STATE OF NEW JERSEY
OFFICE OF ADMINISTRATIVE LAW
BEFORE THE HONORABLE GAIL M. COOKSON

I/M/O THE PETITION OF PUBLIC SERVICE ELECTRIC AND GAS COMPANY FOR APPROVAL OF AN INCREASE IN ELECTRIC AND GAS RATES AND FOR CHANGES IN THE TARIFFS FOR ELECTRIC AND GAS SERVICE, B.P.U.N.J. NO.16 ELECTRIC AND B.P.U.N.J. NO. 16 GAS, AND FOR CHANGES IN DEPRECIATION RATES, PURSUANT TO N.J.S.A. 48:2-18, N.J.S.A. 48:2-21 AND N.J.S.A. 48:2-21.1 AND FOR OTHER APPROPRIATE RELIEF	)	**BPU DOCKET NOS. ER18010029 and GR18010030** **OAL DOCKET NO. PUC 01151-18**

JOINT TESTIMONY OF CHARLES SALAMONE AND MAXIMILIAN CHANG ON BEHALF OF THE DIVISION OF RATE COUNSEL

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I. STATEMENT OF QUALIFICATIONS

Q. Would the members of the Engineering Panel ("Panel") please state your names, positions, and business address?

A. My name is Charles Salamone, PE. I am Owner of Cape Power Systems Consulting, LLC, a power systems consulting Company with an address of 630 Cumberland Drive, Flagler Beach, Florida and I am subcontracting with Synapse Energy Economics, Inc. ("Synapse").

My name is Maximilian Chang. I am a Principal Associate with Synapse Energy Economics, an energy consulting company located at 485 Massachusetts Avenue, Cambridge, Massachusetts.

Q. On whose behalf are you submitting testimony in this proceeding?

A. We are submitting testimony on behalf of the New Jersey Division of Rate Counsel ("Rate Counsel").

Q. Mr. Salamone, please describe your education and professional background.

1. I hold a Bachelor of Science Degree in Electrical Engineering from Gannon University. I joined the Engineering Department of Commonwealth Electric Company in 1973. At that time, I became a Junior Planning Engineer where my primary responsibilities were to assist in the planning, analysis, and design of the transmission and distribution systems of Commonwealth Electric Company, later known as NSTAR. I generally followed the normal progression of positions with increasing levels of responsibility within the planning area until taking the position of Director of System Planning at NSTAR in 2000. I held that position

until starting Cape Power Systems Consulting, LLC in 2005. During my career with NSTAR, in addition to the responsibilities associated with overseeing System Planning, I served as Chair of the New England Power Pool (NEPOOL) Planning Policy Subcommittee (1997–1998), Chair of the NEPOOL Regional Transmission Planning Committee (1998–1999), and Vice Chair of the NEPOOL Reliability Committee (1999–2000). As a consultant, I have been providing consulting services to several power system industry clients since 2005. I am a Registered Professional Engineer with the Commonwealth of Massachusetts. I am also a senior member of the Power Engineering Society of the Institute of Electrical and Electronic Engineers. A copy of my resume is attached hereto as **Attachment RC-ENG-1**.

Q. Mr. Salamone, have you previously testified before utility regulatory agencies?

A. Yes. I have previously testified before the New Jersey Board of Public Utilities ("BPU" or "Board"), the Federal Energy Regulatory Commission ("FERC"), the Massachusetts Department of Public Utilities, and the Massachusetts Energy Facilities Siting Board on several technical matters relating to ratemaking and system planning.

Q. Mr. Chang, please describe your professional background at Synapse Energy Economics.

A. My experience is summarized in my resume, which is attached as **Attachment RC-ENG-2**. I am an environmental engineer and energy economics analyst who has analyzed energy industry issues for eight years. In my current position at

Synapse Energy Economics, I focus on economic and technical analysis of many aspects of the electric power industry, including: (1) utility mergers and acquisitions, (2) utility reliability performance and distribution investments, (3) nuclear power, (4) wholesale and retail electricity markets, and (5) energy efficiency and demand response alternatives. I have been an author and project coordinator for the 2011, 2013, and 2018 biennial New England Avoided Energy Supply Component reports, which were used by energy efficiency program administrators in the six New England states to evaluate energy efficiency programs.

At my previous position at Environmental Health and Engineering, I managed U.S. Environmental Protection Agency-approved Polychlorinated Biphenyls (PCBs) remediation projects. In addition, I have managed environmental risk and exposure communication projects on behalf of clients.

Q. Mr. Chang, please describe your educational background.

A. I hold a Master of Science degree from the Harvard School of Public Health in Environmental Health and Engineering Studies, and a Bachelor of Science degree from Cornell University in Biology and Classical Civilizations.

Q. Mr. Chang, have you previously submitted testimony before the Board of Public Utilities?

A. Yes. I filed testimony before the Board in dockets GO12050363 (South Jersey Gas Energy Efficiency), EM140460581 (Exelon-PHI Merger), ER14030250 (RECO Storm Resiliency), and GM15101196 (AGL Southern Company Merger).

Q. Mr. Chang, have you previously testified before utility regulatory agencies?

A. Yes. I have previously testified before the District of Columbia Public Service Commission, the Hawaii Public Utilities Commission, the Illinois Property Tax Appeal Board, the Maine Public Utilities Commission, the Maryland Public Service Commission, and the Massachusetts Department of Public Utilities. I have also filed testimony before the Delaware Public Utilities Commission, the Kansas Commerce Corporation, the Illinois Commerce Commission, and the United States District Court for the District of Maine.

II. PURPOSE AND SUMMARY

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of our testimony is to review engineering, reliability, and cybersecurity aspects of Public Service Electric and Gas' (the "Company" or "PSE&G") petition to raise electric distribution rates and to seek approval from the New Jersey Board of Public Utilities (the "Board").

Q. Please summarize your findings and recommendations.

A. Our findings and recommendations are summarized as follows:

- PSE&G's electric distribution capital budget when excluding spending for the Stimulus and Energy Strong programs, has increased at a compound annual growth rate of 9 percent since 2010. The 9 percent compound annual growth rate for base capital spending has been in the context of decreased reliability, as evidenced in the Company's failure to meet its Minimum Reliability Level in 2016.

- Future base distribution capital spending in 2019-2022 appears to be much lower than historical spending and flat suggesting there may not be consistency in the Company's planning. This may have implications for future reliability.
- We recommend that the Company's vegetation management budgets should be set at the three-year historical average in order to meet the Board's vegetation management requirements.
- The Company's investment in Advanced Technologies and other programs to automate the operations of its electric distribution system will require vigilance to avoid cybersecurity incidences. The Board should require the Company and other New Jersey utilities to provide it with contemporaneous cybersecurity reports regarding attempts and incidences consistent with FERC Order 848.
- At this time, the Board should disallow costs associated with the American Dream complex since parts of the project are not expected to open until March 2019 and October 2019. The Company has not demonstrated that the project meets the Board's Elizabethtown Water Company and Atlantic Base Rate Case standard for post-test year adjustments.
- The Board should reject the Company's proposed offset of remediation expenses associated with the Cape May remediation project. These expenses are the subject of an ongoing proceeding before the Board for deferred accounting and were not sought in the initial petition. Moreover, the

Company has not demonstrated why ratepayers should bear the full cost of the remediation effort for activities of the Company's predecessors.

- The Board should reject the Company's post-test year adjustments since most of the adjustments are for programs and blankets. The Company has not demonstrated that any of the post-test year adjustments are major in consequence as required by the BPU in the Elizabethtown Water Company Order and re-affirmed in the recent ACE Base Rate case Order.[1,2] Individual projects of more than $1,000,000 in capital spending only represent $68 million of the $242 million post-test year adjustments proposed by the Company.

III. RELIABILITY PERFORMANCE

Q. Please summarize your findings regarding the Company's overall reliability performance.

A. As discussed in more detail below, we find that the Company's system reliability has generally remained the same. However, the Company did not meet its minimum reliability requirements in 2016 for Customer Average Interruption Duration Index ("CAIDI").

Q. Please explain what the relevant reliability metrics represent.

A. System Average Interruption Frequency Index ("SAIFI") measures the number of sustained interruptions of the system during the year. CAIDI represents the

[1] See I/M/O Elizabethtown Water Company, BPU Docket No. WR8504330, (Order, (5/23/85).

[2] See I/M/O Atlantic City Electric .Company, BPU Docket No. ER18060638 (Order, July 25, 2018).

average duration of sustained interruptions experienced by customers and is represented in hours. Lower values for SAIFI and CAIDI indicate improved reliability. Under N.J.A.C. §14:5-8.2, New Jersey electric distribution companies are required to report their annual SAIFI and CAIDI metrics.

Q. Does the Company report a single value for each reliability metric?

A. No. The Company reports a value for reliability metrics that considers all events as well as a separate value that excludes "Major Events." Major Events are defined under N.J.A.C. 14:5 1-2 as interruptions affecting at least 10 percent of customers within an operating area.[3] This includes, but is not limited to, tornadoes, thunderstorms, snowstorms, heat waves, and ice storms.[4] Because Major Events are unpredictable, outages metrics excluding Major Events is better for determining general reliability of the Company's distribution system.

Q. Does your testimony address Major Events?

A. Not explicitly. Our testimony generally addresses the Company's reliability performance under "blue sky" conditions that exclude the Major Events defined by New Jersey BPU regulations. The Company's investments in the Energy Strong program generally address Major Events. Some of those investments are part of this proceeding.

[3] N.J.A.C. 14:5-1.2.
[4] Major Events also include periods when a Company provides mutual assistance to another utility.

Q. What has been the reported Company's reliability performance in the last few years?

A. The Company's reliability performance for both SAIFI and CAIDI as presented in its Petition is shown in the two charts below.

Figure 1 PSE&G Reported SAIFI (excluding major events) 2006 through 2015 from Schedule MJA-16 [5]

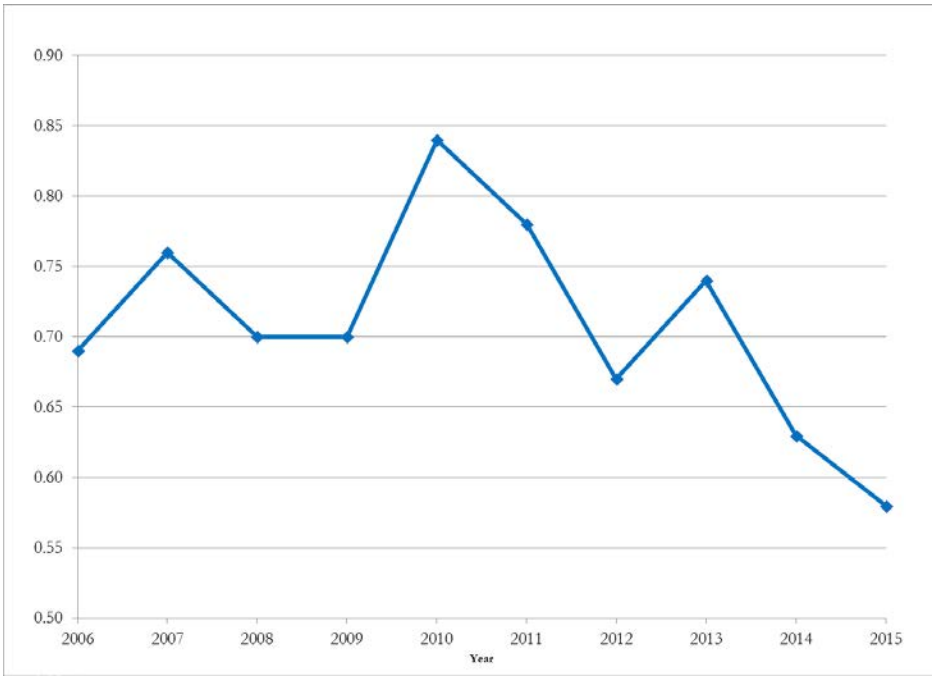
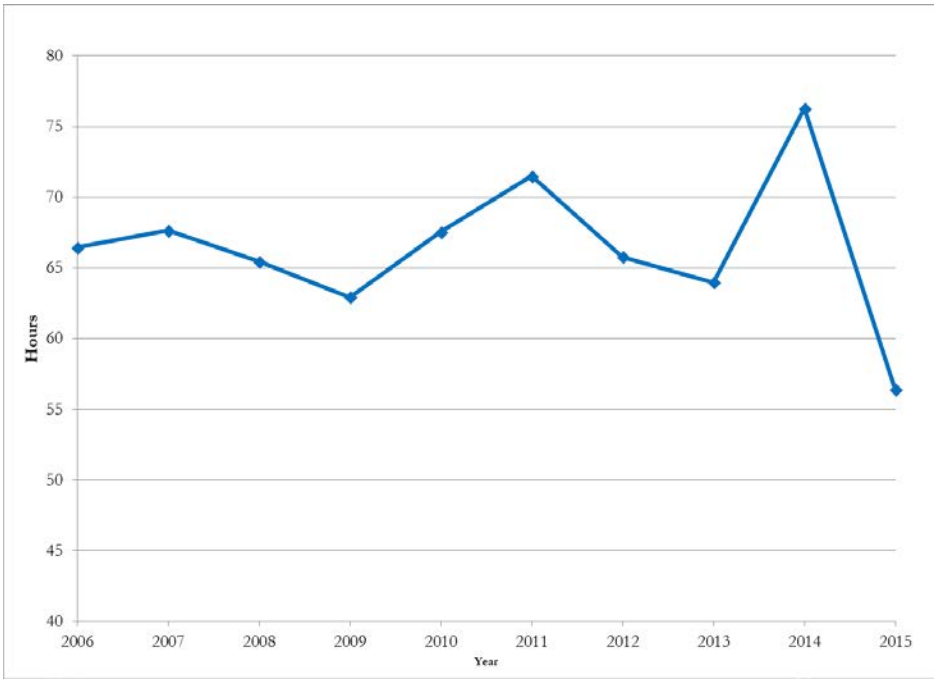


Figure 2 PSE&G Reported CAIDI (excluding major events) 2006 through 2015 from Schedule MJA-16 [6]

[5] Direct Testimony of Michael J. Adams. January 12, 2018 Exhibit P-6 Schedule MJA-16
[6] Direct Testimony of Michael J. Adams. January 12, 2018 Exhibit P-6 Schedule MJA-17



The data through 2015 show that the Company's reliability performance generally remained the same with some slight improvements. The Company has reported good reliability historically, with performance in the top quartile for SAIFI and CAIDI based on the Institute of Electrical and Electronics Engineers ("IEEE") nationwide survey of electric utilities.[7] The Schedules provided in the direct testimony of PSE&G witness Mr. Michael Adams (Exhibit P-6 Schedule MJA-16 and Schedule MJA-17) end in 2015. However, the Company's Petition did not include the Company's 2016 reliability metrics.

Q. Please explain what data is missing from the reliability schedules in Mr. Adams' Direct Testimony.

A. We included data for 2016 and 2017 in our analysis of the Company's reliability metrics. The 2016 data was available since May 2017 yet was not included in the

[7] Direct Testimony of Michael Adams. Schedules MJA-18 and MJA-19.

Company's Petition. The 2017 data became available at the end of May 2018, and we have also included the data for completeness in our analysis.

Q. Is it odd that the Company did not include 2016 reliability data in its Petition, if the data was available?

A. Yes, we find it problematic that PSE&G witnesses Mr. Cardenas and Mr. Adams did not include 2016 reliability data in their respective direct testimonies. The Company's Petition is dated January 12, 2018, while the Company's 2016 Annual System Performance report is dated May 23, 2017.[8] We note that Mr. Adams' direct testimony references 2016 data for his non-reliability schedules (Schedule MJA-3 through MJA-23). Yet, he omitted 2016 data from the five reliability-related schedules (Schedule MJA-16 through Schedule MJA-20).

Q. What would be the Company's reliability values with the inclusion of the 2016 and 2017 data?

A. In the following two figures, we include both 2016 and 2017 reliability data shown as the dotted lines to Mr. Adams' Schedules MJA-16 and MJA-17 for data from 2006 through 2015 shown as solid lines.

[8] RCR-ENG-E-0003

Figure 3 PSE&G SAIFI (excluding major events) 2006 through 2017[9]

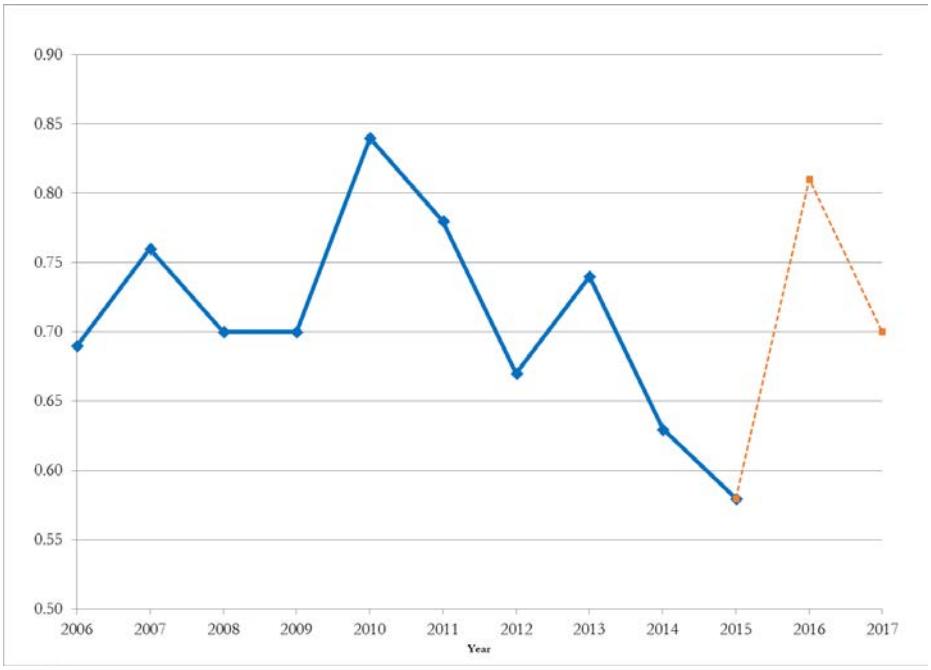
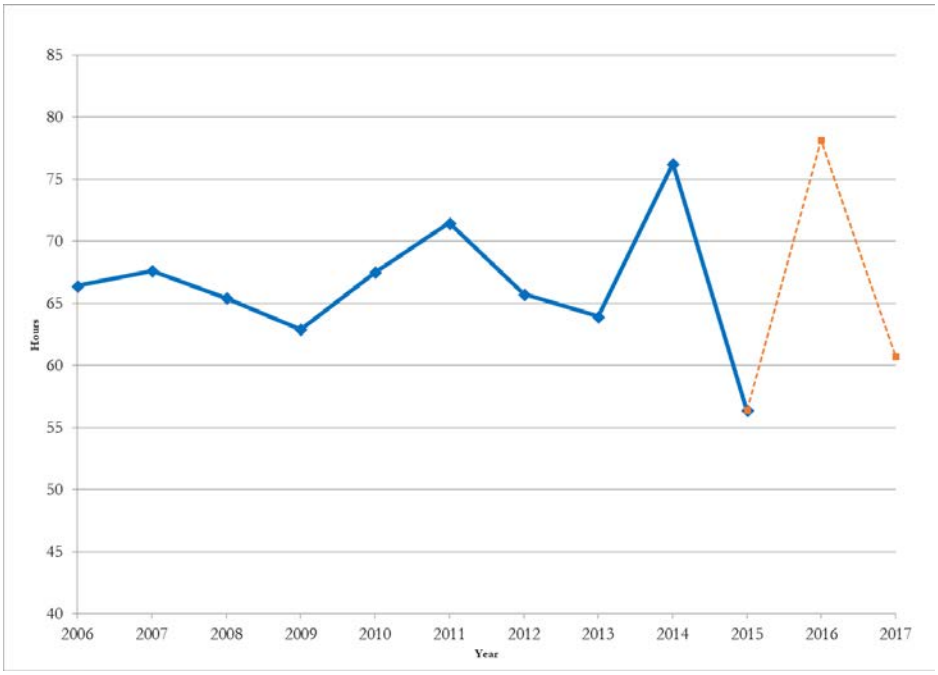


Figure 4 PSE&G CAIDI (excluding Major Events) 2006 through 2017[10]



[9] Direct Testimony of Michael Adams. January 12, 2018. Exhibit P-6 Schedule MJA-16 and RCR-ENG-03
[10] Direct Testimony of Michael Adams. January 12, 2018. Exhibit P-6 Schedule MJA-17 and RCR-ENG-3

Q. What do the two figures show?

A. The inclusion of 2016 and 2017 data shows that the Company experienced increases (deteriorating reliability) in both SAIFI and CAIDI in 2016. Both SAIFI (0.81/0.58) and CAIDI (78/56) values increased by 39 percent between 2015 and 2016. Furthermore, the Company's 2016 CAIDI of 78.16 did not meet the Company's Minimum Reliability Level of 76.41.[11] Under N.J.A.C §14:5-8.2, each electric distribution company has a Minimum Reliability Level that is based on the average SAIFI and CAIDI for the period 2010–2014.[12] Failure to meet the Company's Minimum Reliability Level may result in penalties assessed by the Board.[13] The Company exceeded its Minimum Reliability Level by 2.3 percent In 2016. The Company notes: "Performance worse than the Minimum Reliability Level is unacceptable and may be subject to penalty."[14] It is our understanding the Board has not assessed a penalty on the Company for failing to meet its 2016 Minimum Reliability Level.

Q. Did the Company's reliability improve in 2017?

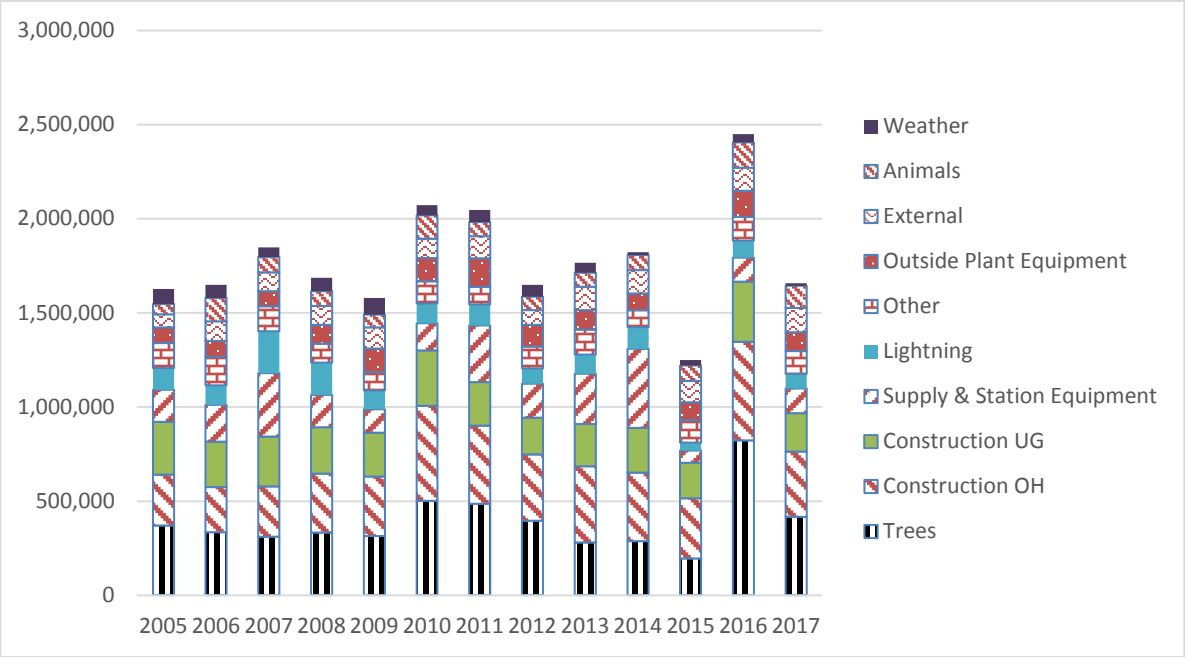
A. Yes, the 2017 values have improved relative to 2016. However, the 2017 values are still higher than 2015 values, indicating worse reliability than was shown in the direct testimony of Mr. Adams' Schedules MJA-16 and MJA-17, and as shown in Figure 3 and Figure 4.

[11] 2016 Annual System Performance Report. Page 10. RCR-ENG-3.
[12] N.J.A.C §14:5-8.10 defines Minimum Reliability Level for each operating area as the CAIDI and SAIFI five-year benchmark standard plus 1.5 standard deviations.
[13] N.J.A.C §14:5-8.13
[14] 2016 Annual System Performance Report. Page 6. RCR-ENG-3.

Q. Does the Company provide details why its reliability deteriorated in 2016?

A. A detailed analysis of the outage duration for 2016 shows an increase in both tree-related outages and overhead construction-related outages. This is shown in the figure below:

Figure 5 PSE&G 2005–2017 Outage hours by classification[15]



The 2016 tree and overhead ("OH") construction outage hours represented 54 percent of the 2016 outage hours, whereas on average the two categories represent approximately 40 percent of outage hours for a given year based on the available data. Another way to look at the 2016 Tree and ("OH") construction outages is that the sum of the two categories for 2016 (1,345,315 hours) exceeded the 2015 outage duration hours (1,248,584 hours) for all outage categories. The Company

[15] RCR-ENG-3

notes that five severe weather events in 2016 resulted in 447,143, or 54 percent, of the tree-related outages.[16]

Q. Should the Board be concerned by the Company's reliability performance in 2016?

A. While the Company's reliability improved in 2017 compared to 2016, the deterioration in reliability in the last two years (2016 and 2017) occurred despite increasing distribution and vegetation management spending. We would expect that the Company's increases in both distribution capital and vegetation management spending would result in improving, or at the very least, maintaining overall reliability. Ratepayers should not experience declining reliability given the level of the Company's capital spending.

IV. HISTORICAL DISTRIBUTION CAPITAL SPENDING

Q. Please summarize the Company's historical spending on its distribution system.

A. Mr. Jorge Cardenas' direct testimony provides a very generalized summary of the Company's historical capital spending since its last rate case in 2010.[17] We have provided a graphical representation of the Company's overall distribution capital spending.

[16] See RCR-ENG-3, 2016 Annual System Performance Report. Page 19. The five events were February 16, April 3, June 8, July 18, and July 25. All five events were not classified as major events by New Jersey.
[17] Direct testimony of Jorge Cardenas. January 12, 2018. Page 24:11-14.

Figure 6 PSE&G Historical Electric Capital Spending ($ millions)[18]

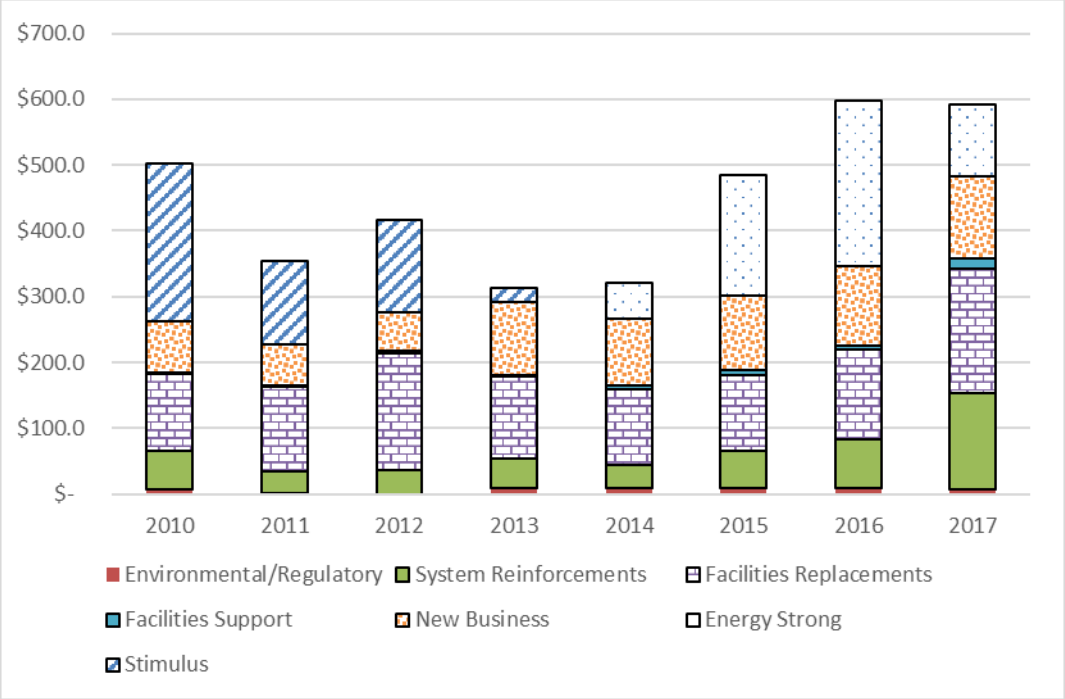


Figure 6 shows the breakdown of the seven capital spending categories as defined by the Company. Overall, the Company's distribution capital spending increased by approximately $89 million from 2010 to 2017. This translates to an overall annual growth rate of 2.4 percent. In the last eight years, the Company has spent over $500 million per year in three instances, with the highest amount at $597 million in 2016. These expenditures are inclusive of the Stimulus spending in 2010 through 2012, and Energy Strong spending from 2014 onwards as described more fully below.[19, 20]

[18] RCR-A-99
[19] See BPU Docket Nos. EO09010049 and GO09010050 (Stimulus Proceeding).
[20] See BPU Docket Nos. EO13020155 and GO13020156 (Energy Strong).

Q. Do the Stimulus and Energy Strong spending programs distort the Company's overall annual budget?

A. Yes. The two programs were capital programs designed to address extraordinary circumstances that impacted New Jersey. The Stimulus program (BPU Docket Nos. EO09010049 and GO09010050) was originally created by Governor Corzine to accelerate planned, but deferred infrastructure spending to help stimulate the New Jersey economy following the recession of 2008/09.[21] These were generally capital projects that the utilities had already planned. The Energy Strong program (BPU Docket Nos. EO13020155 and GO13020156) addressed resiliency spending following Superstorm Sandy.[22] Both programs resulted in an average increase of $140 million to the Company's annual electric distribution capital spending.

Q. What would be the Company's capital spending excluding the effects of the Stimulus and Energy Strong programs?

A. We have restated the Company's distribution capital spending to remove the effects of the Stimulus and Energy Strong programs in the following figure shown below.

[21] BPU Docket Nos. EO09010049 and GO09010050 (Stimulus Proceeding).
[22] BPU Docket Nos. EO13020155 and GO13020156 (Energy Strong).

Figure 7 PSE&G Historical Electric Capital Spending Excluding Stimulus and Energy Strong Programs ($ millions)[23]

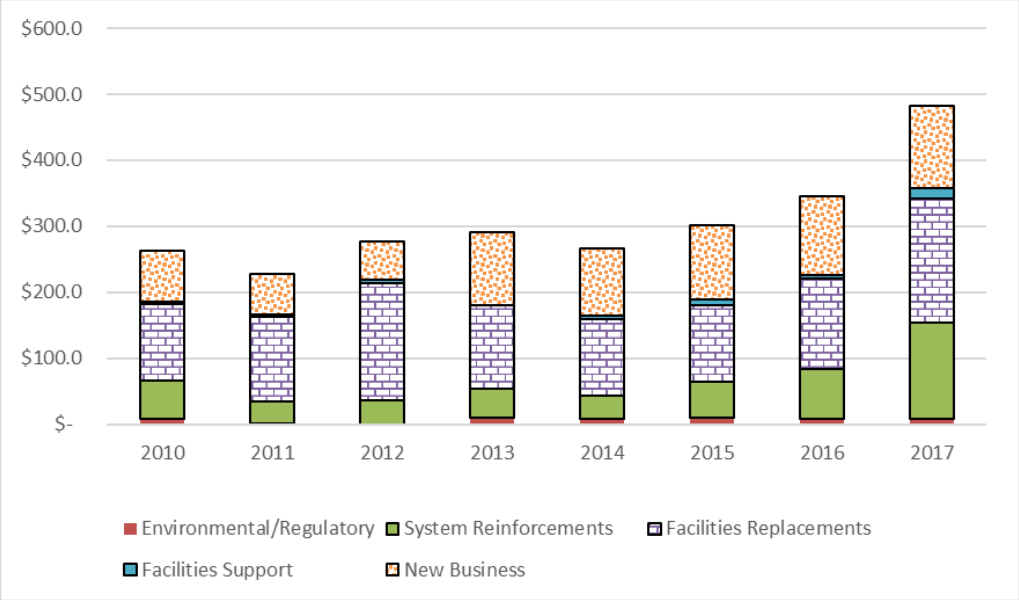


Figure 7 shows the breakdown of the five capital spending categories. The Company's total core distribution capital spending increased from $263 million to $482 million from 2010 to 2017. The growth has been in System Reinforcement, Facilities Replacement, and New Business budget categories. This translates to an overall compound annual growth rate of 9.03 percent. This increase in spending since 2010 has occurred despite SAIFI only improving by a compound annual growth rate of 2.6 percent and CAIDI only improving by a compound annual growth rate of 1.5 percent over the same period. This shows that spending has outpaced observed improvements in reliability.

[23] RCR-A-99

Q. Please explain the five budget categories of the Company's electric capital spending.

A. The Company's definitions for the five categories of capital spending are listed below.[24]

> **Environmental/Regulatory**: The Company notes that expenditures in this category include the costs associated with non-discretionary relocation of facilities and miscellaneous projects required for environmental or regulatory obligations.
>
> **System Reinforcement**: The Company notes that System Reinforcements involve projects associated with increasing electric system capacity to meet customers' peak demand and capacity requirements. The Company notes that System Reinforcement expenditures predominantly include investments in electric facilities such as new substations and "poorest performing" circuits as reported to the Board.
>
> **Facilities Replacement:** These projects include the replacement of defective or aging equipment and facilities and [replacement related to] large equipment failures that may occur. The Company notes that Facilities Replacement expenditures also include ongoing work to replace specific types of electric equipment, such as capacitors, street lights, poles, transformers, breakers, and replacement meters; underground facilities such as cables; and inside plant and substation facilities
>
> **Facilities Support**: The Company notes that these projects include support facilities such as buildings, vehicles, and similar miscellaneous expenditures. This category includes costs related to the replacement of the Company's vehicle fleet.
>
> **New Business:** These projects include the costs of connecting new electric customers lighting, and the service connections for electric residential and smaller business customers. The Company notes that specific connection costs for large electric customer projects or upgrades to existing service would be under this category as well.

[24] Direct Testimony of Jorge Cardenas. January 12, 2018. Page 25, line 10 through Page 29, line 2.

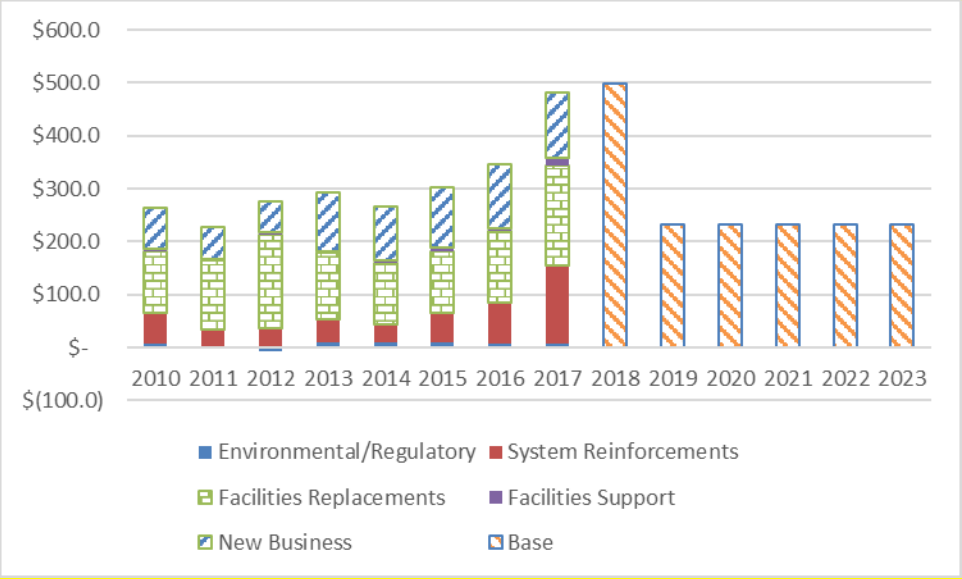
As noted earlier, the Stimulus and Energy Strong categories represented spending attributable to the two specific programs. The Stimulus program ended in 2013, and Energy Strong is projected to end in 2019.

V. PROJECTED DISTRIBUTION CAPITAL SPENDING

Q. Please summarize the Company's proposed capital spending on its distribution system for the period 2018–2023.

A. Figure 8 shows that the distribution capital spending and budgets from 2010 through 2023 excluding the effects of the Stimulus, Energy Strong, or future programs.

Figure 8 PSE&G Actual and Proposed Electric Distribution Capital Spending (2010-2023)[25]



What is notable in the figure is the drop in base spending from 2019 onwards. We understand that the post 2019 spending represents the Company's estimate for

[25] RCR-A-99 and S-OCI-PSEG-ENG-E-30

base capital spending. In of itself, this rapid decrease in spending post 2019 may have implication for the Company's planning and operations. It also suggests the need to maintain vigilance regarding the Company's reliability performance to ensure that the decrease in reliability in 2016 does not occur again.

Q. Does the Company have plans to increase overall distribution capital spending not shown in the Figure 8?

A It is our understanding that the Company filed a petition for its Energy Strong II program on June 6, 2018. The Company is proposing approximately $1.5 billion in electric infrastructure investments over five years. We further understand the Petition is pending before the Board in Docket Nos. EO18060629 and GO18060630. Should the Board ultimately approve some version of the Energy Strong II, the additional spending will be incremental to the $233 million in annual base spending shown in Figure 8.

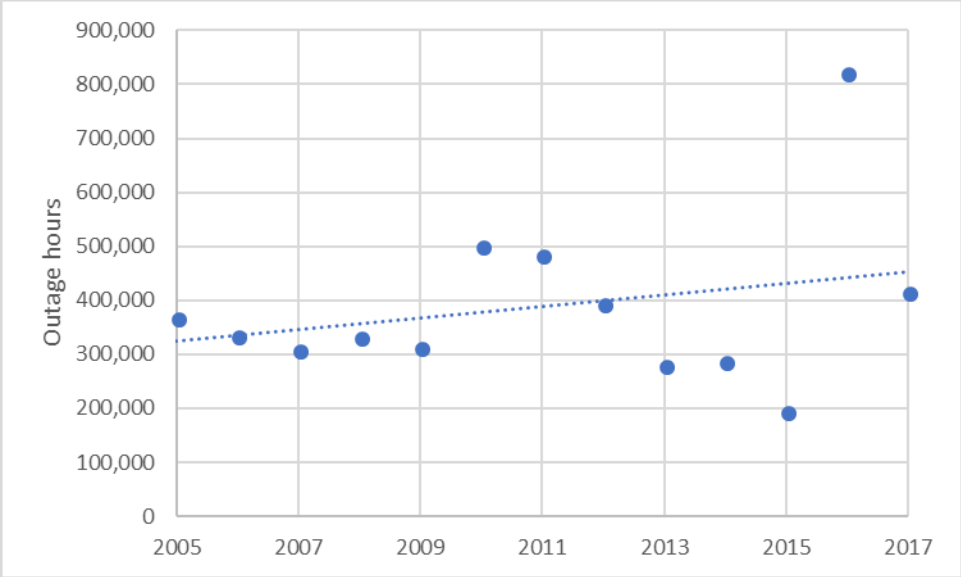
VI. VEGETATION MANAGEMENT

Q. Please summarize your conclusions regarding the Company's vegetation management program.

A. As shown in the figure below, the trend in the Company's vegetation management outage durations since 2005 have increased.

Figure 9 2005–2017 PSE&G Tree-Related Outage Duration (hours)[26]

[26] RCR-ENG-3

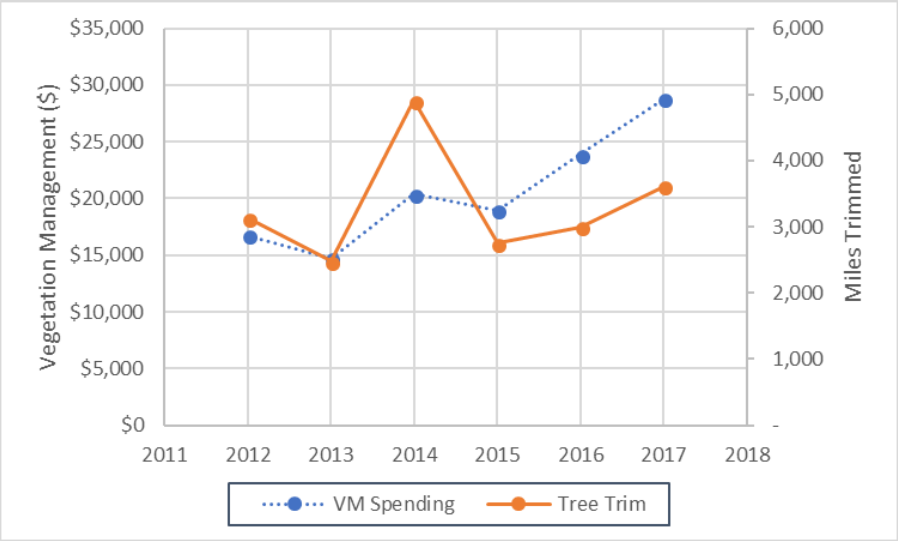


A more detailed look at the trend in tree-related outages suggests that from the period of 2010–2015, the Company achieved improvements in outage durations. Figure 9 shows that since 2005, the Company's tree-related outage durations (excluding Major Events) have increased at an average annual rate of 1 percent. The Company's tree-related outage frequencies and durations generally rank as the number one or two cause of outage durations. However, if we excluded the 2016 tree-related outages, the Company's trend line for tree-related outages would appear generally flat. It is possible that the exclusion of tree-related outages in 2011 and 2012 from major events such as Hurricane Irene, the October 2011 snowstorm, and Superstorm Sandy affected these trends. However, the most recent two years have seen an increase in tree-related outages, as described earlier.

Q. Has vegetation management spending increased in the last few years?

A. Yes. Vegetation management spending has increased, partially due to new vegetation management requirements put in place in 2016, but the trend for increased vegetation management spending occurred before 2016. This trend is shown in the figure below.

Figure 10 PSE&G Historical Vegetation Management Spending and Miles Trimmed[27]



Overall, the Company has experienced increases in its tree trimming expenses at a compound annual growth rate of 11 percent. As shown in the Company's reliability data in Figure 3 and Figure 4, higher spending has not necessarily translated to improved reliability.

Figure 10 also shows a more gradual increase in the amount of tree trimmed miles. The Company has increased the miles trimmed at a compound annual growth rate of 3 percent. The exception in tree trimmed miles is in 2014, when the

[27] RCR-A-77 and RCR-ENG-16.

Company reported that it had exceeded the amount of tree trimming under its Vegetation Management- Tree Trimming – Distribution (4 kV) program.[28] We note that in 2015 and 2016, the Company did not meet its tree trimming targets for its 4-kV and 13-kV overhead circuits.[29] For 2017, the Company reports that it completed 91 percent of its planned 4-KV trimming and 117 percent of its planned 13-kV trimming.[30]

Q. Has the increased spending and increased tree trimming miles been commensurate?

A. No. We note that the Company's tree trimming expenses per mile have been increasing as shown in the table below.

Table 1 Vegetation Management Spending per mile[31]

	VM Spending ($000's)	Miles Trimmed	S/mile
2011		3,686	
2012	$16,763	3,131	$5.35
2013	$14,726	2,480	$5.94
2014	$20,393	4,908	$4.16
2015	$18,941	2,753	$6.88
2016	$23,855	2,994	$7.97
2017	$28,802	3,612	$7.97
Test Year	$35,567		

[28] RCR-ENG-3. 2014 Annual System Performance Report. The Company uses the term Tree Trimming Units in its Annual System Performance reports but does not define the terminology of a Tree Trimming Unit.
[29] RCR-ENG-3. 2015 and 2016 Annual System Performance Report.
[30] S-OCI-ENG-E-0036_2017 Reliability Programs.pdf
[31] RCR-A-77, RCR-ENG-E-0016

Spending per mile has increased at a compound annual growth rate of 8 percent since 2016. While we would expect to see some additional vegetation management expense in response to the Board's 2016 vegetation management regulations, we are concerned about the higher than average levels of tree-related outages in 2016 and 2017.

Q. Does the Company project future spending increases for vegetation management?

A. In response to RCR-A-77, the Company provided the test-year projection for vegetation management spending. This amount is $35.5 million, which is an increase of 23 percent over the 2017 spending. The Company claims that the increased vegetation management budgets are the result of the BPU's new vegetation management regulations that came into effect in 2016.[32]

Q. Please explain your understanding of the BPU's vegetation management regulations adopted in Docket EX15010033.

A. It is our understanding that the revised regulations generally follow initiatives already in place under the Company's Enhanced Vegetation Management program. The BPU regulations include:[33]

- Four-year trim cycle;
- Hazard tree identification and management program;
- The removal of overhanging vegetation from the substation to the first protective device starting in January 2016; and

[32] Direct testimony of Jorge Cardenas, January 12, 2018. Page 44, lines 2 through 15.
[33] See, N.J.A.C. 14:5-9 http://www.njslom.org/documents/NJ-RegulationsSubchapter9-electric.pdf

- Additional reporting requirements for vegetation management.

Q. Do the Board's regulations justify additional vegetation management expenses for the Company?

A. Apart from reporting requirements and explicitly defining the trim area of distribution lines and the first protective device, we believe that the Company has already implemented many of the policies outlined in the BPU's new regulation.[34] That said, the Company is proposing significant increases in vegetation management spending to meet the BPU's new regulations governing vegetation management. We do not believe it is necessary for the Company to increase vegetation management expenses from $18.9 million in 2015 to $35.5 million in the test year to comply with the new BPU vegetation management regulations. It appears to us that the regulation's requirement for trimming of each circuit from the substation to the first protective device as defined by the BPU are consistent with the Company's existing vegetation management program. We believe that the Company's three-year historical spending is more appropriate.

Q. What is your recommendation to the Board regarding the Company's vegetation management program?

A. As we have noted above, the Company has seen increases in vegetation management spending since 2012 and well before the adoption of the new vegetation management regulations in 2016. We recommend that the Board require the Company to utilize a three-year historical average spending level to

[34] RCR-ENG-003. 2015 Annual System Performance Report. Page 29, 104.

meet the Board's vegetation management regulation and that PSE&G's vegetation management budgets be set at those levels.

VII. CYBERSERCURITY

Q. Please summarize your concerns regarding the Company's Cybersecurity response.

A. The Board should require utilities to provide regular updates on the state of cybersecurity efforts. This would mirror cybersecurity incident reporting rules being considered at the Federal Energy Regulatory Commission (FERC).

Q. Are there concerns about cybersecurity? [35]

A. Yes, on a general level. Popular news regularly reports on the cybersecurity threats faced by our society in general, and utilities specifically. A recent Reuters news article reported that hackers had penetrated the networks of several utilities in 2017.[36] In addition, the New Jersey Cybersecurity and Communication Integration Cell ("NJCCIC") has also posted elevated threat levels on its website.[37]

Q. What are some common cybersecurity threats experienced by utilities?

A. Some common cybersecurity threats experienced by the Company and all computer users include, but are not limited to:

[35] See Susan Baldwin's Testimony in this docket for further discussion regarding cyber security.
[36] https://www.reuters.com/article/us-usa-cyber-russia/russian-hackers-penetrated-networks-of-u-s-electric-utilities-wsj-idUSKBN1KE03F
[37] https://www.cyber.nj.gov/ Accessed July 31, 2018.

Malware: Malware is an abbreviated form of "malicious software." This is software that is specifically designed to gain access to or damage a computer, usually without the knowledge of the owner. Examples of malware include: spyware, ransomware, viruses, worms, Trojan horses, adware, or any type of malicious code that infiltrates a computer.[38]

Phishing is an email or electronic communications scam that targets a specific individual, organization, or business. Although often intended to steal data for malicious purposes, phishing scams may also install malware on a targeted user's computer.[39]

In 2016, the Board recognized the need to protect utility critical systems from unauthorized entry by non-physical means.[40] Particularly, the Board recognized that as technology advances, the utilities computerized systems would be become increasingly susceptible to cybersecurity attacks, data breaches, theft, and sabotage from perpetrators around the world.[41] In response, the Board detailed minimum requirements for:[42]

- Cybersecurity Risk Management
- Situational Awareness
- Incident Reporting
- Response and Recovery

[38] https://us.norton.com/internetsecurity-malware.html
[39] https://usa.kaspersky.com/resource-center/definitions/spear-phishing
[40] I/M/O Utility Cyber Security Program Requirements. Docket No. AO16030196. Order March 18, 2016.
[41] Ibid. Page 1.
[42] Ibid. Pages 4-7.

- Security Awareness and Training
- Implementation
- Accountability and Board Review

Q. Has the Company provided information regarding attempted cybersecurity breaches?

A. When asked to provide information on all cybersecurity breaches in the last five years, the Company indicated that it had not experienced any significant breaches in the Company's systems.[43] The Company did indicate that it had experienced malware attempts, phishing attempts, and scams during the same period, but did not provide any specific details or reports of any attempts.[44]

Q. Has the Company indicated that it has experienced any attempted data breaches with its Energy Strong Advanced Technologies program?

The Company noted that it had not experienced any attempted breaches of its Advanced Technologies investments.[45] The Advanced Technologies program deploys smart grid technologies to monitor system operations with the goal of improving deployment of repair teams after major events and under normal operations.[46] The Company does note that it implements several cybersecurity measures and protocols as part of the Energy Strong program.[47] These

[43] RCR-SEC-11
[44] Ibid.
[45] RCR-SEC-18
[46] Direct testimony of Jorge Cardenas. January 12, 2018. Page 29, lines 20-22.
[47] RCR-SEC-13

requirements would need to be in compliance with the Board's 2016 Order regarding cybersecurity ("2016 Order").[48]

Q. Did the Company provide copies of any reports to the Board or other entities regarding cybersecurity?

A. As noted in the Company's response to RCR-SEC-11, the Company only detailed overview information regarding either cybersecurity breaches or attempts. If the Company does provide cybersecurity reports regarding either breaches or attempts to the BPU or the NJCCIC, then it did not provide any indication that it does so in responses to our discovery requests.

Q. Does the Board's 2016 Order cover the reporting of attempted breaches?

A. No, the 2016 Order does not require utilities to report attempted breaches. We believe that information about attempts and incidences would be beneficial to the Board to understand possible threats and to create a forum for utilities to coordinate responses and share information.

Q. Has FERC responded to the expanded cybersecurity threats?

A. Yes. On July 19, 2018, FERC announced new rules to require the North American Electric Reliability Corporation to improve mandatory reporting of cybersecurity incidences.[49] Current rules only require utilities to provide information when incidences have resulted in disruptions or compromised systems. The new rules

[48] I/M/O Utility Cyber Security Program Requirements. Docket No. AO16030196. (Order, March 18, 2016.).
[49] https://www.ferc.gov/media/news-releases/2018/2018-3/07-19-18-E-1.asp#.W1h5G9JKjD5

will require utilities to provide information on attempted incidences in addition to cybersecurity incidences.

Q. What was one of the reasons why FERC modified its rules to include attempts?

A. FERC recognized that its current reporting threshold may understate the true threat facing the bulk electric system since there were no reportable incidences in 2015 and 2016.[50] The new rules will improve awareness of existing and future cybersecurity threats.[51] FERC also envisions the regular reporting of cybersecurity attempts to assist in the analysis of trends over time.[52]

Q. Has FERC suggested incident reporting times?

A. Yes. While FERC will leave the details of the reporting times to NERC, it has indicated some suggested incident reporting times in its order. For instance, FERC recommended:

> Higher risk incidents, such as detecting malware within the ESP and associated EACMS or an incident that disrupted one or more reliability tasks, could trigger the report to be submitted to the E-ISAC and ICS-CERT within a more urgent timeframe, such as within **one hour**, similar to the current reporting deadline in Reliability Standard CIP-008-5. For lower risk incidents, such as the detection of attempts at unauthorized access to the responsible entity's ESP or associated EACMS, an initial reporting timeframe between **eight and twenty-four hours** would provide an early indication of potential cyber-attacks. [53] [bold added for emphasis]

[50] FERC. Order 848. July 19, 2018. Docket No. RM18-2-000 Paragraph 2 at page 2.
[51] Ibid.
[52] Ibid. Paragraph 89 at page 56.
[53] Ibid. Paragraph 89 at page 55.

Q. What is your recommendation to the Board?

A. The Company's investments in the Advanced Technologies program under Energy Strong and other investments in distribution system automation and monitoring mean that cybersecurity awareness and preparedness is becoming more important. At a minimum, the Board should require the Company and other utilities—since cybersecurity affects all of New Jersey's utilities–to provide contemporaneous copies of reports to the Board under the new FERC order. In addition, the Board should review the final NERC reporting rules to identify what elements would be useful to apply to New Jersey.

VIII. AMERICAN DREAM COMPLEX

Q. Please summarize your concerns regarding the Company's proposed American Dream cost recovery.

A. We believe that the Board should disallow the $12.8 million ($6.3 million inside plant, $6.5 million outside plant) for the American Dream Complex that the Company included for the project this proceeding. Our reasoning is that elements of project are not expected to open until the Spring of 2019 and remaining portions of the complex are slated to open in the Fall of 2019. The Company has not demonstrated that the costs associated with the project are consistent with the Board's Elizabethtown Water Standard that projects may be included if projects are in service within six months beyond the end of the test year, that such rate

base additions are major in nature and consequence, and that such additions be substantiated with very reliable data.[54]

Q. Please describe the significance of the Board's Elizabethtown Water standard?

A. The Board's standard for post-test year adjustments states:

> (b) changes to rate base for a period of six months beyond the end of the test year, provided there is a clear likelihood that such proposed rate base additions shall be in service by the end of said six-month period, that such rate base additions are major in nature and consequence, and the such additions be substantiated with very reliable data; [55]

We understand that these criteria were re-affirmed recently in the ACE Base Rate Case Order of July 25, 2018.[56]

Q. Please describe the American Dream Complex.

A. American Dream Complex ("Complex") is a project encompassing 2.9 million square-feet of retail/restaurant leasable space and 346,100 square feet of amusement park space.[57] The retail/restaurant portion will include six anchor tenants, 339 small shops, 21 restaurants, 45 specialty food tenants, 20 food court tenants, and five kiosks. The entertainment anchors for the complex will include a movie theater, performing arts center, a snow dome, observation wheel, miniature golf, and an ice rink.

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[54] I/M/O Elizabethtown Water Company Rate Case, BPU Docket No. WR8504330 (Order, 5/23/85). Page 2.
[55] Ibid.
[56] See In Re Atlantic City Electric Rate Case. BPU Docket No. ER18060638 (Order, July 25, 2018).
[57] http://www.americandream.com/

Q. Has the proposed project faced complications?

A. Yes. The original developer, Mills Corporation, attempted to develop the site in 2003.[58] However, the developer failed to complete the project and so did its successor, Colony Capital.[59] In 2010, Triple Five Worldwide acquired the project and renamed it American Dream Complex. In 2014, the project resumed construction. In BPU Docket Number EO15091080, the Board indicated that the project would be completed in 2017.[60] In this proceeding, the Company has indicated that some of the facilities in the complex are not anticipated to be open until March 2019 and that the water park will not open until October 2019.[61,62] It is not known when the Complex or its tenants will be responsible for utility expenses. The Company did not provide any detail of ongoing electric service agreements for the Complex.

Q. Is the partial opening of the Complex outside the six-month post test year period?

A. Yes. The test year for this Petition is currently June 30, 2018. Therefore, the Company would need to demonstrate that the Complex will be in service before December 31, 2018. The current partial opening is scheduled for March 2019 at the earliest, outside the six-month period.

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[58] https://www.nytimes.com/2010/11/27/nyregion/27Xanadu.html. Accessed July 31, 2018

[59] https://www.nj.com/bergen/index.ssf/2018/06/american_dream_how_did_a_swath_of_land_in_the_mead.html. Accessed July 27, 2018.

[60] American Dream Meadowlands Project Service Extension- Petition for Declaratory Ruling Non-Docketed Matter EO 15091080. September 15, 2015. Page 3.

[61] RCR-ENG-E-0041

[62] https://njmonthly.com/articles/jersey-living/awakening-the-dream/

Q. How much is the Company seeking to recover in this rate case?

A. It is our understanding that the Company has identified a gross rate base amount of$12.8 million for distribution-related work in this rate case.[63]

Q. What has been the actual and projected spending for this project?

A. Through April 2018, the Company spent approximately $2.3 million, with the bulk of the spending in 2016.[64] For the entire year of 2018, the Company anticipates spending a total of $9.7 million.[65] Combined, the two amounts sum to $12.0 million, which is roughly the $12.8 million request in this rate case.

Q. Did the developers of the American Dream Complex provide a service extension deposit?

A. Yes, the developers provided a deposit of $5.2 million in September 2017.[66] Since the Company is required to repay the deposit over a 10-year period, we have not made adjustments to the amounts provided by the Company.[67] We do note that in 2016, the Company requested to proceed with its ongoing investment in the project without receiving a deposit that is typical of service extension rules.[68] It is our understanding that the Company originally requested the Board to support the Company's decision to proceed with the project without requesting a deposit from

[63] RCR-ENG-E-0039, RCR-ENG-E-0040
[64] RCR-ENG-E-0047
[65] RCR-ENG-E-0048
[66] RCR-ENG-E-0043
[67] Public Service Electric and Gas. Tariff for Electric Service. Sheet No. 17 Section 3.7.3. Available at: https://nj.pseg.com/aboutpseg/regulatorypage/-/media/A54279A4641A4FDC8BA14736B51CFE90.ashx. Accessed July 31, 2018.
[68] Public Service Electric and Gas. American Dream Meadowlands Project Service Extension- Petition for Declaratory Ruling. Docket No. EO15091080. September 18, 2005.

the project's developers.[69] The Company's request to the Board was made with the acknowledgement that the project as of 2016 was unlikely to have sufficient energy usage to repay the Company's investment.[70]

Q. Do you have other concerns about the project outside of the post-test year timing?

A Yes, as a practical matter we are concerned that the Company is seeking to recover costs from ratepayers that are attributable to the developers as a service extension. Our understanding of the New Jersey service extension rules is that the utility has ten years to repay the deposit provided by developer for a service extension development.[71] On a theoretical level, if the project meets or exceeds expectations, then the revenue collected from increased sales would allow the utility to recoup its investment within ten years. As noted previously, the Company's acknowledgement that the project currently has insufficient reviews highlights the need for the Company to provide the Board with information regarding the Complex when it opens in 2019.[72] Therefore, we would recommend that the ratepayers should be shielded from the development risks of the Complex over a ten-year period for the costs associated with the service extension.

[69] Ibid.
[70] Ibid. Page 2.
[71] N.J.A.C 14:3-8.9
[72] RCR-ENG-E-0043_2016_01_13 BPU Secretary Ltr re American Dream.pdf, page 2.

Q. Please explain why you recommend disallowing the costs of the American Dream Complex in this rate case.

A. We recommend that the Board disallow the costs of the project in base rates in this rate case since it is still a construction work in process. The Company anticipates that the first portion of the complex will not open until March 2019, and that the remaining portions of the complex will not open until October 2019.[73] This would put the opening of the Complex beyond the six-month period. We recommend that ratepayers should not pay for capital expenditures associated with a project that has yet to open.

IX. CAPE MAY REMEDIATION COSTS

Q. Please summarize your concerns regarding the Company's proposed Cape May remediation cost recovery.

A. The Company has not demonstrated that the contamination of site occurred before the acquisition of the site by the Company's predecessor in 1948. The Company has only demonstrated that the site contained fill in 1930, and that the fill contains environmental pollutants. As such, the costs should be borne by shareholders until the Company demonstrates that the costs are the responsibility of ratepayers. We understand that Rate Counsel witness Ms. Andrea Crane has sponsored testimony stating that the issue of deferred accounting treatment of the proposed remediation costs is not properly before your honor in this case but is the subject of a separate petition before the Board in Docket EF17050461.

[73] RCR-ENG-E-41

Q. What is the Company seeking to recover in this rate case related to the remediation?

A. The Company is seeking to recover $10.9 million in deferred tax benefits to offset the remediation costs in this rate case.[74] This cost is associated with the remediation of contaminated soil from the site from 2011 through the test-year period of June 30, 2018.

Q. Please describe the location of the Harrison site.

A. The site is an eight-acre parcel (one acre submerged) located in Harrison, New Jersey. The site is bounded to the north by Cape May Street and bounded to the south by the Passaic River.[75] To the east and west, the parcel is bounded by other PSE&G properties. Specifically, the PSE&G Harrison Metering and Regulating Station (Transco) and the former Texas Eastern Metering and Regulating Station are located to the west.[76] A PSE&G liquid propane distribution facility is located to the east. The Company's 2011 Final Site Investigation report indicates that the parcel is vacant and covered with bare soil and gravel with vegetation along the Passaic River.

Q. What is the history of the site?

A. The 2011 Site Investigation Report indicates that PSE&G purchased the property in 1948 from the United New Jersey Railroad and Canal Company that owned the

[74] RCR-A-0031

[75] Docket EF17050461. RCR-E-0001. Langan Engineering and Environmental Services, Inc. Site Investigation Report PSEG Cape May Street Site Harrison, Hudson County, New Jersey. December 2011. Page 1-3.

[76] Ibid. Page 2-2.

site from 1873 through 1948 and that it may have been used as a farm prior to 1873.[77] Under PSE&G's ownership a propane distribution system was installed, a railroad spur was constructed, and a portion of the Site was used as an electrical substation.[78] In addition, PSE&G used the site to store stockpiled materials and dredged materials at some point.[79] The Company indicated that the original intent was to use the property to expand the Harrison Gas Works.[80]

Q. What was the Harrison Gas Works?

A. The Harrison Gas Works (1902–1987) was a PSE&G facility located near the Cape May site that historically stored oil and gas but was used primarily as a manufactured gas facility from 1926 through 1965.[81] From thereafter, the site was used as a peak-shaving facility until its closure in 1987 since base-load gas manufacturing was no longer needed.

Q. Did the Company identify some of its historical use of the site?

A. The Company indicated that the Cape May substation was in service from 1963 to 1980.[82] In addition, the Company described the rail spur that supported the Liquid Propane Gas facility to the east of the property.[83] The railroad spur was believed

[77] Ibid. Page 2-4.
[78] Ibid. Page 2-4.
[79] Ibid. Page 2-4 and 2-5.
[80] Docket EF17050461, RCR-0037.
[81] Public Service Electric and Gas Company's (PSE&G) Initial Response to USEPA Request For Information Diamond Alkali Superfund Site Passaic River Study: PSEG Former Harrison Gas Plant. Page 4.
[82] Docket EF17050461. RCR-0025
[83] Docket EF17050461. RCR-0026

to be used by the gas distribution company.[84] The temporary storage area of materials was also used by the gas distribution company.[85] In addition, the Company acknowledged that it had placed dredged material (13,000 cubic feet) from the Harrison Gas plant onto the site around 1979.[86]

Q. What is your understanding of the Company's remediation effort?

A. We understand that the remediation effort of the site is to remove and dispose of the upper 2 feet of soil and then to replace the removed 2 feet of soil with a 2-foot soil cap.[87] For areas with PCB concentrations above EPA's threshold of 1 milligram per kilogram, the Company's remediation plan excavated and transported the waste soil as PCB remediation waste.

Q. Has the Company provided evidence that its predecessor did not contribute to the contamination of this historical fill?

A. No, the Company has not provided evidence that its activities since the purchase of the property in 1948 did not contribute to the contamination on the site. To the contrary, the Company acknowledges that the PCBs and dioxin contamination were the result of its activities.[88] There does not appear to be much documentation as to whether the construction of the substation in 1963 or the rail road spurs in 1970 and 1975 impacted the site. The Company provides circumstantial evidence

[84] Ibid.
[85] Docket EF17050461. RCR-0027
[86] Docket EF17050461. RCR-0029; The Passaic River has well documented history of industrial pollution. See https://www.epa.gov/urbanwaterspartners/urban-waters-and-passaic-rivernewark-new-jersey
[87] Ibid. Page 7 of 48.
[88] Docket EF17050461. RCR-E-0048.

that there was fill at the site in 1930, and that the contamination is found in the fill.[89]

Q. Do you believe it is appropriate for the Company to remediate the site?

A. We do not have a concern about the need and methods for the site remediation. We are concerned that the historical use of the site and the intent of the site to support the expansion of the Harrison Gas Works suggests that other PSE&G entities should bear responsibility in the remediation costs associated with the site. These include the 1979 placement of dredge materials from the Passaic River and the use of the site for temporary storage of excavated materials have contributed to the contamination. As noted above and in the testimony of Rate Counsel witness Andrea Crane, the remediation costs are not properly at issue in this case but are the subject of a parallel proceeding before the Board in which the Company is seeking approval for deferred accounting of those costs. However, if the issue was to be addressed in this proceeding, we believe that ratepayers should not bear the full cost of remediating the contaminated site.

[89] Docket EF17050461. RCR-E-0033. The Company notes that the shoreline was extended with fill after 1948.

X. POST-TEST-YEAR ADJUSTMENTS

Q. Please summarize your concerns regarding the Company's Post-Test-Year Adjustments.

A. We understand that Rate Counsel witness Ms. Andrea Crane has sponsored testimony that also addresses concerns regarding the Company's post-test-year adjustments. We find that the Company has not specifically identified the importance of any one of the projects in its list, and therefore we believe that it would be inappropriate to include any of the Company's post-test-year adjustments as meeting the Board's Elizabethtown Water standard as discussed earlier.

Q. Does the Company provide a list of post-test-year adjustments?

A. In response to update S-PSEG-ENG-0012, the Company provided details of $242 million of post-test-year projects.[90] Using the updated response to S-PSEG-ENG-0012 as the basis of the projects, we have a general sense of the types of projects included in the Company's post-test-year adjustments. Of those post-test-year projects, many items are designated as "blankets" or recurring spending that would be considered routine spending. Specifically, the Company has identified **$142 million, or 65 percent,** of the projects as blanket spending. We calculate that the Company has only identified 18 individual projects with cost estimates of approximately $1 million or more. Together these 18 specific projects represent only $68 million, or 28 percent, of the Company's post-test-year adjustments of

[90] Update S-PSEG-ENG-0012 12+0

$242 million. Several of the 18 projects are not expected to be in service until 2020 or 2021. These projects include the Madison substation ($21 million), the Rebuild Newark Switch Phase 1-D ($4 million), and NJ Transit-Meadows substation ($3.2 million). For these reasons, we do not believe it would be appropriate to include the Company's proposed post-test-year adjustments at this time.

XI. CONCLUSIONS AND RECOMMENDATIONS

Q. What are your recommendations?

A. We summarize our findings and recommendations as follows:

- PSE&G's electric capital budget has increased at an annual compound annual growth rate of 2 percent since 2010. However, when we exclude spending for the Stimulus and Energy Strong programs, the Company's electric distribution capital spending has increased at a compound annual growth rate of 9 percent since 2010. Despite this higher spending, ratepayers have seen decreased reliability—as evidenced in the Company's failure to meet its Minimum Reliability Level in 2016.
- Future base distribution capital spending in 2019-2022 appears to be much lower than historical spending and flat. The sudden decrease in budgets from historical base spending may have implications for future reliability.
- We recommend that the Company's vegetation management budgets should be set at the three-year historical average to meet the Board's vegetation management requirements.

- The Company's investment in Advanced Technologies and other programs to automate the operations of its electric distribution system will require vigilance to avoid cybersecurity incidences. The Board should require the Company and other New Jersey utilities to provide it with contemporaneous cybersecurity reports regarding attempts and incidences consistent with FERC Order 848.
- At this time, the Board should disallow costs associated with the American Dream complex since parts of the project are not expected to open until March 2019 and October 2019. The Company has not demonstrated that the project meets the Board's Elizabethtown Water Company standard for post-test year adjustments.
- The Board should reject the Company's proposed offset of remediation expenses associated with the Cape May remediation project. That matter is the subject of a proceeding before the Board and the Company has not demonstrated why ratepayers should bear the full cost of the remediation effort for activities of the Company's predecessors.
- The Board should reject the Company's post-test-year adjustments since most of the adjustments are generally for programs and blankets. The Company has not demonstrated that any of the post-test-year adjustments are major in consequence as set forth in standard of review found in the Elizabethtown Water Company case.[91] Individual projects of more than $1,000,000 in capital

[91] See In Re Elizabethtown Water Company Rate Case, BPU Docket No. WR8504330, Decision (5/23/85).

spending only represent $68 million of the $242 million post-test-year adjustments proposed by the Company.

Q. Does this conclude your testimony?

A. Yes. However, we reserve our right to modify our testimony based on additional information provided by the Company.

Charles P. Salamone P.E.

Profession: Power systems analysis and assessment, with a special emphasis on transmission planning, performance and design

Nationality: U.S. Citizen

Years of Experience: 40 years

Education B.S.E.E, Power System Engineering, 1973
Gannon University, Erie, PA

Position: Owner/Manager, Cape Power Systems Consulting

Web/Email: www.CapePowerSystems.com csalamone@capepowersystems.com

Contact Number: 774-271-0383

Summary: Mr. Salamone provides professional services based on 40 years of electric utility industry experience in the areas of Transmission Planning, Substation Planning, Distribution Planning, ISO-New England Planning Procedures, New England Power Pool Procedures, Congestion Management, Generator Interconnections, Planning/Capital Budget Management, Meter Engineering, and State (Mass DPU and New Jersey Rate Council) and Federal (FERC) Regulatory Agency Filing Development and Expert Witness Testimony

Experience:

2005- Pres. **Cape Power Systems Consulting**
Established a power system design, analysis, planning and assessment consulting company to work directly with diverse power system stakeholders.

- Worked with a number of clients for the development of analysis, reports and presentations in support of regulatory and technical review/approval process for transmission and distribution projects
- Provided technical assistance for transmission planning activities for an Independent System Operator including support for major transmission system expansion programs and development of a 10 year transmission plan
- Worked with a large Massachusetts Utility as an expert witness in support of State regulatory reviews for the siting of a major transmission system upgrade plan

- Worked with state regulatory agencies in support of electric utility rate case proceedings including expert witness testimony and assessment of electric utility performance
- Worked with multiple state regulatory agencies in support of review of electric utility smart grid initiatives including review of the technical performance, system benefits and viability of proposed electric utility programs
- Developed and conducted a comprehensive training program for implementation of an Energy Management System (EMS) based transmission system security assessment application for a large Massachusetts utility
- Worked with clients to conduct load flow assessment of transmission system performance for feasibility and reliability performance studies across New England and New York

1979-2005 NSTAR (Previously Boston Edison and Commonwealth Electric)

2000-2005 ***Director System Planning***

NSTAR (Previously Boston Edison and Commonwealth Electric) Boston, MA

- Responsible for long term planning of Company transmission, substation and distribution systems
- Successfully managed the studies, design, internal and external review and regulatory approval for a $250M 345 kV underground transmission expansion project serving the greater Boston area
- Managed numerous generator interconnection studies, design and approvals
- Successfully managed studies, design and approval for congestion mitigation plans and expansion project
- Oversaw transmission and distribution planning efforts to establish a comprehensive 10 year $300 million system expansion plan
- Served as Company representative on NEPOOL Reliability Committee and the New England Transmission Expansion Advisory Committee
- Served as Company expert witness for system planning related regulatory proceedings at both the state and federal levels.
- Supervised a staff of 10 senior engineers

1989-1999 ***Manager, System Planning and Meter Services***

Commonwealth Electric Company, Wareham, MA

- Develop risk based prioritized $10 million construction budget procedures
- Supervise a staff of 6 professional engineers and 4 analysts
- Served as chair of the NEPOOL Regional Transmission Planning Committee (currently the NEPOOL Reliability Committee)
- Process billing determinant and interval data for all major system customers
- Lead implementation of first MV90 meter data processing system
- Develop annual performance analysis reports for all transmission and major distribution systems

- Manage multiple FERC tariff based transmission customer and generation developer system impact studies
- Served as expert Company witness in State and FERC regulatory proceedings
- Implemented a risk index for prioritization of all transmission and major distribution construction projects
- Implemented automated electronic processing of major customer billing data, which significantly reduced time needed to generate bills
- Served as lead member on information technology company merger team
- Implemented process and equipment to perform all tie line, generator and wholesale customer meter testing
- Served as chair of the NEPOOL Planning Process Subcommittee, which established numerous NEPOOL policies for transmission/generator owners
- Served as Vice-Chair of the NEPOOL Reliability Committee

1984-1989 ***Meter Engineer***

Commonwealth Electric Company, Plymouth, MA

- Designed and supervised installation of 15 generator meter data recorders
- Developed customer load plotting and analysis software
- Developed meter equipment order data processing system for four remote offices
- Implemented PC control of meter test boards, which significantly reduced processing and record keeping time
- Managed programming of all electronic meter registers to insure accurate data registration

1979-1984 ***Computer Application Engineer***

Commonwealth Electric Company, Wareham, MA

- Implemented numerous technical and analytical software applications for engineering analysis
- Served as member of decision team for implementation of a new SCADA system

1978-1979 **San Diego Gas & Electric, *Planning Engineer***

San Diego Gas & Electric Company, San Diego, CA

- Performed extensive stability analysis for a new 230 kV transmission interconnection with Mexico
- Performed transmission design and performance analysis for a new 250 mile 500 kV line from San Diego to Arizona

1973-1978 **New England Gas & Electric Association, *Planning Engineer***

New England Gas & Electric Association, Cambridge, MA

- Performed extensive stability analysis for a new 560 MW generating plant on Cape Cod
- Developed transmission plan for a new 345 kV transmission line on Cape Cod
- Developed plans for design and sighting of new 115 / 23 kV substations on Cape Cod

Maximilian Chang, Principal Associate

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PROFESSIONAL EXPERIENCE

Synapse Energy Economics Inc., Cambridge, MA. *Principal Associate*, 2013 – present, *Associate*, 2008 – 2013.

Consults and provides analysis of technologies and policies, electric policy modeling, evaluation of air emissions of electricity generation, and other topics including energy efficiency, consumer advocacy, environmental compliance, and technology strategy within the energy industry. Conducts analysis in utility rate-cases focusing on reliability metrics and infrastructure issues and analyzes the benefits and costs of electric and natural gas energy efficiency measures and programs.

Environmental Health and Engineering, Newton, MA. *Senior Scientist*, 2001 – 2008.

Managed complex EPA-mandated abatement projects involving polychlorinated biphenyls (PCBs) in building-related materials. Provided green building assessment services for new and existing construction projects. Communicated and interpreted environmental data for clients and building occupants. Initiated and implemented web-based health and safety awareness training system used by laboratories and property management companies.

The Penobscot Group, Inc., Boston, MA. *Analyst*, 1994 – 2000.

Authored investment reports on Real Estate Investment Trusts (REITs) for buy-side research boutique. Advised institutional clients on REIT investment strategies and real estate asset exchanges for public equity transactions. Wrote and edited monthly publications of statistical and graphical comparison of coverage universe.

Harvard University Extension School, Cambridge, MA. *Teaching Assistant*, 1995 – 2002.

Teaching Assistant for Environmental Management I and Ocean Environments.

Brigham and Women's Hospital, Boston, MA. *Cancer Laboratory Technician*, 1992 – 1994.

Studied the biological mechanism of tumor eradication in mouse and human models. Organized and performed immunotherapy experiments for experimental cancer therapy. Analyzed and authored results in peer-reviewed scientific journals.

EDUCATION

Harvard University, Cambridge, MA
Master of Science in Environmental Science and Engineering, 2000

Cornell University, Ithaca, NY
Bachelor of Arts in Biology and Classics, 1992

REPORTS

Knight, P., Chang, M., White, D., Peluso, N., Ackerman, F., Hall, J., Chernick, P., Harper, S., Geller, S., Griffiths, B., Deman, L., Rosenkranz, J., Gifford, J., Yuen, P.Y., Snook, E., Shoesmith, J. 2018. *Avoided Energy Supply Costs in New England: 2018 Report.* Synapse Energy Economics for Avoided-Energy-Supply-Component (AESC) Study Group.

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Maryland Public Service Commission (Docket No. 9431): Direct testimony on the applications of US Wind and Skipjack Wind for the development of offshore wind projects pursuant to the Maryland Offshore Wind Energy Act of 2013. On behalf of Maryland Office of People’s Counsel. February 15, 2017.

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Maryland Public Service Commission (Docket No. 9424): Direct testimony on Delmarva Power and Light Company’s application for a rate adjustment to recover smart grid costs. On behalf of Maryland Office of People’s Counsel. October 7, 2016.

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and business intelligence investments. On behalf of the Office of Illinois Attorney General. June 29, 2016 and August 11, 2016.

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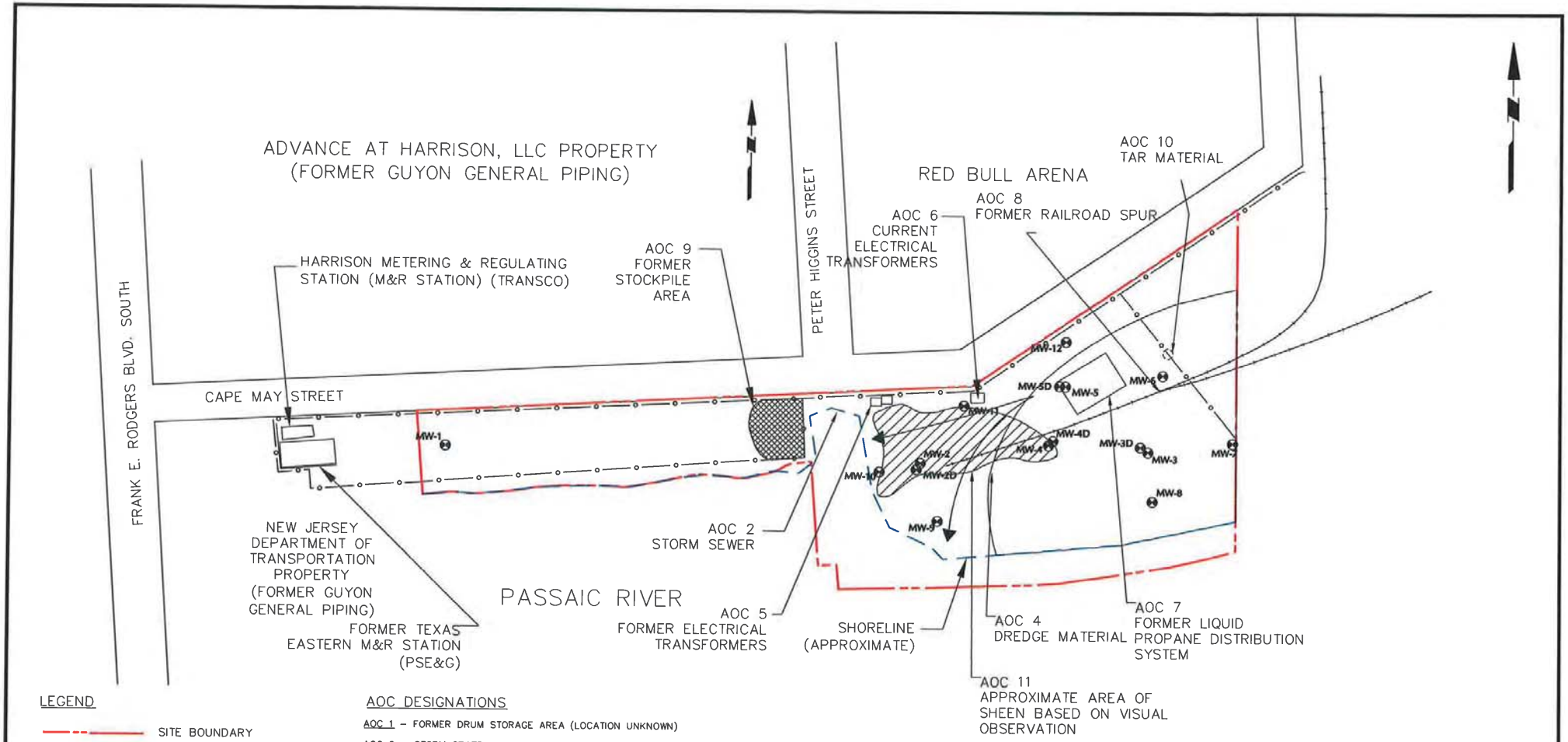
Attachment RC-ENG-3



LEGEND

- SITE BOUNDARY
- FENCE
- FORMER RAILROAD
- SHORELINE (APPROXIMATE)
- MW-1 MONITORING WELL LOCATION
- GROUNDWATER FLOW DIRECTION

NOTES:

1. GROUND WATER FLOW DIRECTION IS BASED ON SHALLOW MONITORING WELL GROUND WATER ELEVATIONS

AOC DESIGNATIONS

- AOC 1 – FORMER DRUM STORAGE AREA (LOCATION UNKNOWN)
- AOC 2 – STORM SEWER
- AOC 3 – HISTORIC FILL (SITE-WIDE)
- AOC 4 – DREDGE MATERIAL
- AOC 5 – FORMER ELECTRICAL TRANSFORMERS
- AOC 6 – CURRENT ELECTRICAL TRANSFORMERS
- AOC 7 – FORMER LIQUID PROPANE DISTRIBUTION SYSTEM
- AOC 8 – FORMER RAILROAD SPUR
- AOC 9 – FORMER STOCKPILE AREA
- AOC 10 – TAR MATERIAL
- AOC 11 – SHEEN
- AOC 12 – FORMER AGRICULTURAL AREA (SITE-WIDE)

150 0 75 150
SCALE IN FEET

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Project
PSE&G CAPE MAY STREET SITE
CASE INVENTORY MAP
HARRISON NEW JERSEY

Project No.	Date	Scale	Dwg. No.
100174301	9/20/12	1"=150'	CID-1