



An Exelon Company

Project Proposal #2

Solution to Address Flowgates 15Y-T2/15Y-T3
(Mickleton-Monroe) and
15Y-S10 (Gloucester-Cuthbert)

PJM RTEP 2014/15 Long Term Proposal Window

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Executive Summary

PJM is seeking solution alternatives to resolve potential reliability criteria violations identified in the 15 year reliability analysis. PECO Energy Company is proposing a solution that would alleviate a subset of these problems, specifically identified as flowgates 15Y-T2, 15Y-T3 and 15Y-S10. Flowgates 15Y-T2 and 15Y-T3 are Mickleton-Monroe 230 kV lines #1 and #2, and are listed as overloaded by 2022 under the generator deliverability test for the tower outage of the Gloucester-Deptford and Gloucester-Eagle Point 230 kV lines. Flowgate 15Y-S10 is the Gloucester-Cuthbert 230 kV line #2, and is listed as overloaded by 2029 under the generator deliverability test for the outage of Gloucester-Cuthbert 230 kV line #1. To alleviate these issues, PECO proposes a project to build a new 230 kV line from Penrose substation in Pennsylvania to Thorofare substation in New Jersey. The estimated cost of the project is \$44.5M in addition to land acquisition and permitting costs. The estimated time needed for construction of the required facilities is five years, with actual project completion time dependent on the time needed for land acquisition and permitting. Penrose substation is located in the southern part of the city of Philadelphia and Thorofare substation is located in West Deptford, New Jersey. The total length of the new line would be approximately 5.5 miles and construction would be underground or submarine.

PECO Energy Company is requesting Designated Entity status for the project. PECO is an affiliate of Exelon Corporation. Exelon has submitted designated entity pre-qualification materials to PJM on behalf of its affiliates (PJM ID 13-04).

Company Evaluation

PECO Energy Company is headquartered in Philadelphia, PA. PECO is an affiliate of Exelon Corporation. Exelon's headquarters are located in Chicago, IL. For details regarding the qualifications, experience and financial standing of PECO Energy Company, please see the designated entity pre-qualification materials submitted by Exelon on behalf of its affiliates (PJM ID 13-04). These materials are posted on PJM's website.

Proposed Project Constructability

1. Component Scope

a. Greenfield Transmission Line Description

The proposed project would include construction of a new 230 kV AC transmission line. The line would be built to connect Penrose substation, located in the southern part of the city of Philadelphia, to Thorofare substation, located in West Deptford, New Jersey. Penrose is a PECO Energy substation and Thorofare is a PSE&G substation. A potential route for the new line is shown on Diagram 1. [redacted] The right-of-way for the new transmission line would need to be acquired. Aerial construction would be preferable, as it is less expensive and can allow for higher facility ratings. The area near Penrose substation is sparsely populated and mainly industrial, so aerial construction may be possible for that portion of the line. However, there is a wide body of water between the two substations. This may require construction of towers in the water, which could add to the cost and construction time required to complete the project. On the New Jersey side of the Delaware River, there are some areas that are more densely populated than on the Pennsylvania side. Therefore, although it is possible that some of the new line could be aerial, this proposal assumes all underground or submarine construction, consisting of a single 5000 kcmil cable per phase. The estimated ratings of the new facility would be 765 MVA normal and 975 MVA emergency.

b. Greenfield Substation Description

The proposed new transmission line would connect two existing substations. Thus, a greenfield substation would not be needed.

c. Transmission Facilities to be Constructed by Others

The proposed new transmission line would connect to Penrose substation, which is located in the southern part of the city of Philadelphia, [redacted] To reduce the risk of overloading the new line or nearby transmission facilities under certain circumstances, an inductor would be installed in series with the new line at Penrose substation. PECO owns Penrose substation, and thus would be responsible for installing the terminal equipment needed to attach the new line to the existing bus. A single line diagram of the proposed connection at Penrose substation is shown in Diagram 2.

The other end of the new line would connect to Thorofare substation, [redacted] Thorofare is a PSE&G substation [redacted] To accommodate connection of the new line, the existing straight bus would need to be expanded into a ring bus and two circuit breakers would need to be added to create a new line position. A single line diagram of the proposed connection at Thorofare substation is shown in Diagram 3.

d. Environmental, Permitting and Land Acquisition

PECO Energy Company will consult with all applicable regulatory agencies as required when constructing new transmission facilities. PECO will ensure that necessary documentation is supplied and procedures are followed throughout the duration of the project. This would include studies and permitting for constructability and construction methods, site access and equipment staging, river crossing, environmental impacts, and development of mitigation plans to address any impacts if determined to be necessary. Specific environmental studies will be needed to identify the presence of wetlands and any endangered plant, fish or animal species. Any construction that impacts wetlands would require a permit from the U.S. Army Corps of Engineers and possibly the U.S. Coast Guard.

The proposed project would require the acquisition of right-of-way on which to construct the new transmission line. Aerial construction would be preferable, and at least some portion of the new line could be aerial. However, there is a wide body of

water and some residential areas in New Jersey along the proposed route. This may require construction of towers in the water and additional permitting issues that could add to the cost and construction time required to complete the project. Therefore, this proposal assumes all underground or submarine construction of the new line.

[redacted]

Diagram 1

(potential route for new line)

[redacted]

Diagram 2

(connection of new line at Penrose substation)

[redacted]

Diagram 3

(connection of new line at Thorofare substation)

2. Project Component Cost Estimates

An itemized cost estimate for the proposed project is as follows:

Build new 230 kV transmission line	
Install series inductor at Penrose substation	
Attach new line to Penrose substation	
Expand 230 kV at Thorofare substation to ring bus	
Attach new line to Thorofare substation	
Total	\$44.5M

The new transmission line would be a total of 5.5 miles in length, all underground and submarine construction, with a single 5000 kcmil conductor per phase. The ratings of the new line would be 765 MVA normal and 975 MVA emergency. The new transmission line would be attached at Penrose substation to an open position on the existing 230 kV ring bus. A current limiting inductor would also be installed at Penrose in series with the new line. The other end of the new transmission line would be attached at Thorofare substation. The 230 kV bus at Thorofare would need to be reconfigured into a ring bus with two additional circuit breakers.

The estimate includes engineering and design, material and labor. The cost of land acquisition and permitting for the new transmission line is not included.

3. Schedule

The proposed project would include construction of a new 230 kV transmission line connecting Penrose substation in Pennsylvania to Thorofare substation in New Jersey. An estimate for the time required to construct the transmission line is five years. The proposed project would also include the addition of a series inductor at Penrose substation and work required to connect the new line to both Penrose and Thorofare substations. It is anticipated that this work would be done concurrently with construction of the new transmission line. Therefore, an estimate for the total time required to construct the facilities included in the proposed project is five years. This includes

engineering and design, but does not include the time required for land acquisition and permitting. However, it is expected that much of the work associated with land acquisition and permitting would be done in parallel with the engineering and design work.

4. On-going Transmission Facility Items

a. Operational Plan

PECO Energy Company is a registered member of Reliability First Corporation and a transmission owner within the PJM Regional Transmission Organization. PECO operates a control center within its territory 24/7 with system operators who maintain both PJM and NERC certification. A state-of-the-art Energy Management System provides SCADA control and monitoring of all of PECO's transmission facilities. PECO also maintains a fully functional back-up control center in the event the primary location must be evacuated.

b. Maintenance Plan

PECO Energy Company owns and maintains over 1,100 miles of transmission lines and over 90 transmission substations throughout its territory. Maintenance on these facilities is performed by both experienced in-house crews and experienced contract crews operating under the direction of in-house personnel. PECO implements a comprehensive preventive maintenance program that meets all regulatory and industry standards. This includes a maintenance template for all transmission facilities that documents necessary program tasks and frequencies. PECO has in-house equipment and personnel and also maintains relationships with outside vendors and other utilities to enable quick restoration in the event of an outage.

5. Assumptions

The proposed project includes the construction of a new 230 kV transmission line, installation of a series inductor and work at either end of the new line to connect into existing substations. The estimates provided for cost and construction time are based on generic facilities

and typical projects. However, each project is unique and actual cost and construction times may vary from the estimates. In addition, land acquisition and permitting have not been included in the estimates, but much of this work would be performed in parallel with the engineering and design work.

Although Diagram 1 shows a potential route for the new transmission line, there may be other routes that could be chosen as alternatives. Final determination of a route can be made after the proposed project is selected as a solution to the identified problems.