May 2013

Mayor's Power Line Undergrounding Task Force

Findings & Recommendations

Abridged version: this is an excerpt of the full Task Force report

Government of the District of Columbia
Executive Office of the Mayor

by participating agencies and utilities:

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The purpose of the Power Line Underground Task Force was to: "advise the Mayor on the general causes of storm-related power outages in the District, actions that may be taken to reduce future storm-related power outages, and the undergrounding of power lines."

INTRODUCTION

Background

On August 16, 2012, Mayor Vincent C. Gray issued Executive Order 2012-130, which established the "Mayor's Power Line Undergrounding Task Force." The overall objective was to define practical options for power line system improvements to further achieve reliable service, with an emphasis on needs during severe weather.

The formation of the Task Force followed a series of powerful storms that hit the Washington, DC metro area over the past several years. The table below lists the major storms over the period 2003-2012, as well as statistics showing their impact on the electric service within the District of Columbia. The disruptive effect of these storms as a result of damage done to electric service cannot be understated. A November 2012 issue of National Defense online newsletter described the June 29, 2012 Derecho as "a case of power delivery threatening to assume national security proportions."[1]

[1] "Energy Security Starts With Hardening Power Grids", Michael G. Frodl and John M. Manoyan, National Defense Magazine, November 2012, accessed at http://www.nationaldefensemagazine.org/archive/2012/November/Pages/EnergySecurityStartsWithHardeningPowerGrids.aspx

The table below provides a summary of the major weather events that have impacted the District of Columbia over the past ten years. This summary shows the increased number of events that have occurred during the past three years with 8 events compared to a total of 4 events during the previous seven years.

	Particulars of Major Service Outage	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	Date of Major Event	Aug 26		July 23			June 4		July 25	Jan 26	June 22
	Customers Out (at Peak)	18,023		21,444			11,775		35,369	32,383	19,561
	Customers Out (Total)	323,276*		90,473			24,802		51,631	51,641	29,126
	Storm Period (Start to Restoration Completion)	122 Hours		82 Hours			98 Hours		92 Hours	108 Hours	51 Hours
	Average Restoration Time	10.2 Hours*		7.3 Hours			7.5 Hours		20.5 Hours	13.5 Hours	8.0 Hours
	Cause of Major Event	Thunder storm		Thunder storm			Thunder storm		Thunder storm	Snow-mageddon	Thunder storm
2	Date of Major Event	Sept 18							Aug 12	Aug 27	June 29
	Customers Out (at Peak)	135,138							14,482	38,472	75,896
	Customers Out (Total)	546,624*							32,830	76,966	107,321
	Storm Period (Start to Restoration Completion)	244 Hours							64 Hours	128 Hours	180 Hours
	Average Restoration Time	55.9 Hours*							6.7 Hours	15.1 Hours	34.2 Hours
	Cause of Major Event	Hurricane Isabel							Thunder storm	Hurricane Irene	Derecho
3	Date of Major Event										Sept 8
	Customers Out (at Peak)										13,140
	Customers Out (Total)										16,260
	Storm Period (Start to Restoration Completion)										38 Hours
	Average Restoration Time										5.0 Hours
	Cause of Major Event										Thunder storm
4	Date of Major Event										Oct 29
	Customers Out (at Peak)										9,694
	Customers Out (Total)										21,459
	Storm Period (Start to Restoration Completion)										54 Hours
	Average Restoration Time										5.0 Hours
	Cause of Major Event										Hurricane Sandy**

*Includes customers out in Pepco Maryland territory; **Not an official Major Service Outage

Table 1 – Historical Major Events in the District of Columbia (2003-2012)

TASK FORCE MEMBERS

CO-CHAIRMEN:

Allen Y. Lew, City Administrator, Office of the City Administrator

Joseph Rigby, Chairman of the Board, President, CEO, Pepco Holdings, Inc.

MEMBERS:

Yvette Alexander, Councilmember, Council of the District of Columbia

Keith Anderson, Director, Department of the Environment

Terry Bellamy, Director, Department of Transportation

Karen Campbell, Vice President, State Government Affairs, Mid-Atlantic Region, Verizon

Matthew Frumin, Resident Representative – Ward 3

Natwar Gandhi, Chief Financial Officer, Office of the Chief Financial Officer

Eric Goulet, Budget Director, Office of Budget and Finance

Herbert Harris, Jr., Resident Representative – Ward 7

William Howland, Director, Department of Public Works

Betty Ann Kane, Chairman, DC Public Service Commission

Sandra Mattavous-Frye, People's Counsel, Office of the People's Counsel

Steve Price, Division Head, Washington Gas

Paul A. Quander, Jr., Deputy Mayor, Office of the Deputy Mayor of Public Safety and Justice

Donna Rattley-Washington, Vice President, Government Affairs, Comcast

Purpose

The purpose of the Task Force was to pool the collective resources available in the District to produce an analysis of the technical feasibility, infrastructure options and reliability implications of undergrounding new or existing overhead distribution facilities in the District. These resources included a legislative body, regulators, utility personnel, community representatives, experts and other parties who could contribute in a meaningful way to the Task Force. In addition, the financing and required legislative or regulatory actions were evaluated. This analysis was intended to help recommend the path forward for reliability improvements including during severe weather events.

Mayor's Directive

The Executive Order assigned the Task Force with evaluating:

A. The general causes of storm-related outages in the District[2];

B. Examining the information related to major storm-related power outages in the District in the past ten (10) years, including the number of customers impacted by the outages and the duration of the outages;

C. The cost and feasibility of undergrounding existing overhead power lines in the District, including undergrounding all power lines, undergrounding only mainline primary lines, and undergrounding targeted assets, and the impacts of undergrounding on reliability and restoration time;

D. Other potential impacts of the undergrounding of power lines, including impacts on the environment, infrastructure, health and safety, and quality of life;

E. Other options that may be taken instead of, or in addition to, undergrounding power lines to reduce the number of customers impacted by power outages due to storms and to reduce the duration of such power outages.

[2] Although the Taskforce was convened in response to storm-related outage events, outages caused by deliberate acts would be equally disruptive. The Federal Bureau of Investigation has long noted its concern regarding the possibility that terrorists may target the electrical power grid and other infrastructure facilities. According to the National Consortium for the Study of Terrorism and Responses to Terrorism, Washington, DC ranks within the top 5 United States cities as potential targets of terrorism. Undergrounding electrical lines provides an additional layer of protection from potential attacks on the infrastructure, in addition to mitigating weather-related events.

Recommendations of the Task Force Co-Chairs

The Task Force Co-chairs support the adoption of the recommendations reached by the Task Force Committees, as described in greater detail in this report. There remain, however, complex matters related to the financing of the recommended projects which will require new legislation and action to be taken by the Public Service Commission. It is also clear that a significant plan needs to be implemented in order to upgrade the electric distribution infrastructure in order to allow it to withstand an increasing number of adverse weather conditions. This is due to the following positions identified by the Task Force:

a) Electric power distribution service in the District of Columbia is vulnerable to equipment failures on the overhead system of the electric company, caused by high winds, flooding, lightning strikes, snow and ice accumulations, foreign contact between overhead equipment and animals, trees and other objects, and for other causes. In the past, this damage has caused loss of electric power over extended time periods to residential and commercial customers, including critical infrastructure customers and other high priority users of electricity, and it can be expected that similar outages on the electric company's overhead distribution system will continue to occur, absent intensified outage prevention measures to address the increased frequency of weather events;

b) The frequency of electric power outages within the District can be expected to decrease when overhead power lines in vulnerable locations are relocated underground. Consequently, selectively undergrounding certain overhead power lines can be expected to minimize the economic, social and other impacts on the District's electricity users caused by increased weather events.

In an effort to avoid undue delay in realizing the reliability benefits of the projects, the Task Force Co-chairs offer the following recommendations in order to immediately implement an investment as part of the Game Changing nearly $1 billion program:

1. The Co-chairs of this task force recommend that the Mayor accept these recommendation and immediately begin to develop an implementation plan that will allow the required legislative and regulatory actions to be completed in the shortest time possible. Upon appropriate approval of required legislative actions the work required to design and construct new underground facilities could begin;

2. The first stage of undergrounding (feeder selection, customer education and design) should commence within 90 days of Commission approval of the undergrounding plan and the financing order, and will involve the undergrounding of up to 60 circuits of high voltage distribution lines. This approach is consistent with the approach of Scenario 3 as outlined in this report. By beginning with this set of feeders, significant reliability improvements can be expected at a lower cost than if Scenario 3 were implemented for the entire system. Feeder selection will be made in accordance with the criteria established by the Technical Committee and will include poorest performing feeders in Wards 3, 4, 5, 7 & 8 where overhead distribution lines currently exist;

3. The Public Service Commission should implement an Electric Utility Improvement Charge, upon application of the Utility, in order to facilitate timely recovery of the investment and associated expenses needed for the upgrades concurrently with the investments being made. The Public Service Commission should also approve a financing order that would allow for the issuance of securitization bonds to finance a portion of this project. The project would therefore be funded through a combination of Pepco investments ($500 million), funding provided by the City as part of DDOT Capital Improvement funding ($62 million[3]), and funds obtained from securitized bonds ($375 million);

4. The Executive Branch and Pepco should continue to evaluate various financing plans and funding sources explored by the Task Force for additional investments going forward. Achieving manageable bill impact for customers should remain as a primary financial consideration;

5. The District Department of Transportation and Pepco will develop operating procedures that outline the process to coordinate work in order to sequence undergrounding of the electric system with local and federal capital improvement funding. Where practical, the District may construct portions of the conduit system in accordance with Pepco standards in order to further reduce the overall cost. This coordination of work should also extend to the other projects that result in major reconstruction of roadways.

In addition to the Co-chairs recommendations above, the five committees of the Task Force also have recommendations.

[3] The $62 million from DDOT is the level of funding included within the current budget. Additional funding up to a total of $125 million may be requested in the future if appropriate to complete selected work.

Recommendations of the Committees

The Task Force has carefully studied the issue of undergrounding power lines to improve electric system reliability and public safety in the District of Columbia during all-weather events, evaluating both storms and 'blue sky' conditions. The five different committees of the Task Force (Technical, Financial, Storm Response, Planning & Research and Legislative & Government Affairs) collaborated with a number of expert resources to analyze the complexities of the issue, formulate options, and quantify costs and benefits in order to make recommendations for the Mayor.

The process involved balancing the advantages and disadvantages of undergrounding options and other reliability measures and programs that can be undertaken as well as fully understanding the financial implications associated with a program of this magnitude. These options that were considered were all above and beyond a number of significant steps that have already been undertaken by the District and Pepco to improve electric system reliability. After careful consideration of the options, the Task Force committees have proposed the following recommendations.

- **Proceed with the selective undergrounding of power lines in the District:**
  - Implement a 5 to 7 year undergrounding program focused on the top 50 to 60 distribution lines. This would cost nearly $1 billion and would limit the average expenditures in any one year to approximately $200 million;
  - Underground the primary mainline and lateral portions of the feeder, retain the secondary lines and communication lines overhead;
  - Coordinate where possible with other construction projects in the District to reduce costs and realize synergies;
  - Coordinate with Economic Development Strategy for the District of Columbia;
  - Utilize joint construction techniques;
  - Devise a strategy for the Public Service Commission of the District of Columbia (PSC) oversight of the undergrounding program and its implementation;
  - Develop joint operating agreement that outlines the methods for sharing the cost between the District and Pepco and provides for Pepco's obligation to maintain, operate and own the facilities following construction, consistent with its obligation to provide electric distribution service.

- **Proceed immediately with legislation to authorize a $937 million Phase 1 initiative that focuses on undergrounding primary mainlines and laterals for approximately 60 priority feeders that are most likely to experience outages:**
    - The $937 million shall be funded as follows:
        - Up to $500 million authorized through a Pepco traditional utility rate surcharge;
        - Up to $375 million authorized through a utility rate securitization in bonds, through one or more series, issued by the District of Columbia. These bonds are outside the District's debt cap, because the electric rates are not part of the General Fund; and
        - $62 million in savings by synchronizing with approved road work.
    - The District shall be responsible for all work installing roads, vaults, conduits, and manholes;
    - Ratepayer contributions shall be through regulated distribution rates. This is the most equitable way to distribute the cost because all users of electricity participate;
    - Low-income electricity users (Residential Aid Discount customers) shall be exempted from any undergrounding surcharges.

- **All relevant District agencies, including D.C. Water, should immediately begin exploring possible coordination with Pepco for synchronization of planned capital projects, new development, and roadwork with undergrounding opportunities for economies of scale and construction savings;**

- **Recommend a legislative review and analysis for a Phase 2 and a Phase 3, at years six and fourteen. Before the Council authorizes additional phases the Finance Committee recommends that:**
    - The Council shall hold a public hearing and community briefing in each quadrant of the city;
    - The Executive, the People's Counsel, the Public Service Commission, and Pepco shall issue written reports and recommendations on the effectiveness of the previous phase, the overall impact on the consumer bill, the reliability impact of implementing the next phase, the impact on tree canopy, and a recommendation as to whether to authorize the next phase; and
    - The recommendations of the Public Service Commission and the People's Counsel shall be given great weight by the Council in determining whether to authorize the next phase.

- **Future work must be approved by the Council and could include the following:**

- Phase 2, if approved, will fund the undergrounding of primary mainlines and laterals for the remaining overhead feeders, or alternative options based on the recommendations in the reports provided to the Council;
- Phase 3, if approved, will fund the undergrounding of all secondary and service lines and the potential removal of all poles.

- **Pepco to prepare timeline of the entire undergrounding project for submission to the District and the Public Service Commission:**
  - A timeline of the entire undergrounding project which, including all major assumptions such as level of expenditure on undergrounding per year, will provide a realistic assessment of the duration of the proposed undergrounding project.

- **Develop public awareness and stakeholder communications plan with budget and engage in extensive consumer education:**
  - Develop and submit a timeline for the consumer education plan roll out. This rollout should be conducted as soon as possible and in advance of the beginning of substantial construction;
  - Educate District customers: the Technical and Planning and Research Committees both feel strongly that there must be an extensive effort to educate District consumers in simple terms about:
    - The near- and long-term plans for undergrounding;
    - The benefits to be obtained from undergrounding;
    - The cost of undergrounding, including cost allocation;
    - The process by which distribution facilities will be selected for undergrounding;
    - The implications of undergrounding for District residential and commercial consumers;
    - Discussion of alternatives to undergrounding and the undergrounding of selective sections of circuits.

- **Approval of legislation and develop process at the Public Service Commission to implement the undergrounding program:**
  - Identification of legislation required to support ultimate financing options, to direct the creation of an undergrounding surcharge mechanism;
  - The Public Service Commission has the authority to approve the implementation of unique construction programs performed by the utilities within the District of Columbia. The PSC sets rates, approves special cost recovery mechanisms and has a well-established process for prudence review of cost expended when these costs are being requested to be added to rate base. The Commission is to establish

the process to be used to gather stakeholder input to the annual construction plan;
  - Reporting and processes will need to be created to set forth the roles and spending limits for Pepco and DDOT consistent with the recommendations of this report, and provide for the PSC to monitor each parties' compliance with those requirements;
  - Consider adjusting permit and right-of-way fees and processes and consider waiving the public inconvenience fee in order to reduce the overall cost of the program and to expedite the review process in order to reduce the time to construction.

- **Improve emergency preparedness and storm restoration processes:**
  - Enhance the coordination of debris removal during storms;
  - Improve communication between District leaders and Pepco;
  - Improve coordination between communication companies and Pepco relative to wires down during storm events;
  - Review resource allocation (manpower) during both blue sky and storm restoration events;
  - Expand community outreach;
  - Evaluate preventative steps other than undergrounding:
    - Pepco to continue its current work with the DC HSEMA Director and EOC member regarding improved levels of communication, information sharing, proactive notifications, and response to District of Columbia priorities and concerns;
    - Require both Comcast and Verizon to commit to providing resources during storm events to assist in addressing wires down issues.

- **Integrate a workforce participation strategy into the undergrounding program:**
  - Examine local workforce participation models to identify best practices that encourage and spur District hiring for capital projects. (For example, the District's Workforce Incentive Program utilizes financial benefits – 5 percent of the general contractor fee, and 10 percent of subcontractor payroll when resident participation targets are achieved – to help stimulate local hiring);
  - Collaborate with employment and vocational development centers to identify prospects for preparing District residents for new technologies and operation and maintenance opportunities related to electric utility services;
  - Develop a workforce participation strategy that aids the contractors, government and District residents; and supports the District Government's objective of increasing the participation of its residents

on capital projects. Incorporate skill-building and competency development programs, as viable.

- **Communication services will work with the electric utility to coordinate undergrounding and improve reliability for customers, where viable:**
  - Undergrounding of communication lines will only be recommended where complete undergrounding of the electric facilities is recommended. This recommendation could be driven by economic development objectives or infrastructure improvement projects that may provide further justification for undergrounding of all lines and equipment;
  - Joint trenching activities, as applicable, will be utilized to reduce the cost for all utilities.
- **To ensure that best practices are implemented for the vegetation management program, the following actions should be considered:**
  - UFA should ensure that its review cycle and tree management activities appropriately target areas where trees have negatively impacted the reliability of the electrical distribution system;
  - UFA and Pepco should work together to ensure that the location and types of trees planted in areas where power lines are overhead are selected so as to minimize the likelihood of interference with the electrical distribution system;
  - UFA and Pepco should coordinate vegetation management issues related to power line undergrounding. As part of this process, UFA and Pepco should review the District's tree planting schedule, with locations outlined, to ensure that planned planting will not be adversely impacted by the approved power line undergrounding plan.

In order to successfully implement these recommendations, there will need to be continued close collaboration between the District government bodies, Pepco, the Public Service Commission and other stakeholders.

Engineering Alternatives Evaluated

Before coming to its recommendations, the Task Force identified and evaluated many short, medium and long term measures to mitigate the impact of electric service outages in the District. The measures evaluated are summarized in the table below.

Short Term	Medium Term	Long Term
Reliability Enhancement Plan (REP) (*underway);* • Vegetation Management; • Improving Priority Feeders; • Preparing for System Growth; • Installing Advanced Technologies & Distribution Automation; • Improving Additional Feeders; • Selective Undergrounding. Electric Quality of Service Standards *(implemented);* Major Service Outage Restoration Plan *(implemented);* Advanced Metering Infrastructure deployment *(underway).*	Improve Emergency Preparedness and Storm Restoration Processes; Enhanced Vegetation Management; Customer Outreach & Education on Undergrounding; Increased supply into the District of Columbia by adding new substations and supply capacity.	Undergrounding of Power Lines – estimated $1 billion (undergrounding/overhead combination based on most severe outages) to $5 billion (undergrounding all power lines throughout the District) multi-year program; Alternative Generation and Micro Grids; • Distributed Generation; • Energy Storage; • Micro Grids.

Table 2 – Short, Medium and Long-Term Measures

Task Force Organization

The Task Force consisted of representatives of the Mayor's Office and other District agencies, Pepco, the Council of the District of Columbia, the Public Service Commission, the People's Counsel, stakeholder businesses and resident representatives. Monthly Task Force meetings were convened during the period of August 2012 through January 2013, to discuss existing conditions, engineering assessments, and strategic options for improving electric power reliability – particularly during severe weather. This work

included an extensive review of technical reports and costs and benefits scenarios. Sub-committees were formed to prepare targeted analysis and recommendations related to five functional areas: technical, financial, storm response, planning and research, and legislative & government affairs.

Notably, the Technical Committee analyzed outage data for a 32 month period ending August 2012 and evaluated five different undergrounding options for the District of Columbia. This extensive review of outage data during all-weather events provided the information needed for the Task Force to examine the reliability improvement benefits that could be achieved from undergrounding the electric distribution system.

A summary of the functional scope of each committee is as follows.

Committee	Responsibilities
Technical	• Examine existing generation, transmission and distribution systems and connectivity with other jurisdictions; and impact on District planning; • Assess reliability conditions and define undergrounding options including key processes and scheduling, and coordination with other infrastructure improvements.
Financial	• Estimate the costs of various undergrounding options (in coordination with the Technical group); • Determine potential sources of funding for undergrounding, including: customer rate/fees, District capital funds, federal capital improvement funds and federal homeland security and disaster assistance funds.
Storm Response	• Examine storm response of Pepco and agencies, as well as restoration practices; identify strategies to improve coordination; Review impact of tree maintenance programs; and define improvements to enhance reliability.
Planning & Research	• Review experience of other jurisdictions that have converted to underground wiring, improved storm response, and strengthened overall system reliability; • Determine which current District plans (e.g. road reconstruction, development projects) should be coordinated with undergrounding.
Legislative & Government Affairs	• Determine the legislative and regulatory changes needed to implement undergrounding, or to improve storm response, or system reliability; • Draft specific provisions where appropriate.

Table 3 – Committees and Responsibilities

Committee members are listed in their respective committee sections of this report.

IMPLEMENTATION PLAN

The implementation of the undergrounding program in the District of Columbia will be a complex undertaking with many stages of activities. There are significant steps that must be taken before actual undergrounding construction work can begin. The implementation plan will involve a multi-year program to underground power lines across 5 different Wards in the District, which is a major construction initiative. The cost estimate for this extensive project is up to $1 billion over a 5 to 7 year implementation period. Construction work will be performed in dense urban neighborhoods. Identifying the feeders, coordinating with pipeline construction projects, obtaining permits and managing other logistical activities will need to be accomplished according to a rigorous production timeline in order to complete the undergrounding program according to the planned schedule and within budget.

Implementation planning is based on a 5 to 7 year timeline for phased construction of the undergrounding initiative. Conceptually, the first 9 to 10 months after approval of the undergrounding strategy will focus on fieldwork assessment, engineering, design, permitting, and resource mobilization, including contracting. Undergrounding construction for the initial group of five feeders (covering approximately 3,000 customers) is targeted to start actual construction activities in 2014. The remaining undergrounding is based on a production schedule from 2015 to 2022, which allows for completion without inordinate construction stress on residents, neighborhoods, and commercial businesses. The work planning process will coordinate construction with DDOT projects scheduled for the same timeline, as well as economic development priorities that might influence sequencing and neighborhoods.

This multi-year program cannot be successful without proactive assistance from the District, in partnership with Pepco. The following basic provisions will be essential:

- The City Administrator and Pepco appoints a manager that can be the implementation champion, facilitator, and problem-solver, as necessary. This manager assembles and leads a Task Force of key officials from District agencies, and is empowered to direct agencies on project related issues;
- Core District agencies assign staff to support the project, with authority to make decisions on behalf of the agency. The agency representatives may be located with the project design team to facilitate close coordination;
- The District provides expedited permits;
- The District authorizes the necessary street closures, work hours, etc. for construction operations;
- The District ensures, with Pepco, that financing mechanisms and performance requirements are in place to achieve timely funding and recovery of Pepco's program costs;

- Financing and cost recovery mechanisms include a potential securitization and an undergrounding cost surcharge mechanism providing return on and of Company investments;
- The District and Pepco implement an ongoing public information and stakeholder communication program to provide reliable and timely information on planning and progress;
- District assists Pepco with economic development initiatives and coordination between utility projects to gain efficiencies in construction of multiple activities.

EXISTING CONDITIONS

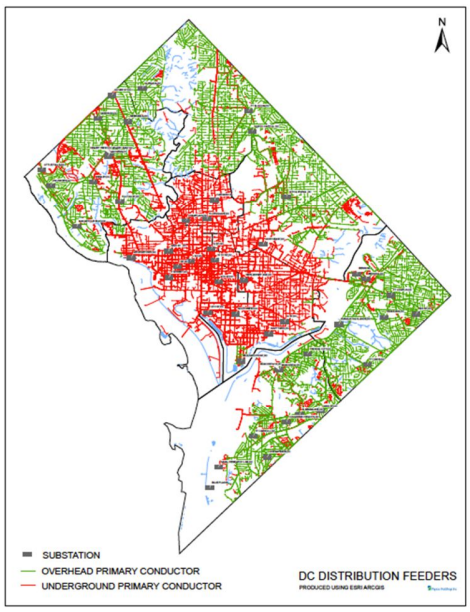


Figure 1 – Underground and Overhead System in Washington, DC

The majority of the underground system is located in the central business district (CBD) and the areas immediately surrounding the CBD, as shown in Figure 1. Overhead supply areas are shown in green, while underground supply areas are shown in red. This high use of underground was mandated from the very beginning of electrification of the District of Columbia and continues today within the central business district and new load growth areas outside of the central business district.

Description of Existing Facilities

The existing electric distribution system within the District of Columbia contains a mix of overhead and underground facilities. The green portions found in the map to the left represent the overhead power lines whereas the red portions represent the underground power lines. It is also important to note that a significant portion of the electric grid is already constructed underground. For example some key facts are as follow:

- 4,070 miles of distribution lines;
    - 1,430 miles of overhead lines;
    - 2,640 miles of underground lines;
- 102,000 citizens connected to overhead lines;
- 155,000 citizens connected to underground lines;
- 40,000 citizens supplied by underground lines are attached to lines that also contain some portion of overhead lines;
- Majority of high voltage lines that supply the substations are already constructed underground.

There are solid arguments for both underground and overhead electric distribution systems. In general, overhead systems are less costly to install, are longer-lasting, and easier to maintain, since problems are easily sighted and repaired. Underground systems, while more costly to install and maintain, are also less susceptible to environmental damage from storms, vegetation and other environmental disturbances. Making the proper choices between overhead and underground facilities requires balancing cost and reliability when evaluating the impacts on the electric system during major weather events.

The cost difference between the two options is significant. A rough estimate of the cost to install overhead distribution feeders is $100,000 to $200,000 per mile, depending on the specific conditions of that individual feeder. This compares to a cost of between $2 million to $5 million to underground that same feeder.

System Configuration

The typical electric system is made up of various components that when operated together provide the capacity to deliver power across the entire electric system. Each component is designed to operate at a voltage level that achieves safe and efficient operation of the system. The figure below is a depiction of the electric system.

The Task Force focused on the distribution lines that originate at the substations across the District. These lines consist of the main line, which extends from the substation to the residential and commercial communities. Extending from the main line are lateral connections that provide power to the local transformers, which channel service to the customer. The transformers reduce the voltage level in order to supply the services that are connected directly to each customer. These connections extend the secondary cables from the transformer to the individual service cables that feed each customer's internal electric service equipment.

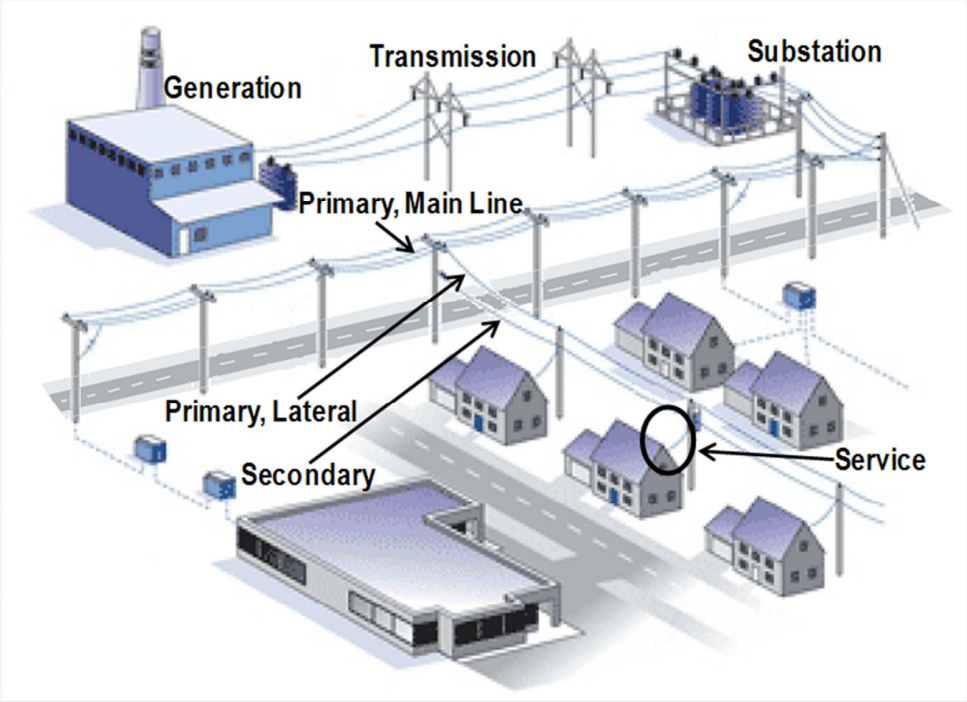


Figure 2 – Overview of Portions of Electric System

Electric System Statistics

To provide a clearer picture of the distribution electric system in the District of Columbia, a number of statistics are provided below. These statistics cover the following:

- Substations (transmission and distribution);
- Circuit miles;
- Customers.

The table below provides substation statistics in the District of Columbia:

Substation Type	Underground Supplied	Overhead Supplied	Total
Distribution	36	15	51
Transmission	7	0	7
Total	**43**	**15**	**58**

Table 4 – Substation Statistics in DC

The next table provides details on the number of circuit miles in the District:

Circuit Type	Underground	Overhead	Total
Primary (4kV & 13kV)	1,699 miles (72%)	645 miles (28%)	2,344 miles
Secondary (120V/240V)	937 miles (54%)	788 miles (46%)	1,725 miles
Total	**2,636 miles (65%)**	**1,433 miles (35%)**	**4,069 miles**

Table 5 – Circuit Miles in DC

The third table provides customer statistics, specifically the number of customers supplied from feeders that are greater than 85% overhead, 100% underground or mixed overhead and underground construction:

Customers By Feeder	4kV	13kV	Total	% of Total
Greater than 85% Overhead	27,742	28,495	56,237	22%
100% Underground	10,168	104,964	115,132	45%
Mixed Overhead & Underground	10,008	75,048	85,056	33%
Total	**47,918**	**208,507**	**256,425**	**100%**

Table 6 – Customers By Feeder in DC

The fourth table provides further customer statistics regarding the number served by overhead versus underground service:

Customers By Service	Total	% of Total
Overhead	101,737	40%
Underground	154,908	60%
Total	**256,745**	**100%**

Table 7 – Customers Served By Overhead vs. Underground

Reliability Performance of Existing Systems

The District of Columbia electric system has significant portions that are located underground. Reliability is typically higher in the underground portions of the system. Reliability data supports this.

In the graphic below, there are two pie charts. The first pie chart to the left shows the percentage of feeders by each underground category. The categories are divided into:

- 100% underground;
- 99%-75% underground;
- 74%-50% underground;
- 49%-25% underground;
- 24%-0% underground.

The pie chart shows that 17% of the feeders in the District are 24%-0% underground. In other words, they are majority overhead feeders (75% to 100% overhead). Nearly one-third (30.1%) of customers in the District are served by these feeders that are 75% to 100% overhead.

The second pie chart to the right then looks at the percentage of customers affected by outages. Unsurprisingly, a large percentage of the customer outages (43.3%) are located on the 17% of feeders that are primarily overhead feeders.

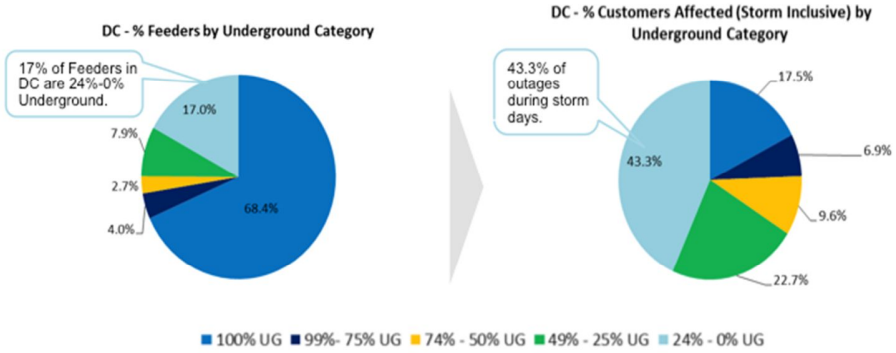


Figure 3 – UG Feeder Categories and Outages

The conclusion is that a relatively small percentage of feeders (17%), serving nearly one-third of District customers are responsible for 43.3% of customer outages.

Some of the positve measures that have been playing a key role in the District include:

- *Electric Quality of Service Standards;*
- *Major Service Outage Restoration Plan;*
- *Council of the District of Columbia Legislative Order on AMI;*
- *Reliability Enhancement Plan.*

ACTIONS TO MITIGATE ELECTRIC SYSTEM OUTAGE IMPACTS, INCLUDING REGULATORY AND LEGISLATIVE

It is important to note that the District of Columbia and related stakeholders have already taken important steps to improve the reliability of electric service. A number of initiatives have been launched that have already resulted in improvements to reliability and the delivery of safe electricity for residents. These initiatives are complementary to the goals of the undergrounding Task Force.

Electric Quality of Service Standards

The Electric Quality of Service Standards (EQSS) were established in the Public Service Commission of the District of Columbia's ("Commission" or "DCPSC") Notice of Final Rulemaking, dated February 29, 2008. The EQSS serves to institute standards and requirements for ensuring that electric utility distributors and electricity suppliers operating in the District of Columbia meet an adequate level of quality and reliability in their electricity service. The EQSS, which were a derivative of the "Customer Service and Reliability Standards," adopted in Commission Order No. 13565 on April 27, 2005, were implemented after the DCPSC received significant input and recommendations from the Office of the People's Council (OPC), Pepco and other stakeholders.

With these approved regulations, Pepco is required to report all major and non-major electricity service outages and manhole events to the DCPSC and OPC. Pepco is also required to report incidents that result in the loss of human life, personal injury requiring hospitalization, or service disruption directly or indirectly arising from, or connected with its maintenance and operation of the electric system. Further, Pepco is also required to comply with established Customer Service and Reliability Standards. In 2013 and extending through 2020, these include completing the restoration of non-major outages within 24 hours following the onset of the outage. Also, beginning January 2013, Pepco is required to meet predefined benchmark levels for SAIDI[4] and

[4] SAIDI – System Average Interruption Duration Index. Average time customers are interrupted. Mathematically equal to the sum of customer interruption hours divided by total number of customers served.

SAIFI[5]. The results for 2012 were such that Pepco exceeded the required level of performance for 2012.

Pepco files quarterly EQSS reports. These filings began with the initial quarterly submission on October 10, 2008 and Pepco continues to file these updates. All reports are posted on the DCPSC's website. In addition, Pepco participates in a working group that was established by the DCPSC entitled the Productivity Improvement Working Group. Pepco meets quarterly with representatives from the DCPSC and OPC to discuss topics germane to Pepco's operations, performance and reliability of the electric distribution system. The EQSS is one of several positive steps that have been taken to improve electric system reliability in the District.

Major Service Outage Restoration Plan

To be in a constant state of preparedness and to have the ability to respond when required, Pepco's restoration process is broken into five stages:

- *Sustained*
- *Preparedness*
- *Pre-Event*
- *Event; and*
- *Post-Event*

Another positive step that has been taken involves the development of formal plans to prepare for major service outages. Pepco filed a Major Service Outage Restoration Plan with the DCPSC pursuant to the Commission's Notice of Final Rulemaking, dated July 27, 2012. On November 6, 2012, Pepco filed its plan which included procedures/processes for encountering both forecasted and unexpected events that could impact Pepco's electric distribution system.

Pepco's emergency response plan is designed to address events such as customer outages, network facilities interruptions, preparation for a potential event, or an event that requires an immediate response.

Once a major service outage event occurs, the objective for Pepco is to safely respond, put conditions on the electrical system back to a normal state and restore service as quickly as possible. Throughout this process, Pepco works to keep all relevant stakeholders informed of the status of restoration activities. It is important for Pepco to communicate the status of preparations, and response strategies internally to employees and externally to its customers and government agencies. Pepco has assigned incident response roles for each of its employees. In addition, Pepco is a member of associations and Regional Mutual Assistance Groups that provide supplemental resources from companies and utilities external to Pepco during major

[5] SAIFI – System Average Interruption Frequency Index. Average frequency of sustained interruptions per customer. Mathematically equal to the sum of number of customer interruptions divided by total number of customers served.

events. Pepco consistently monitors and trains in order to be prepared to analyze, direct, perform and complete emergency response activities. Safety, Communications, Contingency Planning, Finances, Technologies, Training and Regulatory Compliance are all addressed as part of its preparations and response.

Council of the District of Columbia Legislative Order on AMI

In June 2009, the Council of the District of Columbia passed the Advanced Metering Infrastructure and Cost Recovery Act of 2009. This Legislation authorized Pepco to implement AMI for all District of Columbia customers provided the Commission determined that Pepco had obtained sufficient Federal funding for AMI under the American Recovery and Reinvestment Act of 2009 (ARRA). Subsequently, in December 2009, the DCPSC determined that Pepco in fact had received sufficient ARRA funding. Therefore, Pepco began installing smart meters for District customers.

The smart meters are another measure helping to improve reliability in the District of Columbia. With two-way communications, the meters have enhanced outage notification so Pepco has more actionable information to speed restoration activities. The new smart meters have a "last gasp" function that sends a message to Pepco when a meter goes out of service. This message includes the precise location of the outage. Further, Pepco has the capability to "ping" the new meters so it can tell whether that location has restored power or is continuing to experience an outage. These capabilities enable greater efficiency in handling restoration activities. Pepco obtains more detailed information from the smart meters so it can speed the restoration process. Already, the new smart meters are showing results in reducing outage durations.

Reliability Enhancement Plan

Another positive step that has already been taken is Pepco's creation of a Reliability Enhancement Plan (REP). On September 30, 2010, Pepco filed with the DCPSC its REP. Included in the REP is a six-point plan that advances work on existing programs and also initiates new activities to improve reliability. These programs are intended to improve substantially the reliability of the distribution system across the District of Columbia by reducing both the frequency and duration of outages for customers. The total cost of this work between 2011 – 2015 is estimated to be in excess of a quarter billion dollars and increases Pepco's expenditures by $90 million over that same time period.

Pepco's REP is focused on improving electrical reliability in its Washington, DC service territory. The table below outlines the key components of the REP.

Program	Goal
Vegetation Management	Performing on a 2 year growth cycle (Pepco DC), removal of danger trees and limbs (Enhanced Integrated Vegetation Management)
Feeder Improvement	Focusing on improving the distribution assets that are least performing to drastically reduce outage events
Distribution Automation	Using innovative and proven technologies such as switches for automatic fault isolation and restoration in concert with AMI to monitor and optimize the performance of the distribution system and monitor customers' quality of service
Load Growth	Meeting the need for load growth and system enhancement to maintain the required reliability and ability to move load under contingency conditions (DA and Emergency Conditions)
Cable Replacement and Enhancement	Treating and/or replacing cable and related joints/elbows/splices that are reaching "end of life" before failure at an accelerated pace
Selective Undergrounding	Undergrounding selected areas of the mainlines as a pilot to improve reliability and reduce customer impact in areas where reliability cannot be enhanced with other appropriate measures

Table 8 – REP Programs and Goals

The REP is a dynamic plan and will continue to be updated as necessary and as results demonstrate effectiveness of the mitigations executed.

The REP has already resulted in positive impacts to Pepco's reliability in the District. Both the frequency and duration of power outages have been reduced on those distribution feeders that have undergone REP measures. These improvements are reflected in the reliability indices. Both the system average interruption frequency index (SAIFI) and system average interruption duration index (SAIDI) have improved since the inception of the REP. This work has resulted in Pepco being able to exceed the level of reliability performance as required by the Electric Quality of Service Standard for 2012. This improvement is shown in the two charts below.

In the first chart (Figure 4), the SAIDI indices are shown for the following:

- Pepco All (both DC and Maryland);
- DC All (all feeders in DC);
- DC REP 2011 (REP feeders in DC).

The chart shows a marked improvement for the DC REP feeders (seen in the heavier green line in the chart).

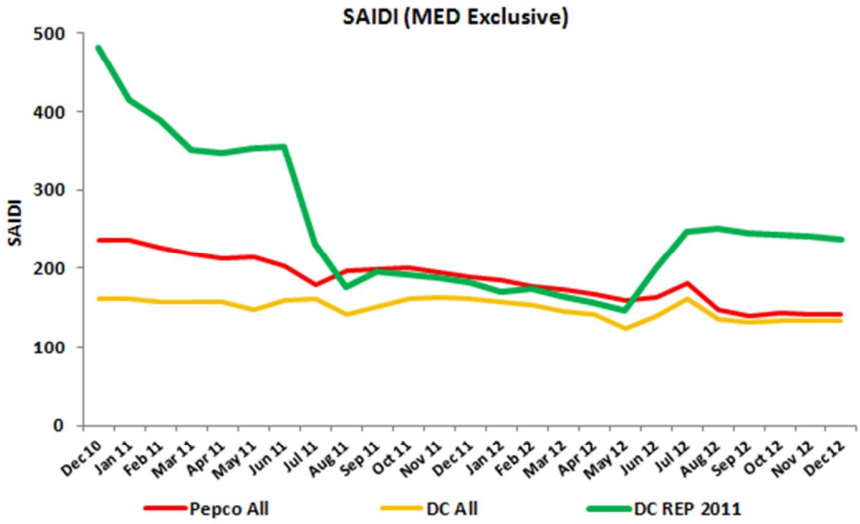


Figure 4 – SAIDI for Pepco, DC and DC REP Feeders

In the second chart (Figure 5), the same elements are shown for the SAIFI index. Again, the clear trend is an improvement - in this case the frequency of outages for DC REP feeders is falling in the District.

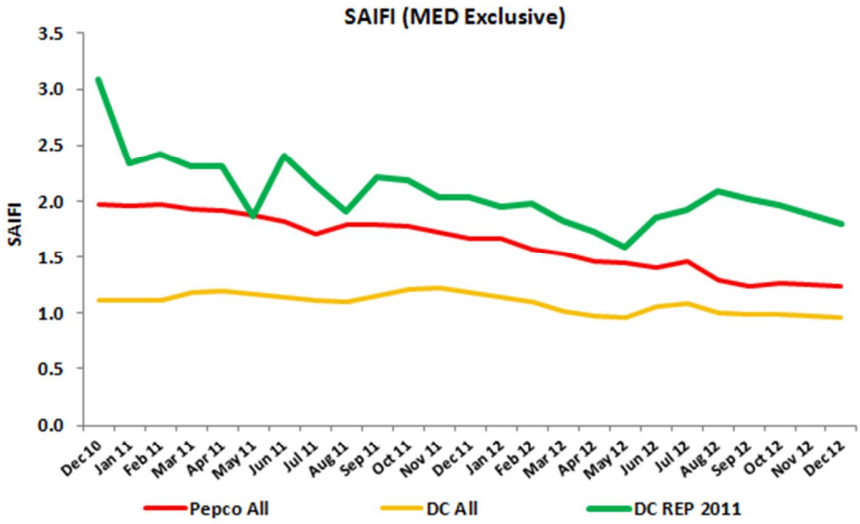


Figure 5 – SAIFI for Pepco, DC and DC REP Feeders

ECONOMIC DEVELOPMENT

On November 14, 2012, the Mayor issued an extensive and detailed five year Economic Development Strategy for the District of Columbia. This plan contains *"the visions, goals and initiatives that will transform the District by creating 100,000 new jobs and generating $1 billion in new tax revenue to support city services over the next five years."*

The Mayor's Five-Year Economic Development Strategy was the product of collaboration between the public sector, private sector and local universities. The team interviewed hundreds of leaders in different sectors for ideas on how to grow the economy in the District, creating jobs and increasing tax revenues. The interviews, along with sector research, contributed data and insights were synthesized into strategic initiatives. The initiatives were analyzed using an economic model to determine their priority.

The result of this process was the establishment of six bold visions for DC:

1. Most business-friendly economy in the nation;
2. Largest technology center on the East Coast;
3. Nation's destination of choice;
4. End of retail leakage;
5. Best-in-class global medical center;
6. Top North American destination for foreign investors, businesses and tourists.

These six visions are to be carried out using a "sector-led approach" focused on seven different sectors. The seven sectors evaluated for growth opportunities during this period were:

1. Federal Government and Contractors;
2. Professional Services;
3. Higher Education & Health Care;
4. Hospitality;
5. Technology;
6. Retail;
7. Real Estate & Construction.

Five of these sectors can have a greater chance of being successful if there is a strong and reliable utility infrastructure to support the growth and the ultimate day-to-day operations once the new development is operational. These sectors include Professional Services, Technology, Hospitality, Retail and Real Estate and Construction. Simply put, new businesses are not likely to move to the District without an expectation of secure and reliable utility infrastructure that is able to withstand significant weather events.

Role of Utilities to Support Economic Development

Another source of economic growth is the increased capital spending of utilities to improve reliability. This includes the current programs that utilize significant numbers of local contracting firms to construct the new facilities and support the increased complement of utilities' employees required to operate the systems once built. In total Pepco plans to spend over $1.1 billion within the District during the next five years, much of that with local contracting firms. A multi-year program to underground utility lines could result in nearly an additional $1 billion of construction work across that city. This level of sustained construction will provide a base for local District-based firms to increase staffing, purchase additional equipment and generate economic development in addition to the growth proposed by the Mayor. Together these programs are expected to create new jobs for District residents and increase the tax base for the city.

Because of the dependency on economic growth and the success of the long term strategic plan, the establishment of a utility sector in future economic development plans would be beneficial and complement the work performed in evaluating the development within the other established sectors.

ALTERNATIVES TO UNDERGROUNDING

Selective Undergrounding of Portions of a Circuit

The Public Service Commission has initiated a process to develop criteria for when Pepco will underground short sections of feeders to improve the overall reliability of a feeder. This process has not been addressed by this Task Force and will continue to be administered by the Commission as an acceptable reliability enhancement method.

Selective undergrounding, as it relates to the work of this Task Force, deals with the identification and selection of the most appropriate sections of a feeder to be undergrounded to produce the greatest reliability improvement benefits for the cost to achieve those benefits. This process is discussed in greater detail in the Pepco Undergrounding Study and involves the ranking of feeders by multiple criteria including costs, customer benefits and potential reliability improvements. Once a feeder is selected for undergrounding, the next step is to determine which portion of the feeder will be undergrounded. This evaluation will determine if all or any portion of the high voltage lines will be undergrounded and if any of the low voltage secondary lines are to be undergrounded. Each of these decisions will impact the cost of the work, the time to complete the work and the impact on the community.

The results of this analysis demonstrate that there is a wide variation in the cost as well as the benefits to be achieved by undergrounding different portions of the overhead distribution system. Based on the study performed by Pepco, the following table show a summary of these costs and benefits if the entire overhead distribution system is undergrounded. These reliability benefits will be obtained across all of the overhead feeders therefore it is reasonable to anticipate the same level of improvement for the feeders proposed as part of this plan ever though all overhead feeders are not being proposed to be undergrounded.

Table 9 is a summary of these costs and benefits if the Scenario were applied to the entire system relative to all overhead outages only. The cost and benefits of implementing any of these Scenarios to part of the system will be different:

District of Columbia (All Outages Percent of overhead)	Cost ($Billions)	Outage Events	Customer Frequency	Customer Duration
1. UG main line w/OH secondary	$1.93	6%	56%	45%
2. UG laterals w/UG secondary	$3.30	94%	44%	55%
3. UG main line and laterals w/OH secondary	$3.00	65%	97%	92%
4. UG main line and laterals w/UG secondary	$5.11	100%	100%	100%
5. UG laterals w/OH secondary	$1.33	59%	42%	47%

Table 9 – Results for All Outages as a Percentage of Overhead Outages

Vegetation Management

Extensive vegetation management can be an alternative to undergrounding power lines. By creating clear spaces around the power lines, trees or tree branches cannot fall on them, creating outages and damaged infrastructure.

Parties Responsible for Vegetation Management in the District

Vegetation management within the District of Columbia is the responsibility of different parties, depending on the location of the tree. There are four primary stakeholders with responsibility for vegetation management:

- District Department of Transportation (DDOT) and its Urban Forestry Administration (UFA);
- Owners of private property;
- United States Park Service on Federal lands;
- Pepco.

The graphic below provides further detail on how responsibility for vegetation management and trees can vary depending on that tree's location.

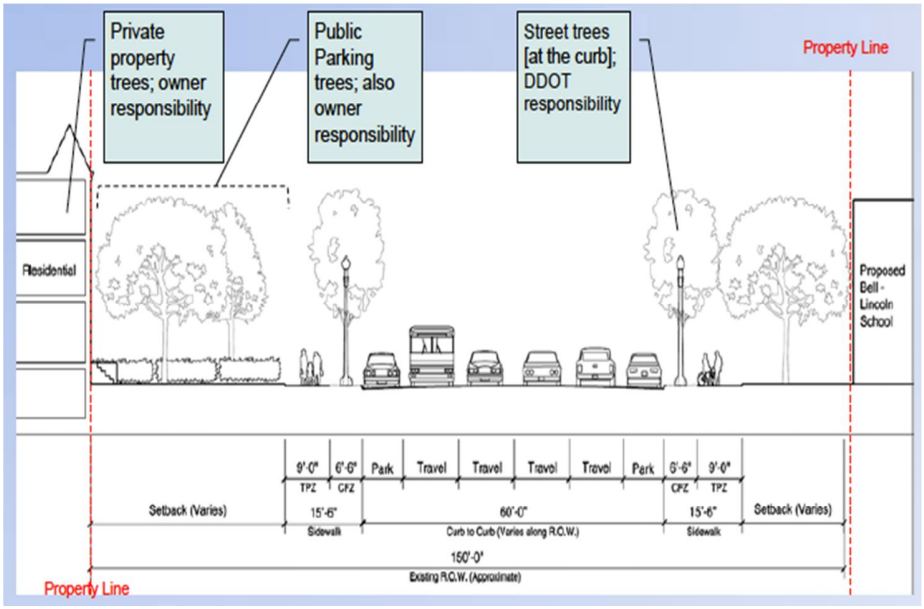


Figure 6 – Public vs. Private Responsibility for Trees

The UFA's mandate is to protect and promote the interests of trees in the District. UFA staff and contractors perform the following forestry activities: pruning, planting and removal.

- *Pruning* – street trees are on a five year inspection cycle, and pruning is planned as soon as possible, based on identified need;
- *Planting* – DDOT/UFA plants 4,000+ street trees each year. The planting season extends from November to May;
- *Removal* – this is completed as needed, based on funding. Removals may arise from any of the following: UFA's proactive evaluation of tree health, resident service requests, storm-related damage, and Pepco's request for reliability.

Private citizens also play a key role in vegetation management. They are responsible for maintaining their own trees. Pepco is restricted from tree work without the owner's consent be that the District, Park Service or private property owner.

Pepco also plays a key role in vegetation management within the District. Commission Order No. 13431, approved by the Commission on November 19, 2004, established a tree working group to establish a vegetation management process and a plan for the program. The working group sought to balance the need for reliable electric service, sound arboricultural practices and the aesthetic value of the District's trees. Multiple

stakeholders – including representatives from the Office of the People's Counsel, Pepco, the District Departments of Transportation and Public Works, and the Commission – took part in the working group.

UFA is today focused on improving the tree canopy through various efforts and policies. Some of these are described below:

1. Tree Canopy Maintenance programs that care for the existing canopy in the District so that it can grow in a healthy manner. It is estimated that 50% of the canopy gain will be seen from canopy growth. UFA inspects over 1/5 of the existing street tree canopy each year using certified arborists on staff to ensure trees are in good standing, prune thousands of trees, treat trees for diseases such as Dutch elm disease and reduce the paving surrounding street trees;
2. Tree Planting programs are the source of the remaining 50% of the canopy growth. This year UFA will plant over 6,400 street trees to fill in open spaces citywide. This is almost double UFA's efforts from previous years;
3. Tree Canopy compensation programs through the permitting process for developers. Existing trees on private property cannot be protected fully since the owner has discretion for tree removal and the law does not allow UFA to stop any removal. Street trees may be lost due to utility improvements, curb cuts, storm water catch basin installs and other changes to the urban environment. UFA staff provides inspection services through the DDOT permit office. Though this is common practice it is not necessarily preservation nor protection;
4. Canopy Keeper programs that engage citizens and work with citizens to become tree keepers and water newly planted trees citywide. This program has over 1,200 new people every year and has been very successful at UFA;
5. Canopy Education programs such as those on the UFA web site, Arbor Day, ANC meetings and other public events allow UFA staff to better inform the citizens about the benefits of trees.

Currently UFA has a very strong working relationship with Pepco foresters. This has allowed UFA and Pepco to work very closely together on the pruning of street trees and the construction of Pepco's infrastructure. The two are following industry standards for pruning trees around utilities. Any undergrounding program should seek to ensure this collaborative vegetation management program remains strong. Further, any trenching work should carefully consider the health of the tree root structures and seek to employ techniques to preserve these root structures.

It is anticipated that since any undergrounding work will involve the primary mainline and laterals and not the secondary or individual service drops, approximately 80% of the potential root and tree conflicts can likely be avoided with the undergrounding program.

This will help prevent harm to the District's lush tree canopy. In isolated cases, localized conditions may require undergrounding additional infrastructure – such as the secondary's – but this will be undertaken on a case-by-case basis and is not anticipated to frequently occur.

TECHNICAL COMMITTEE

Members of the Technical Committee

The list of members was as follows (in alphabetical order):

- John Adragna, Attorney, Office of the People's Counsel;
- Karen Campbell, VP, State Government Affairs, Mid-Atlantic Region, Verizon;
- Bill Gausman, SVP, Strategic Initiatives, Pepco (Committee Lead);
- Herbert Harris, Jr., Ward 7 Appointee, Resident Representative;
- Cary Hinton, Management Analyst, Public Service Commission;
- Phyllis R. Love, Management and Program Analysis Officer, Office of the City Administrator;
- Kevin Mara, OPC Technical Consultant, Office of the People's Counsel;
- Sandra Mattavous-Frye, People's Counsel, Office of the People's Counsel;
- Khalid Muhammed, Deputy Chief Engineer, Department of Transportation;
- Joseph Nwude, Deputy Executive Director for Regulatory Matters, Public Service Commission;
- Steve Price, Washington Gas;
- Donna Rattley-Washington, VP, Government Affairs, Comcast.

The Technical Committee members met on a number of occasions to carry out their work and provide recommendations for undergrounding power lines in the District of Columbia. Presentations were made at each Task Force meeting to provide updates on work performed and to present preliminary recommendations.

Scope of Work for the Technical Committee

The overall scope of work for the Technical Committee was the following:

- Provide details of the current distribution system (for example: where substations and major distribution line substations are located; where distribution systems are underground and overhead);
- Examine generation and distribution system connectivity with other jurisdictions; and impact on District planning;
- Define steps needed (and process) to move lines underground (how, technically, such undergrounding would occur);

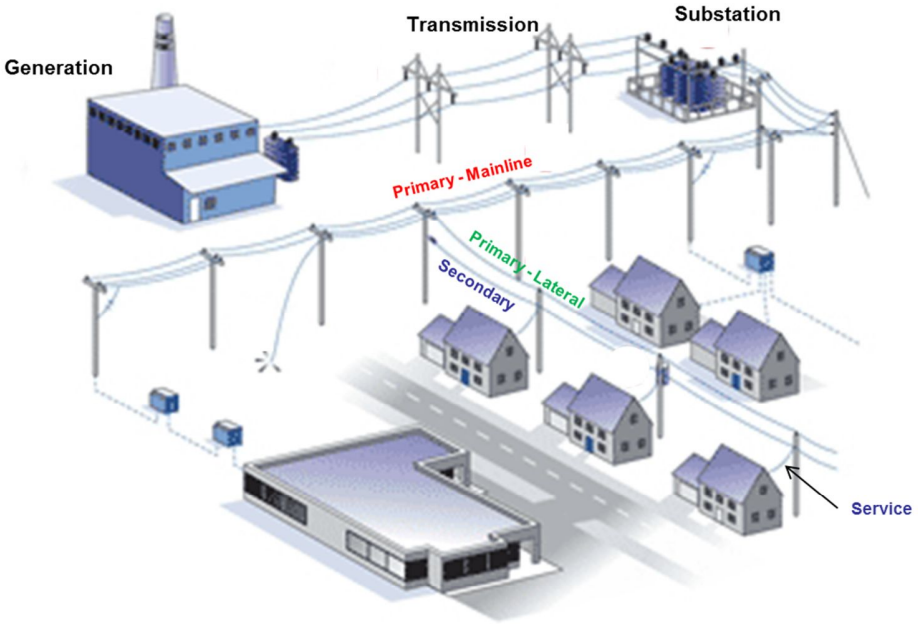
- Examine impact of undergrounding on reliability;
- Identify best options for undergrounding coordination with other utilities and DDOT.

In order to carry out this scope of work, the Technical Committee members drew upon their diverse backgrounds, consulted with a number of expert stakeholders and completed this written report as the product of its work.

Process of Undergrounding

The process of relocating electric distribution facilities from overhead to underground is complex, cost intensive and requires significant analysis. There are a number of different scenarios of undergrounding regarding which part of the power line and associated equipment is placed underground. There is also an analytical process for determining which power lines or portions of the power line to place underground.

Figure 7 – Components of Distribution System



Undergrounding Options

For the District of Columbia, there are fundamentally five different options for undertaking the process of undergrounding power lines. These five options are presented below:

- Scenario 1: Underground the overhead three phase primary mainlines retaining existing overhead transformers, secondary and service poles and overhead laterals.
- Scenario 2: Underground the primary laterals including secondary and services. Replace overhead pole mounted transformers with pad mount transformers.
- Scenario 3: Underground primary mainline and laterals. Replace overhead pole mounted transformers with pad mount transformers. Leave existing overhead secondary and services.
- Scenario 4: Underground all primary mainline and laterals, transformers, secondary, and services up to the service delivery point.
- Scenario 5: Underground the primary laterals, retaining existing overhead mainline, secondary and services. Replace overhead pole mounted transformers with pad mount transformers.

Predicted Benefits

Power outages have become an increasing problem in the District as well as across all east coast states, as severe weather and storms have increased in intensity and frequency over the past several years. The undergrounding of power lines is expected to provide significant benefits in terms of electric service reliability, the reduction in outage frequencies and durations and overall public safety. The two tables that follow provide an overview of the anticipated benefits from various undergrounding options when each option is applied to the entire distribution system. These benefits apply to the approximately 102,000 customers directly supplied from the overhead lines, as well as 40,000 customers that are supplied by underground lines that are attached to overhead lines.

Cost represents the estimate for undergrounding the entire system for each scenario. However, final strategic recommendations will consider selection of specific feeders

based on reliability performance. The reduction in the duration and frequency of outages once the feeder is undergrounded is defined as SAIDI and SAIFI, respectively. The first table is a summary of the costs and benefits relative to all overhead outages, only.

District of Columbia (All Outages Percent of overhead)	Cost ($Billions)	Customer Frequency (SAIFI)	Customer Duration (SAIDI)
1. UG main line w/OH secondary	$1.93	56%	45%
2. UG laterals w/UG secondary	$3.30	44%	55%
3. UG main line and laterals w/OH secondary	$3.00	97%	92%
4. UG main line and laterals w/UG secondary	$5.11	100%	100%
5. UG laterals w/OH secondary	$1.33	42%	47%

Table 10 - Results for All Outages as a Percentage of Overhead Outages

The next table compares the same factors for both overhead and underground outages.

District of Columbia (All Outages Percent of total)	Cost ($Billions)	Customer Frequency	Customer Duration
1. UG main line w/OH secondary	$1.93	32%	31%
2. UG laterals w/UG secondary	$3.30	26%	37%
3. UG main line and laterals w/OH secondary	$3.00	56%	62%
4. UG main line and laterals w/UG secondary	$5.11	58%	67%
5. UG laterals w/OH secondary	$1.33	24%	31%

Table 11 - Results for All Outages as a Percentage of Total

The general conclusion of this predictability analysis is that there is a range of potential benefits that could realistically be achieved with the different undergrounding options. Of the outages found on overhead power lines, the potential benefits of the five scenarios range from a 42% to 100% reduction in customer frequency of outages for those customers supplied by the overhead lines and a 45% to 100% reduction in outage durations. Of the outages found throughout the system, the potential benefits of the five scenarios range from a 24% to 58% reduction in the total number of customer

frequency of outages and a 31% to 67% reduction in outage durations for all customers across the entire City including both the overhead and underground supplied customers. Costs for these five scenarios range from $1.33 billion to $5.11 billion.

Core Undergrounding Strategy: Scenario 3

The Task Force recommends proceeding with Scenario 3. In this scenario, the primary mainline and laterals will be undergrounded. In addition, the overhead primary wire and equipment as well as the pole mounted transformers will be removed from the poles. New transformers will be placed on the ground and will be supplied from the underground lines. The existing overhead secondary and service lines will be left in place. This will be the general design to be applied to the vast majority of feeders. In isolated cases, the exact design may vary somewhat depending on conditions on the ground, coordination with other utility or road projects and economic development activities. In these instances, the precise design would be determined on a case-by-case basis.

Scenario 3 is recommended because it will result in the greatest benefits to costs compared with the other four options. The cost for Scenario 3, based on the undergrounding of all primary lines and transformers in the District that are not already underground, is estimated to be approximately $3.0 billion for the entire system. The Task Force recommendation is to underground up to 60 circuits that will improve the reliability of service for nearly 60,000 residents of the District and will cost nearly $1 billion. The benefits would be very significant. Of the outages found on overhead power lines, the Scenario 3 option is anticipated to result in a 97% reduction in customer frequency of outages and a 92% reduction in outage durations for those customers supplied by the overhead lines. Of the outages found throughout the system, Scenario 3 is anticipated to result in a 56% reduction in the total number of customer frequency of outages and a 62% reduction in outage durations for all customers across the entire City including both the overhead and underground supplied customers.

The cost/benefit rationale for Scenario 3 is based firmly on expected reliability improvements in both the frequency and duration of outages for those customers served from the newly undergrounded power lines. Although not a primary driver, there will also be significant aesthetic benefits for all District residents. The removal of a substantial portion of overhead power lines and equipment will be a vast visual enhancement.

The benefits expected to be obtained with this method of undergrounding are depicted in the following renderings of the number of customers that would be impacted when an outage occurs. In the current situation, when an outage does occur then all customers on the line will lose power and must wait until repairs can be made. Once the lines are placed underground, only the few customers connected to the secondary lines, where the damage occurs, are out of power. This is a significant reduction in the total number of customers out of service and allows Pepco to respond faster to make repairs to the individual customers. In addition to the improved reliability there will be fewer lines and equipment remaining on the poles, thereby reducing the visual impact from the overhead lines.

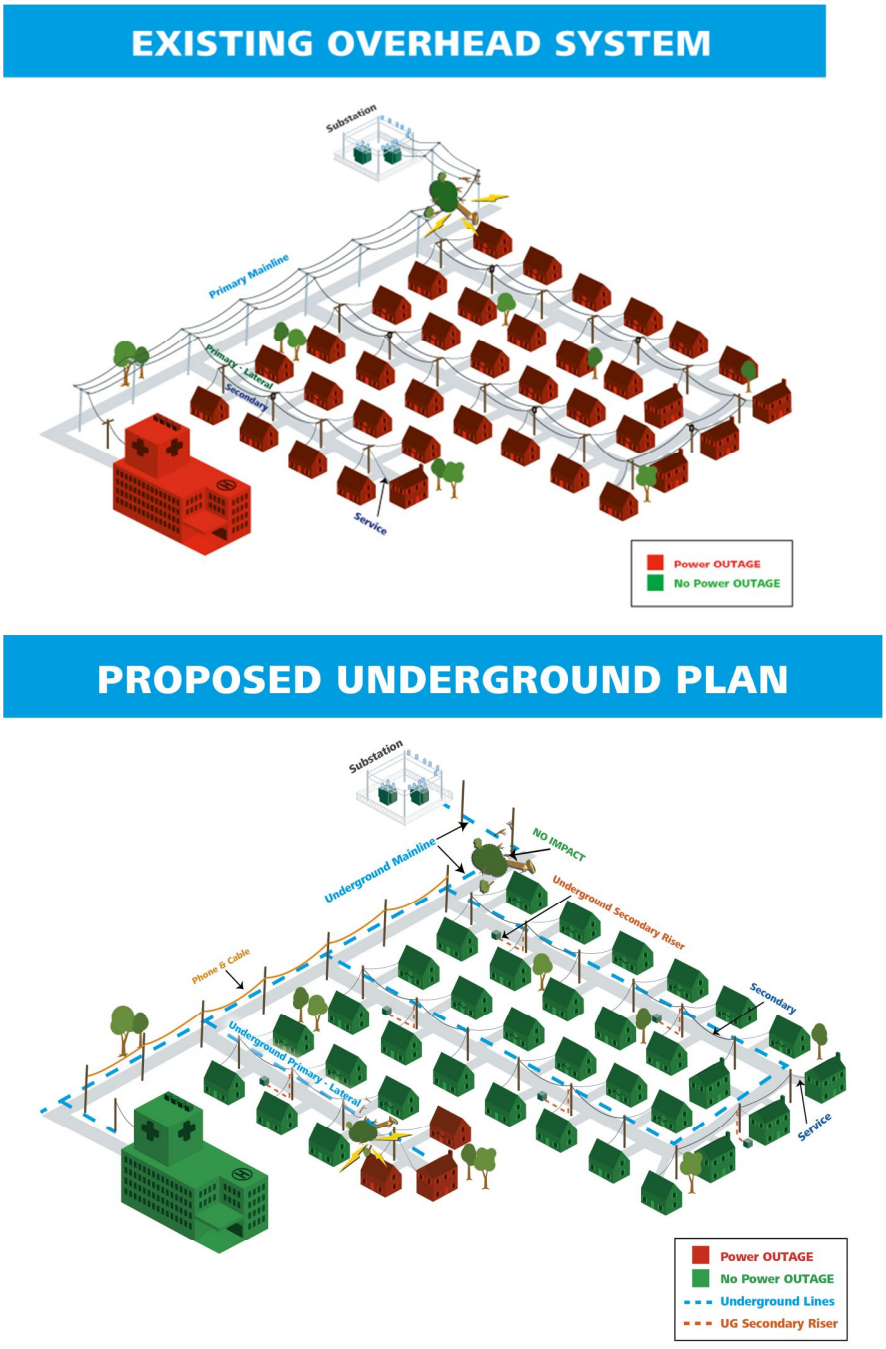


Figure 8 – Existing Overhead System vs. Proposed Underground Plan

Communications Lines and Undergrounding

Another important factor to consider is the impact of undergrounding on the communications lines found on the overhead poles. Currently, the power lines are located above the communications lines and therefore provide some measure of protection from vegetation. For example, if a tree falls on the lines, it is typically the power lines that absorb the weight of the tree, shielding in many cases the communications lines found below.

The recommended undergrounding option does not recommend the placement of communication lines underground. Therefore, if the power lines are placed underground, the communications lines would no longer have the protection from the electric lines above them on the poles. This could have an impact on the reliability of the communications providers. During storms the communication lines may be exposed to increased tree contact when the electric lines are no longer above them as a shield from direct tree contact. The communication firms reserve the right to evaluate the reliability benefits for undergrounding by looking at each individual location where Pepco will be undergrounding their lines. However, the increased cost to underground the communication lines could result in up to doubling the cost for the electric lines alone. Recognizing this cost impact there may be opportunities where additional conduit lines can be constructed now however the communication lines would not be moved underground until some future event occurs, such as a new economic development project.

- Verizon estimates that they have over 850 miles of lines within the area being considered for undergrounding. Using the same estimated cost per mile that Pepco developed for its lines, this would result in nearly $3 billion of investment. This estimate is developed using independent construction of conduit lines, therefore with joint trenching there would be opportunities to reduce this total cost. Likewise, if the District was to construct a portion of the conduit system then the cost to Verizon would be further reduced;
- Comcast has estimated expenditures of over $500 million, not including any rental fees for the use of conduits built by other parties.

Selection of Feeders to Underground

In order to select the specific power lines to underground, a six-step process is followed. This process involves the following six steps:

1. Ranking of power lines (feeders) by historical reliability and customer minutes of interruptions reduced per dollar spent (SAIFI, SAIDI and CMI/$)[6];
2. Evaluation of other reliability enhancement programs already being performed;
3. Coordination with future economic and infrastructure developments in the feeder area;
4. Coordination with other utilities' and local governments' infrastructure projects;
5. Evaluation of the level of construction being performed at any one time within a Ward;
6. Consideration of the number of customers served by each feeder.

Ranking of power lines by historical reliability (SAIFI, SAIDI and CMI/$)

The first step in the selection process for determining which power lines (feeders) to underground involves ranking the feeders. The best method in this step is to rank the feeders by their historic reliability. This is a quantitatively driven approach for filtering out feeders that may not benefit substantially from undergrounding, while identifying feeders that will benefit. The end result is a list of all feeders that are candidates for undergrounding.

Once the list of feeders to be considered has been identified then a series of secondary criteria are used to prioritize the feeders or the order in which they will be selected for undergrounding. The secondary criteria comprise value of service, utility coordination with DDOT, community impact, and customer impact. Using this approach, a feeder that results in a high reduction in the duration of outages and the frequency of outages but only serves a few customers would not be selected over a feeder that has similar reliability benefits and costs but serves a larger number of customers.

Sequencing of work helps to ensure that maximum synergies and cost benefits are obtained with other projects being performed within the District and reduces impacts on communities where the work is to be performed. This evaluation will take into consideration reduced construction cost and diminished disruptions that are possible when multiple projects are coordinated and implemented together. This sequencing

6 SAIDI – System Average Interruption Duration Index. Average time customers are interrupted. Mathematically equal to the sum of customer interruption hours divided by total number of customers served.
SAIFI – System Average Interruption Frequency Index. Average frequency of sustained interruptions per customer. Mathematically equal to the sum of number of customer interruptions divided by total number of customers served.
CMI/$ - Customer Minutes of Interruption reduced per dollar spend to complete the undergrounding project.

process will also limit, in most instances, the undergrounding efforts within any ward to no more than one feeder at a time. When two or more feeders within a ward have similar reliability benefits to be gained, the priority of work will take into consideration additional criteria such as the Value of Service (VOS)[7] or the economic impact of an outage. The feeder with the highest VOS would generally be performed first.

The following tables outline the primary and secondary selection criteria that should be used to develop the feeder ranking and the sequence for performing this work.

Primary Selection Criteria

SAIDI	Selection of feeders that result in the greatest reduction in duration of outages once the feeder is undergrounded
SAIFI	Selection of feeders that result in the greatest reduction in frequency of outages once the feeder is undergrounded
Customer Minutes of Interruptions per Cost of Undergrounding	Achieve the greatest reduction in the minutes of interruptions for every dollar spent to underground

Table 12 – Primary Selection Criteria

[7]Value of Service - In 2008, the U.S. Department of Energy (DOE) funded a meta-study to estimate outage costs (Value of Service or VOS) for U.S. electricity consumers. Twenty-eight studies, conducted by 10 electric utilities between 1989 and 2005 representing residential and commercial and industrial (C&I) customer groups were included in the analysis. The data was used to estimate customer damage functions expressing customer outage costs as a function of duration.

Secondary Evaluation Criteria

Value of Service	When two or more feeders within a ward are scheduled for undergrounding, the order or sequence to perform that work can take into consideration the economic benefits of reduced outages – the feeders with the highest economic impact during an outage would be the first to be undergrounded
Coordination with other District Projects	Coordination of undergrounding projects with major road reconstruction work and other utility projects to achieve cost reduction benefits from reduced paving cost and efficiencies of scale in work being performed
Community Impact	Major road or utility construction work can have a significant impact on a community and economic impact on businesses. Limiting feeder undergrounding projects at any one time to no more than one project per ward can help to reduce this impact
Customer Impact	Evaluation of customer supplied from each feeder so that the prioritization of work takes into consideration the number of public service facilities (fire and police), health care and customers with special needs for electric service are considered when scheduling the order of feeders to be undergrounded

Table 13 – Secondary Evaluation Criteria

Coordination with future economic and infrastructure developments in the feeder area

The refined list of feeders then has another factor to take into consideration: future economic and infrastructure developments in the area. This includes the schedule of upcoming road construction projects and other projects. It is then determined if there is the ability to coordinate the planned infrastructure construction work with the undergrounding projects.

Coordination with other utilities and local governments infrastructure projects

In this step, Pepco meets with local government officials to discuss its plans for undergrounding. It is also at this stage when permits are applied for and other details handled.

Evaluation of the level of construction being performed at any one time within a Ward

In addition to the steps above, an evaluation will also be made regarding the level of overall construction activities being performed within a Ward. This is done to ensure there is not too much construction activity resulting in significant disruptions for Ward residents and businesses. This will limit, in most instances, the undergrounding efforts within any ward to no more than one feeder at a time.

Consideration of the number of customers served by each feeder

The number of customers served by each feeder will also be taken into consideration. In general, those feeders serving a larger number of customers will receive priority over those feeders serving a smaller number of customers.

Economic Benefits

The economy of the District of Columbia benefits from Pepco's ongoing investment in its electric distribution system. The most obvious benefits are the improved reliability, enhanced service, and increased access to the electric system that result from Pepco's construction and maintenance activities.

The Mayor's Power Line Undergrounding Task Force has recommended that further undergrounding of the Pepco distribution system will make important reliability contributions in the system's performance during major storm events. The multi-year

implementation plan (approximately 5 to 7 years) will result in sustained employment in the District of Columbia and also has the potential for job creation.

As Pepco invests in distribution related projects, it contributes to District of Columbia employment in a variety of ways, including:

1) direct Pepco internal employment in both the field and professional levels across a variety of functions, from running cable to designing projects to maintaining equipment;

2) direct contractor employment, mostly in construction and engineering roles;

3) indirect employment along the regional supply chain that provides materials and services to Pepco and its contractors, and;

4) employment throughout the District of Columbia that is supported by spending of income generated by the above three categories of employees.

Methodology for Estimating Employment Contributions

Direct employment within Pepco was estimated for the Undergrounding Program by assuming the labor share of expenditures for a recently completed undergrounding project would be maintained for future projects. The regional allocation of internal employment was based on the regional distribution of Pepco's current employees. Direct contractor employment and all indirect employment was calculated using categorized spending estimates from Pepco and the input-output modeling tool, IMPLAN. IMPLAN is a commonly used tool for estimating supply chain impacts and the regional multipliers that result from income flowing into a region.

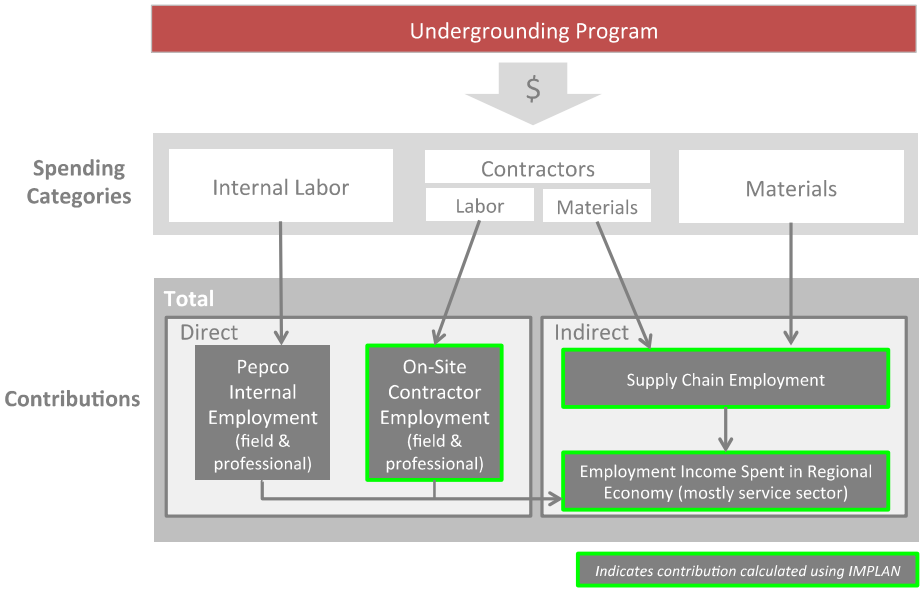


Figure 9 – Methodology for Estimating Employment Contributions

Estimates of the allocation of spending on the Undergrounding Program were based on actual underground construction work of 13 kV networked distribution feeders to supply new federal building construction located within the District of Columbia. The allocation of spending on this work was used as the scalable basis for the construction of new 13 kV distribution feeders in the Undergrounding Program[8]. The sharing between the three main spending categories (internal labor, contractors and materials) is assumed to be similar to the actual spending on the Undergrounding Program. The analysis assumed that contractors will be sourced regionally to the extent possible as indicated by IMPLAN's regional purchase assumptions.

The Undergrounding Program spending profile differs from Pepco's other distribution construction activities in a few key ways:

[8] The "Undergrounding" Program is primarily the construction of new underground 13 kV feeder systems. As the new underground system is constructed, the existing overhead feeder (primary) system is removed. Therefore, the use of actual new underground construction data for similar distribution feeders is an appropriate comparison of labor contributions of the Undergrounding Program.

1) Significantly more civil work, such as digging and paving, than is in Pepco's planned project mix, which largely consists of overhead construction. This leads to more labor per level of investment and a greater share of locally sourced materials;
2) Increasing reliance on contractors. The significant expansion assumed in the Undergrounding Program would result in additional reliance on contractors that provide a more extensive scope of services;
3) More locally sourced contractors. It is assumed that Pepco, through its competitive bid process, will take advantage of the District of Columbia contractor base that is expected to expand with such an increase in construction projects. The extent to which contractors establish a presence in the District of Columbia and hire local workers will determine the accuracy of this assumption.

Table 14 shows the share of spending by category for the Undergrounding Program.

Spending breakdown by category for undergrounding program

Category	% Share
Internal Labor	23.5%
Contractors	53.0%
Materials	23.5%
Total	**100%**

Table 14 – Spending Breakdown for Undergrounding Program

Given these assumptions about sharing between categories, spending for the Undergrounding Program was allocated to relevant IMPLAN sectors. The IMPLAN model was then used to calculate potential employment, both direct for contractors and indirect for all categories.

Employment Contributions

Table 15 shows the direct and indirect employment contributions that could be possible to be developed from spending on the Undergrounding Program for the District of Columbia economy. It includes the potential employment contributions from Undergrounding Programs in both the District of Columbia and Maryland that increase economic activity in the District of Columbia. The Undergrounding Program has a fixed spending amount per year, and thus the contributions are assumed to be the same each year.

	Annual	Total (2013-2017)
Direct	800	4,000
Indirect	150	750
Total	**950**	**4,750**

Table 15 – Employment Contributions of Undergrounding Program (2013-2017)

The direct employment from the Undergrounding Program is consistently larger than the indirect employment throughout the next five years. The large number of direct employees relates mostly to contractors working in project engineering and construction. While some indirect employment comes from the local materials supply chain, electrical equipment and cabling generally come from outside the District of Columbia. The direct employment also generates additional indirect employment in the region.

Customer Engagement

Customer engagement, communication and education will be critical to the success of the undergrounding initiative. Well before construction begins, outreach efforts must begin to educate customers on the undergrounding process, costs and achievable benefits. The significant construction activity that undergrounding requires can have a substantial impact on District residents. Therefore, it is imperative to clearly communicate what these impacts are, how long they will last and how in the longer term, the construction activities will benefit residents.

In partnership with the members of the Undergrounding Task Force and Mayor Gray, the District is undertaking a "game changer" that will place the District of Columbia at the national forefront for grid resiliency. As storms have increased in frequency and severity, the importance of undergrounding the electric system has grown.

A project of this scale requires significant investment. This investment will substantially improve the infrastructure, limit the impact storms have on the electric system, and stimulate economic growth through job creation. For all of those reasons, communication with citizens early and often – before, during and after construction - is a necessity so that they understand the details and the benefits of the undergrounding plan. The education campaign must be fully integrated and use multiple channels to deliver consistent messaging.

The goal of this customer engagement plan will be to inform and update District utility customers and taxpayers on the Task Force's undergrounding solution. Among the objectives of the plan will be:

- Explain the causal impact faced by consumers as a result of power outages caused by increasing weather events;
- Explain that inaction to respond to the increasing storm frequency and intensity is not a viable option;
- Explain the unique process the task force has undergone to involve itself in what has traditionally been a regulatory function in an effort to develop a common understanding of the costs and benefits;
- Explain the impacts, including financial (pocketbook) and physical (lifestyle) on consumers;
- Explain the financing options and limitations available to Pepco and the District government to fund the project;
- Explain the challenges faced by the utility to incur additional expenses at an accelerated pace without timely recovery by the utility of its investment.

FINANCE COMMITTEE

Scope of Work for the Finance Committee

The Finance Committee examined several general financing mechanisms that could be used for the nearly $1 billion underground program, in combination with traditional utility financing:

1. Tracker Surcharge;
2. Third-Party Financing;
3. Utility Securitization.

In addition, the committee evaluated a hybrid approach that involved a combination of utility financing, securitization and the leveraging of capital improvement funding.

In considering these alternatives, the Finance Committee recognized:

1. The cost impact to Pepco's customers;
2. The potential for lower cost debt financing, and;
3. The business characteristics of Pepco, including its credit ratings.

Tracker Surcharge

With this financing mechanism, the utility would use a Public Service Commission approved surcharge to finance a pre-approved construction plan as the costs are incurred. The tracker surcharge is designed to provide timely recovery of costs as the assets are placed in service and provide benefit to the customer, and does not remove the prudence review performed by the Commission. The tracker can spread the cost of the investments over the useful life of the asset and is similar to the method costs are recovered in a typical rate case. Trackers are common and used by dozens of electric utilities in 25 states (including California, Florida, New York, Pennsylvania and Virginia) to facilitate investment and finance projects that benefit millions of electric utility customers, such as programs to modernize the distribution system, increase reliability or to replace aging infrastructure.

Third-Party Financing

This financing mechanism is debt-supported contribution in aid of construction (CIAC) that involves long-term debt issued by the City, State or District in which the utility operates and a ratepayer surcharge to support the repayment of the debt. Depending on the depreciation life of the asset involved, the repayment of the third party financing could be longer or shorter than the asset's recovery period through the traditional rate base process. The positives of this mechanism are that payments could be spread out over a longer time period of time and the construction period is not tied to the payment period. However, there are also some negatives to this mechanism. The payments could be spread over a shorter period of time, the debt generally needs to be reported on the issuer's balance sheet (i.e.: the City, State or District) and issuances have a higher cost and more robust controls to ensure that the proceeds are earmarked strictly for the undergrounding project. With third-party financing, the tax depreciation of the assets, which is a benefit to the customers, is usually forgone since the utility is fully reimbursed for the cost of the investment through the CIAC. The tax implications must be evaluated as part of the economics.

Securitization

Another financing mechanism is securitization. 'Securitization' refers to Laws and Commission Orders needed to set-aside ("secure") a stream of ratepayer fees that are dedicated to paying off bonds issued by a separate entity protected from bankruptcy. In general, the separate entity is created as a subsidiary of the utility. With this financing mechanism, the utility serves as the collection agent for the financing costs which include the repayment of the bond. The Commission cannot change the Financing Order once it is issued nor can the Legislature amend the authorizing statute. Currently, there are approximately 20 states that allow for utility securitization.

Securitizations have typically been utilized to recover regulatory assets and expenditures that have been made in the past and have not been used to fund future construction programs. Examples of assets that have been recovered through securitizations include stranded costs associated with deregulation, loss on power purchase agreements, environmental costs and hurricane restoration activities. The terms of securitization bonds have generally ranged in the 5-10 year period, with a few extending out 20 years.

There are pros and cons to this financing approach. The positives include a very low cost of borrowing due to a AAA rating on the bonds. However, securitization can be inflexible and can be very time consuming to complete. It requires enabling legislation and a financing order from the Commission that cannot be changed regardless of any changing circumstances. Also, there is a limit on the amount of securitization that can be borrowed without negatively impacting the issuer's credit ratings. In setting this limit, the rating agencies consider several financial factors including the percent of surcharge to total customer bill (under significant stress test scenarios) and the percent of securitized debt to total debt outstanding and capital structure. Based on Pepco's discussions with the rating agencies and the investments banks, Pepco has indicated its total capacity to issue securitized debt for the Pepco-DC operations is approximately $375 million. In addition, the term of the securitization bonds is typically significantly less than the amortization schedule often associated with depreciation of the assets through more traditional ratemaking approaches. Such a difference in the amortization impacts customer rates, and may in fact offset the advantage of securitization from a customer rate impact perspective.

A final consideration is that 100% of the cash flow received from the customer securitization surcharge must be used to pay down the securitized debt and cannot be used to further reinvest in the electric system. Operating cash flow the company receives today is not restricted and can be used for many purposes including reinvestment back into the electric system. Over the past five years (2008-2012), Pepco has reinvested approximately 90% of its earnings back into the business.

DDOT Capital Improvement Funds

The District is exploring whether local or federal capital improvement funds are available to cover a portion of the underground program. The District is exploring the feasibility of using capital improvement funds to build the underground conduit system at the same time a street is repaired and resurfaced. There is $62 million in the budget available by synchronizing with approved road work.

Hybrid Funding Approach

There is also the possibility for a hybrid approach that leverages multiple sources of funding. The hybrid approach involves sourcing funds from a combination of utility

financing, securitization and the leveraging of capital improvement funding. The graphic below depicts how this hybrid approach works.

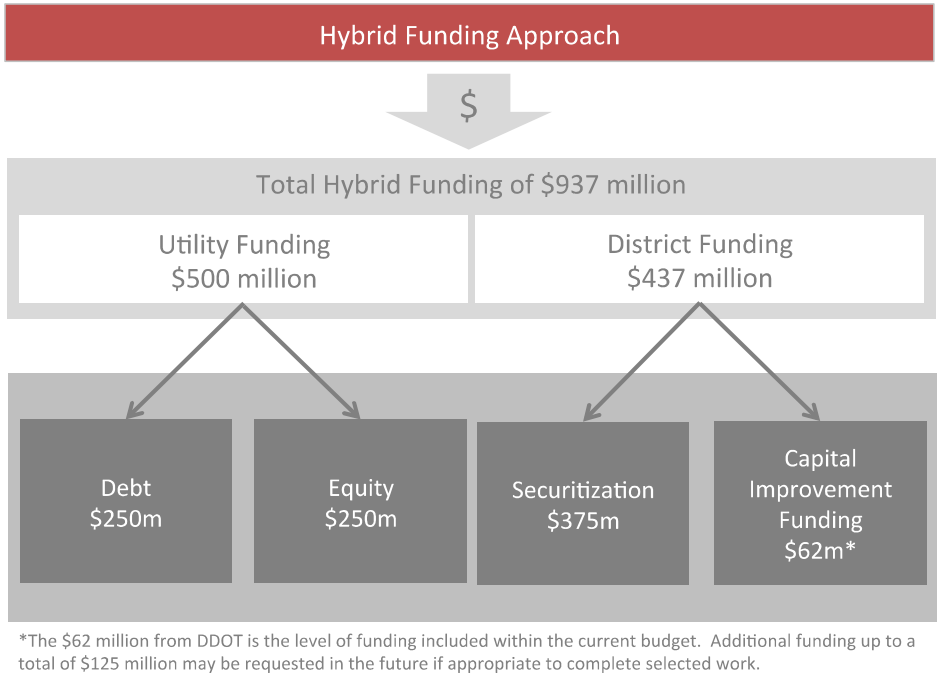


Figure 10 – Hybrid Funding Approach

The hybrid approach sources funding from both the utility and the District. Utility funding would be comprised of both debt and equity financing with cost recovery through a surcharge. District funding would be made up of a combination of securitization and capital improvement funding (both local and federal capital improvement funds). In order to maximize the capital improvement funding, there will need to be close coordination between the District and Pepco to schedule undergrounding and road improvement projects together. The recovery of the utility costs and securitization costs will be through a surcharge on customers' electric bills. The hybrid approach and combination of funding sources allows the District to access the low interest rate funds currently available.

Other Considerations

The Finance Committee recognizes that the proposed allocations could take many months to complete. In order to start the underground work as soon as possible the Commission should allow the Company to establish a regulatory asset to recover all stranded costs and other non-capital costs associated with the underground program.

In addition, the Finance Committee urges the Commission to consider other recovery methods that would allow the utility to recover its costs more timely, thus allowing the Company more capacity to accelerate its other reliability related expenditures. Common methods used throughout the industry include trackers as noted above, fully forecasted test periods and terminal rate base.

EMERGENCY STORM COMMITTEE

The list of members was as follows:

- Chris Geldart, DC HSEMA, Acting (Committee Chairman);
- Elijah Crawford, DC HSEMA, Special Assistant;
- Soumya Dey, DDOT, Acting Associate Director;
- Kenneth Glick, Attorney Advisor, Public Service Commission of the District of Columbia ("DC PSC");
- Cary Hinton, Management Analyst, Public Service Commission of the District of Columbia ("DC PSC");
- Karen Campell, Verizon, VP, State Gov. Affairs, Mid Atlantic Region;
- Nathan Palmer, Verizon;
- Karen Sistrunk, Deputy People's Counsel, DC Office of People's Counsel ("DC OPC");
- Jennifer Weberski, Assistant People's Counsel, DC Office of People's Counsel ("DC OPC");
- Herb Jones, External Affairs Manager, DC Office of People's Counsel ("DC OPC");
- Sybil Hammond, DPW, Administrator, Solid Waste Management;
- Herbert Harris, Jr., Ward 7 Appointee;
- Phyllis Love, OCA, Management & Program Analysis Officer;
- Jeff Mittler, Director Electric System Operations, Pepco;
- Pete Pedersen, Manager Emergency Preparedness, Pepco.

The Emergency Response Subcommittee members met on a number of occasions to carry out their work and provide recommendations for operational practices for prevention of and/or expedited recovery from power outages.

Scope of Work for the Emergency Storm Committee

The Emergency Response Committee examined five general recommendations for prevention of, or improved recovery from, power outages in the District of Columbia.

1. Review of coordination of debris removal (issue with Pepco not providing a timely assessment of whether a power line is live thereby impeding District agencies from moving forward in debris removal);

2. Review of Communication Protocols between District Leaders and Pepco;
3. Review of Resource Allocation (manpower);
4. Review of Pepco's Community Outreach (assisting the District in providing for customers' needs);
5. Preventative steps other than Undergrounding.

Existing Emergency Preparedness and Storm Restoration Processes

The District, in coordination with Pepco, has a well-established emergency preparedness and storm restoration processes in place. There are a number of steps Pepco takes to ensure that it is ready in the event of an emergency and that it can ensure the safety of the public and its employees while restoring electric service as quickly as possible.

Some of the activities Pepco engages in to help prepare for emergency situations include:

- **Plans, training and drills** – these include incident response plans, incident response roles training, drills and exercises and related preparatory activities;
- **Weather monitoring** – Pepco subscribes to two different weather services to ensure it has the best information available regarding future weather events approaching its service territory. It also reviews other publicly available information to compliment these weather subscription services. In addition, Pepco has mechanisms in place to share weather and other related information with other utilities and government entities;
- **Business continuity and contingency planning** – in order to ensure safe and reliable electric service, Pepco has business continuity and contingency plans in place that cover a number of possibilities. These help it plan and prepare for both known and unknown emergencies;
- **Mutual assistance** – Pepco is a member in mutual assistance organizations so it can supplement its work force during storms and other emergencies. Other utilities and contractors lend personnel in times of need and Pepco does the same with its personnel.

Restoration

In the event that power is lost to a significant number of customers, Pepco initiates its emergency activities. Restoration activities are focused on:

- Public safety;
- Employee safety;
- Restoration of service as quickly as possible;
- Customer satisfaction.

As part of these restoration activities, Pepco prioritizes the necessary work to ensure it meets the four focus areas noted above. In general, the prioritization is ranked according to the following criteria:

1. Potentially life-threatening situations;
2. Bulk power system issues (transmission);
3. Sub-transmission system issues (substation supply);
4. Distribution system issues:
    - Critical facilities (nursing homes/assisted living, schools, fire police, etc);
    - Primary feeders;
    - Vicinities;
    - Service drops (customer premises).

In this manner, Pepco can focus its restoration activities in the areas where they are most needed and provide the biggest benefits.

Another component to restoration activities is customer communication. Pepco seeks to provide its customers with the best information it can regarding the progress of restoration. On a "blue sky" day (e.g. not during a storm event), Pepco generates the "estimated time of restoration" (ETR) from its Outage Management System (OMS). The OMS system generates the ETR based on an analysis of customer calls, the typical repair time for the predicted device in question and other relevant criteria. Crews at the scene may then update this ETR after they arrive and can further assess the problem.

During major events and storms, a different process is followed. No ETR is announced until after damage assessment can be completed. Then, a "global ETR" is published where Pepco estimates when it expects the majority of customers will be restored and also when the last customer will be restored. Then there are also "tiered ETRs" where estimates are provided for larger outage groups. Lastly, "individual ETRs" are provided for smaller outage groups and individual customer outages.

By following the process described above, Pepco can focus on restoring electric services as quickly and efficiently as possible while ensuring public and employee safety and customer satisfaction.

PLANNING AND RESEARCH COMMITTEE

Members of the Planning and Research Committee

The list of members was as follows:

- Terry Bellamy, Director, District Department of Transportation ("DDOT") (Committee Chairman);
- The Honorable Betty Ann Kane, Chairman, DC Public Service Commission ("DC PSC");
- Phyllis R. Love, Management and Program Analysis Officer, Office of the City Administrator;
- Daniel Cleverdon, Economist (Technical Advisor), DC PSC;
- Cary Hinton, Management Analyst, DC PSC;
- Laurence Daniels, Assistant People's Counsel, DC Office of People's Counsel ("DC OPC");
- Laurence Jones, Public Policy Analyst, DC OPC;
- Veronique Marier, Deputy Director, Energy Administration, District Department of Environment ("DDOE");
- Hussain Karim, Assistant Attorney General, DDOE;
- Alan Barak, Assistant Attorney General, DDOE;
- Taresa Lawrence, Associate Director, District Department of the Environment, DDOE;
- Sosina Tadesse, Energy Program Specialist, DDOE;
- Khalid Muhammed, Deputy Chief Engineer, DDOT;
- Jama Abdi, Electrical Engineer, DDOT;
- Matthew Frumin, Citizen Representative; and,
- James Boone, Mgr. Sr. Strategic Initiatives, Pepco.

The Planning and Research Committee members met on a number of occasions to carry out their work and provide recommendations for undergrounding power lines in the District of Columbia.

Scope of Work for the Planning and Research Committee

The Planning and Research Committee's charge was as follows:

- Review and summarize experience of other jurisdictions that have converted to underground wiring, improved storm response, and strengthened overall system reliability;
- Determine which current District plans (e.g. road reconstruction, development projects) should be coordinated with undergrounding;
- Collect research and studies for Task Force member review.

Experience in Other Jurisdictions

With respect to the first and third charge noted above, the Planning and Research Committee ("Committee") reviewed proceedings and assessments on electric utility undergrounding activities of other jurisdictions, which were performed generally in response to major interruptions in electric service as a result of a significant weather event. The jurisdictions included the states of Maryland, New Jersey, North Carolina, Oklahoma, Virginia, and the city of Anaheim. The Committee also discussed the conclusions reached in the Shaw Report prepared for the Public Service Commission of the District of Columbia. Finally, Pepco prepared an Undergrounding Study, within which it outlines electric distribution line undergrounding assessments conducted by other jurisdictions.[9]

The work group observed that dozens of cities have developed comprehensive plans to bury or relocate utility lines to improve aesthetics. Among these cities a variety of programs are being used to convert existing overhead lines to underground, for instance, special assessment areas, undergrounding districts and state and local initiatives.

Coordination of Planned Construction Activities

Consistent with the second charge noted above, the Planning and Research Committee identified certain plans that should be coordinated with underground activities. Each year the DDOT develops a comprehensive transportation improvement plan for the

[9] See Appendix E of Pepco's Undergrounding Study for Maryland dated November 30, 2012. The Pepco Study outlines reports conducted in 19 jurisdictions, as well as includes underground conversion cost information compiled by the Edison Electric Institute.

Metropolitan Washington region covering a rolling six-year planning horizon. The most recent plan is for fiscal years 2013 through 2018 and it was approved by the National Capital Region Transportation Planning Board on July 18, 2012. DDOT also has an Envista planning tool that is designed to improve project coordination that may be leveraged to ameliorate the coordination of planning activities. The coordination of transportation construction activities and utility facilities is currently taking place during monthly DDOT meeting, whereby Pepco and other utilities review pending transportation projects and utility construction plans. To enhance these meetings, the utilities should include electric, telecommunications, gas and water and the coordination meetings should continue going forward.[10]

The Committee is also aware of several large private development projects that provide a potential opportunity to underground electric lines. These projects should be coordinated in the planning process to assess additional opportunities to underground utilities. DDOT and the District of Columbia Office of Planning should jointly conduct a review that looks at all major projects to be performed within the City over the next three to five years. This will identify areas of development and opportunities for coordination of work to reduce construction cost for all parties and limit impact on the communities. This review should also investigate future parcels of development that might offer an opportunity to incentivize commercial customers to locate utilities underground, as well as explore various strategies that were useful in the District's coordination of undergrounding with new major projects. DDOT should look to leverage its Envista planning tool to coordinate these projects. The results of this review should be shared widely with utilities, developers and other interested parties.

[10] The Maryland Department of Transportation also generates transportation plans and the coordination of work should be considered across the District of Columbia and state of Maryland boundary, where applicable, to seek cost saving opportunities.

LEGISLATIVE AND GOVERNMENT AFFAIRS COMMITTEE

Scope of Work for the Legislative and Government Affairs Committee

The Legislative and Government Affairs Committee was tasked with two primary activities:

- Determine the legislative and regulatory changes needed to implement undergrounding, or to improve storm response, or system reliability;
- Draft specific provisions where appropriate.

The committee carried out its work in evaluating these two focus areas. Three formal reports were presented by members of the Legislative and Government Affairs Committee to the Task Force. The reports covered public space regulations and tree policies; current overhead lines and undergrounding policies, laws, and tariffs; and intergovernmental coordination.

Legislative and Regulatory Changes

The relevant legislative and regulatory changes that may be required include:

- Public Right-of-Way Occupancy Permits;
- Construction Permits;
- Public Inconvenience Fees and Steel Plate Fees;
- Public Space Coordination;
- Vegetation Management – tree management by DDOT and Pepco;
- Current Laws and Policies Regarding the Undergrounding of Power Lines;
- Enabling Legislation Introduced in the Council.

Legislative Requirements

The undergrounding of electric power lines will require a significant investment of capital: the costs of undergrounding the facilities recommended by the Task Force are nearly $1 billion. The Finance Committee is exploring multiple funding sources to finance undergrounding and has recommended a combination of debt, equity, and securitization bonds. In order to facilitate the financing structure, authorizing legislation will be required. For securitization, legislation is necessary to (1) authorize the issue of financing orders by the Commission, (2) authorize the creation of a special purpose

entity to issue bonds, and (3) authorize the Commission to approve Pepco's undergrounding construction program. The legislation will authorize the PSC to issue irrevocable financing orders which will establish allowable undergrounding costs and create the right to impose certain nonbypassable charges on utility customers to support the securitization. Together, the legislation and the financing order express the commitment of the District of Columbia not to amend the terms of repayment so that the highest bond credit rating and lowest financing costs can be achieved. Reporting and processes will also need to be created to set forth the roles and spending limits for Pepco and DDOT consistent with the recommendations of this report, and provide for the PSC to monitor each parties' compliance with those requirements.

The final major component of the legislation will be to authorize an underground project cost recovery mechanism This will allow Pepco to recover the projected expenses and capital costs (both return of — and return on — capital) for undergrounding construction. Normally, when infrastructure investments are made by the electric utility, those investments are deemed a cost of service and the utility is authorized to recover the actual construction costs after the investments have been made in the next application for a base rate increase.[11] The underground project cost recovery mechanism reduces the financial burden on the company of this large new investment program by allowing them to recover their costs more quickly, rather than waiting until their next base rate case is filed. Under the recovery mechanism, projected costs and actual costs will be "trued-up" yearly and then the recovery mechanism account is re-set to zero when the next base rate case is filed and the undergrounding assets are added to the company's regulated capital base.

[11] Traditionally, Pepco files a rate case with the Public Service Commission to recover costs that are deemed to be prudently incurred. Setting rates for utilities is based on the principle of providing a reasonable opportunity to earn a rate of return that recovers costs that were prudently incurred and necessary for the provision of safe and reliable utility services, including financing costs and a reasonable rate of return to investors. State utility commissions traditionally make the determination of whether costs were prudently incurred, were necessary for the provision of reliability utility service, and were assigned a reasonable return as part of a general rate case proceeding. The goal is to establish rates that are reasonable and also provide timely and sufficient return to allow utilities to attract capital on reasonable terms to finance capital investments. Report to the Legislature: Utility Rates Study As Required By Laws of Minnesota, 2009, Chapter 110, submitted by the Minnesota Public Utilities Commission, June 2010.