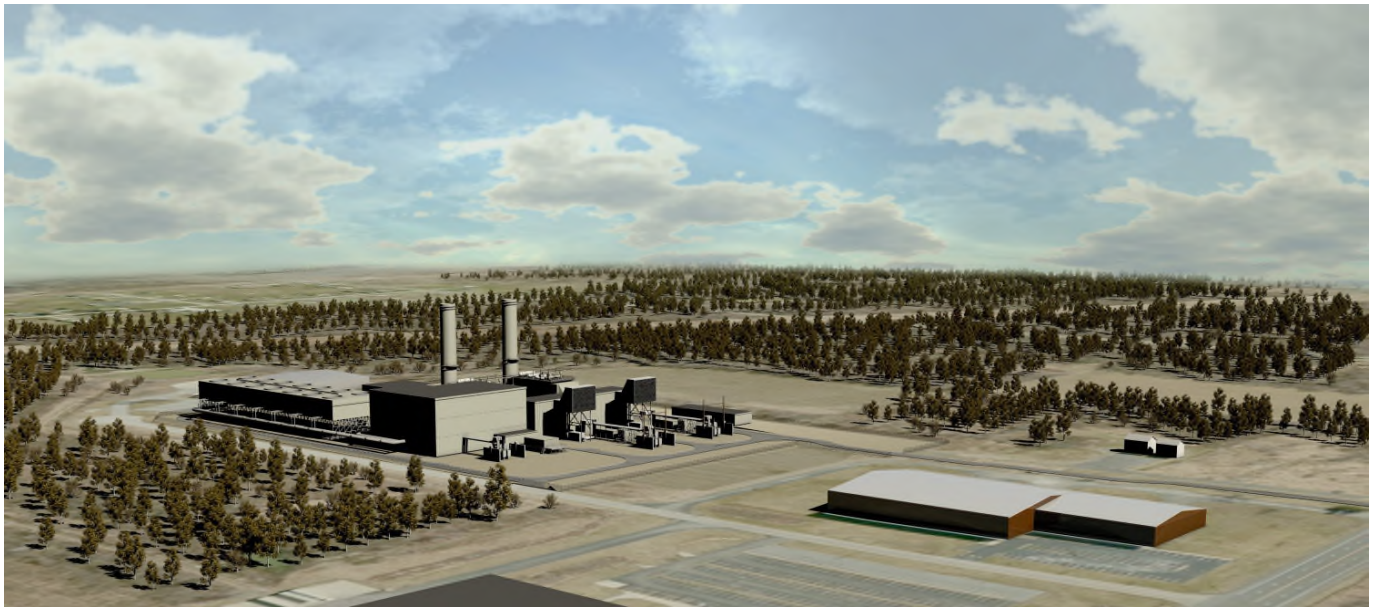
Case No. 17-1485-EL-BGA

THIRD AMENDMENT APPLICATION TO THE

Ohio Power Siting Board FOR A Certificate of Environmental Compatibility and Public Need FOR THE Lordstown Energy Center



SUBMITTED BY: **Clean Energy Future - Lordstown, LLC**

Lordstown Energy Center
Clean Energy for Northeastern Ohio

June 2017

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June 29, 2017

Via Hand Delivery

Ms. Barcy McNeal
Administration/Docketing
Ohio Power Siting Board
180 East Broad Street, 11th Floor
Columbus, Ohio 43215-3793

Re: Clean Energy Future-Lordstown, LLC Third Amendment Application
Case No. 17-1485-EL-BGA

Dear Ms. McNeal:

Enclosed for filing in the above-referenced case is a copy of the Application of Clean Energy Future-Lordstown, LLC for a Third Amendment to its Certificate of Environmental Compatibility granted September 17, 2015 in Case No. 14-2322-EL-BGN. In addition, we have provided the Staff of the Ohio Power Siting Board ("Board") five copies of the Application. Pursuant to Ohio Administrative Code Rule 4906-3-11(B), the Applicant makes the following declarations:

Name of Applicant:	Clean Energy Future-Lordstown, LLC whose general manager is Barry Brits 1853 Henn Parkway Lordstown, OH 44481
Name/Location of Proposed Facility:	Clean Energy Future-Lordstown, LLC Lordstown, Ohio
Authorized Representative Technical:	Barry Brits Clean Energy Future-Lordstown, LLC 1853 Henn Parkway Lordstown, OH 44481 Telephone: (508) 615-2745 or E:mail: barry@lordstownec.com

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Notarized Statement: The Affidavit of Barry Brits, on behalf of Clean Energy Future-Lordstown, LLC is attached.

Sincerely on behalf of
CLEAN ENERGY FUTURE-LORDSTOWN, LLC

Sally W. Bloomfield

Attachment

BEFORE
THE OHIO POWER SITING BOARD

In the Matter of the Application of **Clean Energy Future-Lordstown, LLC** for a Third Amendment to its Certificate to Install and Operate an Electric Generation Facility in Lordstown, Trumbull County, Ohio	)))))	Case No. 17-1485-EL-BGA

AFFIDAVIT OF BARRY BRITS,
CLEAN ENERGY FUTURE-LORDSTOWN, LLC

STATE OF MASSACHUSETTS :
: ss
COUNTY OF MIDDLESEX :

I, Barry Brits, being duly sworn and cautioned, state that I am over 18 years of age and competent to testify to the matters stated in this affidavit and further state the following based upon my personal knowledge:

1. I am executing this affidavit on behalf of Clean Energy Future-Lordstown, LLC as its General Manager. I am authorized to execute this affidavit.

2. I have reviewed Clean Energy Future-Lordstown, LLC's Application for a Third Amendment to its Certificate to Install and Operate an Electric Generation Facility in the above referenced case.

3. To the best of my knowledge, information and belief, the information and materials contained in the above-referenced Application are true and accurate.

4. To the best of my knowledge, information and belief, the above-referenced Application is complete.

Barry Brits

Sworn to before and signed in my presence this 23 day of June 2017.

Notary Public

[SEAL]

11801600v1

BEFORE THE OHIO POWER SITING BOARD
Third Amendment Application of Clean Energy Future – Lordstown, LLC
Lordstown Energy Center

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- No figures

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- No updated Figures

Section 13-07 – Social and Ecological Data
- No updated Figures

LIST OF APPENDICES

Appendix A – PJM Studies – Queue Position AB1-017

LIST OF ACRONYMS AND ABBREVIATIONS

%	percent
the Amendment	the third amendment to the original Ohio Power Siting Board Application for the Lordstown Energy Center
the Applicant	Clean Energy Future-Lordstown, LLC
the Application	the application provided to the Ohio Power Siting Board to support a request for a Certificate of Environmental Compatibility and Public Need to Construct an Electric Generation Facility
CEF	Clean Energy Future, LLC
CEF-L	Clean Energy Future-Lordstown, LLC
the Facility	the Lordstown Energy Center
the Facility Site	an approximately 17-acre property on which the Lordstown Energy Center is being constructed
ISA	Interconnection Service Agreement
MIRA	Macquarie Infrastructure and Real Assets
MMcf	million cubic feet
MUSEH/MUSEH II	MIP III U.S. Energy Holdings, LLC / MIP III U.S. Energy Holdings II, LLC
MW	megawatts
OPSB	Ohio Power Siting Board
PJM	the regional electric transmission independent system operator
SFS	Siemens Financial Services, Inc.

4906-13-01 Project Summary and Facility Overview

As discussed in Section 4906-13-01 of the original Application for Certificate of Environmental Compatibility and Public Need (the Application) in Case Number 14-2322-EL-BGN to the Ohio Power Siting Board (OPSB), Clean Energy Future-Lordstown, LLC (CEF-L or the Applicant) has developed, is currently constructing and plans to own and operate the Lordstown Energy Center (the Facility). Consistent with the original PJM[1] interconnection application, the Application reflected a Facility net generation of 800 megawatts (MW). Since that time, CEF-L has submitted a new PJM interconnection application reflecting the maximum net output of the Facility of 940 MW. As shown in Appendix A, PJM has accepted CEF-L's uprating of the Facility to a maximum capability of 940 MW. This Amendment is intended to allow for OPSB authorization of the additional capability for the Facility; other aspects of the Facility remain unchanged.

The Applicant is aware that new rules are in effect, but inasmuch as the Application to which this Amendment refers was filed under the rules in existence before December 11, 2015, this Amendment application tracks the designations of the older rules. The Applicant believes that it has addressed anything relative to the amendment that is substantively necessary in the new rules.

(A) PROJECT SUMMARY AND OVERVIEW

No change to introductory language.

[1] PJM is the regional independent transmission organization that coordinates the movement of wholesale electricity in all or part of 13 states (including Ohio) and the District of Columbia. Its name results from its origin serving Pennsylvania (P), New Jersey (J), and Maryland (M).

(1) General Purpose of the Facility

No change from prior filings.

(2) Description of the Facility

The Application addressed the Facility, an 800-MW natural gas-fired combined cycle electric generating facility to be developed, built, owned, and operated by CEF-L. The Facility is proposed on a 17-acre property accessible via Henn Parkway, off Tod Avenue (State Route 45 [SR 45]) within the Village of Lordstown, Trumbull County, Ohio (the Facility Site). Two amendments reflecting minor changes to the Facility have previously been filed (Case No. 16-131-EL-BGA and Case No. 16-494-EL-BGA). No changes to major components of the Facility have occurred since the Application and subsequent amendments.

This Third Amendment solely addresses the addition of 140 MW of recognized Facility capacity. This additional capacity has been reviewed and accepted by PJM. The maximum capacity of the proposed Facility is 940 MW. This does not reflect a design modification or change in equipment but, rather, now allows for conditions of operation that would result in the full output. No change to any other environmental permit or level of impact will result from this increase in generation. PJM has completed a System Impact Study for the incremental energy generation and the study confirmed that it can be accommodated by the electric transmission grid (Appendix A).

(3) Site Selection Process

No change from prior filings.

(4) Principal Environmental and Socioeconomic Considerations

No change from prior filings.

(a) Potential Construction Impacts

No change from prior filings.

(b) Potential Operational Impacts

No change from prior filings.

(5) Project Schedule

No change from prior filings.

(A) DETAILED DESCRIPTION OF PROPOSED GENERATION AND ASSOCIATED FACILITIES

No change from prior filings.

(1) Project Details

(a) Generating Units

No change from prior filings except the nominal output of the Facility has increased from the original 800 MW to 940 MW. The Facility is designed to have a maximum capacity of 940 MW, with two combustion turbine generators each capable of generating nameplate capacity of 311 MW, a summer capacity of 263 MW, and a winter capacity of 304 MW. The steam turbine generator has a nameplace capacity of 340 MW, a summer capacity of 324 MW, and a winter capacity of 332 MW. The additional output reflects the equipment's inherent ability to generate the additional output, thus providing a benefit during times when power demand may be high.

(b) Land Area Requirements

No change from prior filings.

(c) Fuel Quantity and Quality

No change from prior filings.

(d) Plant Emissions

No change from prior filings. The additional output can be provided within the parameters of the existing air pemit issued for the Facility.

(e) Water Requirements

No change from prior filings.

(f) Water Discharge Requirements

No change from prior filings.

(g) Stormwater Management

No change from prior filings.

(2) Description of Major Equipment

No change from prior filings.

(3) Transmission Line Interconnect

The original system interconnection studies were initiated with PJM February 2014 for 800 MW. As a result, the Facility was assigned queue position Z2-028. The PJM Feasibility Study was completed in August 2014 and the System Impact Study and Facilities Study were completed in October 2015. An Interconnection Service Agreement (ISA) was executed between PJM, CEF-L, and American Transmission Systems, Incorporated on April 26, 2016.

Since the maximum net output of the Facility has the potential to reach 940 MW, CEF-L started a new PJM interconnection application in June 2015 requesting an increase in MW sales from 800 MW to 940 MW. This application was assigned queue position AB1-017. The PJM Feasiblity Study was completed in February 2016, the System Impact Study was completed in September 2016 (Appendix A), and the Facilities Study is nearing agreement. Completion of the ISA is anticipated in the third quarter of 2017. This information will be provided to OPSB staff once available.

(4) New Natural Gas Transmission Line

Volumes provided in the Application assumed that the Facility would operate at a net output of 800 MW. Assuming the Facility is operating at its maximum net output of 940 MW, it will consume approximately 146.4 million cubic feet (MMcf) per day of natural gas, or an hourly consumption of 6.1 MMcf.

(B) DETAILED PROJECT SCHEDULE

(1) Schedule

No change from prior filings.

(2) Necessity to Maintain Schedule

No change from prior filings.

4906-13-03 Site Alternatives Analysis

(A) SITE SELECTION STUDY

No change from prior filings.

(1) Site Selection Process

(a) Description of Study Area

No change from prior filings.

(b) Study Area and Site Map

No change from prior filings.

(c) Siting Criteria

No change from prior filings.

(d) Process for Identifying the Proposed Site

No change from prior filings.

(e) Factors in Selecting the Proposed Site

No change from prior filings.

(2) Constraint Map

No change from prior filings.

(B) SUMMARY TABLE OF EVALUATED SITES

No change from prior filings.

(C) ADDITIONAL SITE SELECTION STUDIES

No change from prior filings.

4906-13-04 Technical Data

(A) SITE

(1) Geography and Topography

No change from prior filings.

(2) Aerial Photograph

No change from prior filings.

(3) Site Mapping

No change from prior filings.

(4) Geology and Seismology

(a) Geological Issues

No change from prior filings.

(b) Soils and Soil Suitability

No change from prior filings.

(5) Hydrology and Wind

(a) Characteristics of Directly Affected Waterbodies

No change from prior filings.

(b) Potential for Flooding or High Wind Conditions

No change from prior filings.

(c) Aquifer Mapping

No change from prior filings.

(B) LAYOUT AND CONSTRUCTION

No change from prior filings.

(1) Site Activities

(a) Test Borings

No change from prior filings.

(b) Removal of Vegetation

No change from prior filings.

(c) Grading and Drainage

No change from prior filings.

(d) Access Roads

No change from prior filings.

(e) Removal and Disposal of Debris

No change from prior filings.

(f) Post-Construction Reclamation

No change from prior filings.

(2) Layout

No change from prior filings.

(3) Structures

(a) Dimensions

No change from prior filings.

(b) Construction Materials

No change from prior filings.

(c) Color and Texture

No change from prior filings.

(d) Pictorial Sketches

No change from prior filings.

(e) Unusual Features

No change from prior filings.

(4) Plans for Construction

No change from prior filings.

(5) Future Plans

No change from prior filings.

(C) EQUIPMENT

(1) Description of Major Generating Equipment

No change from prior filings.

(a) Combustion Turbine Generators

No change from prior filings.

(b) Steam Turbine Generator

No change from prior filings.

(c) Heat Recovery Steam Generators

No change from prior filings.

(d) Natural Gas System

No change from prior filings.

(e) Steam System

No change from prior filings.

(f) Condensate System

No change from prior filings.

(g) Feedwater System

No change from prior filings.

(h) Air Cooled Condenser

No change from prior filings.

(i) Closed Loop Auxiliary/Cooling Water System

No change from prior filings.

(j) Fire Protection System

No change from prior filings.

(k) Water System

No change from prior filings.

(l) Demineralizer

No change from prior filings.

(m) Wastewater System

No change from prior filings.

(n) Backup Generator

No change from prior filings.

(o) Transformers and Switchyard

No change from prior filings.

(2) Emissions Control and Safety Equipment

(a) Flue Gas Emissions Control

No change from prior filings.

(b) Equipment Reliability and Efficiency Reduction

No change from prior filings.

(c) Effluent Control Equipment

No change from prior filings.

(d) Public Safety Equipment

No change from prior filings.

(3) Other Major Equipment

No change from prior filings.

(a) Combustion Turbine Air Inlet Coolers

No change from prior filings.

(b) Auxiliary Boiler

No change from prior filings.

(c) Natural Gas Heaters

No change from prior filings.

(d) Oil/Water Separator

No change from prior filings.

(D) REGIONAL ELECTRIC POWER SYSTEM

No change from prior filings.

(A) OWNERSHIP

Since filing the original Application, CEF-L has exercised the option to buy the 17-acre Facility Site, currently being developed for the Facility, and adjacent properties, currently in use as construction laydown. Construction of the Facility is well underway, and commercial operation is anticipated by June 2018.

On April 6, 2016 the Facility completed financial close. Ownership of the Facility and CEF-L is now split between three entities: MIP III U.S. Energy Holdings, LLC (MUSEH)/ MIP III U.S. Energy Holdings II, LLC (MUSEH II) (69.8 percent [%]), Siemens Financial Services, Inc. (SFS) (26.1%), and Clean Energy Future, LLC (CEF) (4.16%). A brief description of each entity is provided below:

- MUSEH/MUSEH II is a private infrastructure fund managed by Macquarie Infrastructure and Real Assets (MIRA), the world's largest and most experienced manager of infrastructure funds, with $3.0 billion in capital commitments.
- SFS is a provider of financial solutions with more than $20 billion in assets and 3,000 employees. SFS has committed approximately $11 billion in equity to energy projects worldwide.
- CEF is a Boston-based power development firm and the parent company of the original Facility developer. CEF is owned and managed by William Siderewicz.

(B) CAPITAL AND INTANGIBLE COSTS

(1) Estimated Capital and Intangible Costs

No change from prior filings.

(2) Capital Cost Comparison

No change from prior filings.

(3) Present Worth and Annualized Capital Costs of Alternatives

No change from prior filings.

(C) OPERATION AND MAINTENANCE EXPENSES

(1) Estimated Annual Operation and Maintenance Expenses

(a) Fixed Operation and Maintenance

No change from prior filings.

(b) Variable Operation and Maintenance

No change from prior filings.

(c) Fuel Operating Expense

No change from prior filings.

(2) Operation and Maintenance Expenses Comparison

No change from prior filings.

(3) Present Worth and Annualized Operation and Maintenance Expenses for Alternatives

No change from prior filings.

(D) DELAYS

No change from prior filings.

4906-13-06 Environmental Data

(A) GENERAL

No change from prior filings.

(B) AIR

(1) Preconstruction

(a) Description of Ambient Air Quality

No change from prior filings.

(b) Description of Pollution Control Equipment

No change from prior filings.

(c) Description of Regulatory Applicability

No change from prior filings.

(d) Required Permits to Install and Operate Air Pollution Sources

No change from prior filings. The additional output can be provided under the terms of the existing Facility air permit.

(e) Air Monitoring Stations and Major Source Mapping

No change from prior filings.

(f) Demonstration of Regulatory Compliance

No change from prior filings.

(2) Construction

No change from prior filings.

(3) Operation

(a) Description of Air Quality Monitoring Plans

No change from prior filings.

(b) Estimated Air Concentration Isopleths

No change from prior filings.

(c) Potential Failure of Air Pollution Control Equipment

No change from prior filings.

(C) WATER

No change from prior filings.

(1) Preconstruction

(a) List of Permits

No change from prior filings.

(b) Location of Survey Data Sources

No change from prior filings.

(c) Description of Data Sampling Stations

No change from prior filings.

(d) Water Quality of Receiving Stream

No change from prior filings.

(e) Water Discharge Permit Information

No change from prior filings.

(2) Construction

(a) Description of Water Monitoring and Gauging Stations

No change from prior filings.

(b) Quality and Quantity of Aquatic Discharges from the Site

No change from prior filings.

(c) Plans to Mitigate Effects

No change from prior filings.

(d) Changes in Flow Patterns and Erosion

No change from prior filings.

(3) Operation

(a) Description of Water Monitoring and Gauging Stations

No change from prior filings.

(b) Water Pollutant Control Equipment and Treatment Processes

No change from prior filings.

(c) NPDES Requirements and Schedule

No change from prior filings.

(d) Quantitative Flow Diagram

No change from prior filings.

(e) Water Conservation Practices

No change from prior filings.

(D) SOLID WASTE

(1) Preconstruction

No change from prior filings.

(2) Construction

No change from prior filings.

(3) Operation

No change from prior filings.

(4) Licenses and Permits

No change from prior filings.

No change from prior filings.

(A) HEALTH AND SAFETY

(1) Demographic Characteristics

No change from prior filings.

(2) Atmospheric Emissions

No change from prior filings.

(3) Noise

No change from prior filings.

(a) Construction Noise Levels

No change from prior filings.

(b) Operational Noise Levels

No change from prior filings.

(c) Identification of Noise-Sensitive Areas

No change from prior filings.

(d) Description of Equipment and Noise Mitigation Measures

No change from prior filings.

(4) Water

No change from prior filings.

(a) Construction and Operation Impact to Public and Private Water Supplies

No change from prior filings..

(b) Impact of Pollution Control Equipment Failures on Public and Private Water Supplies

No change from prior filings..

(B) ECOLOGICAL IMPACT

(1) Site Information

(a) Mapping

No change from prior filings.

(b) Vegetation Survey

No change from prior filings.

(c) Species Survey

No change from prior filings.

(d) Ecological Study

No change from prior filings.

(e) List of Major Species

No change from prior filings.

(2) Construction

(a) Impact of Construction on Undeveloped Areas

No change from prior filings.

(b) Impact of Construction on Major Species

No change from prior filings.

(c) Mitigation for Short-Term and Long-Term Construction Impacts

No change from prior filings.

(3) Operation

(a) Impact of Operation on Undeveloped Areas

No change from prior filings.

(b) Impact of Operation on Major Species

No change from prior filings.

(C) Economics, Land Use and Community Development

(1) Land Uses

(a) Land Use Mapping

No change from prior filings.

(b) Residential Structures

No change from prior filings.

(c) Land Use Impact

No change from prior filings.

(d) Structures to be Removed or Relocated

No change from prior filings.

(e) Formally Adopted Plans for Future Use of the Site and Surrounding Lands

No change from prior filings.

(f) Applicant Plans for Concurrent or Secondary Uses of the Site

No change from prior filings.

(2) Economics

(a) Annual Total and Present Worth of Construction and Operation Payroll

No change from prior filings.

(b) Construction and Operation Employment

No change from prior filings.

(c) Increase in Local Revenue

No change from prior filings.

(d) Economic Impact on Local Commercial and Industrial Activities

No change from prior filings.

(3) Public Services and Facilities

No change from prior filings.

(4) Impact on Regional Development

(a) Impact on Regional Development

No change from prior filings.

(b) Compatibility with Regional Plans

No change from prior filings.

(D) Cultural Impact

No change from prior filings.

(1) Cultural Resource Mapping

No change from prior filings.

(2) Cultural Resource Impacts

No change from prior filings.

(3) Cultural Resource Landmarks

No change from prior filings.

(4) Land and Water Recreation Area Mapping

No change from prior filings.

(5) Land and Water Recreation Areas

No change from prior filings.

(6) Recreational Areas and Potential Impacts

No change from prior filings.

(7) Measures to Minimize Visual Impacts

No change from prior filings.

(E) Public Responsibility

(1) Public Interaction Program

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(2) Liability Compensation Plans

No change from prior filings.

(F) AGRICULTURAL DISTRICT IMPACT

No change from prior filings.

(1) Agricultural Land Mapping

No change from prior filings.

(2) Potential Impact to Agricultural Lands

(a) Potential Construction, Operation and Maintenance Impacts

No change from prior filings.

(b) Agricultural Mitigation Practices

No change from prior filings.

(3) Potential Impact on Agricultural Viability

No change from prior filings.

Appendix A: PJM Studies – Queue Position AB1-017

- Feasibility Study – February 2016
- System Impact Study – September 2016

Generation Interconnection Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position AB1-017

Highland-Sammis 345kV & Highland-Mansfield 345kV

February 2016

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

The Interconnection Customer (IC), has proposed an uprate to a proposed natural gas generating facility located in Trumbull County, Ohio. The increase is for 140 MW with 64 MW of this output being recognized by PJM as capacity. Note that this project is an increase to the Interconnection Customer's prior project, which will share the same property and connection point. The proposed in-service date for the AB1-017 project is May 2018. **This study does not imply a American Transmission Systems, Incorporated (ATSI) commitment to this in-service date.**

Point of Interconnection

AB1-017 will interconnect with the ATSI transmission system along the Highland-Sammis and Highland-Mansfield 345kV lines.

Cost Summary

The AB1-017 project will be responsible for the following costs:

Description	Cost	Tax (if applicable)	Total Cost
Attachment Facilities	$ 0	$ 0	$ 0
Direct Connection Network Upgrades	$ 0	$ 0	$ 0
Non Direct Connection Network Upgrades	$ 13,300	$ 3,100	$ 16,400
Total Costs	**$ 13,300**	**$ 3,100**	**$ 16,400**

Attachment Facilities

No Attachment Facilities are required to support this interconnection request.

Direct Connection Cost Estimate

No Direct Connection Facilities are required to support this interconnection request.

Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Activity Cost	Tax (if applicable)	Total Cost
Adjust remote, relaying, and metering settings.	$ 13,300	$ 3,100	$ 16,400
Total Non-Direct Connection Facility Costs	**$ 13,300**	**$ 3,100**	**$ 16,400**

Interconnection Customer Requirements

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

3. The Interconnection Customer seeking to interconnect a wind generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per item 5.iv. of Schedule H to the Interconnection Service Agreement.

4. The purchase and installation of fully rated 345 kV circuit breakers to permit tripping of each entire unit.

5. The purchase and installation of the minimum required FE generation interconnection relaying and control facilities. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.

6. The purchase and installation of supervisory control and data acquisition (SCADA) equipment to provide information in a compatible format to the FE Transmission System Control Center.

7. The establishment of dedicated communication circuits for SCADA to the FE Transmission System Control Center.

8. A compliance with the FE and PJM generator power factor and voltage control requirements.

9. The execution of a back-up service agreement to serve the customer load supplied from the Highland-Sammis-Mansfield 345 kV (AB1-017) generation project metering point when the units are out-of-service. This assumes the intent of the Interconnection Customer is to net the generation with the load.

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.

FirstEnergy Requirements

The Interconnection Customer will be required to comply with all FE Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "FirstEnergy Requirements for Transmission Connected Facilities" document located at the following links:

http://www.firstenergycorp.com/feconnect
http://www.pjm.com/planning/design-engineering/to-tech-standards.aspx

Network Impacts

The Queue Project AB1-017 was evaluated as a 140.0 MW (Capacity 64.0 MW) injection tapping the Highland-Mansfield 345kV and Highland-Sammis 345kV lines (same POI as Z2-028) in the ATSI area. Project AB1-017 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AB1-017 was studied with a commercial probability of 53% using a 2019 Summer Peak case. Potential network impacts were as follows:

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.

Short Circuit

(Summary of impacted circuit breakers)

None.

Potential Congestion due to Local Energy Deliverability

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.

Note: Only the most severely overloaded conditions are listed below. 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 shall study all overload conditions associated with the overloaded element(s) identified.

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)

None.

Generation Interconnection System Impact Study Report

For

PJM Generation Interconnection Request Queue Position AB1-017

Highland-Sammis 345kV & Highland-Mansfield 345kV

September 2016

Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, 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 System Impact Study is performed.

The System Impact 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

Clean Energy Future-Lordstown, LLC, the Interconnection Customer (IC), has proposed an uprate to a proposed natural gas generating facility located in Trumbull County, Ohio. The increase is for 140 MW with 64 MW of this output being recognized by PJM as capacity. Note that this project is an increase to the Interconnection Customer's Z2-028 project, which will share the same property and connection point. The Z2-028 project will have a capability of 800 MW with 800 MW being recognized as capacity. The total capability of the combined Z2-028 and AB1-017 projects will be 940 MW with 864 MW being recognized by PJM as capacity. The proposed in-service date for the AB1-017 project is May 2018. **This study does not imply a American Transmission Systems, Incorporated (ATSI) commitment to this in-service date.**

Point of Interconnection

AB1-017 will interconnect with the ATSI transmission system along the Highland-Sammis and Highland-Mansfield 345kV lines.

Cost Summary

The AB1-017 project will be responsible for the following costs:

Description	Cost	Tax (if applicable)	Total Cost
Attachment Facilities	$ 0	$ 0	$ 0
Direct Connection Network Upgrades	$ 0	$ 0	$ 0
Non Direct Connection Network Upgrades	$ 13,300	$ 3,100	$ 16,400

Description	Cost	Tax (if applicable)	Total Cost
Allocation for New System Upgrades	$ 0	$ 0	$ 0
Contribution for Previously Identified Upgrades	$ 0	$ 0	$ 0
Total Costs	**$ 13,300**	**$ 3,100**	**$ 16,400**

Attachment Facilities

There are no Attachment Facilities are required to support this interconnection.

Direct Connection Cost Estimate

There are no Direct Connection Facilities are required to support this interconnection.

Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Activity Cost	Tax (if applicable)	Total Cost
Adjust remote, relaying, and metering settings. N5130	$ 13,300	$ 3,100	$ 16,400
Total Non-Direct Connection Facility Costs	**$ 13,300**	**$ 3,100**	**$ 16,400**

Transmission Owner Scope of Work

The Clean Energy Future-Lordstown, LLC generation project's scope of work includes associated non direct connection relay setting upgrades at the remote end substations.

Schedule

Based on the fact that there are no additional FE primary direct connection and limited system upgrades, beyond the requirements of Z2-028, it is expected to take no more than one to two months from the date of a fully executed Interconnection Construction Service Agreement, and the completion of Z2-028, to complete the requirements for the Highland-Sammis-Mansfield 345 kV (AB1-017) generation project.

Short Circuit and Dynamics Analysis

Attachment 4 provides the detailed results for the short circuit analysis.

Interconnection Customer Requirements

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

3. The Interconnection Customer seeking to interconnect a wind generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per item 5.iv. of Schedule H to the Interconnection Service Agreement.

4. The purchase and installation of fully rated 345 kV circuit breakers to permit tripping of each entire unit.

5. The purchase and installation of the minimum required FE generation interconnection relaying and control facilities. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.

6. The purchase and installation of supervisory control and data acquisition (SCADA) equipment to provide information in a compatible format to the FE Transmission System Control Center.

7. The establishment of dedicated communication circuits for SCADA to the FE Transmission System Control Center.

8. A compliance with the FE and PJM generator power factor and voltage control requirements.

9. The execution of a back-up service agreement to serve the customer load supplied from the Highland-Sammis-Mansfield 345 kV (AB1-017) generation project metering point when the units are out-of-service. This assumes the intent of Clean Energy Future-Lordstown, LLC is to net the generation with the load.

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.

ATSI Requirements

The Interconnection Customer will be required to comply with all FE Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "FirstEnergy Requirements for Transmission Connected Facilities" document located at the following links:

http://www.firstenergycorp.com/feconnect
http://www.pjm.com/planning/design-engineering/to-tech-standards.aspx

Compliance Issues

The proposed interconnection facilities must be designed in accordance with the FE "Requirements for Transmission Connected Facilities" located at:

http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx

Clean Energy Future-Lordstown, LLC will also be required to meet all PJM, ReliabilityFirst and NERC reliability criteria and operating procedures for standards compliance. For example, Clean Energy Future-Lordstown, LLC will need to properly locate and report the over and under voltage and over and under frequency system protection elements for its units as well as the submission of the generator model and protection data required to satisfy the PJM and ReliabilityFirst audits. Failure to comply with these requirements may result in a disconnection of service if the violation is found to compromise the reliability of the FE system.

Network Impacts

The Queue Project AB1-017 was evaluated as a 64.0 MW (Capacity 64.0 MW) injection into the Z2-028 345 kV substation (which is a double tap of the Highland – Mansfield and Highland – Sammis 345 kV lines) in the ATSI area. Project AB1-017 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AB1-017 was studied with a commercial probability of 100% using a Summer Peak 2019 case. 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 contingencies were studied for the full energy output. The contingencies of Line with Failed Breaker and Bus Fault will be performed for the Impact Study.)

None.

Short Circuit

(Summary of impacted circuit breakers)

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

(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

None.

Stability and Reactive Power Requirement for Low Voltage Ride Through

(Summary of the VAR requirements based upon the results of the dynamic studies)

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)

None.

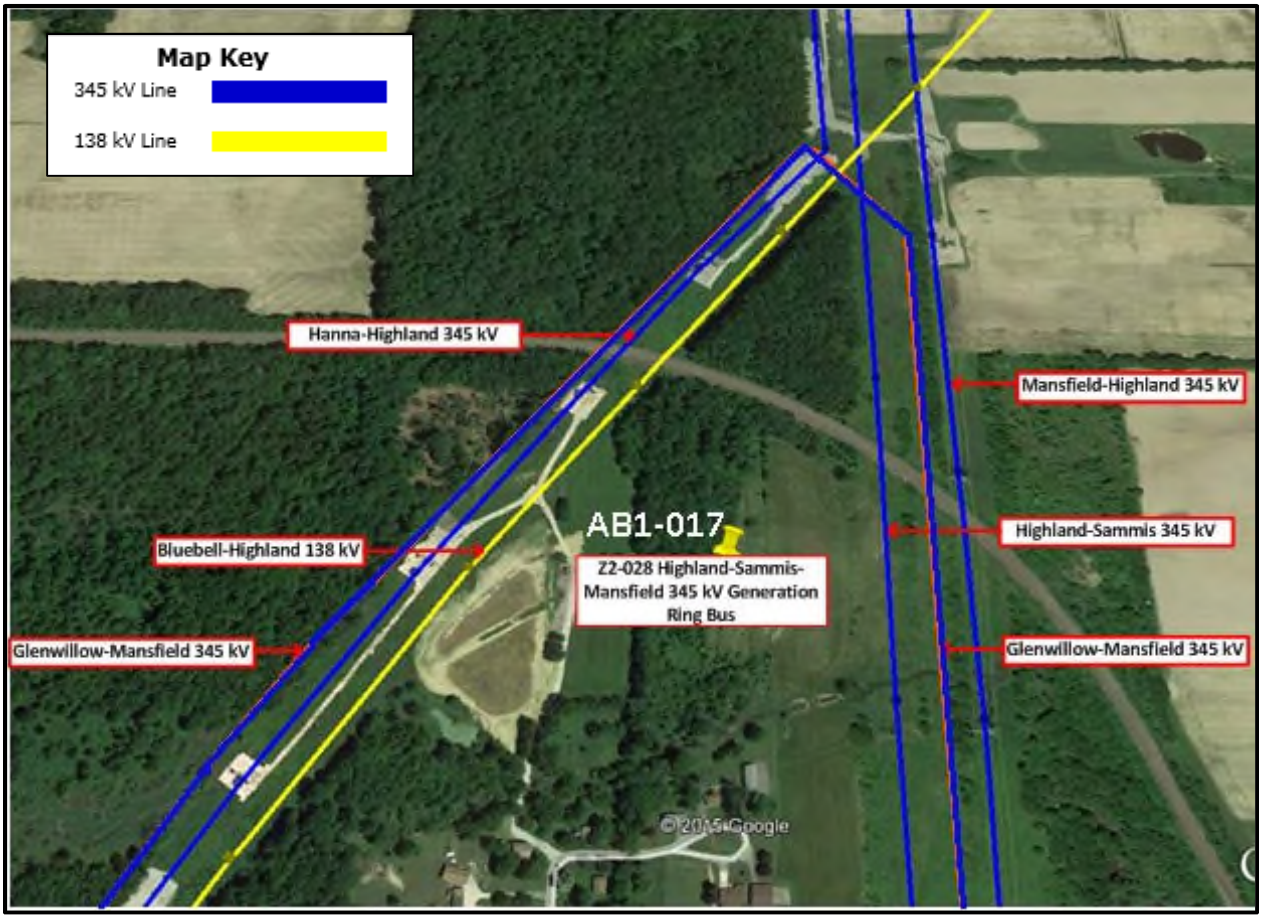
Potential Congestion due to Local Energy Deliverability

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.

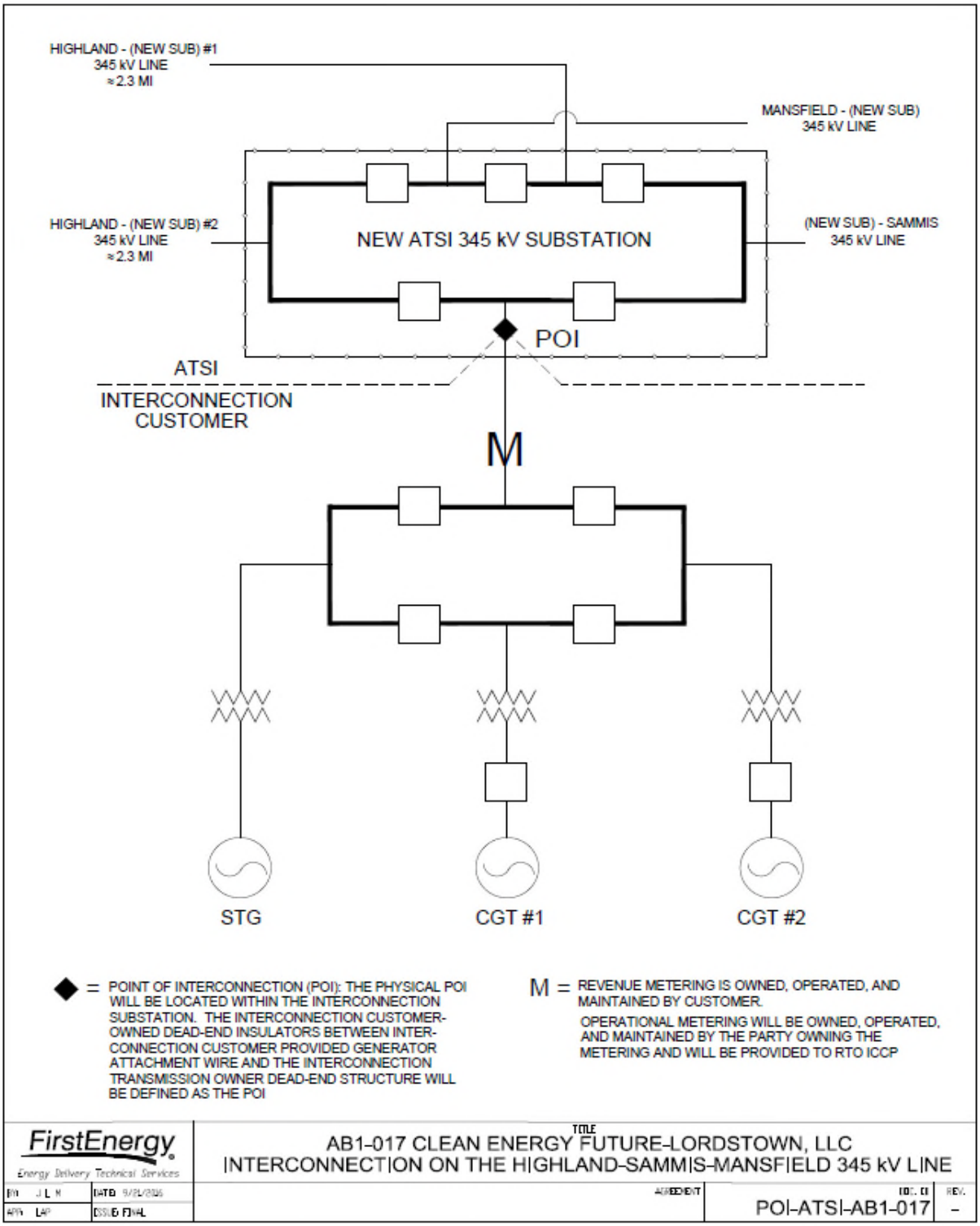
Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified

None.

Attachment 1. Project Location



Attachment 2. Single Line Diagram



Attachment 3. Protection Requirements

General Connection Requirements

All proposed generation interconnection points and load-serving delivery points must comply with the technical requirements detailed in FE's "Requirements for Transmission Connected Facilities" document.

FE System Modifications

Settings Changes

- Settings changes are possible at, but not limited to, the following stations:
  - Bruce Mansfield
  - Hanna
  - Highland
  - Lordstown
  - Niles
  - Sammis

Attachment 4. Dynamic Simulation Analysis

Executive Summary

PJM Queue project AB1-017 is a request for a 940 MW net injection to Highland – Mansfield 345 kV and Highland – Sammis 345 kV circuit. The POI is located in the First Energy ATSI transmission system in Ohio. AB1-017 is a combined cycle facility which consists of one 349 MW Steam Turbine and 2x313 MW Combustion Turbines.

This study is based on the RTEP 2019 light load case and modified to include applicable queue projects. PJM queue project AB1-017 was dispatched at a maximum power transfer of 940 MW total and POI voltage of 350 kV (1.015 p.u.), consistent with the default generator reference voltage specified in PJM Manual 03 *Transmission Operations* for generator connections to the PJM 345 kV system.

AB1-017 was tested for compliance with NERC, PJM and other applicable criteria. 45 contingencies were studied, each with a 20 second simulation time period. Studied faults included:

a) Steady state operation (20 second simulation);

b) Three phase faults with normal clearing time;

c) Single-phase faults with stuck breaker;

d) Single-phase faults placed at 80% of the line with delayed (Zone 2) clearing at line end remote from fault due to primary communications/relay failure.

e) Single phase faults with loss of multiple-circuit tower line

f) Single phase faults with loss of multiple-circuit bus contingency

No relevant Bus or High Speed Reclosing (HSR) contingencies were identified.

For all simulations, the queue project under study along with the rest of the PJM system were required to maintain synchronism and with all states returning to an acceptable new condition following the disturbance.

For all fault contingencies tested on the 2019 light load case:

a) Post-contingency oscillations were positively damped with a damping margin of at least 3%.

a) The AB1-017 generator was able to ride through all faults (except for faults where protective action trips a generator(s)).

No mitigations were found to be required.

Introduction

Generator interconnection request AB1-017 is a tap on Highland – Mansfield 345 kV circuit and Mansfield – Sammis 345 kV circuit in the First Energy ATSI area. The AB1-017 project is a combined cycle unit made up of one steam turbine and two gas turbine generators.

This analysis is effectively a screening study to determine whether the addition of AB1-017 will meet the dynamic requirements of the NERC, PJM and Transmission Owner reliability standards.

In this report the AB1-017 project and how it is proposed to be connected to the grid are first described, followed by a description of how the project is modeled in this study. The fault cases are then described and analyzed, and lastly a discussion of the results is provided.

Description of Project

The AB1-017 project is a combined cycle unit made up of one steam turbine and two gas turbine generators. The POI is tap on Highland – Mansfield 345 kV circuit and Mansfield – Sammis 345 kV circuit in the First Energy ATSI area. The steam turbine is modeled at 349.0 MW gross winter output, and each gas turbine is modeled at 313.0 MW gross winter output, with 22.0 MW being consumed as auxiliary service load. For this stability study, the AB1-017 project was studied as a total net injection of 940 MW into the First Energy ATSI 345 kV transmission system. AB1-017.

The AB1-017 Point of Interconnection (POI) is as shown in Figure 1. Table 1 lists the parameters given in the impact study data and the corresponding parameters of the AB1-017 loadflow models.

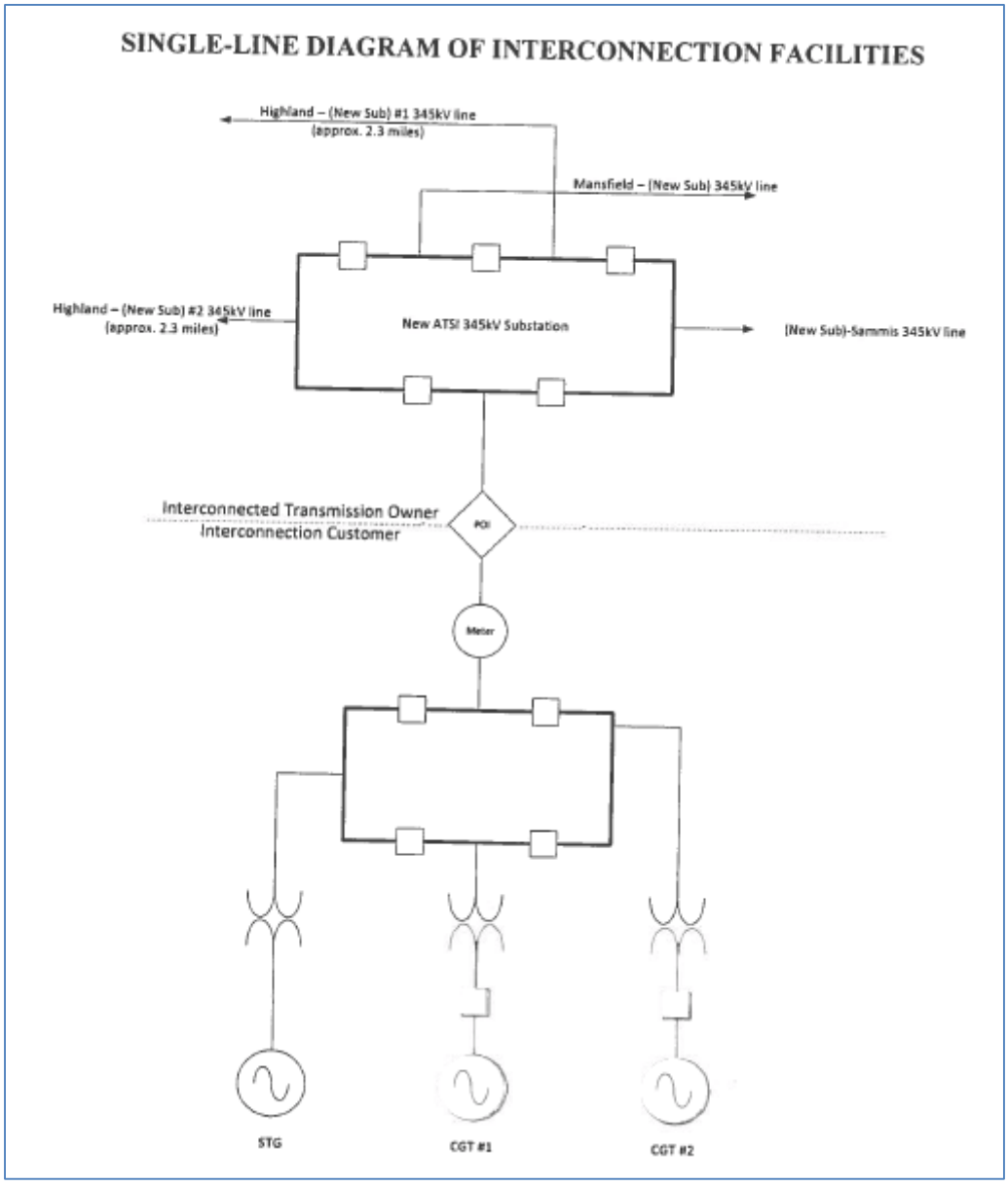


Figure 1: AB1-017 Plant Model

Table 1: AB1-017 Plant Model

	Impact Study Data	**Model**
Combustion Turbine Generators	2 x 313 MW generators MVA base = 347.8 MVA Vt = 19 kV Unsaturated sub-transient reactance = 0.1943 pu @ MVA base	2 x 313.0 MW generators Pgen 313.0 MW Pmax 313.0 MW Pmin 0 MW Qgen 23.63 MVAr Qmax 150.0 MVAr Qmin -120.0 MVAr Mbase 347.8 MVA Zsorce j0.1943 pu @ Mbase
Steam Turbine Generator	1 x 349 MW generators MVA base = 395 MVA Vt = 19 kV Unsaturated sub-transient reactance = 0.2889 pu @ MVA base	1 x 349 MW generators Pgen 349.0 MW Pmax 349.0 MW Pmin 0 MW Qgen 23.6 MVAr Qmax 180 MVAr Qmin -140 MVAr Mbase 395 MVA Zsorce j0.2889 pu @ Mbase
CT GSU transformers	2x 500/19 kV transformers Rating = 238.9/318.6/398.2 MVA (OA/F1/F2) Transformer base = 238.9 MVA Impedance = 0.00234 + j0.10998 pu @ MVA base Number of taps = N/A Tap step size = N/A	2x 500/19 two winding transformer Rating = 238.9/318.6/398.2 MVA Transformer base = 238.9 MVA Impedance = 0.00234 + j0.10998 pu @ MVA base Number of taps = 5 Tap step size = 2.5 %
ST GSU transformer	1x 345/19 kV transformer Rating = 270/360/450 MVA (OA/F1/F2) Transformer base = 270 MVA Impedance = 0.00250 + j0.0875 pu @ MVA base Number of taps = N/A Tap step size = N/A	1x 345/19 kV two winding transformer Rating = 270/360/450 MVA Transformer base = 270 MVA Impedance = 0.00250 + j0.0875pu @ MVA base Number of taps = 5 Tap step size = 2.5 %

Auxiliary load	11.0 MW + 0 MVAr on Low voltage side of the GSU	11.0 MW + 0 MVAr at LV side of CT1 GSU 11.0 MW + 0 MVAr at LV side of CT2 GSU
Station Load	N/A	N/A

Loadflow and Dynamics Case Setup

The dynamics simulation analysis was carried out using PSS/E Version 32.2.4.

The load flow scenario and fault cases for this study are based on PJM's Regional Transmission Planning Process.

The selected load flow scenario is the RTEP 2019 light load case with the following modifications:

a) Addition of all applicable queue projects prior to AB1-017.

b) Addition of AB1-017 queue project.

c) Removal of withdrawn and subsequent queue projects in the vicinity of AB1-017.

d) Dispatch of units in the PJM system to maintain slack generators within limits.

The AB1-017 initial conditions are listed in Table 2, indicating maximum power output, with leading power factor and less than 1.0 pu voltage at the generator terminals.

Table 2: AB1-017 machine initial conditions

Bus	Name	Unit	PGEN	QGEN	ETERM	POI Voltage
917133	AB1-017 CT1	1	313 MW	-23.6 MVAr	0.98 pu	1.02 pu
917134	AB1-017 CT2	1	313 MW	-23.6 MVAr	0.98 pu	1.02 pu
917135	AB1-017 ST1	1	349 MW	-23.6 MVAr	0.98 pu	1.02 pu

Generation within the PJM500 system (area 225 in the PSS/E case) and within the vicinity of AB1-017 has been dispatched online at maximum output (PMAX).

Generators within 5 buses from the generator(s) under study are dispatched at their maximum power output and were set to hold scheduled voltages.

Fault Cases:

The stability study for AB1-017 was performed on a RTEP 2019 light load case for normal operating conditions, and modified to include applicable queue projects. The range of contingencies evaluated was limited to those necessary to assess compliance with NERC, PJM and other applicable criteria. Simulation time was 20 seconds for all faults.

Simulated NERC Standard TPL-001faults include:

1. Three-phase (3ph) fault with normal clearing (Category P1)
2. Single-line-to-ground (slg) with delayed clearing as a result of breaker failure (Category P4)
3. Single-line-to-ground (slg) with delayed clearing as a result of protection failure

(Category P5)

4. Single-line-to-ground (slg) with normal clearing for common structure (Category P7)

Note: For generator interconnection studies, Category P2, P3 and P6 faults will be studied on an as needed basis.

No relevant tower or High Speed Reclosing (HSR) contingencies were identified.

The system was tested for an all lines in service condition and the faults listed above. Specific fault descriptions and breaker clearing times used for this study are provided in Tables 2 -7.

All generators were monitored to assess transient stability and satisfactory post-contingency conditions.

Table 2. Steady State Operation

Fault ID	Duration
SS.01	Steady State 20 sec run

Table 3: Three Phase Faults

Fault ID	Fault description	Clearing Time Near & Remote (Cycles)	Results
3N.00	3ph fault on AB1-017 POI – AB1-017 345 kV line (trips AB1-017)	5	Stable
3N.01	3ph fault on AB1-017 TAP1-Mansfield 345 kV line	5	Stable
3N.02	3ph fault on AB1-017 TAP1 – Highland 345 kV line	5	Stable
3N.03	3ph fault on AB1-017 TAP2 – AA1-123 345 ckt kV line	5	Stable
3N.04	3ph fault on AB1-017 TAP2 – Highland ckt#2 345 kV line	5	Stable
3N.05	3ph fault on Highland – Hanna 345 kV line	5	Stable
3N.06	3ph fault on Highland – Niles 345 kV line	5	Stable
3N.07	3ph fault on Highland 345/138 kV transformer	5	Stable
3N.08	3ph fault on Sammis – Beaver Valley 345 kV line	5	Stable
3N.09	3ph fault on Sammis – Toronto 345 kV line	5	Stable
3N.10	3ph fault on Sammis – AA1-123 345 kV line	5	Stable
3N.11	3ph fault on Sammis – Highland 345 kV line	5	Stable
3N.12	3ph fault on Sammis – South Canton 345 kV line	5	Stable
3N.13	3 ph fault on Sammis – Star 345 kV line	5	Stable
3N.14	3ph fault on Mansfield – Hanna 345 kV line	5	Stable

Fault ID	Fault description	Clearing Time Near & Remote (Cycles)	Results
3N.15	3ph fault on Mansfield – Hoytdale 345 kV line	5	Stable
3N.16	3ph fault on Mansfield – Beaver Valley ckt#1 345 kV line	5	Stable
3N.17	3ph fault on Mansfield – Beaver Valley ckt#2 345 kV line	5	Stable
3N.18	3ph fault on Mansfiled – N Field 345 kV line	5	Stable
3N.19	3ph fault on Mansfield – Crescent 345 kV line	5	Stable

Table 4: SLG Stuck Breaker Faults at Normal Clearing

Fault ID	Fault description	Clearing Time Near & Remote (Cycles)	Results
1B.01	SLG fault on Highland to AB1-017 TAP1 345 kV line, SB '124' @ Highland, Loss of Highland to Niles 345 kV line	5/14	Stable
1B.02	SLG fault on Highland to AB1-017 TAP1 345 kV line, SB '128' @ Highland, Loss of Highland 345/134 kV Transformer#1 and #2	5/14	Stable
1B.03	SLG fault on Highland to AB1-017 TAP2 345 kV line, SB '120' @ Highland, Loss of Highland 345/134 kV Transformer#3	5/14	Stable
1B.04	SLG fault on Sammis to AB1-017 TAP2 345 kV line, SB '279' @ Sammis, Loss of Sammis gen#3 (trips Sammis G3)	5/14	Stable
1B.05	SLG fault on Sammis to Star 345 kV line, SB '14' @ Sammis, Loss of Sammis gen#4 (trips Sammis G4)	5/14	Stable
1B.06	SLG fault on Sammis to South Canton 345 kV line, SB '287' @ Sammis, Loss of Sammis gen#5 (trips Sammis G5)	5/14	Stable
1B.07	SLG fault on Sammis to Toronto 345 kV line, SB '295' @ Sammis, Loss of Sammis gen#6 (trips Sammis G6)	5/14	Stable
1B.08	SLG fault on Sammis to Beaver Valley 345 kV line, SB '456' @ Sammis, Loss of Sammis gen#7 (trips Sammis G7)	5/14	Stable

Fault ID	Fault description	Clearing Time Near & Remote (Cycles)	Results
1B.09	SLG fault on Mansfield to Crescent 345 kV line, SB '61' @ Mansfield, Loss of Mansfield to Glenwillow 345 kV line	5/14	Stable
1B.10	SLG fault on Mansfield to Hanna 345 kV line, SB '50' @ Mansfield, Loss of Mansfield to Hoytdale 345 kV line	5/14	Stable
1B.11	SLG fault on Mansfield to Beaver Valley 345 kV line ckt#1, SB '34' @ Mansfield, Loss of Mansfield gen#1 (trips Mansfield G1)	5/14	Stable
1B.12	SLG fault on Mansfield to Beaver Valley 345 kV line ckt#2, SB '23' @ Mansfield, Loss of Mansfield gen#2 (trips Mansfield G2)	5/14	Stable

Table 5: SLG Fault with Delayed (Zone 2) Clearing

Fault ID	Fault description	Clearing Time Near & Remote (Cycles)	Results
1D.01	SLG fault @ 80% of AB1-017 Tap1 – Mansfield 345 kV line	5/65	Stable
1D.02	SLG fault @ 80% of AB1-017 TAP1 – Highland 345 kV line	5/65	Stable
1D.03	SLG fault @ 80% of AB1-017 Tap2 – Sammis 345 kV line	5/65	Stable
1D.03	SLG fault @ 80% of AB1-017 Tap2 – Highland 345 kV line	5/65	Stable

Table 6: Tower Contingencies

Fault ID	Fault description	Clearing Time Near & Remote (Cycles)	Results
1T.01	Fault on Highland to AB1-017 TAP1 345 kV line. Fault cleared with loss of Highland to AB1-017 Tap1 and Highland to Hanna 345 kV line Contingency *"C5-TWL-ER001B_A"*	5	Stable
1T.02	Fault on AB1-017 TAP2 to AA1-123 Tap 345 kV line. Fault cleared with loss of AB1-017 Tap2 to AA1-123 Tap 345 kV line and Highland to Hanna 345 kV line Contingency "C5-TWL-ER001B_B"	5	Stable
1T.03	Fault on Hanna to Mansfield 345 kV line. Fault cleared with loss of Hanna to Mansfield 345 kV line and Hanna to Beaver Valley 345 kV line Contingency "C5-TWL-CR31B"	5	Stable
1T.04	Fault on Hanna to Beaver Valley 345 kV line ckt#1. Fault cleared with loss of Hanna to Beaver Valley 345 kV line ckt#1 and Highland to AB1-017 TAP1 345 kV line Contingency "TWR_58A_A"	5	Stable
1T.05	Fault on Hanna to Beaver Valley 345 kV line ckt#1. Fault cleared with loss of Hanna to Beaver Valley 345 kV line ckt#1 and AB1-017 TAP1 to Mansfield 345 kV line Contingency "TWR_58A_B"	5	Stable
1T.06	Fault on Mansfield to Crescent Ridge 345 kV line. Fault cleared with loss of Mansfield to Crescent Ridge 345 kV line and Mansfield to Beaver Valley 345 kV line ckt#1. Contingency "TWR_11"	5	Stable
1T.07	Fault on Mansfield to Beaver Valley 345 kV line ckt#1. Fault cleared with loss of Mansfield to Beaver Valley 345 kV line ckt#1 and Mansfield to Beaver Valley 345 kV line ckt#2. Contingency "TWR_57"	5	Stable
1T.08	Fault on Highland to Hanna 345 kV line. Fault cleared with loss of Highland to Hanna 345 kV line and AA1-123 TAP to Sammis 345 kV line	5	Stable

Table 6: Single-phase Bus Faults with Normal Clearing

Fault ID	Fault description	Clearing Time Near & Remote (Cycles)	Results
1S.01	Fault on Beaver Valley 345 kV bus. Fault cleared with loss of Beaver Valley to Jlfurn 345 kV line, Beaver Valley 345/138 kV transformer ckt#2, Beaver Valley to Mansfield 345 kV line Contingency “BUS_1A”	5	Stable
1S.02	Fault on Beaver Valley 345 kV bus. Fault cleared with loss of Beaver Valley 345/138 kV transformer ckt#2, Beaver Valley to Mansfield 345 kV line Contingency “BUS_1B”	5	Stable

Summary: Application of Clean Energy Future-Lordstown, LLC for a Third Amendment to its Certificate to Install and Operate an Electric Generation Facility electronically filed by Teresa Orahood on behalf of Sally W. Bloomfield