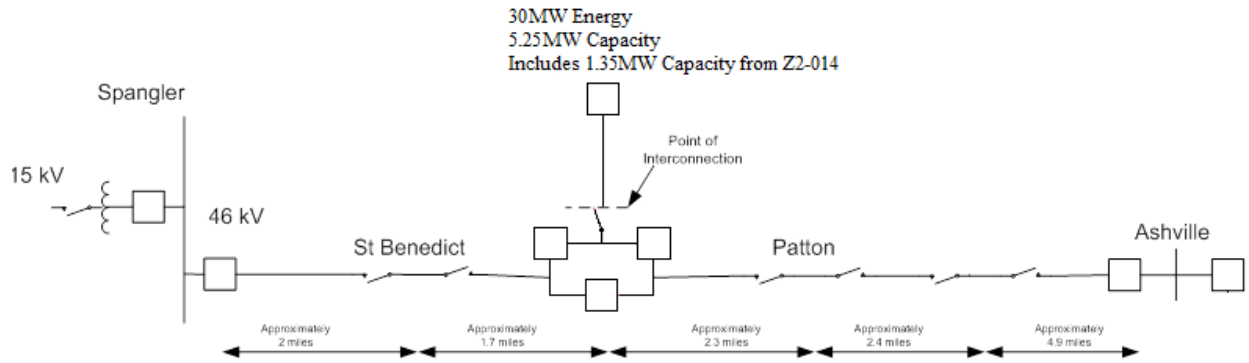


Figure 1. Single Line Diagram

Network Impacts

The Queue Project Z2-014 was studied as a 1.4 MW (1.4 MW Capacity) injection at the V3-030 46kV substation in the Penelec area. Project Z2-014 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project Z2-014 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Summer Peak Analysis – 2018

Generator Deliverability

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

No violations identified.

Multiple Facility Contingency

(Double Circuit Tower Line contingencies only with full energy output. Stuck Breaker and Bus Fault contingencies will be applied during the Impact Study)

No violations identified.

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.)

No violations identified.

Short Circuit

(Summary of impacted circuit breakers)

Not Required.

Steady-State Voltage Requirements

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

None.

Stability and Reactive Power Requirement

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

Not Required.

System Reinforcements

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.

Delivery of Energy Portion of Interconnection Request

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. 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 analyzes all overload conditions associated with the overloaded element(s) identified.

As a result of the aggregate energy resources in the area, no violations were identified.

#Z2-014 – Oxbow II 34.5kV

Generation Interconnection

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No violations identified.

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(Summary of impacted circuit breakers)

Not Required.

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