Staff Review of Delmarva Power & Light's 2013-2017 Infrastructure Investment Plans

Docket No. 13-152 Reliability Investigation

This review addresses Staff's conclusions and recommendations regarding Delmarva Power & Light Company's plans to invest $397 million in infrastructure investment over the next five years, as reported in the Testimony of Michael W. Maxwell in PSC Docket 13-115. It includes an independent review by Silverpoint Consulting, LLC, hired by Staff to assess the need for the proposed reliability investments.

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STAFF CONCLUSIONS & RECOMMENDATIONS[1]

- Given Delmarva's current reliability performance, its proposed infrastructure investment of $397 million[2] over the next five (5) years appears to be excessive and premature.

- The Commission should re-open Regulation Docket 50 ("Docket 50") service quality regulations for review and update. Such review and update should include at a minimum:
    - Appropriate reliability metrics
    - Revisions to the reliability planning process
    - Incorporation of a public review process
    - Addition of resiliency planning
    - Elimination or modification of unnecessary regulations.

- Until such time as a collaborative review process is undertaken and completed, Delmarva's reliability related capital additions should be limited. The Commission should be clear that investment beyond the recommended cap suggested by Silverpoint in its report may not be recovered from ratepayers until sufficient benefits have been demonstrated.

- The Commission approve a public review of Delmarva's most recent reliability plan as filed with the Commission on March 31, 2014, with a report back to the Commission on that public review due no later than September 2014.

- The Commission instruct Delmarva that all planned reliability projects are required to incorporate reasonable justifications and tangible identified benefits for ratepayers before being submitted in any future planning scenarios.

- Delmarva consider updating its depreciation study and/or determine an approach that will provide updated information on the age of all distribution plant serving customers.

- Delmarva consider re-categorizing and reporting its proposed infrastructure investment to include:
    - New Customer Service
    - Load Transfer and System Continuity Requirements
    - Short-term Sustaining Reliability

[1] On April 30, 2014 Exelon Corp's announced that it was acquiring Pepco Holdings Inc., the parent of Potomac Electric Power Company ("Pepco"), Delmarva Power & Light ('Delmarva") and Atlantic City Electric. Since the specific terms of the proposed merger are not yet available, this report does not take into account the potential changes that the announcement may have on levels of investment in Delaware or the effects on customers' rates. Some conclusions and recommendations contained in this report may change based on this new event. Staff will update this report as new information related to the merger becomes available.

[2] Staff selected Silverpoint Consulting, LLC to help in this investigation. Silverpoint's report excludes "Customer" driven capital and "Load" capital from the $397 Million and focuses on $326 Million in "Reliability" capital spending.

- Grid Modernization
- Long-term Sustaining Reliability/Resiliency

STAFF REVIEW PROCESS

Background

On March 22, 2013, Delmarva Power and Light Company ("Delmarva" or "the Company") filed an application with the Delaware Public Service Commission ("the Commission") seeking an increase in electric base rates. The total revenue increase requested by Delmarva in this matter was $42,044,000 or 23.8% over existing retail distribution rates. In addition, Delmarva stated that it intended to invest approximately $397 million in its distribution system over the next five years to replace infrastructure and enhance and maintain system reliability.[3]

As part of its application in PSC Docket No. 13-115, Delmarva proposed to include reliability investments that it planned to make through the end of 2013 including investments that it said would maintain and enhance reliability. The Company asserted that enhanced reliability benefits its customers and is needed given the digital economy in which we live.[4] The Company pointed out that improved reliability can reduce the number and duration of outages that customers experience. Delmarva also pointed out that better electric reliability has a positive economic impact on the State as companies locate or seek to locate in Delaware, including financial institutions that require highly reliable electric service.

Delmarva's filing, and the extent of its planned infrastructure investment, raised concerns over the need for such a high level of investment and the impact such investment might have on future rates. On April 16, 2013, the Staff of the Commission ("Staff") filed a Motion requesting the Commission to open an investigation to examine Delmarva's proposed expenditures for reliability improvements over the course of the next several years, intended to maintain adequate and reliable service. On May 7, 2013, the Commission considered the Motion and entered Order No. 8363 opening PSC Docket No. 13-152 to investigate, among other things, Delmarva's proposed distribution infrastructure and reliability investments going forward for a period of up to five years to determine if such investment is consistent with Delmarva customers' reliability needs and the ability of those customers to pay for such investment.

Investigation

As an initial part of the investigation, Staff issued a Request for Proposals on May 22, 2013 seeking consulting assistance on the proposed levels of investment in both the docketed rate case and the Staff investigation. Staff retained the services of Silverpoint Consulting LLC to provide testimony in the rate proceeding and to review Delmarva's planned level of infrastructure investment. Silverpoint and Staff met with Delmarva personnel on several occasions to discuss and discover how the Company operates, maintains, and evaluates its electric distribution system as well as how it determines what, when, where, why, and how it invests in infrastructure. Discovery documents and data that were used by the Company to report on its system performance were also reviewed. Joint meetings and follow-up data

[3] Docket No. 13-115, Prefiled Direct Testimony of Michael W. Maxwell, page 5, line 6.
[4] Docket No. 13-115, Application Summary, page 3, paragraph 5.

requests were also used to gain insight into the age and condition of the Company's infrastructure (poles, wire, transformers, etc.) as well as to ascertain how different levels of investment might affect the Company's overall reliability.

Silverpoint Approach

Early in the process, Silverpoint, Staff and Delmarva agreed to a less formal approach for this investigation. Since Silverpoint could utilize material previously provided by Delmarva as part of the discovery process in the rate case, it agreed to forgo written discovery requests in this docket. Silverpoint and Staff subsequently requested several informal, yet structured, day-long working sessions with Company personnel and provided detailed agendas beforehand to ensure that the appropriate Delmarva personnel would be present at each meeting.

In the first full working session, Silverpoint met with Delmarva operations, restoration, and asset management personnel. The objective for this meeting was to learn more about the characteristics of each of Delmarva's electric distribution processes—planning, design, construction, operations, and maintenance—and how they varied across Delmarva's service areas within the state. During this time, Staff and the Silverpoint team became more familiar with the system, reviewing geographically oriented maps and diagrams of typical distribution circuits. They also examined historical outage cause data in order to better understand system vulnerabilities. They discussed planning and design criteria with the Company, its transmission and distribution studies, and standards and requirements for system maintenance, including vegetation management. Silverpoint also discussed the Company's approach to asset management and the criteria for determining the timing of replacements for overhead, underground, and substation system components.

Silverpoint analyzed information about Delmarva's prior reliability-related capital projects as well as those it proposed in its five-year plan. Silverpoint grouped projects into categories of similar work *(e.g.*, feeder work, pole replacement, automation) in order to better understand the Company's pattern of past spending. At the second working session, Silverpoint and Staff reviewed this analysis with Company personnel knowledgeable about reliability-related capital projects as well as system reliability and outage analysis. The primary objective for this meeting was to better understand distribution system projects from the 2007 to 2012 period, such as how they were selected and whether they were designed to maintain the current level of reliability or to enhance it. The results of this meeting helped to inform Silverpoint's historical trend analysis.

In the next step of the evaluation, Silverpoint assessed whether past and future capital projects were aimed at (a) sustaining current levels of reliability over the short term, (b) improving reported reliability performance and metrics, (c) modernizing the system, or (d) helping to sustain system reliability over the longer term through, for example, replacement of aging infrastructure. At the third working session, Staff and Silverpoint explored the Company's rationale for future spending levels and reviewed the data and engineering analyses it offered to support them. The results of this meeting helped to define spending priorities and to develop a reasonable estimate of baseline capital spending needed to maintain an appropriate level of reliability. After establishing historic baselines, Silverpoint developed its preliminary

recommendations and requested that Delmarva prepare two alternative five-year capital plans, one assuming a reasonable target SAIDI of 175 and a second with target of 200. Silverpoint and Staff considered the resulting Company scenarios, but the impacts on capital plans were nominal and ultimately had no effect on final conclusions and recommendations.

During the reliability review, Staff independently reviewed materials gathered from the Delmarva rate case discovery process. Included were requests for current and anticipated reliability indices,[5] the impacts of various levels of investment on customer reliability and the rate impacts related to various levels of investment.[6] While the Company was able to document reliability indices through 2012, it indicated it had not made any forecasts with respect to reliability indices. Regarding the impact of investment on revenue requirements, the Company objected to Staff inquiries as requiring the Company to conduct calculations for the benefit of Staff and its consultants. The Company concluded that responding to a staff discovery request with a hypothetical nominal 20% carrying charge was not relevant to the docket.[7]

As an additional part of its investigation and to attempt further analysis of Delmarva's need for added infrastructure investment, Staff reviewed Delmarva's FERC Form 1 and latest 2004 depreciation study. Silverpoint and Staff requested age-related data on Delmarva's electric plant-in-service. Although Delmarva provided age-related data concerning breakers, distribution substation switchgear, distribution substation transformers, and poles, Delmarva's age-related data concerning its distribution system as a whole was limited to the 2004 depreciation study.

Public Discussion Forums

Staff and Delmarva conducted public discussion forums in all three counties in Delaware. The format of the forums included initial presentations by Staff and Delmarva with open questions or discussion following the presentations. The first forum was held in Dover at the Commission Office. The majority of the people that spoke were electrical contractors that may have worked for Delmarva. Mr. Geoffrey Kempter of Asplundh Tree Expert Company spoke about the importance of vegetation management. Mr. George Giles, one of four local emergency managers for the State of Delaware Emergency Management Agency and Mr. Patrick Delaney, CEO of the American Red Cross also spoke.[8] There were no residential participants. Everyone at the forum was in favor of Delmarva continuing to provide reliable service. Some of the participants indicated that maintenance of the system needed to continue at appropriate levels. Staff noted that the focus of the investigation was not directed to maintenance activities and expenditures; however, Staff also noted that infrastructure investment does affect the Company's maintenance costs.

At the second discussion forum, held in Sussex County, several people spoke including Mr. John Walsh, a representative of AARP. The discussion focused on the hardship increasing rates are placing on some residents and the need for better communication about what Delmarva is doing and how it will impact customers. The third discussion session was held in New Castle

[5] Docket 13-115, PSC Staff Discovery, PSC-CP-1 thru 7.
[6] Docket 13-115, PSC Staff Discovery, PSC-CP 11 thru 12.
[7] Docket 13-115, PSC Staff Discovery, PSC CP-11.
[8] Public Forum Transcript, September 26, 2013, pages 106,122 and 126.

County. There was a mixture of interests that participated in the discussion. Several residential customers expressed concern with ever increasing rates. Mr. Kleinschmidt, President of the New Castle Chamber of Commerce, speaking on behalf of business interests, suggested that businesses in the State need better reliability to compete with others given the current economic climate.[9] In addition, Representative John Kowalko expressed concern on behalf of his constituents about the increase in rates that they were continuing to experience.[10] Mr. George Giles, now appearing in his position as Chief of the Elsmere Fire Company, indicated how important electric reliability is to first responders during and after emergencies.[11]

As noted in the Silverpoint report,[12] Delmarva pointed out that its current reliability performance (SAIDI of 146) placed it in the middle of the third quartile compared to other utilities participating in a national survey.[13] During public forum presentations, Delmarva's management also emphasized that other utilities are, on average, improving their reliability performance by about 15% per year. Delmarva's reliability improvement plan, which was reportedly designed to keep pace with the industry, specifically targets three areas: grid resiliency, grid modernization, and aging infrastructure.

The Company also cited various third party reports that underscored the need for electric utilities nationwide to upgrade and modernize their grids.[14] These reports focused on the nation's electric and other infrastructure as a whole. None of these reports shed any light on Delmarva's energy distribution system. Delaware's regulatory oversight is primarily focused on distribution infrastructure, the poles, wires and transformers that serve customer's homes and businesses in Delaware. However, Delmarva presented no facts that its aging distribution infrastructure was driving its need for investment.

Staff also made a presentation at each of the public forums reviewing the pros and cons of increased investments in reliability. On the positive side, Staff pointed to potential reductions in the number and duration of outages, which would in turn reduce the inconvenience and economic losses by customers during those power outages. On the negative side, Staff presented Delmarva reliability information showing that Delmarva had improved its distribution reliability performance over the past three years by approximately 50% better than standard, with a SAIDI of 146 minutes. Staff further pointed out that Delmarva's planned investments to continue improving reliability will increase the average residential consumer's rates by $11.36 by 2017 and its plan proffered no means to determine whether the proposed investments would actually benefit customers.

[9] Public Forum Transcript, October 16, 2013, Page 302-303.
[10] Ibid, Page 252-260.
[11] Ibid, Page 260-263.
[12] Silverpoint Report, April 22, 2014, page 11.
[13] Institute of Electrical and Electronics Engineers (I.E.E.E.) Annual Reliability Survey; American Society of Civil Engineers, Economic Development Research Group, Inc. and LaCapra Associates, FAILURE TO ACT – The Economic Impact of Current Investment Trends in Electricity Infrastructure. 2011; and the Executive Office of the President, Economic Benefits of Increasing Electric Grid Resilience to Weather Outages, August 2013.
[14] Public Forum Transcript, October 16, 2013, Page 227, American Society of Civil Engineers, 2013 Report Card for America's Infrastructure, Executive Summary General statement on Energy.

Throughout the public sessions, both business and residential customers were mixing their concerns for "blue sky" reliability and "major storm" reliability. Blue sky reliability reflects the conditions that customers experience day in and day out during normal daily weather conditions. This is the reliability that is routinely reflected in the SAIDI and SAIFI performance measures. Major storm reliability is the restoration of service after a major weather event or power equipment failure. It is measured separately and is not included in the typical SAIDI/SAIFI performance measures. Distinguishing concerns between these two needs seemed to vary by customer class. While the general public seemed satisfied with current daily reliability, many business customers seemed to think higher reliability and shorter restoration periods would be beneficial.

To further complicate the investigation issues, Delmarva's Bryan Clark discussed how major storm outages can take weeks to rebuild or restore the system. Mr. Clark also cited a Joint DOE White House Report that noted the inflation adjusted cost of power outages associated with storms over the past 10 years has been between $18 and $33 billion.[15] Delmarva did point out that infrastructure investment can have a favorable impact on both blue sky reliability and system resiliency (the ability to withstand major storm or events). New investment can improve blue sky reliability and can also harden the system to withstand major storms and shorten outage times. For example, new poles and wires can certainly withstand major weather events better than older structures. However, it was also noted by several participants that improved maintenance programs such as vegetation management can have a significant impact on system resiliency and outage times. Increasing maintenance programs may increase expenses but will not increase Delmarva's earnings as they are a one for one recovery and do not increase rate base.

RELIABILITY AND PERFORMANCE

Reliability Standards

Blue sky or daily reliability is generally measured as the number of interruptions customers experience and the duration of those interruptions, excluding major events. Specific distribution performance indicators are used to measure the frequency and duration of these interruptions. Interruption durations of more than five minutes are normally classified as sustained interruptions and counted in the performance measures. Those lasting less than five minutes are classified as momentary and are typically excluded from reliability performance measures. Most reliability indices also exclude interruptions caused by major adverse weather events or unusual equipment failures that impact large numbers of customers.

The most commonly used performance indices are System Average Interruption Frequency Index ("SAIFI"), Customer Average Interruption Duration Index ("CAIDI"), System Average Interruption Duration Index ("SAIDI"), and Average Service Availability Index ("ASAI"). SAIFI represents the average frequency of sustained interruptions per customer

[15] Public Forum Discussion, Delmarva Presentation, Bryan Clark, October 16, 2013, Page 228.

during the reporting period. It is simply the ratio of customers interrupted divided by the total number of a utility's customers. CAIDI represents the average time in minutes required to restore service to those customers that experienced sustained interruptions during the reporting period. Although some distribution upgrades may affect the time it takes to restore service, CAIDI is primarily a metric that reflects the effectiveness of a utility's response operations over time, and as such may not be a good indicator of overall system performance and reliability. SAIDI represents the average duration of sustained interruptions per utility customer during the reporting period. It is essentially a ratio of the total outage time to all the utility's customers, even though not all customers experienced an outage. SAIDI is a composite of SAIFI and CAIDI and generally provides the best indication of a utility's overall performance. ASAI is the ratio of the total number of customer hours that service was available during a given time period to the total customer hours demanded. This is sometimes called the service reliability index.

Regulation Docket 50 Standards

The Commission's standards for electric reliability were promulgated in 2006 in Docket 50. Those regulations are now contained in 26 *Del. Admin. C.* §3007. The Standards require Delmarva to maintain its system such that the system-wide SAIDI does not exceed (is no worse than) 295 minutes per customer. Delmarva has continuously met and exceeded this requirement; in fact, it points out in its 2012 Annual Performance Report and its application in Docket No. 13-115 that in 2012 its SAIDI was 146 minutes per customer, which was 51% lower (better) than the Standard.

In accordance with the Standards, Delmarva excludes "Major Events" from its SAIDI calculation. "Major Event" is defined as an event consistent with then-current I.E.E.E.1366, Guide for Electric Power Distribution Reliability Indices standard. Thus, the objective, and the actual metric performance, excludes major outages that occur, in many instances, during large storms. Given this fact, reliability investments that improve the SAIDI metric may not always improve reliability or restoration times during storms. Since Delmarva has projects that improve the SAIDI metric and some that harden the system to withstand major storms, it is important that customers who are being asked to pay for the investments in reliability should be informed of what they are being asked to pay for and what they are getting for their payment.

There is no single standard that is used by most States for electric reliability; rather, States use a wide range of standards to evaluate electric distribution service quality. Attachment A to a report dated March 2, 2011 that Silverpoint and First Quartile Consulting prepared for the Maryland Public Service Commission discussed the diversity of approaches, benchmarks, and standards used by state commissions in their attempt to codify appropriate methods for evaluating electric system reliability. Simply put, the appendix clearly documents that there is no single answer to the question of what commissions and states believe is an appropriate level of reliability.[16] Given the diversity in approaches, standards, metrics, and definitions of excludable events, an accurate comparison of benchmark numbers across states or even utilities is not possible. Many factors influence the statistics that states use for setting reliability

[16] Maryland Public Service Commission, Case 9240, Evaluation of the Reliability and Quality of the Electric Distribution System of Potomac Electric Power Company, March 2, 2011, Appendix A, page 121.

standards. As an example, topography alone can affect the speed at which customers are restored and can drive customer expectations.

Appropriate Performance Level Metrics

The Delaware Legislature and Governor weighed in on the appropriate level of reliability when it enacted electric utility restructuring. 26 *Del. C.* §1002 (1) states that "[t]he reliability of electric service to all customers in this State shall be maintained. In response to that legislation, the Commission has set standards for reliability in support of the statutory requirement. 26 *Del. Admin. C.* §3007 sets the minimum system reliability measure for Delmarva at a SAIDI of 295 minutes, which at the time was the level of reliable service being provided to customers.

But the Commission's regulation goes much further than just setting a minimum SAIDI measure. It requires Delmarva to identify its reliability and quality of service performance objectives, to share its reliability and planning studies with Staff and to detail its annual performance, including its worst performing circuits. Staff's review of Delmarva's plans and projects has been relatively limited with no specific actions other than to monitor the reliability performance.

Delmarva Performance

Delmarva has pointed out that the SAIDI requirement is a minimum reliability level that it must maintain. In addition, Delmarva has produced graphs that show that 295 minute level, established in 2006, is now in the fourth quartile of a proxy of utilities it uses to evaluate its performance. Delmarva has been outperforming the Commission's requirement on a consistent basis and, until recently, was maintaining a system wide SAIDI of around 200 minutes with a trend toward ever improving metrics. And then in 2012 the Company's SAIDI index performance improved even further to 146 minutes. In comparison to other electric utilities in the Mid-Atlantic area, Delmarva's 2012 SAIDI places it comfortably within the third quartile of that proxy group.

In 2011, after Potomac Electric Power Company ("Pepco") (a sister company) was criticized by legislators and commissions in Maryland and the District of Columbia, the Company's parent launched a corporate wide program aimed at increasing its reliability across its footprint. The effort can be clearly seen in its investments in 2011 and 2012 where its Delaware SAIDI dropped to 146 minutes. That is less than half of the Commission's requirement contained in 26 *Del. Admin. C.* §3007. Staff agrees that improved reliability is good for customers; however, all parties must acknowledge and consider the cost as well as the benefit of increasing reliability as it relates to customers.

Mr. Michael W. Maxwell's pre-filed direct testimony in PSC Docket No. 13-115, indicated that over the next five years that the Company would invest $397,000,000 in

infrastructure.[17] According to Delmarva's calculation, an investment of $397 million, coupled with the recent increase approved by the Commission in PSC Docket 13-115, could result in an increase for a typical Delmarva customer using 1,000 Kilowatt-hours of approximately $8.98 per month by 2017.[18] In the response to data request PSC-CP-2 in PSC Docket No. 13-115, the Company provided graphs showing that it estimated a SAIDI of 142 minutes in 2016 based on that level of investment. However, as stated above, the Company achieved a system wide SAIDI of 146 minutes for 2012 and according to its 2013 Annual Performance Report filed as required by Regulation Docket 50, the Company achieved a SAIDI of 139 minutes in 2013. Although Staff acknowledges that there are, and will be, fluctuations in SAIDI, it appears that Delmarva is already achieving its enhanced reliability goals for 2016. Although the response does not indicate an estimate for SAIFI in 2017, Staff has to question if customers should have to pay an additional $8.89 per month ($108.00 per year) when the Company is already achieving the reliability goals it projected for 2016 now, before most of the additional infrastructure has been placed in service.

It should also be noted that the reliability investments that the Company is considering do not necessarily prevent or reduce the frequency of outages experienced by customers, nor do they necessarily help with storm-related outages. The Company claims that reliability is one of the biggest factors that affect customer satisfaction and Staff does not dispute this claim. However, the Company has not produced evidence that customers are dissatisfied with the current level of reliability they are receiving. No commenter at the public discussion forums suggested that they were receiving poor service quality. Staff notes that there were commercial representatives that indicated their constituents wanted reliable service and suggested that they would like higher reliability but they did not indicate that Delmarva was not currently providing reliable service. Without evidence that the majority, or even a significant percentage, of Delmarva's customers are requesting or requiring better reliability from their electric service, Staff finds it hard to support Delmarva's push for significantly higher investment in its infrastructure leading to a targeted SAIDI of 142.

During Staff and Silverpoint investigation discussions, the Company also indicated that its aging infrastructure and specifically a "baby boom" type bubble is coming and that bubble will require it to increase its replacement program over the next few years. Staff requested infrastructure age information; however, the Company was only able to produce the requested information for certain substation plant elements. Staff finds it hard to believe that the Company does not have age information for its infrastructure. Staff also notes that the Company has not performed a depreciation study for its infrastructure since 2004. Although depreciation rates are an accounting construct, and are not the focus of this investigation, Staff is concerned that the

[17] Michael W. Maxwell, Vice President Asset Management, PEPCO Holdings, Inc., Prefiled Direct Testimony, Page 5, Line 6.

[18] In a joint effort during the Investigation, Delmarva and Staff determined that an investment of $397 million, coupled with Delmarva's then current rate request of an additional $42M in PSC Docket No. 13-115, could result in an increase for a typical Delmarva customer using 1,000 Kilowatt-hours of approximately $14.00 per month by 2017, (that estimate assumed, however, that the Commission would approve Delmarva's entire Docket 13-115 increase request for $42 million). On April 1, 2 2014 the Commission considered and deliberated on the Company's current rate application in Docket 13-115, and approved in PSC Order No. 8549 a rate increase of $15,096,000. As a result of Order No. 8549, according to Delmarva's calculation, the prior $14/month estimated increase by 2017 should be revised downward to 8.98/month.

lack of a recent depreciation study in support of the current rates may result in significant cross-generational inequities.

Staff Reliability Recommendation

After review of reliability data, Silverpoint recommended that the Docket 50 minimum standard be revised to a SAIDI of 200 and a SAIFI of 1.6.[19] It further recommended that the Company comparison be based on a two (2) year average to account for some swings in the actual result from year to year. Staff recalls, that in 2004, when the Docket 50 rules were being developed, it suggested that the annual SAIDI standard be a somewhat higher level of performance and that it be compared to a three (3) year rolling average for assessing the Company's performance. The Company was extremely concerned with that approach and requested a more moderate minimum targeted level of reliability without averaging. Staff agrees with the Silverpoint recommendation that if a more realistic standard of performance is adopted, the Company should have some flexibility that includes averaging of annual performance.

Staff supports re-opening Docket 50 to reconsider the reliability performance standards. Staff agrees with Silverpoint that a SAIDI of 200 and SAIFI of 1.6 would be appropriate minimum performance targets, given today's environment and the need to have a good reliable electric distribution system for all classes of customers. Staff recommends the Commission re-open Docket 50 to consider this and possible other changes in a collaborative manner that may improve the Commission's oversight of Delmarva's reliability performance and reduce the level of reporting that may be excessive or no longer necessary.

SYSTEM RESILIENCY

In the public forums, Delmarva also referred to the need to enhance system resiliency as justification for increased investment. While reliability and resiliency terms are often referred to interchangeably, there are significant differences. Reliability, as measured by Docket 50 standards, refers to the availability of electric service during normal blue sky and minor storm events. Resiliency refers to the ability of the system to withstand large storms and natural disasters while continuing to provide service. Industry reports tend to define resiliency in three (3) distinct steps: prevention, recovery and survivability.[20] Prevention is supported by system design standards, construction guidelines and appropriate maintenance programs. Recovery is supported by rapid damage assessments and prompt deployment of repair resources. Survivability is supported by addressing the customer communication processes and the utility's approaches to maintaining critical services during major storms.

Invariably, distribution rebuilds provide both enhanced reliability and added resiliency, but each infrastructure investment should have a primary driver such as improved reliability or the need to better withstand storms and natural disasters. Based on the Silverpoint review and

[19] Silverpoint Report, Page 11.

[20] Electric Power Research Institute (EPRI), "Enhancing Distribution Resiliency," Opportunities for Applying Innovative Technologies, January 2013, pages 4-13.

Staff's understanding of Delmarva's investment approach, there appears to be no firm nexus between the project investments and the principal drivers of those projects. It's all for added reliability and distribution system resiliency.

State's Concerns

While reliability is important to all customers, resiliency is taking on new dimensions, with climate change and sea level rise resulting in more storms and the potential for natural disasters. On September 12, 2013, Delaware Governor Jack Markell issued Executive Order 41 creating the Governor's Committee on Climate and Resiliency (the "Committee"). The Committee has been charged with oversight on a plan to improve Delaware's preparedness for and resiliency to climate impacts. The Commission, as an agency responsible for maintaining quality utility services and effective responses to emergencies, needs to ensure that utility service plans include considerations for prevention, recovery and survivability. In the case of Delmarva's infrastructure investment, it is increasingly important that the dollars spent are buying useful benefits for consumers. Reliability improvements to the worst performing circuits and targeted rebuilds using improved construction standards to improve resiliency are appropriate and should be considered when they can be justified by appropriate customer benefits.

Staff Recommendation

It is important that all utilities in Delaware begin to assess the resiliency of their systems in the face of climate change and sea level rise. Infrastructure investment needs to go beyond just reliability planning with consideration for new, more resilient construction standards and replacement of facilities that may not be able to withstand natural disasters. Examples that have already taken place are the hardening of east coast transmission structures with steel poles and concrete caisson foundations. While this example is unrelated to distribution infrastructure, it highlights the opportunities for new distribution standards and should be reviewed. All utilities need to have longer range plans to ensure they can adapt to climate change issues.

With respect to Delmarva, Staff recommends that Delmarva incorporate climate change within its reliability planning process and that a long range plan for both reliability and resiliency be developed that identifies specific targeted projects that will sustain reliability performance and begin to address the facilities that may have greater exposure to natural disasters or storms related to climate change.

INFRASTRUCTURE INVESTMENT

The speed at which Delmarva is increasing its capital spending in Delaware appears to be linked to its affiliate Pepco's regulatory experiences in Maryland and D.C. As a result of the Maryland Public Service Commission's initiation of an investigation[21] into concerns about

[21] Maryland Public Service Commission, Case 9240.

Pepco's ability to provide and maintain reliable service for its Maryland customers, Pepco in August 2010 presented the elements of a Reliability Enhancement Plan (REP) that proposed to invest $250 million over five years for enhancement of system reliability in Maryland. Staff believes that Delmarva may be leveraging its affiliate's reliability problems in Maryland to accelerate reliability spending in Delaware, where it has had little to no reliability concerns.

Staff and Silverpoint's initial review was tied to the five-year capital spending plan that had been filed as part of the Delmarva rate case; however, as Silverpoint was reviewing Company material it became apparent that more complete and detailed project forecast information was available as capital plant additions.[22] As a result, Silverpoint concentrated its analysis on the forecasted reliability capital additions of $326.6 million as noted in the below table. There is an intrinsic relationship between capital spending and capital additions. In the life of a capital project, Delmarva accumulates the project expenditures for labor, material, transportation, benefits, etc. in what is called Construction Work in Progress ("CWIP"). For projects that take longer than a month or two to complete, Delmarva can also apply an interest charge. Once the project is complete, (which can vary in time from a few months to years) and placed in service, Delmarva transfers all the costs to Plant-in-Service. Capital spending ultimately makes its way to capital additions, but with timing and interest differences. Capital spending in the current year can typically become a capital addition later in that year or into the next year. It is all about the timing of the project completion. In reviewing the capital additions, Silverpoint was essentially reviewing the capital spending except for the timing and interest differences.

Delmarva Delaware Planned Five Year Capital Additions

$ Millions	**2013**	**2014**	**2015**	**2016**	**2017**	**Total**
Customer	$12.1	$11.9	$12.2	$12.6	$13.0	$61.7
Reliability	73.4	62.3	63.2	64.3	63.4	326.6
Load	4.8	6.1	4.3	4.5	7.4	27.2
Total	**$90.3**	**$80.3**	**$79.6**	**$81.4**	**$83.8**	**$415.5**

Silverpoint Recommendations

In its review of the planned capital additions Silverpoint further categorized Delmarva's reliability projects totaling $326.6 million into four (4) distinct classifications: 1) Short-term Sustaining, 2) Grid Modernization, 3) Metric Improvement, and 4) Long-term Sustaining. Silverpoint looked at the historical trends and provided suggested levels of capital additions that they thought were more appropriate to support and maintain the current level of reliability. While the initial Delmarva forecast was for $326.6 million for reliability improvements for 2013 through 2017, Silverpoint recommended a more moderate schedule of capital additions of $200 million. Their analysis recognized the importance of the Short-term Sustaining requirements, some of the Long-term Sustaining investments and some Grid Modernization. Conversely, capital investment to continue improving reliability metrics were felt to be unnecessary given the current performance of the Company in meeting existing SAIDI targets.

[22] Silverpoint Report, Page 14.

While Staff appreciates the recommendations of Silverpoint and feels they are much more in line with where Delmarva's capital investment should be, they are based on historical trends designed to maintain a recommended SAIDI of approximately 200 minutes, which may or may not be an appropriate performance standard.

Staff Infrastructure Findings

Silverpoint noted that there is little question that the electric industry as a whole is wrestling with aging infrastructure.[23] They further note that "[s]ignificant amounts of distribution utility assets in the industry are well beyond their depreciable lives" and utilities like Delmarva (and their customers) have thus far been able to benefit from the extended useful service from these assets.[24]

One of the requests to Delmarva during discussions was documentation as to the age of their current plant-in-service. During the formal discovery process in the base rate case and the more informal process in this docket, Silverpoint and Staff sought to obtain data from Delmarva on the age of its overall distribution system. With the exception of specific age information concerning substation switchgear, distribution transformers, breakers and poles, Delmarva was only able to provide its 2004 depreciation study. In order to gauge the age of Delmarva's infrastructure (at least on a high level), Staff compared the level of accumulated depreciation reserve to the level of gross plant of the distribution system for the period 2009 through 2013. Depreciation allocates the cost of a tangible asset over its useful life. For accounting purposes, book depreciation indicates how much of an asset's value has been used up. Accumulated depreciation reserve is the cumulative depreciation of an asset up to a single point in its life. An asset with a 10-year useful life and a zero salvage value would show a 50% ratio of accumulated depreciation reserved to gross plant halfway through its ten-year life. The following chart shows ratios of accumulated depreciation reserve to gross plant for both Delmarva and PEPCO.[25]

Delmarva Power & Pepco 10-K Information

[23] Ibid, Page 17.
[24] Ibid, Page 22.
[25] Delmarva Power & Pepco Annual 10-K Filings.

		Millions of $				
		EOY				
DPL		2009	2010	2011	2012	2013
Gross Distribution Plant		1430	1515	1580	1664	1788
Acc Depr Reserve		411	431	435	498	492
% ADR/GR Plnt		28.7%	28.4%	27.5%	29.9%	27.5%
PEPCO						
Gross Distribution Plant		4,386	4,541	4,661	4,949	5,287
Acc Depr Reserve		1,808	1,885	1,960	1,995	2,027
% ADR/GR Plnt		41.2%	41.5%	42.1%	40.3%	38.3%

Because the data in this analysis is taken from publicly available SEC forms, it is presumed to have inherent weaknesses. For example, DPL's values reflect both Delaware and Maryland plant, and the Gross Distribution Plant for both DPL and Pepco include non-depreciable assets such as land and contributions from customers.[26] However, it is apparent that the PEPCO distribution system is older than the Delmarva system and that the Delmarva system has significantly more than half of its remaining life left. If Delmarva's aging infrastructure is to be used as a basis of support for significant increases in spending, then the Company should provide more detailed information on the age of its system to support its assertion of an aging infrastructure. Otherwise, the Commission should disregard this justification for increased spending.

In an attempt to look further at the age of Delmarva's Delaware electric plant assets, Staff reviewed many of the discovery documents that were requested in the Delmarva rate case docket, starting with the last 2004 depreciation study conducted by AUS Consultants – Weber Fick & Wilson Division.[27] In reviewing the various distribution plant and depreciation balances, it appears that the age of Delmarva's electric plant varies from 14.9 years for Account 361, Structures and Improvements to 26.7 years for Account 366, Underground Conduit. The dollar weighted average of the distribution accounts age was calculated at approximately 16 years. Given that distribution plant routinely lasts for 35 to 40 years and longer, Delmarva plant in 2004 was relatively new with over half (at least 55%) of life remaining.

In the Delmarva rate case, the Attorney General's office, acting on behalf of the Public Advocate during the discovery process, asked for more recent specifics on Delmarva's Distribution Electric Plant and Depreciation Reserves. Delmarva's response to the AG's request was contained in its response to AG-GEN-4.[28] If one were to look at the historical ratios of reserve to plant, it becomes apparent that Delmarva's electric plant has continued to grow younger with substantial new investment. In 2007 the average age appeared to be 14 years

[26] For 2010 the depreciable gross plant for Delmarva was $1,507 rather than $1,515 total gross plant shown in the chart. Delmarva's ratio of accumulated depreciation reserve would have been 28.6% rather than 28.4% using depreciable gross plant only.

[27] PSC Docket 13-115, Discovery Request AG-GEN-4 with attached Delmarva Power & Light Depreciation Study pages 4-1 through 4-9, 2004, AUS Consultants Weber Fick & Wilson Division

[28] Ibid, Delmarva Discovery Request AG-GEN-4 Summary Response.

growing ever younger to 12 years old at the end of 2012. Given this data, it is difficult to see how Delmarva can claim the need to replace aging distribution infrastructure for reliability purposes.

Staff Infrastructure Recommendation

Staff understands that it is important for Delmarva to maintain customer service levels by maintaining the system, updating infrastructure investment as necessary, and undertaking new innovative approaches to modernizing the grid. Unfortunately, those efforts all require funds that ultimately translate into customer rates. Delmarva's customers, just like other Delaware citizens, have been hard hit with the most recent economic downturn. Considering ratepayer needs, Staff suggests that, Delmarva should: (1) look very hard at new capital investments before commencing improvement programs and (2) provide appropriate justification (customer metrics) or cost-benefit analysis for the anticipated expenditures. Without more clarity of purpose, Staff will continue to oppose rate recovery for Delmarva's infrastructure investments.

Without subscribing to the Silverpoint recommended fixed or capped level of investment,[29] Staff suggests the Commission take advantage of Regulation Docket 50, which requires Delmarva to provide Staff with a synopsis of their planned reliability efforts and capital projects designed to ensure a reliable system. Under the current rules, Delmarva is required to submit its reliability planning and studies report to the Commission for review by March 31 of each year. The Company recently made its annual filing. Since Staff is recommending re-opening of Docket 50 and suggesting a collaborative review process for all stakeholder input, it would seem to be a logical place to address Delmarva's infrastructure investment plans. In this manner, all parties would have opportunity to address aging infrastructure initiatives, reliability investments and targeted resiliency investment on an annual or longer basis and, most importantly, to assess the impacts that such investment may have on Delmarva's ratepayers.

CUSTOMER RATES

Delmarva's Anticipated Reliability Investment

Currently a typical residential customer using 1,000 kWh receives a total bill of approximately $141.23, of which only $39.01 (less than 30%) is actually related to distribution costs. As discussed above, Delmarva has stated that it intends to invest $397 million over the next 5 years on infrastructure (2013-17). This is in addition to the revenue increase that was granted to the Company in PSC Docket No. 13-115. The impact of these additional investments on the distribution portion of an average residential customer's bill could be considerable. Based on updated calculations performed after the Commission's ruling in Delmarva's recent rate case (Docket No. 13-115), Delmarva asserts that, assuming no changes to other variables, an average residential customer, using 1000 kilowatt-hours a month, could see an increase in the distribution portion of their bill of between 23% over the next five years. That's an additional $8.98 per

[29] Silverpoint Report, April 22, 2014, Page 23

month in 2017, or a potential $108 more per year on the average customer's bill in 2017.[30] This is in addition to the forecasted bill increases that can be expected from the General Assembly's mandated 2010 Renewable Energy Portfolio Standards legislation.

Comparison to Inflation

In comparison, the average consumer inflation rate over the past five (5) years (as measured by the Consumer Price Index) has only been between 2.0 and 2.5%. If that rate were to continue, and Delmarva were to make all of its proposed investments, Delmarva's future rate increases would be significantly higher than the historical average inflation rate for the next five year period.

PLANNING FOR RELIABILITY AND RESILIENCY

Re-opening Docket 50

Staff's investigation of Delmarva's planned infrastructure investment provides the Commission with an opportunity to create a review process in which Staff, the Public Advocate and various other parties may interact with Delmarva and perhaps reach a collaborative agreement on the investments that should be made to the system. Re-opening Docket 50 for review and update provides that opportunity, not only for setting appropriate metric measures, but also for reviewing planned reliability and resiliency investments. Fostering a collaborative review of the regulation and Delmarva's plans can certainly help clarify the benefits that customers receive for the various capital investments. The update may also identify specific requirements that are no longer beneficial or required.

Planning for System Resiliency

While current Docket 50 regulations do not require Delmarva to assess system resiliency, it may be even more important to include such requirements given current climate change issues. Certain distribution facilities that may be more exposed to natural disasters should perhaps be targeted for upgrades in a reasonable long-term timeframe. Planning for natural disasters needs to be included in the planning for system reliability.

Planning Limitations

While it is not Staff's suggestion that the Commission approve Delmarva's future infrastructure investment plans, it is suggested that Delmarva understand that capital investment

[30] *See also,* footnote 18, *supra.*

without sufficient justification may well be denied rate recovery in future periods. The opportunity to ensure that investment is appropriate and beneficial for Delaware ratepayers can be accomplished by a more formal review process related to overall reliability planning.

STAFF CONCLUSIONS & RECOMMENDATIONS

After reviewing the Silverpoint report and completing its own internal review, Staff requests the Commission consider the following conclusions and recommendations:

- Given Delmarva's current reliability performance, its proposed infrastructure investment of $397 million over the next five (5) years appears to be excessive and premature.

- The Commission should re-open Regulation Docket 50 ("Docket 50") service quality regulations for review and update. Such review and update should include at a minimum:
    - Appropriate reliability metrics
    - Revisions to the reliability planning process
    - Incorporation of a public review process
    - Addition of resiliency planning
    - Elimination or modification of unnecessary regulations.

- Until such time as a collaborative review process is undertaken and completed, Delmarva's reliability related capital additions should be limited. The Commission should be clear that investment beyond the recommended cap suggested by Silverpoint in its report may not be recovered from ratepayers until sufficient benefits have been demonstrated.

- The Commission approve a public review of Delmarva's most recent reliability plan as filed with the Commission on March 31, 2014, with a report back to the Commission on that public review due no later than September 2014.

- The Commission instruct Delmarva that all planned reliability projects are required to incorporate reasonable justifications and tangible identified benefits for ratepayers before being submitted in any future planning scenarios.

- Delmarva consider updating its depreciation study and/or determine an approach that will provide updated information on the age of all distribution plant serving customers.

- Delmarva consider re-categorizing and reporting its proposed infrastructure investment to include:
    - New Customer Service
    - Load Transfer and System Continuity Requirements
    - Short-term Sustaining Reliability
    - Grid Modernization
    - Long-term Sustaining Reliability/Resiliency

Staff Appendix 1 – Silverpoint Consulting LLC Report

Report to the Staff of the Delaware Public Service Commission Regarding the Appropriateness of Planned Infrastructure and Reliability-Related Investments by Delmarva Power & Light Company

Submitted By:

SILVERPOINT
CONSULTING LLC

April 22, 2014

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I. Executive Summary

A. Introduction

On March 22, 2013, Delmarva Power & Light Company (Delmarva or the Company) filed a new electric base rate case with the Delaware Public Service Commission (Commission) in Docket 13-115, requesting a $42 million rate increase. In its filing, the Company unveiled its proposed five-year, $397 million distribution system capital spending plan.

Delmarva Delaware
Five Year Capital Spending Plan[31]

$ Millions	**2013**	**2014**	**2015**	**2016**	**2017**	**Total**
Customer	$12.1	$11.9	$12.1	$12.6	$13.0	$61.7
Reliability	71.4	58.9	59.2	60.3	59.2	309.1
Load	4.43	6.1	4.2	4.5	7.4	26.6
Total	**$87.8**	**$76.9**	**$75.7**	**$77.4**	**$79.6**	**$397.4**

Delmarva intends to spend approximately $309 million of the planned spending on reliability-related initiatives, including grid modernization, improvements in distribution system reliability, and replacing aging infrastructure that Delmarva claims is nearing the end of its useful life.

Staff and the Division of the Public Advocate (DPA) were concerned that Delmarva was leveraging the reliability problems of its affiliate in Maryland, Potomac Electric Power Company (Pepco), to accelerate reliability spending in Delaware. Thus, on April 16, 2013, Staff filed a motion requesting the Commission to open an investigation to examine Delmarva's proposed expenditures for reliability improvements over the course of the next several years. While Staff did not oppose reasonable investments to maintain adequate and reliable service, it considered the Company's proposed investments to be excessive in light of current reliability standards. Given the significant rate impact of such a capital spending program, Staff also argued for public forums in which customers could specifically question the need for the large increase in reliability investments.

In Order No. 8363 dated May 7, 2013, the Commission granted Staff's motion and opened Docket 13-152 to investigate two issues: the appropriateness of Delmarva's planned distribution infrastructure and reliability investments, and the need for modifications to the Electric Service Reliability and Quality Standards (Standards) in Regulation Docket No. 50. The Commission stated that it would consider whether the existing reliability standards should be revised to include new or adjusted metrics to help measure reliability performance related to distribution infrastructure and reliability investments, and would further consider when and if such investment is consistent with Delmarva customers' reliability needs and the ability of those customers to pay for such investment. The Commission also ordered Delmarva to hold

[31] Direct Testimony of Michael Maxwell in Docket 13-115, p. 5.

public comment sessions in each county to receive comments from customers about service reliability and Delmarva's proposed infrastructure and reliability improvements.

Staff selected Silverpoint Consulting LLC (Silverpoint) to assist it in its investigation. Staff asked Silverpoint to:

- Analyze and evaluate Delmarva's current reliability performance;
- Assess the adequacy of current Delaware reliability standards and recommend changes, if needed;
- Analyze and evaluate Delmarva's past and planned distribution system infrastructure projects;
- Determine the appropriate level of reliability performance and the level of planned investment necessary to achieve that reliability; and
- Assist Staff in assessing the impact of the planned level of investments on Delmarva ratepayers.

B. Major Conclusions and Recommendations

In this section of the report, Silverpoint provides an overview of major conclusions and recommendations arising from its investigation.

Delmarva's five-year plan will have a significant impact on customers.

The Company projected that its $397 million distribution system capital spending plan would increase the typical residential customer's bill by approximately $11.34 per month, which represents 29% of the distribution-only bill and 8% of the total bill. Approximately 78% of Delmarva's proposed expenditures are devoted to reliability-related investments, so the impact of the reliability-related investments alone on a typical residential customer's bill would be approximately $8.85 per month.

Regulation Docket No. 50 Standards should be updated and revised.

In 2006, the Standards established Delmarva's "everyday" reliability standard at a maximum System Average Interruption Duration Index (SAIDI) of 295 minutes.[32] Since that time, the Company's performance has improved to such an extent that it is now outperforming the requirement by over 50 percent. Even so, the Company plans significant capital investments to improve its SAIDI performance still further.

Performance standards should send a clear signal to the utility about what its regulators consider to be adequate and reliable service; they should also serve as a framework for consideration of reliability-related capital investments. To that end, Silverpoint recommends that the Commission revise the yearly SAIDI maximum of 295 minutes to a maximum two-year average SAIDI of 200 minutes. A SAIDI standard of 200 will guarantee that ratepayers receive

[32] "Everyday" SAIDI reflects the system's reliability under both blue sky conditions and during minor storms, but excludes the effects of major outage events.

respectable reliability performance. It will also make clear that capital projects designed merely to reduce Delmarva's SAIDI metric are inconsistent with investment priorities the Commission has determined to be in the best interest of ratepayers.[33]

Reliability standards in most states include both duration and frequency measures. Silverpoint believes the current Standards should therefore be expanded at this time to include the System Average Interruption Frequency Index (SAIFI) metric. We recommend a maximum two-year average SAIFI of 1.60.

Delmarva's five-year plan mistakenly emphasizes short-term SAIDI improvements.
Delmarva's five year plan contains $87 million in feeder-related projects that target improvement beyond what is required under the current worst performing feeder program. Although these projects will offer some limited benefit in terms of system hardening, the Company acknowledges that its primary reason for pursuing them is to reduce its SAIDI metric.

Delmarva's discretionary capital spending should be focused on modernizing the grid and replacing aging infrastructure to ensure system reliability for the mid- to long term. From the customer's perspective, these objectives are much more important than short-term SAIDI improvements. It is important to remember that short-term reliability is heavily dependent on how well a distribution system has been maintained. As long as Delmarva's operations and maintenance (O&M) budgets include adequate amounts for system maintenance, including vegetation management, it will not have to expend significant capital in order to maintain its reliability performance.

Delmarva cannot justify the need for an accelerated aging infrastructure replacement program.
Delmarva's five year plan contains nearly $58 million in aging infrastructure replacement projects aimed at improving long-term system reliability. Most of these projects involve URD cable or substation components such as switchgear and breakers. Based on our review of the Company's asset data and engineering studies, Delmarva's aging asset problem is similar to most utilities and not one that requires extraordinary measures to address. It is important to remember that replacement of aging infrastructure is a long-term issue, which can be dealt with using a long-term approach that will help mitigate the impact on customer rates.

Delmarva's five-year reliability-related capital spending plan should be revised to better match the priorities and best interests of its customers.
The following chart compares Delmarva's proposed reliability-related capital additions in its five year plan with those recommended by Silverpoint based on its investigation.[34]

[33] Order No. 8363 implies that the Standards might be amended in order to indicate the level of investment consistent with Delmarva customers' reliability needs and the ability of those customers to pay for such investment. We believe that reliability standards by themselves cannot clearly delineate when and if particular capital investments are appropriate or cost-effective. We therefore recommend that such issues be dealt with in procedural dockets or as part of an ongoing collaborative process.

Five Year Total Reliability-related Capital Additions by Category

$ Millions	**Delmarva**	**Silverpoint**	**Difference**
Short-Term Sustaining	$148.3	$150.0	$(1.7)
Grid Modernization	33.8	20.0	13.8
Metric Improvement	86.9	0	86.9
Long-Term Sustaining	57.6	30.0	27.6
Total	**$326.6**	**$200.0**	**$126.6**

Silverpoint concurs with the Company's estimate of the amount of short-term sustaining capital needed to keep the system operational, which is approximately $30 million per year over the five-year period. We consider such spending to be non-discretionary and of the highest priority. However, none of the Company's $87 million in metric improvement projects are in the best interest of ratepayers at this time. Replacing aging infrastructure and investing in grid modernization are both in the ratepayers' best long-term interest, but we found no support for Delmarva's pace of spending on those programs. A more modest investment in these initiatives each year will adequately serve customers' needs. Silverpoint's recommended five-year capital budget of $200 million would reduce the impact on Delmarva's customer bills by nearly 50%.

[34] These figures are stated in terms of capital additions rather than capital expenditures.

II. Summary of Public Sessions and Silverpoint's Investigative Approach

A. Public Sessions

Delmarva held public comment sessions in Dover, Georgetown, and Wilmington over a three-week period in September and October 2013. During its formal presentations, the Company cited various industry reports that underscored the need for electric utilities nationwide to upgrade and modernize their grids.[35] Delmarva pointed out that its current reliability performance placed it in the third quartile compared to other utilities participating in a national survey.[36] Management also emphasized that other utilities are, on average, improving their reliability performance by about 15% per year. Delmarva's reliability improvement plan, which was reportedly designed to keep pace with the industry, specifically targets three areas: grid resiliency, grid modernization, and aging infrastructure.

Delmarva stated that its investments in grid resiliency would be aimed at improvements in (a) system hardening and outage prevention, which would make the electrical infrastructure better able to withstand stresses of storms, and (b) outage recovery, allowing Delmarva to more quickly restore service. Grid modernization would involve investments in automation, information, and communication technology to keep the distribution system current and provide value to customers. Its investments in replacing aging infrastructure would be aimed at preventing deterioration of its reliability performance over the mid- to long term. Delmarva stated that aging infrastructure is a critical issue, since equipment failure rates can increase as equipment nears the end of its useful life. It cited as symptoms of aging infrastructure (a) system design and/or equipment more than forty years old, (b) performance that is beginning to degrade, (c) above-average equipment failure rates, (d) high labor overtime due to unscheduled repair and restoration, and (e) major interruption events frequently coinciding with cascading outages.

According to the Company, its research indicated that more severe storms are becoming the "new normal," and that customers are concerned about maintaining reliability given increasing dependence on electricity in their everyday lives. Delmarva believed it had adequately balanced the need for future investments with the impact to its customers. The Company projected the impact of its planned capital investments of $397 million at approximately $11.34 per month for a typical residential customer, which represents 8% of the total bill and 29% of the distribution-only bill.[37]

Staff and Silverpoint attended the three Delmarva public forums and also made a presentation reviewing the pros and cons of increased investments in reliability. On the positive side, Staff pointed to potential reductions in the number and duration of outages, which would in turn

[35] For example, the Company cited the report by the American Society of Civil Engineers, "2013 Report Card for America's Infrastructure."
[36] Institute of Electrical and Electronics Engineers (I.E.E.E.) Annual Reliability Survey.
[37] Staff's estimate is similar to that of Delmarva.

reduce the inconvenience and economic losses by customers during those power outages. On the negative side, Staff presented Delmarva reliability information showing that the Company had improved its distribution reliability performance over the past three years to approximately 50% better than the Standard with a SAIDI of 146 minutes. Staff further pointed out that Delmarva's planned investments to continue improving reliability will increase the average residential consumer's rates by $11.36 by 2017, and that its plan proffered no means to determine whether the proposed investments would actually benefit customers.

Turnout for the three public sessions was relatively small. At the Dover session, those offering comments included contractors that work for Delmarva as well as representatives from emergency management and the business sector. All emphasized the importance of maintaining or improving system reliability. There were no comments from residential customers. At the Georgetown session, several attendees spoke, including a representative from AARP. Public comments at this meeting focused on the hardships imposed by increasing rates, and the need for better communication from Delmarva about how its initiatives will impact customers.

Overall, the residential customers who provided comments at the Wilmington session were generally satisfied with the current level of Delmarva's reliability, but felt that the current economic environment makes it difficult for them to pay for expensive system improvements. Some commenters emphasized that they did not want to see degradation in reliability or in the speed of restoration after major storm events. Others stated that they did not want to pay for reliability that benefitted others more than themselves, noting that the perceived benefit of avoiding an eight-hour outage for a residential customer is very low compared to that for a commercial or industrial customer.

At the Wilmington session, Representative Kowalko stated that his constituents were not in a position to absorb more costs given the current economic circumstances.[38] Several businesses emphasized their need for extremely reliable service and supported Delmarva's plans for improved reliability, but made no comment about cost. Mr. Mark Kleinschmidt, President of New Castle County Chamber of Commerce, was supportive of Delmarva's plans, stating that reliability is critical to individual business interests but even more so to the Delaware economy, which competes with other states.[39]

Throughout the public sessions, it appeared that both business and residential customers could not always distinguish between their concerns about "blue sky" reliability and "major storm" reliability. Blue sky reliability refers to the system dependability that customers experience during normal daily weather conditions or minor weather events, and which is reflected in typical SAIDI and SAIFI performance measures. Major storm reliability reflects resiliency, or the ability of the distribution system to withstand damage (*i.e.*, avoid customer outages) during

[38] Transcript, Public Comment Session, October 16, 2013, Page 257, Line 16-19.
[39] Ibid, Page 302-303, Lines 12-24, 1-14.

major weather events; it is measured separately and not reported in standard SAIDI and SAIFI performance measures.[40]

B. Silverpoint's Approach to the Investigation

Early in the process, Staff and Delmarva agreed to a less formal approach for this investigation. Since Silverpoint could utilize material previously provided by Delmarva as part of the discovery process in the rate case, it agreed to forgo written discovery requests in this docket. Silverpoint subsequently requested several informal, yet structured, day-long working sessions with Company personnel, and provided detailed agendas beforehand to ensure that the appropriate Delmarva personnel would be present at each meeting.

In the first full working session, Silverpoint met with Delmarva operations, restoration, and asset management personnel. The objective for this meeting was to learn more about the characteristics of each electric distribution process—planning, design, construction, operations, and maintenance—and how they varied across Delmarva's service areas within the state. During this time, the Silverpoint team became more familiar with the system, reviewing geographically-oriented maps and diagrams of typical distribution circuits. We also examined historical outage cause data in order to better understand system vulnerabilities. We discussed with the Company its planning and design criteria, its transmission and distribution studies, and its standards and requirements for system maintenance, including vegetation management. Silverpoint also discussed the Company's approach to asset management and its criteria for determining the timing of replacements for overhead, underground, and substation system components.

Silverpoint analyzed information about Delmarva's prior reliability-related capital projects as well as those it proposed in its five year plan. We grouped projects into categories of similar work *(e.g.*, feeder work, pole replacement, automation) in order to better understand the Company's pattern of past spending. At our second working session, we reviewed this analysis with Company personnel knowledgeable about reliability-related capital projects as well as system reliability and outage analysis. Our primary objective for this meeting was to better understand distribution system projects from the 2007 to 2012 period, such as how they were selected and whether they were designed to maintain the current level of reliability or to enhance it. The results of this meeting helped to inform our trend analysis.

In the next step of our evaluation, Silverpoint assessed whether past and future capital projects were aimed toward (a) sustaining current levels of reliability over the short term, (b) improving reported reliability metrics, (c) modernizing the system, or (d) helping to sustain system reliability over the longer term through, for example, replacement of aging infrastructure. At our third working session, we explored the Company's rationale for future spending levels and

[40] Delmarva pointed out in the public comment sessions that infrastructure investment can have a favorable impact on both blue sky reliability and system resiliency. New investment can improve blue sky reliability and can also harden the system to withstand major storms and shorten outage times.

reviewed the data and engineering analyses it offered to support them. The results of this meeting helped us to define spending priorities and to develop a reasonable estimate of baseline capital spending needed to maintain an appropriate level of reliability. After the team developed its preliminary recommendations, Silverpoint requested that Delmarva prepare two alternative five-year capital plans assuming a target SAIDI of 175 and 200, rather than its more aggressive target. We considered the Company's scenarios, but they ultimately had no effect on our final conclusions and recommendations.

In Section III of this report, we discuss in more detail our analysis of the existing Standards and Delmarva's current reliability performance; we also offer our recommendations regarding the appropriate level of reliability performance and the corresponding modifications to the Standards. In Section IV, we discuss our analysis of Delmarva's prior and proposed levels of reliability-related capital investments; we also present our recommendations regarding the level of investment necessary to achieve an appropriate level of reliability performance.

III. Reliability Standards and Performance

A. Current Reliability Standards and Delmarva's Recent Performance

The Standards set Delmarva's reliability standard at a maximum SAIDI of 295 minutes, exclusive of major event days. It is quite clear from Delmarva's performance, as measured by SAIDI as well as SAIFI, that it never had any difficulty satisfying that standard.

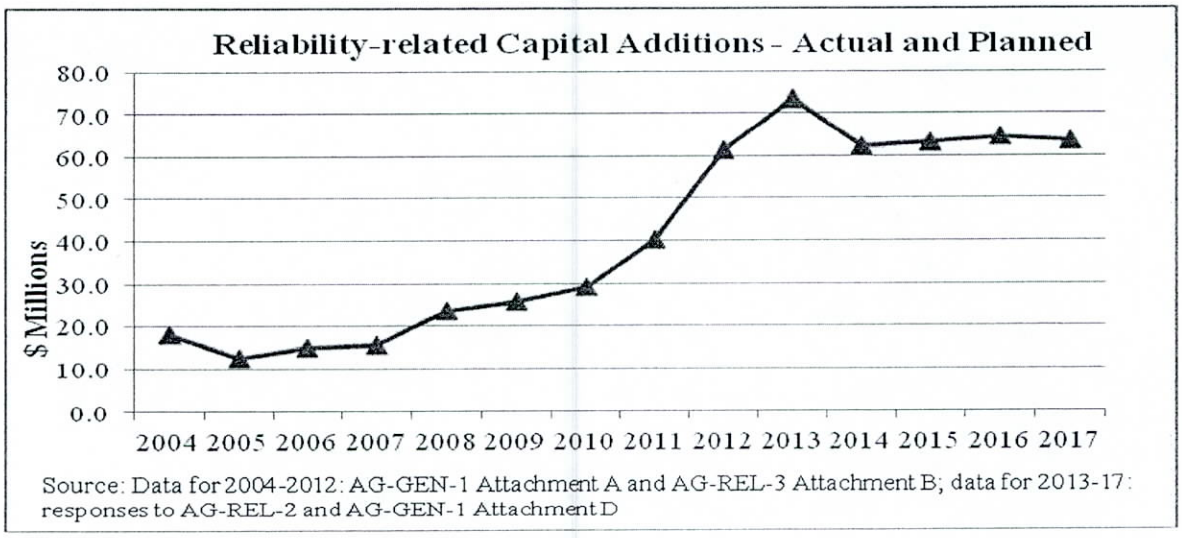
Delmarva Delaware Reliability Performance 2003-2012[41]

	SAIDI	SAIDI Standard	SAIFI
2003	237	-	2.87
2004	245	-	1.61
2005	169	-	1.51
2006	234	295	1.63
2007	197	295	1.60
2008	213	295	1.47
2009	190	295	1.35
2010	199	295	1.47
2011	192	295	1.41
2012	146	295	1.14

In fact, the Company's performance has been steadily improving to such an extent that by 2012 it was outperforming the SAIDI requirement by over 50 percent. Within four years of the Standards being in place, Delmarva more than doubled its pace of spending on reliability-related initiatives. That spending has recently become a runaway train, as Delmarva again doubled its spending despite having far surpassed the SAIDI standard.[42]

[41] Data from Delmarva Delaware Capital Distribution Construction Plan 2014-2018, dated December 18, 2013.

[42] Under the Company's Reliability Enhancement Plans, it expects to invest equal amounts in supplemental reliability projects over the 2013 to 2017 period, approximately $170 million, in both Maryland and Delaware, despite vastly different standards and requirements for improvement. [Docket No. 13-115, Vavro Direct Testimony, p. 8.]



Performance standards should clearly signal what a commission considers to be adequate and reliable service. They should also serve as a framework for regulators and utilities to ultimately arrive at the level and type of infrastructure investment necessary to maintain that level of service. The current Standards do neither.

The Standards may have originally been adequate, but regulatory paradigms have been changing in recent years. The language in §1.3 of the Standards reflects the then-common concern among regulators about underspending, noting that compliance "does not create a presumption of safe, adequate and proper service," and that "nothing in this regulation relieves any utility from the requirement to furnish safe, adequate and proper service." Clearly, this was a warning to utilities not to merely squeak by the standard nor shirk their responsibility to ensure systems are properly maintained.

We have in a sense fallen through the looking glass—utilities such as Delmarva now look for opportunities to spend money on capital projects, when in the past they made excuses to *not* spend it. For at least two decades, commissions were concerned with ensuring that utilities did not neglect their regulated businesses. Utilities had a tendency to underinvest in the distribution system, which was typically lowest in priority when corporate capital was limited. Many utilities now want to grow their distribution system rate base as a means to boost earnings. This turnabout in attitude was evident in Delmarva's arguments in the rate case, as it argued for unfettered discretion to expand rate base at will and set its own reliability goals.

B. Recommended Changes to Reliability Standards

Specific revisions to the Standards are necessary to better convey the Commission's expectations about Delmarva's reliability performance. In setting thresholds for performance metrics, regulators should remain sensitive to customers' ability to pay to maintain such performance. It is unrealistic, however, to expect that reliability standards in and of themselves can clearly delineate if and when a particular level of capital investment is appropriate or

whether customers can afford it. The answers to those questions are never static, and should be dealt with in procedural dockets or as part of an ongoing collaborative process such as the one we discuss in more detail in the next section.

Given where Delmarva is today, a SAIDI of 146, the existing SAIDI maximum standard of 295 minutes is no longer relevant.[43] A good portion of the capital that Delmarva spent to achieve its current level of performance has already been added to plant in service and customers are, or will soon be, paying for it in rates.[44] Customers should therefore receive a concrete benefit from those investments through higher guarantees of reliability performance. The question is, to what level?

During its investigation, Silverpoint considered two alternative maximum SAIDI standards – 175 minutes and 200 minutes – and a good argument for setting a new standard at either level can be made. We believe Delmarva can comfortably comply with a maximum of either 200 minutes or 175 minutes without any new capital investment specifically aimed at lowering SAIDI (*e.g.*, feeder reliability improvement projects) over the next five to seven years.[45] Regardless of which level is in place, we would not expect much if any erosion in the Company's current SAIDI performance in the near future.

We believe that adopting a maximum SAIDI of 200 minutes is more appropriate at this time. It sends a clear signal that the Commission does not support the spending surge unilaterally undertaken by Delmarva in 2011 to drive down its SAIDI level. Revising the Standards to reflect a SAIDI maximum of 200 also underscores the fact that neither the Commission nor ratepayers were unhappy with Delmarva's reliability in the 2009 to 2011 period, when the Company was performing at that level. It should be made explicit to the Company that there never was a mandate for Delmarva to march towards the SAIDI levels in place today.

This does not mean that Delmarva should specifically target an erosion of its current SAIDI level of performance to more closely mirror a revised standard. However, it is important to allow room for that performance to degrade temporarily, if necessary, in order to stay the course with any agreed-upon plan for distribution system infrastructure investments over the next several years. In a similar vein, the new SAIDI standard should be based on a two-year average. That way, the Company will not have grounds to argue for the need to maintain a sufficiently-large cushion in any given year, as there would be ample time for any necessary course correction. It is also important to provide Delmarva with some certainty that these standards will not suddenly change, so that it can concentrate on infrastructure priorities that the Commission ultimately supports. We therefore suggest that the Standards explicitly state that

[43] In our recent discussions with Delmarva personnel, they indicated that the Company expects its 2013 year-end SAIDI to be the same as 2012.

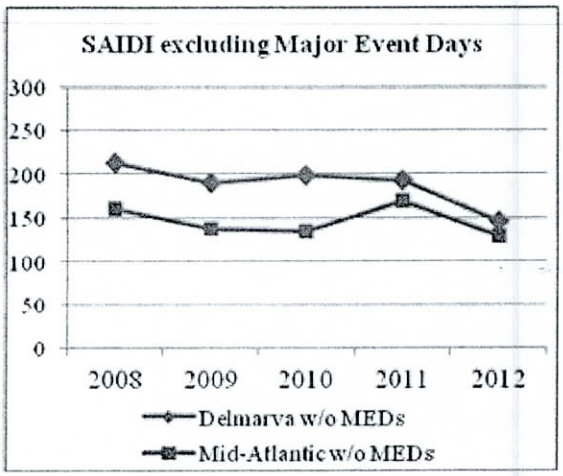
[44] For example, Delmarva had nearly $40 million in plant additions in 2011 and 2012 under its Reliability Enhancement Plan. [Docket No. 13-115, Vavro Direct Testimony, p. 9.]

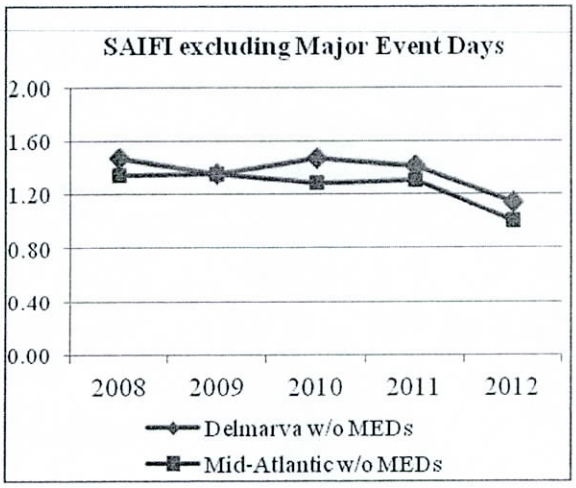
[45] We recognize the need for some level of spending to meet the requirements of the worst performing feeder program, but consider this amount part of yearly sustaining capital.

the revisions will remain in place until at least the year 2020, at which time they could be re-examined and either extended or further adjusted.[46]

Reliability standards in most other states typically reflect both duration and frequency measures, and we consider it appropriate to add a frequency index, specifically SAIFI, in the revised Standards. We believe a maximum two-year average SAIFI of 1.60 would be consistent with the Company's performance in the 2009 to 2011 period while allowing some room for variations that could occur as the Company's infrastructure investment priorities change.

Delmarva's current reliability performance, along with any revised Standards, has to be viewed in the proper perspective. The Company has emphasized that its current performance, when compared to a surveyed national panel of utilities, falls in the middle of the third quartile.[47] Comparing its performance to a subset of that panel, specifically utilities located in the Mid-Atlantic region, is actually more meaningful. The following charts, developed using data that Delmarva provided, illustrate the Company's SAIDI and SAIFI levels compared to median performance by a panel of Mid-Atlantic utilities.[48]





As the charts highlight, Delmarva is currently in the middle of the pack in terms of both SAIDI and SAIFI, performing on a par with the median utility in the Mid-Atlantic group. The Company has also stressed that the current SAIDI standard maximum of 295 minutes translates into fourth quartile performance (as would a SAIDI maximum of 200 minutes) when viewed nationally. We do not have access to raw survey data, but surmise that from a Mid-Atlantic utility perspective, the revised Standards would represent respectable performance.

[46] This is similar to the treatment in Maryland, where SAIFI and SAIDI benchmarks continue to ratchet downwards until 2015, where they will remain unless changed by regulators.
[47] Delmarva cited the 2012 I.E.E.E. Annual Reliability Survey in its Post-Hearing Opening Brief in Docket 13-115.
[48] Data provided by Delmarva in its responses to PSC-CP-6 and PSC-REL-23; these data correspond to the Mid-Atlantic utilities included in the I.E.E.E survey.

The Commission and Delmarva should make ratepayers aware that the revised Standards are being designed as a backstop measure to ensure that the utility continues to provide a respectable level of reliability while at the same time allowing it some leeway as it embarks on a program of more sizable infrastructure investments over the next several years. Rather than setting more aggressive reliability targets, customers will benefit more from a focus on programs (*e.g.*, grid modernization and replacement of aging infrastructure) aimed at preserving reliability levels for the longer term rather than on short-term improvements.

Furthermore, performance standards should not be static, but rather should be reviewed periodically for continued relevance and usefulness. It may be beneficial to expand the metrics to include those that are more customer-focused, but for now we believe the SAIDI and SAIFI measures are adequate.

We do not recommend including a Customer Average Interruption Duration Index (CAIDI) metric at this time. As illustrated in the chart below, Delmarva's CAIDI performance is currently in line with that of a median Mid-Atlantic utility. CAIDI is derived from other measures, and in and of itself is not necessarily useful for infrastructure investment decision-making.[49]

Trends in CAIDI Performance

	Delmarva Delaware			Mid Atlantic Median		
	SAIDI	**SAIFI**	**CAIDI**	**SAIDI**	**SAIFI**	**CAIDI**
2007	197	1.60	123			
2008	213	1.47	145	160	1.34	119
2009	190	1.35	141	138	1.35	102
2010	199	1.47	135	134	1.28	105
2011	192	1.41	136	169	1.30	130
2012	146	1.14	128	129	1.00	129

Focusing on CAIDI at this time may in fact be counterproductive, potentially creating confusion or conflicting priorities. For example, during a period in which a utility is making significant investments in distribution automation, CAIDI would tend to increase. On one hand, by automating a switch, a utility could eliminate an outage that would otherwise require it to dispatch a crew to manually reset in the field (thereby improving SAIFI). On the other hand, such outages tend to be relatively short, and eliminating a significant number of them could increase average outage duration for the remaining customers that experience them. Until the parties more fully understand the effect of certain investment priorities on measures like CAIDI, it is premature to set a definite standard.

[49] CAIDI is less an indicator of system reliability than one of restoration efficiency. It is a useful tool for evaluating the response to actual outages by operations personnel.

In summary, we believe that revising the current Standards to reflect a maximum two-year average SAIDI of 200 minutes and a maximum two-year average SAIFI of 1.60, to remain unchanged for at least the next five years, is a necessary part of establishing the framework and context for the infrastructure investment decision-making we discuss next.

IV. Distribution System Reliability-Related Infrastructure Investment

A. Analysis of Historic and Planned Reliability-Related Capital Projects

In Docket No. 13-115, Delmarva introduced a five-year distribution capital spending plan for the years 2013 to 2017, which is summarized in the table below.[50]

Delmarva Delaware Five-Year Capital Spending Plan

$ Millions	2013	2014	2015	2016	2017	Total
Customer	$12.1	$11.9	$12.1	$12.6	$13.0	$61.7
Reliability	71.4	58.9	59.2	60.3	59.2	309.1
Load	4.43	6.1	4.2	4.5	7.4	26.6
Total	**$87.8**	**$76.9**	**$75.7**	**$77.4**	**$79.6**	**$397.4**

The Company categorizes capital projects as being driven by customers, load, or reliability. Customer-driven capital projects are those required by customers (*e.g.*, new connections) or by government agencies (*e.g.*, relocating plant for highway construction). Load-driven projects are designed to maintain load transfer and system continuity (*e.g.*, adding substation capacity). Projects that fit in neither of those two categories are reliability-related, and are designed to either maintain or enhance distribution system reliability. Examples of reliability-related capital projects include underground residential distribution (URD) cable replacement, feeder improvements, and distribution automation.

During discovery in the rate case, Delmarva provided considerable information about the projects and initiatives that make up its five-year plan. The most complete and detailed project-level information, and therefore the most useful to us in our investigation, was stated in terms of plant additions, as opposed to capital expenditures. Total plant additions anticipated under Delmarva's five year plan are shown in the following table.[51] Our analysis was focused on the planned reliability capital additions of $326.6 million.

Delmarva Delaware Planned Five Year Capital Additions

$ Millions	2013	2014	2015	2016	2017	Total
Customer	$12.1	$11.9	$12.2	$12.6	$13.0	$61.7
Reliability	73.4	62.3	63.2	64.3	63.4	326.6
Load	4.8	6.1	4.3	4.5	7.4	27.2
Total	**$90.3**	**$80.3**	**$79.6**	**$81.4**	**$83.8**	**$415.5**

[50] Direct Testimony of Michael Maxwell in Docket 13-115, p. 5.

[51] Data from Delmarva's responses to AG-REL-2 and AG-GEN-1 Attachment D. Silverpoint cannot reconcile the $309.1 million reliability-related capital expenditure figure with the $326.6 million reliability-related plant additions figure. We expect that some of the differential could be due to accounting timing issues, since capital expenditures are not always closed to plant in service in the year they are spent.

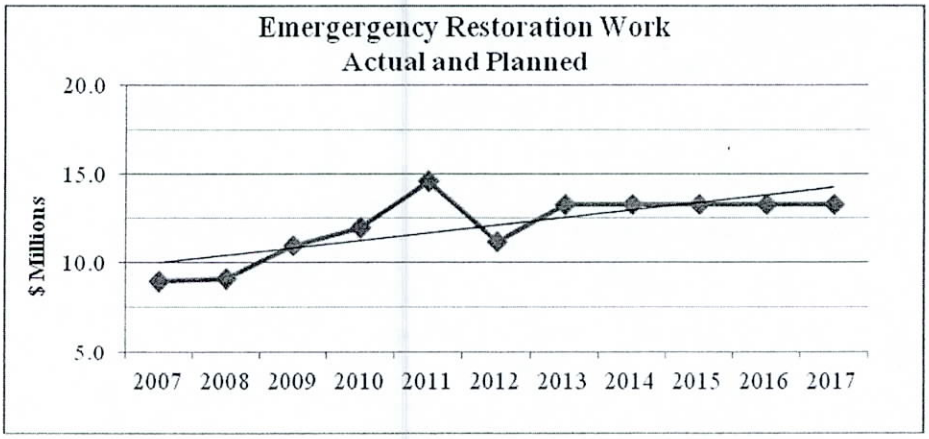
All dollar figures in the balance of our discussion refer to plant additions.[52]

It is important to understand the nature of the work that Delmarva recently performed on its distribution system so that one can compare and contrast it with the Company's proposed future plans. Delmarva provided itemized lists of the projects included in capital additions for the six-year period (2007 to 2012) immediately preceding the five-year plan, as well as the projects included in the plan itself.[53] Over 200 projects were represented in the eleven years of data, but the information was not presented in a fashion that lent itself to useful analysis. Also, for 2011 onward, the Company had differentiated between Reliability Enhancement Plan (REP) projects and non-REP projects; we found the Company's basis for this designation ambiguous, and we eliminated that distinction quite early on.[54]

Silverpoint grouped the capital projects into categories of similar work, such as emergency restoration, underground facilities, feeder work, and pole replacement, with the largest category of projects being substation-related work. We reviewed and discussed this analysis at some length with Company personnel, making adjustments as needed.[55] This capital project grouping analysis is included in Appendix 1.

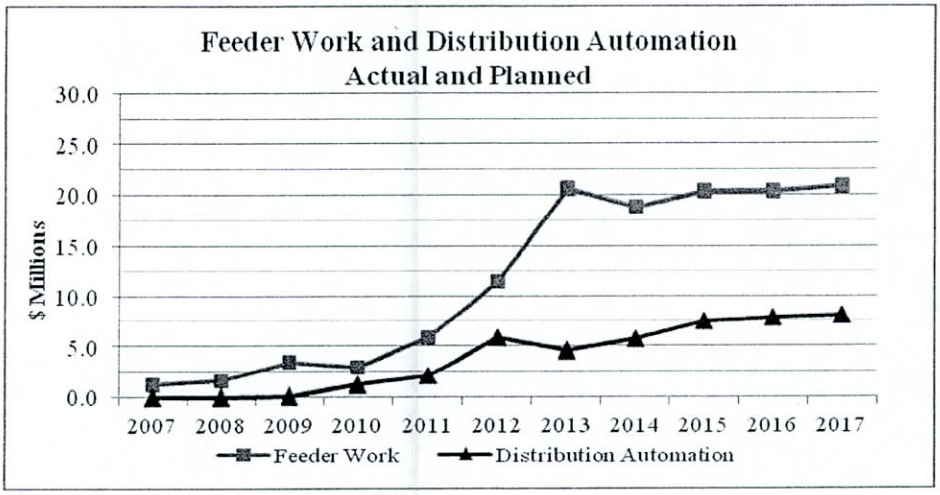
Some replacement of existing distribution system infrastructure is part of normal utility operations. A utility must perform certain categories of capital work (such as emergency restoration) to keep the system up and running. In that sense, then, these capital additions are non-discretionary, and work of this type will be required every year. Although the amount can vary each year, the level is relatively predictable and stable. Our trend analysis of emergency restoration work, for example, indicates that this category of capital addition can be expected to grow at an average rate of roughly four percent per year.

[52] Our investigation focused on reliability-related investments, and we have taken no position on the appropriateness of Delmarva's capital requirements for customer-driven or load-driven projects.
[53] Historical project information was provided by Delmarva in responses to AG-REL-3 Attachment A and Attachment B in Docket No. 13-115. Information regarding 2013-2017 projects was provided by Delmarva in responses to AG-REL-2 Attachment and AG-GEN-1 Attachment D in Docket No. 13-115. A copy of the relevant project information is included in the Supporting Documents accompanying this report.
[54] Background information on Delmarva's Delaware and Maryland REPs from Vavro Direct Testimony in 13-115.
[55] Delmarva personnel noted that they had not looked at their projects in this way before.

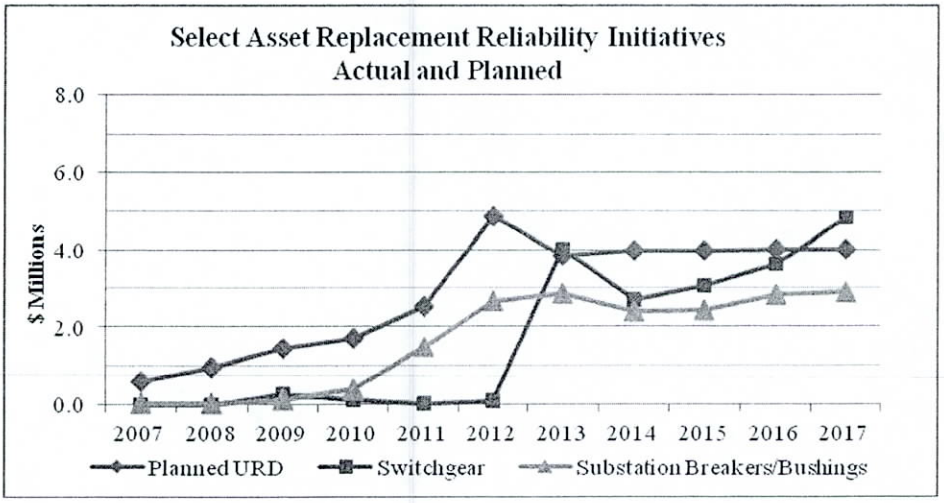


Other categories of capital projects needed as part of normal operations include emergency substation work, as well as routine replacement of poles and pole top transformers, deteriorated URD cable, pad mount transformers, and substation batteries and their associated charging equipment. These projects are also non-discretionary, and have a growth rate similar to that of emergency restoration work. Some of these capital additions are for assets that are essentially run until failure, *i.e.*, pole top transformers.

On the opposite end of the spectrum are Delmarva's feeder and distribution automation projects. As is evident from the graph below, the Company began major new initiatives in these areas in 2011, with a noticeable surge in spending planned for the 2013 to 2017 period. While some amount of capital work in these two categories is necessary, such as the worst performing feeder improvements required by the Standards, most of the spending from 2011 onward is not required to maintain the distribution system at its current level of reliability. In that sense, we consider it to be discretionary spending. The tremendous ten-fold growth in feeder reliability work is indicative of the "pedal-to-the-metal" attitude that permeates Delmarva's five-year plan in general.



Certain categories of assets are the subject of more sophisticated asset replacement planning at Delmarva. Examples include planned URD cable, substation switchgear, and substation circuit breakers and bushings. While Delmarva's capital additions in these assets for the 2007 to 2011 period were relatively modest, ranging from $1 to 4 million per year, they were adequate to prevent any erosion in its reliability performance. In its five-year plan, however, Delmarva significantly speeds up its replacement efforts for these assets, with spending reaching a rate of $12 million per year by 2017.



There is little question that the electric utility industry as a whole is wrestling with the issue of aging infrastructure. Many electric distribution systems were expanded substantially in the 1960s and 1970s, and much of that equipment is nearing the end of its useful life. Utilities like Delmarva are experiencing a "baby boomer" effect on their distribution system based on asset age demographics. Realistically speaking, replacement of that infrastructure will produce a bulge in capital budgets for a number of years.

According to Delmarva personnel, the Company recently developed a deeper sense of urgency about attacking the problem of aging infrastructure, and the Company's five-year plan clearly reflects a significant increase in spending in these areas. As with the feeder work, some capital projects of this type are undoubtedly necessary to maintain the distribution system at its current level of reliability, but to the extent that the work is being rushed, we consider a portion of those capital additions to be discretionary.

As the next step in our evaluation of Delmarva's five-year plan, Silverpoint separated the capital projects into four broad categories:[56]

- Short-Term Sustaining – capital projects needed to keep the system operational and to maintain current reliability levels for the short term;

[56] In certain instances, project groupings are split among two categories. For example, for feeder work, we assumed approximately $1 million per year was required for the priority feeder work required by the Standards and included it in short-term sustaining; we included the balance in reliability metric improvement.

- Reliability Metric Improvement – initiatives designed primarily to improve the Company's reported reliability measures;
- Grid Modernization – initiatives such as distribution automation that, while improving reliability, have corollary benefits such as synergies with advanced metering initiatives (AMI) or cost reduction; and
- Long-Term Sustaining – initiatives such as aging infrastructure replacement designed to ensure that current levels of reliability can be maintained over the mid- to longer term.

A copy of our category analysis for the 2007 to 2017 period is included in Appendix 2.

The following table summarizes the total dollar value of capital additions in Delmarva's five-year plan in each category.

Delmarva Five Year Plan Capital Additions by Category

$ Millions	**2013**	**2014**	**2015**	**2016**	**2017**	**Total**
Short-term Sustaining	$39.8	31.3	$27.0	$26.6	$23.6	$148.3
Grid Modernization	4.7	5.7	7.4	7.9	8.1	33.8
Metric Improvement	16.1	15.9	18.1	18.2	18.6	86.9
Long-term Sustaining	12.8	9.4	10.7	11.7	13.0	57.6
Total	**$73.4**	**$62.3**	**$63.2**	**$64.3**	**$63.4**	**$326.6**

During its investigation, Silverpoint considered the adequacy of the Company's justification for the level of capital additions in each category. We should make clear at the outset that we did not find any of the Company's initiatives to be frivolous or not potentially worthwhile to pursue at some point in the future. The issue, quite simply, is that customers should not be asked, nor can they likely afford, to pay for the system to which Delmarva aspires under its proposed five-year plan.

Although it will entail an economic hardship for ratepayers, we nonetheless believe it is important to move forward with an increased level of system investment, albeit at a more measured pace. One of the toughest challenges in this investigation was setting reasonable priorities for infrastructure and reliability-related investment given the economic realities Delmarva's customers face. In terms of protecting ratepayer interests, however, the Commission has to be the ultimate arbiter. Providing adequate service to customers at a reasonable price requires a partnership between Delmarva and its regulators, and as partners, both are ultimately responsible for the quality of service. To that end, a more hands-on collaborative approach to infrastructure and reliability-related investment is needed.[57]

[57] We understand that a collaborative process regarding future reliability-related investments was agreed to in the prior rate case. Delmarva could have begun a conversation with the Commission two years ago before embarking on its REP initiative, but it did not. That said, we believe the only reasonable way forward given the dollars at stake is a process that eliminates the need to argue over the necessity or usefulness of infrastructure investments in future proceedings.

B. Recommended Level of Reliability-Related Capital Additions

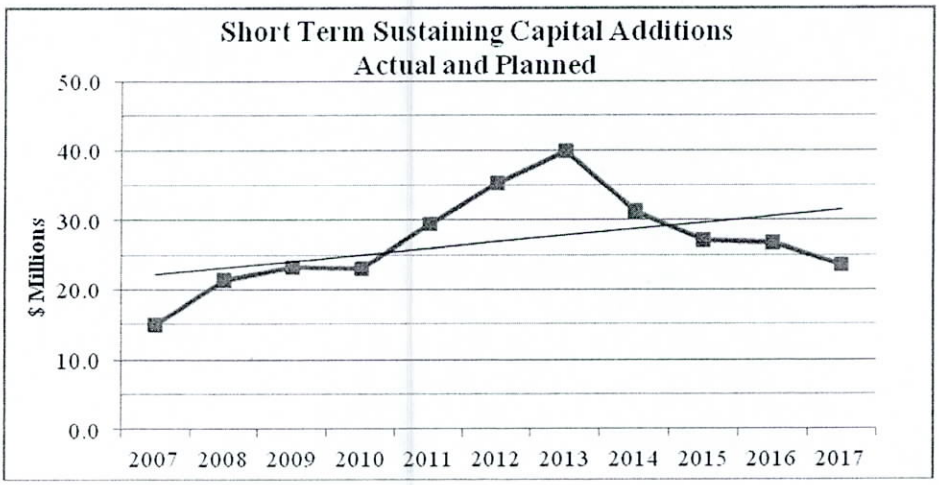
The table below summarizes Silverpoint's recommended capital additions over the next five-year period, consistent with its recommended revised Standards for SAIDI and SAIFI.[58]

Silverpoint Recommendation
Five Year Plan Capital Additions by Category

$ Millions	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Short-Term Sustaining	$30.0	$30.0	$30.0	$30.0	$30.0	$150.0
Grid Modernization	4.0	4.0	4.0	4.0	4.0	20.0
Metric Improvement	0	0	0	0	0	0
Long-Term Sustaining	6.0	6.0	6.0	6.0	6.0	30.0
Total	**$40.0**	**$40.0**	**$40.0**	**$40.0**	**$40.0**	**$200.0**

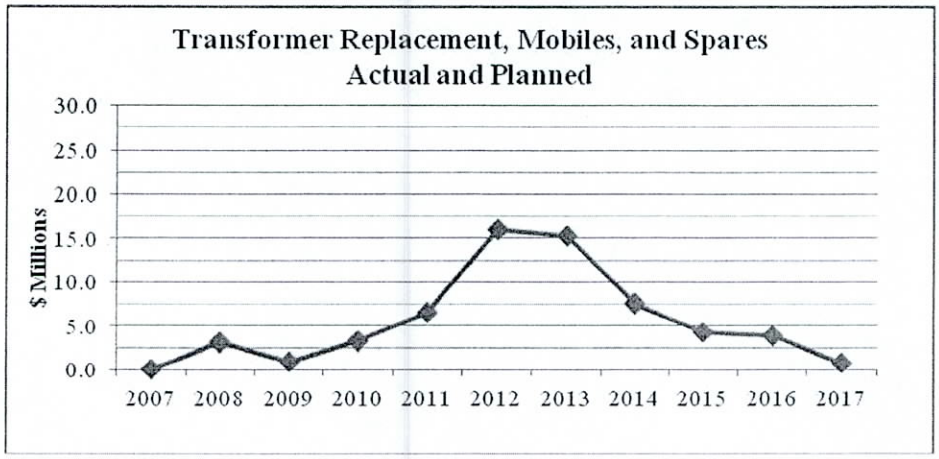
Short-Term Sustaining

Every utility must invest in non-discretionary capital projects each year in order to maintain reliable service. The graph below illustrates Delmarva's short-term sustaining capital additions through 2012 and its projected additions under its five year plan.



Deriving a reasonable estimate of short-term sustaining capital needs is not an exact science; there is normally some variability in capital additions due to the inherent lumpiness of capital projects. For example, the chart below illustrates Delmarva's capital additions for transformer replacements and the purchase of mobile and spare transformers.

[58] Late in the process, Delmarva provided to us its 2014-2018 distribution construction plan that essentially continues the initiatives from its earlier plan into 2018. Our recommended levels are therefore applicable on a going-forward basis.



We observed similar peaks in other types of sustaining capital spending over the recent past. For example, Delmarva spent $2 million under its tree wire initiative in 2008, but plans to invest at one-quarter that rate in the future. A substation spill prevention initiative begun in 2008 was completed by 2010, with no similar work required in the future.

Our trend analysis indicates requirements of roughly $30 million per year over the next five years. We believe that $30 million per year for sustaining capital project spending will allow Delmarva to meet its short-term reliability needs over the next five years while also providing a small cushion. In the event the full amount is not needed in a given year, the Company could either devote the excess to the two initiatives we support, grid modernization and long-term sustaining capital investment, or set it aside for contingencies such as the purchase of a large transformer.

Short-term sustaining capital projects are for the most part unavoidable investments, and in that sense should be relatively non-controversial from a ratemaking perspective. In the context of a multi-year rate scheme, the Commission might consider a program whereby this amount is added to rate base each year (after netting out retirements) in order to smooth the ratemaking impact and avoid the cost of rate cases.[59] Allowing the Company to recover for non-controversial capital additions in a timely fashion would help remove the financial pinch of funding capital additions in other areas.

Metric Improvement

Delmarva's five-year plan in this area consists of $87 million of feeder-related work beyond that required to meet the worst performing feeder remediation requirement in the Standards.[60] In Delmarva's new priority feeder initiative, the Company plans to invest an *additional* $4 million per year on its ten worst performing feeders, based on in-depth evaluations to identify further

[59] The Company in turn might agree not to initiate a rate case for the purposes of further rate base adjustments over a given time period. We suggest that sustaining capital projects be confirmed by Staff and other interested parties in an abbreviated review process.

[60] We have included the cost of the required worst performing feeder program in sustaining capital.

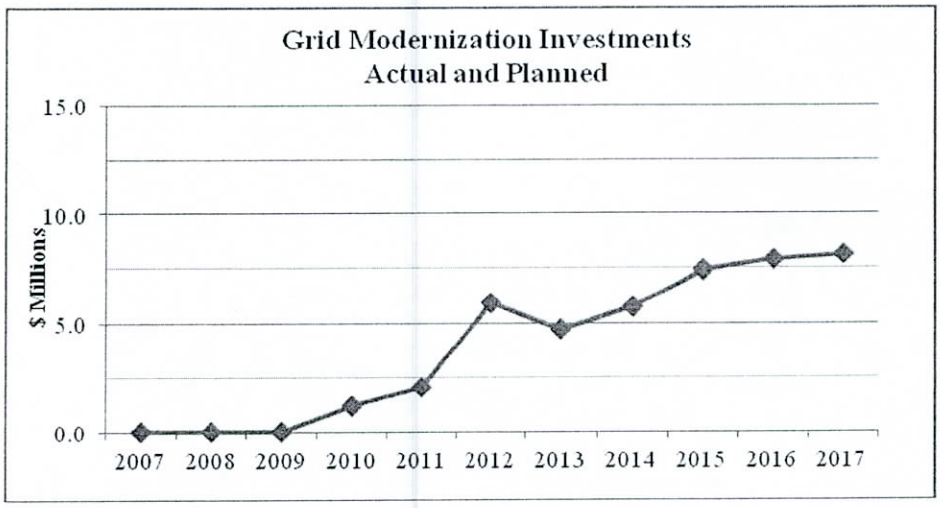
opportunities to improve performance on those circuits. The remaining approximately $60 million relates to Delmarva's feeder reliability improvement initiative. This program targets circuits other than the ten worst performing feeders that have a significant negative effect on system reliability indices.

Further capital additions in this category over the next five years would be inconsistent with the revised Standards we recommend, *i.e.*, a maximum SAIDI of 200 minutes and maximum SAIFI of 1.60. Delmarva is currently performing at a SAIDI of 146 minutes, much better than what we have defined as respectable performance. While these feeder projects are arguably worthwhile on some level, they cannot be justified given the higher priorities of grid modernization and replacement of aging infrastructure. As noted earlier, Delmarva can readily comply with the revised performance standards without any new capital investment specifically aimed at lowering SAIDI or SAIFI, particularly since the Company may see some corollary reduction in these indices from other capital initiatives.[61]

Obviously, the Commission cannot prevent Delmarva from continuing to spend on these programs. However, the framework established by the revised Standards, along with an order in this docket that clearly sets forth the Commission's view of priorities on behalf of ratepayers, means that certain investments would be difficult to later justify and recover in rates.

Grid Modernization

Delmarva's five year plan includes $34 million of grid modernization initiatives, primarily projects in the areas of distribution automation and further build-out of Supervisory Control and Data Acquisition (SCADA) capabilities. The Company began to significantly ramp up these efforts in 2011 under its REP.



[61] Feeder improvement projects to improve SAIDI and SAIFI can be reinstated rather quickly in the remote likelihood that compliance appeared questionable.

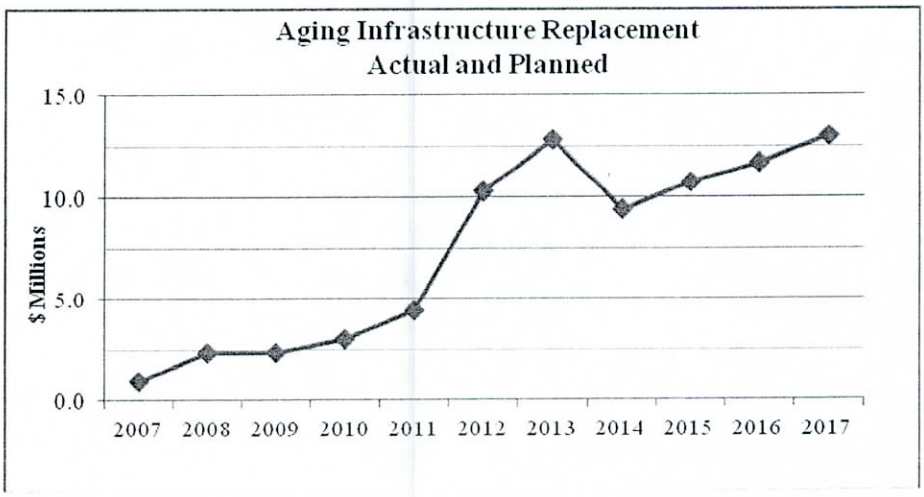
The two primary distribution automation initiatives in Delmarva's five year plan are the installation of automatic sectionalizing and restoration (ASR) schemes and the addition of recloser remote control capabilities. These technologies allow for automated fault isolation and restoration to reduce the number of customers impacted by feeder outages and to speed restoration of service to those customers impacted by a fault. This distribution automation is useful under blue sky or small outage conditions, but is generally not as effective during larger scale outage events. SCADA equipment improves the collection of operational data from the distribution system and provides remote control capabilities, which in turn aids a utility in locating or preventing outages and speeding restoration efforts.

The Commission has indicated its interest in pursuing grid modernization technologies that are ultimately beneficial to ratepayers, *e.g.*, AMI. Given that, some level of investment in this area over the next five years is appropriate. However, some of Delmarva's grid modernization projects appear less time-sensitive than others. For example, the Company's need to standardize or upgrade existing radio control capabilities is not particularly urgent. Silverpoint therefore recommends grid modernization at a slower pace than Delmarva proposes to mitigate the impact on customer rates. Based on our analysis of the Company's past spending as well as the nature of its proposed future projects, we believe that approximately $4 million per year over the next five years will be adequate. This amount is roughly half that of Delmarva's current plan and more consistent with historical spending patterns.

Silverpoint suggests that the parties work together as part of a collaborative process to prioritize the grid modernization projects. In its selection, Delmarva should consider emphasizing projects that would make the most of synergies with AMI already being implemented and paid for by ratepayers.

Long-Term Sustaining (Aging Infrastructure Replacement)

Aging infrastructure represents a threat to maintaining current levels of reliability over the mid- to longer term. Delmarva's five-year plan includes nearly $58 million of replacement initiatives, which it began to increase in 2011 under its REP.



The Company plans to double its pace of planned URD replacement, as well as its major initiatives at substations including switchgear, breaker, and bushing replacement and structural improvements. These projects tend to be more complex and have longer planning horizons than other types of investments.

Significant amounts of distribution utility assets in the industry are well beyond their depreciable lives, and utilities like Delmarva (and their customers) have thus far been able to benefit from the extended useful service from these assets. It is not realistic to think that any utility, including Delmarva, can put off indefinitely the need to significantly reinvest in its system. At some point a utility must rejuvenate, and the cost of the replacement of these assets in some cases is an order of magnitude greater than the original cost.

However, after reviewing the data and studies that the Company offered as justification for its infrastructure replacement program, we saw no support for the pace of Delmarva's planned investment for this initiative. While we agree that Delmarva needs to dedicate capital investments to maintain reliability over the longer term, the Company appears to be no worse off than the average utility in this regard. We appreciate the Company's renewed sense of urgency, but the system is not in imminent danger of catastrophic failure. Any aging infrastructure replacement initiative must be managed in such a way as to remain respectful of ratepayers and the rates they ultimately pay for these infrastructure reinforcements.[62]

Silverpoint therefore recommends that the Commission authorize a more moderate pace of aging infrastructure replacement than the one Delmarva proposes to mitigate the impact on customers' rates. Based on our analysis of the Company's past spending as well as the nature of its proposed future projects, approximately $6 million per year over the next five years should be adequate. This amount is approximately half that of Delmarva's current plan, but still higher than in the recent past. We suggest the parties work in a collaborative process to prioritize the selection and order of these projects. Managing the infrastructure replacement process requires that the Company have an appropriate preventative maintenance program that measures key factors to determine the condition of each major asset, the risks, and the timing for replacement. Information from that program should be shared with stakeholders to inform the decision-making process.

In conclusion, Silverpoint found Delmarva's planned five-year reliability-related capital additions of $326.6 million to be excessive. We recognize the need for investment in projects designed to sustain current levels of reliability over the near term that total approximately $150 million. We do not, however, support the planned $87 million investment in metric

[62] The Company's position is in our view unsupported. In the two alternative scenarios it developed at Silverpoint's request (*i.e.*, maintaining a SAIDI of 175 or 200 compared to its current trajectory) the Company did not even consider the possibility of slowing down or spreading out its programs over more years. The Company's analyses supporting the need for replacement of metal clad switchgear and setting priorities for various facilities were not sufficiently compelling and were inconsistent with the results of its budgeting process.

improvement projects. And while we agree with the necessity of replacing aging infrastructure and in modernizing the grid over the long term, we found no support for Delmarva's pace of spending on those programs. We therefore propose an additional reduction of approximately $40 million in Grid Modernization and Long-Term Sustaining projects over the next five years. Silverpoint's recommended capital additions by category compared to those in the Delmarva plan are summarized in the table below.

Five Year Total Reliability-related Capital Additions by Category

$ Millions	**Delmarva**	**Silverpoint**	**Difference**
Short-term Sustaining	$148.3	$150.0	$(1.7)
Grid Modernization	33.8	20.0	13.8
Metric Improvement	86.9	0	86.9
Long-term Sustaining	57.6	30.0	27.6
Total	**$326.6**	**$200.0**	**$126.6**

Our recommended reductions of $126.6 million would save the typical residential ratepayer approximately 32% of the cost of Delmarva's original plan.

Appendices

Appendix 1 Delmarva 2007-2017 Reliability-Related Plant Additions by Project Grouping

Project Name	Short Description	2007	2008	2009	2010	2011	2012	2013
Emergency Restoration Work								
RDLBEMG2	Emergency Restoration Blanket - Millsboro	1,475,661	247,105					
UDLBRM3M1	Emergency Restoration Blanket - Millsboro		1,657,497	2,276,450	2,752,585	2,181,352	2,143,782	2,485,026
RDLNEMG1	Emergency Restoration Blanket-Christiana	7,453,015	59,109	42,228	-200			
UDLNRM3C1	Emergency Restoration Blanket-Christiana	0	7,110,534	8,663,847	9,218,021	12,404,954	9,082,965	10,796,115
Projects Sponsored by Local District								
RDLBMS2	Millsboro – Misc. Dist. Improve. Blanket	1,245,315	183,272	3,176				
UDLBRM4MA	Millsboro – Misc. Dist. Improve. Blanket	0	532,150	1,140,134	1,423,116	869,427	511,114	612,596
RDLNMS1	CH- District Misc. Improvement Blanket	1,702,791	998,855	-16,035	-5,026			
UDLNRM4CA	Misc. Dist. Improve. Blanket - Christiana	0	217,870	1,499,821	1,400,097	932,286	1,443,005	899,690
UDLBRM4MM	Customer Reliability Improve. - Millsboro	0				408,039	587,345	205,216
UDLBRM4M	Customer Reliability Improvements-Bay	0	72,539	7,056	129,807	126,368		
UDLNRM4CM	Customer Reliability Improve. - Christiana	0	253,114	659,659	170,546	459,996	383,405	433,430
Underground Facilities								
UDLNRM4CR	Wilmington Network Upgrade (underground)	0	0	468,216	336,193	529,769	830,228	448,645
UDLBRM4MD	Millsboro - Planned URD Cable Replace.	0	907,533	960,316	1,361,058			
RDLBIR26	Millsboro - Planned URD Cable Replace.	572,045	45,949					
RDLNIR27	Christiana - Planned URD Cable Replace.	-4,542	0					
UDLBRM4MD	Millsboro - Planned URD Cable Replace.					2,004,031	3,148,970	1,776,909
UDLNRM4CD	Christiana - Planned URD Cable Replace.						891,918	1,617,641
UDLBRM4MU	MI - Replace URD Secondary Cables	0	672,837	1,208,637				
UDLBRM5MA	IR: Millsboro- URD Infrastructure Replace.	0	729,161	125,506				
RDLBUP60	Millsboro-Replace Deteriorated BD Cable	398,099	49,340					
RDLNUP121	Christiana - Replace Failed Cable (UG)	660,910	254,500	125,016	3,408	10,750		
RDLBUP68	Country Club Estates Cable Replacement	111,733	0					
UDLBRM4MC	Millsboro - Replace Deteriorated URD Cable	0	439,472	808,969	1,084,073			

Project Name	Short Description	2007	2008	2009	2010	2011	2012	2013
UDLBRM4MC	Millsboro - Replace Deteriorated URD Cable					759,646	929,715	678,281
UDLNRM4CC	Christiana - Replace Deter. URD Cable					1,073,832	703,978	903,213
UDLBRM4MO	Millsboro: Pad mount Transformer Replace.							0
UDLNRM4CO	Christiana: Pad mount Transformer Replace.							0
Line/Feeder Programs								
RDLBUP122	Priority Circuit Improvements- Bay Reg.	329,366	157,479					
UDLBRM4F	Bay Reg.: Priority Circuit Improvements	0	366,235	706,600	219,136	192,921		
UDLBRM4K	Bay Reg.: Priority Feeder Rebuild	0	184,824	0	0			
RDLNUP199	Priority Circuit Improve.- Christiana	818,247	5,943					
UDLBRM4MF	Millsboro - Priority Circuit Improvement					1,361,055	795,059	2,501,875
UDLNRM4CF	Christiana - Priority Circuit Improvement					1,334,564	5,037,261	2,538,288
UDLNRM4CK	Priority Feeder Rebuild: Christiana					209,958	0	
UDLBRM4RC	Bishop Substation - Lines Upgrades DE							142,156
UDLNRM5SD	Re-conductor DE0217 (distribution lines)							568,372
UDLBRM21N	Bay Reg.: Misc. Reliability Improvements	0	1,016	191,582	728,952	45,377		
UDLBRM2M2	Bay MI – Misc. Reliability Improve.					5,074	35,907	
UDLNRM21N	NC Reg.: Misc. Reliability Improvements	0	0	76,060	1,083,024	608,358	-8,651	
UDLBRM4MQ	Millsboro: Upgrades for Multi Device Operations							452,135
UDLNRM4CQ	Christiana: Upgrades for Multi Device Ops.							502,574
UDLBRM63M	Millsboro: Feeder Reliability Improvement					627,540	2,647,888	4,324,609
UDLNRM63C	Christiana Feeder Reliability Improvements					840,003	2,182,214	6,057,151
UDLBRM4ZM	AMI Dist. Line Work Bay Reg. (Millsboro)							9,934
UDLBRM5ND	NERC Line Upgrades: Dist. Lines Bay DE							235,309
UDLNRM5ND	NERC Line Upgrades: Dist. Lines NC DE							226,509
UDLNRM5SC	Christiana Sub: Replace Duct Bank						201,865	1,502,344
UDLBRM4MJ	Millsboro District - Recloser Replacement	0	166,893	266,769	43,932	92,623	707,907	376,971
UDSNRD8SA	Churchmans Recloser Removal	0	0		77,410			46,220
UDLNRM4CJ	Christiana Distr- Replace Line Reclosers	0	0	103,436	50,169		95,152	505,863

Project Name	Short Description	2007	2008	2009	2010	2011	2012	2013
UDLNRM8SH	Churchmans - Replace Reclosers							20,225
UDLNRM8SG	Brandywine River Crossing Cable Install.	0	0		247,714	365,363	-11,417	
UDLNRM9SB	CH District Replace Steel Poles - 4th St. Wilmington	0	0	160,515	269,450	188,010	163,620	546,987
UDLNRM4CV	CH - Install Rubber-Covered Second. Wire	0	173,495	147,794	184,133			
UDLNRM5SD	R/C Circuit DE217	0	0				10,231	
UDLBRM4MW	MI - Install Tree Wire/Spacer Cable	0	0				6,501	
UDLNRM4CU	Install Tree Wire/Spacer Cable - Christiana	0	513,086	1,767,414	14,508			0
UDLBRM4MH	Avian Protection Improvement Millsboro							30,022
UDLNRM4CH	Avian Protection: Christiana							46,999
UDLBOSV5DE	Bay DE: Salvage Scrap Wire/Cable	0	0				-361,108	
UDLNMS5D	NC DE: Removal & Salvage Capital Equip.	0	0				-1,661	-17,640
UDLNOSV5D	NC DE: Salvage Scrap Wire/Cable	0	0				-145,702	-17,640
Pole Replacement/Poletop Transformers								
UDLBRM4E	Bay Reg: Deteriorated / Reject Pole Replace.	0	73,692	180,586	201,497	48,133	145	
RDLBMS6	Bay Region: Reject Pole Replacement	136,663	42,487					
UDLBRM4ME	Millsboro - Distribution Pole Replace.	0				29,247	88,968	35,488
UDLNRM4CE	Christiana District-Distrib. Pole Repl.\Reinf.	0				1,285,897	417,566	330,572
UDLNMS3D	Distribution Transformer Retire DE (poletop)							132,992
Automation - Substation (S), Lines (L), and Other (O)								
UDSBRD8M	Upgrade SCADA/RTU Capability	0	0	30,383	0	0	0	42,072
UDSNRDA1	UF NC Region: Distribution Automation	0	0		726,151	0	0	
UDLNRDA1	UF Distr. Automation New Castle Reg.	0	0		456,864	0	0	
UDSNRDA1C	Distribution Automation: Christiana Subs.					154,396	3,363,047	823,380
UDSNRD8MD	Scada/RTU Upgrade NC DE Dist. Sub					0	57,605	304,054
UDSBRDA1D	Substation Distribution Automation Bay DE					200,647	924,674	17,795
UDLNRDA1C	Distribution Automation: Christiana District					0	184,726	1,508,748
UDLBRDA1D	Distribution Automation - Bay DE					1,063,871	397,950	0

Project Name	Short Description	2007	2008	2009	2010	2011	2012	2013
UOIBRASRD	UF Install ASR Computer					2,555	121,397	7,843
UOINRASRD	UF Install ASR Computer					79,502	167,057	223,264
UORNOBR1C	CH Comm. Work - Collector to Data Network					196,004	286,224	313,987
UORNODA1C	Christiana Comm. Work-Install Radios Line Equip.					46,907	173,459	437,553
UORNORBSC	BBW Base Station - Install Christiana					101,423	32,669	314,066
UORNORBTC	Christiana Comm Work: Upgrade Radios							0
UORNORSSC	Christiana - Sub Subscriber - BBW					0	114,852	330,325
UORNORCPC	Install Radio Control for Cap Cntrl-Christiana							0
UORBORBTM	Millsboro Comm. Work – Upgrade Radios in Line Equip.							0
UORBORCPM	Millsboro: Install Radio Control for Cap Control							19,270
UORBORSSM	Millsboro Sub Subscriber - BBW							145,735
UORBOBR1M	MI Comm .Work-Collector to Data Network					88,494	64,175	0
UORBODA1M	Millsboro Comm. Work - Install Radios Line Equip.					57,591	-12,552	0
UORBORBSM	BBW Base Station - Install Millsboro					62,419	14,964	168,270
Substation Work								
RDSBEMG1	Bay Distribution Sub. Emerg. (Formerly RDSBIR4)	103,629	0	0	0	0	0	
UDSBRD71	Bay Dist. Substation Emergency Replace.	0	13,626	48,260	179,278			
UDSBRD71D	Bay Dist. Sub. Emergency - DE	0				203,191	128,279	136,860
RDSNEMG1	New Castle Sub Emergency (formerly RDSNIR4)	91,340	701,662	36,330	-26,145			
UDSNRD71	New Castle Substation Emergency	0	41,363	92,110	110,772	-14,997	32,390	
UDSNRD71D	NC DE: Dist. Sub. Emergency	0				66,050	137,232	235,656
RDSBIR26	Bay Dist. Substation Bushing Replacements	27,268	0	0	0	0	0	
UDSBRD8F	Bay Dist. Substation Bushing Replacements	0	5,195	0	5,014			
UDSBRD8FD	Bay Dist. Substation Bushing Replacements	0		0			44,978	102,445
UDSNRD8F	New Castle Dist. Sub Bushing Replacement	0	0	0	27,915	27,979	267,506	
UDSNRD8FD	NC DE Dist. Sub Bushing Replace.				5,533	138,781		122,066
UDSBRD9D	IR: Bay Substation Replace Deteriorated Dist. Breakers	0	0	0	6,838	0	215,830	
UDSNRD9D	IR: New Castle Dist. Sub Breaker Replace.	0	0	116,827	328,704	448,855		

Project Name	Short Description	2007	2008	2009	2010	2011	2012	2013
UDSBRD9DD	Replace Deteriorated Dist. Breakers DE	0	0	0		144,520	802,679	584,086
UDSNRD9SE	IR: Edgemoor 12kv Sub Upgrade 12kv Bkrs.						201,553	207,818
UDSNRD9DD	IR: NC DE Breaker Repl. Dist. Sub.	0	0			522,873	713,041	1,399,999
UDSNRD9FD	IR: NC DE Replace/Upgrade PTs Dist. Subs	0	0			78,888	38,839	69,201
UDSNRD9HD	IR: New Castle Sub. Replace. PCB Caps	0	0				322,588	287,450
UDSNRD9SDD	NC DE - Add Sub Condition Monitoring Points	0	0			100,154	62,358	
UDSBRD8ED	Bay Dist. Sub Battery & Charger Replace	0					89,315	66,777
UDSBRD8E	Bay Dist. Sub Battery and Charger Replace.	0	420	19,228	18,568			
UDSNRD8ED	NC DE: Dist. Sub Battery/ Charger Replace.	0				65,226	81,917	
UDSNRD8E/ED	New Castle Dist. Sub Battery & Charger Replacement	0	66,570	58,561	70,625	9,085		103,071
UDSNRD9ZD	IR: NC DE Repl. Deter Switches Dist. Sub							72,789
UDSBRD8A	Bay Dist. Sub Planned Improvements	0	0	0	-2,491			
UDSBRD8AD	Bay Dist. Sub Planned Improvements DE	0	0	0			92,675	35,248
RDSNIR3	Substation Planned Improve. - New Castle	65,428	62,624	-657	0			
UDSNRD8A	Substation Planned Improve. - New Castle	0	0	3,806	6,771	7,094		
UDSNRD8AD	Substation Planned Improve. - New Castle DE	0	0				75,304	98,046
UDSNRM61D	NC - DE Sub Comprehensive Reliability Improvements						1,982,713	547,708
UDSBRM61D	Bay - DE Sub Comprehensive Reliability Improvements							0
UDLNRM5BA	IR: Rogers Road Sub: Convert 4kv to 12kv	0	16,979	60,202	755,484	404,497	533,591	3,947
RDLNIR14	N. Wilmington Sub: Convert 4kV to 12kV	114,816	0					
RDLNUP56	Tenth Street Sub: Convert 4kV to 12kV	-455	0	390,993	1,672			
RDLNUP262	Christiana Dist.-Old Kennett & Cntr Mtg, 4/12 Conversion	112,935	802,845					
UDLNRM8BA	N. Wilmington Sub: Convert 4kv to 12kv	0	458,693	918	37			
UDLBRM8BA	Greenwood: 4-25kV Conversion							745,726
UDLBRM8BB	Wyoming-Convert to 25kV Cir 2233 (Phase II)							695,797
UDSNRD9SF	IR: NC Replace. Deter Switches Dist. Sub.				107,986			
UDLNRM5SE	Cable Replacement for New Switchgear	0	0				77,669	480,339
UDSNRD8K	NC Reg.: 15kv Switchgear Improvements	0	0	260,958	10,666	27,148		
UDSNRD8KD	DPL DE - Switchgear replacements							0
UDSNRD9KA	Milford Crossroads Sub - Switchgear							1,818,832

Project Name	Short Description	2007	2008	2009	2010	2011	2012	2013
	replacements							
UDSNRD9KB	Bear Sub - Switchgear replacements							1,699,116
UDSNRD9KC	Naamans Sub - Switchgear replacements							0
UDSNRD9KD	Mermaid Sub - Switchgear replacements							0
UDSNRD9KE	West Wilmington Sub - Switchgear replacements							0
UDSNRD9KF	Churchmans Sub - Switchgear replacements							0
UDSNRD9KG	Milltown Sub - Switchgear replacements							0
UDSNRD9KH	Sunset Lake Sub - Switchgear replacements							0
UDSNRD9KI	Tallyville Sub - Switchgear replacements							0
UDSBRD8ID	Bay DE: Roof Replacement	0	0		0		148,223	406,368
UDSNRD9Y	IR: NC Repl Deter Structures Dist. Subs				107,986			
UDSBRD8VD	NERC Physical Security Bay DE Dist. Subs	0	0	0			49,009	165,567
UDSNRD8VD	NERC Physical Security: NC DE	0	0				241,878	784,419
UDLNRM5BC	Edgemoor - GM: Rebuild Dist. Underbuild	0				1,276	416,041	
UDLNRM8SE	Christiana Distr.-Rebuild OH Rear Lot Dist. Sys.	0	0	13,625	3,150			341,196
UDSBRD8P/PD	Bay Reg.; Misc. Dist. Sub Equipment Retirement	0	0	-3,826				10,532
UDLBMS5D	Bay DE: Removal & Salvage of Capital Equip.	0	0				11,735	-17,640
UDLBOSV5D	Bay DE: Salvage Scrap Wire/Cable	0	0				-76,007	-17,640
RDSNIR18	New Castle Sub Misc. Equipment Retirement-Dist.	69,135	30,724	0	0			
UDSNRD8P/PD	NC Reg.: Misc. Dist. Sub Equipment Retirement	0	-7,236	-3,932	-973			24,515
UDSNRD8PD	IR: NC DE Dist. Sub Misc. Equip Retire				6,642	39,562	4,556	
UDSNRD8RB	Old Kennett Road Sub. - Cleanup and Retire	0	0	36,450	-3,793			
UDSNRD8RC	Tenth Street Substation - Cleanup and Retire	0	0	11,938	3,872			136,479
UDSNRD8RD	Center Meeting Sub. - Cleanup and Retire	0	0	23,737	-3,793			
UDSNRD9RB	Madison St. Sub: Retire and Clean-Up	0	0			84,836		
RDSNIR6	Old Christiana Sub: Retire (69kV)	35,951	0					
UDSBRD8RB	Greenwood Substation-Retire/Remove 4kV							127,281
UDSBRD8RG	Wyoming-Retire Substation							80,129
UDSNRD8RA	North Wilmington Substation - Cleanup and Retire.							0
UDSNRD9A	IR: Rogers Road Substation - Cleanup and							0

Project Name	Short Description	2007	2008	2009	2010	2011	2012	2013
	Retire.							
RDSBUP165	Bay Reg. - Substation spill prevention Plans	22,195	-18,335	-3,860	0	0	0	
UDSBRD8Q	Bay Reg.: SPCC Plans - Add Sub. Containment	0	214,623	403,254	288,413	11,894	36,527	
UDSBRD8Q1	Bay Reg. SPCC Compliance: Bkr Repl – Dist.	0	0	234,778	0	0		
RDSNUP121	New Castle Reg. - Substation SPCC Plans	158,387	376,770	10,642	-43,074			
UDSNRD8Q	New Castle Reg.: SPCC Plans Install Sub. Containment	0	981,462	981,462	1,004,744	236,994	25,780	
UDSNRD8Q1	NC Reg. SPCC Compliance: Breaker Replace. – Dist.	0	614,290	614,290	664,655	15,263		
Substation Transformer Replacement								
UDLBRCP2	Ches-Ply Lines - work for T1 Replace.	0	0	0	0		113,846	
UDSBRD9SO	Sussex Sub: Replace T1 Transformer	0	0	0		0	137,377	
UDSBRD8SO	Sussex Sub: Replace failed T1 Transformer	0	0	0			24,002	
UDSNRD9G	Milford Crossroads T1 Transformer				134,794	502,276		
UDSNRD8SB	Milford Crossroads: Replace T1 Transformer	0	0	280,162		90		
UDLNRMT1	Milltown: Move Circuit 640 from T1 to T3 (lines)							185,823
UDSNRMT2	Milltown: Retire T1- Relocate Ckt 640 to T3							91,185
UDSNRD8SI	Chapel St: Retire T1- Resupply Station Serv.							88,077
UDSBRD9SF	IR: Millsboro Sub - T1 Replacement							1,466,838
UDSBRD9SG	IR: Nr Seaford Sub - T1 & T2 Replacement							282,050
UDSNRD9SH	Brookside - Replace T2 34/12kv Transformer	0	0				1,160,584	2,080,135
UDSNRD9SJ	Milford Crossroads - Replace T2	0	0				359,637	389,773
UDSNRD8SC	Bear Sub: Replace Failed T-3 Unit				408,489	715,543	730,598	
UDSNRD8SD	Christiana Sub: Replace 138/12kv T2 Unit	0	0			417,853		
UDSNRD8SE	Silverbrook Sub: Replace Failed T3	0	0			2,039,218	823,079	264,849
UDSBRD9SX1	IR: Sussex - T2 Replacement							339,529
UDSNRD9SM	Replace Kiamensi 138-34 KV T2 Transformer							292,515
UDSNRD9SN	Replace Talleyville T2 transformer							0
UDSNRD8DA	Brookside - DPU Replacements	0	107,046					
UDSNRD8DB	New Castle - DPU Replacements	0	1,954	244,141				

Project Name	Short Description	2007	2008	2009	2010	2011	2012	2013
UDSNRD8DC	West Wilmington - DPU & ITE51Y Replacements	0	99,311	26,942				
UDSNRD8DD	Churchmans & Milltown DPU replacements	0	159,626	47,501				
UDSBRD8DD	DPU Relay Replacement: Laurel Feeder 506							160,406
UDSBRD8BD	Dist Miscellaneous Relay Blanket - Bay DE	0	0	0	0		12,543	47,406
RDSNIR5	Distribution Misc. Relay Blanket	38,347	0	0	0			
UDSNRD8B/BD	Distribution Misc. Relay Blanket	0	99,038	29,206	48,623			61,414
UDSNRD9SG	Montchanin Sub Install new 34.5-12kV Transformer	0	0			1,669,736	2,550,811	
UDLNRM9SC	Montchanin Sub: Relocate 34kV and 12kV Circuits	0	0			82,616	601,797	
UDLNRM8SA	Edgemoor: Transfer 12kV ckts to 138/12kV T6 trans	0	495,340	43,184				
UDLNRM8SB	Edgemoor: Transfer 12kV to new 69/12kV T7 transformer	0	943,865					
UDSBRD9GD	Replace Aging Dist. Transformers DE (substations)							0
UDSNRD9G1	Replace Aging Dist. Transformers DE							0
UDSNRD9SK	West T5: Replace 69/34 kV Transformer							1,079,066
UDSNRD9SL	Replace West T2 69-34 KV Transformer							287,831
Spare/Mobile Substation Transformers								
UDSBRD8G	Bay Distribution - Spare Transformers	0	1,175,958	189,794	758,462	19,430		1,160,295
UDSNRD8G	New Castle - Spare Transformers	0	2,056	4,307	1,872,198	753,673	2,057,635	1,125,160
UDSNRD8GD	New Castle - Spare Transformers / T2 upgrade	0	0			153,916	1,731,516	124303
UDSBRD8G1	BAY - PHI Mobile Transformers					54,925		
UDSBRD8SC	Bay Region: Purchase Mobile Unit Trailer/Cables	0	0	0	1,281	88,750	236,166	
UDSNRD8G1	New Castle - Purchase 138/69-12kv Mobile Transformer	0	0				353,024	3,790,302
UDSBRD8G2	Bay Region 69/25x12 40MVA Mobile Unit							918,806
UDSBRD8G3	Bay Region Purchase Mobile Transformer							4,704
UDSBRD8G4	Bay Reg. Purchase 138x69kV/25kV 30MVA Mobile							966,027

Project Name	Short Description	2007	2008	2009	2010	2011	2012	2013	
Unidentified Category - assumed transformer related									
UDLNRACRD	NC-DE - Accrual for Reliability	0	0				2,990,371	996	
UDLBRACRD	BAY-DE - Accrual for Reliability	0	0				2,135,979	1,068	
	TOTAL Reliability Related	15,738,278	23,562,456	25,875,467	29,035,523	40,165,578	61,185,585	73,374,179	6

Actual data from AG-REL-3 Attachment B Capital Additions (2007-2012 non-REP) and AG-REL-3 Attachment A (2011-12 REP). Budget data from AG-REL-2 (non-REP 2013-17 Bu
AG-GEN-1 Attachment D (REP 2013-17 Budget)

Appendix 2 Delmarva Reliability-Related Project Capital Additions by Category

	2007	2008	2009	2010	2011	2012	2013	2
Short-term Sustaining								
Emergency Restoration Work	8,928,676	9,074,245	10,982,525	11,970,406	14,586,306	11,226,747	13,281,141	13,2
Substation Emergency Work	194,969	756,651	176,701	263,905	254,244	297,901	372,516	4
Projects Sponsored by District/Customer	2,948,106	2,257,800	3,293,811	3,118,540	2,796,116	2,924,870	2,150,932	2,2
Replace Deteriorated URD and Pad Mounts	1,170,742	2,145,310	2,268,128	1,087,481	1,844,228	1,633,693	1,581,494	2,0
Required Priority Circuit work (1)	1,147,613	714,481	706,600	219,136	1,000,000	1,000,000	1,000,000	1,0
Line work (NERC, Reclosers, Tree/avian, Steel Poles, etc.)	0	853,474	2,445,928	887,316	645,996	665,388	3,512,103	1,9
Pole Replacement/Pole Top Transformers	136,663	116,179	180,586	201,497	1,363,277	506,679	499,052	5
Substation Transformer Replacement; Spares/Mobiles (2)	38,347	3,084,193	865,237	3,223,847	6,498,026	16,018,965	15,208,557	7,5
Substation Equipment Cleanup/Retire; Spill Prevention	285,668	2,192,298	2,304,934	1,916,693	388,549	2,591	343,656	5
Substation Security/Under-build/Lot	0	0	13,625	111,136	1,276	855,153	1,697,550	1,5
Substation Battery/Charger Replacements	0	66,990	77,789	89,194	74,311	171,232	169,848	1
	14,850,783	**21,261,621**	**23,315,864**	**23,089,152**	**29,452,330**	**35,303,219**	**39,816,849**	**31,3**
Reliability Metric Improvement								

Supplemental Work on Priority Feeders (1)	0	0	0	0	2,098,498	4,832,320	4,040,163	4,00
Feeder Reliability Improvement (priority circuits/upgrades)	0	1,016	267,642	1,811,976	2,126,352	4,857,358	12,046,997	11,87
	0	**1,016**	**267,642**	**1,811,976**	**4,224,850**	**9,689,678**	**16,087,160**	**15,88**
Grid Modernization								
Automation - Substation, Lines, and Other	**0**	**0**	**30,383**	**1,183,015**	**2,053,809**	**5,890,247**	**4,656,362**	**5,69**
Long-term Sustaining (Aging Infrastructure Replacement)								
Planned URD Replacement	567,503	953,482	1,428,532	1,697,251	2,533,800	4,871,116	3,843,195	3,98
Switchgear Replacement	0	0	260,958	118,652	27,148	77,669	3,998,287	2,67
Substation Conversions	227,296	1,278,517	452,113	757,193	404,497	533,591	1,445,470	
Substation Improvements	65,428	62,624	3,149	4,281	7,094	2,150,692	681,002	39
Sub. Breaker/Bushing/Switch Replace.	27,268	5,195	116,827	374,004	1,462,050	2,669,374	2,845,854	2,38
	887,495	**2,299,819**	**2,261,579**	**2,951,381**	**4,434,589**	**10,302,441**	**12,813,808**	**9,43**
	15,738,278	**23,562,456**	**25,875,467**	**29,035,523**	**40,165,578**	**61,185,585**	**73,374,179**	**62,34**

(1) assumes approximately $1 million of priority feeder work is required by standards 2013 onward, rest discretionary (2) includes $4 million accrual in 2012