PJM Generator Interconnection Request
Queue #V4-071
Bixby 13.8kV
Feasibility/Impact Study Report

April 2010
#591021

V4-071 Bixby 13.8kV Feasibility/Impact Study

General

Altairnano has proposed installing a 2.0 MW energy storage (battery) project to provide frequency regulation at Bixby 13.8kV station at 3810 Bixby Road, Groveport, Franklin County, Ohio. The in-service date for the project is June 1, 2010.

Direct Connection

The proposed facility is a 2MW/250KWH Altairnano Energy Storage System (ALTI-ESS) to supply frequency regulation service to PJM. The project consists of three major components, two Altairnano Power Modules (ALTI-PM) and the Power Control System (PCS). The ALTI-PM includes the Line Replaceable Units (LRU's) including nLTO battey cells, battery racking system, battery mangement system, HVAC system and fire suppresion housed in a 53 foot shipping container. The DC input/output from the ALTI-PMs is converted to 480 volt AC through the PCS system that includes the power inverters, human machine interface (HMI), controls and communication ports. The 480 volt AC of the PCS is stepped up to 13.8kV in the step-up tranformers and will be connected to AEP's distribution system.

AEP is hosting the project. The sponsor of the project at AEP is Ram Sastry – Director Research and Technology. AEP has indicated that the best location for installation is the Bixby 13.8kV station that is used for testing new technology. This is a 2 MW version of the storage system that is sitting in the PJM parking lot. The project is going through the AEP interconnection process at the same time it is going through the PJM interconnection process. The project manager for AEP is Ben Wilson.

Customized Energy Solutions (CES) is managing communications for the project and will be responsible for bidding into the market when the project goes commercial.

The project will require a customized regulation signal every four seconds similar to the installation at PJM.

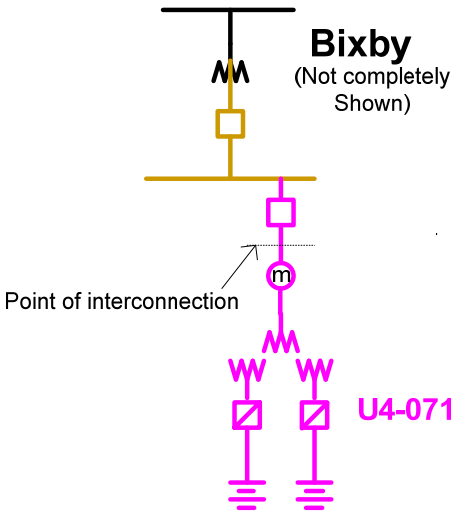
The project consists of a battery that is kept half full that can deliver 2MW of power for 15 minutes when fully charges and can deliver 500 kwhr of energy. The project will get a regulation signal every 4 seconds that tell it to either charge or discharge. It has the ability to either discharge or absorb 2 MW.

The battery, operating at 750-1000 VDC, is connected to a DC to AC inverter with an output at 480 volts. There is a 480v/13.8kV step-up transformer that is then connected to the Bixby station. The unique capability of the system is that it can respond within 10 milliseconds.

Interconnection costs and requirements will be as defined in the Interconnection Agreement with AEP-Ohio (ColumbusSouthern Power Company)

Altairnano will need to have an Interconnection Agreement in place with AEP-Ohio and meet all conditions of that Interconnection Agreement before the project may be permitted to participate in the Frequency Regulation Market.

U4-071 Bixby 13.8kV



Network Impacts

The queue V4-005 project was studied as a 2.0MW energy injection into AEP's system at the Bixby 138kV substation. The project was studied on a combined feasibility-impact basis which utilizes an AC analysis, and incorporates all contingency types. Project V4-071 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)

No problems identified

Multiple Facility Contingency

(Double Circuit Tower Line, Line with Failed Breaker and Bus Fault contingencies for the full energy output)

No problems identified

Short Circuit
(Summary form of Cost allocation for breakers will be inserted here if any)

No problems identified

Stability

Not required because the project is less than 30 MW.

System Reinforcements

None.