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October 30, 2020

VIA EMAIL

Ms. Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
2nd Floor, Room-N201
400 North Street
Harrisburg, PA 17120

Re: **Duquesne Light Company**
Capital Investment Plan Report 2020-2024

Dear Secretary Chiavetta:

Enclosed please find Duquesne Light Company's Capital Investment Plan Report for 2020-2024, as required by 52 Pa. Code § 73.7. This report is being filed in a "Confidential" and "Public" version. Duquesne Light Company respectfully requests that the confidential report not be made available to the public.

If you have any questions regarding the information contained in this filing, please feel free to contact me or Chris Johnson at 412-393-6496 or cljohnson@duqlight.com.

Sincerely,

Lindsay A. Baxter
Manager, State Regulatory Strategy

Enclosure

Cc:
Bureau of Technical Utility Services
Office of Consumer Advocate
Office of Small Business Advocate

CAPITAL INVESTMENT PLAN REPORT *2020-2024*

October 30, 2020

Introduction

Duquesne Light Company (the "Company" or "DLC") submits the following five year capital investment plan, which includes 15 planned and anticipated major projects.[1]

Operations Projects

- Universal-Plum Transmission Project
- Mon-Fayette Expressway Facility Relocation
- East End Substation Conversion
- Brunot Island-to-Crescent Corridor Rebuild
- Southeast Capacity
- Establish Riazzi Substation
- Oakland Capacity and Resiliency
- Darlington Substation Elimination
- Rochester Substation Elimination & Valley 4 kV Elimination
- Establish Watson Substation
- BRT Forbes and Fifth Duct Bank

Information Technology Projects

- SPARK
- SCADA Phase 2 RTU
- SCADA IntelliRupters®
- Outage Management System and Distribution Management System

A description of these fifteen projects follows, including alternatives investigated, effect on existing equipment, projected in-service date, and estimated cost.

OPERATIONS PROJECTS (PLANNED)

1. Universal-Plum Transmission Project

Summary

This project will install a new 138 kV transmission line from the Plum Substation to the Universal Substation, increasing the number of transmission lines feeding the Universal Substation from two to three. This line will be designated Plum-Universal Z-154. Provision of this third transmission supply line to Universal Substation is needed to mitigate the risk of dropping a major load-block during periods when one transmission supply line is out of service (either forced out or out for scheduled maintenance). DLC's planning criteria requires substations with peak load in excess of 100 MVA to have a minimum of three transmission sources. The peak demand at Universal

[1] For purposes of this report, a "major project" for the Company is a project with initial Capital Committee approval with an estimated cost in excess of $10 million.

Substation exceeds this 100 MVA threshold. This project will also provide a second transmission source to the Plum Substation. The Pennsylvania Public Utility Commission ("PUC" or "Commission") approved the transmission Siting Application for this project by Order entered August 9, 2019, at Docket Nos. A-2018-3000708, *et al.*

Alternatives Investigated
The planned 138 kV transmission line evolved as the most effective project to mitigate the reliability issues in the area. It provided both a third source to Universal substation and a second source to Plum substation with the installation of a single new line. Furthermore, single contingencies to the transmission lines supplying either substation will not result in loss of customer load.

Duquesne Light investigated various combinations using its 138 kV transmission lines in the area to mitigate the reliability concerns. Using existing facilities to supply the third source to Universal substation could resolve the reliability issues; however, these alternatives did not provide an additional source to Plum substation. The planned project will address all reliability concerns with the addition of a single new 138 kV line.

Effect on Existing Equipment
The Company will add a new transmission line. At Universal Substation, DLC will put an idle 138 kV breaker position back into service. At Plum, new breaker positions and 138 kV bus work will be installed. Also at Plum, with the installation of a transformer high side breaker, the protection for the existing No. 1 23 kV transformer and the No. 1 23 kV bus will be updated. Additionally, a 0.51-mile section of existing 138 kV transmission line will be relocated.

Projected In-Service Date
This project is anticipated to be placed into service in 2022.

Estimated Cost
The cost of this project is estimated to be $47 million.

2. Mon-Fayette Expressway Facility Relocation

Summary
The PA Turnpike Commission ("PTC") is constructing a new highway extension starting in Jefferson Hills and heading northeast to Monroeville. As a result, the PTC is requesting DLC to relocate all electric facilities that present a conflict to the proposed highway. The PTC informed DLC in March 2018 that it is only funded to design and construct the southern section of the expressway from Jefferson Hills to Duquesne. The northern section is not projected to receive funding or start design until the late-2020s or early-2030s. The information included herein is exclusive to the southern section.

The Commission approved the transmission Siting Application for the transmission components of this project by Order entered September 17, 2020, at Docket No. A-2020-3015225.

Alternative Investigated
This is a customer driven project. Alternatives are limited due to the design of the expressway and the other utilities sharing the same area.

Effect on Existing Equipment
Execution of this project will cause the existing towers, conductors, and ancillary equipment to be retired and replaced with new monopoles, conductors, and ancillary equipment.

Projected In-Service Date
This project is anticipated to be placed into service in 2023.

Estimated Cost
The cost of this project is estimated to be $77 million to $92 million, with $64 million to $75 million being reimbursed by the PTC.

3. East End Substation Conversion

Summary
This project will rebuild the East End Substation to add additional capacity to the rapidly growing East Liberty area of Pittsburgh, update aging infrastructure at the station, and eliminate over-dutied circuit breakers. The rebuilt substation will have three 23 kV busses with five positions each. One position on each 23 kV bus will serve a 23/4 kV 10 MVA transformer. Each transformer will feed a 4 kV bus with four 4 kV distribution feeders.

Alternatives Investigated
Apart from the recommended solution, the following alternative solutions also were investigated:

1) Alternative 1: Replace Over-Dutied Breakers. Over-dutied breakers may be replaced; however, the logistics involved with the removal and fitment/installation of new equipment, associated outages, and associated environmental hazards is not cost effective.

2) Alternative 2: Rebuild East End Substation and Convert three to four of the 4 kV circuits to 23 kV. This alternative would help alleviate the congestion of the underground circuits around East End Substation. This alternative is not recommended at this time due to cost.

Effect on Existing Equipment
Execution of this project will cause the existing substation, conductors, and ancillary equipment to be retired and replaced with new equipment, conductors, and ancillary equipment.

Projected In-Service Date
This project is anticipated to be placed into service in 2026.

Estimated Cost
The cost of this project is estimated to be $95 million.

4. <u>Brunot Island-to-Crescent Corridor Rebuild</u>

Summary
The Brunot Island ("BI")-Crescent transmission line corridor has some of DLC's oldest in-service steel lattice towers. Structural evaluations have determined that the structures have exceeded their expected life. Based on current conditions, below grade section losses, and PLS-CADD modeling at current design codes, all results indicate these structures are beyond permanent repair and require replacement. Temporary repairs have been made to some of the foundations to ensure that they will remain in service until replacement structures can be installed.

BI to Crescent will use self-supporting monopoles with deep soil foundations to eliminate the risk created by potential landslides. The structures will have two 138 kV transmission circuits constructed with 795 ACSS/TW which is a high-temperature conductor which will provide increased ratings with minimal sag.

As of the date of this plan, the transmission Siting Application for this project is pending before the Commission at Docket Nos. A-2019-3008589, *et al.*

Alternatives Investigated
1) <u>Alternative 1:</u> Other alternatives investigated included varying degrees of rehabilitation of the existing lattice towers. These alternatives were determined to be insufficient at achieving the objectives of addressing issues associated with equipment ages and providing increased capacity to serve increasing load.

2) <u>Alternative 2:</u> Rebuild one BI-Crescent circuit to 345 kV. This alternative is no longer being pursued based upon the input DLC received from its customers through multiple channels and forums and changes in circumstances regarding recent generation deactivations that may alleviate certain reliability criteria violations that Duquesne Light initially contemplated addressing by building one of the circuits associated with the BI-Crescent Corridor to 345 kV standards.

Effect on Existing Equipment
Execution of this project will cause the existing towers, conductors, and ancillary equipment to be retired and replaced with new towers, conductors, and ancillary equipment.

Projected In-Service Date
This project is anticipated to be placed into service in 2027.

Estimated Cost
The cost of this project is estimated to be $130-160 million.

5. <u>Southeast Capacity Project</u>

Summary
DLC is planning to expand its transmission system capacity in the Southeast portion of its service territory to address potential transmission system violations that would result from the proposed deactivations of Beaver Valley, Bruce Mansfield, Davis-Besse, Perry, and Sammis Power Station. The initial notice scheduled these stations' deactivations for May 31, 2021. However, since first notification of the deactivation, DLC has been informed that the three nuclear power plants (Beaver Valley, Davis-Besse, and Perry) have withdrawn their deactivation notices. Therefore, DLC and PJM are currently reassessing the overall need for these projects.

The Commission approved the Letter of Notification for this reduced-scope project by Order entered October 3, 2019 at Docket Nos. A-2019-3009698, *et al.*

Because this project scope is being reassessed due to the change in potential generator deactivations, Duquesne Light cannot provide alternatives, effects on existing equipment, projected in-service date, or estimated cost at this time.

6. <u>Establish Riazzi Substation</u>

Summary
The Oakland area is a highly concentrated load center on the DLC system. There are four universities, three hospitals, two museums, and densely arranged homes, shops, and restaurants. Presently, this area is supplied by a single source, Oakland Substation. There are 22 circuits emanating from Oakland Substation with limited ratings due to the underground nature of Oakland's urban environment and the resultant mutual heating. Due to the load growth and limited circuit ampacity, an alternative to Oakland Substation must be established in the form of a new 138 kV – 23 kV substation. This substation is to be known as Riazzi Substation, and it will be located centralized to Oakland Substation's load center. Riazzi Substation will provide power to customers in the neighborhoods of Oakland, Shadyside, Squirrel Hill, Greenfield, Hazelwood, and Point Breeze.

[redacted]

Alternatives Investigated

[redacted]

Neither of these alternatives was selected because, on balance, the planned project, by being central to the load block, best serves the load without causing mutual heating between circuits and therefore derating adjacent facilities in the area.

Effect on Existing Equipment

This project establishes a new substation with new circuits with new equipment and new conductor. [redacted]

Projected In-Service Date

This project is anticipated to be placed into service in 2021.

Estimated Cost

The cost of this project is estimated to be $70 million.

7. Oakland Capacity and Resiliency

Summary

The establishment of Riazzi Substation provides an alternate power source to supply the Oakland area. The Establish Riazzi Substation project plan includes construction of the substation and two distribution circuit getaways. In order to fully utilize Riazzi Substation, additional distribution duct paths and circuits will need to be established. The expansion of the Riazzi Substation distribution system is intended to alleviate forecasted overloads of Oakland Substation distribution circuits, eliminate Oakland Substation circuits in order to increase ratings of the remaining circuits, and transfer large customers from Oakland Substation to Riazzi Substation in order to be able to support these and other customers following a first contingency. The scope of this project is to install and extend an additional seven 23 kV circuits and underground infrastructure in and around Riazzi Substation.

Alternatives Investigated

1) Alternative 1: Extend Circuits from Arsenal Substation. The nearest DLC substation to the Oakland area other than Oakland and Riazzi Substations is Arsenal Substation. This alternative is not recommended because Arsenal Substation is approximately 2.5 miles from the Oakland load center, while Riazzi Substation is approximately 1,500 feet from that same location.

2) Alternative 2: Extend Circuits from Highland Substation. This is not a recommended option. Highland Substation is approximately 4.5 miles from the Oakland load center.

3) Alternative 3: Extend Circuits from Oakland Substation. This is not a recommended option. Oakland Substation has only four available circuit positions. Only one of these circuit positions can be utilized without existing circuits experiencing decreased ratings. Given the overload concerns that exist at Oakland Substation, any de-rating of circuits is unacceptable.

None of these alternatives were selected because, on balance, the planned project, by being central to the load block, best serves the load without causing mutual heating between circuits and therefore derating adjacent facilities in the area.

Effect on Existing Equipment
This project will transfer a portion of load from existing circuits to new circuits from Riazzi Substation.

Projected In-Service Date
This project is anticipated to be placed into service in 2022.

Estimated Cost
The cost of this project is estimated to be $18 million.

8. Darlington Substation Elimination

Summary
This project includes the elimination and upgrade of one 4 kV to 23 kV circuit at Darlington Substation and the conversion of Valley-Morado No. 2 circuit from a 23 kV sub-transmission circuit to a 23 kV distribution circuit out of Valley Substation. This project is necessary to address aging equipment, and equipment that must be modified due to changes in load concentrations or system requirements.

Alternatives Investigated
Due to the condition of the existing equipment, it must be replaced. Therefore, there are no viable alternatives.

Effect on Existing Equipment
Execution of this project will cause the existing 23/4 kV unit substation, along with poles, conductor, automated devices, and other ancillary equipment on the existing 4 kV circuit to be retired. A 23 kV circuit consisting of new poles, conductor, automated devices, and ancillary equipment will be constructed in its place.

Projected In-Service Date
This project currently is anticipated to be placed into service in 2021.

Estimated Cost
The cost of this project currently is estimated to be $21 million.

9. Rochester Substation Elimination & Valley 4 kV Elimination

Summary
This project includes the elimination and upgrade of three circuits at Rochester Substation and one circuit at Valley Substation from 4 kV to 23 kV. This project is necessary to address aging equipment, and equipment that must be modified due to changes in load concentrations or system requirements.

Alternatives Investigated
Due to the condition of the existing equipment, it must be replaced. Therefore, there are no viable alternatives.

Effect on Existing Equipment
Execution of this project will cause two existing 23/4 kV unit substations, along with poles, conductor, automated devices, and other ancillary equipment on four 4 kV circuits to be retired. Two 23 kV circuits consisting of new poles, conductor, automated devices, and ancillary equipment will be constructed in place of the existing four 4 kV circuits.

Projected In-Service Date
This project is anticipated to be placed into service in 2021.

Estimated Cost
The cost of this project is estimated to be $26 million.

10. Establish Watson Substation

Summary
This project will enhance reliability and redundancy by establishing Watson Substation, a new 138/23 kV substation. This substation will provide load relief, increased service reliability, and additional capacity in the Downtown, Uptown, Hill District, and Oakland areas. This additional capacity can be used to eliminate the 11/4 kV Grant Substation, provide capacity for load growth in Uptown and the Hill District, and aid in the future conversion of the Forbes 11 kV network to

23 kV. Most importantly, Watson Substation will provide an additional 23 kV source for the Downtown network. Establishing multiple sources to supply the Downtown network is a key principle of the Downtown Resilience initiative. Two underground transmission sources are adjacent to the proposed Watson substation.

[redacted]

Alternatives Investigated

[redacted]

Effect on Existing Equipment
This project will establish a new substation with all new equipment.

Projected In-Service Date
This project is anticipated to be placed into service in 2026.

Estimated Cost
The cost of this project is estimated to be $177 million.

11. <u>BRT Forbes and Fifth Duct Bank</u>

Summary
The Port Authority of Allegheny County along with the City of Pittsburgh will be milling and paving portions of Forbes and Fifth Avenues to support its Bus Rapid Transit ("BRT") Project. DLC's underground infrastructure in these roadways is aged and in need of an upgrade. Construction of new duct banks in Fifth Avenue and Forbes Avenue will also support the addition of distribution circuits between the future Watson Substation and Downtown Pittsburgh. By coordinating with the City of Pittsburgh and Port Authority's paving efforts, as well as other utilities, DLC can mitigate costs associated with the new duct bank installations throughout the Uptown area.

Alternatives Investigated

1) <u>Alternative 1: Overhead Construction</u>. Instead of utilizing underground infrastructure, overhead circuits can be constructed in the Uptown area. This alternative is not recommended due to density and limited public right-of-way in this highly-developed area.

2) Alternative 2: Use Alternate Underground Routes. DLC could design the Watson underground paths to Downtown using streets other than Forbes and Fifth Avenues. This will prove difficult since those are the two main thoroughfares in the Uptown area. [redacted]

Effect on Existing Equipment

Execution of this project will cause the existing conductors and ancillary equipment to be retired and replaced with new conductors and ancillary equipment.

Projected In-Service Date

This project is anticipated to be placed into service in 2025.

Estimated Cost

The cost of this project is estimated to be $52 million.

INFORMATION TECHNOLOGY PROJECTS (PLANNED)

1. SPARK

Summary

Project SPARK involves the upgrade of the Oracle Customer Care & Billing, Meter Data Management, and Mobile Workforce Management applications. The original implementation of these applications went live in 2014. The current product will no longer be supported by Oracle after 2020. In an effort to remain up to date with new versions and patch releases, DLC has embarked upon an upgrade project which will impact a large number of employees, customers, and third-party vendors.

The goals of the upgrade project are to:

- Minimize customizations in order to reduce maintenance costs and total cost of ownership;
- Establish a technology platform that helps improve the speed to modify, "patch", upgrade, and integrate the systems and comply with regulatory and business requests;
- Standardize business processes across departments and business units to improve organizational efficiency, reduce operational costs, and establish a continuous improvement framework.

Alternatives Investigated

As discussed above, the Company's applications to be updated through SPARK are obsolete and will no longer be supported; therefore, there are no viable alternatives.

Effect on Existing Equipment

This project will upgrade the existing platform to the latest version.

Projected In-Service Date

This project is anticipated to be placed into service in 2020.

Estimated Cost

The cost of this project is estimated to be $61.7 million.

2. SCADA Phase 2 RTU

Summary

The Company will upgrade the substation communication devices to a standard, Remote Terminal Unit ("RTU")-centered architecture. There will be three to five standard templates depending on (1) a station's Critical Infrastructure Protection status and (2) whether Operations has required the station to have redundant RTUs to further increase the already improved reliability of these new devices. There are expected to be approximately 87 total stations that will be addressed as part of this effort.

Alternatives Investigated

1) Alternative 1 – Do Nothing. To do nothing and keep the existing communication configuration, would require accepting the existing risk associated with old and unreliable equipment, replacing failed equipment in emergency mode and manning substations until replacement is complete, and accepting the existing risk level of reportable events. Duquesne Light does not find it prudent to accept these risks.

2) Alternative 2 – Relay-Based Solution. The primary alternative investigated was the use of an RTU-based versus a Relay-based approach. In the end, the RTU-based approach was selected. The RTU-based approach proved to be the less expensive option.

Effect on Existing Equipment

Execution of this project will cause existing RTUs, serial protocol converters, and associated equipment to be retired. New RTUs, redundant RTUs, and ancillary equipment will be installed in place of the retired equipment. At some sites, new fiber will also be installed to allow assets to have a more reliable communication to the SCADA system.

Projected In-Service Date

This project is anticipated to be placed into service in 2025.

Estimated Cost

The cost of this project is estimated to be $21 million.

3. SCADA IntelliRupters®

Summary

This initiative will upgrade end of life pole-top equipment and replace defective underground communication equipment to support reliable communication and standardize protocols and equipment. In addition, it will simplify architecture and migrate existing 3G devices to a new medium (Verizon 4G). This will result in a more resilient Distribution SCADA system including a near real time fail over to DLC's Alternate Operations Center.

Alternative Investigated

Alternative 1 – Do Nothing. To do nothing and keep the existing communication configuration requires accepting the existing risk associated with old and unreliable equipment, replacing failed equipment in emergency mode and tracking items on inoperable report until replacement is complete, and accepting the existing risk that DLC will not know what equipment is non-responsive until the day a control is attempted.

Effect on Existing Equipment

Execution of this project will cause equipment with obsolete communication, including 3G modems in Intellirupters®, reclosers, and Intellicaps® to be retired. New equipment, such as 4G modems, Intellirupters®, or Intellicap® 2000s will be installed in their place.

Projected In-Service Date
This project currently is anticipated to be placed into service in 2023.

Estimate Cost
The cost of this project currently is estimated to be $27 million.

4. Outage Management System

Summary
Duquesne Light will implement a sustainable Outage Management System ("OMS") using an electrical model under development. This project includes the following elements: a) implementing business process management and organizational change management strategy, b) identifying "as-is" and "to-be" business processes for departments that will be affected by the OMS, c) performing organizational change management needed to change processes, d) populating electrical model with up to date distribution data, e) loading existing AutoCAD circuit maps into GIS, f) conducting a field inventory study and update GIS with gathered data, g) implementing the OMS, h) receiving customer calls, SCADA input, and AMI last gasps and restoration pings, i) exporting data to a web based outage map, j) supporting or interfacing with customer outage text messaging service, and k) implementing damage assessment capabilities with mobile data units.

Alternatives Investigated

1) Alternative 1 – Implement OMS and DMS. This alternative includes all items in Alternative 1, but it is supplemented by purchasing the software and equipment needed for DMS. Additionally this alternative includes the training, support, IT infrastructure, etc., that will be needed for DMS.

Effect on Existing Equipment
The Electrical Model Tool, OMS, DMS, and Graphic Design Tool are new systems. The only existing system, OMS Lite, will be retired after the OMS is implemented.

Projected In-Service Date
The OMS is anticipated to be placed into service in 2022, with DMS at a later date

Estimated Cost
The cost of the OMS project is estimated to be $18 million.