#P21 - McGirr Road – Dixon 138 kV
(150 MW Energy and 30 MW Capacity)

# PJM Generator Interconnection

**Feasibility Study**

## *Network Impacts*

The #P21 project was studied as a 150 MW (30 MW of Capacity) injection into a tap of the Dixon to McGirr Road 138 kV line 10714. Project #P21 was evaluated for compliance with PJM reliability criteria for summer peak conditions in 2010. Potential network impacts were as follows:

**Generator Deliverability**
No problems were identified

**Multiple Facility Contingency**
No problems were identified.

**Contribution to Previously Identified Overloads**

1. Contribution of 44 MW further overloads the 138kV station equipment and current transformers in series with the Bus Tie 2-3 Circuit Breaker at Waterman from 128% to 146% of its load-dump rating (247 MVA) for the tower outage of lines 18402 & 16703. The violation was originally caused by the #P14 project. The solution for this overload is still being developed, and P21 may share an allocation for this upgrade. The allocation cost, if any, will be determined during the P21 Impact Study.
2. Contribution of approximately 52 MW further overloads the West Dekalb Tap to Tower Road Wind Farm portion of 138 kV line 11323 from 119% to 137% of its load-dump rating (300 MVA) for the tower outage of lines 18402 & 16703. The thermal violation from the West Dekalb Tap to Tower Road Wind Farm portion of 138kV line 11323 was originally caused by the #P14 project for the tower outage of lines 15616 & 15627. The thermal violation on the portion of 138kV line 11323 from West Dekalb Tap to Tower Road Wind Farm was caused again by the #P14 project for the different tower contingency of lines 18402 & 16703. The solution for this overload is still being developed, and P21 may share an allocation for this upgrade. The allocation cost, if any, will be determined during the P21 Impact Study.
3. Contribution of 52 MW further overloads the Waterman to West Dekalb Tap portion of 138 kV line 11323 from 131% to 151% of its load-dump rating (259 MVA) for the tower outage of lines 18402 & 16703. The violation was originally caused by the #P14 project. The solution for this overload is still being developed, and P21 may share an allocation for this upgrade. The allocation cost, if any, will be determined during the P21 Impact Study.
4. Contribution of 52 MW to further overload the Steward to Tower Road Wind Farm portion of 138 kV line 11323 (future line 18623) from 103% to 122% of its load-dump rating (279 MVA) for the tower outage of lines 18402 & 16703. The violation was

originally caused by the #P14 project for the tower outage of lines 15616 & 15627. The solution for this overload is still being developed, and P21 may share an allocation for this upgrade. The allocation cost, if any, will be determined during the P21 Impact Study.

5. Contribution of approximately 14 MW to further overload the Kammer 765/500 kV transformer from 129% to 130% of its emergency rating (1434 MVA) for the Beverly-Tidd-W. Bellair and Kammer-W. Bellair 345 kV tower outage. This violation was first identified for the #N42 project. APS is currently studying the associated network reinforcements to mitigate this condition. The necessary reinforcements and associated cost estimates will be available at the Impact Study phase for this project. The replacement cost for the Kammer 765/500 kV transformer is estimated in the $18,000,000 range, and P21 may share an allocation cost for this upgrade. The allocation cost, if any, will be determined during the P21 Impact Study.

6. There is a potential overload on the Byron to Wempletown 345 kV line 0624, for which the project #P21 contributes approximately 9 MW to the loading on the facility. PJM and ComEd are continuing to review the cause of and solution to the overload. The Impact Study for this project will define the cost allocation, if any, for this generation project. Rough estimates to eliminate the overload are around $20 million. The P21 cost allocation, if any, for this upgrade will be determined in the P21 Impact Study.

**New System Reinforcements**

To be determined at the System Impact Study.

**Contribution to Previously Identified System Reinforcements**

To be determined at the System Impact Study.

**Short Circuit**

There were no overdutied circuit breakers due to #P21 identified at this time. The short-circuit study for #P21 considers the overdutied breakers upgraded for projects ahead of #P21 in the PJM queue. If projects ahead of #P21 drop out, the short-circuit analysis will be repeated and #P21 may ultimately be responsible for breaker upgrades.

**Potential Issues**

During certain maintenance outages the P21 project may be required to be taken off-line.

**Impacts on the MISO member transmission systems are not included in this analysis, but they will be included in the Impact Study, which may reveal upgrades needed in the MISO system not identified in this Feasibility Study**.

**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.

As a result of the aggregate energy resources in the area, the following violations were identified:

1. Contribution of 51 MW to further overload the McGirr Road to Rochelle Tap 138 kV line 16914 from 110% to 134% of its normal rating (209 MVA) under normal system conditions. The facility was first overloaded by the #P14 project under normal system conditions.
2. The Rochelle Tap to Steward 138 kV line 16914 loads from 93% to 116% of its normal rating (209 MVA) under normal system conditions. The #P21 contributes approximately 48 MW to cause this thermal violation under normal system conditions.
3. The P21 to McGirr Road 138 kV line 19914 (formerly line 10714) loads from 87% to 107% of its emergency rating (261 MVA) for the loss of Nelson to Electric Junction 345kV line 15502. The #P21 contributes approximately 52 MW to cause this violation.
4. The Dixon to P21 138 kV line 10714 loads from 49% to 116% of its emergency rating (225 MVA) for the loss of the McGirr Road to Rochelle Tap 138kV line 16914. The #P21 contributes approximately 52 MW to cause this violation.