PJM Generator Interconnection

V2-040 Mountain 34.5 kV

4 MW Capacity / 4 MW Energy

Feasibility Study Report

October 2009
DMS #564802v1

Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff §36.2 and the Feasibility Study Agreement between Interconnection Customer (IC) and PJM Interconnection, LLC (PJM) (Transmission Provider). The Interconnected Transmission Owner (ITO) is Dominion.

Preface

The intent of a Feasibility Study is to determine a plan, with cost and construction time estimates, to allow the subject generation interconnection project to inject into 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 for the appropriate transmission owner.

In some instances 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 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 ITO properties, the costs may be included in the study.

Executive Summary

V2-040 is estimated to cost $210,000 to interconnect and will take 18 months to complete.

Potential Network Impacts

The queue V2-040 project was studied as a 4MW Capacity injection into ITO system at the Mountain Road 34.5kV substation. These results and incorporate all contingency types. Project V2-040 was evaluated for compliance with reliability criteria for summer peak conditions in 2013. Potential network impacts were as follows:

Generator Deliverability

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

No issues identified.

Multiple Facility Contingency

(Double Circuit Tower Line contingencies only for the full energy output. Stuck breaker and bus fault contingencies will be performed for the Impact Study)

No issues 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 issues identified.

Short Circuit Analysis

Not required.

Stability and Reactive Power Requirement

Not required.

Interconnected Transmission Owner Analyses

IC requested study of a 4 MW interconnection for a proposed facility at Henrico, VA Landfill onto ITO 34.5 kV distribution system. IC requested that any modifications to existing facilities and any facilities built new to accommodate the 4 MW interconnection request be constructed for a potential final build out capacity of 4 MW. The requested site is located approximately 3.5 miles from ITO 34.5 kV Mountain Road Substation Circuit 480 source. ITO results are provided in the Interconnection Requirements section below:

Interconnection Requirements

Non – Direct Connection Local Upgrades

New System Reinforcements

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

1. Replace existing line fuse, 480 F19, with three-phase electronic recloser with transfer trip capability; and
2. Reconductor two 250 feet sections of overhead wire of circuit 480 with 477 AL.

The costs of these upgrades is estimated to be $55,000 and will be coordinated within the overall project schedule of 18 months.

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.

Direct Connection Local Upgrades

Four fuses will be added to circuit 480. The estimated cost for adding these fuses is $5000 and will be coordinated within the overall project schedule of 18 months.

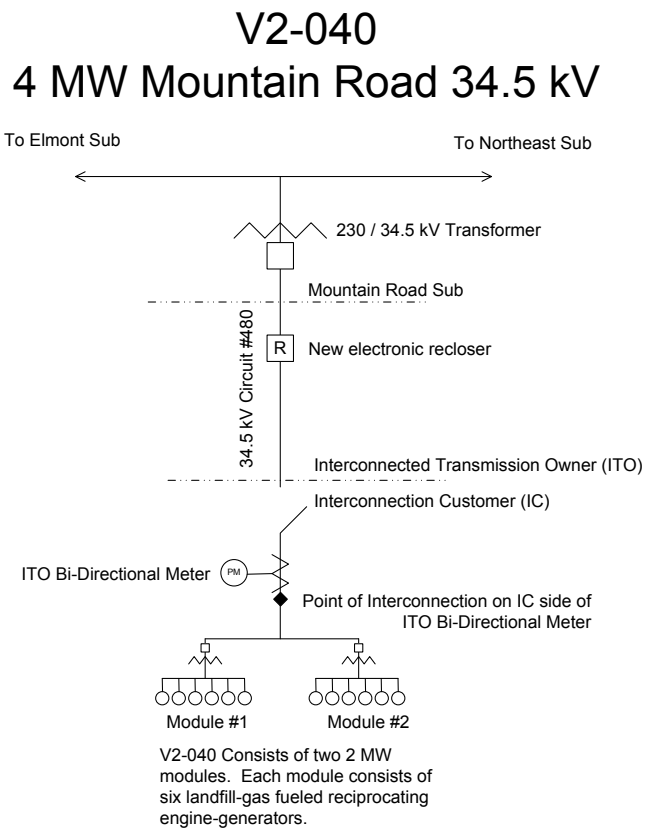
Attachment Facilities

The proposed layout and attachment facilities are illustrated below in Figure 1. The interconnection requires installation of the following:

1. Direct transfer trip[1];
2. 100 feet of three-phase overhead line and two poles;
3. Installation of three phase overhead solid blade disconnects at two separate pole locations; and
4. Bi-directional metering[2].

Estimated cost for these upgrades is $150,000 and will take 18 months to complete.

Figure 1



[1] To provide a transfer trip circuit protection scheme, the IC shall provide and maintain communication lines between the IC main generator breaker and up line recloser, and between the IC main generator breaker and ITO Mountain Road Substation.

[2] IC shall provide and maintain telephone lines to ITO metering equipment at the Point of Interconnection. IC provided 34.5 kV three-phase circuit shall interconnect overhead at the Point of Interconnection, which will be the IC side terminals of ITO provided pole mounted bi-directional meter.