

***Generation Interconnection  
Feasibility Study Report***

***For***

***PJM Generation Interconnection Request  
Queue Position AC2-066***

***Hillcrest 138 kV***

***June 2017***

## Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, 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 impact study is performed.

The Feasibility 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.

## General

Hillcrest 138 kV, LLC (“Interconnection Customer”) has proposed a 75 MW uprate to prior 125 MW queue request AB1-014. The increased capability associated with queue position AC2-066 is achieved by adding similar equipment to the solar generation equipment of prior queue request AB1-014.

AB1-014 requested 125 MW Energy (MFO) and 47.5 MW CIR; AC2-066 requested an uprate of 75 MW Energy and 28.5 MW CIR; Both projects combined, AB1-014 and AC2-066, will have a total capability of 200 MW Energy (MFO) and 76 MW CIR.

The proposed in-service date for this project is October 31, 2018. **This study does not imply a Duke Energy commitment to this in-service date.**

## Point of Interconnection

AC2-066 will interconnect with the Duke Energy transmission system by direct injection into Hillcrest 138 kV substation. The Point of Interconnection is located in Brown County, Mount Orab, Ohio, where Duke Energy’s overhead transmission line from the Hillcrest 138 kV substation terminates at the Interconnection Customer’s switch on the structure outside of substation fence; please refer to the single-line diagram in Appendix 2.

## Costs Summary and Transmission Owner Scope of Work

The additional 75MWs of project AC2-066 will be combined with the 125MWs of project AB1-014 prior to exiting the Interconnect Customer's substation, and will connect to Duke Energy's transmission system via the same circuit.

The attachment facilities and network upgrades for project AB1-014 will accommodate the additional generation of project AC2-066. No new facilities or upgrades will be required for AC2-066. Duke Energy facilities and network upgrades costs required to support the AC2-066 project are listed below.

- (a) Attachment Facilities: \$ 0.0
- (b) Direct Connection Network Upgrades: \$ 0.0
- (c) Non-Direct Connection Network Upgrades: \$ 0.0
- (d) Direct Connection Local Upgrades: \$ 0.0
- (e) Non-Direct Connection Local Upgrades: \$ 0.0
- (f) Option to Build Upgrades: \$ 0.0

***Estimated Total Costs (a) to (f):*** ..... **\$ 0.0**

NOTE: CIAC Tax Gross Up charges will be charged to the project if it does not meet the eligibility requirements of IRS Notice 88-129.

## **Interconnection Customer Requirements**

Interconnection Customer will be required to engineer, procure, and construct the connecting circuit from the Interconnection Customer's substation to the Point of Interconnection. This includes, but is not limited to, an underground circuit from the Interconnection Customer's substation, a structure near the Hillcrest 138 kV substation where the circuit will transition from underground to overhead, and a switch mounted on the structure.

In addition, Interconnection Customer will be responsible for meeting all criteria as specified in the applicable sections of the Duke Energy "Requirements for Connection of Facilities to the Duke Energy MIDWEST Transmission System" document, Version 6, effective January 31, 2014, which can be found under this link:

<http://www.pjm.com/~media/planning/plan-standards/deok/deok-facility-connection-requirements.ashx>.

## **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.

### **Duke Energy Requirements**

The Interconnection Customer will be required to comply with all Duke Energy Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "Requirements for Connection of Facilities to the Duke Energy MIDWEST Transmission System" document, Version 6, effective January 31, 2014.

## **Network Impacts**

The Queue Project AC2-066 was evaluated as a 75.0 MW (Capacity 28.5 MW) injection at the Hillcrest 138 kV substation in the DEOK area. Project AC2-066 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AC2-066 was studied with a commercial probability of 53%. Potential network impacts were as follows:

### **Summer Peak Analysis - 2020**

#### **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**

To be determined at later study phases.

#### **Short Circuit**

*(Summary of impacted circuit breakers)*

None

### **Affected System Analysis & Mitigation**

#### **LGEE Impacts:**

LGEE Impacts to be determined during later study phases (as applicable).

#### **MISO Impacts:**

MISO Impacts to be determined during later study phases (as applicable).

### **OVEC Impacts:**

OVEC Impacts to be determined during later study phases (as applicable).

### **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

### **Light Load Analysis - 2020**

Light Load Studies to be conducted during later study phases (as required by PJM Manual 14B).

### **System Reinforcements**

#### **Short Circuit**

None

#### **Stability and Reactive Power Requirement**

To be determined at later study phase (If applicable).

#### **Summer Peak Load Flow Analysis Reinforcements**

None

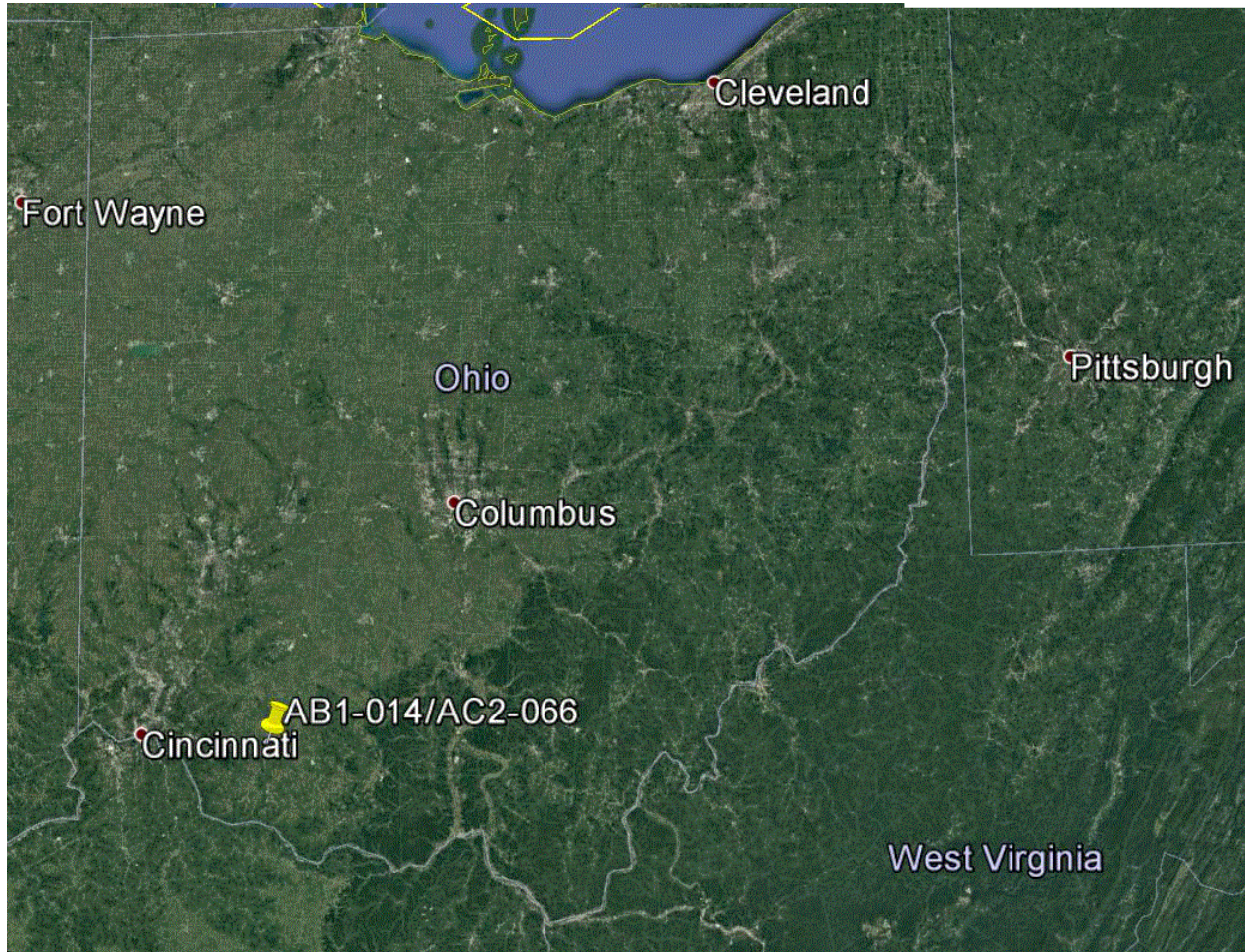
#### **Light Load Load Flow Analysis Reinforcements**

None

## Appendix 1

### Facility Location

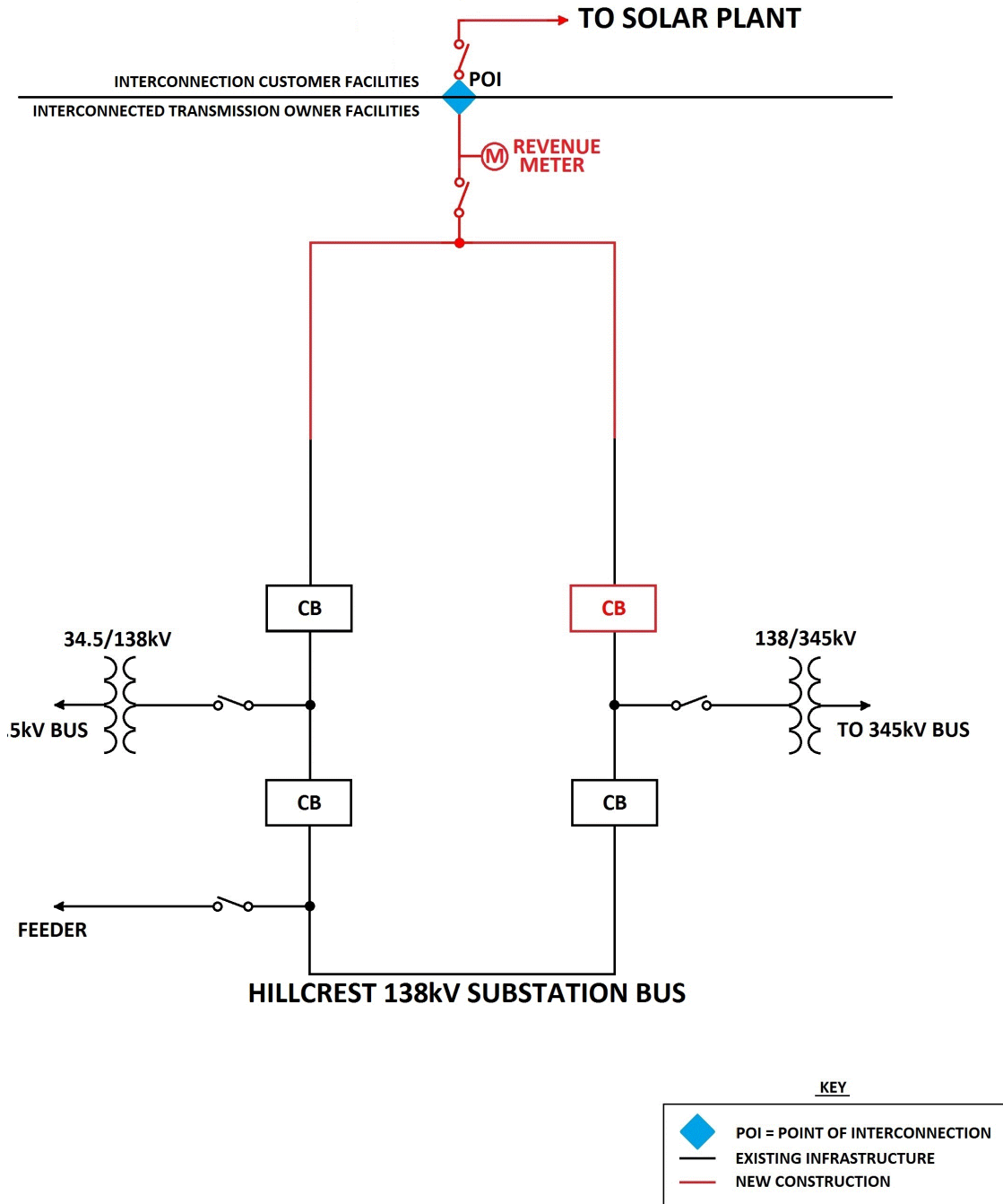
PJM Queue Position: AC12-066



## Appendix 2

### Interconnection One-Line Diagram

PJM Queue Position: AC2-066





**This foregoing document was electronically filed with the Public Utilities**

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Summary: Amended Application Updated Exhibit L electronically filed by Mr. MacDonald W Taylor on behalf of Hillcrest Solar I, LLC