PJM Generator Interconnection Request
Queue #W2-007
East Leipsic (Leipsic II)138kV
Feasibility Study

618004

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Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, 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,

W2-007 East Leipsic (Leipsic II) 138kV Feasibility Study Report

General

The Interconnection Customer (IC) proposes to install PJM Project #W2-007, a 100 MW (13 MW capacity) generating facility comprised of 50 – 2.0 MW Gamesa wind turbine generators connecting to the American Electric Power (AEP) facilities at East Leipsic 138kV Substation. The proposed location of the generating facilities and switching station is in Putnam County, Ohio. The projected in-service date is scheduled for December 31, 2013.

Attachment Facilities

The proposed interconnection proposeded for project V2-006, described below, will be designed to accommodate both the V2-006 (Leipsic I) and W2-007 (Leipsic II) projects. There are still outstanding issues with Protec regarding the connection of IPP #V2-006. The station design will depend on the final layout and design of Protec's expansion project (Tentative in-service date of Fall 2012). It is understood that the IC will be responsible for all the costs associated with this construction, as well as facilities associated with connecting their 100 MW of generation to the in-line facilities or to East Leipsic station.

"The proposed generation project will be connected at the AEP 138 kV East Leipsic station via a new 138 kV circuit breaker on the 138 kV East Leipsic bus. (See Figure 2)

Note - This breaker arrangement requires an outage of V2-006 when breaker maintenance is required. However, if needed, the detailed connection configuration can be addressed in later study phases.

It is understood that the IC will be responsible for all the costs associated with this construction, as well as facilities associated with connecting their 150 MW of generation to the in-line facilities or to East Leipsic station.

The AEP construction scope:

- Install a new 138 kV circuit breaker and associated equipment at East Leipsic station, including 138 kV metering and relaying.
  Estimated Cost (2009 Dollars): $2,000,000

Total Attachment Facilities Cost[1]: $2,000,000

[1] Estimates are preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination to determine final construction requirements. It will take approximately one year after obtaining the authorization to construct the facilities as detailed.

Local Network Impacts

The impact of the proposed generating facility on the AEP System was assessed for adherence with applicable reliability criteria. AEP planning criteria require that the transmission system meet performance criteria in accordance with the AEP FERC form 715. Therefore, this criterion was used to assess the impact of the proposed facility on the AEP System. The IC's project was studied as a 100 MW net energy injection consistent with the interconnection application.

Normal System (2013 Summer Conditions)

- No problems identified.

Single Contingency (2013 Summer Conditions)

- No problems identified.

Multiple Contingency (2013 Summer Conditions)

- No problems identified.

Short Circuit Analysis

- No problems identified.

Stability Analysis

- Stability analysis was not performed as part of this Feasibility Study. The stability assessments are part of the System Impact Study. Based upon the results of this future System Impact Study, the extent of system upgrades could change and the associated costs could be significantly different.

Local Upgrades

- Replace 138 KV breaker A1 and associated equipment at East Lima Station.

  Estimated Cost (2010 Dollars)*: $200,000

*This estimate is preliminary in nature, as it was determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination to determine final construction requirements. It will take approximately 15 months after obtaining a signed agreement to construct the facilities as outlined above.

Network Impacts

The queue W2-007 project was studied as a 100MW injection (13 MW of which was capacity) into the AEP system at East Leipsic 138kV substation. Project W2-007 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 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)

- One 138kV circuit breaker, East Lima A12, has been identified as overdutied due to the addition of the W2-007 project.

BUS_NO	BUS	BREAKER	Rating Type	Duty Percent With w2-007_comparison	Duty Percent Without w2-007_comparison	Duty Percent Difference	Note
0	05E LIMA 138.kV	A1	T	100.40%	99.70%	0.70%	New Over-duty

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

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

- The overdutied condition of the East Lima A1 138kV circuit breaker can be alleviated by replacing the circuit breaker with one having a higher interrupting rating. PJM's estimated cost for the replacement is **$200,000**.

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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.
Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed that shall study all overload conditions associated with the overloaded element(s) identified.

No problems identified

Reactive Requirements

PJM requires a power factor correction to 95% lead/lag at the point of interconnection for wind generating facilities. It is expected that the IC will adhere to this standard.

MISO Impacts

Any impacts on the MISO transmission system will be identified in the Impact Study.

Figure 1: East Leipsic Area

Figure 2: Proposed Connection of W2-007 to East Leipsic 138kV Bus