System Impact Report

For

PJM Generation Interconnection Request Queue Position AD2-131

“Kincaid-Pana 345 kV”

Revision 1: May 2022
Revision 0: January 2021

Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, 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 System Impact Study is performed.

The System Impact 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, the costs may be included in the study.

An Interconnection Customer with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

Revision History

Revision 0: Issued January 2021

Revision 1: Issued May 2022. This report revises the previously issued report to update the physical interconnection scope and the fuel type.

General

The Interconnection Customer ("IC") has proposed to connect a 50 MW Energy (8.3 MW Capacity) solar facility to be located in Christian County, IL.

Point of Interconnection

The Interconnection Customer requested to interconnect with the ComEd transmission system by connecting to the Edinburg TSS 345 kV interconnection substation to be built by the earlier queue position AD2-100. AD2-131 will share the same generator lead line with the prior AD2-100 project.

Attachment Facilities

The addition of a 50 MW solar facility behind the meter will require review and possible upgrade of SCADA, Communication, relays and metering. The estimated cost is $250,000. ComEd would take approximately 18-months to review and possibly upgrade SCADA, Communication, relays and metering after the ISA / ICSA are signed.

The preliminary cost estimate for Attachment Facilities is given in the following table.

Scope of Work	Cost Estimate
Review and possible upgrade of SCADA, Communication, relays and metering	$250,000

Direct Connection Network Upgrades

None.

Non-Direct Connection Network Upgrades

None.

Notes on Cost Estimate:

1) These estimates are Order-of-Magnitude estimates of the costs that ComEd would bill to the customer for this interconnection. These estimates are based on a one-line electrical diagram of the project and the information provided by the IC.

2) There were no site visits performed for these estimates. There may be costs related to specific site related issues that are not identified in these estimates. The site reviews will be performed during the Facilities Study or during detailed engineering.

3) These estimates are not a guarantee of the maximum amount payable by the IC and the actual costs of ComEd's work may differ significantly from these estimates. The IC will be responsible for paying actual costs of ComEd's work in accordance with Sections 212.1 and 217 of the PJM Open Access Transmission Tariff.

4) The IC is responsible for all engineering, procurement, testing and construction of all equipment on the IC's side of the POI.

5) These cost estimates do not include cost of acquiring right-of-way for the transmission line and purchasing any additional land, if needed, for the line terminations. The need and cost of acquiring property and associated legal costs will be investigated during Facilities Study for this project.

Network Impacts

The Queue Project AD2-131 was evaluated as a 50.0 MW (Capacity 8.3 MW) injection/withdrawal into a tap of the Kincaid-Pana 345 kV line, specifically into the AD2-100 tap interconnection substation in the ComEd area. Project AD2-131 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-131 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Summer Peak Analysis - 2021

Generator Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

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

Steady-State Voltage Requirements

(Results of the steady-state voltage studies should be inserted here)

None

Short Circuit

(Summary of impacted circuit breakers)

No issues.

Stability and Reactive Power Requirement

(Results of the dynamic studies should be inserted here)

The AD2-100/AD2-131 project does not meet 0.95 leading and lagging reactive power requirement at the POI. The estimated required additional capacitive reactive power is 6.56 MVAR to fulfill the power factor requirement for AD2-100 (4.96 MVAR) and AD2-131 (1.61 MVAR) together. See full report for details.

Affected System Analysis & Mitigation

MISO Impacts:

Preliminary MISO analysis indicates no MISO Impacts. MISO indicates their affected system analysis needs to be retooled to determine final MISO impacts.

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.
Only the most severely overloaded conditions are listed. 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 Request, a subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

1. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 100.59% to 102.15% (AC power flow) of its normal rating (797 MVA) for non-contingency condition. This project contributes approximately 13.08 MW to the thermal violation.

2. (CE - CE) The AB2-070 TAP-BROKAW ; T 345 kV line (from bus 924260 to bus 270673 ckt 1) loads from 108.02% to 109.07% (AC power flow) of its emergency rating (1327 MVA) for the single line contingency outage of 'COMED_P1-2_SPS-2102&2106_W4-005-FSA'. This project contributes approximately 14.17 MW to the thermal violation.

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CONTINGENCY 'COMED_P1-2_SPS-2102&2106_W4-005-FSA'
  TRIP BRANCH FROM BUS 270804 TO BUS 905080 CKT 1          / LATHAM TAP
W4-005
  TRIP BRANCH FROM BUS 270804 TO BUS 270796 CKT 1          / LATHA; T 345
KINCA; B 345
  TRIP BRANCH FROM BUS 270804 TO BUS 348856 CKT 1          / LATHA; T 345
7LATHAM 345
  TRIP BRANCH FROM BUS 270796 TO BUS 347955 CKT 1          / KINCA; B 345
AUSTIN 345 (THE)
  TRIP BRANCH FROM BUS 270668 TO BUS 905080 CKT 1          / BLUEM; B 345
W4-005
  END
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Light Load Analysis - 2021

No violations

Summer Peak Load Flow Analysis Reinforcements

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

None

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

ATTACHMENT 1