Revised
Generation Interconnection
System Impact Study Report

For

PJM Generation Interconnection Request
Queue Position AD1-061

McConnellsburg – Mercersburg 34.5 kV

June 2020

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.

General

LSBP NE Development, LLC (Interconnection Customer) has proposed a solar generation facility located in Franklin County, Pennsylvania. The installed facilities will have capability of 20 MW with 7.6 MW of this output being recognized by PJM as capacity. The proposed in-service date is December 31, 2021. This study does not imply a **West Penn Power (Transmission Owner) company commitment to this in-service date.**

Revision from November 2018 System Impact Study Report

The AD1-061 System Impact Study has been revised to reflect that this project no longer has a contribution to the overload of the Ringgold-Wolfsville 138 kV line. Therefore, the AD1-061 project no longer needs to wait for the Rebuild/Reconductor of the Ringgold-Catoctin 138 kV circuit and upgrade of terminal equipment (PJM Baseline RTEP b2743.7) to be in-service before going commercial.

Point of Interconnection (POI)

The AD1-061 project will interconnect with the West Penn Power distribution system by tapping the McConnellsburg – Mercersburg 34.5 kV line at a point located approximately 6.8 miles from McConnelsburg substation and 1.5 miles from Mercersburg substation. Please refer to Appendix 2 for a one-line diagram of the system configuration.

Schedule

Based on the scope of the direct connection for the proposed Point of Interconnection, it is expected to take a minimum of **twelve (12) months** from effective date of fully executed Interconnection Construction Service Agreement (ICSA) to complete the installation required for this Project. This includes a preliminary payment that compensates West Penn Power for the first three months of the engineering design work that is related to the construction of the Project. It also assumes that the Interconnection Customer will provide right-of-way, permits, easements, etc. that will be needed. A further assumption is that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined direct connection and network upgrades, and that PJM will allow all transmission system outages when requested.

Transmission Owner Scope of Work and Cost Summary[1]

The following upgrades are required to support AD1-061 interconnection. Please Note: The estimated costs shown below do not include Contribution in Aid of Construction (CIAC) Federal Income Tax Gross Up charge The total tax is $107,900 may or may not be charged to this project based on whether or not this project meets the eligibility requirements of the latest IRS Notice 88-129 provisions for non-taxable status. Total cost with tax: $712,900. All costs are in 2018 Dollars. All Network Upgrade Numbers will be stated in the final impact study report.

(a) Attachment Facilities: None.

(b) Direct Connection Network Upgrades:

(b1) Tap the McConnellsburg - Mercersburg 34.5 kV Line. Install two (2) manual line switches and provide 34.5 kV meter package **$67,200**

(b2) Project management, commissioning, SCADA..... **$147,300**

(c) Non-Direct Network Upgrades:

(c1) Install new relay panel on the McConnellsburg 34.5 kV line at Mercersburg substation. **$188,000**

(c2) Install new relay panel on the Mercersburg 34.5 kV line at McConnellsburg substation **$202,500**

(d) Direct Local Network Upgrades: None.

(e) Non-Direct Local Network Upgrades: None.

(f) Option to Build Upgrades: None.

Estimated Total Costs (a) to (f): **$605,000**

[1] Note that the work scope and cost has not been updated in this SIS revision. The updated scope and cost will be provided in the Facilities Study Report.

Interconnection Customer Requirements

The proposed Customer Facilities must be designed in accordance with FirstEnergy's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx. In particular, Interconnection Customer is responsible for the following:

1. The purchase and installation of fully rated 34.5 kV circuit breaker to protect the AD1-061 generator lead line. A single breaker must be used to protect this line. FirstEnergy does not approve for individual GSU transformer breakers (if applicable) to protect this line.

2. The purchase and installation of the minimum required FirstEnergy generation interconnection relaying and control facilities. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.

3. The purchase and installation of supervisory control and data acquisition (SCADA) equipment to provide information in a compatible format to the FirstEnergy Transmission System Control Center.

4. A compliance with the FirstEnergy and PJM generator power factor and voltage control requirements. Interconnection Customer shall design its non-synchronous Customer Facility with the ability to maintain a power factor of at least 0.95 leading (absorbing VARs) to 0.95 lagging (supplying VARs) measured at the generator's terminals.

5. The execution of a back-up service agreement to serve the customer load supplied from the McConnellsburg – Mercersburg 34.5 kV Line when the units are out-of-service. This assumes the intent of the IC is to net the generation with the load.

6. Interconnection Customer must meet all PJM, ReliabilityFirst, and NERC reliability criteria and operating procedures. For example, the IC will need to properly locate and report the over and under-voltage and over and under-frequency system protection elements for its units as well as the submission of the generator model and protection data required to satisfy the PJM and ReliabilityFirst audits. Failure to comply with these requirements may result in a disconnection of service if the violation is found to compromise the reliability of the West Penn system.

7. Interconnection Customer will be responsible for acquiring all easements, properties, and permits that may be required to construct both the new interconnection line tap and the associated attachment facilities. The project will also require non-direct connection upgrades at McConnellsburg and Mercersburg substations.

8. Interconnection Customer will be responsible for constructing a 34.5 kV line to the line tap. The Interconnection Customer will also be responsible for acquiring all easements, properties and permits that may be required to construct the associated attachment facilities.

9. Revenue Metering and Scada Requirements:
   PJM requires that Interconnection Customer to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for Interconnection Customer's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Sections 24.1 and 24.2. FirstEnergy requires that Interconnection Customer to comply with all its Revenue Metering Requirements for Generation Interconnection Customers which can be found in its document "FirstEnergy Requirements for Transmission Connected Facilities". [Online]. Available http://www.pjm.com/planning/design-engineering/to-tech- standards.aspx.

The above FirstEnergy requirements apply in addition to any metering or other requirements of PJM.

Network Impacts

The Queue Project AD1-061 was evaluated as a 19.9 MW (Capacity 7.6 MW) injection tapping Mercersburg to McConnellsburg 34.5kV line in the APS area. Project AD1-061 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD1-061 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

Steady-State Voltage Requirements

None.

Short Circuit

None. (No overdutied circuit breakers identified)

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 - 2021

Not required

System Reinforcements

Short Circuit

None.

Stability and Reactive Power Requirement

None.

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

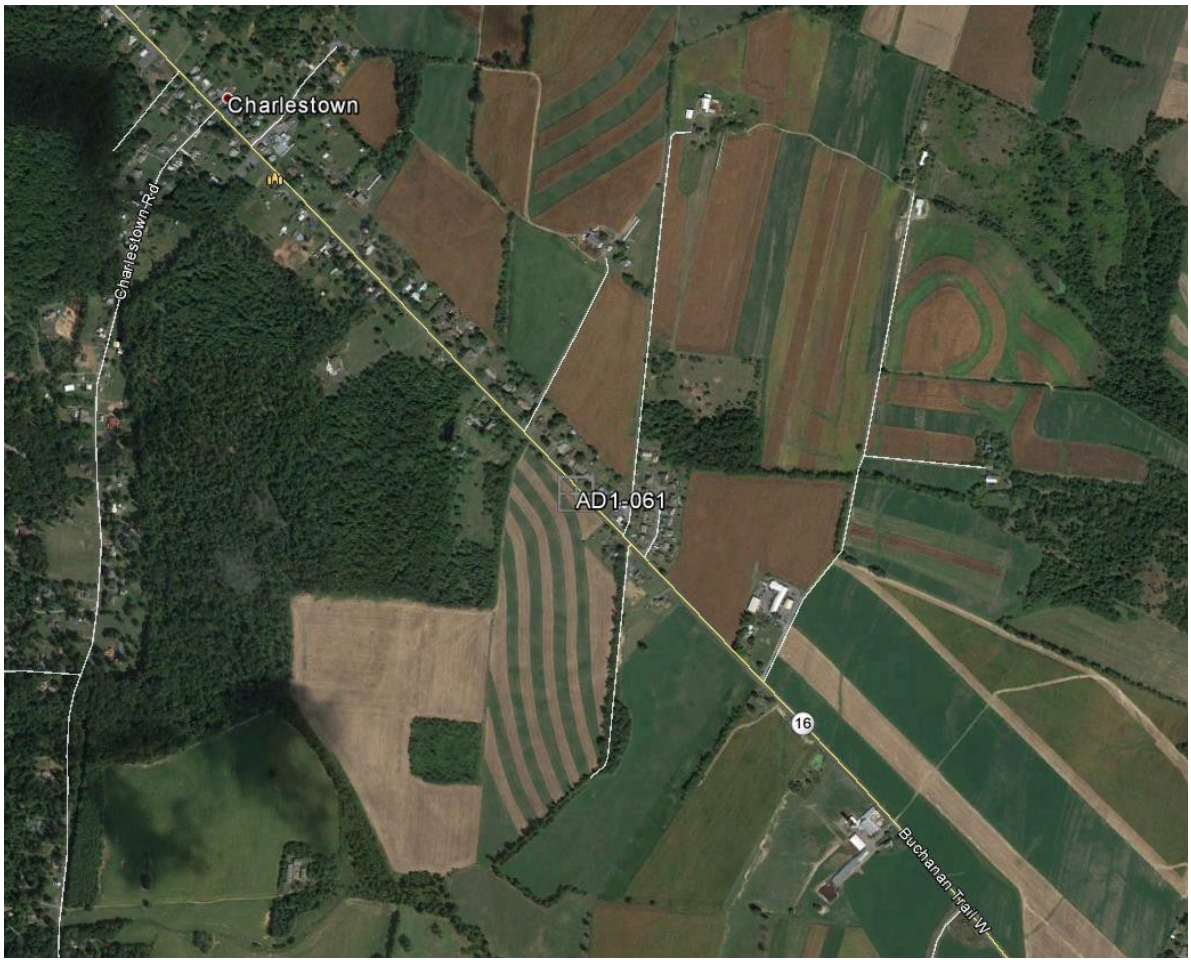
(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

None

Appendix 1

Facility Location

PJM Queue Position: AD1-061



Appendix 2

Interconnection One-Line Diagram
PJM Queue Position: AD1-061