#I11 Cardiff 500 MW

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 - 500 MW Capacity Injection

Capacity injection of 500 MW into the Cardiff 230 kV bus was evaluated to determine Network Impacts. The following potential network upgrade requirements determined:

Generator Deliverability

1. The Cardiff #2 230/69 kV transformer is contingency overloaded at 108% of the emergency rating (259 MVA) for the outage of the Cardiff #1 230/69 kV transformer.
   The I11 project contributes approximately 72 MVA to the loading of this transformer.
2. The Cardiff #1 230/69 kV transformer is contingency overloaded at 110% of the emergency rating (259 MVA) for the outage of the Cardiff #2 230/69 kV transformer.
   The I11 project contributes approximately 73 MVA to the loading of this transformer.
3. The Cardiff - Mill 69 kV circuit is contingency overloaded at 108% of the emergency rating (261MVA) for the outage of the Cardiff-Lewis 69 kV circuit. The I11 project contributes approximately **76** MW to the loading on this circuit

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

No identified problems.

Short Circuit

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

New System Reinforcements

Overload #1 can be relieved by upgrading the Cardiff #2 230/69 kV transformer to 300 MVA rating. The cost is estimated at **$1.35 Million** and will take approximately 3 years to complete.

Overload #2 can be relieved by upgrading the Cardiff #1 230/69 kV transformer to 300 MVA rating. The cost is estimated at **$1.35 Million** and will take approximately 3 years to complete.

Overload #3 can be relieved by operating the Cardiff-Mill 69 kV circuit at a higher temperature rating at no cost.

Contribution to Previously Identified System Reinforcements

The I11 project will contribute to the cost of the following previously identified network reinforcements:

1. Reconductor the Richmond – Waneeta 230 kV circuit. The project contributes approximately **30** MW. The cost is estimated at **$9 million** and is expected to take four years to complete.
2. Rebuild the Graceton – Raphael 230kV circuit. The project contributes approximately **25** MW. The total cost is estimated at **$17 million** and it is expected to take four years to complete.

3. Replace terminal equipment at Peach Bottom 500kV substation to increase the rating of the Conastone – Peach Bottom 500kV circuit. The project contributes approximately **95**MW. The total cost is estimated at **$0.5 million** and it is expected to take one year to complete.
4. Reconductor the B48 – Graceton 230kV circuit. The project contributes approximately **25**MW. The total cost is estimated at **$1.8 million** and it is expected to take two years to complete.
5. Reconductor Graysferry – Parrish 230kV circuit. The project contributes approximately **38**MW. The total cost is estimated at **$4 million** and it is expected to take two to complete.

Cost allocation percentages are not provided as part of the Feasibility Study analysis, however, cost allocation will be provided during the Impact Study evaluations.