Generation 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 - 750MW Injection

Injection of 750 MW into the Vienna 230kV substation was evaluated for network impacts. The following potential impacts were identified:

Generator Deliverability

1. The Vienna – Steele 230 kV circuit is overloaded at 107% of the normal rating (466 MVA). The Vienna – Steele 230 kV circuit is also overloaded at 159% of the emergency rating (466 MVA) for the outage of the Vienna 230/138 kV transformer. The G28 project contributes approximately 543 MW to the normal overload and 750 MW to the contingency overload.
2. The Vienna 230/138 kV transformer is contingency overloaded at 129% of the emergency rating (573 MVA) for the outage of the Vienna – Steele 230 kV circuit. The G28 project contributes approximately 750 MW to the loading on this circuit.
3. The Vienna – Nelson 138 kV circuit is contingency overloaded at 164% of the emergency rating (213 MVA) for the outage of the Vienna – Steele 230 kV circuit. The G28 project contributes approximately 297 MW to the loading on this circuit.
4. The Nelson – Indian River 138 kV circuit is contingency overloaded at 110% of the emergency rating (192 MVA) for the outage of the Vienna – Steele 230 kV circuit. The G28 project contributes approximately 245 MW to the loading on this circuit.
5. The Loretto – Piney Grove 138 kV circuit is contingency overloaded at 100% of the emergency rating (159 MVA) for the outage of the Vienna – Steele 230 kV circuit. The G28 project contributes approximately 200 MW to the loading on this circuit.
6. The Laurel – Sharptown 69 kV circuit is contingency overloaded at 112% of the emergency rating (46 MVA) for the outage of the Laurel – Short 69 kV circuit. The G28 project contributes approximately 22 MW to the loading on this circuit.

Multiple Facility Contingency – Tower Line Outages (MAAC Criteria IIC)

7. The Steele – Church 138 kV circuit is contingency overloaded at 100% for the Steele – Keeney tower line outage. The G28 project contributes approximately 170 MW to the loading on this circuit.

Short Circuit

Short circuit analysis was not performed due to the magnitude of reinforcements required to eliminate the identified overloads. Any required breaker replacements are not expected to materially alter the total network reinforcement cost.

New System Reinforcements

Overloads 1, 2, 3, 4 and 5 can be relieved by constructing a new 230 kV circuit from Vienna to Steele with one 230 kV breaker at Vienna and one 230 kV breaker at Steele. (estimated cost: $25.138 million)

Overload 6 can be relieved by reconductoring the 69 kV circuit from Laurel to Sharptown. (estimated cost: $1.87 million)

Overload 7 can be relieved by reconductoring the 138 kV circuit from Steele to Church and replacing 600A Disconnect switch at Church. (estimated cost: $5.375 million)

The total **new Network Upgrades** are estimated to cost **$32.383 Million**. The construction cost for network upgrades may be subject to a CIAC (Contribution in Aid to Construction) state and federal tax gross up, which can add as much as **$10.222 Million**.

The estimated time required to construct the new network upgrades is **24-36 months**. This estimate is highly dependent upon the ability to secure the required facility outages.

Contribution to Previously Identified System Reinforcements

The G28 project will contribute to the cost of the following previously identified network reinforcements:

8) The project contributes approximately 81 MW to the Graysferry – Parrish 230 kV circuit. (estimated cost: $3.444 million)

9) The project contributes approximately 55 MW to the Eddystone – Morton Tap 230 kV circuit. (estimated cost: $0.06 million)

10) The project contributes approximately 38 MW to the Master – North Phila. 230 kV circuit. (estimated cost: $4.68 million)

11) The project contributes approximately 52 MW to the A27 – Graysferry 230 kV circuit. (estimated cost: $65 million)

12) The project contributes approximately 41 MW to the B48 – Graceton 230 kV circuit. (estimated cost: $1.8 million)

The total estimated cost for **previously identified network upgrades** is **$74.984 Million**. This estimate already includes CIAC (Contribution in Aid to Construction) state and federal tax gross up. Project #G28 will be required to share the cost of these upgrades. Project #G28's cost allocation will be determined as part of the #G28 Impact Study.

The estimated time required to construct the new network upgrades is **36-48 months**. This estimate is highly dependent upon the ability to secure the required facility outages.