

***Generation Interconnection  
Combined Feasibility/System  
Impact Study Report***

***For***

***PJM Generation Interconnection Request  
Queue Position Y3-097***

***Trent 34.5 kV***

**July 2014**

## **General**

RES Energy Storage Holdings, LLC (RES) proposes to interconnect a 4 MW Energy Storage project utilizing battery technology at the 34.5 kV disconnect switch adjacent to Trent substation along the Johnstown – Trent 34.5 kV line (Figure 1). PJM project Y3-097 consists of battery banks with an 8 x 0.5 MW convertor connected to two 2250 kVA transformers. Project Y3-097 was studied as a 4 MW injection at the Trent 34.5 kV substation.

The requested in service date is September 9, 2015.

The objective of this Feasibility study is to determine budgetary cost estimates and approximate construction timelines for identified transmission facilities required to connect the proposed generating facilities to the AEP transmission system. These reinforcements include the Attachment Facilities, Local Upgrades, and Network Upgrades required to maintain the reliability of the AEP transmission system. Stability analysis is not included as part of this study.

**This study does not imply an AEP commitment to this in-service date.**

Attachment facilities and local upgrades (if required) along with terms and conditions to interconnect Y3-097 will be specified in a separate two party Interconnection Agreement (IA) between AEP and the Interconnection Customer as this project is considered FERC non-jurisdictional per the PJM Open Access Transmission Tariff (OATT). From the transmission system perspective, no network impacts were identified as detailed below.

### **Point of Interconnection**

Y3-097 will interconnect with the AEP distribution system by connecting to the Trent 34.5 kV substation.

### **Cost Summary**

The Y3-097 project will be responsible for the costs outlined in the two-party Interconnection Agreement between AEP and Y3-097.

## **Transmission Owner Scope of Work**

The scope of AEP's work will be defined in the two-party Interconnection Agreement between AEP and Y3-097.

## **Revenue Metering and SCADA Requirements**

### **PJM Requirements**

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

### **AEP Requirements**

The Interconnection Customer will be required to comply with all AEP Revenue Metering Requirements for Generation Interconnection Customers.

## **Network Impacts**

The Queue Project #Y3-097 was studied as a 4.0 MW (Capacity 0.0 MW) injection at the Trent 34.5 kV substation in the AEP area. Project #Y3-097 was evaluated for compliance with reliability criteria for summer peak conditions in 2017. Potential network impacts were as follows:

## **Generator Deliverability**

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

None

## **Light Load Analysis**

Light Load Studies to be conducted during later study phases (applicable to wind, coal, nuclear, and pumped storage projects).

None

## **Multiple Facility Contingency**

*(Double Circuit Tower Line, Failed Breaker and Bus Fault contingencies for the full energy output)*

None

## **Short Circuit**

*(Summary form of Cost allocation for breakers will be inserted here if any)*

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

**Stability and Reactive Power Requirement**

*(Results of the dynamic studies should be inserted here)*

None

**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

**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.

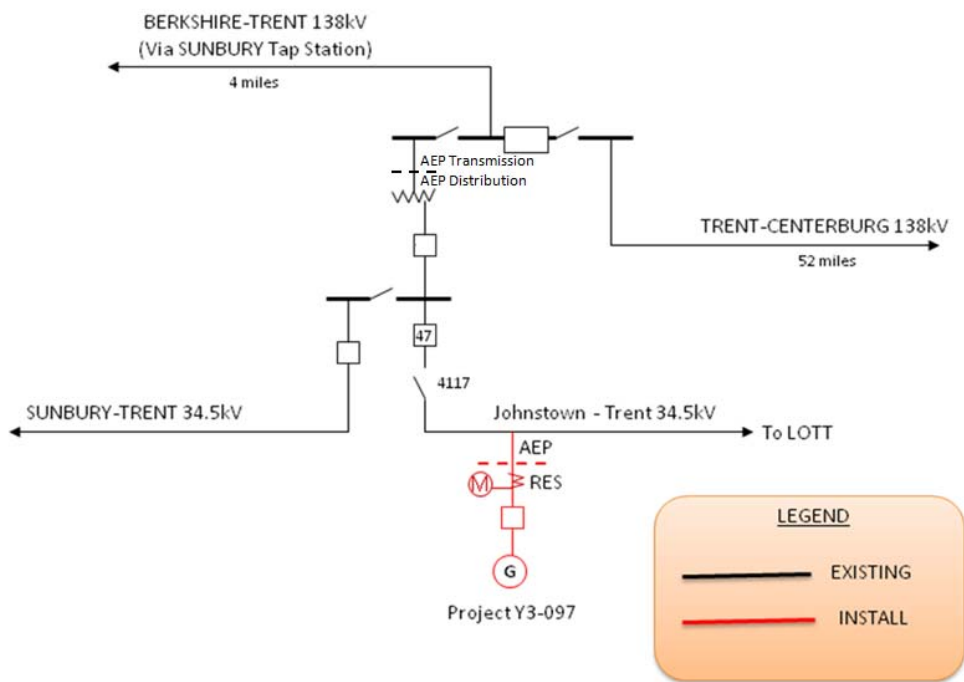
None

# Attachment 1

## System Configuration

### Y3-097

#### TRENT SUBSTATION



# Attachment 2

## Project Location

