

**PJM Developer Pre-Qualification Application of
PPL Electric Utilities Corporation
PPL Translink, Inc.
September 2019**



PPL Electric Utilities

1) Name and Address of the Entities:

PPL Electric Utilities Corporation ("PPL EU")
Two North Ninth Street
Allentown, PA 18101

PPL Translink, Inc. ("PPL Translink")
Two North Ninth Street Allentown, PA 18101

2) Technical and engineering qualifications of the entity or its affiliate, partner, or parent company

PPL EU relies on its own experience and qualifications to provide technical and engineering expertise. PPL Translink relies on the experience and qualifications of its affiliate, PPL EU, to provide technical and engineering expertise. Refer to appendix I for list of recent transmission projects executed by PPL EU and appendix II for more info on PPL EU's engineering and other capabilities.

3) The demonstrated experience of the entity or its affiliate, partner, or parent company to develop, construct, maintain, and operate transmission facilities, including a list or other evidence of transmission facilities the entity, its affiliate, partner, or parent company previously developed, constructed, maintained, or operated.

PPL EU is a Pennsylvania corporation and a wholly owned subsidiary of PPL Corporation. PPL EU is headquartered in Allentown, Pennsylvania, and is an owner of transmission facilities in PJM Interconnection, L.L.C. ("PJM"). PPL EU distributes electricity to all retail customers within its service territory in central eastern Pennsylvania. PPL EU is a load-serving entity ("LSE") in PJM and a signatory to the PJM Consolidated Transmission Owners Agreement and the Reliability Assurance Agreement ("RAA").

PPL Translink is also a wholly owned subsidiary of PPL Corporation and an affiliate of PPL EU. PPL Translink is also headquartered in Allentown, Pennsylvania.

PPL EU relies on its own experience in developing, constructing, maintaining, and operating transmission facilities. PPL Translink relies on the demonstrated experience of its affiliate, PPL EU, to develop, construct, maintain, and operate transmission facilities.

PPL EU is currently engaged in a significant number of transmission projects across its service territory with a 5 year annual capital transmission investment of approximately \$3B. These projects have encompassed new and upgraded substations, capacitor bank installations, replacement of degraded line structures, control cubicle and transformer replacements, and new line installations ranging from 69kV to 500kV. Completing these projects requires extensive technical expertise, effective project management

capabilities at both the project and portfolio levels, the ability to work with numerous stakeholders and sometimes other transmission owning partners, and effective cost controls over the capital being deployed.

This section contains descriptions of four PPL EU transmission projects that were recently completed. These examples illustrate the types of projects PPL EU encounters and the range of capabilities it can deploy to successfully complete them.

Project Case Study #1 – Susquehanna – Roseland

In 2007, PJM directed the construction of a new 145-mile, 500kV transmission line between the Susquehanna substation in Pennsylvania and the Roseland substation in New Jersey that it identified as essential to the long-term reliability of the Mid-Atlantic electrical grid. The line was energized in May 2015. PJM determined that the line was needed to prevent potential overloads that could occur on several existing transmission lines in the interconnected PJM system. PJM directed PPL EU to construct the portion of the Susquehanna – Roseland (SR) line in Pennsylvania and the Public Service Electric & Gas Company (PSE&G) to construct the portion of the line in New Jersey. The route crosses the Delaware Water Gap National Recreation Area using a utility corridor already occupied by a high-voltage power line. The existing line and the rights to use the corridor are owned by PPL EU and PSE&G. Figure 1 illustrates the portion of the line that PPL EU is responsible for constructing.

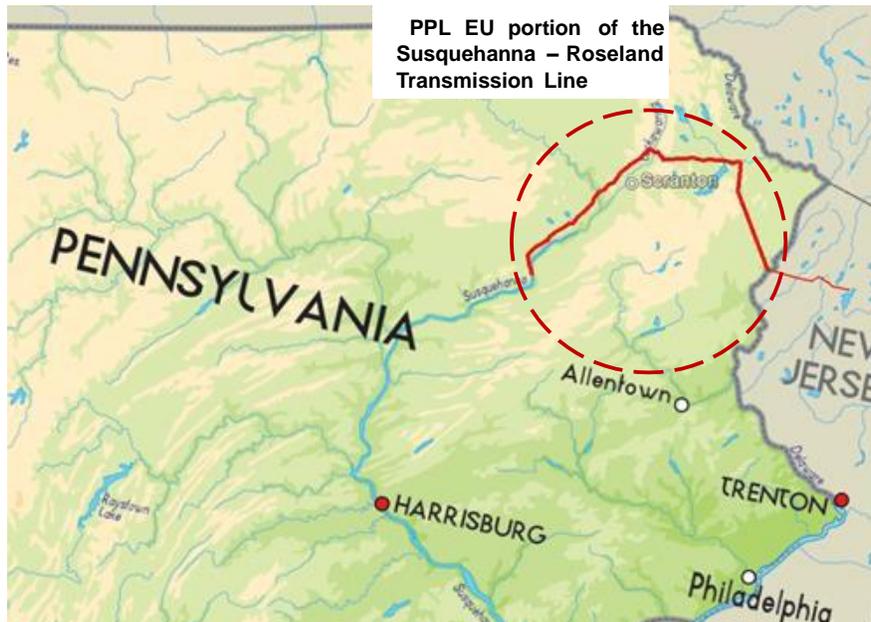


Figure 1: PPL EU Portion of the Susquehanna – Roseland Transmission Line

PPL EU and PSE&G cooperated closely on the design, siting and other aspects of the project, and formed a joint team to accomplish construction of a four-mile segment that passes through three National Park Service units that lie in both Pennsylvania and New Jersey. The line was energized in May 2015, and the

large scale of the SR project provided an opportunity to renew and enhance PPL EU’s development expertise through invaluable learning experiences that uniquely position PPL EU for success with future development projects.

One of the key success factors for the PPL EU SR project was the structure of the internal PPL EU team, which allowed for flexibility and coordination. A depiction of the Susquehanna – Roseland Project team is included in Figure 2.

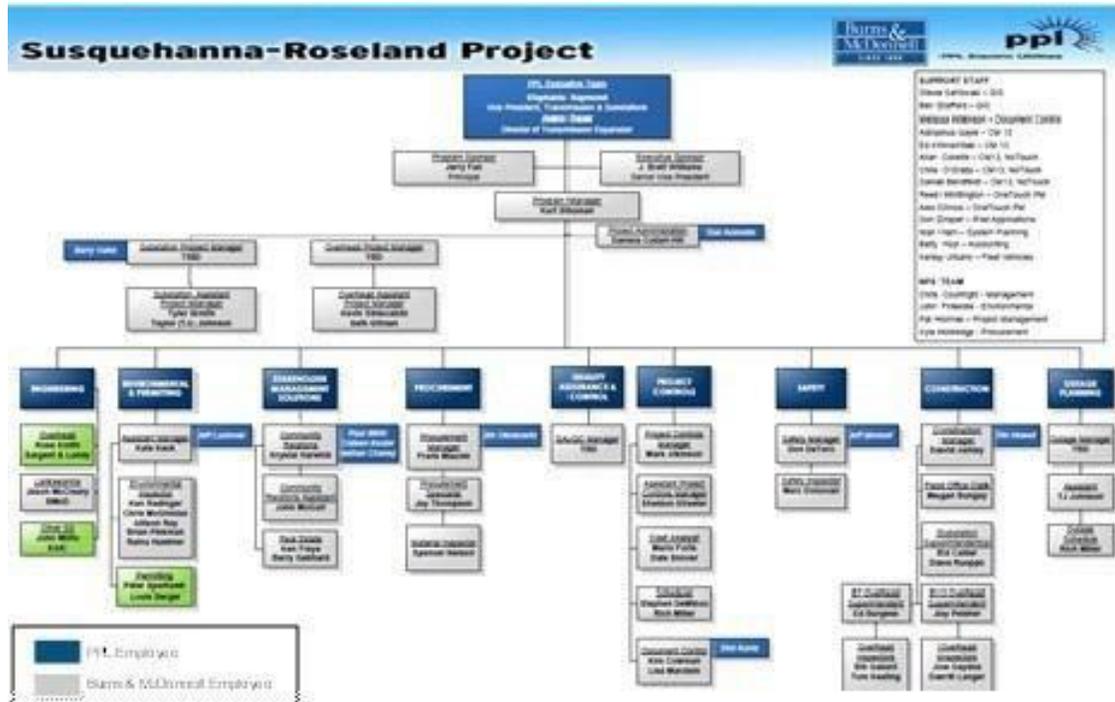


Figure 2: Susquehanna – Roseland Project Team

PPL EU chose to place internal SR project management subject matter experts (SMEs) in the various business units rather than solely in a central project team, which improved communication and raised the visibility of the project. In addition, the SMEs were easily able to leverage internal and external stakeholder relationships as needed. In addition to the internal team resources, PPL EU relied on contractors for most of the project management, engineering and construction work, which is a best-practice for large-scale development projects.

Throughout the course of the planning, engineering and design phases, PPL EU was able to successfully overcome major hurdles, including significant challenges associated to the Environmental Impact Study required under the National Environmental Policy Act performed by the National Park Service. PPL EU was able to leverage state and federal government relationships to keep the process on track and to obtain insight into NPS deliberations. PPL EU also leveraged strong political relationships to work with the Federal Aviation Administration (FAA) toward a solution that eliminated an FAA concern with tower heights by decommissioning a Doppler radar system.

As a result of the SR project, PPL EU has adopted new processes to improve the efficiency and

effectiveness of future transmission development. PPL EU now conducts more extensive constructability reviews at the front-end of development, including line analysis and location and access assessments, which enable better estimates and reduces risk. PPL EU's culture as a learning organization enables the organization to continuously improve its capability to efficiently and effectively manage an expansive portfolio of projects.

Throughout the SR project, PPL EU has also demonstrated its experience with extensive public outreach processes to help address public concerns. For this project, PPL EU employed an outreach process that included frequent targeted communications by letter, e-mail, door-to-door visits, public open houses, special websites and dedicated toll-free phone lines. This process also included a two-way component in order to log and track comments as well as company responses to these comments. PPL EU intends to use these industry leading processes and designs in any future transmission development opportunities, which creates a distinct advantage over other organizations.

Project Case Study #2 – Lauschtown 500/230kV Substation New Build

In 2012, studies conducted for PPL EU's Electric transmission system, in conjunction with the PJM Regional Transmission Expansion Plan ("RTEP") process, revealed several transmission line thermal overload and voltage violations to the 230kV system serving the Lancaster, Berks, and Chester counties.

To resolve the NERC Standard Reliability Criteria and PJM reliability violations, PPL EU proposed and successfully constructed the Lauschtown 500-230-138-69kV substation in the Brecknock Township, Lancaster County Pennsylvania, east of State Route 625. This new substation also provides a new 500kV backbone source to the area. A failure to complete this project would have resulted in a violation of both NERC Standard Reliability Criteria, PJM Reliability Criteria and PPL EU's Reliability Criteria and could have led to sustained damage to transmission infrastructure and catastrophic long duration power outages.

During the each phase of the project PPL EU collaborated closely with Met-Ed one of its' neighboring Transmission Operators, since the Lauschtown substation was going to be interconnected with the existing Hosensack-Three Mile Island 500kV Transmission Line, and Met-Ed was responsible for construction of two single circuit 500kV transmission lines that extended approximately 0.2 miles from the 500kV Lauschtown substation to the Hosensack – Three Mile Island 500kV Transmission Line.

In Development, PPL EU evaluated several options to alleviate the potential issue which included multiple new transformer installations and substantially more line mile additions. The PPL EU team found these alternative options to be costlier and more complex, and the Lauschtown 500/230 kV substation was found to be the least cost, best-value, and wholistic solution alternative.



Figure 3: Lauschtown 500/230/69kV Substation

During the pre-construction phase, PPL EU performed a siting study and concluded the entire substation including line terminations and routing can be accomplished with PPL EU existing new Right of Way. The construction phase involved the installation of a new 500/230 kV substation, additional circuit breakers, transformers, and new 69 kV lines. Total construction costs for the Lauschtown 500/230 kV Substation build were approximately \$38 million. The Lauschtown 500/230kV Substation project was completed and put into service in 2017.

Project Case Study #3 – Summit 230/69kV Substation New Build

In 2014, PPL EU identified through contingency and load flow studies heavily loaded transformers at the 230-69kV Lackawanna substation were at risk of reaching their maximum thermal emergency rating. Additionally, studies identified several 69kV transmission lines in the Lackawanna County at risk for excessive load drops due to unacceptable line exposure and high momentary outage rates. To resolve these concerns PPL EU initiated, developed, sited, engineered, constructed and placed into service Summit 230/69kV Substation and associated 230kV lines. Summit Substation provides a new 230kV backbone source that is more central to the load it serves. Consequences of not completing this project are the potential for customer to be without power or internal damage to the transformer.

This project was one element of a large comprehensive plan to improve the reliability of service to over one hundred thousand customers served from the Stanton, Lackawanna and Jenkins 230-69kV regional substations that provide supply to the greater Scranton area. Failure to complete would have placed over a hundred thousand customers at risk to extended outages, due to inability to restore customers should their normal supply be interrupted.

In Development, PPL EU evaluated several options to alleviate the potential issue which included multiple new transformer installations and substantially more line mile additions. The PPL EU team found these alternative options to be more costly and complex and the Summit 230/69 kV substation was found

to be the least cost, best-value long-range alternative.



Figure 4: Summit 230/69kV Substation

During the pre-construction phase, PPL EU performed a siting study and acquired approximately 1.08 miles of new Right of Way and approximately 65 acres of land. The construction phase involved the installation of a new 230/69 kV substation, a new capacitor bank, additional circuit breakers, transformers, and new 230kV lines. Total construction costs for the Summit Substation build were approximately \$48 million. The Summit substation project was completed and put into service in 2017.

Project Case Study #4 – Susquehanna – Jenkins 230kV Rebuild

In 2013, PJM identified Planning Criteria violations that required the PPL EU to undertake a project to reinforce the 230kV system. The Susquehanna – Jenkins 230kV rebuild project was initiated to alleviate these concerns. Consequences of not completing this project are the potential for thousands of customers to be without power.

In Development, PPL EU evaluated several options to solve the criteria violations which included multiple new or rebuilt transmission lines. The PPL EU team found these alternative options to be more costly and complex and the Susquehanna – Jenkins 230kV rebuild project was found to be the least cost, best-value alternative.

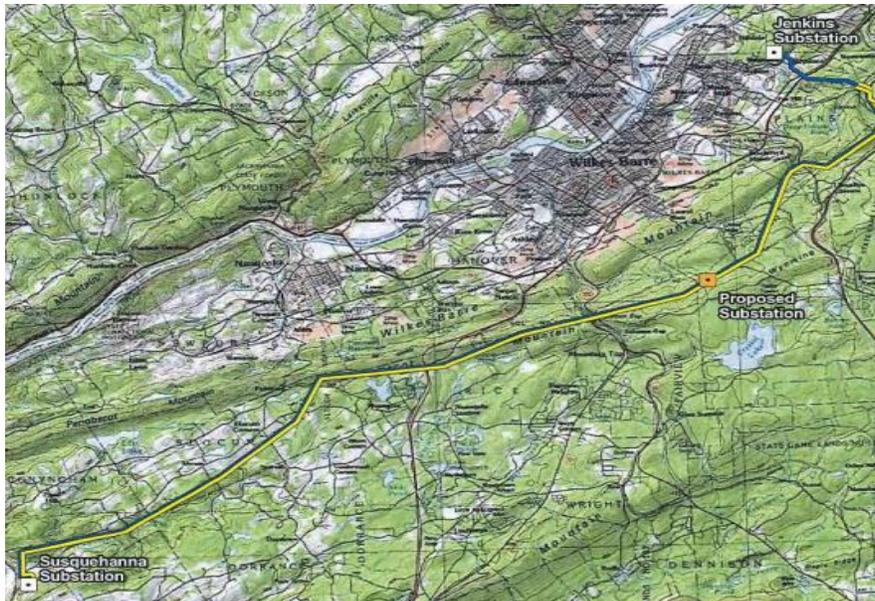


Figure 5: Susquehanna – Jenkins 230kV Transmission Line

During the pre-construction phase, PPL EU performed a siting study and acquired several miles of new Right of Way. The construction phase involved the rebuild of a single circuit 230kV transmission line to a double circuit 230kV transmission line. Total construction costs for the Susquehanna – Jenkins 230kV rebuild were approximately \$71 million. The Susquehanna – Jenkins 230kV rebuild project was completed and put into service in 2017. Refer to appendix I for a list of PPL EU’s 30 largest recently completed transmission capital projects.

4) Previous record of the entity or its affiliate, partner, or parent company to adhere to standardized construction, maintenance and operating practices.

Refer to appendix I for list of the recent transmission projects executed by PPL EU.

There are over 5,000 miles of transmission lines on over 50,000 transmission structures, spanning the 10,000 square miles of the PPL Electric Utilities service territory. These transmission lines carry voltages ranging from 69 kilovolts to 500 kilovolts. PPL EU operates more than 1,300 miles of 230- and 500-kilovolt transmission line rights of way. These lines are the backbone of the nation's electric grid and are vital to security, safety and commerce.

PPL Electric Utilities maintains 35,000 miles of overhead distribution lines across its system, delivering power to customers.

In order to operate and maintain the transmission grid reliably, PPL EU manages a Transmission Control Center 365 days, 24 hours a day in the Lehigh Valley. The control center is secure and has redundant data and communication at both the Operations Center and the Disaster Recovery Site that are independent of each other and meet all ReliabilityFirst (RF) and NERC Reliability Standard criteria.

Our electric delivery system includes roughly 900,000 utility poles that carry conductors, cross-arms,

insulators, transformers, circuit breakers, lightning arrestors, and other equipment. Additionally, PPL EU delivers power along 6,500 miles of underground lines, mainly in cities. These lines run through hundreds of manholes and underground vaults, which are inspected, tested and repaired on condition and/or time-based cycle as part of a comprehensive maintenance plan.

Inspections of distribution lines and poles are also done periodically based on a schedule and circuit performance to identify equipment problems that may affect system performance or service to customers. Overhead line inspections identify the weak links in the system so that damaged or deteriorated equipment can be repaired or replaced. Each year PPL EU performs thermography inspections on about 6,000 miles of distribution circuits, where infrared cameras are used to identify problems before an outage occurs.

Routine helicopter patrols of all transmission lines are conducted every year, as well as comprehensive aerial inspections on a four-year cycle. From helicopter patrols, PPL EU uses LiDAR to measure the distances between transmission power lines and any obstructions, like trees.

PPL EU performs ground patrols of about 1,500 miles of transmission lines annually. PPL EU has installed and is continuing to install animal guards at substations to prevent birds, squirrels and other animals from entering the electrical facilities resulting in outages.

Refer to appendix II for more information on PPL EU’s Engineering, Project management, Operation, Maintenance and other capabilities.

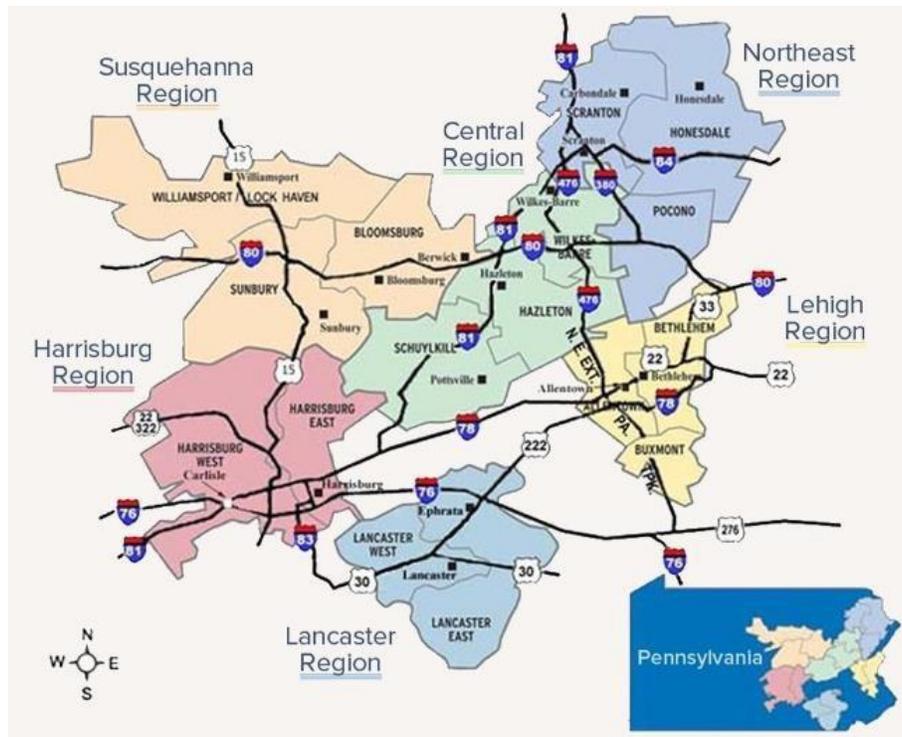


Figure 6: PPL EU Service Territory

5) Capability of the entity or its affiliate, partner, or parent company to adhere to standardized construction, maintenance and operating practices.

Refer to question 4 response, appendix I and appendix II.

6) Financial statements of the entity or its affiliate, partner, or parent company. Please provide the most recent fiscal quarter, as well as the most recent three fiscal years, or the period of existence of the entity, if shorter, or such other evidence demonstrating an entity's current and expected financial capability acceptable to the Office of the Interconnection

PPL TransLink will rely on its parent, PPL, as well as certain subsidiaries of PPL, to assist with financing. Annual audited financial statements for the most recent three calendar years for PPL are included in the links below in Form 10-K's filed by PPL with the Securities and Exchange Commission (SEC):

- 2016 Form 10-K:
<https://www.sec.gov/Archives/edgar/data/55387/000092222417000010/ppl-1231201610k.htm>
- 2017 Form 10-K:
<https://www.sec.gov/Archives/edgar/data/55387/000092222418000023/ppl-1231201710k.htm>
- 2018 Form 10-K:
<https://www.sec.gov/Archives/edgar/data/55387/000092222419000015/ppl-1231201810k.htm>

PPL's most recent quarterly financial statements are included in the link below in the Form 10-Q filed with the SEC for the quarterly period ended June 30, 2019:

- 2019 second Quarter 10-Q:
<https://www.sec.gov/ix?doc=/Archives/edgar/data/55387/000092222419000050/ppl-6302019x10q.htm>

7) Commitment by the entity to execute the Consolidated Transmission Owners Agreement, if the entity becomes a Designated Entity

PPL EU is already a signatory to the Consolidated Transmission Owners Agreement.

PPL Translink commits to execute the Consolidated Transmission Owners Agreement if PPL Translink becomes a Designated Entity.

8) Evidence demonstrating the ability of the entity to address and timely remedy failure of facilities

Refer to "**Storm/ Outage Response and Restoration Plan**" section of the appendix II.

9) Description of the experience of the entity in acquiring rights of way

Refer to "**Routing and Surveying**" section of the appendix II.

Contact Information

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Appendix I: List of Recent Transmission Capital Projects

The following list contains several of the largest transmission capital budget projects placed in-service since 2015:

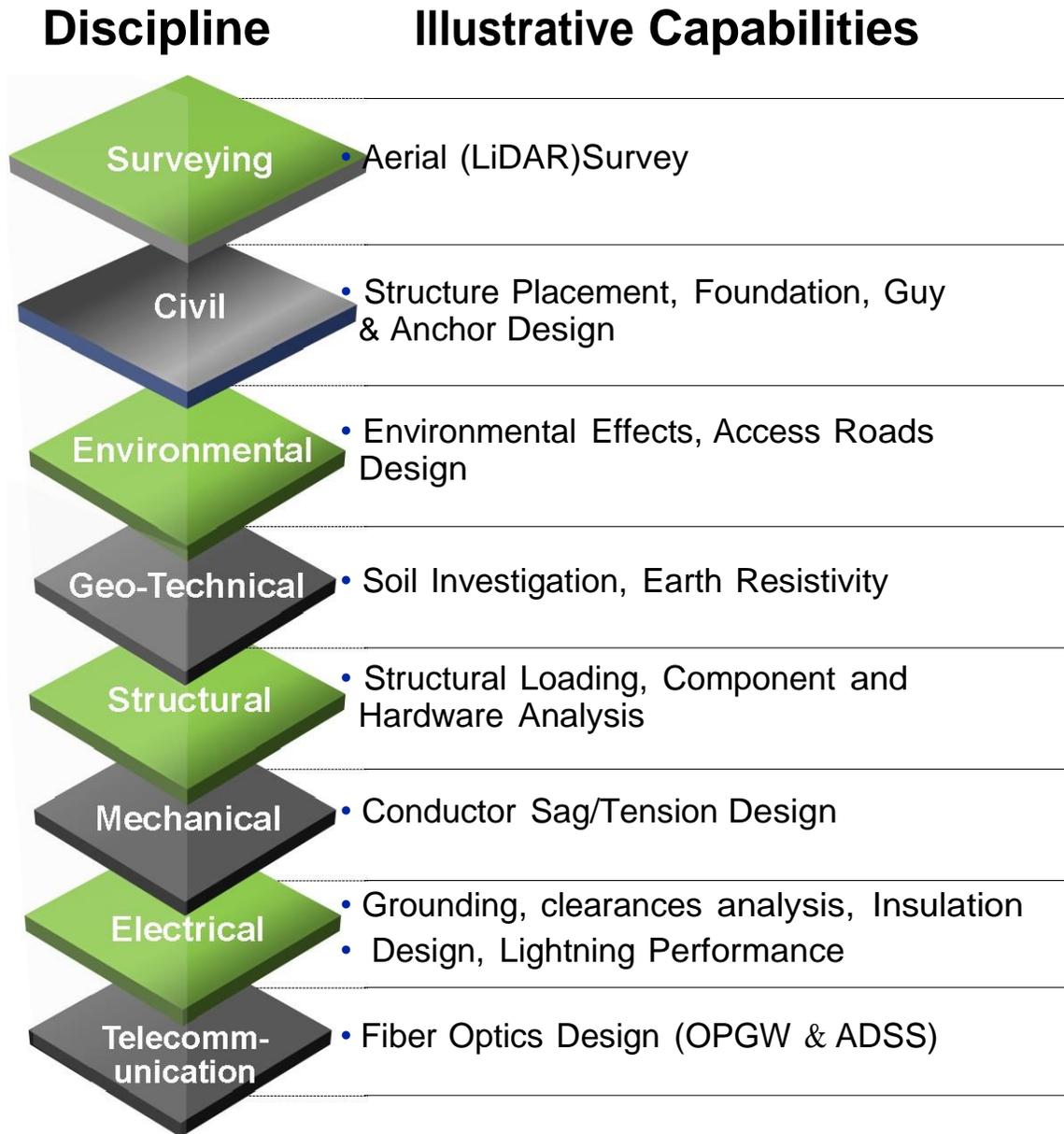
1. Rebuild the entire Susquehanna - Jenkins 230kV transmission line (approximately 26.4 miles).
2. Rebuild the entire Acahela - Pocono 230kV transmission line (approximately 20.6 miles).
3. Build a new 7 bay Summit 230/69kV substation.
4. Build a new 9 bay Laushtown 500/230/69kV substation.
5. Rebuild the entire Dalmatia - Richfield 69kV transmission line (approximately 12 miles).
6. Rebuild the entire Lycoming - Lock Haven 69kV transmission line (approximately 12 miles).
7. Build a new 4 bay Lock Haven 69kV Switchyard.
8. Build a new 8 bay Siegfried 230/69kV substation adjacent to the existing substation.
9. Build a new 5 bay Williams Grove 230/69kV Substation.
10. Rebuild 5 bay Sunbury 230/69kV substation.
11. Added a second circuit to Lake Naomi 69kV Tap transmission line (approximately 24 miles).
12. Rebuild Otter Creek - Conestone 230kV transmission line (approximately 12 miles).
13. Rebuild existing 7 bay Milton 230/69kV Substation.
14. S. Akron - Laushtown 69kV T-Line Rebuild (approximately 20 miles)
15. Rebuild Atglen - Kinzer 69kV transmission line (approximately 7.3 miles)
16. Rebuild Stanton - Avoca 69kV transmission line (approximately 6.4 miles)
17. Fiber installation on the Hosensack - Wescosville 230kV transmission line (approximately 9.8 miles).
18. Rebuild Blooming Grove - Honesdale 69kV transmission line (approximately 6.3 miles)
19. Rebuild W. Shore - Cumberland 230kV transmission line (approximately 4 miles)
20. Rebuild Rohrsburg Tap 69kV transmission line (approximately 7.2 miles)
21. Rebuild the 17 bay Quarry 230/69kV substation
22. Rebuild Stanton - Brookside 69kV transmission line (approximately 4.7 miles)
23. Install a new Capacitor & Circuit Breaker at the Elimsport 230/69kV substation.
24. Rebuild the 7 bay Alburtis 230/69kV Substation.
25. Build a new 69kV transmission line from Macungie - Emmaus (approximately 3 miles)
26. Rebuild Cumberland - W. Shore 69kV (approximately 2 miles).
27. Rebuild Lansdale Tap 69kV transmission line (approximately 2.6 miles)
28. Rebuild Quarry-Monocacy 69kV transmission line (approximately 3.3 miles)
29. Install a new transformer at the Sunbury 500/230kV substation.
30. Install a protection system at the Cumberland 230/69kV substation complete with both passive and active security measures.

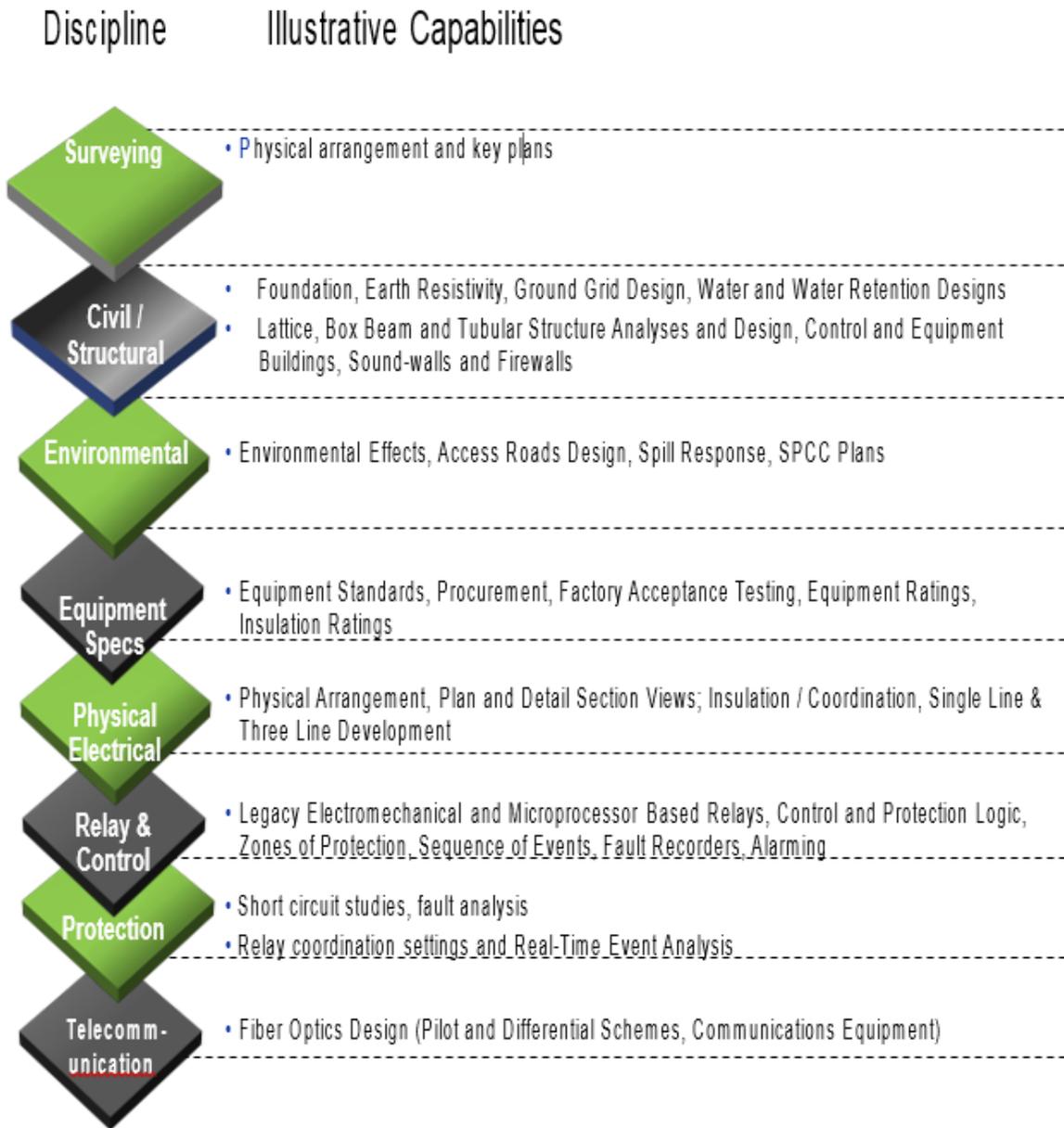
Appendix II: Additional Information

Engineering

PPL EU's Engineering organization is responsible for the project design and engineering of both Transmission Lines and Substation Design and Protection. The Engineering group provides conceptual and detailed design services for projects and technical input into project cost estimates. Specifically, engineering develops design packages, specifications for engineered equipment and minor material and specification of design and construction standards. The Engineering departments also provide technical support to the Operations, Construction, Maintenance and Testing organizations. Overviews of PPL EU's transmission and substation & protection engineering capabilities are shown in Figures 1 and 2, respectively.

Figure 1: Transmission Engineering Overview





Increased Transmission Investments

As a result of PPL EU's commitment to increase infrastructure investments, the Engineering department has gained a broad mix of recent design experience including both new capacity additions and upgrades to the existing system for both transmission lines and substations. Through this increase in project volume, the Engineering team has improved its constructability criteria, undergone robust process refinement, upgraded standards to achieve high level performance and adopted stronger QA/QC standards. Another byproduct of the recent PPL EU investment that sets PPL EU Engineering organization apart from peers is the exposure and experience gained as a result of the varied electrical system, weather and geographic topography in the PPL EU footprint. This experience will be an

extremely valuable skill when developing future transmission projects.

Contractor Management

PPL EU's Engineering group has extensive experience with in-house designing as well as managing contracted engineered services. The Engineering department has deep expertise with the contracting and bidding process as well as the management and performance improvement of contractors.

Design Standards

PPL EU's Transmission and Substation Standards are designed to incorporate best in class standards for reliability and cost efficiency. PPL standards works to provide innovative solutions while meeting all applicable industry standards. PPL EU has engineering, material, and construction standards requirements and specifications for transmission line and substation systems. PPL Standards are designed to meet NERC requirements and facilitate testing requirements. PPL EU has also deployed a fully digital drawing and standard management tool, which can be used to quickly deploy designs to the field while also ensuring a seamless process when working with standard drawings.

Transmission line standards include but are not limited to electrical clearances, structures, civil, insulation, grounding, lightning, fiber optics, switches and conductors.

Substation standards included but are not limited to electrical clearances, buses, transformers, circuit breakers, switches, conductors, power cables, controls cables, structures and capacitor banks, shunt reactors, control houses, protection relays, communication, fiber and monitoring equipment.

Technology Enhancements

The Transmission Engineering group has seen major efficiencies and improvements as a result of a new state-of-the-art Power Line Computer Aided tool called PLS – CADD that acts as a centralized tool for designing and drafting. The tool enables the group to develop "seed" files that retains data and updates directly from LIDAR surveys which can be used as the foundation for future designs. The PLS – CADD program, and the "seed" files specifically, provides for a more reliable and robust process that enables quick field response.

In addition to the standard AutoCAD 2D tool, the Substation Engineering group is currently utilizing AutoCAD Inventor 3D and AutoCAD Electrical design programs, that uses the latest and most efficient designs, generating error free engineering deliverables. The substation Engineering group is also in the process of leveraging the technology of Augmented Reality and Virtual Reality (AR/VR) to help optimize and streamline the engineering and construction activities throughout the life cycle of the project.

Permitting and Environmental

PPL EU Permitting department has a track record of successfully obtaining the necessary local, state and federal government permits and licenses for proposed transmission projects. PPL EU is cognizant of the need to constantly adapt and strategically plan for the replacement of its T&S infrastructure as land becomes more fragmented and populations increase. The PPL EU Permitting department is successful because of strong agency relationships and tools to increase accountability, which are discussed below:

Maintain Strong Agency Relationships

PPL EU’s strong agency relationships, political engagement and vigorous outreach to landowners is critical to the permit and license acquisition strategy. PPL EU’s strong relationships and coordinating experience with several local, state and federal agencies provides key advantages in transmission project development. See Figure 3 for a listing of relevant regulatory agencies and the types of permits and licenses that they provide.

Figure 3: Regulatory Agencies and Permit/ License Types

	Agency	License or Permit Type
Local	Local County Conservation Districts	Erosion & Sediment Control Plan, Post Construction Stormwater Management Plan, NPDES Application, BMP Compliance
State	Pennsylvania Department of Environmental Protection	GP-5, GP-7, GP-8, GP-11, NPDES, Erosion & Sediment Control Plan, Post Construction Stormwater Management Plan
	Pennsylvania Game Commission	License for ROW, Special Use Permit, Post Construction Stormwater Management Plan
	Pennsylvania Fish & Boat Commission	License for Land Use, PNDI clearance letter for fish, reptiles, amphibians
	Pennsylvania Department of Conservation and Natural Resources Bureau of Forestry & Bureau of State Parks	License for ROW, Letter of Authorization, Road Use Agreements, Certificate of Survey
	Pennsylvania Turnpike	Line Crossing Agreements / Alterations, Access Road and Restoration Agreements
	Pennsylvania Department of Transportation	Minimum Use Driveway, Limited Access, HOP, Aviation Obstruction Review
	Pennsylvania Historical and Museum Commission	Consultation for Phase I, II, III studies, Section 106 viewshed evaluation and report, clearance letter
Federal	U.S. Fish & Wildlife Service	Incidental Take Permits, Rare, Threatened & Endangered Species, Avian Protection Plan
	U.S. Army Corps of Engineers	Water Obstruction and Encroachment Permits, Section 404 Permits
	Federal Aviation Administration (FAA)	Notifications
	National Parks Service	Special Use Permits, NEPA Compliance

Real-Time Communication

One of the key drivers of PPL EU’s strong external relationships is PPL EU’s “real-time communication commitment”, which includes same-day inquiry responses and one-on-one meetings with stakeholders. The project development timeline relies on the success of the Permitting department, so this commitment to direct communication adds significant value to PPL EU.

Permitting and Licensing Tools

Other tools that PPL EU utilizes for successful acquisition of permits and licenses include a robust licensing and permitting accountability model, permitting plans, metrics for tracking successes and risks, and robust permitting tracking tool. The PPL EU Permitting department has recently undergone a significant process improvement effort which has resulted in improved tracking, transparency and accountability for the organization.

Figure 4 shows a sample listing of projects and the corresponding permits and/or licenses that have recently been acquired to construct transmission projects:

Figure 4: Example of Recent Permits / Licenses Acquired

Project Name	Permit / License Acquired
Blooming Grove - Honesdale	PADEP - Individual NPDES Permit, GP-5, GP-8, Submerged Lands License Agreement
Brunner Island - Middletown	AMTRAK - License Agreement
Columbia - Danville	USACE/PADEP - Joint Permit for Water Obstruction and Encroachment
Columbia - Danville	PADEP - General NPDES, Submerged Lands License Agreement
Honesdale Tap	PADEP - Individual NPDES Permit, GP-5, GP-8, Submerged Lands License Agreement
Honesdale Tap	PennDOT - Highway Occupancy Permit (HOP)
Hosensack - Wescosville	PADEP - Individual NPDES, GP-8
Hosensack - Wescosville	PennDOT - Highway Occupancy Permit (HOP)
Lackawanna - Summit	PA Turnpike Commission - Utility Crossing License
Palooka - Wilkes Barre	PADEP - Individual NPDES, GP-7, GP-8, GP-11
Seigfried - South Slatington Sub and Treichlers	PADEP - Individual NPDES Permit, GP-5
Summit - Brookside	PA Turnpike Commission - Utility Crossing License
Sunbury - Dauphin	National Park Service - Special Use Permit, Archaeological Investigations Permit
Sunbury - Dauphin	PADEP - Individual NPDES Permit, GP-11, Submerged Lands License Agreement
Susquehanna - Jenkins	PA Game Commission - License Agreement

The PPL EU organization houses Right of Way, Real Estate, Permitting and Licensing in one cohesive group. In peer utilities, these groups often function independently. PPL EU chooses to combine these organizations to promote synergies, reduce redundancies, increase checks and balances and allow for enhanced budget and schedule accountability.

Equipment and Material Procurement

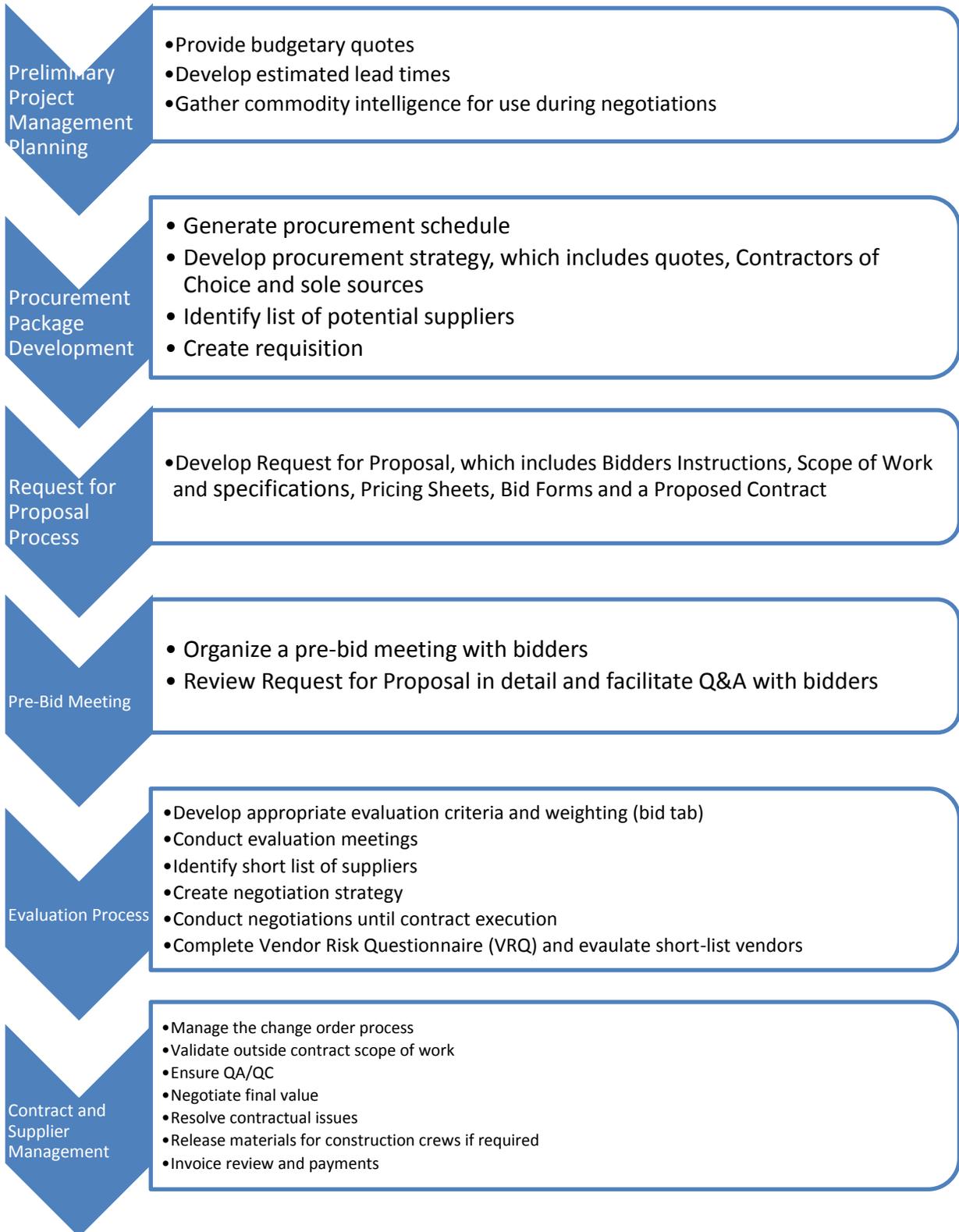
Supply Chain Management is centralized within PPL EU and works closely with PPL EU's Transmission Project Management to secure materials and services utilizing competitive processes that ensure a fair and competitive outcome, while minimizing company risk and delivering materials and equipment according to project schedule. The Supply Chain organization is set up to deliver materials and services successfully for future transmission projects through its organizational and operating structure, established relationships and recent large-scale project experience:

Supply Chain Structure

While a centralized supply chain organization provides the benefits of scale and process efficiency, the Transmission organization benefits from Transmission Project Specialists that have long-standing relationships with many key suppliers. The Supply Chain organization is split into Sourcing and Logistics functions, which both interact directly with PPL EU Project Managers.

See Figure 5 for a visual representation of the Sourcing process that PPL EU follows.

Figure 5: PPL EU Sourcing Process



Established Relationships with Key Vendors

The Sourcing department has relationships with vendors nationwide, creating a strong network across the PPL EU footprint. The Sourcing organization has developed an extensive RFP process that comprehensively vets potential contractors for safety, performance, quality, EMR, DART Rates and safety incidents. The process also involves interviews of personnel and relevant clients to confirm compatibility and the ability to deliver. PPL EU is confident that due to the significant volume of projects it executes and the emphasis it places on supplier relationships and sourcing effectiveness, that it receives preferred customer prices that are equal to or better than its peers and can also secure supply when others in the industry are unable to find needed resources and/or materials.

Susquehanna – Roseland Project Experience

PPL EU has significant recent sourcing and logistics experience as evidenced by the Susquehanna – Roseland 500 kV project. PPL EU found that embedding a Sourcing Manager into the Susquehanna – Roseland project team allowed for greater project success. This setup enabled the Susquehanna – Roseland sourcing manager to better communicate with other internal project stakeholders, which is helpful during sourcing negotiations. The Sourcing department was responsible for the procurement of all materials and services for the project, with the exception of \$6 million small-scale items like connectors and fuses.

Contract Management

The Contract Management organization develops the overall contract strategy and is responsible for initiating, developing, negotiating, administering, and managing the performance of contracts involving the use of contractors for all PPL EU construction, design, engineering, and miscellaneous services work in accordance with PPL Corporation’s Supply Chain policies.

Contractor Relationships

The Contract Management department is responsible for identifying and vetting potential contractors, maintaining contractor relationships, understanding contractor capabilities, managing Request for Proposals (RFPs) and contracting processes, and matching contractor capabilities with business requirements. PPL EU has established a preferred set of contractors, Contractors of Choice (COC), through an extensive, formal RFP process. The Contract Management team has established relationships with contractors nationwide, which creates a strong ability to effectively source the best contractor(s) for each piece of work required by PPL EU. This contracting process delivers a best practice contracting approach that generally complies with the National Contract Management Association standards and processes. The team also looks to champion continuous improvement and innovation and employ balanced negotiation practices to improve business results.

Contracting Strategy

The Contract Management organization is responsible for developing, managing and administering the Contracting Strategy for PPL EU. The team serves as the single point of contact for obtaining contracting reviews and approvals for the use of contractors for work across PPL EU system. Contract Management works with other teams to develop a final scope for contracting all types of miscellaneous physical work as well as engineering and construction work. The Contract Management team contracts PPL EU work

related to transmission, distribution, substation, and vegetation management services.

Communication with External Contractors

The Contract Management department maintains and requires frequent communication with external contractors throughout the project lifecycle. The PPL EU team holds regular quarterly meetings with all contractors to share and receive feedback, with more frequent meetings held as necessary. PPL EU also holds monthly Environmental, Health and Safety (EHS) meetings with all contractors to educate contractors on new requirements and regulations, share concerns, discuss best practices and gather feedback. Our Contract Management team believes that this open, two-way communication loop improves the work of both the contractors and our internal Contract Management team and is extremely beneficial for current and future projects.

Project Management

The PPL EU Project Management department manages projects from approval to closeout using industry-accepted project management methodologies and standards. The PPL EU Project Controls team works closely with the Project Management team, which provides for more effective execution and follow-up of projects.

Project Management

The PPL EU Project Management team ensures that project activities are completed to scope, schedule and budget, to facilitate the business objectives and requirements that are outlined in the project plan using best-in-class Project Management Institute (PMI) practices. The Project Management team remains connected to projects throughout the entire development lifecycle, which starts with a specific Project Manager being assigned to a project in the early stages of Project Planning and Design. The Project Management team has experience managing projects across the service territory and across all types and sizes of projects. Depending on the size and scope of a particular project, Project Managers are responsible for managing and overseeing anywhere from one to fifteen projects at the same time. For the largest and most complex projects PPL EU will assign our most experienced Project Managers to ensure that the project is handled in the most efficient and effective method possible.

Relationships with External Stakeholders

The team interacts directly with key stakeholders to facilitate completion of project activities and provide them with timely communication. The Project Management department utilizes key performance metrics and indicators to measure progress and outcomes as they relate to project and key stakeholder goals as well as to align project execution with strategy. For the vast majority of projects, PPL EU handles all project management activities internally; however, PPL EU also has experience managing external project management resources when work volumes exceed our internal capacity. Our experience vetting and engaging external resources allows us to quickly and efficiently accommodate significant increases in project activity.

Project Controls

PPL EU's Project Controls group is tightly integrated with the Project Management department within a single organization, which facilitates communication and increases efficiency. The Project Controls group provides financial and scheduling support throughout the life cycle of PPL EU's transmission projects

utilizing guidelines established by the Project Management Institute (PMI). This includes developing project baseline budgets, maintaining project schedules, tracking resource usage and project progress, identifying potential problems and using advanced analytical tools such as earned value metrics and reporting. Additionally, this position prepares overall capital project forecasts and cash flows for the PPL EU business plan.

Cost Analyses

The Project Controls group works alongside Project Managers and project teams to assess and address resource and cost-related risks during the project life cycle, including the analysis of costs related to open contract items such as claims for out-of-scope work billed by contractors. The Project Controls group supports Project Managers in performing specialized analyses of corrective action plans to determine the most effective means of addressing potential problems. For example, the Project Controls group would be responsible for assessing the cost of schedule slippage versus a variety of alternatives including the cost of hiring additional contractors and/or the cost of using internal resources at overtime rates.

Performance Management

The Project Controls Department implements process controls for the governance of project schedules and budgets, ensures adherence to Generally Accepted Accounting Principles (GAAP) guidelines and compliance to Federal Energy Regulatory Commission (FERC) and Sarbanes-Oxley Act of 2002 (OSX) regulations. The department objective is to ensure projects meet their intended goals while adhering to schedule and budget projections. The Project Controls Department is managed by the Manager, Portfolio Management, & Project Controls and is supported by Project Control Leader(s) and Senior Accountant(s).

Construction

The PPL EU Construction Management department is directly responsible for ensuring that contracted work for PPL EU is completed on time, within budget, to specified quality levels and that PPL EU policy and procedures are understood and followed by contractors.

Strategic Goals

The Construction Management department uses a Strategic Framework that translates cascaded strategic goals into meaningful objectives.

Field Representatives

The PPL EU Construction Management team acts as the field representative on project teams. Due to the recent increase in transmission investments, and subsequent rise in construction work volume, the PPL EU Construction Management team has gained valuable experience that sets us apart from peer utilities. The team is responsible for participating in constructability assessments and the development of project plans, which include project risk assessments. Once construction has begun, the team continues to manage construction throughout the lifecycle of the project until construction completion.

Construction Liaison

The Construction Management team is responsible for ensuring that contractors review the work plans, understand the scope and requirements for performing the work and understand the General Safety Procedure requirements. The Construction Management team ensures timely receipt of materials and has experience coordinating construction resources when multiple contractors or PPL EU crews are involved with a project, outage, specialty equipment, and / or material staging / lay down areas. At the beginning of construction, the Construction Management team sets priorities across the project construction timeline to ensure timely task completion and clear accountability. Throughout the construction process, the Construction Management team directly manages the change order process for contract claims, particularly for work that is not in scope. As a result, the team has experience participating in claims dispute resolution sessions as well as negotiating changes to the project scope. The team is responsible for ensuring quality workmanship before accepting the finished product and verifies all contractor invoices.

Adherence to Project Costs and Budgets

The Construction Management team develops and implements policies and procedures for budget/cost tracking, corrective actions, and schedule changes as cost deviations are detected. Construction Management provides regular project status reports to the Project Managers and Project Controls Group including corrective actions taken to keep projects on track. This high level of coordination and communication between Project Management and Construction provides a distinct advantage to PPL EU in transmission project development and execution.

Commissioning of New Facilities

PPL EU has an established Acceptance of Facility process for newly installed equipment to ensure that all equipment performs as intended when subjected to real world operating conditions. Standardized equipment and relay tests are specified and conducted, reviewed and approved by T&S Commissioning Engineering prior to energizing the equipment. Real world system voltage is also methodically tested against all equipment before applying customer load.

Pre-Commissioning activities such as programming relay settings, relay testing, trip testing, wiring validation and testing for shorts and grounds are performed by relay technicians, substation design engineers and contractors to ensure projects are ready for demonstration testing at the time of commissioning. Test results are then recorded on the Acceptance of Facility forms and approved by T&S Commissioning Engineering prior to being placed in service.

New or Emerging Technologies

PPL EU has deployed a fully digital drawing and standard management tool, which can be used to quickly deploy designs to the field while also ensuring a seamless process when working with standard drawings from incumbent utilities.

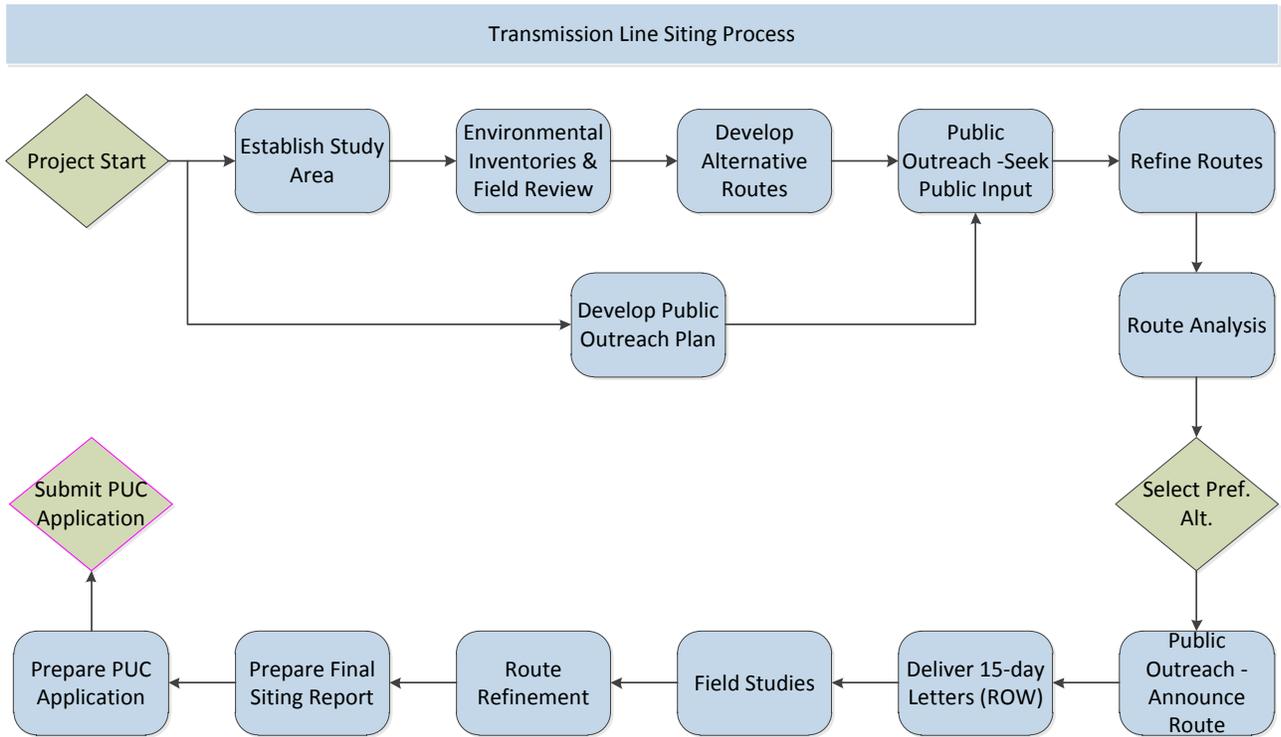
The Transmission Engineering group utilizes a new state-of-the-art Power Line Computer Aided tool called PLS – CADD that acts as a centralized tool for designing and drafting. The tool enables the group to develop “seed” files that retain data and update directly from LIDAR surveys which can be used as the foundation for future designs. The Substation Engineering group is piloting a Synergis 3-D design tool

program that uses the latest and most simple designs to interface with 2-D designs.

Routing and Surveying

PPL EU’s Siting department is an integral part of the transmission project lifecycle for both the Bulk Electric System (BES) and the non-Bulk Electric System (non-BES). The Siting team becomes involved during the early stages of the project development lifecycle during the Concept phase and manages key functions such as route determination, PA PUC application development and community outreach. See Figure 6 for a visual representation of the Siting Process.

Figure 6: Siting Process



The main responsibilities of the Siting team are outlined below:

Study Area Development

One of the team's first tasks is to define the Project Study Area. The Study Area encompasses the source and destination points. Man-made or natural barriers that would restrict line construction determine lateral boundaries. Absent such barriers, boundaries are set at a location beyond which the length and/or costs of line construction become unreasonable. Defining the Study Area is important because it sets the limits on the amount of information to be collected

Environmental Inventories

In the early phases of the project lifecycle, the Siting team conducts comprehensive Environmental Inventories necessary to make informed facility siting decisions. The organization utilizes robust processes to analyze land use, environmental conditions to get a detailed understanding of the area in which the facilities may ultimately be situated. The Environmental Inventory consists of gathering baseline environmental, land use, and natural features data for the study area.

Proactive Community Outreach

PPL EU understands the right and the need for residents in and around the project study area to be notified, informed, and to provide feedback to the Siting Team on proposed PPL EU facilities. To facilitate this exchange of information, the Siting Team is responsible for developing and implementing a Public Involvement Plan and a Communications Plan. The Public Involvement Plan is the blueprint that is followed to ensure the public is involved in the decision-making process as appropriate for new PPL EU's Electric substations and new or relocated transmission lines

Alternative Development/Selection of the Preferred Route

Based upon all the information gathered and input received, alternative line routes are developed. The Siting Team evaluates and documents the environmental and land use impacts of each alternative. Costs for each alternative are also developed. The Siting Team ranks the alternatives based upon their environmental and land use impacts, public and governmental input, and costs the Siting team has a thorough understanding The Siting team evaluates the social, environmental, constructability and cost impacts for each alternative route to determine the optimal route for facilities.

Preferred Route Development

After the preferred route has been chosen based on impacts analyses, public input and input from the internal team, the Siting team coordinates the initial environmental surveys, including wetlands, threatened and endangered species and cultural resources for the preferred route. In addition, the Siting team also begins to communicate and coordinate with the Right of Way team about mapping and initial property surveys. Early coordination with the Right of Way team sets PPL EU apart from other utilities and creates cohesion in the early stages of project development.

Historically, the internal Siting team has conducted most site and route selection work in-house, but PPL EU has established relationships with several siting and environmental firms which allows for easy scaling based on the volume, size and complexities of projects being undertaken. The external contractors are also able to provide supplemental environmental assessment reports on plants, wildlife,

threatened and endangered species, cultural / historical resources and land use impacts.

Right-of-Way and Real Estate Acquisition

The PPL EU's Right of Way, Real Estate and Permitting team is heavily integrated with the Siting team, which provides benefits such as increased community outreach and greater consensus on route development. The Right of Way team is involved in a variety of functions that largely involve external stakeholders, which can be seen below:

Route Selection Assistance

The Right of Way team assists in route siting and selection, largely through extensive community outreach. The Siting team utilizes input from the Right of Way team to determine community preferences, which can ultimately impact route determination.

Market Studies

Once the preferred route has been identified, the Right of Way team conducts a market study, which can be completed internally or by an external appraisal firm, to determine property values, estimate Right of Way costs and determine the appropriate timing for acquisition. The team will also attend open houses in order to facilitate the Right of Way process.

Relationships with Government Agencies

At an early stage, the Right of Way team identifies relevant governmental agencies involved in the project like State Game Lands, Department of Conservation and Natural Resources and the National Park Service. Although PPL EU has strong relationships with many governmental agencies, negotiations can have significant impacts to project timelines, as seen with the National Park Service in the Susquehanna – Roseland project, so early contact and collaborative negotiation is a priority for PPL EU.

Landowner Relationships

The PPL EU Right-of-Way team is responsible for ordering title abstracts and preparing 15- Day Packets, which explain topics such as PPL EU's fair negotiation tactics, background on eminent domain and relevant vegetation management information. Figure 8 is an example of a PPL EU cover letter for the 15-Day Packet that PPL EU delivers to landowners.

Figure 7: PPL EU 15-Day Packet

RE: [REDACTED] Rebuild Notification

Dear [REDACTED]

PPL Electric Utilities Corporation (PPL) is planning to rebuild the [REDACTED] 69KV electric transmission line in [REDACTED]. This project will significantly improve the reliability of electric service in your area, particularly during and after major storms. I am writing to notify you of the proposed project as required by the Pennsylvania Public Utility Commission.

PPL plans to negotiate with the applicable landowners to expand the current right-of-way to [REDACTED] feet in width to accommodate the rebuilt transmission line.

Since the proposed right-of-way needs of this project may involve your property, enclosed are notices required by the Pennsylvania Public Utility Commission that provide important information regarding eminent domain, right-of-way maintenance practices, and land agents conduct. Also enclosed is PPL's Internal Practices for Dealing with the Public on Power Line Projects. The Pennsylvania Public Utility Commission's regulations require that PPL provide you with this information at least 15 days in advance of our discussions. For your convenience, I also have enclosed information on electromagnetic fields and a brochure on vegetation management, as well as a glossary of real estate terms.

If you have any questions on any of the enclosed information, please contact me at [REDACTED]

I kindly request that you sign in the space provided below to indicate that you have received this information.

Very truly yours,

[REDACTED]
Right of Way Agent
PPL Electric Utilities Corporation

The Right of Way team has representatives spread out across the six PPL EU regions which allows for more direct communication and access to landowners, providing a key advantage for PPL EU. Because of the geographic dispersion of resources, the team can hand deliver and attain landowner signature for acknowledgement of receipt as well as deliver or mail non-negotiating packets to adjacent landowners. The team negotiates with landowners for easement acquisitions, fee purchases when required, substation sites, access roads, pull-pad sites and off-ROW access. The Right of Way department follows landowner relationships all the way to completion by obtaining Highway Occupancy Permits and access road agreements, reviewing survey drawings, scheduling closings, delivering payments and acting as a liaison during construction.

"Property Owner Perspective"

PPL EU prides itself on taking a "property owner perspective" when acquiring ROW – for example, rather than splitting a small parcel, PPL EU will seek to buy the land outright and accommodate landowner requests when practical. Acquiring Right of Way is a complex process that requires the coordination of

many stakeholders, but the PPL EU's Right of Way team has demonstrated success through several acquisition projects with 100% voluntary acquisition. On a limited basis, the Right Of Way team has been involved in a few condemnations.

Liaison to Landowners during Construction Process

A key element that sets the Right of Way team apart from peer utilities is the level of involvement PPL EU maintains with internal and external stakeholders throughout the entire development and construction process. During planning and construction, the Right of Way team coordinates with landowners and external agencies for input collection and negotiation. After construction is complete, the team remains engaged to assist with, and ensure, project clean up, including crop damage payments.

Internal and Contractor Safety Program, Including Safety Performance Record and Program Execution

Safety is a core value at PPL EU, and the company is committed to providing a safe work environment and to send each and every employee home injury-free each and every day.

Safety is a commitment that actively involves everyone in our organization. PPL EU's safety rules and procedures are a compilation of hazard controls and barriers identified through proactive work methods and past experiences – either by us or regulatory agencies. Only by consciously identifying the hazards of the job, knowing the safety rules and procedures, and applying them can PPL EU develop a safer work culture.

It is every employee's obligation to ensure that safety rules and safety procedures are incorporated into the planning and performance of each task. The scope of responsibility for a safe work environment includes a variety of duties by each PPL EU employee.

According to the Safety process, there are differing responsibilities for each level of responsibility at PPL EU. According to the Safety process:

All levels of management shall be responsible to:

- Educate employees under their direct supervision on safety rules
- Plan the work to include applicability of safety rules
- Monitor the work to ensure applicable safety rules are being followed
- When warranted, enforce safety rules through appropriate behavior modification, to include disciplinary method from reprimand up to termination
- Communicate with Environmental Health & Safety on interpretation and applicability of safety rules.

Each employee shall be responsible to:

- Become knowledgeable of safety rules and their application
- Identify safety rules, work methods, and safety procedures applicable to the task(s) performed

- Adhere to all safety rules applicable to the task(s) at all times
- If there are questions on applicability, employees must seek interpretations of safety rules prior to performing the task.

Through its Safety program, PPL EU strives to minimize Occupational Safety and Health Administration (OSHA) designated Recordable Events. A Recordable Event consists of any occupational illness or injury that requires medical attention above and beyond simple first aid. As seen in Figure 8, PPL EU has low incidence rates, especially when compared with industry peers.

Figure 8: PPL EU OSHA Recordable Events, 2016-2019

	2016	2017	2018
PPL EU Employees:			
Number of OSHA Recordable Events that occurred in PPL EU	47	32	26
Incidence Rate as related to the number of OSHA Recordable Events	2.1	1.71	1.28

Control Center Operations

PPL EU’s Transmission Control Center (TCC) is tasked with the responsibility of monitoring and operating a reliable transmission grid as defined by PJM, RF and NERC.

Transmission Control Center

In order to operate and maintain the transmission grid reliably, PPL EU manages a Transmission Control Center 365 days, 24 hours a day in the Lehigh Valley. The control center is completely secure and has redundant data and communication at both the Operations Center and the Disaster Recovery Site that are independent of each other and meet all RF and NERC Reliability Standards. The control center adheres to the guiding principles of safety, reliability and production in that order. Due to proactive approach and use of Human Performance tools the TCC has lessened the severity (or impact) and amount of Electric System Events (ESE’s) and continues to strive for zero ESE’s.

Transmission Control Center Operations

Core responsibilities of the TCC include monitoring and operating the BES and 69kV systems in the PPL EU footprint using an GE EMS system, directing the application of the PPL EU Permit and Tag process and procedures, constructing and maintaining the EU Outage plan, using EMS - load flow and study programs and contingency analysis to identify and mitigate overloads on a pre-contingency basis. The Operations engineering section resolves operational discrepancies with PJM when load flow models provide inconsistent results and requests stability studies from either Transmission Planning or PJM to

assure system reliability is maintained within predefined limits. A key differentiating attribute of the TCC that sets PPL EU apart from other utilities is its tight linkage and coordination with the Susquehanna nuclear plant, including interface documents and maintenance and outage coordination meetings. This interface demonstrates PPL EU's ability to manage significant and complex interfaces safely and reliably.

The Transmission Control Center is comprised of employees who are certified PJM, NERC and PPL EU operators. The Manager of the Transmission Control Center is also PJM and NERC Certified.

NERC Compliance Process and Compliance History

NERC Compliance Program

The purpose of PPL EU's NERC Compliance Program is to achieve and maintain compliance to applicable NERC Reliability Standards approved by FERC. As part of a healthy compliance culture and continuous learning organization, PPL EU follows a well-defined process for identifying, analyzing, documenting and resolving potential non-conforming conditions related to PPL EU's NERC Compliance program. This process is defined in the PPL EU NERC Governance Program (EU-NERC-100) as the Compliance Condition Report (CCR) Process. PPL EU's CCR process includes near miss/good catch events which helps ensure corrective action is taken before issues occur. PPL EU was granted self-logging permissions by RF for both Operations & Planning (O&P) and Critical Infrastructure Protection (CIP) Reliability Standards, demonstrating confidence in PPL EU's NERC Reliability program and self-monitoring capabilities.

Proven Compliance Track Record

PPL EU is very well received among peers, both within NERC and the RF regional organization. PPL EU takes pride in our compliance track record and external stakeholders recognize PPL EU for its compliance expertise. For example, Tim Gallagher – CEO of ReliabilityFirst Corporation stated, *“We hold PPL in very high regard based on our past dealings, understanding of your compliance programs and reliability record. Observing the culture and attitude you have developed and implemented only served to reinforce our opinion....when ReliabilityFirst encounters a company that is struggling with its compliance programs, PPL is the first company suggested as a contact to help them improve.”*

PPL EU has been audited by the FERC, NERC, RF, and PJM on O&P and CIP Reliability Standards including tasks assigned to PPL EU via the PJM TO/TOP Matrix. PPL EU has also participated in RF Re-certifications of its new Operations Control Center (2014) and EMS Upgrade project (2018) as part of the NERC Rules of Procedure. Part of PPL EU's compliance success results from its early adoption of its CCR process which includes steps to identify and document non-conforming situations, perform an internal assessment that looks at generic implications that go beyond the specific event and ensures that the appropriate measures are taken to prevent recurrence. This process identifies potential problems early and, if deemed necessary, may result in self-reported potential non-compliances (PNCs), both of which are considered best practices. PPL EU has received numerous comments from the auditors for our commitment to reliability, continuous improvement and transparency during the process.

External Stakeholder Engagement

In order to ensure that PPL EU and its affiliates remain current on reliability and compliance related activities, PPL EU is active in the industry and well represented on many of the industry forums and committees available through EEI, NATF, PJM, RF and NERC. In addition, PPL EU frequently engages in peer-sharing events with other utilities to share best practices.

Compliance Training

PPL EU recognizes that the identification, development and delivery of specific role-based training is essential to long-term compliance with NERC Reliability Standards. PPL EU provides numerous NERC related training courses for applicable PPL EU employees and contractors. Some of these courses are designed for one-time implementation and others are designed for periodic implementation.

Registration or Ability to Register for Compliance with Applicable NERC Reliability Standards

PPL EU Compliance Resources

PPL Corporation and its relevant subsidiaries have dedicated resources, including staff and budget, to meet the requirements of PPL's NERC Compliance Program. Subject Matter Experts in PPL EU utilize their expertise in achieving, documenting and sustaining compliance to the NERC Standards on a part-time basis. The full-time resources noted above coordinate the efforts of these SMEs to ensure that compliance related tasks are properly implemented. Office of General Counsel, Corporate Security, Information Solutions and Corporate Auditing also apply internal resources to the NERC Compliance Program.

Storm/ Outage Response and Restoration Plan

Outage Requests

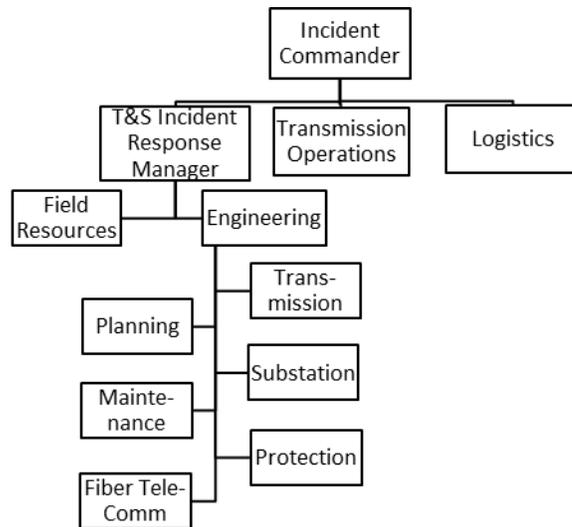
In addition to real time operations the department is charged with the construction and maintenance of the PPL EU outage plan. TCC Outage Planning analyzes and processes requests to upgrade transmission facilities and then translate these requests to equipment outages / restrictions using the PJM outage criteria time lines. The TCC effectively plans all outage requests, limits risks to the electric system, ensures PPL EU customer reliability and responds to any unplanned events. Transmission outage planning, including risk and conflict analysis, is key to promoting safety, preserving the reliability of the BES, eliminating volatility in the work portfolio and ultimately completing all projects in the capital and maintenance budgets.

T&S Incident Response

The T&S Incident Response process outlines the organizational structure, strategy, and process to effectively respond to a Transmission system event. The T&S Incident Response Manager interfaces with the Transmission Operations organization and leads a team of representatives from multiple

organizations: engineering, including Substation and Relay engineering; Protection Analysis; Transmission Engineering, T&S Maintenance Engineering, Relay Test and Fiber/Telecommunications. Incident Response Team members are on call to quickly address any electric system event that may occur. Figure 9 illustrates the engineering collaboration on the T&S Engineering Support team.

Figure 9: PPL T&S Incident Response Team



Emergency Preparedness

PPL EU has an Emergency Preparedness (EP) group. The Emergency Preparedness group’s mission is to develop and maintain comprehensive emergency response plans for all of PPL EU through documented policies, procedures and processes that incorporate lessons learned and industry best practices. The group also supports the effective execution of the plans through training and the conduct of periodic drills and exercises to test the plan under various restoration scenarios.

Emergency Response Plan

PPL EU has an emergency response plan that provides for a coordinated and comprehensive response for the rapid restoration of electrical service during and after natural disasters, man-made events or other emergencies by ensuring that all required corporate resources are used in the most efficient manner. The plan describes the PPL EU Emergency Response Organization and the roles and responsibilities of those responding to an emergency event. It also defines the thresholds for expanding the emergency response organization based on the size and complexity of the event.

Emergency Response Activation

For the weather report, PPL EU currently uses two different sources; StormGEO, which is a national weather prediction company, and EPAWA, which is a PA / Allentown based weather company. Using a combination of their predictions, PPL EU develops a model that will then show how the PPL EU system will be impacted. Additionally, PPL EU contracts with a third-party weather service that provides daily forecasts tailored to each of the six operating regions, real-time weather alerts, telephone consultation with an on-call meteorologist and lightning data. Hourly feeds of the daily weather forecast are uploaded into the PPL EU outage prediction model that is used to predict the number of cases of weather-related trouble anticipated across the system. Based on the forecast and the outage model predictions, a pre-event strategy conference call may be conducted by the on-call storm team.

PPL EU Employee Involvement

Each PPL EU employee is assigned to one of 86 emergency support roles that support storm and non-storm emergencies. The Emergency support roles of employees are tracked through the PPL EU's Human Resources database. Position specific procedures and job aids have been developed to provide guidance and outline the roles and responsibilities of the positions. All information and tools necessary for the implementation of the plan are stored and maintained on an internal SharePoint Site that is accessible to all PPL EU employees. PPL EU and PPL Services Corporation have personnel on call 24 hours a day, seven days a week, to fill the critical functions needed to support and staff the Emergency Command Center (ECC) and each of the three Regional Command Centers (RCCs) throughout PPL EU's service territory.

Smaller, isolated storm events impacting one of PPL EU's six regions are managed by the impacted region's on-call Regional Emergency Manager. However, when multiple regions are impacted, the Emergency Command Center is staffed and the incident commander for the event, the Director - System Emergency (DSE), is responsible for the overall restoration of PPL EU's transmission and distribution systems.

Monthly emergency exercises are conducted to maintain ECC and RCC staff proficiency with tools and processes. Additional exercises are conducted to assess summer and winter readiness. The EP group also facilitates bi-monthly Storm & Emergency Improvement Initiatives meetings to communicate to leadership teams in the regional and emergency command centers any changes to storm and emergency processes.

Key External Relationships

PPL EU has access to additional resources through the local contractors working on PPL EU's transmission and distribution systems. Additional resources are available through our affiliates: Louisville Gas & Electric and Kentucky Utilities. In the event of extreme damage to the T&S infrastructure, PPL EU has access to two very large pools of resources through the mutual assistance groups to which we belong: The North Atlantic Mutual Assistance Group (NAMAG) and the Southeastern Electric Exchange (SEE).

Emergency Response Experience

On October 28, 2015, the heavy bundle of communications lines and ropes dangling from an errant military blimp that broke free from the Aberdeen Proving Ground in Maryland caused significant damage to PPL EU transmission lines and distribution equipment. Five transmission lines were locked out of service.

The Emergency Response Organization immediately activated to locate and assess the damage and to secure the resources and materials needed for repairs. A total of 30,000 customers were without power at the start of the incident, and all were restored by early Thursday morning (10/29).

This incident demonstrated that PPL EU is prepared to respond to even the most unusual of events on our system.

Awards and Recognition

PPL EU has recently received the following awards for storm response and industry support:

- 2013 Northeastern Pennsylvania Manufacturers and Employers Association Process Improvement Award for improvements related to storm response processes.
- J.D. Power and Association conducted a national survey of consumers to rate performance of utilities and local, state and federal government actions prior to and following Hurricane Sandy. In February, J.D. Power recognized PPL EU as one of only three utilities that performed “Particularly well”
- EEI Awards:
 - 2017 Emergency Assistance Award for restoration assistance provided in Florida following Hurricane Irma.
 - 2012 EEI Emergency Recovery Award for Hurricane Sandy
 - 2012 EEI Emergency Assistance Award, for tremendous support in the recovery from

Record of Past Reliability Performance

PPL EU is committed to achieving leading operations reliability and system performance for its transmission system. Stringent maintenance programs have been developed that prioritize maintenance activities based on established reliability standards, asset management driven programs, and overall equipment criticality. It is PPL EU’s philosophy to perform as much substation maintenance as possible internally.

The experience of the PPL EU transmission team is essential to success in operating and maintaining the system’s transmission assets. A wide variety of training is available and provided for engineers, technicians and crews, including programs for journeyman, switchman, substation engineering, and relay technicians. Human performance tools training has also been developed to reduce human errors and programs required for NERC / CIP compliance, such as NERC compliance overviews, substation simulations, critical cyber asset recovery drills, system protection programs, facility rating methodology instruction and guidance for proper handling and protection of transmission information. Training programs are predominantly developed and administered internally, but external vendors provide training in some cases, especially on newly acquired equipment and tools.

This commitment to system performance through effective, preventive and real-time operations and maintenance programs is borne out in the reliability performance of system assets. As shown in Figure 10 below, T-SAIFI performance has been continually improving and has reached top-quartile performance (excluding major events). In July 2018 PPL EU won its 7th straight J.D. Power award for residential customer satisfaction.

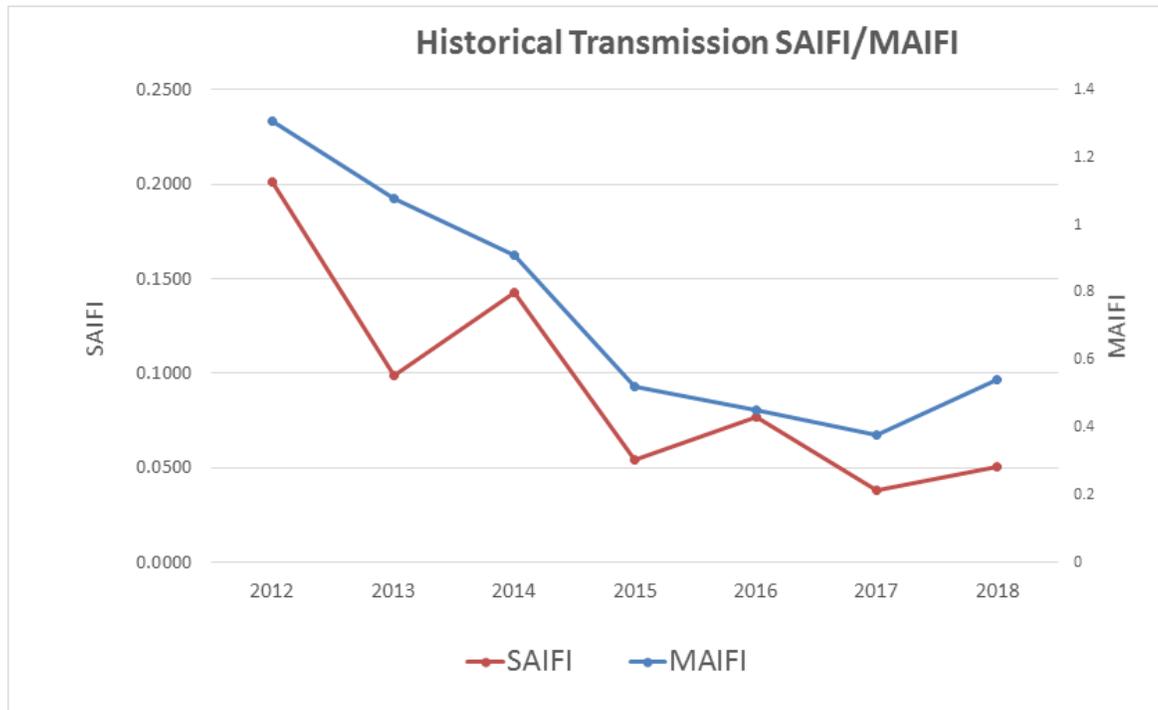


Figure 10: PPL EU T-SAIFI and MAIFI Historical Trend

Statement of Which Entity will be Operating Completed Transmission Facilities

Completed transmission facilities will be operated by PPL EU.

Staffing

The TCC employees seek continuous improvement in technologies and processes, are trained in all relevant operator tasks, and embrace compliance as a measure of PPL EU’s effectiveness. The PPL EU Transmission Control Center follows best-in-class training practices, which increases the effectiveness of the organization and creates a distinct advantage when dealing with adverse conditions. All Transmission Control Center employees are trained within the TCC and they receive NERC, PJM Transmission Operator, PJM Generation and PPL EU training, several of which receive PJM and NERC certifications. In addition, PPL EU owns an internal simulator that is used for training. The transmission control center operators have broad experiences across multiple areas of the control center and are well versed on the uses of security- analysis/state estimation tools. Because of the training, the operators are all able to take action when necessary and can perform trouble shooting on advanced systems. All team members at the TCC participate in black start drills, and act as liaisons between PPL EU and PJM for information dissemination. All operators are coached and trained in black start requirements to ensure not only job knowledge but also to assure consistency from drill to drill.

Equipment

Supply Chain Management is centralized within PPL and works closely with PPL EU's Transmission Project Management to secure materials and services utilizing competitive processes that ensure a fair and competitive outcome, while minimizing company risk and delivering materials and equipment according to project schedule.

While a centralized supply chain organization provides the benefits of scale and process efficiency, the Transmission organization benefits from Transmission Project Specialists that have long-standing relationships with many key suppliers. The Supply Chain organization is split into Sourcing and Logistics functions, which both interact directly with PPL EU Project Managers.

The Sourcing department has relationships with vendors nationwide, creating a strong network across the PPL EU footprint. The Sourcing organization has developed an extensive RFP process that comprehensively vets potential contractors for safety, performance, quality, EMR, DART Rates and safety incidents.

Crew Training

The ability to respond to unexpected events, such as major electric-system outages, is a critical skill for control center personnel, and the related training programs and emergency drills conducted help to prepare for unexpected events. PPL EU's control center has a training coordinator responsible for developing quality training programs, engaging operators, verifying learning and refreshing the program over time. A large part of the training program consists of providing trainees with the necessary hands-on experience in dealing with challenging situations. Control room simulation provides experienced operators and trainees realistic and real-time experience in dealing effectively with those events that are unlikely, but potentially catastrophic. A virtual control room provides trainees and staff with a variety of realistic, but simulated scenarios, such as equipment failures, outages or other problems. The Dispatcher Training Simulator (DTS) is part of the energy management system and mirrors the real-time system to enable operators to create diverse scenarios that might be encountered.

Staffing and Crew Training

PPL EU currently has field employees dispersed across its operating territory solely responsible for the 24/7/365 operation and maintenance of substation facilities and equipment. The majority of physical operations and maintenance for substation facilities is performed by this team internally to ensure immediate and guaranteed service. The varied skill set of the department includes emergency response and restoration, operational switching, substation inspections, operational functionality testing, system protection functionality testing and general troubleshooting and maintenance in the substation environment. This team is also responsible for executing diagnostic testing, preventative maintenance and corrective maintenance for all substation equipment including NERC required maintenance of relay zones of protection, and voltage and current metering devices. This team is fully equipped with the latest test equipment, SF-6 gas and insulating oil-handling and processing equipment for maintenance and diagnostic testing of power transformers, circuit breakers, potential transformers, current transformers, protective relaying and switchgear.

The substation electricians are trained in a Department of Labor sanctioned four-year apprenticeship

that requires 144 hours of formal training for each year of the apprenticeship and a comprehensive written and oral examination at the end of the apprenticeship before advancing to Substation Journeyman Electrician. System protection relay technicians are two-year degreed technicians with various levels of experience and skills. Substation Field Engineers are all degreed Electrical Engineers with various levels of experience in substation operation and maintenance.

Maintenance crews are assigned substation responsibilities which drives a sense of ownership and community between the team assigned to that facility. In the unlikely event of an equipment failure due to human error, there is no lack of clarity regarding responsibility. All of the crews perform individualized, local switching, diagnostic testing, inspections, preventative maintenance, corrective maintenance and emergency response. These crews are assigned work throughout the year and, using an accepted work management tool (Cascade). Crews also coordinate work that could impact both ends of a line outage or outage availability. Completion progress is tracked, monitored and reported on a monthly.

The operations and maintenance team also provides input into new project development on optimal design and construction in terms of ease and cost to maintain the assets.

PPL EU's Maintenance organization is responsible for providing direction and oversight of the Electric Utility's Transmission and Substation Maintenance Engineering functions. The team promotes the safe, reliable, efficient and economical operation of the PPL EU Substation and Transmission line assets in order to optimize customer reliability and service.

Work Management

The Maintenance organization uses the Cascade maintenance program to schedule tasks and monitor an inventory database, which can be used for failure analysis and root cause investigations. The group is continually developing and refining a Preventative Maintenance program which includes processes, technical support and training to reflect best-in-class maintenance practices. The Maintenance organization regularly interacts with the Transmission Operations organization to coordinate repair priorities based on established reliability standards and equipment criticality.

Maintenance Resources

The Maintenance organization has engineers stationed throughout all six regions of the PPL EU footprint in order to provide technical support and quickly respond to issues that may arise. The engineers are highly trained, and their experience is essential to successfully maintaining the system's transmission assets. The organization requires that its employees attend seminars and manufacturer trainings. The PPL EU Maintenance organization has strong relationships with our Contractors of Choice in all six of the regions in PPL EU's footprint.

Transmission Facility and Equipment Maintenance and Record of Past Maintenance Performance

PPL EU has established an asset management strategy to manage reliability at target levels and minimize system risk, all with sustainable spending levels. Maintaining a consistently reliable and cost-effective transmission system requires a robust and methodical strategy for efficient maintenance, which incorporates a number of strategies to enhance system performance, including:

- Deliberate capital investment to ensure sustainability and drive down on-going and unplanned maintenance
- Cost-effective maintenance programs designed around asset condition and desired operating outcomes
- Reducing variability by mitigating high-consequence events and establishing and enforcing robust standards
- Leveraging technology to increase system visibility and improve operability
- Developing systems, tools and processes to enhance asset management decision making and generate value
- Collecting comprehensive asset information to facilitate accurate analyses and informed decision making

This sustainability concept combines deliberate, proactive equipment replacement, targeted asset maintenance programs, improved decision data and deployment of the right monitoring and control technologies. Design and materials standards have been established that optimize life-cycle costs and oversee effective commissioning to enable a high-quality system to be operated. These concepts are essential to developing a strategy to sustain the system at a reasonable cost.

The Transmission Maintenance Group conducts both routine and emergency maintenance using a variety of methods and technologies including: helicopter patrols (comprehensive, routine and emergency), special patrols resulting from Risk Mitigating Studies, foot patrols, routine air break inspections, thermo vision, Acceptance of Facilities, pole inspections and right-of-way encroachment reviews. Figure 11 is an example of a Condition Report from comprehensive helicopter inspection conducted by one of PPL EU's Contractors of Choice.

Str / Span	Location	Structure Side	Circuit	Phase	Insulator	Sub-Conductor	Shield Wire	Span Location	Component	Problem	Priority	Accessible	Severity	Inspection Date
1	ALL									Re-Inspect Entire Line (Every Year)				01/03/12
2	Sunbury Sub									Not Inspected (Substation)	1	NA		01/03/12
3	Susquehanna S									Not Inspected (Substation)	1	NA		01/05/12
4	30891N26258	Conductor		R		R			Shoe (Cotter Key)	Backed Out/Off	1	NA		01/03/12
5	39953N31382	Conductor		M	R				Shoe (Cotter Key)	Backed Out/Off	1	NA		01/05/12
6	27124N24295	Insulator Assembly		R	L				Cold End (Cotter Key)	Backed Out/Off	1	NA		01/03/12
7	27284N24375	Insulator Assembly		M	L				Cold End (Cotter Key)	Backed Out/Off	1	NA		01/03/12
8	28901N25048	Insulator Assembly		L	R				Cold End (Cotter Key)	Backed Out/Off	1	NA		01/03/12
9	29267N25283	Insulator Assembly		M	R				Cold End (Cotter Key)	Backed Out/Off	1	NA		01/03/12
10	40625N31704	Insulator Assembly		R	R				Cold End (Cotter Key)	Backed Out/Off	1	NA		01/05/12
11	30782N25080	Insulator Assembly	L	R	T				Insulator (Skirt)	Broken (1 of 24)	1	NA		01/03/12
12	33584N27292	Insulator Assembly	L	R	R				Insulator (Skirt)	Broken (1 of 25)	1	NA		01/04/12
13	35584N25448	Insulator Assembly	L	L	R				Insulator (Skirt)	Chipped (1 of 25)	1	NA		01/04/12
14	36405N28853	Insulator Assembly	L	L	L				Insulator (String)	Flashed (25 of 25)	1	NA		01/04/12
15	36405N28853	Insulator Assembly	M	L	L				Insulator (String)	Flashed (25 of 25)	1	NA		01/04/12
16	29480N25515	Right of Way		A				All	Span Area (Undemearth)	Encroachment [29635N25494]	1	NA		01/03/12
17	30520N25780	Right of Way		A				3/3	Span Area (Undemearth)	Encroachment (Equipment) [30628N25836]	1	NA		01/03/12
18	32011N26771	Right of Way		R				3/3	Span Area (Undemearth)	Encroachment (Tree Stand) [32112N26790]	1	NA		01/03/12
19	33350N27135	Right of Way		A				2/3	Span Area (Undemearth)	Encroachment (Tree Farm) [33430N27188]	1	NA		01/04/12
20	33430N27188	Right of Way		R				2/3	Span Area (Undemearth)	Encroachment (Equipment) [33493N27232]	1	NA		01/04/12
21	35140N28213	Right of Way		A				3/3	Span Area (Undemearth)	Encroachment (Tree Farm) [35240N28260]	1	NA		01/04/12
22	37746N29893	Right of Way		R				3/3	Span Area (Undemearth)	Encroachment (Equipment) [37862N29884]	1	NA		01/04/12
23	37862N29884	Right of Way		A				3/3	Span Area (Undemearth)	Encroachment (Equipment)	1	NA		01/04/12
24	38959N30771	Right of Way		L				2/3	Span Area (Undemearth)	Encroachment (Live Stock Feeder) [39049N30851]	1	NA		01/04/12
25	39159N30919	Right of Way		A				1/3	Span Area (Undemearth)	Encroachment (Garden/Debris) [39226N30964]	1	NA		01/04/12
26	39226N30964	Right of Way		A				3/3	Span Area (Undemearth)	Encroachment (Tree Farm) [39366N31052]	1	NA		01/04/12
27	39366N31052	Right of Way		T				All	Span Area (Undemearth)	Encroachment (Tree Farm) [39430N31093]	1	NA		01/04/12
28	39430N31093	Right of Way		A				All	Span Area (Undemearth)	Encroachment (Tree Farm) [39493N31129]	1	NA		01/04/12
29	41319N31950	Right of Way		R				2/3	Span Area (Around)	Encroachment (Deer Stand) [41417N31970]	1	NA		01/05/12
30	41525N31955	Right of Way		R				1/3	Span Area (Undemearth)	Encroachment (Deer Stand) [41610N32012]	1	NA		01/05/12

Structure Side	Circuit, Phase, Insulator, Sub-Conductor	Shield Side	Accessible	Severity	Priority	Color Codes
(L)ow (-L)eft (H)igh (B)ottom (M)iddle	(R)ight (T)op (L)eft (B)ottom (M)iddle (R)ight	(A)ll (B)ottom (L)eft (M)iddle (R)ight	(T)op (S)ingle (I)nergized (D)energized (N)ot (W)ire Walk	(S)evere (-S)mall (L)ight (M)oderate (L)arge (H)eavy (-H)ollow	(-S)mall (M)edium (L)arge (L)arge (L)arge (L)arge (L)arge	1 - 0 - 3 months 2 - 3 - 12 months 3 - 12 - 24 months 4 - 24+ months Green Text - Complete Red Text - Priority 1

Figure 11: Condition Report from Comprehensive Helicopter Inspection

Substation Maintenance

The Substation Maintenance Group is responsible for the maintenance and reliability of Substation equipment including: batteries, battery chargers, oil circuit breakers, gas circuit breakers, air break switches, disconnects, ground switches, lightning arrestors, power fuses, CCVTs, potential transformers, power transformers, tertiary cables, capacitor bank vacuum switches and station service transformers.

Advanced Technologies

The PPL EU Maintenance organization uses advanced technologies when it provides demonstrable technical, operational or economic value to projects or operations. For example, the organization has implemented Forward Looking Infrared (FLIR) and LIDAR technologies as they have proven to provide essential advantages to the Maintenance organization.

Relay Test

PPL EU Relay Test is responsible for the operability of all transmission and distribution protection systems, Supervisory Control and Data Acquisition (SCADA) equipment, protection system high speed communications systems, and disturbance analysis sub- systems.

Work Management

The Relay Test organization utilizes work management processes and systems that provide integrated planning and scheduling of work (via work orders), multi-work group scheduling, cost accounting, metrics, and electronic asset registry updating. All work orders are generated in the state-of-the-art Asset Suite program, which can handle five different types of work orders. The Asset Suite program allows the Relay Test organization to know the work that will be performed up to one year in advance. Relay Test management actively participates in protection system maintenance program governance and compliance audits and process reviews.

The core focus of PPL EU Relay Test is preventative maintenance as required by all applicable NERC Reliability Standards. PPL EU Relay test also provides resources for capital projects as time permits, based on the maintenance work load. For larger projects, PPL EU contracts additional Relay Test resources. Relay Test's work objectives and resource allocation focuses on the following:

Protection System Maintenance

The Relay Test organization performs preventative maintenance activities (relay calibrations, functional trip testing, communication testing) for all transmission and distribution assets. Relay Test assures PPL EU's compliance to the applicable NERC Reliability Standards.

Supervisory Control and Data Acquisition (SCADA)

The Relay Test organization is responsible for the commissioning, maintenance, configuration programming, and overall operability of all Remote Terminal Units (RTUs), Programmable Logic Controllers (PLCs), and other data concentrators / data collections systems within the PPL EU's substations.

Communication Systems

The Relay Test organization is responsible for the commissioning, maintenance, configuration programming and overall operability of all high speed protective system pilot communication systems including fiber optics (both sonnet and direct), power line carrier, audio tone and third party leased digital and POTS communication.

Disturbance Monitoring Equipment

The Relay Test organization is responsible for the commissioning, maintenance, configuration programming and overall operability of PPL EU's fault analysis systems, including digital fault recorders, relay based oscillography, and phasor measurement units (PMUs). Relay Test assures PPL EU's compliance to the NERC Reliability Standards under their ownership.

Corrective Maintenance

The Relay Test organization is tasked with the timely response, investigation, and remedy for all protection system anomalies. Relay Test staff respond to call-outs whenever they occur to perform investigative studies and troubleshooting, supporting PPL EU's operations to rapidly diagnose issues and return equipment back to service.

Capital Projects

The Relay Test organization or the Commissioning Organization is responsible for the commissioning activities of all new transmission and distribution substation protections systems, SCADA, and communication systems. Relay Test performs the field engineering function of design and drawing review, wire checks, energization, phasing, and final assurance that all substation equipment is protected and functional. Additionally, PPL EU contracts adjunct testing staff to provide additional testing resources when needed for extensive capital projects. Commissioning responsibilities is performed by the PPL EU Commissioning Organization.

All of PPL EU's protection system maintenance is performed by the PPL EU internal Relay Test organization. All protective relaying work with respect to capital projects is either performed by PPL EU's internal Relay Test organization or augmented by testing contractors who work under the guidance or direction of PPL EU's Commissioning Organization. The PPL EU Commissioning Organization has extensive experience managing contractors and ensuring that they are familiar with PPL EU systems and technologies. In addition, the internal PPL EU team is responsible for ensuring receipt of work and incorporating it into asset management.

Vegetation Management

PPL EU's Vegetation Management organization works to ensure the safe, efficient and technically compliant execution of our vegetation management program across the PPL EU service territory.

The North American Electric Reliability Corporation (NERC) has adopted a vegetation-management reliability standard with detailed requirements for vegetation management and inspection (FAC-003).

PPL EU's vegetation management (VM) group manages all aspects of this overall enterprise program with the goal of keeping transmission facilities clear of all incompatible trees, brush, and other vegetation through routine maintenance activities such as tree felling, pruning, mowing and, herbicide application. The VM team is centralized under the PCM group.

PPL EU solicits competitive bids for contractor services to ensure quality and safety, while minimizing the cost to customers. VM contractor expectations are defined in a VM Guidelines document and work completed by contractors is evaluated and audited against these expectations. At the highest level, the goal is to ensure public and worker safety, comply with regulatory and legal requirements, provide reliable electric service that allows for flexible operations, and act as a good steward of the environment.

PPL EU VM has a long-term, managed business relationship with two of the largest VM contractors in North America and a comprehensive contractor evaluation system is used to quantify overall contractor value to the company. Evaluation components include line-miles completed, budget management, quality, safety, electric service reliability performance and a variety of micro indicators that measure contractor project management abilities. In addition, the VM contractors play an active role supporting the VM formal daily management structure.

PPL EU has leveraged geospatial and remote sensing technologies to better manage the vegetation threats to transmission facilities at a reduced cost. Light Detection and Ranging (LiDAR) is a remote sensing technology that allows for geospatially reference three-dimensional point clouds to be created to ensure adequate clearance between vegetation and conductors, as well as identify danger and hazard trees. LiDAR was first used by PPL EU in 2008 and the favorable results confirmed that this process and approach for vegetation management would be beneficial.

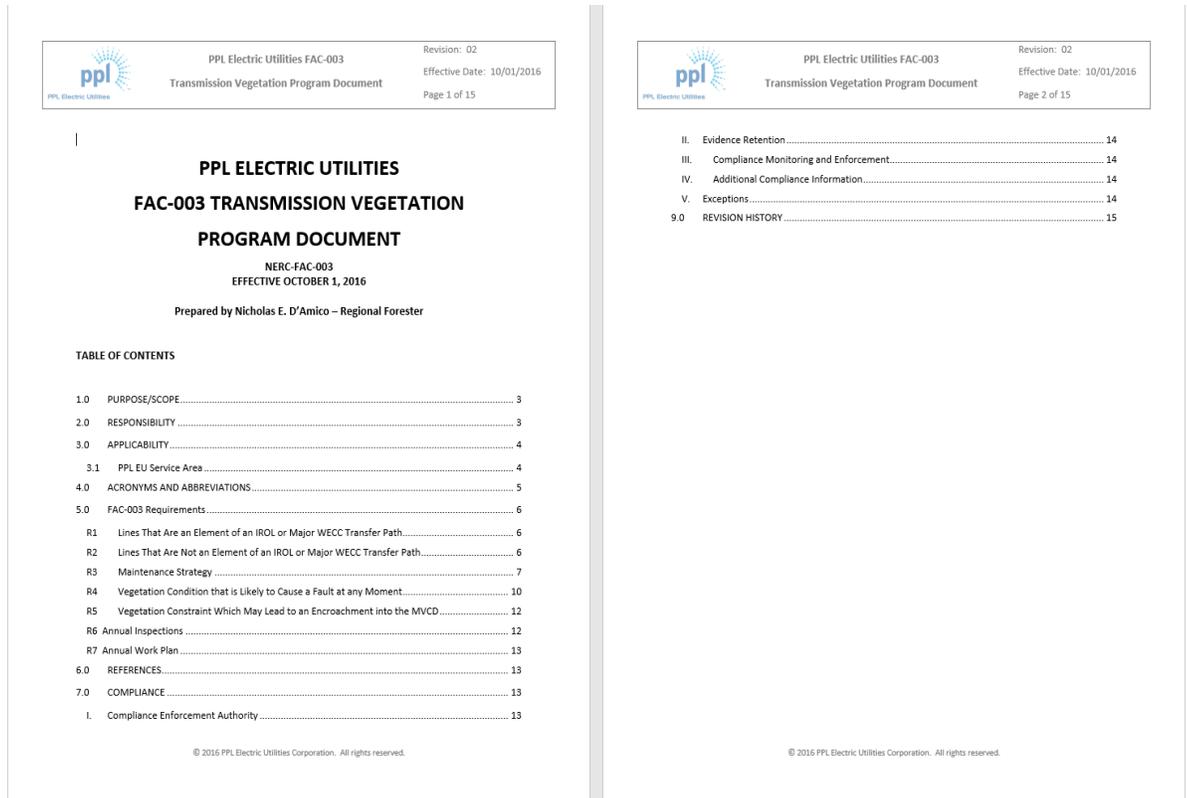
Advanced vegetation management practices have proven effective with high reliability performance and lower cost.

Transmission Vegetation Management Program (TVMP)

The PPL EU Transmission Vegetation Management Program (TVMP) seeks to improve the reliability of the electric transmission systems by preventing outages from vegetation located on transmission rights-of-way (ROW) and minimizing outages from vegetation located adjacent to ROW, maintaining clearances between transmission lines and vegetation on and along transmission ROW, and reporting vegetation related outages of the transmission systems to the respective Regional Reliability Organizations (RRO) and the North American Electric Reliability Corporation (NERC).

The purpose of the TVMP is to memorialize PPL EU's required practices intended to prevent vegetation-related transmission outages from occurring within the rights-of-way (ROW) and to minimize vegetation outages from occurring outside the ROW on all 200 kV and above transmission lines as well as any other lower voltage transmission lines that are designated as critical to reliability. Figure 12 provides an overview of PPL EU's Transmission Vegetation Management Program.

Figure 12: PPL EU Transmission Vegetation Management Program



Proven Track Record

PPL EU places great emphasis on the value of Vegetation Management, since it recognizes the importance of proactive line management. PPL EU has already completed a “Wire Zone - Border Zone” program for the Bulk Electric System in October 2012 - ahead of schedule. The completion of this three-year program significantly reduced operating costs. In addition to “Wire Zone Border Zone”, the team uses LiDAR and helicopter observations to monitor vegetation along the entire system. As a testament to the thoroughness of the Vegetation Management program, all work that is completed is 100% inspected. PPL EU is committed to continued Vegetation management investment, which can be seen in Figure 13.

Figure 13: Specific Vegetation Management Work

Type of Work	Units	2015	2016	2017	2018	2019
230-500kV	Miles	567	777	664	964	653
Cycle Maintenance - Herbicide	Miles		456	323	479	345
Cycle Maintenance - Trim	Miles		321	341	485	308
138kV	Miles	370	110	186	89	197
Cycle Maintenance - Herbicide	Miles		51	137	28	57
Cycle Maintenance - Trim	Miles		59	49	60	140
69kV	Miles	1048	1591	1460	1551	1580
Cycle Maintenance - Herbicide	Miles		823	616	696	831
Cycle Maintenance - Trim	Miles		768	844	856	749
Grand Total	Miles	1985	2478	2310	2604	2430
<i>Cycle</i>		<i>3 Year (actual)</i>	<i>4 Year (average)</i>	<i>4 Year (average)</i>	<i>4 Year (average)</i>	<i>4 Year (average)</i>

Proactive and Extensive Community Outreach

The PPL EU Vegetation Management program prides itself on early outreach and communication with affected stakeholders. The team distributes a communication plan comprised of a letter and a brochure four weeks prior to maintenance, which provides information about the work to be done as well as contact information. The Vegetation Management group is committed to responding to all phone calls within 24 hours of receipt, which speaks to the dedication of the organization.

Qualified Employees

The Vegetation Management organization is unique because of the high qualifications of the employees. All employees are either degreed foresters or certified arborists, which provides a high level of technical expertise. All employees are initially trained on processes, procedures, and the specifications of the TVMP and receive updates and new training based on new equipment, herbicides, application methods, or other significant changes in vegetation management trends and processes.

Ability to comply with or demonstration of how the Applicant plans to be able to comply with NERC Reliability Standards

As an operating member of PJM, PPL EU has consistently performed to the NERC Reliability Standards. This is accomplished through a robust NERC Compliance program that is integrated within PPL EU’s existing programs and processes and are extended to new assets added to the PPL EU transmission grid.