PJM Generator Interconnection Request
Queue AA1-125
Seaman 138 kV
Feasibility/Impact Study Report

June 2015

Preface

The intent of the Feasibility/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 Feasibility/System Impact Study is performed.

The Feasibility/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

Pioneer Green Energy, LLC proposes to interconnect a 20 MW (7.6 MW Capacity) Solar generation plant to the Seaman 138 kV Substation (Figure 1). The 7.6 MW Capacity is due to the application of PJM's default Adequacy Planning 38% Capacity Factor to Photovoltaic (PV) solar facilities. Therefore, Project AA1-125 was studied as a 20 MW (7.6 MW Capacity) injection at the Seaman 138 kV Substation. The location of the generating facility is adjacent to AEP's Seaman Substation located in Seaman, Ohio (see Figure 2).

The requested in service date is October 01, 2016.

The objective of this Feasibility/System Impact study is to determine budgetary cost estimates and approximate construction timelines for identified transmission facilities required to connect the proposed generating facilities to the AEP transmission system. These reinforcements include the Attachment Facilities, Local Upgrades, and Network Upgrades required to maintain the reliability of the AEP transmission system. Stability analysis is not required.

Attachment Facilities

The following work is required to connect Project AA1-125 to the Seaman 138 kV Substation:

Station Cost:

- Install a new circuit breaker and associated bus work including installing SCADA and 138 kV revenue metering. (Network Upgrade **n4559**)

- **Estimated Station Cost: $1,040,175**

  Direct Material $322,721

  Direct Labor $531,049

  Indirect Material $140,104

  Indirect Labor $46,301

Protection and Relaying Cost:

- Protection, relaying and control need to be installed at 138 kV Seaman's Substation. (Network Upgrade **n4560**)

- **Estimated Protection and Relaying Cost: $ 115,108**

  Direct Material $44,323

Direct Labor $70,785

Local and Network Impacts

The impact of the proposed generating facility on the AEP Transmission System was assessed for adherence with applicable reliability criteria. AEP planning criteria require that the transmission system meet performance parameters prescribed in the AEP FERC Form 715[1] and Connection Requirements for AEP Transmission System[2]. Therefore, these criteria were used to assess the impact of the proposed facility on the AEP System. PJM Queue # AA1-125 was studied as a 20 MW (7.6 MW Capacity) injection at the Seaman 138 kV Substation consistent with the interconnection application. Project #AA1-125 was evaluated for compliance with reliability criteria for summer peak conditions in 2018.

Potential network impacts were as follows:

Normal System (2018 Summer Conditions Capacity Output)

- No problems identified

Single Contingency (2018 Summer Conditions Capacity Output)

- No problems identified

Multiple Contingency (2018 Summer Conditions Capacity Output)

- No problems identified

Contribution to Previously Identified Overloads (2018 Summer Conditions Capacity Output)

- No problems identified

Normal System (2018 Summer Conditions Full Output)

- No problems identified

Single Contingency (2018 Summer Conditions Full Output)

1 https://www.aep.com/about/codeofconduct/oasis/transmissionstudies/GuideLines/2015%20AEP%20PJM%20FERC%20715_Final_Part%204.pdf

2 https://www.aep.com/about/codeofconduct/OASIS/TransmissionStudies/Requirements/AEP_Interconnection_Requirements_rev1.pdf

- No problems identified

Multiple Contingency (2018 Summer Conditions Full Output)

- No problems identified

Contribution to Previously Identified Overloads (2018 Summer Conditions Full Output)

- No problems identified

Short Circuit Analysis

- Not required

Stability Analysis

- Not required

Voltage Variations

- No problems identified

Additional Limitations of Concern

- No additional limitations identified

Local/Network Upgrades

- None

Schedule

It is anticipated that the time between receipt of executed agreements and Commercial Operation may range from 12 to 18 months.

Conclusion

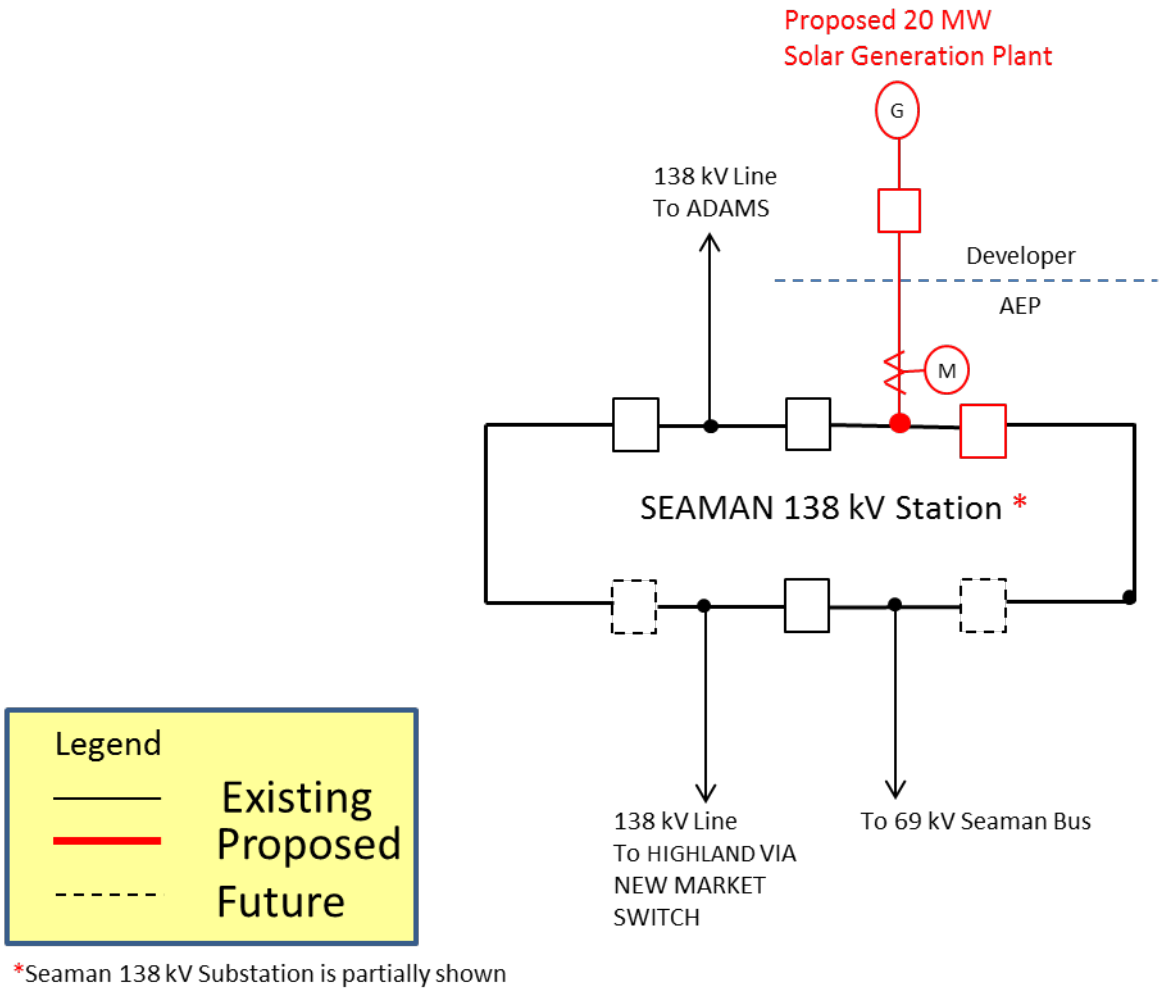
Based upon the results of this Feasibility/System Impact Study, the injection of 20 MW (7.6 MW Capacity) at the Seaman 138 kV Substation (PJM Project Queue #AA1-125) Solar generation is estimated to require the following interconnection charges.

Estimated Interconnection Cost: $1,040,175
Estimated Protection and Relaying Cost: $115,108

Total Estimated Cost for Project AA1-125: $1,155,283

The estimates are preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review to determine final construction requirements. Per the PJM Tariff, the customer is responsible for the actual costs incurred.

Figure 1: PJM Queue #AA1 - 125 POI Seaman 138 kV Substation



*Seaman 138 kV Substation is partially shown

Figure 2: PJM Queue AA1-125 POI