#X2-008– Prunytown 138kV
Generation Interconnection

Option 1:

The X2-008 project was studied as an 30MW Capacity injection with a 17.62% tap on the Prunytown - Union Road 138kV line.

Facilities to Accommodate the Interconnection

Scope of Direct Connection Work

The X2-008 project will interconnect to the Leadsville – Prunytown #16 138kV line approximately 2.4 miles away from the Prunytown substation. The Interconnection Customer will construct a new 1.5 mile 138kV line from the hydroelectric facilities to the Point of Interconnection (POI) at the Tygart Dam 138kV switching station. A gang operated switch will be required on the Interconnection Customer's side of the POI. To accommodate this interconnection, a new 138kV three-breaker ring bus called the Tygart Dam switching station, along with metering and SCADA will be required. It is estimated to take 18 months after the receipt of an executed Construction Service Agreement to complete this work.

The Interconnection Customer is responsible for meeting all criteria as specified in the applicable sections of the "FirstEnergy Requirements for Transmission Connected Facilities" document.

The Interconnection Customer is responsible for constructing all of the facilities on the Interconnection Customer's side of the Point of Interconnection.

Direct Connection Cost Estimate

The total preliminary cost estimate for Direct Connection work performed by APS is $**4,746,700**. This estimate consists of:

Description	Total Cost
New Tygart Dam switching station 138kV three-breaker ring bus	$4,407,000
Loop/tie-in into Prunytown – Union Road #16 138kV line	$216,900
Engineering, oversight and commissioning	$122,800
Total Cost:	**$4,746,700**

Note: Tax gross-ups are not included in the upgrade costs. However, if applicable, apply 16.2% tax gross-up.

Non-Direct Connection Cost Estimate

The total preliminary cost estimate for Non-Direct Connection work performed by APS is $**115,500**. This estimate consists of:

Description	Total Cost
Update transfer trip/relay settings and install a transmitter at Leadsville switching station	$58,300
Update relay settings at Prunytown substation	$28,600
Update relay settings at Loughs Lane substation	$28,600
Total Cost:	**$115,500**

Note: Tax gross-ups are not included in the upgrade costs. However, if applicable, apply 16.2% tax gross-up.

Revenue Metering and SCADA Requirements

For PJM: The Interconnection Customer will install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for Interconnection Customer's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 24.1 to 24.2.

For APS: The Interconnection Customer will be required to comply with all FE Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "FirstEnergy Requirements for Transmission Connected Facilities" document located at the following links:
www.firstenergycorp.com/feconnect
www.pjm.com/planning/design-engineering/to-tech-standards.aspx

Network Impacts

The X2-008 project was studied as a 30MW Capacity injection into the APS area at the 17.62% tap of the Prunytown - Union Road 138kV line. Project X2-008 was evaluated for compliance with reliability criteria for summer peak conditions in 2015.

Potential network impacts were as follows:

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

No violations were identified.

Multiple Facility Contingency
(Double Circuit Tower Line contingencies were studied for the full energy output. The contingencies of Line with Failed Breaker and Bus Fault will be performed for the Impact Study.)

No violations were identified.

Short Circuit
(Summary of impacted circuit breakers)

PJM has completed the short circuit analysis of the X2-008 queue project Pruntytown. One option was considered during this study: the first option was a tap between Pruntytown and Lough's Lane 138 kV line. No new breakers were found to be over-duty in the APS transmission area.

Contribution to Previously Identified Overloads
(X2-008 contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

No violations were identified.

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

Not required.

Contribution to Previously Identified System Reinforcements
(Overloads initially caused by prior Queue positions with additional contributions to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study.)

Not required.

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.

Note: Only the most severely overloaded conditions are listed below. 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 shall study all overload conditions associated with the overloaded element(s) identified.

As a result of the aggregate energy resources in the area, no violations were identified.

Option 2:

The X2-008 project was studied as an 30MW Capacity injection at the 01PRNTY 138kV substation.

Facilities to Accommodate the Interconnection

Scope of Direct Connection Work

The X2-008 project will tie in directly into the 138kV bus at Prunytown substation. The Interconnection Customer will have to build a new 3.8 mile 138kV line from the hydroelectric facilities to the Point of Interconnection (POI) at the Prunytown 138kV substation.

The Interconnection Customer is responsible for meeting all criteria as specified in the applicable sections of the "FirstEnergy Requirements for Transmission Connected Facilities" document.

The Interconnection Customer is responsible for constructing all of the facilities on the Interconnection Customer's side of the Point of Interconnection.

Revenue Metering and SCADA Requirements

For PJM: The Interconnection Customer will install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for Interconnection Customer's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 24.1 to 24.2.

For APS: The Interconnection Customer will be required to comply with all FE Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "FirstEnergy Requirements for Transmission Connected Facilities" document located at the following links:
www.firstenergycorp.com/feconnect
www.pjm.com/planning/design-engineering/to-tech-standards.aspx

Network Impacts

The X2-008 project was studied as a 30MW Capacity injection into the APS area at the 01PRNTY 138kV substation. Project X2-008 was evaluated for compliance with reliability criteria for summer peak conditions in 2015.

Potential network impacts were as follows:

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

No violations were identified.

Multiple Facility Contingency
(Double Circuit Tower Line contingencies were studied for the full energy output. The contingencies of Line with Failed Breaker and Bus Fault will be performed for the Impact Study.)

No violations were identified.

Short Circuit
(Summary of impacted circuit breakers)

PJM has completed the short circuit analysis of the X2-008 queue project Pruntytown. One option was considered during this study: the second option was a direct connection to Pruntytown 138 kV substation. No new breakers were found to be over-duty in the APS transmission area.

Contribution to Previously Identified Overloads
(X2-008 contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

No violations were identified.

New System Reinforcements

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

Not required.

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contributions to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study.)

Not required.

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.

Note: Only the most severely overloaded conditions are listed below. 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 shall study all overload conditions associated with the overloaded element(s) identified.

As a result of the aggregate energy resources in the area, no violations were identified.