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JOSE R. OLIVA
Speaker of the House of Representatives

May 28, 2020

Adam J. Teitzman, Commission Clerk
Office of Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0850

Re: Docket No. 20200071-EI
Review of 2020-2029 Storm Protection Plan pursuant to Rule 25-6.030, F.A.C., Florida Power & Light Company.

Dear Mr. Teitzman:

Enclosed for filing in the above docket is the Office of Public Counsel's Direct Testimony and Exhibits of Kevin J. Mara, P. E.

The original testimony was filed on May 26, 2020, as confidential pursuant to Florida Power & Light Company's (FPL) notice of intent to seek confidential status. Thereafter, FPL withdrew its notice of intent, and thus OPC is filing the direct testimony and exhibits of Kevin Mara as a non-confidential, public document. Thank you for your assistance.

Yours truly,

Sincerely,

/s/ Patricia A. Christensen
Patricia A. Christensen
Associate Public Counsel

cc: Parties of Record

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2020-2029 Storm Protection Plan pursuant to Rule 25-6.030, F.A.C., Florida Power & Light Company	DOCKET NO.: 20200071-EI FILED: May 28, 2020

DIRECT TESTIMONY

OF

KEVIN J. MARA, P.E.

ON BEHALF OF THE CITIZENS OF THE STATE OF FLORIDA

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DIRECT TESTIMONY

OF

KEVIN J. MARA

On Behalf of the Office of Public Counsel

Before the

Florida Public Service Commission

20200071-EI

I. INTRODUCTION

Q. WHAT IS YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS?

A. My name is Kevin J. Mara. My business address is 1850 Parkway Place, Suite 800, Marietta, Georgia 30067. I am the Executive Vice President of the firm GDS Associates, Inc. ("GDS") and Principal Engineer for a GDS company doing business as Hi-Line Engineering. I am a registered engineer in Florida and 20 additional states.

Q. PLEASE STATE YOUR PROFESSIONAL EXPERIENCE.

A. I received a degree of Bachelor of Science in Electrical Engineering from Georgia Institute of Technology in 1982. Between 1983 and 1988, I worked at Savannah Electric and Power as a distribution engineer designing new services to residential, commercial, and industrial customers. From 1989-1998, I was employed by Southern Engineering Company as a planning engineer providing planning, design, and consulting services for electric cooperatives and publicly-owned electric utilities. In 1998, I, along with a partner, formed a new firm, Hi-Line Associates, which specialized in the design and planning of electric distribution systems. In 2000, Hi-Line Associates became a wholly owned subsidiary of GDS Associates, Inc. ("GDS") and the name of the firm was changed to Hi-Line

Engineering, LLC. In 2001, we merged our operations with GDS Associates, Inc., and Hi-Line Engineering became a department within GDS. I serve as the Principal Engineer for Hi-Line Engineering and am Executive Vice President of GDS Associates. I have field experience in the operation, maintenance, and design of transmission and distribution systems. I have performed numerous planning studies for electric cooperatives and municipal systems. I have prepared short circuit models and overcurrent protection schemes for numerous electric utilities. I have also provided general consulting, underground distribution design, and territorial assistance.

Q. PLEASE DESCRIBE GDS ASSOCIATES, INC.

A. GDS is an engineering and consulting firm with offices in Marietta, Georgia; Austin, Texas; Auburn, Alabama; Manchester, New Hampshire; Kirkland, Washington; Portland, Oregon; and Madison, Wisconsin. GDS has over 170 employees with backgrounds in engineering, accounting, management, economics, finance, and statistics. GDS provides rate and regulatory consulting services in the electric, natural gas, water, and telephone utility industries. GDS also provides a variety of other services in the electric utility industry including power supply planning, generation support services, financial analysis, load forecasting, and statistical services. Our clients are primarily publicly-owned utilities, municipalities, customers of privately-owned utilities, groups or associations of customers, and government agencies.

Q. HAVE YOU TESTIFIED BEFORE ANY REGULATORY COMMISSIONS?

A. I have submitted testimony before the following regulatory bodies:

- Vermont Department of Public Service
- Federal Energy Regulatory Commission ("FERC")

- District of Columbia Public Service Commission
- Public Utility Commission of Texas
- Maryland Public Service Commission
- Corporation Commission of Oklahoma

I have also submitted expert opinion reports before United States District Courts in California, South Carolina, and Alabama.

Q. HAVE YOU PREPARED AN EXHIBIT DESCRIBING YOUR QUALIFICATIONS AND EXPERIENCE?

A. Yes. I have attached Exhibit KJM-1, which is a summary of my regulatory experience and qualifications.

Q. ON WHOSE BEHALF ARE YOU APPEARING?

A. GDS was retained by the Florida Office of Public Counsel ("OPC") to review Florida Power & Light's ("FPL" or "Company") proposed 2020-2029 Storm Protection Plan ("SPP" or "Plan") on behalf of the OPC. Accordingly, I am appearing on behalf of the Citizens of the State of Florida.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. I am presenting OPC's recommendations regarding FPL's proposed 2020-2029 Storm Protection Plan.

Q. WHAT INFORMATION DID YOU REVIEW IN PREPARATION OF YOUR TESTIMONY?

A. I reviewed the Company's filing, including the direct testimony and exhibits. I also reviewed the Company's responses to OPC's discovery, the Company's responses to the Florida Public Service Commission ("PSC" or "Commission") Staff's discovery, and other materials pertaining to the SPP and its impacts on the Company. In addition, I reviewed section 366.96, Florida Statutes, which requires the filing of the SPP and authorized the Commission to adopt the relevant rules, including Rule 25-6.030, Florida Administrative Code ("F.A.C."), which addresses the Commission's approval of a Transmission and Distribution SPP that covers a utility's immediate 10-year planning period.

Q. PLEASE DESCRIBE HOW THE REMAINDER OF YOUR TESTIMONY IS ORGANIZED.

A. I first discuss the purpose of storm hardening and an SPP as informed by Rule 25-6.030, F.A.C., and the concept of "resiliency," and I distinguish the concepts of "resiliency" and "reliability." I then discuss principles to be applied when reviewing FPL's proposed SPP. Finally, I discuss my analysis of the new programs proposed in the SPP, including principles that should be applied when reviewing FPL's proposed SPP. In the discussion of the principles I applied, I include criteria that, in my expert opinion, the Commission must weigh to properly evaluate the sufficiency of the SPP and each SPP program under the statutes and rules governing the SPPs.

II. THE PURPOSE OF STORM HARDENING

Q. PLEASE DISCUSS FLORIDA SENATE BILL 796 (2019) AND THE RESULTING SECTION 366.96, FLORIDA STATUTES, FROM YOUR PERSPECTIVE AS AN ELECTRIC UTILITY DISTRIBUTION ENGINEER.

A. As the Commission knows, the Florida Legislature passed Senate Bill 796 regarding Storm Protection Plan and Storm Protection Plan Cost Recovery, and the Governor signed the bill on June 27, 2019. Section 366.96, Florida Statutes, resulted. The purpose of storm hardening is stated as follows: "Protecting and strengthening transmission and distribution electric utility infrastructure from extreme weather conditions can effectively reduce restoration costs and outage times to customers and improve overall service reliability for customers". Further, the statute states that "All customers benefit from the reduced costs of storm restoration."[1]

The Florida Legislature directed the Commission to consider "the estimated costs and benefits to the utility and its customers of making the improvements proposed in the plan."[2] All of the SPPs should be based on the premise that, by investing in storm hardening activities, the electric utility infrastructure will be more resilient to the effects of extreme weather events. This resiliency should result in lower costs for restoration from the storms and reduced outage times experienced by the customers. In my opinion, clearly, the goal is to invest in storm hardening activities that benefit the customers of the electric utilities at a cost that is reasonable relative to those benefits.

Q. PURSUANT TO SECTION 366.96, FLORIDA STATUTES, THE COMMISSION ADOPTED RULE 25-6.030, F.A.C. PLEASE DISCUSS RULE 25-6.030, F.A.C., FROM YOUR PERSPECTIVE AS AN ELECTRIC UTILITY DISTRIBUTION ENGINEER.

A. Rule 25-6.030, F.A.C., mandates that after its initial SPP, each utility must file an updated SPP at least every three years that covers the utility's immediate ten-year planning period.

[1] Section 366.96 (1)(d) and (f), Florida Statutes.
[2] Section 366.96(4)(c), Florida Statutes.

This language is significant and central to a recommendation that I make later in my testimony. Per the rule, a storm protection program, is a group of storm protection projects that are undertaken to enhance the utility's existing infrastructure for "the purpose of reducing restoration costs and reducing outages times associated with extreme weather conditions . . ."[3] Further, a storm protection *project* is defined as a specific activity designed for enhancement of the system "for the purpose of reducing restoration costs and reducing outage times associated with extreme weather conditions . . ."[4]

The utility is required to provide, within the SPP, a description of how implementation of the projects will reduce restoration costs and outage times associated with extreme weather. Specifically, for each proposed storm protection program, the utility is to provide "an estimate of the resulting reduction in outage times and restoration costs due to extreme weather conditions."[5]

Rule 25-6.030, F.A.C., requires utilities to provide budgets for projects and to provide the estimated reduction in restoration costs. These amounts must be balanced for the benefits to the utilities' customers. Further, the two amounts will allow the Commission and stakeholders to understand the benefits of the capital investments for storm hardening. Any project can claim to reduce outage time/cost; however, the project must be cost effective for customers to benefit. To summarize, without giving consideration to benefits achieved from the projects, there will be no limit on expenditures for the storm protection plan, which is not contemplated by the SPP rule or the statute.

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[3] Rule 25-6.030 (2)(a), F.A.C.
[4] Rule 25-6.030 (2)(b), F.A.C.
[5] Rule 25-6.030 (3)(d)(1), F.A.C.

Q. HOW IS RULE 25-6.030, F.A.C. DIFFERENT FROM THE REQUIREMENTS OF RULE 25-6.0342, F.A.C.?

A. Pursuant to the now repealed Rule 25-6.0342, F.A.C., the requirement was to provide an "estimate of the costs and benefits to the utility of making the electric infrastructure improvements, including the effect on reducing storm restoration costs and customer outages."[6] Previously, benefits were <u>the effect</u> on reducing storm restoration costs, while the current Rule 25-6.030, F.A.C., requires an estimate of the reduction of the storm restoration time and a comparison of the estimated cost of the program and resulting benefit.[7]

Q. ARE THE COSTS ASSOCIATED WITH THE SPP BEING PROPOSED TO ADDRESS SYSTEM RELIABILITY OR SYSTEM RESILIENCY?

A. They should address both concepts to some extent. To begin, it is fundamental that electric utilities have a duty to provide safe, reliable, and affordable electric service. This duty for reliable service does not mean 100% reliable, but it is a core function of an electric utility. Many jurisdictions including Florida require utilities to report on system reliability. Reliability indices include System Average Interruption Frequency Index ("SAIDI"), System Average Interruption Frequency Index ("SAIFI"), and Customer Average Interruption Duration Index ("CAIDI"), which are defined in Institute of Electrical and Electronics Engineers ("IEEE") Standard 1366 - *IEEE Guide for Electric Power Distribution Reliability Indices*. Comparison of these indices is normally done by excluding major event days which are also referred to as Major Service Outages.

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[6] Rule 25-6.0342 (4)(d), F.A.C.
[7] Rule 25-6.030 (3)(d)(1) and (3)(d)(4), F.A.C.

On the other hand, resiliency focuses on the ability of an electric utility system to withstand and reduce the magnitude and/or duration of disruptive events.[8]

One way to consider the difference of reliability and resiliency is to compare common characteristics:[9]

Reliability: Routine, not unexpected, normally localized, shorter duration interruptions of electric service.

Resiliency: Infrequent, often unexpected, widespread/long duration power interruptions, generally with significant corollary impacts.

Because Rule 25-6.030, F.A.C., references "extreme weather conditions" throughout its provisions, the projects contained in the SPP should be primarily focused on resiliency, and not reliability. However, even though the primary focus should be on resiliency, the benefits from reliability cannot and should not be ignored.

Q. WHY IS IT IMPORTANT TO DISTINGUISH BETWEEN RESILIENCY AND RELIABILITY IN EVALUATING UTILITY-PROPOSED SPP INVESTMENTS?

A. The amount of capital investment in the utilities' proposals to regulators is increasing as indicated by the SPP proposals filed by FPL and the other Florida electric utilities. It will, therefore, be important to develop standards to evaluate whether the SPP proposals being made by FPL and the other Florida electric utilities are cost justified. Standards will be needed to evaluate the value and cost-effectiveness of the proposed SPP programs and how they differ from traditional reliability investments that would be included and recovered in traditional utility base rates. Using traditional *reliability* measures to fully evaluate proposed system hardening expenditures to improve resiliency may not be adequate. As

[8] FERC Docket RM18-1-000 Grid Reliability and Resilience Pricing

[9] *See*, http://necpuc.org/wp-content/uploads/2018/05/metrics-for-resilience-eto.pdf. *Metrics for Resilience in Theory and in Practice*, Joseph Eto, Lawrence Berkeley National Laboratory, 05/22/18.

noted above, resilience and reliability are distinguishable concepts and the expenditures to address improvements in each would appear to require their own specialized evaluation criteria. There is not yet a clear and widely accepted "value of resilience" metric, thus appropriate evaluation standards will need to be developed by the Commission to determine the adequacy of the proposed SPP's. Moreover, while traditional measurements of reliability have been in use for many years and are widely accepted, there are not yet standardized or widely-accepted standards for measuring resiliency, measurements for reliability related to resiliency, or methods of determining the value of system hardening expenditures intended to improve resiliency. Without such criteria, expenditures may be undertaken by a utility for SPP programs that may not produce or result in adequate benefits related to the costs of the proposed initiatives.

Q. ARE YOU AWARE OF CLEAR STANDARDS USED IN THE ELECTRIC INDUSTRY TO MEASURE SYSTEM RESILIENCY?

A. The electric utility industry has clearly defined standards to measure system reliability using SAIDI, SAIFI, CAIDI as defined in IEEE Standard 1366. However, the industry does not have mature or clearly defined standards for measuring resiliency.

Q. WHAT ARE SOME METHODS FOR MEASURING SYSTEM RESILIENCY?

A. To define metrics for resiliency, it is important to consider the purpose of resiliency. Energy distribution systems provide energy for the benefit of the community in the form of transportation, health care, economic gains, etc. The goal of improving energy system resiliency is to make communities safer and more productive. Major weather events can result in widespread electric outages and cause damage to the community and to individual customers.

Thus, resiliency metrics should include the impact to customers and community.[10] The following table contains suggested resiliency metrics.

Electric Service	Cumulative customer-hours of outage from extreme weather events
Critical Electric Service	Cumulative critical customer-hours of outage from extreme weather events
Restoration	Time to recover to 50% of peak number of customers out Time to recover to 75% of peak number customers out Time to recover to 100% of peak number of customers out
Monetary	Cost to Recovery Cost of grid damages
Community Function	Critical services without power more than N hours where N is less than hours of back up fuel.

The restoration time to 50% of peak is a measurement of speed of restoration and a key component of resiliency. Generally, the 50% value is an indication of the resiliency of the transmission and substation facilities.

Critical Electric Service represents those critical customer-hours not served by the utility. A more resilient system would help prevent or minimize outages and, if outages did occur, to restore the system more quickly. Community Function measures the impact to a community and is based on hours of outage time for the critical public infrastructure (first responder facilities, hospitals, critical community loads, etc.) is without utility power over N hours. Critical public infrastructure will often have backup generators with fuel supplies for 48 to 96 hours depending on building code requirements. N represents the number of hours for which the facility has backup fuel supplies. Thus, it is important that

[10] *See*, https://prod-ng.sandia.gov/techlib-noauth/access-control.cgi/2017/171493.pdf. *Resilience Metrics for the Electric Power System:* A Performance-Based Approach, Sandia National Laboratories, February 2017.

power is restored to these customers prior to their depletion of the fuel supply for the backup generator. So, N could be defined as 48 hours. The goal would be for the Community Function to have very few hours of outage time beyond their fuel supply hours. Critical Electric Service is a function of the total hours these critical public infrastructure customers are without utility power and relying instead on their backup power systems. I recommend the Commission consider these resiliency metrics to track the effectiveness of SPP projects in future events. Limits for these parameters can help define the scope of SPP projects and may influence the speed of the roll-out of the projects.

III. BENEFITS OF SPP PROGRAMS

Q. YOU STATED THAT A COMPARISON OF THE ESTIMATED COST OF THE PROGRAM AND RESULTING BENEFIT IS REQUIRED BY RULE 25-6.030, F.A.C. DID FPL INCLUDE QUANTIFIED BENEFITS FOR PROPOSED PROJECTS OR THE ENTIRE PLAN?

A. Yes. Data from FPL's Third Supplemental Amended Response to Staff's First Data Request in Docket No. 20170215-EI was used by FPL to provide benefits for existing projects that were contained in FLP's 2019 SHP in terms of costs and reduction in outage time.[11] However, FPL did not provide such data for new programs and there was no overarching analysis of the total SPP cost and benefit to customers.

Q. CAN YOU DISCUSS THE MODEL USED BY FPL TO DEMONSTRATE THE REDUCED RESTORATION TIME AND REDUCED RESTORATION COSTS WHEN FPL'S SYSTEM IS IMPACTED BY SEVERE WEATHER EVENTS?

[11] *See* Exhibit MJ-1, Appendix A.

A. Yes. FPL presented an estimate of the reduction in restoration time and reduction in restoration costs from severe weather events such as hurricanes.[12] These estimates were derived from FPL's storm assessment model which helps predict the damage of an incoming hurricane or tropical storm. This model can be used to estimate restoration assuming the storm hardening activity was not in place. The model uses a GIS model of the assets (poles and wires) and applies wind speeds. The model is calibrated based on actual storm data.[13] With the modeled damage, estimates can be made on the restoration construction time and total duration.

FPL modeled the system without Storm Hardening Plan ("SHP") improvements and estimated the construction man-hours (CMH) needed to restore the system based on Hurricane Michael and Hurricane Irma making landfall. This was done by using the weather data from these hurricanes and applying that to the strength of the system without SHP improvements. FPL then prepared a net present worth of the savings assuming a return cycle of hurricanes of three-years and five-years.[14] The results of FPL's analysis for Hurricane Irma is shown below:

40 Yr NPV Savings (2017$)

40 Yr NPV Savings Every 3 Years (Millions) (2017$)	40 Yr NPV Savings Every 5 Years (Millions) (2017$)
$653	$406
$3,082	$1,915

[12] *See* Exhibit MJ-1, p. 4
[13] *See* FPL's Response to OPC's Fourth Request for Production of Documents, Production of Document No. 65.
[14] *See* Exhibit MJ-1, Appendix A.

Q. IN YOUR OPINION, SHOULD FPL PROVIDE A SIMILAR ANALYSIS FOR THE SPP?

A. Yes, Rule 25-6.030, F.A.C., requires utilities to provide budgets for projects and to provide the estimated reduction in restoration costs. This will allow a comparison of benefits to costs to determine if there are savings to the utilities' customers.

In this case, FPL should model the future system with the proposed SPP program in place subjected to Hurricane Matthew and/or Hurricane Irma. These results can then be compared to the actual restoration costs of Hurricane Matthew and/or Hurricane Irma. This will represent the savings as a result of FPL's proposed SPP.

In addition, FPL should provide a net present value of the revenue requirements for the programs contained in its SPP and detailed in the Errata to Exhibit MJ-1 in Section VI. This value would then be compared to the storm restoration savings. My approximation of the 40-year net present value ("NPV") of the hardening costs would be in the range of $10.3 billion.

Q. SHOULD THE COMMISSION CONSIDER POTENTIAL ECONOMIC IMPACTS OF THE COVID-19 PANDEMIC IN DECIDING WHETHER FPL'S PROPOSED $10.2 BILLION SPP SHOULD GO FORWARD AT THIS TIME?

A. Yes. The uncertainty of the economic impacts of COVID-19 on the Florida economy should be considered by the Commission in reviewing FPL's SPP. Florida's economy has been hit hard by the pandemic and has experienced a significant increase in unemployment. Section 366.96, Florida. Statute, directs the Commission to consider the estimated annual rate impacts resulting from implementation of the Plan during the first three years.[15] In the first three-year period of its SPP, FPL budgeted $3.25 billion in various programs.[16] In determining the rate impact of this investment, the Commission needs to consider the state of the economy and the affordability of electric service where there are uncertainties associated with the economic impact from the COVID-19 pandemic. Because we are still in the middle of the pandemic and do not know the full impact to the Florida and national economy or when the pandemic may end, I recommend the Commission direct FPL to re-file or file an update to its plan in 2022 to consider the impacts of the pandemic and the effects to Florida citizens and businesses. If FPL was required to update the SPP in 2022 after the conclusion of the 2021 rate case, it would not be unreasonable for the Commission to allow FPL to implement and submit for prudence determinations the core programs of the SPP including:

- Distribution – Pole Inspections;
- Transmission – Inspections;
- Distribution – Vegetation Management; and
- Transmission – Vegetation Management.

These programs have been developed and in use for many years as part of FPL's approved SHP. The three-year total expenditure for these programs is $476.6 million.[17] Accordingly, I would not find it unreasonable if the Commission approves the SPP with the modification that allowed the core programs to go forward and ordered a delay in implementing the other hardening programs until FPL can provide the rate impact of all programs updated with the economic impact of COVID-19 pandemic. A key to this analysis will be an update to the total program cost benefit analyses using the storm damage

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[15] Section 366.96(4)(d), Florida Statutes.
[16] *See* Exhibit MJ-1, Appendix C.
[17] *See* Exhibit MJ-1, Appendix C.

model to determine benefits on a forward looking basis coupled with the net present value of the costs of the SPP programs.

IV. NEW SPP INITIATIVES

Q. HAS FPL OFFERED ANY NEW INITIATIVES IN THE SPP FROM ITS 2019 SHP?

A. Yes. FPL has offered several new initiatives that were not in FPL's 2019 SHP approved by the Commission on July 29, 2019.[18] These new or modified programs are as follows:

- Substation Storm Surge/Flood Mitigation Program; and
- Expansion/Changes to the Storm Security Underground Plan (SSUP) Pilot.

Q. CAN YOU DESCRIBE THE SUBSTATION STORM SURGE/FLOOD MITIGATION PROGRAM?

A. Yes. This new program is designed to mitigate damage at several targeted distribution and transmission substations that are susceptible to storm surge and flooding during extreme weather events.[19] FPL discussed two substations (St. Augustine Substation and South Daytona Substation) that had flooding during Hurricane Irma. Flooding of a substation is a low-probability high-risk scenario. The flooding of a substation can be a high-risk scenario since little can be done other than to de-energize the station until flood waters have receded.

Q. WHAT IS YOUR UNDERSTANDING OF BUILDING A SUBSTATION IN COASTAL FLOOD ZONES?

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[18] Order No. PSC-2019-0301-PAA-EI, issued July 29, 2019, in Docket No. 20180144-EI.
[19] *See* Exhibit MJ-1, p. 30.

A. The acquisition of land for a substation is always a challenge; however, the land needs to be suitable for safe and reliable electric service. Flood maps were not issued until 1973;[20] therefore, substations constructed before 1973 would not have had standards requiring certain elevations. For example, the St. Augustine Substation was originally built in 1927 and rebuilt in 1969.[21] However, substations built after 1973 should have been designed with the knowledge of potential flood waters and the designs should have accounted for this predicable occurrence. Specifically, the ASCE-24-14 Flood Resistant Design and Construction recommends the facilities to be designed for the Basic Flood Elevation (100 year flood level) plus two feet. Details of improvements are not required to be contained in the current SPP, thus, no conclusion can be reached regarding the prudency of the original design and the proposed mitigation plans.

Q. CAN YOU DESCRIBE THE MITIGATION TO BE USED BY FPL FOR FLOOD MITIGATION?

A. Yes. FPL is suggesting that one substation will need to be re-built at a higher elevation and seven to nine other substations can be retro-fitted with flood protection walls.[22] The flood protective walls appears to be a cost effective mitigation action (pending determination of the original substation design). FPL suggests changing the elevation of the St. Augustine Substation. This would be accomplished by increasing the height of the seawall by five feet and adding fill so as to raise the elevation of the land. Once complete, the substation will be re-built on essentially the same site.[23]

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[20] *See* https://www.fema.gov/media-library-data/20130726-1602-20490-6472/nfip eval chronology.txt
[21] *See* FPL's Response to OPC's Fourth Set of Interrogatories, Interrogatory No. 214.
[22] *See* Exhibit MJ-1, p. 30.
[23] *See* FPL's Response to OPC's Fourth Set of Interrogatories, Interrogatory No. 217

The cost of the project is budgeted at $10,000,000[24] which includes $3,000,000 for the site work.[25]

Q. WHAT IS YOUR RECOMMENDATION REGARDING THIS PROJECT TO RAISE THE ELEVATION OF THE ST. AUGUSTINE SUBSTATION?

A. FPL should provide an alternative project which would relocate the substation away from the water's edge to determine whether the Company's proposal is the least cost option, as required by Rule 25-6.030(3)(i), F.A.C. The cost of a new site could be offset by the cost of the site work. However, this is not necessarily the forum to discuss the pros and cons of individual projects.

Q. WHAT IS YOUR RECOMMENDATION REGARDING THE SUBSTATION STORM SURGE/FLOOD MITIGATION PROGRAM?

A. I recommend inclusion of this program but limit it to the retro-fitting of the flood protection walls for the seven to nine substations. FPL provided the costs and benefits associated with the program including time of outage due to flooding which repeated in Hurricanes Irma and Michael.

Q. CAN YOU DESCRIBE THE STORM SECURITY UNDERGROUND PLAN (SSUP) PILOT?

A. Yes. In FPL's 2019 SHP, the SSUP was identified as a program targeting certain overhead laterals that were impacted by recent storms and have a history of vegetation-related

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[24] *See* Exhibit MJ-1, p. 31.
[25] *See* FPL's Response to OPC's Third Set of Production of Documents, Production of Document No. 36

outages and other reliability issues for conversion from overhead to underground.[26] This pilot program is slated for three years ending 2020, and FPL plans to convert approximately 220-230 laterals from overhead to underground.[27] FPL stated its key objectives of the SSUP pilot included validating conversion costs, testing different design philosophies, gaining a better understanding of customer impacts and identifying barriers.[28]

Q. IS FPL PROPOSING TO EXPAND THE SSUP PROGRAM IN ITS SPP?

A. Yes. FPL suggests it is expanding the application of the SSUP for the implementation of its system-wide Lateral Hardening (Undergrounding) – Distribution Program for the period of 2021-2019.[29] Total projected expenditures for the period of 2021 to 2029 is $4,981,100,000 which averages $553,500,000 per year. In my view, this is not an expansion but a new program. As stated earlier, the SSUP Pilot approved by the Commission[30] focused on key objectives such as validating conversion costs, testing different design philosophies, gaining a better understanding of customer impacts and identifying barriers. With those learning objectives met, FPL is now proposing a new distribution hardening program which includes undergrounding laterals.

Q. HAS THE PRIORITY OF THE PROGRAM CHANGED IN THE SPP?

A. Yes, the priority for selection of laterals has changed from FPL's filing in its 2019 SHP. The original priority and scope of the Pilot was to target overhead laterals experiencing an outage during Hurricanes Matthew and/or Irma and having a history of vegetation-caused

[26] Direct Testimony of Michael Jarro, p. 11, lines15-17.
[27] Direct Testimony of Michael Jarro, p. 11, lines 4-6.
[28] *See* Exhibit MJ-1, p. 22.
[29] Direct Testimony of Michael Jarro, p. 11, lines 18-21.
[30] Order No. PSC-2019-0301-PAA-EI, issued July 29, 2019, in Docket No. 20180144-EI.

outages and overall reliability.[31] The focus of the program, as conveyed to the Commission and stakeholders, was that FPL would find laterals that had a history of poor resiliency and poor reliability and convert those overhead laterals to underground. Many of these laterals, especially in older neighborhoods, are located on the customer's back property line[32] making access extremely difficult for storm restoration which increases the cost of the normal maintenance of the system.

The priority as described in the SPP is very different. FPL will prioritize based on an overall feeder performance methodology.[33] The methodology for prioritizing undergrounding budgets is based on the reliability/resiliency of <u>all</u> overhead laterals on feeders. In other words, FPL will take in account and sum up on a feeder basis the outage experience of all 20-30 laterals on a feeder during hurricanes, the number of vegetation-related outages over the last 10 years and the total number of lateral and transformer outages for the last 10 years.[34] Based on the scoring of the feeders, FPL will then underground all of the laterals on a feeder. Clearly, this methodology is much different than focusing on individual laterals with poor performance.[35]

Q. DO YOU AGREE WITH THE METHODOLOGY PROPOSED BY FPL FOR THE UNDERGROUNDING OF LATERALS?

A. No. Undergrounding power lines/laterals is an expensive proposition and one that should not be taken lightly. The average lateral on FPL's system is 0.13 miles long[36] and the average cost to underground a lateral is $755,778.[37]

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[31] FPL Storm Hardening Plan, page 10, in Docket No. 20180144-EI.
[32] *See* Exhibit MJ-1, p. 23.
[33] *See* Exhibit MJ-1, p. 26.
[34] *Id.*
[35] *See* Exhibit MJ-1, p. 22.
[36] *See* Exhibit MJ-1, p. 23.(23,000 miles of laterals and 180, 000 laterals)
[37] *See* Exhibit MJ-1, Appendix C (10 year average)

If FPL undergrounds all of the laterals on a feeder, then the investment per feeder will be $15,115,556 to $22,673,333 per feeder. This is a significant investment in a small portion of the system in a single community. A better course of action is not to underground all of the laterals on a feeder, but to focus on the laterals that have a history of poor resiliency and poor reliability. This way the investment can be spread to more communities in the system, which is important since all customers will be contributing to the costs of undergrounding.

In addition, the makeup of a feeder is generally not homogeneous. Some laterals will have fewer outages due to vegetation (or lack thereof), some will be located along a roadway with easy access with greater reliability, some will have few customers, and some will have no access and very poor reliability. However, under FPL's proposed program to lump all laterals together and score the priority on a feeder basis, there will be laterals that will be undergrounded that do not need to be. Thus, this would not be as effective in reducing outage times and recovery costs from extreme weather events. Given that this is a change in the methodology from the original SSUP Pilot program, there is no information available to determine how over-inclusive this new methodology would be and result in unnecessary undergrounding.

The SSUP Pilot included 497 laterals[38] and all of these laterals suffered outages in either Hurricane Irma or Michael. I note that the number of laterals without power in Irma was 23,341 and these 497 laterals are a small subset of that total. The following is a break down on the number of sustained outages for each lateral between 2015 and 2019.[39]

- 19 laterals have more than 10 outages
- 56 laterals have 6-10 outages

[38] *See* Exhibit MJ-1, Appendix E
[39] *See* FPL's Response to OPC's Fourth Set of Interrogatories, Interrogatory No. 210.

- 98 laterals have 3-5 outages
- 129 laterals have 1-2 outages
- 195 laterals have 0 outages.

This data shows that during the Pilot phase, 195 laterals to be undergrounded suffered no outages since 2015. In fact, 65% of the laterals FPL proposes to be undergrounded had two or fewer outages over the last five years. Further, 85% of these laterals had two or fewer outages related to vegetation issues. In my opinion, this program on a going forward basis should not be focused on undergrounding laterals with no significant history of outages. The population of laterals that experience an outage in Hurricane Irma was 20,341;[40] therefore, it is necessary to locate laterals where the investment will have the largest return in terms of resiliency and, to a lesser extent, improvement in reliability.

Q. WHAT IS YOUR RECOMMENDATION FOR PRIORITIZING THE LATERALS FOR UNDERGROUNDING?

A. I agree with FPL's starting point of analyzing the laterals on a feeder basis. The selection of feeders should be weighted by Management Area so as to spread the investment to all parts of the system. However, once a feeder is selected, the screening of the 20-30 laterals on the feeder should start with accessibility (or lack thereof), then the number of outages experienced, and then investment per outage hours for the last five years. The outage hours would be better than investment per number of customers, because the outage hours recognizes the difficulty of access on some lateral taps. Finally, there should be a cutoff on investment per feeder such that no more than 10 or 15 laterals are addressed per feeder.

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40 *See* Exhibit MJ-1, Appendix A p. 8 of 18.

This limit of laterals per feeder meets a goal of improving the resiliency and reliability on as many feeders as practical and, thus, improving as many communities as possible.

Q. DO YOU HAVE THOUGHTS ON THE TIMING OF THE DISTRIBUTION LATERAL HARDENING PROGRAM?

A. Yes. The accelerated rate for undergrounding has no basis or rationale. Of course, more undergrounding means better resiliency, yet this has to be balanced with the rate impacts to the customers. FPL is proposing nearly tripling its 2020 budget of $120,000,000 to $342,800,000 in 2021. By 2025, FPL proposes doubling the budget again to $631,400,000.[41]

The Distribution Feeder Hardening Program which has annual budgets of $650,000,000 will be ramping down in 2023 and closing down in 2026.[42] I recommend that the Distribution Lateral Hardening Program be ramped up slowly to match the expenditures on the Distribution Feeder Hardening Program. This essentially delays the full roll out by three years. This is shown in my Exhibit KJM-2. This reduces the total 10 year budget from $10.245 billion to $9.052 billion and levels the annual budget in the early years (2021-2023) to $1.048 billion per year.

Q. WHAT INFORMATION DID FPL PROVIDE REGARDING BENEFITS OF ITS LATERAL HARDENING PROGRAM?

A. FPL pointed out that many of the laterals are behind customers' premises making it more difficult to access and, therefore, increasing the time to restore power to these facilities compared to facilities located along the roadways.[43] FPL also noted that performance of

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[41] *See* Exhibit MJ-1, Appendix C
[42] *See* Exhibit MJ-1, Appendix C
[43] *See* Exhibit MJ-1, p. 23.

underground laterals is better than overhead laterals. However, FPL provided no quantifiable benefits in terms of restoration time or restoration costs benefits to customers from extreme weather events.

Q. DID YOU CONDUCT ANY COMPARISON OF THE BENEFIT AND COST OF UNDERGROUNDING DISTRIBUTION LATERALS?

A. Yes, I did. FPL's data show that, for restoration during a hurricane event, the average cost to restore power to a lateral was $44,880 per lateral;[44] however, the cost to underground a single lateral for FPL is $755,778.[45] I know that undergrounding laterals provides much greater resiliency during extreme weather events, yet the benefit to cost ratio is so low as to be not justifiable. I also recognize that some laterals will have much longer restoration time and much higher costs for restoring power especially those in inaccessible locations. However, it is incumbent on FPL to provide data to justify these expenditures which it has not done.

Q. DESPITE THE COMMISSION'S APPROVAL OF FPL'S 2019 SHP, INCLUDING THE PILOT FOR UNDERGROUNDING LATERALS, WHAT IS YOUR RECOMMENDATION REGARDING THE UNDERGROUNDING DISTRIBUTION LATERALS PROGRAM CONTAINED IN FPL'S PROPOSED SPP?

A. To be clear, FPL's 2019 SSHP proposed a pilot program that had key objectives including validating conversion costs, testing different design philosophies, better understanding

[44] *See* Exhibit MJ-1, Florida Power & Light Company Storm Protection Plan 2020-2029, Appendix A. Average Construction Man-Hour (CMH) to restore a lateral is 43.7for Hurricane Michael and Irma. Cost per CMH is $1027 for Irma per Exhibit MS-1, P. 4

[45] *Id.* Appendix C.

customer impacts and identifying barriers. Commission approval for a pilot does not extend to approving a new program that invests $4,981,100,000 over an eight year period. This level of investment requires much greater scrutiny and consideration.

In my opinion, benefits and costs for undergrounding distribution laterals needs a critical comparison to determine if customers are receiving adequate benefits for the higher rates due to this program. Without such data, the Commission does not have enough information to evaluate the sufficiency of the SPP on this program and should not approve it. This deficiency can be remedied in a 2022 SPP update.

V. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS.

A. I recommend metrics be established by the Commission which can be useful to determine the effectiveness of FPL's SPP on a going-forward basis. These resiliency metrics should include Electric Service, Critical Electric Service, Restoration, Monetary, and Community Focus.

FPL should be directed to model its future system with the proposed SPP program in place and subjected to the weather conditions of Hurricane Matthew and/or Hurricane Irma. These results can be compared to the actual restoration costs of Hurricane Matthew and/or Hurricane Irma. This will represent the savings as a result of the SPP. The net present value of the savings should be compared to the net present value of the proposed $10.2 billion in SPP programs. This information is critical for the Commission to compare the total costs of the program to the project benefits of the program.

I also recommend the Commission direct FPL to file an updated SPP in 2022 with a rate impact analysis that considers the impact of the COVID-19 pandemic and includes the required analyses that I address in my testimony. If such an update is ordered, it would not be unreasonable for the Commission to allow FPL to proceed with submitting for cost recovery core programs such as inspections and vegetation management, and delay consideration of other hardening programs until FPL has prepared an analysis on the rate impacts of these programs with the economic impact of COVID-19 pandemic.

Further, FPL has proposed two new projects entitled Substation Storm Surge/Flood Mitigation Program and Expansion/Changes to the Storm Security Underground Plan (SSUP) Pilot. I recommend that, in accordance with Rule 25-6.030(3)(i), F.A.C., FPL be directed to provide in the 2022 SPP update, an alternative to the re-building of the St. Augustine Substation which would relocate the substation away from the water's edge. The Commission does not have enough information in this docket to evaluate the sufficiency of the SSUP and FPL has not demonstrated that this program has sufficient benefits (actually no benefits are defined) relative to the cost of the program.

My testimony recommends delaying the pace of the SSUP such that the new expenditures of the SSUP to match reductions in the Feeder Hardening Program.

Q. DOES THIS COMPLETE YOUR PREFILED TESTIMONY?

A. Yes, it does.

CRTIFICATE OF SERVICE
Docket No. 20200071-EI

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished by electronic mail on this 28th day of May 2020, to the following:

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HI LINE ENGINEERING
a GDS Associates Company

KEVIN J. MARA, P.E.

Exec. Vice President & Principal Engineer

EDUCATION

BS Electrical Engineering, Georgia Institute of Technology, 1982

PROFESSIONAL MEMBERSHIPS

Institute of Electrical and Electronic Engineers Power Engineering Society – Senior Member

National Electric Safety Code Subcommittee 5 – Alternate Member

Past Member - Insulated Conductor Committee

PROFESSIONAL REGISTRATIONS

Registered Professional Engineer in Alabama, Arkansas, Georgia, Florida, Idaho, Indiana, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Missouri, North Carolina, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Virginia, and Wisconsin.

AREAS OF EXPERTISE

Overhead and Underground Distribution Design, Distribution System Planning, Power System Modeling and Analysis, Training

DESIGN

Mr. Mara has over 30 years of experience as a distribution engineer. He worked six years at Savannah Electric as a Distribution Engineer and ten years with Southern Engineering Company as a Project Manager. At Savannah Electric, Mr. Mara gained invaluable field experience in the operation, maintenance, and design of transmission and distribution systems. While at Southern Engineering, Mr. Mara performed planning studies, general consulting, underground distribution design, territorial assistance, and training services. Presently, Mr. Mara is a Vice President at GDS Associates, Inc. and serves as the Principal Engineer for GDS Associates' engineering services company known as its trade name Hi-Line Engineering.

Overhead Distribution System Design

Mr. Mara is in responsible charge of the design of distribution lines for many different utilities located in a variety of different terrains and loading conditions. Mr. Mara is in responsible charge of the design of over 100 miles of distribution line conversions, upgrades, and line reinsulation each year. Many of these projects include acquisition of right-of-way, obtaining easements, and obtaining permits from various local, state and federal agencies. In addition, Mr. Mara performs inspections at various stages of completion of line construction projects to verify compliance of construction and materials with design specifications and applicable codes and standards.

Underground Distribution System Design

Mr. Mara has developed underground specifications for utilities and was an active participant on the Insulated Conductor Committee for IEEE. He has designed underground service to subdivisions, malls, commercial, and industrial areas in various terrains. These designs include concrete-encased ductlines, direct-burial, bridge attachments, long-bores, submarine, and tunneling projects. He has developed overcurrent and overvoltage protection schemes for underground systems for a variety of clients with different operating parameters.

PLANNING

Mr. Mara has prepared numerous planning studies for electric cooperatives and municipal systems in various parts of the country. The following is a representative list of specific projects:

- Little River Electric Cooperative, SC
  - Long Range Plan
  - Four Construction Work Plans
- Maxwell AFB, AL - Long Range Plan
- Fall River Electric, ID – Long Range Plan
- Chugach Electric, AK - Long Range Plan
- Newberry Electric Cooperative, SC - Construction Work Plan, Long Range Plan
- Lackland AFB, TX - Long Range Plan
- Rio Grande ECI, TX - Construction Work Plan, Long Range Plan
- Northern Virginia Electric Cooperative, VA - Construction Work Plan
- BARC Electric Cooperative - Construction Work Plan
- Dixie Electric Cooperative - Construction Work Plan
- Joe Wheeler Electric Cooperative - Construction Work Plan
- Cullman Electric Cooperative - Long Range Plan, Construction Work Plan

TRAINING SEMINARS

Mr. Mara has developed engineering training courses on the general subject of distribution power line design. These seminars have become extremely popular with more than 25 seminars being presented annually and with more than 4,000 people having attended seminars presented by Mr. Mara. A 3-week certification program is offered by Hi-Line Engineering in eleven states. The following is a list of the training material developed and/or presented:

- Application and Use of the National Electric Safety Code
- How to Design Service to Large Underground Subdivisions
- Cost-Effective Methods for Reducing Losses/Engineering Economics
- Underground System Design
- Joint-Use Contracts – Anatomy of Joint-Use Contract
- Overhead Structure Design
- Easement Acquisition
- Transformer Sizing and Voltage Drop

Construction Specifications for Electric Utilities

Mr. Mara has developed overhead construction specifications including overhead and underground systems for several different utilities. The design included overcurrent protection for padmounted and pole mounted transformers. The following is a representative list of past and present clients:

- Cullman EMC, Alabama
- Blue Ridge EMC, South Carolina
- Buckeye Rural Electric Cooperative, Ohio
- Three Notch EMC, Georgia
- Little River ECI, South Carolina
- Lackland Air Force Base
- Maxwell Air Force Base

System Privatization/Evaluation

- Central Electric Power Cooperative, Columbia, SC
  - 2017 Independent Certification of Transmission Asset Valuation, Silver Bluff to N. Augusts 115kV
  - 2015 Independent Certification of Transmission Asset Valuation, Wadmalaw 115kV
- Choctawhatchee Electric Cooperative, DeFuniak Springs, FL
  - Inventory and valuation of electrical system assets at Eglin AFB prior to 40-year lease to private-sector entity.

Publications

- Co-author of the NRECA "Simplified Overhead Distribution Staking Manual" including editions 2, 3 and 4.
- Author of "Field Staking Information for Overhead Distribution Lines"
- Author of four chapters of "TVPPA Transmission and Distribution Standards and Specifications"

Testimonies & Depositions

Mr. Mara has testified as an expert at trial or by deposition in the following actions.

- Deposition related to condemnation of property
  Newberry ECI v. Fretwell, 2005
  State of South Carolina

- Testimony in Arbitration regarding territory dispute
  Newberry ECI v. City of Newberry, 2003
  State of South Carolina
  Civil Action No. 2003-CP-36-0277

- Expert Report and Deposition, 2005
  United States of America v. Southern California Edison Company
  Case No CIV F-o1-5167 OWW DLB

- Expert Report and Deposition, 2005
  Contesting a transmission condemnation
  Moore v. South Carolina Electric and Gas Company
  United States District Court of South Carolina
  Case No. 1:05-1509-MBS

- Affidavit October 2007
  FERC Docket No. ER04-1421 and ER04-1422
  Intervene in Open Access Transmission Tariff filed by Dominion Virginia Power

- Affidavit February 26, 2008
  FERC Docket No. ER08-573-000 and ER08-574-000
  Service Agreement between Dominion Virginia Power and WM Renewable Energy, LLC

- Direct Filed Testimony date December 15, 2006
  Before the Public Utility Commission of Texas
  SOAH Docket No 473-06-2536
  PUC Docket No. 32766

- Expert Report and Direct Testimony April 2008
  United States Tax Court
  Docket 25132-06
  Entergy Corporation v. Commissioner Internal Revenue

- Direct Testimony September 17, 2009
  Public Service Commission of the District of Columbia
  Formal Case 1076
  Reliability Issues

- Filed Testimony regarding the prudency of hurricane restoration costs on behalf of the City of Houston, TX, 2009
  Cozen O'Connor P.C.
  TX PUC Docket No. 32093 – Hurricane Restoration Costs

- Technical Assistance and Filed Comments regarding line losses and distributive generation interconnection issues, 2011
  Office of the Ohio Consumer's Counsel
  OCC Contract 1107, OBM PO# 938 for Energy Efficiency T & D

- Technical Assistance, Filed Comments, and Recommendations evaluating Pepco's response to Commission Order 15941 concerning worst reliable feeders in the District of Columbia.
  2011, 2012 Office of the People's Counsel of the District of Columbia
  Formal Case No. 766

- Technical Assistance, Filed Comments, and Recommendations on proposed rulemaking by the District of Columbia PSC amending the Electric Quality of Service Standards (EQSS), 2011.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 766

- Yearly Technical Review, Filed Comments, and Recommendations evaluating Pepco's Annual Consolidated Report for 2011 through 2018.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 766

- Technical Evaluation, Filed Comments, and Recommendations evaluating Pepco's response to a major service outage occurring May 31, 2011. (2011)
  Office of the People's Counsel of the District of Columbia
  Formal Case Nos. 766 and 1062

- Technical Assistance, Filed Comments, and Recommendations evaluating Pepco's response to Commission Order 164261 concerning worst reliable neighborhoods in the District of Columbia, 2011.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 766

- Technical Review, Filed Comments, and Recommendations on Pepco's Incident Response Plan (IRP) and Crisis Management Plan (CMP), 2011.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 766

- Technical Assistance, Filed Comments, and Recommendations assessing Pepco's Vegetation Management Program and trim cycle in response to Oder 16830, 2012.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 766
- Technical Review, Filed Comments, and Recommendations on Pepco's Secondary Splice Pilot Program in response to Order 16426, 2012.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 766 and 991
- Technical Review, Filed Comments, and Recommendations on Pepco's Major Storm Outage Plan (MSO), 2012 - active.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 766
- Technical Assistance and Direct Filed Testimony for fully litigated rate case, 2011-2012.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 1087 – Pepco 2011 Rate Case. Hearing transcript date: February 12, 2012.
- Evaluation of and Filed Comments on Pepco's Storm Response, 2012.
  Office of the People's Counsel of the District of Columbia
  Storm Dockets SO-02, 03, and 04-E-2012
- Technical Assistance and Direct Filed Testimony for fully litigated rate case, 2013 - 2014.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 1103 – Pepco 2013 Rate Case. Hearing transcript date: November 6, 2013.
- Evaluation of and Filed Comments on Prudency of 2011 and 2012 Storm Costs, 2013 – 2014.
  State of New Jersey Division of Rate Counsel
  BPU Docket No. AX13030196 and EO13070611
- Technical Assistance and Direct Filed Testimony for DTE Acquisition of Detroit Public Lighting Department, 2013 – 2014.
  Office of the State of Michigan Attorney General
  Docket U-17437
- Evaluation of and Filed Comments on the Siemens Management Audit of Pepco System Reliability and the Liberty Management Audit, 2014
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 1076
- Expert witness for personal injury case, District of Columbia
  Koontz, McKenney, Johnson, DePaolis & Lightfoot LLP
  Ghafoorian v Pepco 2013 - 2016
  Plaintive expert assistance regarding electric utility design. operation of distribution systems and overcurrent protection systems.
- Technical Assistance and Direct Filed Testimony in the Matter of the Application for approval of the Triennial Underground Infrastructure Improvement Projects Plan, 2014 – 2017.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 1116
- Technical Assistance and Direct Filed Testimony in the Matter of the Merger of Exelon Corporation, Pepco Holdings, Inc., Potomac Electric Power Company, Exelon Energy Delivery Company, LLC and New Special Purpose Entity, LLC, 2014 – 2016.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 1119. Hearing transcript date: April 21, 2015.

- Technical Assistance to Inform and advise the OPC in the matter of the investigation into modernizing the energy delivery system for increased sustainability. 2015 - active
  Office of the People's Counsel of the District of Columbia
  Formal Case No 1130.
- Technical Assistance and Direct Filed Testimony in the Matter of the Merger of Exelon Corporation and Pepco Holdings, Inc., 2014 – 2016.
  State of Maryland and the Maryland Energy Administration
  Case No. 9361
- Technical Assistance and Direct Filed Testimony for fully litigated rate case, 2015 – 2016.
  State of Oklahoma Office of the Attorney General
  Cause No. PUD 201500273 - OG&E 2016 Rate Case. Hearing transcript date: May 17, 2016.
- Technical Assistance and Filed Comments on Notice of Inquiry, The Commission's Investigation into Electricity Quality of Service Standards and Reliability Performance, 2016 - active.
  Office of the People's Counsel of the District of Columbia
  RM36-2016-01-E
- Technical Assistance and Direct Filed Testimony for fully litigated rate case, 2016 - 2017.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 1139 – Pepco 2016 Rate Case. Hearing transcript date: March 21, 2017.
- Technical Assistance in the Matter of the Application for approval of the Biennial Underground Infrastructure Improvement Projects Plan, 2017.- active
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 1145
- Technical Assistance to Inform and advise the OPC Regarding Pepco's Capital Grid Project, 2017 - active.
  Office of the People's Counsel of the District of Columbia
  Formal Case No. 1144. Confidential Comments and Confidential Affidavit filed November 29, 2017.
- Expert witness for personal injury case Mecklenburg County, NC
  Tin, Fulton, Walker & Owen, PLLC
  Norton v Duke, Witness testimony December 1, 2017
- Technical assistance and pre-filed Direct Testimony on behalf of the Joint Municipal Intervenors in a rate case before the Indiana Utility Regulatory Commission; 2017 - active.
  Cause No. 44967. Testimony filed November 7, 2017.
- Prefiled Direct Testimony and Prefiled Surrebuttal Testimony on behalf of the Vermont Department of Public Service in a case before the State of Vermont Public Utility Commission, Tariff Filing of Green Mountain Power Corp.
  Case No. 18-0974-TF. Direct Testimony Filed August 10, 2018. Surrebuttal Testimony Filed October 8, 2018.
- Technical assistance and pre-filed Direct Testimony on behalf of McCord Development, Inc. and Generation Park Management District against CenterPoint Energy Houston Electric, LLC in a case before the State Office of Administrative Hearings of Texas.
  TX PUC Docket No. 48583. Testimony filed April 5, 2019.

Exhibit KJM-2
Proposed Storm Protection Plan Budgets

Proposed Storm Protection Plan

FPL SPP Programs	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total SPP Costs	Annual Average Cost
Distribution - Pole Inspections												
Total	$ 54.5	$ 57.9	$ 57.9	$ 59.0	$ 59.1	$ 60.3	$ 61.8	$ 63.3	$ 64.9	$ 66.5	**$ 605.2**	$ 60.5
# of Pole Inspections	150,000	150,000	154,000	154,000	154,000	154,000	154,000	154,000	154,000	154,000		
Transmission - Inspections												
Total	$ 35.8	$ 32.2	$ 28.9	$ 68.5	$ 55.6	$ 53.0	$ 54.3	$ 55.7	$ 57.0	$ 58.4	**$ 499.5**	$ 50.0
# of Structure Inspections	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000		
Distribution - Feeder Hardening (1) (2)												
Total	$ 628.1	$ 664.9	$ 664.9	$ 573.3	$ 474.5	$ 200.0	$ -	$ -	$ -	$ -	**$ 3,205.8**	$ 534.3
# of Feeders (3)	300-350	300-350	300-350	300-350	250-350							
Distribution Lateral Hardening (1) (2)												
Total	$ 120.4	$ 212.5	$ 212.5	$ 217.8	$ 223.3	$ 369.2	$ 512.2	$ 663.4	$ 679.9	$ 696.9	**$ 3,908.0**	$ 390.8
# of Laterals (3)	220-230	300-350	300-350	300-350	300-350	300-350	400-500	800-900	800-900	800-900		
Transmission - Replacing Wood Structures												
Total	$ 52.9	$ 42.9	$ 22.1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 117.9**	$ 39.3
# of Structures to be Replaced	1,400-1,600	900-1,100	300-600									
Distribution - Vegetation Management												
Total	$ 61.1	$ 61.3	$ 60.2	$ 60.2	$ 60.6	$ 60.6	$ 59.5	$ 58.5	$ 57.4	$ 56.4	**$ 595.7**	$ 59.6
# of Miles Maintained	15,200	15,200	15,200	15,200	15,200	15,200	15,200	15,200	15,200	15,200		
Transmission - Vegetation Management												
Total	$ 9.0	$ 8.9	$ 8.9	$ 9.0	$ 9.7	$ 9.7	$ 9.9	$ 10.2	$ 10.4	$ 10.7	**$ 96.4**	$ 9.6
# of Miles Maintained	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000		
Substation Storm surge/Flood Mitigation												
Total	$ 3.0	$ 10.0	$ 10.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 23.0**	$ 7.7
# of Substations	1	2	5 to 7									
Total SPP Costs	**$ 964.7**	**$ 1,090.7**	**$ 1,065.5**	**$ 987.8**	**$ 882.8**	**$ 752.7**	**$ 697.7**	**$ 851.0**	**$ 869.7**	**$ 889.0**	**$ 9,051.7**	**$ 905.1**

(1) Project level detail for 2020 in Appendix
(2) Costs include previous year(s) projects carried over to current year's project costs and future year's preliminary project costs (e.g., engineering)
(3) # of feeders or lateral to be initiated in the current year