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Adam J. Teitzman, Commission Clerk  
Florida Public Service Commission  
2540 Shumard Oak Boulevard  
Tallahassee, Florida 32399-0850

**Re: Docket No. 20200071-EI**

Dear Mr. Teitzman,

Please find enclosed for filing in the above referenced docket the Direct Testimony and Exhibits of Scott Norwood. This filing is being made via the Florida Public Service Commission's Web Based Electronic Filing portal.

If you have any questions or concerns; please do not hesitate to contact me. Thank you for your assistance in this matter.

Sincerely,

/s/A. Mireille Fall-Fry  
A. Mireille Fall-Fry  
Associate Public Counsel

cc: All Parties of Record

**BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION**

**IN RE: REVIEW OF 2020-2029 STORM                    )**  
**PROTECTION PLAN PURSUANT TO RULE            ) DOCKET NO. 20200067-EI**  
**25-6.030, F.A.C., TAMPA ELECTRIC COMPANY )**

**DIRECT TESTIMONY OF**  
**SCOTT NORWOOD**  
**ON BEHALF OF THE OFFICE OF PUBLIC COUNSEL**

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**DIRECT TESTIMONY OF SCOTT NORWOOD**  
**TABLE OF CONTENTS**

<b><u>SECTION</u></b>	<b><u>PAGE</u></b>
I. INTRODUCTION.....	3
II. SUMMARY OF TESTIMONY.....	5
III. SUMMARY OF TECO’S SPP APPLICATION.....	7
IV. COST EFFECTIVENESS OF PROPOSED SPP.....	14
V. NEED FOR PROPOSED SPP.....	19
VI. ECONOMIC IMPACTS OF COVID-19 PANDEMIC.....	26
VII. CONCLUSIONS AND RECOMMENDATIONS.....	28
 <b><u>DIRECT EXHIBITS:</u></b>	
SN-1 Background and Experience of Scott Norwood	
SN-2 SAIDI Adjustment for Hurricane Irma.	
SN-3 EIA 861 Distribution Reliability Survey data	

## I. INTRODUCTION

1 **Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.**

2 A. My name is Scott Norwood. I am President of Norwood Energy Consulting,  
3 L.L.C. My business address is P.O. Box 30197, Austin, Texas 78755-3197.

4  
5 **Q. WHAT IS YOUR OCCUPATION?**

6 A. I am an energy consultant specializing in the areas of electric utility  
7 regulation, resource planning, and energy procurement.

8  
9 **Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND  
10 PROFESSIONAL EXPERIENCE.**

11 A. I have over 37 years of experience in the electric utility industry. After  
12 graduating from the University of Texas with a Bachelor of Science degree in  
13 electrical engineering, I began my career as a power plant engineer for the  
14 City of Austin's Electric Utility Department where I was responsible for  
15 electrical maintenance and design projects for the City's three gas-fired power  
16 plants. In January 1984, I joined the staff of the Public Utility Commission of  
17 Texas ("PUCT") as Manager of Power Plant Engineering, and in that capacity,  
18 was responsible for addressing resource planning, fuel, and purchased power  
19 cost issues presented in regulatory filings before the PUCT. In 1986, I joined  
20 GDS Associates, Inc., an electric utility consulting firm, where I served as a  
21 Principal and Director of the firm's Deregulation Services Department for 18  
22 years. In January 2004, I founded Norwood Energy Consulting, LLC, which  
23 is based in Austin, Texas. The focus of my current consulting practice is  
24 providing regulatory consulting and expert witness services to organizations

1 representing consumers of electricity on matters related to electric utility  
2 economic, operational, and planning issues.<sup>1</sup>

3  
4 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?**

5 A. I am testifying on behalf of the Citizens of the State of Florida (“Citizens”)  
6 through the Office of Public Counsel (“OPC”).

7  
8 **Q. HAVE YOU PREVIOUSLY FILED TESTIMONY BEFORE UTILITY  
9 REGULATORY COMMISSIONS OR THE FLORIDA PUBLIC SERVICE  
10 COMMISSION (“FPSC” OR “COMMISSION”)?**

11 A. Yes, I have testified before both. I have filed testimony in over 200 electric  
12 utility regulatory proceedings involving electric restructuring, base rate, fuel  
13 recovery, power plant certification, and demand-side management matters  
14 before state regulatory commissions in Arkansas, Alaska, Florida, Georgia,  
15 Illinois, Iowa, Kentucky, Louisiana, Michigan, Missouri, New Jersey, Ohio,  
16 Oklahoma, Texas, Virginia, Washington, and Wisconsin. I filed testimony on  
17 behalf of OPC in FPSC Docket No. 20130140-EI, a proceeding involving Gulf  
18 Power Company’s application for approval of a transmission-related solution  
19 to an environmental compliance plan for the Company’s coal-fired generating  
20 stations. That case was settled before hearing. I have also filed testimony  
21 addressing Duke Energy Florida LLC’s proposed Storm Protection Plan  
22 (“SPP”) in pending FPSC Docket No. 202000069-EI, and in a number of other  
23 utility transmission and distribution grid hardening and grid modernization  
24 proposals and T&D reliability issues in regulatory proceedings over the last  
25 several years in Arkansas, Iowa, Oklahoma, Texas, and Virginia.

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<sup>1</sup> See Direct Exhibit SN-1 for a more detailed summary of my background and experience.

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

A. The purpose of my testimony is to present my conclusions and recommendations regarding Tampa Electric Company's ("TECO" or "Company") application for approval of a Storm Protection Plan ("SPP" or "the Plan") for the ten-year period 2020-2029, pursuant to rule 25-6.030, F.A.C. ("SPP Rule").

3 **Q. HAVE YOU PREPARED ANY EXHIBITS TO SUPPORT YOUR**  
4 **TESTIMONY?**

5 A. Yes. I have prepared 3 exhibits which are included with my testimony.

6 **II. SUMMARY OF TESTIMONY**

7 **Q. PLEASE SUMMARIZE YOUR FINDINGS AND RECOMMENDATIONS**  
8 **BASED ON YOUR REVIEW OF TECO'S SPP.**

9 A. My testimony addresses the reasonableness of TECO's proposed SPP, which  
10 is expected to cost \$1.92 billion for deployment over the next ten years. The  
11 purpose of the SPP is to reduce outage time and restoration costs associated  
12 with "extreme weather events" ("EWE") through hardening of TECO's  
13 Transmission and Distribution (T&D) grid, undergrounding of distribution  
14 lines, and vegetation management programs. My primary conclusions  
15 regarding TECO's proposed SPP are as follows:

16 1) TECO's proposed SPP is expected to cost \$1.92 billion over the next  
17 ten years. The Company has barred review of details regarding its CBA  
18 calculations that are essential to confirm the reasonableness of the CBA  
19 results; therefore, the claimed benefits and cost-effectiveness of the SPP  
20 cannot be verified. TECO's lack of transparency regarding its CBA

1 calculations needlessly complicates the Commission's review and is unusual  
2 for an investment of this magnitude.

3 2) The estimated benefits included in TECO's CBA for the SPP are  
4 inflated by the inclusion of forecasted EWE outage impacts that are nearly 3  
5 times the EWE outage minutes incurred since 2006, after adjusting for the  
6 extraordinary impact of Hurricane Irma. Even with this problem, which  
7 inflates forecasted benefits and has not been explained by the Company,  
8 TECO's CBA indicates that the total cost of the SPP is more than \$1 billion  
9 higher (3.7 times) the forecasted electric benefits of the Plan, and that only  
10 one proposed program, the Substation Extreme Hardening Program, is  
11 expected to be cost-effective.

12 3) TECO's CBA for the SPP did not evaluate alternatives to selected  
13 programs, including potentially lower-cost alternatives, such as delaying or  
14 scaling back the proposed \$1.92 billion SPP.

15 4) TECO has provided high service reliability over the last ten years,  
16 with customers receiving electric service in 99.98% of all hours, including  
17 EWE outages that contribute approximately 20 minutes of outage time per  
18 customer per year on average. The forecasted improvement with the \$1.92  
19 billion SPP is relatively small, and would likely increase TECO's annual  
20 service reliability by less than 0.004%.

21 5) Given the high cost of the proposed SPP, and the fact that the Plan  
22 is not urgently needed in its current magnitude, it would be prudent for TECO  
23 to delay implementation of the proposed SPP until the economic impacts of  
24 the COVID-19 pandemic are more certain, and so that potentially less costly  
25 alternatives to the SPP can be evaluated.

1           Based on the above, I recommend that the Commission consider  
2 approving a modified Plan contingent upon TECO's filing of an updated Plan  
3 in 2022, so that analysis of alternatives to the SPP can be conducted, and so  
4 longer-term COVID-19 impacts on Plan costs and implementation can be  
5 further evaluated.

6                           **III. SUMMARY OF TECO'S SPP APPLICATION**

7 **Q. PLEASE DESCRIBE TECO'S SERVICE AREA AND EXISTING**  
8 **TRANSMISSION AND DISTRIBUTION SYSTEM.**

9 A. As of January 1, 2020, TECO served approximately 794,953 retail electric  
10 customers located in a service area covering approximately 2,000 square miles  
11 in West Central Florida.<sup>2</sup> TECO has 1,350 miles of overhead facilities,  
12 including 25,416 transmission poles, and approximately 9 miles of  
13 underground transmission facilities. The Company's distribution system  
14 consists of 6,300 miles of overhead lines, 404,000 poles, approximately 5,100  
15 circuit miles of underground facilities, and 216 substations.<sup>3</sup>

16  
17 **Q. PLEASE DESCRIBE TECO'S PROPOSED SPP APPLICATION.**

18 A. In 2019, the Florida Legislature enacted section 366.96, Florida Statutes,  
19 ("SPP Statute"), which requires Florida utilities to prepare and file 10-year  
20 Storm Protection Plans, at least every three years. The SPP Statute specifies  
21 that, among other things, utility SPP filings "must explain the systematic  
22 approach the utility will follow to achieve the objectives of reducing restoration

---

2 See TECO witness Chasse's Direct Testimony, page 5.  
3 See TECO witness Chasse's Direct Testimony, pages 6-7.



1 costs and outage times associated with extreme weather events and enhancing  
2 reliability.”<sup>4</sup>

3 As directed by the SPP Statute, the FPSC enacted rules to establish  
4 specific filing requirements and administrative procedures for review and  
5 approval of utility SPP filings and related cost recovery mechanisms. In this  
6 case, TECO is requesting Commission-approval of an SPP for the 10-year  
7 period 2020-2029, pursuant to the SPP Rule, which establishes required  
8 elements of the SPP filing, including descriptions of the programs, specific  
9 projects, and summaries of proposed costs for implementing the first three  
10 years of the SPP (2020-2022).

11  
12 **Q. HAVE EXTREME WEATHER EVENTS HAD A MAJOR IMPACT ON**  
13 **TECO’S SYSTEM OVER TIME?**

14 A. There have been relatively few EWEs on TECO’s system over time. For  
15 example, according to data presented in TECO’s proposed SPP, since 1852  
16 there have only been approximately 184 EWEs (on average 1.1 events per  
17 year) that have impacted TECO’s service area.<sup>5</sup>

18  
19 **Q. IS THE SPP THE COMPANY’S FIRST MAJOR INITIATIVE TO**  
20 **REDUCE OUTAGE TIME AND OUTAGE RESTORATION COSTS**  
21 **RELATED TO MAJOR STORM EVENTS?**

22 A. No. The SPP appears to be largely a continuation of TECO’s Storm Hardening  
23 Plan (“SHP”), which has been filed with the Commission every three years

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4 Section 366.96(3), Florida Statutes. While the term “extreme weather event” is not defined in the SPP Statute or SPP Rule, the Commission’s rules governing Annual Distribution Service Reliability Reports suggest that the term EWE generally been used to refer to named tropical storms and hurricanes, ice storms, and other extreme events such as tornados.

5 See TECO witness De Stigter’s Direct Testimony, page 29, Table 4.

1 since 2007, pursuant to Commission Rule 25-6.0432. The Commission’s rules  
2 describe the purpose of the SHP as follows:

3 [T]o ensure the provision of safe, adequate, and reliable transmission  
4 and distribution service for operational as well as emergency purposes;  
5 require the cost-effective strengthening of critical electric  
6 infrastructure to increase the ability of transmission and distribution  
7 facilities to withstand extreme weather conditions; and reduce  
8 restoration costs and outage times to end-use customers associated with  
9 extreme weather conditions.

10 TECO’s most recent SHP for the 2019-2021 period was filed in March  
11 2019 and approved by the Commission in July 2019.<sup>6</sup>  
12

13 **Q. WHAT IS THE PROPOSED SCOPE AND ESTIMATED COST OF**  
14 **TECO’S PROPOSED SPP?**

15 A. As summarized in Table 1, TECO proposes to expend approximately \$1.92  
16 billion over the 2020-2029 period for programs and projects involving overhead  
17 hardening of transmission and distribution (“T&D”) facilities, undergrounding  
18 of certain distribution lines, and enhanced vegetation management that it  
19 asserts are intended to reduce restoration costs and outage times to customers  
20 related to EWE.<sup>7</sup> The Distribution Lateral Undergrounding, T&D Vegetation  
21 Management and Distribution Overhead Feeder Hardening Programs make  
22 up over 81% of the total SPP cost over the first ten years.

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6 See the Commission’s Final Order dated July 29, 2019, in FPSC Docket No. 20180145-EI. It is my understanding that since the time of the SHP Final Order, the SHP Rule has been repealed but the approved SHP remains in effect.

7 See TECO witness Chasse’s Direct Testimony, page 10.

Table 1  
 Projected Cost of TECO's SPP  
 2020-2029 (\$Millions)<sup>8</sup>

<u>SPP Program</u>	<u>Capital</u>	<u>O&amp;M</u>	<u>Total</u>	<u>% of Total</u>
Distribution Lateral Undergrounding	\$976.8	\$0.0	\$976.8	50.9%
T&D Vegetation Management	\$0.0	\$291.4	\$291.4	15.2%
Transmission Asset Upgrades	\$149.1	\$3.0	\$152.1	7.9%
Substation Extreme Weather Hardening	\$32.4	\$0.0	\$32.4	1.7%
Distribution Overhead Feeder Hardening	\$289.7	\$8.9	\$298.6	15.5%
Transmission Access Enhancements	\$14.7	\$0.0	\$14.7	0.8%
Distribution Infrastructure Inspections	\$0.0	\$10.5	\$10.5	0.5%
Transmission Infrastructure Inspections	\$0.0	\$5.1	\$5.1	0.3%
SPP Planning & Common	\$0.0	\$3.1	\$3.1	0.2%
Other Legacy SH Plan Initiatives	\$0.0	\$3.0	\$3.0	0.2%
Distribution Pole Replacements	<u>\$126.1</u>	<u>\$6.9</u>	<u>\$133.0</u>	<u>6.9%</u>
Total 10-Yr SPP Cost	\$1,588.8	\$331.8	\$1,920.6	100.0%

1 **Q. HOW MUCH HAS TECO EXPENDED OR INVESTED UNDER PAST**  
 2 **STORM HARDENING PLANS FOR GRID HARDENING TO REDUCE**  
 3 **IMPACTS OF MAJOR STORMS?**

4 A. TECO indicates that it has expended or invested approximately \$679 million  
 5 since 2007 for SHP projects, much of which includes grid hardening and  
 6 vegetation management enhancements similar to the programs proposed in  
 7 the current SPP.<sup>9</sup>

8  
 9 **Q. WHAT HAS BEEN THE FREQUENCY, DURATION AND COST OF**  
 10 **EWE OUTAGES ON TECO'S SYSTEM SINCE 2006?**

---

8 Source is the 10-year SPP Program cost summary provided on page 67 of TECO's 2020-2029 SPP Report.

9 Source is TECO's response plus referenced attachment to OPC Interrogatory 6-198.

1 A. TECO indicates it does not have records regarding EWE outage time or  
 2 restoration costs that impacted its system before 2006.<sup>10</sup> However, as shown  
 3 in Table 2 below, since 2006 TECO's system has been impacted by  
 4 approximately 1 EWE per year, and these events increased TECO's outages to  
 5 customers by an average of 68 minutes per year and increased TECO's SAIFI  
 6 by 0.08 outages per customer per year. These EWE impacts are small, and  
 7 they would have been much smaller except for the extraordinary impact of  
 8 Hurricane Irma in 2017, which represented approximately 83% of the total  
 9 EWE outage time on TECO's system since 2006.

Table 2  
 TECO's Extreme Weather Event Outage History<sup>11</sup>

<u>Year</u>	<u># of Events</u>	<u>SAIDI Impact</u>	<u>SAIFI Impact</u>
2006	1	7.2	0.01
2007	1	5.5	0.08
2008	0	0.0	0.00
2009	0	0.0	0.00
2010	0	0.0	0.00
2011	1	75.5	0.15
2012	2	28.4	0.13
2013	2	3.5	0.02
2014	1	1.1	0.01
2015	0	0.0	0.00
2016	3	34.6	0.19
2017	2	792.8	0.47
2018	0	0.0	0.00
2019	1	1.2	0.02
<b>Total</b>	<b>14</b>	<b>949.8</b>	<b>1.08</b>
<b>Average</b>	<b>1</b>	<b>67.8</b>	<b>0.08</b>

10 **Q. WHAT DO THE HISTORICAL EWE DATA IN TABLE 2 SUGGEST**  
 11 **REGARDING THE IMPACTS OF EWE-RELATED OUTAGES ON**  
 12 **TECO'S SYSTEM?**

---

10 Source is TECO's response to OPC Interrogatory 3-98.

11 Source is TECO's response to OPC Interrogatory 3-98.

1 A. The data in Table 2 indicates that EWE-related outages have had a very small  
2 impact on TECO's system since 2006. The 68 minutes of average EWE SAIDI  
3 time including Hurricane Irma equates to only 0.013% of total annual  
4 minutes. If the average EWE outage time is adjusted to normalize the impact  
5 of Hurricane Irma, one of only two Category 4 storms that have impacted  
6 TECO's system since 1852, the average EWE impact on TECO's SAIDI is  
7 approximately 20 minutes per customer per year.<sup>12</sup> This 20 minutes equates  
8 to approximately 0.004% of annual minutes. Assuming the SPP is able to  
9 reduce 50% of TECO's historical average EWE outage time, this means that  
10 the EWE outage reduction benefit of the Plan would be approximately 10  
11 minutes per customer per year, or 0.002% of annual minutes. This is a very  
12 small potential outage reduction benefit of the SPP, which most TECO  
13 customers would probably not notice.

14  
15 **Q. HAVE ANY OF THE PROGRAMS IN TECO'S PROPOSED SPP BEEN**  
16 **DEPLOYED BY THE COMPANY AS PART OF PAST SHPS?**

17 A. Yes. Some of the proposed SPP programs have been deployed by TECO as  
18 part of past SHP projects; however, there are several new programs,<sup>13</sup>  
19 including the Distribution Lateral Undergrounding Program, the Substation  
20 Extreme Hardening Program, the Distribution Overhead Feeder Hardening  
21 Program, and Vegetation Management Program Enhancements.

22  
23 **Q. WHAT ARE THE ESTIMATED REVENUE REQUIREMENTS FOR**  
24 **TECO'S PROPOSED SPP OVER THE TEN-YEAR PLAN PERIOD?**

---

12 See Exhibit SN-2, SAIDI adjustment for Hurricane Irma.

13 See pages 9 and section 6 of TECO's 2020-2029 SPP Report.

1 A. The total estimated revenue requirement of TECO's proposed SPP over the  
2 2020-2029 plan period is approximately \$972 million.<sup>14</sup> It should be noted that  
3 the above revenue requirements do not reflect additional deployment and  
4 operational costs of the proposed SPP programs that would be incurred for full  
5 deployment of the Plan beyond 2029.

6 B.

7 **Q. WHAT IS THE ESTIMATED RATE IMPACT OF TECO'S PROPOSED**  
8 **SPP ON RESIDENTIAL CUSTOMERS?**

9 A. TECO estimates that the proposed SPP investments will increase monthly  
10 electric charges to a residential customer that uses 1,000 kWh per month by  
11 approximately \$2.22 per month in 2021, and by \$3.09 per month in 2022.<sup>15</sup>

12 These TECO rate impact estimates are incremental rate impacts that exclude  
13 related costs of the SPP that have historically been recovered in base rates.

14  
15 **Q. HOW HAVE YOU EVALUATED THE REASONABLENESS OF TECO'S**  
16 **PROPOSED SPP?**

17 A. My testimony focuses on three primary issues: 1) the extent to which TECO  
18 has demonstrated that the proposed SPP is cost-effective and represents the  
19 lowest reasonable cost alternative for addressing identified forecasted needs  
20 to reduce EWE outage durations and restoration costs; 2) whether TECO's  
21 proposed SPP programs are needed to reduce EWE outage time and outage  
22 restoration costs; and 3) whether it is essential and prudent for TECO to  
23 proceed with such a large project at a time when its customers are facing great  
24 economic uncertainty as a result of the COVID-19 pandemic.

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14 See the 10-year SPP revenue requirements summary provided on page 70 of TECO's 2020-2029 SPP Report.

15 Source is TECO witness Chasse's Direct Testimony, page 29.

**IV. COST EFFECTIVENESS OF PROPOSED SPP**

1 **Q. HOW IS THE COST EFFECTIVENESS OF PROPOSED MAJOR**  
2 **UTILITY INVESTMENTS TYPICALLY EVALUATED IN**  
3 **REGULATORY PROCEEDINGS?**

4 A. Once the need for an investment to ensure reliable electric service is  
5 established, the cost-effectiveness of the investment is typically evaluated  
6 through cost-benefit analyses, which are generally designed to determine  
7 whether projects are cost-effective, and the lowest reasonable cost alternative  
8 to supply the identified need, with due consideration given to uncertainty in  
9 major assumptions used for the analysis.

10

11 **Q. HAS TECO PROVIDED A CBA THAT DEMONSTRATES THAT ITS**  
12 **SPP IS COST-EFFECTIVE AND THE LOWEST REASONABLE COST**  
13 **ALTERNATIVE TO REDUCE EWE OUTAGE TIME AND COSTS?**

14 A. No. In fact, as summarized in Table 3 below, TECO's CBA indicates that its  
15 SPP is not cost-effective, with the estimated costs of the SPP being more than  
16 \$1.0 billion (3.7 times) higher than the forecasted benefits of the SPP.

Table 3  
TECO CBA Results for SPP Programs  
(for P50 Outage Scenario)<sup>16</sup>

<u>SPP Programs</u>	<u>SPP Program Costs</u>	<u>EWE Outage Benefits</u>	<u>Net Benefit/(Cost)</u>	<u>Ben/Cost Ratio</u>
Distribution Lateral Undergrounding	\$976,900,000	\$234,790,464	(\$742,109,536)	0.24
Transmission Asset Upgrades	\$148,900,000	\$57,962,916	(\$90,937,084)	0.39
Substation Extreme Weather Hardening	\$32,300,000	\$34,988,866	\$2,688,866	1.08
Distribution Feeder Hardening	\$289,600,000	\$66,105,759	(\$223,494,241)	0.23
Transmission Access Enhancements	<u>\$14,800,000</u>	<u>\$3,005,945</u>	<u>(\$11,794,055)</u>	<u>0.20</u>
Total SPP Plan	\$1,462,500,000	\$396,853,950	(\$1,065,646,050)	0.27

3.7

1           Moreover, TECO’s CBA does not evaluate other potentially lower cost  
2 alternatives to the SPP on the basis of net electric cost benefits to customers;<sup>17</sup>  
3 therefore, the CBA does not demonstrate that TECO’s SPP is the lowest  
4 reasonable cost alternative to reduce EWE outages and outage restoration  
5 costs to customers.

6  
7 **Q. DO YOU HAVE ANY CONCERNS REGARDING THE MANNER IN**  
8 **WHICH TECO’S CBA WAS CONDUCTED AND PRESENTED IN THIS**  
9 **CASE?**

10 A. Yes. I have four primary concerns regarding TECO’s CBA for the SPP. First,  
11 the Company has not provided details regarding the CBA calculations for  
12 proposed SPP programs, as required by Rule 25-6030(3)(d), F.A.C. While the  
13 Company has provided summary results for the total estimated costs and

---

16 Source is TECO’s response to OPC Interrogatory 6-196.  
17 TECO’s response to OPC Interrogatory 6-196 shows that the Company’s cost-benefit analysis of alternatives included \$4 billion of non-electric customer benefits. Without these benefits, none of the SPP Programs except the Substation Extreme Hardening Program, are forecasted to provide net electric cost benefits to customers.



1 benefits of each proposed SPP program, and a summary of major input  
2 assumptions, the Company claims that because the analysis was developed  
3 using a proprietary model, details as to how referenced benefits and costs were  
4 calculated for each SPP program, a breakdown of the total costs and benefits  
5 by type, or the calculations of the benefit/cost ratios for each proposed  
6 program, cannot be provided to OPC or other parties in this case.<sup>18</sup> This  
7 claimed barrier to access to the details of the CBA calculations is problematic  
8 and extraordinary for a case involving a request for approval of a \$1.92 billion  
9 investment.

10 The second major flaw in TECO's CBA for the SPP is that many details  
11 regarding the Storm Modeling calculations supporting the forecasted EWE  
12 storm impacts on TECO's system, are not available to OPC or other parties,  
13 again because of claims that such disclosure would require release of  
14 proprietary information on the storm model.<sup>19</sup> Moreover, the Storm Modeling  
15 results appear to overstate the EWE outage time and outage restoration costs  
16 when compared to the very low EWE impacts that historically have been  
17 experienced on TECO's system. For example, the Company's CBA forecasts  
18 that the SPP would reduce EWE outage time by approximately 29 minutes  
19 per customer per year over the next 50 years, which is nearly 3 times the EWE  
20 outage minutes incurred since 2006, after adjusting for the extraordinary  
21 impact of Hurricane Irma. However, without having access to details of  
22 TECO's storm model calculations, there is no way to determine that the model  
23 is operating properly, because the model has not been used or reviewed in any  
24 other regulatory proceeding, and has not been benchmarked to determine  
25 whether it is reasonably forecasting storm impacts for TECO's system.<sup>20</sup>

---

18 See TECO's responses to OPC Interrogatories 2-49 and 2-50.

19 See TECO's responses to OPC Interrogatories 2-52 and 5-138.

20 See TECO's responses to OPC Interrogatories 5-154 and 5-155.

1 Again, in my experience it is unusual and problematic for details regarding an  
2 essential modeling function (such as TECO's storm forecast) to be obscured  
3 from review, particularly in a proceeding involving a \$1.92 billion proposed  
4 investment, such as TECO's SPP.

5 The third primary flaw in TECO's CBA for the SPP is that the Company  
6 did not evaluate or present potentially lower cost alternatives to the \$1.92  
7 billion Plan, except for analyses that included non-electric customer benefits.<sup>21</sup>  
8 For example, two plausible and potentially less costly alternatives to the SPP  
9 would be: 1) to refine the Plan to continue with the Company's current  
10 practice of strategically addressing worst performing circuits until there is an  
11 observed need to improve T&D reliability performance, and 2) to significantly  
12 reduce the scale and investment level of the SPP in light of the already very  
13 high service reliability and small impacts of EWE outages on TECO's system.  
14 TECO's failure to evaluate net electric benefits to customers for less costly  
15 alternatives in conjunction with the CBA of the SPP means that there is no  
16 basis to conclude that the SPP is the lowest reasonable cost alternative to  
17 improve reliability, if the Company had such a need.

18 The fourth primary flaw in TECO's CBA for the SPP is that it includes  
19 approximately \$4 billion of non-electric customer benefits for the purpose of  
20 selection and prioritization of programs included in the SPP. These estimated  
21 non-electric customer benefits include items such as EWE outage related costs  
22 and lost revenues that are theoretically avoided by reducing outages. It is not  
23 appropriate to include such speculative non-electric benefits to justify  
24 selection of a major electric utility investment such as the SPP.

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21 See TECO's response to OPC Interrogatory 6-186 and Figure 1-2 on page 99 of TECO's SPP Benefits and Assessment Report.

1 **Q. WHAT ARE YOU ABLE TO CONCLUDE REGARDING THE RESULTS**  
2 **OF TECO'S CBA FOR THE SPP WITHOUT HAVING ACCESS TO**  
3 **DETAILS OF THE COMPANY'S CBA OR STORM MODELING**  
4 **CALCULATIONS?**

5 A. I am unable to conclude whether forecasted storm impacts or related benefits  
6 of the SPP presented in TECO's testimony are reasonably estimated; however,  
7 as noted earlier in my testimony, the information provided in TECO's SPP  
8 filing and discovery responses indicate that the forecasted EWE outage time  
9 for the SPP CBA is approximately 3 times the average EWE outage time on  
10 TECO's system, which means that the SPP outage reduction benefits are  
11 unreasonably inflated. Notwithstanding this flaw, and the fact that OPC and  
12 other parties were not allowed to see details of the Company's CBA  
13 calculations or storm modeling calculations, TECO's CBA analysis still shows  
14 that the cost of the proposed SPP is approximately \$1 billion higher (3 times  
15 higher) than the forecasted electric cost benefits to TECO's customers.

16 In fact, as noted in Table 3 of my testimony, TECO's CBA indicates that  
17 only one of the proposed SPP programs — the Substation Extreme Hardening  
18 Program — is expected to be cost-effective. That program has an estimated  
19 10-year deployment cost of approximately \$32.3 million, which is  
20 approximately 2.2% of the \$1.92 billion total SPP deployment cost for the  
21 2020-2029 period. Although TECO's estimated benefits of the Substation  
22 Extreme Hardening Program cannot be verified, one option the Commission  
23 could consider would be to allow TECO to proceed with that program and to  
24 re-evaluate the need for and cost-effectiveness of other SPP program  
25 alternatives in the Company's next SPP filing.

26  
27 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING THE**  
28 **COST-EFFECTIVENESS OF TECO'S PROPOSED SPP?**

1 A. TECO has not provided details necessary to verify the reasonableness of the  
2 high-level CBA and Storm Modeling summary results it has provided for the  
3 SPP. From the information that was provided by TECO, it is apparent that  
4 the CBA analysis includes inflated benefits estimates due to its inclusion of  
5 unrealistically high forecast of future EWE outage impacts without the SPP,  
6 therefore overstating potential benefits of SPP programs. Moreover, the  
7 Company's CBA for the SPP did not evaluate the electric cost benefits of  
8 potentially lower cost alternatives to the Plan and includes several programs  
9 for which there are no forecasted net electric cost benefits for customers.  
10 Given these facts, it would be imprudent for TECO to proceed with the \$1.92  
11 billion SPP initiative, particularly when the Company already has very high  
12 T&D service reliability including EWE outages, and because the potential  
13 reliability improvements from the SPP will be too small for most TECO  
14 customers to notice.

#### **V. NEED FOR PROPOSED SPP**

15 **Q. WHAT STANDARDS ARE TYPICALLY APPLIED BY REGULATORY**  
16 **COMMISSIONS TO DECIDE WHETHER MAJOR UTILITY**  
17 **INVESTMENTS ARE PRUDENT AND SHOULD BE APPROVED?**

18 A. In my experience, most regulatory commissions evaluate major electric utility  
19 investments such as the SPP based on three primary factors: 1) whether the  
20 Project is needed to ensure reasonable and reliable electric service; 2) whether  
21 the proposed Project is cost-effective and the lowest reasonable cost  
22 alternative; and 3) whether such investments are justified in light of  
23 uncertainty in market conditions at the time they are proposed.

1 **Q. HOW DO YOU MEASURE THE RELIABILITY OF ELECTRIC UTILITY**  
2 **T&D SERVICE TO CUSTOMERS?**

3 A. Electric T&D service reliability is most commonly measured by two  
4 performance metrics: 1) the System Average Interruption Frequency Index  
5 (“SAIFI”), which represents the average number of outages per customer per  
6 year; and 2) the System Average Interruption Duration Index (“SAIDI”),  
7 which is the average duration of T&D outages per customer per year,  
8 expressed in minutes. Often these two reliability metrics are reported with  
9 and without the impacts of extreme weather events, such as hurricanes or  
10 tornados, which are difficult to control. In fact, the Commission’s rules require  
11 that TECO and other utilities file Annual Distribution Reliability Reports  
12 each year, and specifies that reliability data be provided with and without  
13 adjustments to remove impacts of EWEs.<sup>22</sup>

14  
15 **Q. HAS TECO’S T&D RELIABILITY PERFORMANCE BEEN**  
16 **REASONABLE OVER THE LAST TEN YEARS?**

17 A. Yes. While I have not examined the performance of each of TECO’s T&D  
18 circuits, on the whole, the Company’s service reliability has been very good  
19 over the last ten years. For example, as summarized in Table 4 below, TECO’s  
20 customers have experienced approximately 1.37 outages per year and  
21 approximately 102 minutes per year of service interruption time, including  
22 impacts of Hurricane Irma and other EWEs. This performance means that on  
23 average, over the last 10 years TECO’s customers have received electric  
24 service in 99.98% of the hours each year, including impacts of major storm  
25 events (with Hurricane Irma). This past performance of TECO’s system

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22 See FPSC Rule 25-6.0455, Annual Distribution Service Reliability Report.

1 indicates the Company has provided very high service reliability to customers  
 2 without the SPP.

Table 4  
 TECO's Distribution System Reliability Performance<sup>23</sup>

	SAIFI	SAIFI	SAIDI	SAIDI
	(# of Outages)	(# of Outages)	(Outage Minutes)	(Outage Minutes)
	<u>Incl EWE</u>	<u>Excl EWE</u>	<u>Incl EWE</u>	<u>Excl EWE</u>
2010	1.21	1.06	92.20	88.73
2011	1.48	1.17	158.49	80.95
2012	1.30	0.98	112.35	80.80
2013	1.37	1.09	99.26	89.54
2014	1.26	1.03	86.49	81.71
2015	1.33	1.12	87.93	84.27
2016	1.34	1.12	98.63	86.16
2017	1.32	1.10	85.58	74.78
2018	1.62	1.32	111.33	98.16
2019	<u>1.48</u>	<u>1.20</u>	<u>92.32</u>	<u>78.89</u>
2010-19 Average	1.37	1.12	102.46	84.40

3 **Q. HOW DOES TECO'S 99.98% SERVICE RELIABILITY COMPARE TO**  
 4 **THE RELIABILITY PROVIDED BY OTHER INVESTOR-OWNED**  
 5 **ELECTRIC UTILITIES?**

6 A. As shown in Table 5 below, TECO's T&D SAIDI and reliability performance  
 7 over the 2014-2018 period compared favorably to the performance of other  
 8 Florida electric utilities, and the Company's SAIDI performance including  
 9 EWEs ranked 6th best out of a comparison group of 89 investor-owned utilities  
 10 serving more than 300,000 customers during 2018, the most recent period for  
 11 which national data from the Energy Information Administration ("EIA") is  
 12 available.<sup>24</sup>

23 Sources are TECO's responses to OPC Interrogatories 2-46 and 2-47.

24 See Exhibit SN-3, EIA 861 Reliability Survey data.

Table 5  
 Florida IOU SAIDI and Reliability Performance<sup>25</sup>  
 (2014-2018 Average)

	<u>SAIDI</u>	<u>Average</u>
DEF	86.4	99.98%
FPL	57.2	99.99%
FPUC	156.0	99.97%
GULF	96.8	99.98%
TECO	82.0	99.98%

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In summary, TECO’s historical T&D service reliability, even with impacts of EWE outages (including Hurricane Irma), has been very high, comparable to other Florida utilities and better than most electric utilities in the United States. Therefore, the Commission should not decide to approve the Company’s proposed \$1.92 billion investment for the SPP over the next ten years as being completely necessary from the perspective of reducing outages (to improve reliability) at this time.

9

**Q. IS THERE ANY EVIDENCE THAT TECO’S CUSTOMERS ARE DISSATISFIED WITH THE COMPANY’S RELIABILITY PERFORMANCE?**

10

11

12

A. There is evidence that TECO’s customers are not dissatisfied with the Company’s service reliability. For example, as summarized in Table 6 below, over the last ten years TECO has averaged approximately 117 complaints per year regarding the reliability of service it provides, which represents approximately 0.015% of the Company’s 782,000 customers.

13

14

15

16

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<sup>25</sup> Source of reliability data are the FPSC Division of Engineering’s November 2019 Report entitled “Review of Florida’s Investor-Owned Electric Utilities 2018 Service Reliability Reports.”

Table 6  
TECO Customer Complaints  
Related to T&D Reliability Issues<sup>26</sup>

	<u>Complaints</u>	<u>Total Customers</u>
2012	73.0	0.009%
2013	107.0	0.014%
2014	92.0	0.012%
2015	98.0	0.013%
2016	163.0	0.021%
2017	131.0	0.017%
2018	108.0	0.014%
2019	<u>162.0</u>	<u>0.021%</u>
Average:	116.8	0.015%

Note: % of Total assumes 782,400 total customers  
per pg 42 of SPP Benefits Report.

1 **Q. ARE THERE OTHER INDICATORS OF THE LEVEL CUSTOMER**  
2 **SATISFACTION AND ACCEPTANCE OF THE LEVEL OF TECO’S**  
3 **SERVICE RELIABILITY?**

4 A. Yes; TECO offers an optional “Relay Service” tariff that allows customers to  
5 purchase higher than standard reliability.<sup>27</sup> However, since 2015 only  
6 approximately 30 of TECO’s 782,000 customers have opted for this premium  
7 service, which indicates broad customer acceptance of TECO’s current service  
8 reliability or perhaps the lack of interest by most customers to pay more for  
9 higher service reliability.<sup>28</sup>

10 **Q. WOULD TECO’S T&D RELIABILITY BE GREATLY IMPROVED IF**  
11 **THE SPP IS IMPLEMENTED?**

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26 Sources are TECO’s responses to OPC’s PODs 2-20 and 2-21.

27 See TECO’s response to OPC’s POD 2-22.

28 See TECO’s response to OPC’s POD 2-22.



1 A. No. As discussed earlier in my testimony, TECO has averaged approximately  
2 20 minutes per year of EWE-related outage time since 2006, including  
3 adjustments for the extraordinary impacts of Hurricane Irma. I understand  
4 that the Legislature determined that it is in the interest of the state to  
5 increase resilience and reliability. They appear to have been aware that  
6 TECO has expended hundreds of millions of dollars since 2006 on SHP  
7 programs to harden its T&D grid and for enhanced vegetation management  
8 programs to reduce outages and storm restoration costs. For this reason, it is  
9 important to note that in sections 366.96(3) and (4)(a) – (d), Fla. Stat., the  
10 Legislature required that the utilities explain the “systematic approach” they  
11 will “follow to achieve the objectives of reducing restoration costs and outage  
12 times associated with extreme weather events and enhancing reliability.”

13 I further understand that the Legislature also required the Commission  
14 to consider the extent to which the plan is expected to reduce restoration costs  
15 and outage times associated with extreme weather and enhance reliability,  
16 including whether the plan prioritizes area of lower reliability performance.  
17 They further required that the Commission consider the costs and benefits of  
18 making the improvements proposed in the plan and the rate impacts. In other  
19 words, the Legislature stated rather plainly that there is no presumption that  
20 the plan would be approved. Rather, it laid out tests of demonstration that  
21 the objectives would be achieved and those would be cost effective with an eye  
22 towards the impact on those who have to pay the costs.

23 In this regard, one of the fundamental concerns that I have is illustrated  
24 under the circumstance where, assuming that future EWE outages remain at  
25 the average 20 minute level reported since 2006, and that the SPP was able to  
26 eliminate 50% of total EWE outage time, which is not guaranteed, the  
27 improvement in TECO’s reliability would only be approximately 10 minutes  
28 per customer per year, or 0.004% of total annual minutes. This means TECO’s

1 average service reliability including EWEs would increase the 99.98%  
2 reliability level including EWE outages over the last ten years without the  
3 SPP to a level of 99.984% with the SPP. Even if TECO guaranteed this very  
4 small improvement in reliability, which it has not, such a small improvement  
5 in reliability would not seem to justify the rate impact of the \$1.92 billion  
6 TECO proposes to spend to deploy the SPP over the next 10 years, particularly  
7 under circumstances that may be clouded by the very real and affordability-  
8 threatening economic fallout of the COVID-19 pandemic. Given these  
9 circumstances, it seems premature for the Commission to fully approve  
10 TECO's plan to incur costs for SPP for 20 to 30 years beyond the proposed  
11 initial 10-year deployment period.

12 In summary, TECO's forecast that the \$1.92 billion SPP initiative could  
13 be justified by the reduction in EWE outage time on its system is highly  
14 suspect given the high level of reliability of TECO's system (99.98% including  
15 EWEs) that has been achieved without the SPP, and the relatively small level  
16 (20 minutes per customer per year) of EWE outage time experienced by the  
17 Company's customers since 2006, including adjustments to normalize impacts  
18 of Hurricane Irma.

19 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS AS TO WHETHER THE**  
20 **SPP IS COST-EFFECTIVE AND NEEDED TO IMPROVE TECO'S T&D**  
21 **SERVICE RELIABILITY.**

22 A. The SPP is not likely to materially improve TECO's T&D service reliability.  
23 TECO has provided highly reliable T&D service for at least the last ten years  
24 and is on a trajectory to provide highly reliable service as a result of the  
25 Company's significant past investments for Grid Hardening and Vegetation  
26 Management since the Company's SHPs were initially implemented in 2006.  
27 There is evidence that most of TECO's customers are not dissatisfied with

1 TECO's existing reliability service given the relatively small level of  
2 complaints filed related to service reliability and the general lack of customer  
3 interest in TECO's optional premium service tariff, which provides higher than  
4 standard reliability. Moreover, the small improvement in reliability  
5 performance that TECO claims would result from the SPP project is not  
6 guaranteed and has not been shown to be cost-effective as I discussed earlier  
7 in my testimony.

## **VI. ECONOMIC IMPACTS OF COVID-19 PANDEMIC**

8 **Q. SHOULD THE COMMISSION CONSIDER POTENTIAL ECONOMIC**  
9 **IMPACTS OF THE COVID-19 PANDEMIC IN DECIDING WHETHER**  
10 **TECO'S PROPOSED \$1.92 BILLION SPP PROJECT SHOULD GO**  
11 **FORWARD AT THIS TIME?**

12 A. Yes. The COVID-19 pandemic has already had tremendous adverse impacts  
13 on the U.S. and World economies as a result of widespread public health  
14 effects, travel restrictions, job loss and forced shutdown of many businesses.  
15 Although we are very early in the pandemic, and Florida has been affected  
16 less than many other states, the final economic impacts and effects on Florida,  
17 its citizens and the electric utility industry as a whole remain uncertain.  
18 Given this situation, I would recommend that the Commission require TECO  
19 to update its SPP on April 1, 2022, for COVID-19 impacts, including  
20 affordability and other downstream cost impacts driven by the related  
21 economic fallout. This update would accompany the robust CBA that I point  
22 out is lacking in this filing and would also give the Commission more visibility  
23 into any affordability impacts of the Plan and potential lower cost alternatives  
24 to the SPP. It would be prudent for the Commission at this time to delay full  
25 consideration of TECO's proposed SPP project until potential impacts of

1 COVID-19 on customers are more certain, particularly when it appears that  
2 there is no urgent need or demand for the very small projected reliability  
3 benefits that the Project might provide.

4 Given these facts, the Commission should be cautious in giving  
5 wholesale approval in today's environment to TECO's proposed \$1.92 billion  
6 SPP initiative at this time. It is my understanding that Section 366.96(5), Fla.  
7 Stat., gives the Commission three options when confronted with a plan. It  
8 may approve the SPP as filed, it may reject the SPP, or it may approve the  
9 SPP with modification. Since the SPP statute requires the Commission to  
10 determine the rate impacts of the three-year horizon of each plan in  
11 conjunction with its disposition of the plans, the plain language of the statute  
12 requires customer rate impact and the affordability of the SPP be considered.  
13 Under the circumstances of the proposed SPP, where the Company has failed  
14 to file a CBA, where the proposed Plan carries a \$1.92 billion price tag over  
15 ten years, and where there are numerous unresolved uncertainties associated  
16 with the economic impact of the COVID-19 pandemic, the Commission should  
17 proceed cautiously. Because the SPP statute requires the utilities to  
18 implement cost effective plans that would both enhance reliability and the  
19 resiliency of the grid, I do not believe that the Commission should approve the  
20 Plan as filed. Therefore, I recommend that the Commission modify the  
21 proposed SPP with the required CBA and a requirement that TECO re-file to  
22 consider the impact of the pandemic. Alternatively, I am recommending that  
23 the Commission temper any approval of the proposed SPP, with a requirement  
24 that the Company submit a plan update by April 1, 2022, that includes a cost  
25 benefit analysis that includes a complete and detailed demonstration of how  
26 the relevant costs and benefits are calculated. In addition, the Commission  
27 should require the Company to provide a complete discussion of how the long-  
28 term effects of the COVID-19 pandemic — including any severe economic

1 ramifications — are expected to impact the affordability of electric service.  
2 This analysis should address the SPP as it proposes to implement the SPP  
3 costs of projects and programs as they are impacted by COVID-19. This  
4 analysis should further address the extent of how cost inputs such as fuel  
5 prices, labor costs and labor working conditions and other societal adjustments  
6 and cost inputs are expected to impact the costs included in the updated CBA  
7 underlying the SPP.

8 **Q. HAS THE COMMISSION RECOGNIZED THE NEED TO CONSIDER**  
9 **SPECIAL REGULATORY RELIEF TO MITIGATE ECONOMIC**  
10 **IMPACTS OF COVID-19 TO FLORIDA ELECTRIC CUSTOMERS?**

11 A. Yes. While it is in the early stages of this process, it is my understanding that  
12 the Commission has recently adopted proposals that would accelerate fuel cost  
13 refunds to customers in an effort to mitigate the economic impacts of COVID-  
14 19. I am also aware that in a different docket, the Commission’s staff has  
15 asked for Duke Energy Florida, LLC (“DEF”) to update assumptions and  
16 impacts of a large nuclear decommissioning and dismantlement proposal  
17 based on COVID-19 effects.

**VII. CONCLUSIONS AND RECOMMENDATIONS**

18 **Q. PLEASE SUMMARIZE YOUR PRIMARY CONCLUSIONS AND**  
19 **RECOMMENDATIONS REGARDING TECO’S PROPOSED SPP?**

20 A. My primary conclusions regarding TECO’s proposed SPP are as follows:

21 1) TECO’s proposed SPP is expected to cost \$1.92 billion over the next  
22 ten years. The Company has barred review of details regarding its CBA  
23 calculations that are essential to confirm the reasonableness of the CBA  
24 results; therefore, the claimed benefits and cost-effectiveness of the SPP  
25 cannot be verified. TECO’s lack of transparency regarding its CBA

1 calculations needlessly complicates the Commission's review and is unusual  
2 for an investment of this magnitude.

3 2) The estimated benefits included in TECO's CBA for the SPP are  
4 inflated by the inclusion of forecasted EWE outage impacts that are nearly 3  
5 times the EWE outage minutes incurred since 2006, after adjusting for the  
6 extraordinary impact of Hurricane Irma. Even with this problem, which  
7 inflates forecasted benefits and has not been explained by the Company,  
8 TECO's CBA indicates that the total cost of the SPP is more than \$1 billion  
9 higher (3.7 times) the forecasted electric benefits of the Plan, and that only  
10 one proposed program, the Substation Extreme Hardening Program, is  
11 expected to be cost-effective.

12 3) TECO's CBA for the SPP did not evaluate alternatives to selected  
13 Programs, including potentially lower-cost alternatives, such as delaying or  
14 scaling back the proposed \$1.92 billion SPP.

15 4) TECO has provided high service reliability 2006, with customers  
16 receiving electric service in 99.98% of all hours, including EWE outages. The  
17 forecasted improvement with the \$1.92 billion SPP is relatively small, and  
18 would likely increase TECO's annual service reliability by approximately  
19 0.004%.

20 5) Given the high cost of the proposed SPP, and the fact that the Plan  
21 is not urgently need in its current magnitude, it would be prudent for TECO  
22 to delay implementation of the SPP until the economic impacts of the COVID-  
23 19 pandemic are more certain, and so that potentially less costly alternatives  
24 to the SPP can be evaluated.

25 Based on the above, I recommend that the Commission consider  
26 approving with modifications TECO's proposed SPP contingent upon the filing

1 of an updated Plan in 2022, so that analysis of alternatives to the SPP can be  
2 conducted, and so longer-term COVID-19 impacts on Plan costs and  
3 implementation can be further evaluated.

4 **Q. DOES THAT CONCLUDE YOUR TESTIMONY?**

5 A. Yes.

**CERTIFICATE OF SERVICE**  
**Docket No. 20200067-EI**

I **HEREBY CERTIFY** that a true and correct copy of the foregoing Citizens' Notice of Service has been furnished by electronic mail on this 26<sup>th</sup> day of May, 2020, to the following:

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**SUMMARY**

Scott Norwood is an energy consultant with over 37 years of utility industry experience in the areas of regulatory consulting, resource planning and energy procurement. His clients include government agencies, publicly-owned utilities, public service commissions, municipalities and various electric consumer interests. Over the last 15 years Mr. Norwood has presented expert testimony on electric utility ratemaking, resource planning, and electric utility restructuring issues in over 200 regulatory proceedings in Arkansas, Georgia, Iowa, Illinois, Michigan, Missouri, New Jersey, Oklahoma, South Dakota, Texas, Virginia, Washington and Wisconsin.

Prior to founding Norwood Energy Consulting in January of 2004, Mr. Norwood was employed for 18 years by GDS Associates, Inc., a Marietta, Georgia based energy consulting firm. Mr. Norwood was a Principal of GDS and directed the firm's Deregulated Services Department which provided a range of consulting services including merchant plant due diligence studies, deregulated market price forecasts, power supply planning and procurement projects, electric restructuring policy analyses, and studies of power plant dispatch and production costs.

Before joining GDS, Mr. Norwood was employed by the Public Utility Commission of Texas as Manager of Power Plant Engineering from 1984 through 1986. He began his career in 1980 as Staff Electrical Engineer with the City of Austin's Electric Utility Department where he was in charge of electrical maintenance and design projects at three gas-fired power plants.

Mr. Norwood is a graduate of the college of electrical engineering of the University of Texas.

**EXPERIENCE**

The following summaries are representative of the range of projects conducted by Mr. Norwood over his 30-year consulting career.

**Regulatory Consulting**

*Oklahoma Industrial Energy Consumers* - Assisted client with technical and economic analysis of proposed EPA regulations and compliance plans involving control of air emissions and potential conversion of coal-to-gas conversion options.

*Cities Served by Southwestern Electric Power Company* – Analyzed and presented testimony regarding the prudence of a \$1.7 billion coal-fired power plant and related settlement agreements with Sierra Club.

*New York Public Service Commission* - Conducted inter-company statistical benchmarking analysis of Consolidated Edison Company to provide the New York Public Service Commission with guidance in determining areas that should be reviewed in detailed management audit of the company.

*Oklahoma Industrial Energy Consumers* - Analyzed and presented testimony on affiliate energy trading transactions by AEP in ERCOT.

*Virginia Attorney General* – Analyzed and presented testimony regarding distribution tap line undergrounding program proposed by Dominion Virginia Power Company.

*Cities Served by Southwestern Electric Power Company* – Analyzed and presented testimony regarding the prudence of the utility’s decision to retire the Welsh Unit 2 coal-fired generating unit in conjunction with a litigation settlement agreement with Sierra Club.

*Georgia Public Service Commission* - Presented testimony before the Georgia Public Service Commission in Docket 3840-U, providing recommendations on nuclear O&M levels for Hatch and Vogtle and recommending that a nuclear performance standard be implemented in the State of Georgia.

*Oklahoma Industrial Energy Consumers* - Analyzed and presented testimony addressing power production and coal plant dispatch issues in fuel prudence cases involving Oklahoma Gas and Electric Company.

*Georgia Public Service Commission* - Analyzed and provided recommendations regarding the reasonableness of nuclear O&M costs, fossil O&M costs and coal inventory levels reported in GPC's 1990 Surveillance Filing.

*City of Houston* - Analyzed and presented comments on various legislative proposals impacting retail electric and gas utility operations and rates in Texas.

*New York Public Service Commission* - Conducted inter-company statistical benchmarking analysis of Rochester Gas & Electric Company to provide the New York Public Service Commission with guidance in determining areas which should be reviewed in detailed management audit of the company.

*Virginia Attorney General* – Analyzed and presented testimony regarding an accelerated vegetation management program and rider proposed by Appalachian Power Company.

*Oklahoma Attorney General* – Analyzed and presented testimony regarding fuel and purchased power, depreciation and other expense items in Oklahoma Gas & Electric Company’s 2001 rate case before the Oklahoma Corporation Commission.

*City of Houston* - Analyzed and presented testimony regarding fossil plant O&M expense levels in Houston Lighting & Power Company's rate case before the Public Utility Commission of Texas.

*City of El Paso* - Analyzed and presented testimony regarding regulatory and technical issues related to the Central & Southwest/El Paso Electric Company merger and rate proceedings before the PUCT, including analysis of merger synergy studies, fossil O&M and purchased power margins.

*Residential Ratepayer Consortium* - Analyzed Fermi 2 replacement power and operating performance issues in fuel reconciliation proceedings for Detroit Edison Company before the Michigan Public Service Commission.

*Residential Ratepayer Consortium* - Analyzed and prepared testimony addressing coal plant outage rate projections in the Consumer's Power Company fuel proceeding before the Michigan Public Service Commission.

*City of El Paso* - Analyzed and developed testimony regarding Palo Verde operations and maintenance expenses in El Paso Electric Company's 1991 rate case before the Public Utility Commission of Texas.

*City of Houston* - Analyzed and developed testimony regarding the operations and maintenance expenses and performance standards for the South Texas Nuclear Project, and operations and maintenance expenses for the Limestone and Parish coal-fired power plants in HL&P's 1991 rate case before the PUCT.

*City of El Paso* - Analyzed and developed testimony regarding Palo Verde operations and maintenance expenses in El Paso Electric Company's 1990 rate case before the Public Utility Commission of Texas. Recommendations were adopted.

## **Energy Planning and Procurement Services**

*Virginia Attorney General* – Review and provide comments or testimony regarding annual integrated resource plan filings made by Dominion Virginia Power and Appalachian Power Company.

*Dell Computer Corporation* – Negotiated retail power supply agreement for Dell's Round Rock, Texas facilities producing annual savings in excess of \$2 million.

*Texas Association of School Boards Electric Aggregation Program* – Serve as TASB's consultant in the development, marketing and administration of a retail electric aggregation program consisting of 2,500 Texas schools with a total load of over 300 MW. Program produced annual savings of more than \$30 million in its first year.

*Oklahoma Industrial Energy Consumers* - Analyzed and drafted comments addressing integrated resource plan filings by Public Service Company of Oklahoma and Oklahoma Gas and Electric Company.

*S.C. Johnson* - Analyzed and presented testimony addressing Wisconsin Electric Power Company's \$4.1 billion CPCN application to construct three coal-fired generating units in southeast Wisconsin.

*Oklahoma Industrial Energy Consumers* - Analyzed wind energy project ownership proposals by Oklahoma Gas and Electric Company and presented testimony addressing project economics and operational impacts.

*City of Chicago, Illinois Attorney General, Illinois Citizens' Utility Board* - Analyzed Commonwealth Edison's proposed divestiture of the Kincaid and State Line power plants to SEI and Dominion Resources.

*Georgia Public Service Commission* - Analyzed and presented testimony on Georgia Power Company's integrated resource plan in a certification proceeding for an eight unit, 640 MW combustion turbine facility.

*South Dakota Public Service Commission* - Evaluated integrated resource plan and power plant certification filing of Black Hills Power & Light Company.

*Shell Leasing Co.* - Evaluated market value of 540 MW western coal-fired power plant.

*Community Energy Electric Aggregation Program* – Served as Community Energy's consultant in the development, marketing and start-up of a retail electric aggregation program consisting of major charitable organizations and their donors in Texas.

*Austin Energy* – Conducted competitive solicitation for peaking capacity. Developed request for proposal, administered solicitation and evaluated bids.

*Austin Energy* - Provided technical assistance in the evaluation of the economic viability of the City of Austin's ownership interest in the South Texas Project.

*Austin Energy* - Assisted with regional production cost modeling analysis to assess production cost savings associated with various public power merger and power pool alternatives.

*Sam Rayburn G&T Electric Cooperative* - Conducted competitive solicitation for peaking capacity. Developed request for proposal, administered solicitation and evaluated bids.

*Rio Grande Electric Cooperative, Inc.* - Directed preparation of power supply solicitation and conducted economic and technical analysis of offers.

*Virginia Attorney General* – Review and provide comments or testimony regarding annual demand-side management program programs and rider proposals made by Dominion Virginia Power and Appalachian Power Company.

*Austin Energy* – Conducted modeling to assess potential costs and benefits of a municipal power pool in Texas.

## **Electric Restructuring Analyses**

*Electric Power Research Institute* - Evaluated regional resource planning and power market dispatch impacts on rail transportation and coal supply procurement strategies and costs.

*Arkansas House of Representatives* – Critiqued proposed electric restructuring legislation and identified suggested amendments to provide increased protections for small consumers.

*Virginia Legislative Committee on Electric Utility Restructuring* – Presented report on status of stranded cost recovery for Virginia’s electric utilities.

*Georgia Public Service Commission* – Developed models and a modeling process for preparing initial estimates of stranded costs for major electric utilities serving the state of Georgia.

*City of Houston* – Evaluated and recommended adjustments to Reliant Energy’s stranded cost proposal before the Public Utility Commission of Texas.

*Oklahoma Attorney General* – Evaluated and advised the Attorney General on technical, economic and regulatory policy issues arising from various electric restructuring proposals considered by the Oklahoma Electric Restructuring Advisory Committee.

*State of Hawaii Department of Business, Economics and Tourism* – Evaluated electric restructuring proposals and developed models to assess the potential savings from deregulation of the Oahu power market.

*Virginia Attorney General* - Served as the Attorney General’s consultant and expert witness in the evaluation of electric restructuring legislation, restructuring rulemakings and utility proposals addressing retail pilot programs, stranded costs, rate unbundling, functional separation plans, and competitive metering.

*Western Public Power Producers, Inc.* - Evaluated operational, cost and regional competitive impacts of the proposed merger of Southwestern Public Service Company and Public Service Company of Colorado.

*Iowa Department of Justice, Consumer Advocate Division* - Analyzed stranded investment and fuel recover issues resulting from a market-based pricing proposal submitted by MidAmerican Energy Company.

*Cullen Weston Pines & Bach/Citizens’ Utility Board* - Evaluated estimated costs and benefits of the proposed merger of Wisconsin Energy Corporation and Northern States Power Company (Primergy).

*City of El Paso* - Evaluated merger synergies and plant valuation issues related to the proposed acquisition and merger of El Paso Electric Company and Central & Southwest Company.

*Rio Grande Electric Cooperative, Inc.* - Analyzed stranded generation investment issues for Central Power & Light Company.

## **Power Plant Management**

*City of Austin Electric Utility Department* - Analyzed the 1994 Operating Budget for the South Texas Nuclear Project (STNP) and assisted in the development of long-term performance and expense projections and divestiture strategies for Austin's ownership interest in the STNP.

*City of Austin Electric Utility Department* - Analyzed and provided recommendations regarding the 1991 capital and O&M budgets for the South Texas Nuclear Project.

*Sam Rayburn G&T Electric Cooperative* - Developed and conducted operational monitoring program relative to minority owner's interest in Nelson 6 Coal Station operated by Gulf States Utilities.

*KAMO Electric Cooperative, City of Brownsville and Oklahoma Municipal Power Agency* - Directed an operational audit of the Oklaunion coal-fired power plant.

*Sam Rayburn G&T Electric Cooperative* - Conducted a management/technical assessment of the Big Cajun II coal-fired power plant in conjunction with ownership feasibility studies for the project.

*Kamo Electric Power Cooperative* - Developed and conducted operational monitoring program for client's minority interest in GRDA Unit 2 Coal Fired Station.

*Northeast Texas Electric Cooperative* - Developed and conducted operational monitoring program concerning NTEC's interest in Pirkey Coal Station operated by Southwestern Electric Power Company and Dolet Hills Station operated by Central Louisiana Electric Company.

*Corn Belt Electric Cooperative/Central Iowa Power Cooperative* - Perform operational monitoring and budget analysis on behalf of co-owners of the Duane Arnold Energy Center.

## **PRESENTATIONS**

*Quantifying Impacts of Electric Restructuring: Dynamic Analysis of Power Markets*, 1997 NARUC Winter Meetings, Committee on Finance and Technology.

*Quantifying Costs and Benefits of Electric Utility Deregulation: Dynamic Analysis of Regional Power Markets*, International Association for Energy Economics, 1996 Annual North American Conference.

*Railroad Rates and Utility Dispatch Case Studies*, 1996 EPRI Fuel Supply Seminar.

### 2006-2019 SAIDI Normalization Adjustment for Hurricane Irma

Line No.			<u>Comment</u>
1	Category 4 Hurricanes in TECO's Area since 1852	2.0	SPP Benefits Report pg 121
2	Years since 1852	<u>168</u>	2020 - 1852
3	Category 4 Hurricanes/Year	0.012	L1 / L2
4	2017 Irma SAIDI Impact, mins	<u>792.20</u>	TECO Resp to OPC 3-98.
5	Avg Irma SAIDI Impact, mins/Yr	9.43	L3 x L4
6	Normalized Irma SAIDI Impact - 2006-2019, mins	132.0	L5 x 14 yrs
7	2006-19 EWE avg SAIDI w IRMA SAIDI adj to 132	20.64	Recalculated Below
8	SPP SAIDI Improvement at 50%	<b>10.32</b>	50% x L7
9	TECO Storm Model P50 SPP SAIDI Improvement	<b>29</b>	TECO Resp to OPC 6-196
10	Forecasted SPP SAIDI Improvement/2006-19 Adjusted Avg SAIDI	<b>2.81</b>	LN9 / LN8

	<u>EWE</u>	<u>EWE</u> <u>SAIDI Impact</u>	<u>Irma Normalized</u> <u>EWE SAIDI Impact</u>
	<u>Events/Yr</u>	<u>Outage Minutes/Customer</u>	<u>Outage Minutes/Customer</u>
2006	1	7.23	7.23
2007	1	5.53	5.53
2008	0	0	0
2009	0	0	0
2010	0	0.00	0.00
2011	1	75.45	75.45
2012	2	28.43	28.43
2013	2	3.48	3.48
2014	1	1.13	1.13
2015	0	0.00	0.00
2016	3	34.60	34.60
2017	2	792.81	<b>132.00</b>
2018	0	0.00	0.00
2019	<u>1</u>	<u>1.15</u>	<u>1.15</u>
2010-19 Average	1.00	<b>67.84</b>	<b>20.64</b>
Avg Reliability Impact w Hurricane Irma		<b>0.013%</b>	<b>0.004%</b>

**2018 EIA Distribution Reliability Statistics for Larger U.S. IOUs (Ranked by SAIDI w MED)**

<u>RANKING</u>	<u>Utility Name</u>	<u>State</u>	<u>Ownership</u>	<u>Number of Customers</u>	<u>SAIDI With MED</u>	<u>SAIFI With MED</u>	<u>CAIDI With MED</u>	<u>SAIDI Without MED</u>	<u>SAIFI Without MED</u>	<u>CAIDI Without MED</u>
1	El Paso Electric Co	TX	Investor Owned	325,494	49.3	0.7	71.0	49.3	0.7	71.0
2	Tucson Electric Power Co	AZ	Investor Owned	528,355	51.4	0.8	65.9	0.0	0.0	.
<b>3</b>	<b>Florida Power &amp; Light Co</b>	<b>FL</b>	<b>Investor Owned</b>	<b>4,978,301</b>	<b>60.4</b>	<b>0.7</b>	<b>85.0</b>	<b>54.6</b>	<b>0.7</b>	<b>84.0</b>
4	The Toledo Edison Co	OH	Investor Owned	301,949	62.2	0.6	104.8	55.7	0.6	98.5
5	Portland General Electric Co	OR	Investor Owned	875,224	88.0	0.5	169.2	88.0	0.5	169.2
<b>6</b>	<b>Tampa Electric Co</b>	<b>FL</b>	<b>Investor Owned</b>	<b>775,102</b>	<b>95.8</b>	<b>1.2</b>	<b>80.5</b>	<b>81.5</b>	<b>1.2</b>	<b>70.9</b>
7	NorthWestern Energy LLC - (MT)	MT	Investor Owned	360,376	103.0	1.1	95.4	103.0	1.1	95.4
8	Kansas Gas & Electric Co	KS	Investor Owned	328,524	105.9	1.1	96.3	101.1	1.1	96.2
9	Public Service Co of NM	NM	Investor Owned	527,072	107.3	1.0	109.1	107.3	1.0	109.1
10	Public Service Co of Colorado	CO	Investor Owned	1,383,852	112.6	1.0	110.4	97.9	1.0	99.9
11	Nevada Power Co	NV	Investor Owned	975,142	114.3	0.7	165.6	46.5	0.5	94.8
12	MidAmerican Energy Co	IA	Investor Owned	691,449	117.0	1.0	113.6	93.0	0.9	100.0
13	Wisconsin Public Service Corp	WI	Investor Owned	450,573	118.0	1.0	121.4	108.0	0.9	115.4
14	Wisconsin Electric Power Co	WI	Investor Owned	1,134,188	119.0	0.7	162.6	70.0	0.6	117.6
15	Commonwealth Edison Co	IL	Investor Owned	4,103,470	120.3	0.8	146.7	57.8	0.7	82.6
16	San Diego Gas & Electric Co	CA	Investor Owned	1,462,128	121.0	0.7	183.8	77.7	0.6	123.7
17	Hawaiian Electric Co Inc	HI	Investor Owned	304,965	123.4	1.3	93.1	111.9	1.3	89.3
18	PacifiCorp	UT	Investor Owned	917,739	123.7	1.1	117.7	123.7	1.1	117.7
19	Northern States Power Co - Minnesota	MN	Investor Owned	1,265,163	125.0	1.0	131.5	95.0	0.9	108.0
20	Public Service Co of Oklahoma	OK	Investor Owned	550,649	126.9	1.3	94.6	101.2	1.2	86.7
21	Idaho Power Co	ID	Investor Owned	532,420	128.8	1.1	120.3	121.5	1.1	114.7
22	Duquesne Light Co	PA	Investor Owned	598,295	133.0	0.9	141.5	89.0	0.8	106.0
23	Southern California Edison Co	CA	Investor Owned	5,126,985	136.8	0.9	156.5	71.3	0.7	99.5
24	Union Electric Co - (MO)	MO	Investor Owned	1,231,639	140.0	0.9	164.7	86.0	0.7	119.4
25	Delmarva Power	DE	Investor Owned	310,376	141.5	0.9	164.5	70.8	0.7	101.1
26	PacifiCorp	OR	Investor Owned	607,462	145.8	1.5	98.9	98.0	1.2	79.5
27	Indianapolis Power & Light Co	IN	Investor Owned	496,450	149.0	1.1	131.4	67.5	0.9	71.1
28	Arizona Public Service Co	AZ	Investor Owned	1,239,949	153.3	1.1	142.3	86.3	0.8	102.9
29	Westar Energy Inc	KS	Investor Owned	381,392	153.4	1.2	132.3	92.5	0.9	101.6
30	Oncor Electric Delivery Company LLC	TX	Investor Owned	3,502,276	153.5	1.3	114.5	78.0	0.8	97.5
31	Interstate Power and Light Co	IA	Investor Owned	486,689	157.2	1.0	152.6	93.9	0.9	99.9
32	Wisconsin Power & Light Co	WI	Investor Owned	486,689	157.2	1.0	152.6	93.9	0.9	99.9
33	Sierra Pacific Power Co	NV	Investor Owned	361,601	161.6	1.7	95.1	161.6	1.7	95.1
34	Dominion Energy South Carolina, Inc	SC	Investor Owned	732,903	165.9	1.8	92.2	96.2	1.4	70.2
35	CenterPoint Energy	TX	Investor Owned	2,517,201	178.4	1.6	110.2	140.2	1.4	102.4
36	Public Service Elec & Gas Co	NJ	Investor Owned	2,373,060	178.9	1.1	165.7	55.1	0.8	69.7
37	Oklahoma Gas & Electric Co	OK	Investor Owned	775,945	180.5	1.0	180.5	130.9	0.9	145.4
38	KCP&L Greater Missouri Operations Co.	MO	Investor Owned	326,479	181.7	1.2	147.7	89.8	0.9	94.7
39	Potomac Electric Power Co	MD	Investor Owned	560,152	189.2	1.0	184.7	61.9	0.8	76.9
40	Ohio Edison Co	OH	Investor Owned	1,040,109	189.5	1.3	142.4	107.7	1.1	101.1
41	Dayton Power & Light Co	OH	Investor Owned	587,473	194.6	1.1	170.7	104.1	0.9	114.4
42	AEP Texas Central Company	TX	Investor Owned	844,645	196.3	1.8	108.7	166.0	1.7	98.9



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43	Consolidated Edison Co-NY Inc	NY	Investor Owned	3,464,959	201.0	0.2	1,020.1	19.8	0.1	165.2
44	Ameren Illinois Company	IL	Investor Owned	1,244,276	207.8	1.1	195.1	110.9	0.9	123.7
45	Rochester Gas & Electric Corp	NY	Investor Owned	377,943	216.7	1.0	218.9	80.4	0.8	107.2
<b>46</b>	<b>Duke Energy Florida, LLC</b>	<b>FL</b>	<b>Investor Owned</b>	<b>1,794,724</b>	<b>225.0</b>	<b>1.4</b>	<b>163.0</b>	<b>111.0</b>	<b>1.2</b>	<b>92.5</b>
47	Georgia Power Co	GA	Investor Owned	2,456,340	227.4	1.5	153.6	125.2	1.2	103.5
48	Ohio Power Co	OH	Investor Owned	1,480,292	255.6	1.6	162.3	218.4	1.5	149.4
49	Entergy Texas Inc.	TX	Investor Owned	459,199	259.2	1.8	146.4	224.2	1.7	134.7
50	Indiana Michigan Power Co	IN	Investor Owned	464,619	262.8	1.3	206.0	175.7	1.1	159.6
51	Virginia Electric & Power Co	VA	Investor Owned	2,482,946	266.8	1.5	172.2	149.6	1.3	114.8
52	United Illuminating Co	CT	Investor Owned	333,861	267.0	1.2	228.2	59.0	0.6	93.7
53	Entergy Louisiana LLC	LA	Investor Owned	1,100,782	274.3	1.8	148.8	207.9	1.6	127.7
54	Alabama Power Co	AL	Investor Owned	1,476,907	278.6	1.4	194.8	113.2	1.0	108.3
55	Pennsylvania Electric Co	PA	Investor Owned	580,198	287.1	2.1	135.7	216.5	1.9	116.3
56	Cleveland Electric Illum Co	OH	Investor Owned	731,388	296.1	1.3	236.5	126.4	1.0	130.4
57	Pacific Gas & Electric Co.	CA	Investor Owned	5,547,929	301.6	1.2	256.7	126.3	1.1	117.1
58	Duke Energy Ohio Inc	OH	Investor Owned	725,829	317.0	1.5	205.8	143.0	1.2	124.3
59	Entergy Mississippi LLC	MS	Investor Owned	455,640	320.1	1.8	177.1	254.2	1.6	155.4
60	Atlantic City Electric Co	NJ	Investor Owned	555,560	325.3	1.3	244.6	76.4	0.9	84.9
61	Duke Energy Indiana, LLC	IN	Investor Owned	836,411	366.0	1.5	252.4	156.0	1.1	147.2
62	Public Service Co of NH	NH	Investor Owned	528,668	386.8	1.9	205.3	119.9	1.1	112.2
63	PPL Electric Utilities Corp	PA	Investor Owned	1,422,558	393.3	1.0	374.9	80.6	0.7	110.3
64	Niagara Mohawk Power Corp.	NY	Investor Owned	1,643,827	396.2	1.5	259.1	147.0	1.1	138.1
65	West Penn Power Company	PA	Investor Owned	716,367	400.1	1.4	278.2	170.6	1.2	148.0
66	Consumers Energy Co	MI	Investor Owned	1,813,361	406.8	1.3	314.1	200.9	1.0	197.5
67	Kentucky Utilities Co	KY	Investor Owned	536,063	411.3	1.3	307.7	100.1	0.9	107.7
68	Baltimore Gas & Electric Co	MD	Investor Owned	1,286,804	432.2	1.3	326.2	94.9	1.0	99.5
69	Puget Sound Energy Inc	WA	Investor Owned	1,148,866	434.0	1.5	285.5	145.0	1.0	146.5
70	Entergy Arkansas LLC	AR	Investor Owned	722,846	448.5	1.9	232.7	297.2	1.7	170.8
71	DTE Electric Company	MI	Investor Owned	2,191,374	485.3	1.4	357.9	177.2	1.0	170.2
72	Louisville Gas & Electric Co	KY	Investor Owned	420,114	490.7	1.5	331.1	85.7	0.9	97.4
73	Monongahela Power Co	WV	Investor Owned	388,704	524.8	2.5	209.9	423.3	2.3	182.3
74	The Narragansett Electric Co	RI	Investor Owned	492,421	594.8	1.6	378.8	65.1	1.0	65.0
75	Central Maine Power Co	ME	Investor Owned	635,107	633.3	2.6	239.9	235.8	1.9	127.5
76	PECO Energy Co	PA	Investor Owned	1,625,072	641.9	1.5	425.1	87.9	0.9	97.7
77	Duke Energy Carolinas, LLC	SC	Investor Owned	668,844	656.0	1.8	360.4	240.0	1.3	187.5
78	Connecticut Light & Power Co	CT	Investor Owned	1,271,056	780.0	1.3	604.7	81.0	0.7	111.0
79	Massachusetts Electric Co	MA	Investor Owned	1,301,417	790.7	1.5	542.0	122.3	1.0	120.9
80	Duke Energy Carolinas, LLC	NC	Investor Owned	1,910,497	910.0	1.8	505.6	203.0	1.1	186.2
81	NSTAR Electric Company	MA	Investor Owned	1,430,397	970.0	1.7	577.4	85.0	0.8	102.4
82	Appalachian Power Co	WV	Investor Owned	422,611	1,067.8	3.1	343.1	693.9	2.7	256.5
83	Appalachian Power Co	VA	Investor Owned	531,820	1,247.1	2.4	517.5	426.5	1.8	238.8
84	Central Hudson Gas & Elec Corp	NY	Investor Owned	304,381	1,257.7	2.6	483.7	182.7	1.5	121.8
85	New York State Elec & Gas Corp	NY	Investor Owned	891,168	1,260.2	2.3	550.3	155.4	1.2	130.6
86	Jersey Central Power & Lt Co	NJ	Investor Owned	1,112,634	1,291.8	2.2	594.7	161.6	1.4	119.1
87	Metropolitan Edison Co	PA	Investor Owned	565,359	1,354.1	2.0	675.7	161.5	1.2	131.9
<b>88</b>	<b>Gulf Power Co</b>	<b>FL</b>	<b>Investor Owned</b>	<b>462,983</b>	<b>2,826.8</b>	<b>2.5</b>	<b>1,149.1</b>	<b>124.3</b>	<b>1.4</b>	<b>91.4</b>
89	Duke Energy Progress - (NC)	NC	Investor Owned	1,398,206	3,679.0	3.0	1,230.4	165.0	1.4	122.2