PJM Generator Interconnection
V4-038 Friendship Manor
1 MW Capacity / 1 MW Energy
Feasibility Study Report

April 2010
DMS #587890v1

Introduction

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

Preface

The intent of this Feasibility Study is to determine a plan, with preliminary cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by IC. As a requirement for interconnection, IC may be responsible for the cost of constructing Local and Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM and the underlying system. All facilities required for interconnection of a generation interconnection project must be designed to meet ITO technical specifications.

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. IC is responsible for its right of way, real estate, and construction permit issues.

General

Queue V4-038 is an IC Capacity resource interconnection consisting of 1 MW of landfill gas engine. V4-038 generation will be installed on site at the Alpha Ridge Landfill, 2350 Marriottsville Road, Marriottsville in Howard County, Maryland. Output from the generation will be connected to the 13 kV service at the landfill, fed from Friendship Manor substation.

Potential PJM Network Impacts

The queue V4-038 project was studied as a 1 MW Capacity injection into ITO's system at the Friendship Manor substation. The project was studied on a Feasibility & System Impact Study basis which utilizes an AC analysis, and incorporates all contingency types. Project V4-038 was evaluated for compliance with reliability criteria for summer peak conditions in 2014. Potential network impacts were as follows:

Generator Deliverability

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

None.

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)

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.

Short Circuit

Not required.

System Stability Analysis

Not required.

Interconnection Requirements

ITO has determined that this magnitude of electrical generation can be connected to ITO's local 13.2 kV distribution system. Friendship Manor substation distribution feeder 7793 is presently routed along the Alpha Ridge access road in the vicinity of the proposed generation. To extend the local 13 kV feeder to the Alpha Ridge Generation Facility, ITO will intercept feeder 7793 and install a section of three-switch pad-mounted switchgear.

Export generation interconnected with ITO distribution must be equipped with anti-islanding protection. This protection must disconnect the generation from the distribution system when the utility supply is lost to prevent damage to the generator when feeder reclose operations occur.

Transfer-trip protection is typically installed as back-up protection on export. For this protection, ITO sends a signal to the IC when the normal supply circuit breaker from the ITO substation opens. The signal is received at the IC substation to trip the generator(s) off line. This protection requires a

communications circuit between ITO's supply substation (Friendship Manor) and the IC's generation equipment at Alpha Ridge Landfill. The IC is responsible for this communications circuit and the associated terminal equipment. The communication circuit can be fiber optic cable, dedicated data grade telephone circuits, or spread spectrum radio if a clear line of sight is available between ITO's substation and the IC substation. Modifications to ITO's substation to accommodate the transfer-trip protection will be furnished and installed by ITO and billed to the IC. Typical costs for a Spread Spectrum transfer trip installation are provided below, but not included in the study totals.

Export generation interconnected with ITO's distribution system typically requires the installation of Billing Metering and Distribution Automation (DA) equipment by ITO. The DA equipment sends real time data from the generation substation to ITO's operations control center. This equipment is furnished and installed by ITO and billed to the IC. ITO is evaluating whether it may be possible to eliminate the DA requirement on this project, due to the relatively small magnitude of generation involved. Costs provided include DA.

For interconnection with ITO's 13.2 kV system, IC is required to install at its expense a 13.2 kV service entrance substation, constructed in accordance with ITO guide specification CSR-1 or CSR-2.

Following is a typical summary of costs for extending the feeder to the Alpha Ridge Landfill Facility. This is an order-of-magnitude estimate since the actual location or configuration of the IC's equipment is not known at this time. A firm estimate will not be available until design is complete.

Also shown are typical past costs for installation of the Distribution Automation Equipment and a typical cost for transfer-trip using Spread Spectrum Radio equipment.

CIAC (Contribution In Aid of Construction) Taxes have not been included in ITO costs, since past projects have fallen into the "Safe Harbor" category which is exempt from CIAC charges. If it is determined that CIAC charges apply, an additional 36.5% will be added to the total.

Distribution Costs	
Labor	$18,700
Materials	$20,000
Total	$38,700

Distribution Automation Costs	
Labor	$15,000
Materials	$ 5,300
Total	$20,300

Metering Costs	
Labor	$ 3,600
Materials	$ 6,200
Total	$ 9,800

Cost Summary	
Distribution	$38,700
Metering	$ 9,800
Distribution Automation	$20,300
Total	**$68,800**

CIAC, if applicable	$25,112

Typical Spread Spectrum Transfer-Trip Costs	
Labor	$20,000
Materials	$25,000
Total	$45,000 (excluded from totals above)