Generation Interconnection Facilities Study Report

For

PJM Generation Interconnection Requests U2-045 W4-063

"Huron 69 kV"

June 2014

U2-045/W4-063 Huron 69kV Facilities Study Report

A. Transmission Owner Facilities Study Summary

1. **Description of Project**

PJM queue project U2-045, "Huron 69kV" is a Fishermen's Energy of New Jersey, LLC, the Interconnection Customer (IC), generation interconnection request to interconnect a 20 MW energy (2.6 MW Capacity) wind powered generating facility to the Atlantic City Electric Company's transmission system at the Huron 69 kV substation. W4-063 is a 5 MW energy (0.65 MW capacity) upgrade to U2-045. The combined project is to be located in the Atlantic Ocean approximately 3 miles offshore from Atlantic City, New Jersey.

The intent of this study is to define the cost and construction schedule for the necessary system reinforcements, Attachment Facilities, and system protection requirements to accommodate the project.

PJM studied U2-045/W4-063 as a 25 MW injection (total) into the Atlantic City Electric (ACE) system at the Huron 69 kV substation. U2-045 was evaluated for compliance with reliability criteria for summer peak conditions in 2013. W4-063 was evaluated for compliance with reliability criteria for summer peak conditions in 2014.

2. **Amendments to System Impact Study Data or System Impact Study Results**

For U2-045, the Interconnection Customer substituted a wind turbine type from what was originally evaluated during the System Impact Study.

3. **Interconnection Customer's Submitted Milestone Schedule**

June 30, 2016	Delivery of Major Electrical Equipment
July 31, 2016	Substantial Site Work Completed
January 1, 2017	Commercial Operation – 15 MWs
February 1, 2017	Commercial Operation – 10 MWs

4. **Scope of Customer's Work**

The IC proposes to construct a new wind powered generating facility consisting of six (6) General Electric 4.13 MW wind turbines generators for a maximum facility output of 25 MWs.

The IC assumes full responsibility for the design and construction of all facilities associated with the U2-045/W4-063 generating facility and the 69 kV direct connection line on the IC's side of the Point of Interconnection. The IC will

interconnect the project with the Atlantic City Electric system by constructing a customer-owned 69 kV circuit from the generation facility to the Huron 69 kV substation. Route selection, line design, right-of-way acquisition and construction of such circuits will be the responsibility of the IC. The proposed facilities must be designed in accordance with the Atlantic City Electric Company Planning Standards where applicable.

5. **Description of Facilities Included in the Facilities Study**

- Huron substation 69 kV terminal – construct a 69 kV terminal (disconnect switches, relaying, metering, etc.) as required to provide a bus position for the Interconnection Customer's 69 kV line to the U2-045/W4-063 site.

- Huron substation direct connection circuit - construct a 69 kV direct connect line from the Huron substation to the Point of Interconnection.

6. **Total Costs of Transmission Owner Facilities included in Facilities Study**

Attachment Facilities	$1,371,086
Network Upgrades	$0
Total Project Cost	**$1,371,086**

7. **Summary of Milestone Schedules for Completion of Work Included in Facilities Study**

The following schedules assume that an Interconnection Service Agreement and Interconnection Construction Service Agreement are fully executed by August 30, 2014. If that occurs, the Interconnected Transmission Owner work schedule is supportive of the Interconnection Customer's Commercial Operation milestone date of January 1, 2017.

Attachment Facilities

Huron substation 69 kV Terminal

Design	29 weeks
Permitting & Environmental	4 weeks
Materials Procurement	42 weeks
Construction & Testing	23 weeks
In Service	On or before January 1, 2017

Huron substation to POI circuit

Design	29 weeks
Permitting & Environmental	4 weeks
Materials Procurement	30 weeks
Construction & Testing	23 weeks
In Service	On or before January 1, 2017

Network Upgrades
No construction related activities are required.

B. Transmission Owner Facilities Study Results

This section describes facilities identified to be installed, replaced, and/or upgraded by Atlantic City Electric Company (ACE) to accommodate the U2-045/W4-063 project. During detailed design and analysis other components may be identified for installation or replacement due to this interconnection.

The purpose of the project is to interconnect the proposed generator to the ACE transmission system for the purpose of selling its output into the PJM market.

In order to meet the U2-045/W4-063 requested in-service date, the following items must be completed within the guideline below. Project schedules are dependent on the ISA and CSA documents being signed prior to ordering materials and construction activities

1. **Transmission Lines – New**

Huron substation to POI direct connection circuit

The following is a description of the work necessary to construct a 69 kV tie from the proposed terminal at Atlantic City Electric's Huron Substation to the Point of Interconnection.

The tie will be a 69 kV underground circuit in a concrete encased duct bank from the terminal in Huron Substation to a 69 kV riser steel pole located just outside of the substation fence. A short span of aerial conductor will then be installed to a remotely operated 69 kV phase over phase disconnect switch mounted on a steel pole. The IC will be responsible to install the aerial span of conductor to this switch pole.

2. **Transmission Line – Upgrades**

U2-045/W4-063 does not require any transmission line upgrades.

3. **New Substation/Switchyard Facilities**

U2-045/W4-063 does not require any new substations or switchyards to be constructed.

4. **Upgrades to Substation / Switchyard Facilities**

Huron substation 69 kV terminal

The following is a description of the work necessary to construct a 69 kV terminal at Atlantic City Electric's Huron Substation for the proposed 69 kV direct connection from the Interconnection Customer's substation. This terminal will be installed in the existing 69 kV ring bus at Huron between circuit breakers P and V.

The Interconnection Customer will be required to install a circuit breaker within 500 feet of the new bus position at Huron to satisfy the requirements outlined in the customer interconnection guidelines document. This circuit breaker cannot be accommodated within the existing Huron substation.

The substation terminal work will consist of installation of one new 69 kV circuit breaker with associated 69 kV disconnect switches, supporting structural steel and three 69 kV potential transformers on the new 69 kV bus section; lightning arresters, line disconnect switch with supporting structural steel and metering instrument transformers on the terminal. Front-line and back-up current differential relay schemes will be installed using (front-line) an SEL-387E relay, and (back-up) SEL-387 relay. The new breaker control and stuck-breaker schemes will utilize an SEL-451 relay. An additional Orion5r-based RTU will be installed for ACE telemetry and control. Metering will be installed at the Huron terminal.

The construction at Huron will require outages of the T2 69-23 kV transformer and the #8-69 kV bus at Huron for approximately 11 weeks and an approximately 1 week concurrent outage of circuit breakers P and V for construction and commissioning activities.

5. **Metering and Communications**

Metering

The Interconnection Customer will be required to install telemetry equipment to provide 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 Atlantic City Electric Company Applicable Standards.

Unless the Interconnection Customer invokes its right to install, own, operate, and maintain the revenue meter (part of Metering Equipment), Atlantic City Electric Company will install, own, operate, and maintain, at the Interconnection Customer's expense, the revenue meter to be located at the Huron 69 kV substation Point of Interconnection. Billing quality 69 kV metering instrument transformers will be installed to serve this new meter position. This meter will be used by the Interconnection Customer to provide revenue metering data to PJM. The revenue meter will be connected to the Atlantic City Electric telecommunications system at the Huron 69 kV substation. The Interconnection Customer is responsible to install necessary telemetry equipment to obtain the revenue meter data and submit the data to PJM.

Atlantic City Electric Company will provide a multifunction solid state meter (Class 20, 120V, 60Hz, 0.1%, 125V DC auxiliary power, Form-C output) that will record four channels of load profile data (Imported and exported MW and MVAR) which will then be interrogated remotely via Atlantic City Electric's translation system operators.

Communications

1. Atlantic City Electric Company will require the capability to remotely trip the generator from its System Operations facility. Such tripping may be facilitated by either a generator breaker, inverter (if so equipped), or a line recloser, depending upon the specific circumstances and the evaluation of the Company.

2. The Interconnection Customer will grant its permission to PJM for PJM to send the Company all telemetry that the Interconnection Customer sends to PJM. A direct telemetry connection to PHI System Operations will be required via a radial connection to PHI's telecommunications system or a rented data circuit, at the Interconnection Customer's cost.

3. The Interconnection Customer will be required to make provisions for a voice quality phone line within approximately 3 feet of each Company metering position to facilitate remote interrogation and data collection.

6. Environmental, Real Estate, and Permitting Issues

Atlantic City Electric Company will be responsible for obtaining all required permits necessary for construction related activities on their side of the Point of Interconnection.

7. Summary of Results of Study

Cost Estimates

Attachment Facilities

Huron 69 kV substation terminal

Detailed Design Costs	54,500
Material and Equipment Costs	156,800
Construction and Testing Costs	400,000
Miscellaneous Costs (i.e. real estate fees, environmental studies, contingencies, Project management/oversight, etc.)	91,700
CIAC tax Gross-up	0
Total	**703,000**

Huron 69 kV substation to POI Attachment Facility

Detailed Design Costs	78,080
Material and Equipment Costs	186,225
Construction and Testing Costs	223,000
Miscellaneous Costs (i.e. real estate fees, environmental studies, contingencies, Project management/oversight, etc.)	180,781
CIAC tax Gross-up	0
Total	**668,086**

Network Upgrades

None

Schedules

The schedule below assumes a January 1, 2017 commercial operation date as requested by the Interconnection Customer.

Activity	**Duration (Weeks)**
Project Management	
Anticipated Receipt of Fully Executed ISA & CSA	
Kick off of construction phase of project	2
Engineering	
Huron 69kV substation terminal	30
Huron 69kV substation to POI	30

direct connection circuit	
Permits and Approvals	
Huron 69kV substation terminal	4
Huron 69kV substation to POI direct connection circuit	4
Procurement of Materials	
Huron 69kV substation terminal	42
Huron 69kV substation to POI direct connection circuit	27
Construction	
Huron 69kV substation terminal	20
Huron 69kV substation to POI direct connection circuit	20
Controls, Test and Energize Project Close-out	
Huron 69kV substation terminal	20
Huron 69kV substation to POI direct connection circuit	20

Assumptions

The ACE schedule is based on a 46 week lead-time from start of engineering to backfeed date. The ACE construction schedule supports an INterconenction Customer requested commercial operation date of January 1, 2017. Uncertainties for the ACE scope of work include weather, the availability of outages to perform the work in the substations, equipment delivery, and execution of interconnection agreements.

8. **Information Required for Interconnection Service Agreement**

The following table contains the cost breakdown as required by FERC.

Attachment Facilities	$
Direct Charges Labor	601,477
Direct Charges Material	417,459
Indirect Charges Labor	352,150
Indirect Charges Material	0
Carrying Charges	0

Project Total	**1,371,086**
Tax Gross-up	0
Network Upgrades	$
Direct Charges Labor	0
Direct Charges Material	0
Indirect Charges Labor	0
Indirect Charges Material	0
Carrying Charges	0
Project Total	**0**
Tax Gross-up	0

Attachment 1

Huron 69 kV