

Appendix B: PJM Facilities Study

***PJM Generator Interconnection Request
Queue #U4-028 & U4-029
Fostoria Central-Greenlawn-Howard (Seneca)
138kV
Facilities Study***

U4-028 and U4-029 new AEP Melmore Station 138 kV (Fostoria Central – Greenlawn – Howard 138 kV circuit) Facilities Study Report

A. Facilities Study Summary

1. Project Description

Exelon Wind LLC proposes to install a 200 MW generating facility comprised of 88 Siemens SWT-22.3-93 2.3 MW wind turbine generators. Exelon is proposing a single connection for U4-028 and U4-029 to connect to the American Electric Power (AEP) Melmore Station on the Fostoria Central – Greenlawn - Howard 138 kV circuit. **The Melmore Station, once proposed as part of the scope of this project, is now being developed by AEP under approved baseline project b1667. This revised report reflects the effects of the reduced scope of work and updates the proposed schedule.**

*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 is 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. Amendments/Changes to the Impact Study Report

- The commercial operation date has changed from October 1, 2012 to December 31, 2017.
- Exelon has requested a single point of connection for U4-028 and U4-029.

3. Interconnection Customer Schedule

Exelon has proposed the following schedule for their collector station:

- Ground Breaking: November 1, 2016
- Receive back feed from AEP: October 15, 2017
- Commercial Operation Date: December 31, 2017

4. Scope of Customer's Work

- Design and construct generation collector station including step up transformers.
- Design and construct 138 kV tie from generation collector station to interconnect station.
- Fiber optic tie between stations for relay communication.
- Right of way and land purchases for all facilities, including access road.

5. Description of Transmission Owner Facilities Included in the Facilities Study

Direct Connection Work

- Install two 138 kV circuit breakers configured in a breaker and a half arrangement at the AEP Melmore Station on the Fostoria Central – Greenlawn - Howard 138 kV circuit. (Work done by AEP)

Network Upgrade Work - First Energy (FE)

At West Fremont substation, relocate the 138-69 kV Transformer #2 to being tapped off the East 138kV bus. The position between West Fremont breakers B5 & B6 will be left open with future use to be determined. A new 138kV high-side circuit breaker is required to be added on the 138-69kV Transformer #2. (n3577).

The cost for this network upgrade is \$550,900.

Network upgrade n3577 is no longer required. The baseline upgrades listed below mitigated the need for the network upgrade, but the Exelon Wind LLC still has a cost allocation of \$550,900 towards the baseline upgrades listed below.

1. Build new Hayes 345/138 kV substation with new 138 kV lines to: Greenfield #1, Greenfield #2, and Avery (b1281)
2. Build Beaver - Hayes - Davis - Besse #2 345 kV line (b1282)

A separate network upgrade, n4797, was created to capture Exelon Wind LLC's cost responsibility towards the above referenced baseline upgrades.

6. Total Cost of Transmission Owner Facilities Included in the Facilities Study:

Direct Connection facilities	\$1,108,304
Network Upgrade facilities	<u>\$550,900</u>
Total Cost	\$1,659,204

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

Material ordered by September 15, 2016
Outage requests made by September 30, 2016
Construction Start (Below Grade) November 1, 2016
Outage (Test, Checkout & Commission) September 1, 2017 – October 15, 2017
Backfeed by October 15, 2017

Commercial Operation date of December 31, 2017

B. Transmission Owner Facilities Study Results

1. Transmission Lines – New

None required.

2. Transmission Lines – Upgrades

None required.

3. Substation Facilities – New

Install two 138 kV circuit breakers at the AEP Melmore station. (Work done by AEP)

4. Substation Facilities – Upgrades

None required.

5. Metering & Communications

Standard 138 kV metering will be installed at the Melmore station.
A standard station communication scheme will be used.

6. Environmental, Real Estate and Permitting Issues

None required.

7. Summary of Results of Study

Cost Estimates for AEP

	NUN#	Engineering	Material	Construction	Misc.	Total
Melmore Station	n2115	\$155,631	\$319,200	\$183,615	\$194,555	\$853,001
Melmore Metering	n2121	\$52,422	\$108,959	\$43,192	\$50,730	\$255,303
Contribution to baseline upgrades b1281 and b1282	n4797					\$550,900
	Total	\$208,053	\$428,159	\$226,807	\$245,285	\$1,659,204

Schedule

Material ordered by September 15, 2016
Outage requests made by September 30, 2016
Construction Start (Below Grade) November 1, 2016
Outage (Test, Checkout & Commission) September 1, 2017 – October 15, 2017
Backfeed by October 15, 2017
Commercial Operation date of December 31, 2017

Assumptions

Agreements executed by June 15, 2016.
Exelon will have their construction and required checkout completed prior to the start of the September 1, 2017 outage.
System conditions allow scheduled outages to occur.

8. Information Required for Interconnection Service Agreement

Direct Interconnection Cost Breakdown

Direct Material -	\$640,982
Direct Labor -	\$651,014
Indirect Material -	\$48,888
Indirect Labor -	<u>\$318,320</u>
Total	\$1,659,204

Network Upgrade Cost Breakdown

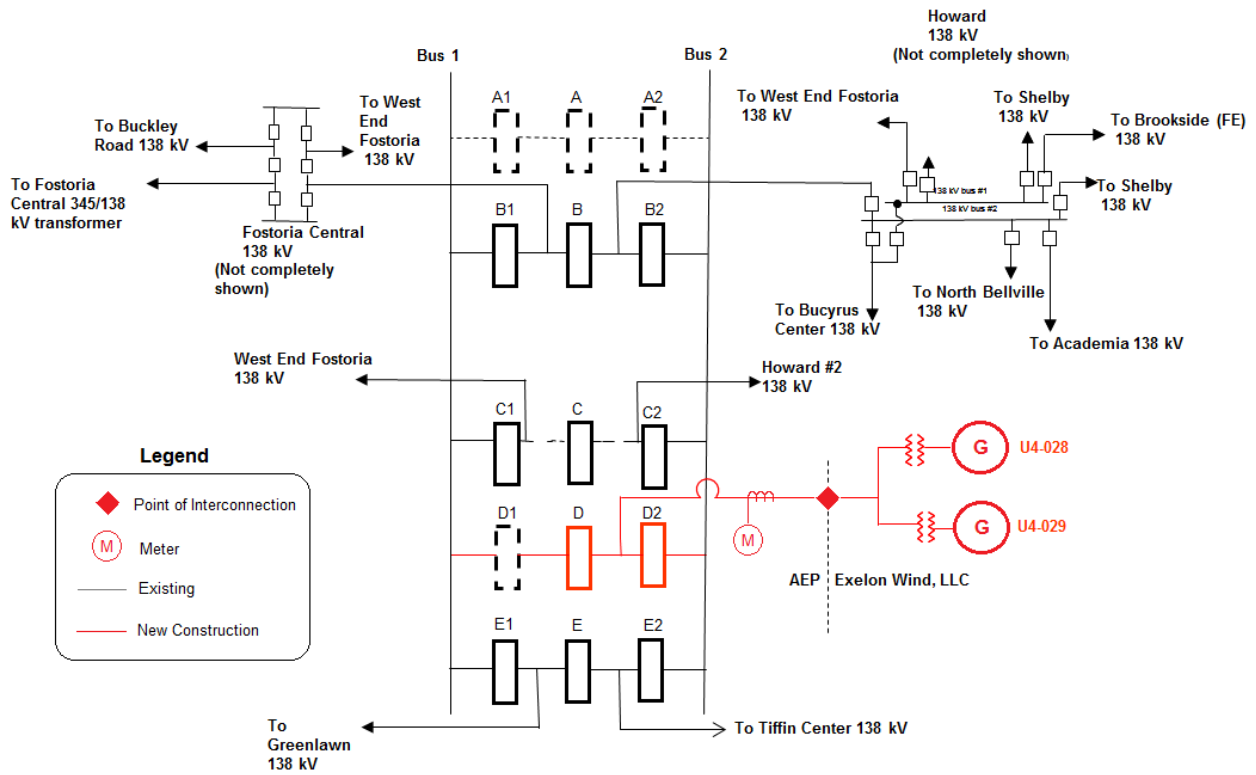
N/A

Figure 1



Approximate interconnection location of the proposed facilities

Figure 2



Simplified diagram of the proposed 138 kV interconnection on the AEP Melmore Station on the Fostoria Central – Greenlawn - Howard 138 kV circuit.