Generation Interconnection System Impact Study Report

For

PJM Generation Interconnection Request Queue Position AB1-112

Hatfield 500 kV

October 2016

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

Hill Top Energy Center, LLC, ("Interconnection Customer") has proposed a natural gas generating facility located at located approximately two miles north of Nemacolin, West of the Monongahela River at about river mile marker 75, in Greene County, PA. The installed facilities will have a capability of 20.0 MW with 20.0 MW of this output being recognized by PJM as capacity. Note that this project is an increase to the Interconnection Customer's AA2-173 project, which will share the same property and connection point. The AA2-173 project will have a capability of 515.0 MW with 515.0 MW being recognized as capacity. The total capability of the combined AA2-173 and AB1-112 projects will be 535.0 MW with 535.0 MW being recognized by PJM as capacity. The proposed in-service date for the AB1-112 project is 1/1/2019. **This study does not imply a West Penn Power ("Transmission Owner") to this in-service date.**

Point of Interconnection

AB1-112 will interconnect with the West Penn Power transmission system at the same Point of Interconnection as AA1-173 project.

Cost Summary

Transmission Owner facilities and network upgrades required to support this interconnection project are listed below. All Upgrades shown are New System Upgrades unless otherwise specified. Contributions in Aid of Construction (CIAC) tax gross-up is not included.

(a.) Attachment Facilities:

(a.1) Adjust remote end relaying and metering settings.
Estimated costs **$ 12,700**
Estimated time to complete: two (2) months

(b.) Direct Connection Local Upgrades: $ 0.00

(c.) Direct Connection Network Upgrades: $ 0.00

(d.) Non-Direct Connection Local Upgrades: $ 0.00

(e.) Non-Direct Connection Network Upgrades: $ 0.00

(f.) Option to Build Upgrades for Attachment Facilities, Direct Connection Local Upgrades, and Direct Connection Network Upgrades: $0.00

Total Costs (a.) to (f.): **$ 12,700**

Transmission Owner Scope of Work

There are no network upgrades associated with the Project.

Interconnection Customer Requirements

None.

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.

FirstEnergy Requirements

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

Schedule

Based on the scope of interconnection attachment facilities and network upgrades, it is expected to take a minimum of two (2) months from the date of a fully executed Interconnection Construction Service Agreement to complete the installation. This includes a preliminary payment that compensates the Interconnected Transmission Owner for the first three months of the engineering design work that is related to the interconnection facilities of the Project. It also assumes that the Interconnection Customer will provide the property for the Project direct connection facilities and all 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 facilities and that transmission system outages will be possible when requested.

Network Impacts

The Queue Project AB1-112 was evaluated as a 20.0 MW (Capacity 20.0 MW) injection into the Hatfield 500 kV substation in the APS area. Project AB1-112 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AB1-112 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Summer Peak Analysis - 2019

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
(Summary of impacted circuit breakers)

None

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.

Not Applicable

Light Load Analysis - 2019

None

System Reinforcements

Short Circuit

Not required

Stability and Reactive Power Requirement

Will be determined at a later study stage.

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

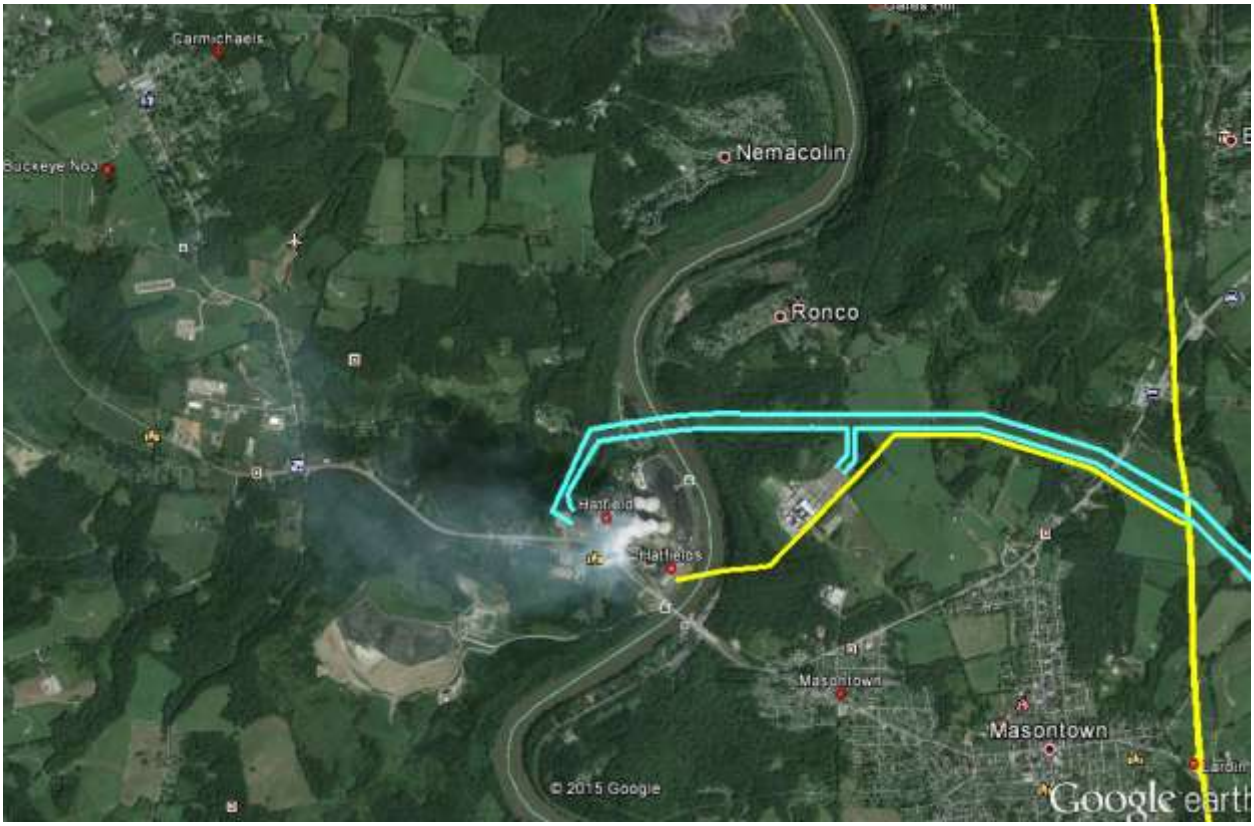
Contribution to Previously Identified System Reinforcements

(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
PJM Queue Position: AB1-112



Appendix 2

Interconnection One-Line Diagram
PJM Queue Position: AB1-112