Generation Interconnection

Facilities Study Report

for

Queue Project AC2-123

Jacksons Ferry 138 kV

Wythe County, VA

January, 2021

1 Facilities Study Summary

1.1 Project Description

Savion Energy proposes to install PJM Project AC2-123, a 75.0 MW (44.6 MW Capacity) solar generating facility in Wythe County, Virginia (Figure 2). The point of interconnection for the generating facility will be a direct connection to AEP's Jacksons Ferry 138 kV substation (Figure 1).

The requested backfeed date for the project is: 10/1/2022.

The requested in-service date for the project is: 12/1/2022.

1.2 Amendments/Changes to the Impact Study Report

No significant amendments/changes noted.

1.3 Interconnection Customer Schedule

PJM and AEP understand that the Interconnection Customer has established the following schedule dates:

Receive back feed power from AEP: 10/1/2022

Generation Commercial Operation Date: 12/31/2022

1.4 AEP's Scope of Work to Facilitate Interconnection

- To accommodate the interconnection at AEP's existing Jacksons Ferry 138 kV substation, the station will have to be expanded by adding one (1) 138 kV circuit breaker, extending the 138 kV bus 2 , and starting a new circuit breaker string.
- Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will be required at 138 kV Jacksons Ferry . AEP reserves the right to specify the final acceptable configuration considering design practices, future expansion, and compliance requirements.

- AEP will extend one span of 138 kV transmission line beyond the Jacksons Ferry 138 kV station fence for the generation-lead going to the AC2-123 site. Unless this span extends directly from within the AEP Jacksons Ferry 138 kV station to the IC collector station structure, AEP will build and own the first transmission line structure outside of Jacksons Ferry substation, to which the conductor coming from the AC2-123 collector station will attach. Note that due to existing

conditions just outside the Jacksons Ferry station fence, the AEP scope also includes a separate structure just inside the Jacksons Ferry station, to maintain required clearances from the crossing transmission line.

- It is understood that the Interconnection Customer is responsible for all of the connection costs associated with interconnecting the PJM project AC2-123 to the AEP transmission system. The cost of the customer's generating facility and the costs for the line connecting the generating facility to AEP's transmission system (Beyond the first span exiting the Jacksons Ferry 138 kV station) are not included in this report; these are assumed to be the Customer's responsibility.

- The customer will be responsible for the cost of constructing a fiber-optic connection from their telecom equipment to AEP's Jacksons Ferry control house.

1.5 Description of Transmission Owner Facilities Included in the Facilities Study

1.5.1 Attachment Facilities Work

- Install 138 kV revenue metering at Jacksons Ferry 138 kV substation.

- AEP will extend one span of 138 kV transmission line for the generation-lead going to the AC2-123 site. AEP will build and own a transmission line structure within the Jacksons Ferry 138 kV station, and the first transmission line structure outside of Jacksons Ferry substation, to which the conductor coming from the AC2-123 collector station will attach.

1.5.2 Direct Connection Work

- AEP shall install one (1) additional 138 kV circuit breaker and one line connection for the IPP at Jacksons Ferry substation. Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will also be required (Figure 1).

1.5.3 Non-Direct Connection Work

- AEP will need to expand the existing Jacksons Ferry substation to facilitate the connection of the generation lead. To accomplish this, the Jacksons Ferry 138 kV bus 2 will be extended to the west.

1.5.4 Network Upgrade Work

None

1.6 Total Cost of Transmission Owner Facilities Included in the Facilities Study:

Attachment Facilities	$1,831,545
Direct Connection Facilities	$991,465
Non-Direct Connection Facilities	$499,998
Network Upgrade Facilities	$0
Total Cost	$3,323,008

The estimates do not include the impact that delays in obtaining ROW, permits, or other approvals may have.

1.7 Summary of Schedule Milestones for Completion of Transmission Owner Work Included in Facilities Study:

Standard Process

Task	Dates
Engineering Start	Q3-2021
Material Ordered	Q3-2021
Construction Start (Grading & Below Grade)	Q1-2022
Construction Start (Above Grade)	Q2-2022
Outage Requests Made By	Q1-2022
Outage (Structure Foundations)	Not Applicable
Outage (Cut-in & Testing)	Q3-2022
Ready For Back Feed	10/1/2022
In-Service Date	12/1/2022

Assumptions (Standard Process)

- **ISA and ICSA executed by the end of Q1-2021**
- **System conditions must allow scheduled outages to occur.**
- **The customer will obtain, at its' cost, all necessary provisions for the AEP direct connection facilities.**
- **The customer will perform site development and road construction in accordance with AEP specifications.**
- **The customer will provide any additional easements for 138 kV line work to include access to all facilities and structures.**
- **The customer will have their construction and required checkout completed prior to the start of the cut-in and testing outage.**

Transmission Outage Plan

Note that all 138 kV outages are subject to PJM and AEP Operations BES outage-scheduling requirements.

2 Transmission Owner Facilities Study Results

2.1 Transmission Lines – New

AEP will extend one span of 138 kV transmission line for the generation lead going to the AC2-123 site from the Jacksons Ferry substation. AEP will build and own a transmission line structure within the Jacksons Ferry 138 kV station, and the first transmission line structure outside of the Jacksons Ferry substation, to which the conductor coming from the AC2-123 collector station will attach.

2.2 Transmission Lines – Upgrades

None

2.3 Substation Facilities – New

None

2.4 Substation Facilities – Upgrades

AEP will need to expand the existing Jacksons Ferry substation to facilitate the connection of the generation lead going to the PJM project AC2-123. To accomplish this, Jacksons Ferry 138 kV bus 2 will be extended to the west. One additional circuit breaker will be installed. Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will also be required (Figure 1).

Due to the new generation source being added, nearby Protective relay-settings for the remainder of the Jacksons Ferry 138 kV substation will have to be reviewed and updated to account for the addition of the AC2-123 generation source.

2.5 Metering & Communications

Standard 138 kV metering will be installed at Jacksons Ferry substation. A standard station communication scheme will be used. All metering equipment shall meet the requirements as specified by AEP in the "AEP Metering and Telemetering Requirements for AEP Transmission Customers" document (SS-490011). Communication requirements are published in the "AEP SCADA RTU Requirements at Transmission Interconnection Facilities" (SS-500000).

AEP will need to update the telecom equipment at Jacksons Ferry for SCADA/EMS functionality. Two independent paths of Fiber-optic cable will be extended to the AEP/AC2-123 point of interconnection.

The Generation Interconnection Agreement does not in or by itself establish a requirement for American Electric Power to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand, and proper metering equipment in installed. The metering work above and cost indicated below does not include any potential work or cost to address metering requirements of the local service provider. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

2.6 Environmental, Real Estate, and Permitting issues

The Interconnection customer is expected to obtain, at its' cost, all necessary permits and provisions for the IPP station and the portion of the generator lead to Jacksons Ferry to be owned by AC2-123.

2.6.1 System Modeling & Operating Requirements

In addition to the IPP modeling requirements imposed by PJM as part of the Generation Interconnection process, the following system modeling parameters will need to be supplied by the Interconnection Customer to AEP:

- 138 kV transmission line impedances, including positive and zero sequence, up to the agreed-upon Point of Interconnection.
- Coordination of the protection equipment and settings at the AC2-123 site, to coordinate with the Jacksons Ferry relays and communication equipment

Summary of Results of Study

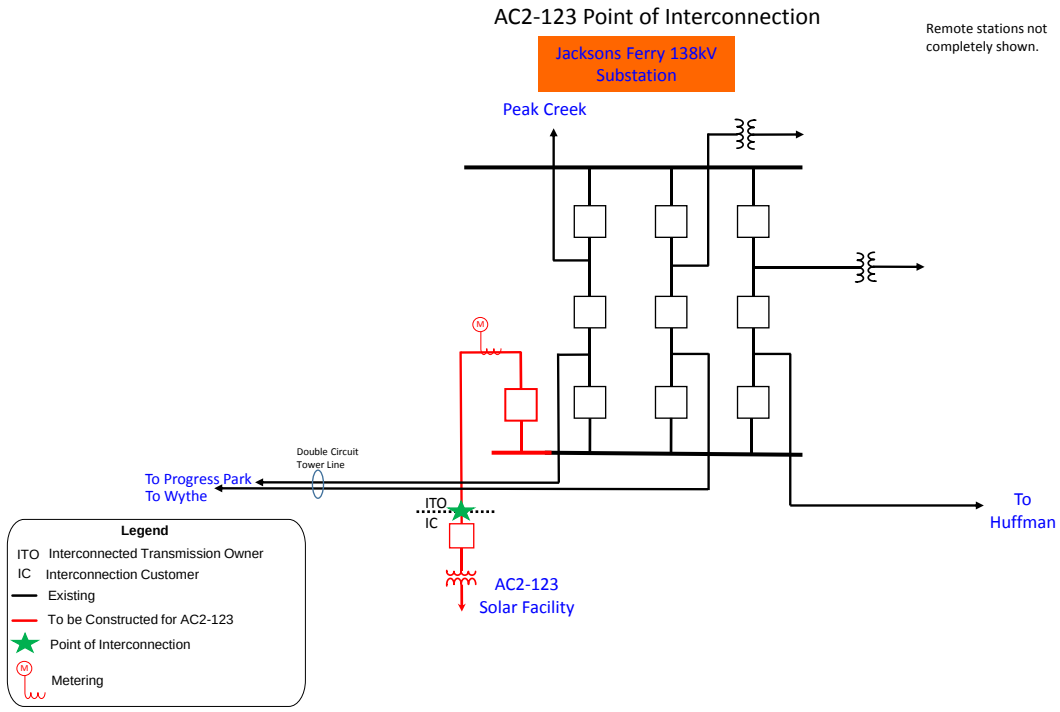
Cost Estimates for AEP

Task	Network Upgrade Number	Engineering	Material	Construction	Other	TOTAL
Expand Jacksons Ferry 138 kV Station (Bus extension)	n5744	$105,140.33	$155,205.33	$163,139.33	$76,513.00	$499,998.00
Expand Jacksons Ferry 138 kV Station (other than bus extension)	n5743	$208,486.33	$307,762.33	$323,493.33	$151,723.00	**$991,465.00**
138 kV Revenue metering	n5742	$57,238.67	$92,623.67	$111,773.67	$64,010.00	**$325,646.00**
Jacksons Ferry – generator lead to AC2-123 POI	n5742	$211,134.33	$263,775.33	$738,915.33	$292,074.00	**$1,505,899.00**
TOTAL		**$581,999.67**	**$819,366.67**	**$1,337,321.67**	**$585,320.00**	**$3,323,008.00**

2.7 Information Required for Interconnection Service Agreement

Description	Non-Direct Connect Facilities	Attachment Facility	TOTAL
Direct Material	$155,205.33	$664,161.33	**$819,366.67**
Direct Labor	$268,279.67	$1,651,041.67	**$1,919,321.33**
Indirect Material	$26,593.28	$130,743.73	**$157,337.01**
Indirect Labor	$49,919.72	$377,063.27	**$426,982.99**
TOTAL	**$498,00.00**	**$2,823,010.00**	**$3,323,008.00**

Figure 1: AC2-123 Jacksons Ferry 138 kV Point of Interconnection One-Line Diagram



The Point of Interconnection ("POI") is at a Dead-end structure south of the Progress Park/Wythe 138kV Double-Circuit line, with the ITO owning the spans from the Jacksons Ferry 138kV substation to the Dead-end, including the jumpers at the Dead-end. Wythe County Solar Project, LLC owns the span connecting to the POI, and the 138kV generator lead line and remaining structures back to the AC2-123 generation collector station.

Figure 2: AC2-123 Jacksons Ferry 138 kV Point of Interconnection Map

[36.875, -80.839; parcel # or other location identification is required and must be included. Corners not required, but preferred]