# *Generation Interconnection Combined Feasibility and System Impact Study Report*

# *For*

# *PJM Generation Interconnection Request Queue Position AB2-038*

# *Frostburg 138 kV*

***January 2017***

# Preface

The intent of the Combined Feasibility and 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, if any, is included in the System Impact Study.

The Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. Interconnection Customer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs associated with them will be addressed when seeking an Interconnection Agreement as outlined below. Interconnection Customer will also be responsible for providing and installing metering equipment in compliance with applicable PJM and Transmission Owner standards.

# General

Mason Dixon, LLC ("Interconnection Customer") has proposed a wind generating facility located in the Big Savage and Little Savage Mountain areas of Somerset County, Pennsylvania. The installed facilities will have a capability of 60.6 MW with 11.3 MW of this output being recognized by PJM as capacity. This project will share the POI and some facilities with another Queue Project U2-073/Z2-013. The proposed in-service date for the AB2-038 project is 12/31/2017. **This study does not imply a Potomac Edison ("Transmission Owner") to this in-service date.**

## Point of Interconnection

AB2-038 will interconnect with the Potomac Edison transmission system through an existing POI of prior project U2-073/Z2-013 at Frostburg Substation 138 kV bus. Please refer to the one-line diagram in Appendix 2 for system configuration.

## Costs Summary

Interconnected Transmission Owner facilities and network upgrades as well as related costs estimates required for this interconnection project are listed below. Contributions in Aid of Construction (CIAC) tax gross-up is not included in below listing, however if interconnection customer is not conforming with IRS Safe Harbor Provisions for non-taxable status, CIAC gross-up amounts will be collected.

(a.) Attachment Facilities:

Adjust remote, relaying, and metering settings.

- Estimated time to complete: 6 months (concurrent with Network Upgrades)
- Estimated costs: **$ 10,000**
- Network Upgrade Number: Not Required

(b.) Direct Connection Network Upgrades: $ 0 (None)

(c.) Non-Direct Connection Network Upgrades:

Install the Ridgeley 34.5kVA breaker.

- Estimated time to complete: 6 months (concurrent with Attachment Facilities)
- Estimated costs: **$ 96,000**
- Network Upgrade Number: n3508

(d.) Direct Connection Local Upgrades: $ 0 (None)

(e.) Non-Direct Connection Local Upgrades: $ 0 (None)

(f.) Contributions for Previously Identified Upgrades: $ 0 (None)

(g.) Option to Build: $ 0 (None)

**Total costs (a.) to (g.): $ 106,000**

## Interconnection Customer Requirements

In addition to the Potomac Edison facilities, AB2-038 will also be responsible for meeting all criteria as specified in the applicable sections of the FirstEnergy "Requirements for Transmission Connected Facilities" document including:

1. A compliance with the FirstEnergy and PJM generator power factor and voltage control requirements.

The above requirements are in addition to any metering or other requirements imposed by PJM.

## 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.

### Interconnected Transmission Owner Requirements

The Interconnection Customer will be required to comply with all FirstEnergy 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

# Network Impacts

The Queue Project AB2-038 was evaluated as a 4.2 MW (0 MW Energy and 4.2 MW Capacity) uprate to the U2-073/Z2-013 projects at the Twin Ridge 34.5kV substation in the APS area. Project AB2-038 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners).

The reason why this project was evaluated as a 0 MW Energy and 4.2 Capacity instead of 61.6 MW Energy and 11.3 MW Capacity is because of the following project history. A 61.6 MW of a prior queue project U2-073/Z2-013, 200 MW MFO, was suspended and only 139.4 MW became In-Service. Meanwhile, Interconnection Customer changed ownership of the 61.6 MW from Big Savage to Mason Dixon. Mason Dixon entered the queue as AB2-038 project to increase its project's CIRs by 4.2 MW.

Project AB2-038 was studied with a commercial probability of 100%. Potential network impacts were as follows:

## Summer Peak Analysis - 2020

### 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

### Steady-State Voltage Requirements

Not required.

### Short Circuit

No overdutied circuit breakers were identified for this project.

## Affected System Analysis & Mitigation

**NYISO Impacts:**

None.

**Delivery of Energy Portion of Interconnection Request**

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

None.

**Light Load Analysis - 2020**

None.

# System Reinforcements

**Short Circuit**

None.

**Stability and Reactive Power Requirement**

Not required.

**Summer Peak Load Flow Analysis 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.

## Light Load Load Flow Analysis Reinforcements

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

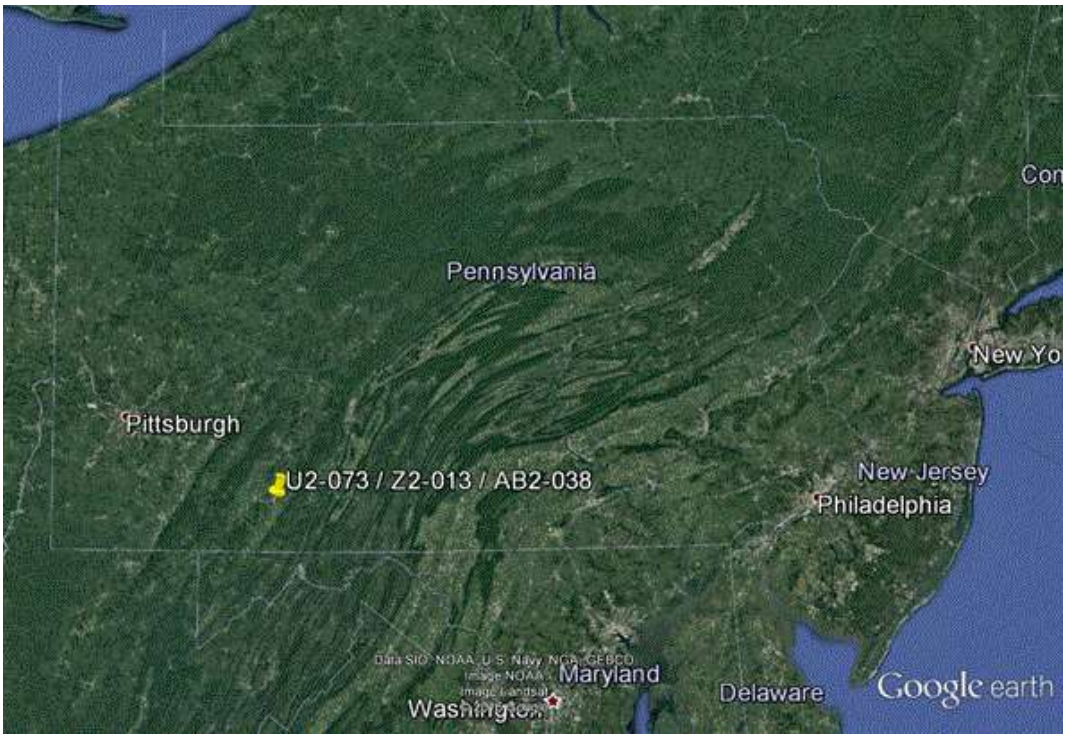
None.

**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.

# Appendix 1

Facility Location



# Appendix 2

Interconnection Single Line Diagram (SLD)

Project Queue Number: U2-073/Z2-013/AB2-038