PJM Generator Interconnection

V2-042 Calvert Cliffs 500 kV

1640 MW Capacity

Feasibility Study Report

October 2009
DMS #562196v1

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).

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 properties currently owned by Transmission Owners, the costs may be included in the study.

Potential Network Impacts

PJM Queue Project V2-042 was studied as a 1640 MW Capacity injection at Calvert Cliffs 500 kV substation in the BGE area. V2-042 was evaluated for compliance with reliability criteria for summer peak conditions in 2013. Two key assumptions were that MAPP and Q48 were included in the Feasiblity Study model. These and other base case assumptions may change at the System Impact Study. 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

The following table shows preliminary short circuit results with and without the V2-042 generator included in the model. The Feasibility Study results show that V2-042 impacts breakers at Calvert Cliffs Units' 1 and 2 Swithyard.

BUS NO	BUS	BREAKER	Rating Type	Duty Percent With v2-042_BGE(500)	Duty Percent Without v2-042_BGE(500)	Duty Percent Difference	Note
20	CLVT CLF 500.kV	5052 BLK BUS	T	123.80%	99.00%	24.80%	New Overduty
20	CLVT CLF 500.kV	5051/1GEN (2	T	121.50%	95.90%	25.60%	New Overduty
20	CLVT CLF 500.kV	2GEN/5072 (6	T	116.50%	90.30%	26.20%	New Overduty
20	CLVT CLF 500.kV	1GEN/BUS SYN	T	129.60%	103.80%	25.80%	Over 100%, > 3% contribution
20	CLVT CLF 500.kV	2GEN/BUS SYN	T	129.60%	103.80%	25.80%	Over 100%, > 3% contribution
20	CLVT CLF 500.kV	5072 (62)	T	129.60%	103.80%	25.80%	Over 100%, > 3% contribution
20	CLVT CLF 500.kV	5051 (21)	T	126.90%	101.60%	25.30%	Over 100%, > 3% contribution
20	CLVT CLF 500.kV	5052 RED BUS	T	126.30%	101.20%	25.10%	Over 100%, > 3% contribution

Stability and Reactive Power Requirement

To be determined at the System Impact Study.

Interconnection Requirements

The following provides the estimated cost and schedule for the Non-Direct and Direct Connection Network Upgrades and the Attachment Facilities:

Non – Direct Connection Network Upgrades

New System Reinforcements

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

Three breakers at Calvert Cliffs Units 1 & 2 Switchyard are required to be upgraded to 63 kA. Estimated cost and duration for all three breakers is approximately $1.8 million and 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)

V2-042 contributes to five overdutied breakers. The total cost and duration is $2.4 million and 18 months. Specific cost allocation will be determined at the System Impact Study.

Direct Connection Network Upgrades

The IC has elected to design and construct the new unit's substation. IC shall comply with BGE, PEPCO and PJM design and operating standards in construction of the substation. Due to IC's election of Option to Build, this upgrade is outside of the scope of this Feasibility Study, however, BG&E "preliminary" estimated costs for its portion of this project, including project management, engineering & design, construction, and testing/commissioning for oversight, are $560,000.

Attachment Facilities

The developer has identified it will elect the Option to Build its own Attachment Facilities. BG&E oversight costs for these are included in the Direct Connection Network Upgrade estimate.