#T61 Cedar 8.3 MW

Generator Interconnection

This analysis was completed to assess the reliability impact for a new generator interconnecting to the PJM System as a Capacity Resource.

Network Impacts

Queue T61 was studied as a 8.3 MW* Capacity increase (68 MW to 76.3 MW*) at Cedar. Project T61 was evaluated for compliance with reliability criteria for summer peak conditions in 2012. Network impacts were as follows:

NETWORK IMPACTS

Generator Deliverability

(Normal System with all facilities in-service and Single, or N-1, contingencies for the Capacity portion only of the interconnection)

1. **Cedar #4 13.8/23 kV GSU** is overloaded at **105% of normal rating**. **This equipment is owned by CESI (Conectiv Energy).**

2. **Cedar #1 69/23 kV** transformer is overloaded at **107% of normal rating**.

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 problems were 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)

3. **Cedar #1 69/23 kV** transformer is overloaded at **159% of emergency rating** for the outage of Cedar #2 69/23 kV transformer.

4. **Cedar #2 69/23 kV** transformer is overloaded at **212% of emergency rating** for the outage of Cedar #1 69/23 kV transformer.

Short Circuit

Not applicable, there is no change to generator and transformer impedance.

Stability Analysis
Not required, there are no changes to generator characteristics

Power Factor Analysis
Preliminary results indicate that T61 can meet the PJM Tariff 0.90 lag power (at the generator terminals) factor requirement based on manufacturer's design data.

Queue T61 generator interconnection design must be capable of either;

1) A power factor of 0.95 lead to 0.90 lag (at the generator terminals) at the new MW value, or
2) A MVAR capability equal to the original MVAR capability (grandfathered lead and lag MVAR capability before the MW increase, or 0.95 lead to 0.90 lag for the original MWs whichever is less) plus a power factor of 1.0 to 0.90 lag for T61 MW increase, all measured at the generator terminals.

T61 design capability ("D" curves or other documentation) information was not provided by the Interconnection Customer in sufficient time to include a Power Factor analysis in this Feasibility Study. **Power Factor requirements will be further evaluated for the Impact Study.**

NETWORK UPGRADE REQUIREMENTS

New System Reinforcements

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

1. The recommended solution for the Cedar 69/23 kV transformers #1 and #2, and the Cedar CT GSUs overloads is for CESI (Conectiv Energy) to replace their existing GSUs with appropriately sized 13.8/69 kV GSUs connected to the Cedar 69 kV bus.

2. Same as #1 above.

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)

3. Same as #1 above.

4. Same as #1 above.