

# *Generation Interconnection Request*

## *Queue Position V2-026*

### **General**

The Interconnection Customer (IC) has proposed a 164 MWE (21.32 MWC) wind powered generating facility to be located near the boundary of Barbour, Preston, and Tucker Counties in West Virginia. V2-026 was studied as a 164 MW injection into the Allegheny Power (APS) transmission system and evaluated for compliance with reliability criteria for summer peak conditions in 2013. The proposed in-service date is December 31, 2012.

### **Point of Interconnection**

V2-026 will interconnect with the APS transmission system either as a direct connection into the existing Denver 138kV substation (primary option) or as a direct connection into the existing Corder Crossing 138kV substation (secondary option).

### **Primary Option**

V2-026 will interconnect with the APS transmission system via a direct connection into the existing Denver 138kV substation.

### **Direct Connection Requirements**

#### **Transmission Owner Scope of Direct Connection Work**

The Transmission Owner's scope of work for the direct connection facility includes:

#### **Attachment Facilities**

##### Denver 138kV Substation

Expand the existing west fence and yard for an additional area of approximately 40' x 150'. Install ground grid, structures, foundations, and yard stone. Extend the 138kV bus and install a 138kV line terminal with one (1) 138kV breaker, three (3) 138kV disconnect switches, 138kV steel structures, one (1) 138kV deadend structure, 138kV metering, line traps, and CVTs. Install control cables, panels, transfer trip, and associated equipment. Assume connection to the Interconnection Customer (IC) is by overhead 138kV line. The IC is to install OPGW cable between the Denver substation and their interconnection substation.

The estimated cost to perform this work is **\$1,584,900** in 2012 dollars.

### **Network Upgrades**

- Install 138kV transfer trip facilities at the Pruntytown 138kV substation.

The estimated cost to perform this work is **\$50,900** in 2012 dollars.

- Install 138kV transfer trip facilities at the Albright 138kVsubstation.

The estimated cost to perform this work is **\$50,900** in 2012 dollars.

### **Interconnection Customer Scope of Direct Connection Work**

The Interconnection Customer (IC) has assumed full responsibility for the design and construction of all facilities associated with the V2-026 generating facility and the 138kV direct connection line on the IC side of the Point of Interconnection (POI). The IC will interconnect V2-026 with the AP transmission system by constructing a customer-owned overhead 138kV line from the generating facility to AP's Denver 138kV substation, a distance of approximately 15 miles. Route selection, line design, right-of-way acquisition and construction of such lines will be entirely the responsibility of the IC. Cost estimates do not include construction of that line. It is assumed that the IC's step up transformer will conform to the AP standard of delta on the low side and grounded wye on the high side as illustrated in the AP Facility Connection Manual.

The IC will be required to install metering and telemetry equipment to provide revenue metering and real-time telemetry data to PJM. The requirements for this equipment are listed in Appendix 2, Section 8 of Attachment O to the PJM Tariff, as well as PJM Manuals 01 and 14D. Protective relaying and metering design and installation must comply with the Allegheny Power Applicable Standards. It is assumed that a fiber optic interface will be used for the protection channel between the AP and Interconnection Customer's substations.

### **Cost and Timing Summary**

The cost estimates in this report do not include tax gross-up, land acquisition, or any network upgrades which may have been identified and required by this project.

The estimated project duration is **21 months** after the receipt of an executed Interconnection Service Agreement (ISA) and Interconnection Construction Service Agreement (CSA).

### **Network Impacts**

Potential network impacts are as follows:

### **Generator Deliverability**

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

No problems identified.

### **Multiple Facility Contingency**

*(Double Circuit Tower Line, Line with Failed Breaker, and Bus Fault contingencies for the Full energy output.*

No problems identified.

### **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)*

No problems identified.

### **Short Circuit**

No breakers were identified as being over their maximum interrupting rating.

Allegheny Power reserves the right to review the electrical protection design and relay settings for interconnecting customer facilities to ensure that the protective relaying equipment will be compatible with that installed at the new switching station. The relaying package will likely include both primary and backup protection. Allegheny Power personnel must be present at the time of commissioning to witness proper function of the protection scheme and related coordination. The estimated cost to perform this engineering review and field test effort is **\$10,000** in 2012 dollars.

*Note: The purchase and installation of protective relaying and associated equipment at the generation site is the responsibility of the interconnecting customer and is not included in this scope of work.*

### **Stability and Reactive Power Requirements**

Will be performed during the V2-026 System Impact Study.

### **New System Reinforcements**

*(Upgrades required to mitigate reliability criteria violations, i.e. “Network Impacts” initially caused by the addition of this project’s 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 in the System Impact Study report)*

None

### **Potential Congestion due to Local Energy Deliverability**

*(PJM also studied the delivery of the energy portion of the surrounding generation. Any potential 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 Transmission Interconnection Request. Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full deliverability for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which analyzes all overload conditions associated with the identified overloaded element(s). As a result of the aggregate energy resources in the area, the following violations were identified:*

***These are not required network upgrades.***

1. The 01ALBRIG-01RUTHBL 138kV line (from bus 20120 to bus 20398 ckt 1) loads from 123.85% to 133.75% (DC power flow) of its emergency rating (176MVA) for the tower outage (APS-SB-16) as a result of V2-026. This project contributes approximately 17.4MW to cause this thermal violation.
2. The 01RUTHBL-01CHEATL 138kV line (from bus 20398 to bus 20802 ckt 1) loads from 121.23% to 131.13% (DC power flow) of its emergency rating (176MVA) for the tower outage (APS-SB-16) as a result of V2-026. This project contributes approximately 17.4MW to cause this thermal violation.
3. The 01CHEATL-01LKLYNN 138kV line (from bus 20802 to bus 20122 ckt 1) loads from 144.73% to 156.06% (DC power flow) of its emergency rating (176MVA) for the operational contingency outage (APS-SB-16) as a result of V2-026. This project contributes approximately 19.9MW to cause this thermal violation.
4. The 01ALBRIG-01KINGWD 138kV line (from bus 20120 to bus 20356 ckt 1) loads from 124.23% to 134.86% (DC power flow) of its emergency rating (176MVA) for the single line outage (AP128\_OP) as a result of V2-026. This project contributes approximately 18.7MW to cause this thermal violation.
5. The 01KINGWD-01PRNTY 138kV line (from bus 20356 to bus 20391 ckt 1) loads from 114.68% to 125.32% (DC power flow) of its emergency rating (176MVA) for the tower outage (AP128\_OP) as a result of V2-026. This project contributes approximately 18.7MW to cause this thermal violation.
6. The 01ALBRIG-01 106 J 138kV line (from bus 20120 to bus 20305 ckt 1) loads from 101.52% to 113.25% (DC power flow) of its emergency rating (143MVA) for the single line outage (APS-SB-100) as a result of V2-026. This project contributes approximately 16.8MW to cause this thermal violation.

## **Secondary Option**

V2-026 will interconnect with the APS transmission system via a direct connection into the existing Corder Crossing 138kV substation.

## **Direct Connection Requirements**

### **Transmission Owner Scope of Direct Connection Work**

The Transmission Owner's scope of work for the direct connection facility includes:

### **Attachment Facilities**

#### **Corder Crossing 138kV Substation**

Expand the existing west fence and yard for an additional area of approximately 60' x 130'. Install ground grid, structures, foundations, and yard stone. Extend the 138kV bus and install a 138kV line terminal with one (1) 138kV breaker, three (3) 138kV disconnect switches, 138kV steel structures, one (1) 138kV deadend structure, 138kV metering, line traps, and CVTs. Install control cables, panels, transfer trip, and associated equipment. Assume connection to the Interconnection Customer (IC) is by overhead 138kV line. The IC is to install OPGW cable between the Corder Crossing substation and their interconnection substation.

The estimated cost to perform this work is **\$1,560,100** in 2012 dollars.

### **Network Upgrades**

- Install 138kV transfer trip facilities at Pruntytown substation.

The estimated cost to perform this work is **\$50,900** in 2012 dollars.

- Install 138kV transfer trip facilities at Buckhannon substation.

The estimated cost to perform this work is **\$50,900** in 2012 dollars.

### **Interconnection Customer Scope of Direct Connection Work**

The Interconnection Customer (IC) has assumed full responsibility for the design and construction of all facilities associated with the V2-026 generating facility and the 138kV direct connection line on the IC side of the Point of Interconnection (POI). The IC will interconnect V2-026 with the AP transmission system by constructing a customer-owned overhead 138kV line from the generating facility to AP's Corder Crossing 138kV substation, a distance of approximately 15 miles. Route selection, line design, right-of-way acquisition and construction of such lines will be entirely the responsibility of the IC. Cost estimates do not include construction of that line. It is assumed that the

IC's step up transformer will conform to the AP standard of delta on the low side and grounded wye on the high side as illustrated in the AP Facility Connection Manual.

### **Network Impacts**

Potential network impacts are as follows:

#### **Generator Deliverability**

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

No problems identified.

#### **Multiple Facility Contingency**

*(Double Circuit Tower Line, Line with Failed Breaker, and Bus Fault contingencies for the **Full** energy output.*

No problems identified.

#### **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)*

No problems identified.

#### **Short Circuit**

No breakers were identified as being over their maximum interrupting rating.

#### **Stability and Reactive Power Requirements**

Will be performed during the V2-026 System Impact Study.

#### **New System Reinforcements**

*(Upgrades required to mitigate reliability criteria violations, i.e. "Network Impacts" initially caused by the addition of this project's 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 in the System Impact Study report)*

None

**Potential Congestion due to Local Energy Deliverability**

No problems identified.