Overview of the Undergrounding Process

October 24, 2012

Process to Underground a Feeder

1 Ranking of Feeders by Historical Reliability

- Rank feeders based on their historical reliability.

12 weeks

2 Screening and Decision to Underground

- Carry out a comprehensive screening to determine sections or entire feeders to be placed underground.

12 weeks

Ongoing – 1 year

3 Underground Planning and Design

- Conduct initial engineering planning analysis, field inspection, determine design, apply for permits, meet with local government officials and identify contractor.

28 weeks

Start Construction

Ranking of Feeders by Historical Reliability

Identification of Feeders

- Ranking is completed using historical reliability data
- Other drivers are also considered in the identification of feeder to underground
- For instance, road construction projects and the reliability of the area are taken into account. If a road construction project is scheduled in an area where feeders are amongst the worst performing it will make sense to coordinate the undergrounding project with the road infrastructure project.
- Coordination between infrastructure and reliability projects can minimize costs and disruption to the community.

Screening and Decision to Underground

Engineering Planning Process

- Obtain outage data and exclusive major storm history.
- Obtain construction drawings showing location and timeline for the additional Reliability Enhancement Plan (REP) work performed on the identified feeder.
- Overlay the outage history and the additional REP work onto a feeder map to determine if the past REP work would have mitigated the past outage.
- Conduct field evaluation, evaluate overall condition of the feeder and identify any special construction requirements.
- Determine OH portions of the feeder for potential conversion to underground.
- Determine which underground scenario to use and which section to be underground.
- Develop a conceptual plan for conversion of OH portions of the feeder to underground and upgrade plan annually.

Underground Planning and Design

Field Inspection and Engineering Design Process

- Perform detailed field inspection, identify scope of work and associated cost estimate.
- Conduct a constructability review meeting with construction and develop construction drawings.
- Apply for excavation/work permits. Applications take approximately 6 to 8 weeks to be approved and returned to Pepco.
- Hold information meetings with local government officials and local communities impacted by the upcoming construction.
- Bid project once excavation/work permit with work restrictions are obtained.
- Select contractor and start construction.

Undergrounding Communication Lines

- The decision to underground communication lines should be driven strictly by aesthetics.
- While, the District Government may determine that undergrounding communication lines makes sense as part of a beautification and economic development effort, it is worth noting that there is no reliability improvement associated with undergrounding communication lines.

Feeder Improvement Analysis (Example for All Weather Conditions)

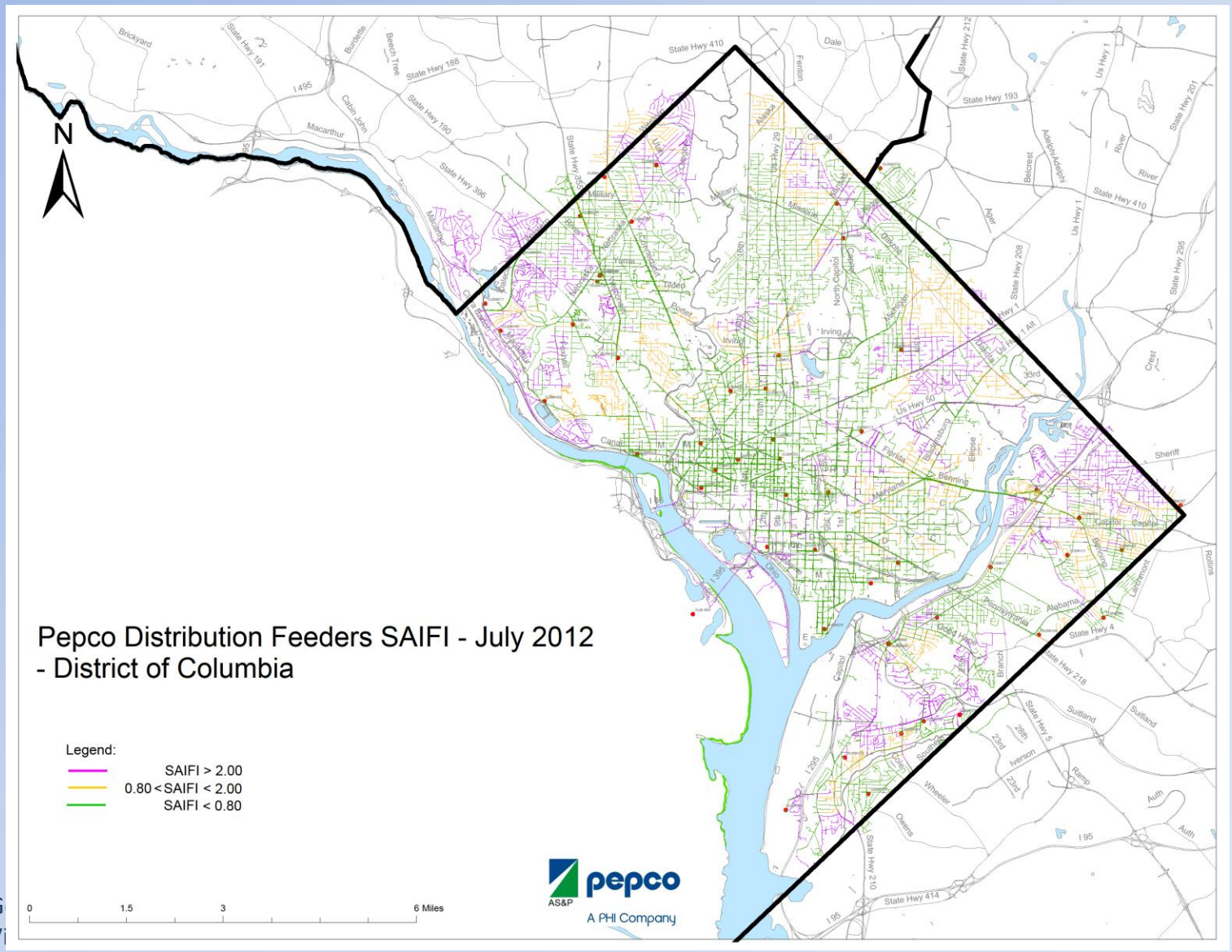
		Demographics		Construction Costs	Percent Reliability Improvement					
	Cost and reliability scenario	Feeder Number	Region	Total	% improvement OH outages - Number	% improvement OH outages - Frequency	% improvement OH outages - Duration	% improvement all outages - Number	% improvement all outages - Frequency	% improvement all outages - Duration
1	Underground primary main line, leave main line transformers, secondary, services, and laterals overhead. All main line overhead outages removed under all weather conditions.	1	DC	$21,182,492	8%	29%	4%	6%	25%	4%
2	Underground primary laterals, secondary, and services. Leave primary main line, transformers, secondary, and services overhead. All lateral overhead outages removed under all weather conditions.	1	DC	$23,600,417	92%	71%	96%	78%	62%	94%
3	Underground primary main line, laterals, and transformers. Leave all secondary and services overhead. All primary overhead outages removed under all weather conditions.	1	DC	$29,228,541	70%	99%	100%	59%	86%	98%
4	Underground main line primary, laterals, secondary, and services. All overhead outages removed under all weather conditions. Reliability improvement measured as a % of overhead outages.	1	DC	$42,551,292	100%	100%	100%	84%	87%	98%

Summary of Overall Process

1. Rank/Select feeders for consideration based on past reliability performance and coordination with other construction projects.
2. Evaluate other reliability improvement work either recently completed or planned and determine the impact on each feeder under consideration.
3. Decision made to underground selected feeder and/or portion of each feeder.
4. Develop cost estimates and timelines for construction.
5. Develop a multi-year plan, review and updated it annually.
6. Obtain permits and coordinate with local communities.
7. Perform construction.

Appendix

District of Columbia Feeder SAIFI



District of Columbia's Electric System

Number of Substations	UG feed	OH feed	Total
Distribution	36	15	51
Transmission	7	0	7
Total	43	15	58

Circuit Miles	UG	OH	Total
Primary (4 and 13kV class)	1,699 miles (72%)	645 miles (28%)	2,344 miles
Secondary (120/240, 120/208)	937 miles (54%)	788 miles (46%)	1,725 miles
Totals	2,636 miles (65%)	1,433 miles (35%)	4,069 miles

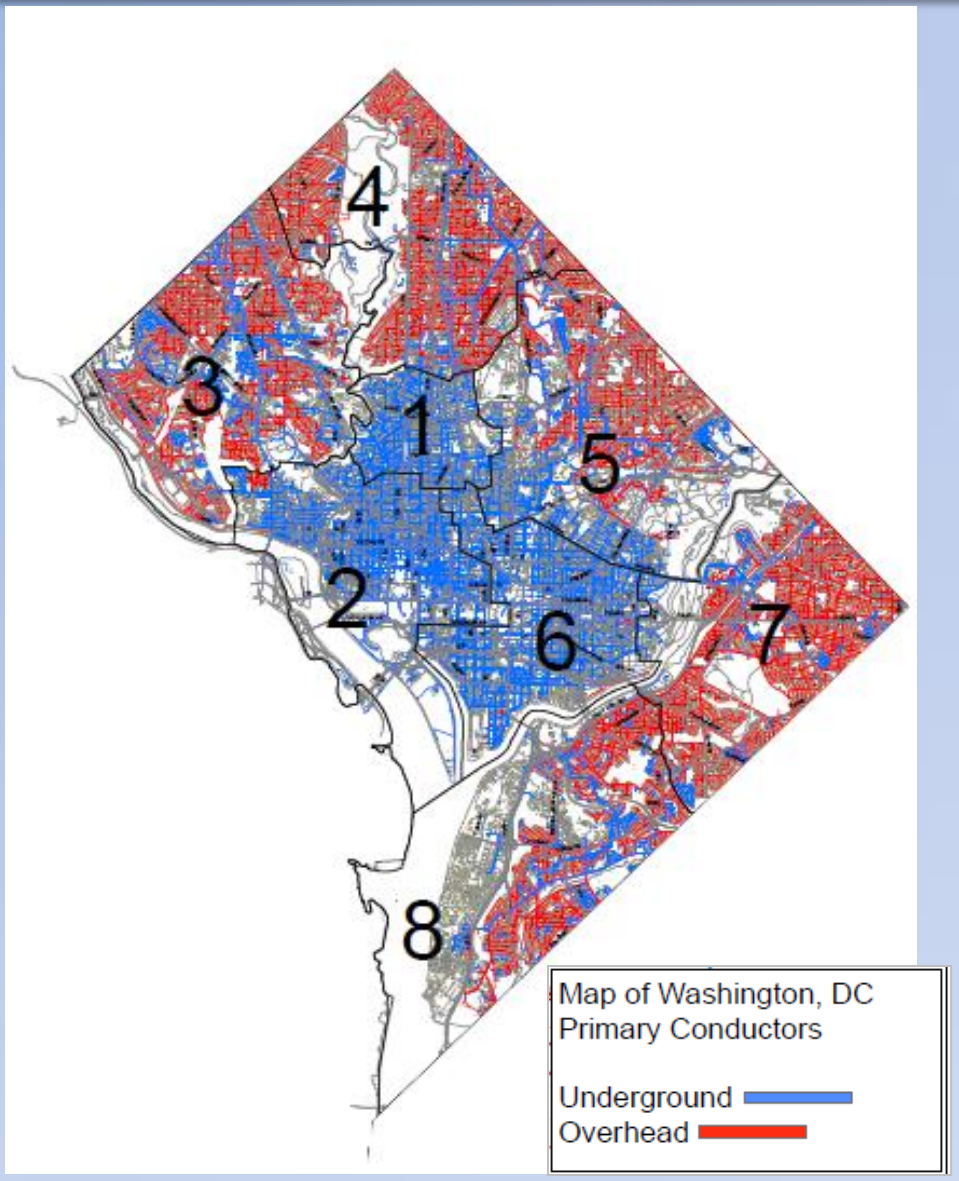
Customers by feeder	4kV	13kV	Total	% of Total
>=85% Overhead	27,742	28,495	56,237	22%
100% Underground	10,168	104,964	115,132	35%
Mixed	10,008	75,048	85,056	43%
Total	47,918	208,507	256,425	100%

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

The Reliability Enhancement Plan (REP) Initiatives

The REP includes the following increments, it is a dynamic plan and will continue to be updated as necessary and as results demonstrate effectiveness of the mitigations executed

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



Pepco DC System

- 1,433 miles of overhead lines (35%)
- 2,636 miles of underground lines (65%)
- 60% of customers are served by underground service
- 40% of customers are served by overhead service

Customers by Feeder

- 35% of customers are on 100% underground feeders
- 22% of customers are on feeders that are >= 85% underground
- 43% of customers are on mixed feeders