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April 2, 2024

**VIA ELECTRONIC FILING**

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

Re: Docket 20240025-EI, Petition for Rate Increase by Duke Energy Florida, LLC

Dear Mr. Teitzman,

Attached for filing on behalf of Duke Energy Florida, LLC's ("DEF") in the above-referenced docket is the Direct Testimony of Brian Lloyd and Exhibit Nos. BL-1 through BL-3.

Thank you for your assistance in this matter. Please feel free to call me at (727) 820-4692 should you have any questions concerning this filing.

(Document 4 of 40)

Respectfully,

*/s/ Dianne M. Triplett*

Dianne M. Triplett

DMT/mw

Attachments

**CERTIFICATE OF SERVICE**

*Docket No. 20240025-EI*

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished by electronic mail this 2<sup>nd</sup> day of April, 2024, to the following:

*/s/ Dianne M. Triplett*  
Dianne M. Triplett

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**BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION**

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**In re: Petition for rate increase by  
Duke Energy Florida, LLC**

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**Docket No. 20240025-EI**

**Submitted for filing: April 2, 2024**

**DIRECT TESTIMONY**

**OF**

**BRIAN M. LLOYD**

**On behalf of DUKE ENERGY FLORIDA, LLC**

1 **I. INTRODUCTION AND SUMMARY**

2 **Q. Please state your name and business address.**

3 A. My name is Brian M. Lloyd. My current business address is 3250 Bonnet Creek  
4 Road, Lake Buena Vista, FL 32830.

5  
6 **Q. By whom are you employed and in what capacity?**

7 A. I am employed by Duke Energy Florida, LLC (“DEF” or the “Company”) as  
8 General Manager, Florida Major Projects.

9  
10 **Q. What are the duties and responsibilities of your position with DEF?**

11 A. My duties and responsibilities include planning for grid upgrades, system planning,  
12 and overall Distribution asset management strategy across Duke Energy Florida, as  
13 well as the Project Management for executing the work identified. Additionally, I  
14 manage organizations that execute the developer interactions and engineers large  
15 residential developments across the DEF territory.

16  
17 **Q. Please describe your educational background and professional experience.**

18 A. I have a Bachelor of Science degree in Mechanical Engineering from Clemson  
19 University and am a registered Professional Engineer in the state of Florida.  
20 Throughout my 18 years at Duke Energy, I have held various positions within  
21 Distribution ranging from Engineer to General Manager focusing on Asset  
22 Management, Asset Planning, Distribution Design, and Project Management. My

1 current position is General Manager of Projects and Engineering for Power Grid  
2 Operations.

3  
4 **Q. Have you ever testified before the Florida Public Service Commission?**

5 A. Yes. I have submitted pre-filed testimony and testified before the Florida Public  
6 Service Commission in support of the Company's Storm Protection Plan (Docket  
7 No. 20220050-EI) as well as the Storm Protection Plan Cost Recovery Clause  
8 (Docket No. 20220010-EI). In Storm Protection Plan Cost Recovery Docket No.  
9 20210010-EI and Docket No. 20230010-EI, I only submitted pre-filed testimony.

10  
11 **Q. What is the purpose of your direct testimony?**

12 A. My testimony supports the Company's distribution capital and operations &  
13 maintenance ("O&M") expenses.

14  
15 **Q. How is your testimony organized?**

16 A. My testimony is organized as follows:

17 I. In Section I of my testimony, I provide background on my education and  
18 experience, as well as a summary of my testimony and a list of the exhibits I  
19 sponsor in support of the Company's request.

20 II. In Section II of my testimony, I describe DEF's distribution system, explain  
21 the costs now recovered through the Storm Protection Plan versus those  
22 requested in this base rate case, and describe notable base rate investments

1           made in our system since the Company’s 2021 Settlement Agreement and  
2           how they have benefitted our customers.

3           III.    In Section III of my testimony, I provide an overview of the operational  
4           performance of the Company’s distribution system, outline DEF’s reliability  
5           performance, and highlight DEF’s storm response efforts.

6           V.    In Section IV of my testimony, I summarize DEF’s distribution capital and  
7           O&M requests for 2025-2027 and demonstrate that the costs are reasonable.

8

9   **Q.    Do you have any exhibits to your testimony?**

10   A.    Yes, I have prepared or supervised the preparation of the following exhibits to my  
11   direct testimony:

- 12           •   Exhibit BL-1, a summary of co-sponsored schedules of the Company’s
- 13           Minimum Filing Requirements (“MFRs”);
- 14           •   Exhibit BL-2, a summary of Distribution reliability results for the years
- 15           2018-2023; and
- 16           •   Exhibit BL-3, a summary of Distribution Maintenance Subprograms.

17           These exhibits are true and correct.

18

19   **Q.    Do you sponsor any schedules of the Company’s MFRs?**

20   A.    Yes, Exhibit BL-1 to my testimony lists the schedules of the Company’s MFRs  
21   that I sponsor or co-sponsor with respect to the Company’s distribution system.  
22   These MFR Schedules are true and correct, subject to being updated during the

1 course of this proceeding.

2

3 **Q. Please summarize your testimony.**

4 A. My testimony provides an overview of DEF's distribution system, initiatives to  
5 improve reliability and enhance the customer experience, and the distribution  
6 capital and O&M investments the Company has made and proposes to make over  
7 the 2025-2027 timeframe. Continued investment in the distribution system is  
8 necessary to continue to maintain and operate the Company's distribution assets  
9 safely and reliably and to implement planned work to accommodate customer  
10 growth and other major projects initiatives.

11

12 I first provide a comprehensive overview of DEF's distribution system and its  
13 management and work programs. The system is managed through a zone and  
14 regional support network, which allows for quick and responsive support to  
15 customers in each area. DEF's Customer Delivery work is organized into four  
16 major distribution programs: Expansion, Restore, Maintenance, and Major  
17 Projects.

18

19 Looking forward at investments for new load and future growth, DEF's Capacity  
20 Planning Engineering department analyzes the distribution grid and substation  
21 transformers to determine where grid capacity investments are required to maintain  
22 service to customers. This data informs the team as to where overload situations

1 may exist and allows the team to develop new solutions. I also discuss several  
2 reliability programs.

3  
4 DEF has taken several steps to improve the customer experience related to  
5 distribution resources. We have improved response times to customer inquiries  
6 related to new growth or service improvements, and introduced the Ping It program,  
7 which allows remote checking of smart meter status, saving time and costs. We also  
8 developed a specialized portal and mobile application for builders and developers  
9 and have made it easier for customers to report outages on the website and via the  
10 mobile application.

11  
12 Part III of my testimony focuses on DEF's storm response strategies, particularly  
13 for hurricanes and major storms. DEF uses the Incident Command Structure  
14 ("ICS") Event Response Organization, a nationally recognized emergency response  
15 model. DEF has improved its storm response with crew tracking enhancements and  
16 GIS technology use, resulting in increased productivity, reduced costs, and  
17 shortened restoration times. DEF also conducts annual drills to prepare for major  
18 weather events, assessing the Transmission and Distribution teams' preparedness  
19 and response effectiveness and identifying gaps in knowledge, tools, and processes.  
20 I also discuss recent extreme weather events in DEF's service territory, including  
21 Hurricanes Ian, Nicole, Elsa, and Idalia. DEF's response to these events  
22 demonstrated the team's ability to mobilize resources and restore power quickly



1 and efficiently. In fact, in 2023 DEF was awarded Edison Electric Institute’s  
2 Emergency Recovery Award for its 2022 response to Hurricane Nicole.

3  
4 The next section discusses DEF’s investments since the 2021 Settlement  
5 Agreement and the Storm Protection Plan (“SPP”). The 2021 Settlement  
6 Agreement confirmed the transfer of costs previously recovered through base rates  
7 to the Storm Protection Plan Cost Recovery Clause (“SPPCRC”), enabling  
8 additional base rate investment in areas such as customer delivery to maintain  
9 reliability and meet new customer growth needs. Because the SPPCRC is focused  
10 on investments related to improving resiliency of the grid, a base rate increase is  
11 necessary to fund investments for ongoing maintenance and customer growth. The  
12 SPP investments will harden the system to better withstand extreme weather  
13 conditions, while the distribution investments included in the base rate request are  
14 for increased customer growth and maintenance of distribution facilities.

15  
16 I also discuss Vision Florida, a pilot program approved as part of the 2021  
17 Settlement Agreement. This program consists of capital and O&M investments  
18 associated with various projects, including up to four Emergency Relief Microgrid  
19 projects, a floating solar pilot project at the Hines generating station, a hydrogen  
20 power investment, and solar plus storage projects. The total costs under this pilot  
21 must not exceed \$100 million in capital and \$12 million in O&M. Each project was  
22 selected to provide benefits to customers, such as cost savings, load shaping,

1 distributed energy solutions, and solutions that defer or eliminate the need for  
2 traditional capital investment.

3  
4 Part V discusses the reliability, customer satisfaction, cost control, resource  
5 management, and future planning of DEF's distribution system. DEF uses several  
6 industry-standard metrics to measure service reliability. Over the past five years,  
7 DEF's performance on these metrics has shown a favorable downward trend,  
8 indicating improved reliability. DEF recognizes the intrinsic value of customer  
9 satisfaction. The Company provides personalized communication and services  
10 tailored to individual customer needs. By understanding and addressing customer  
11 needs, DEF can deliver more focused and tailored services.

12  
13 To control costs, DEF optimizes resource schedules, conducts peer reviews of  
14 design work, requires authorization for construction exceptions, and has  
15 implemented cost-saving measures where feasible. DEF ensures it has the  
16 necessary resources to operate, maintain, and invest in its distribution system by  
17 keeping its workforce trained and flexible and using contract labor for periods of  
18 high demand. The Company also improved its procurement activities in order to  
19 continue obtaining the best available pricing for materials and implementing a  
20 process that packages all material for an activity together in a single "kit" with a  
21 packing list, similar to how large product delivery companies ship all items in an  
22 order in one box. This process creates efficiencies at both the supply warehouse

1 and at the work site.

2

3 DEF anticipates an increase in electricity demand over the next few years due to  
4 the demands of interconnected homes, electric cars, pools, and continued growth of  
5 residential customer count. To plan for this growth, DEF monitors the demand on  
6 its distribution infrastructure and plans for new or upgraded feeders at least two  
7 years out.

8

9 Finally, Part VI discusses the capital needs and O&M expense of DEF's distribution  
10 system. DEF confirms that its capital and O&M requests are not duplicative of any  
11 activities related to the Storm Protection Plan and are within the Florida PSC O&M  
12 benchmark costs. Recent economic conditions and inflation have impacted DEF's  
13 expenses, but the Company has mitigated O&M expenses where possible. Despite  
14 increasing costs and inflation, DEF's distribution expenses per customer are  
15 projected to remain lower than 2022 levels through 2027.

16

17 DEF asserts that its distribution system capital and O&M requests are reasonable  
18 and necessary to provide reliable distribution service to customers. The Company  
19 sets annual budgets with growth forecast and reliability needs in mind and monitors  
20 each budgeted program and department throughout the year for adherence to the  
21 budget. DEF also ensures cost-effective designs are created to minimize capital  
22 expenditure and future O&M maintenance spend as new customers join the DEF

1 distribution grid.

2  
3 The Company emphasizes the need to maintain existing overhead and underground  
4 infrastructure and to continue its environmental stewardship by mitigating potential  
5 hazards to waterways and wildlife. DEF acknowledges the need to continue capital  
6 investments and incur O&M expenses necessary to replace assets as they reach the  
7 end of their useful life, maintain existing distribution assets, and reliably serve  
8 customers. Managing our costs moving forward, however, is a challenge in this  
9 economy with rising costs and inflationary pressures. Additionally, we must  
10 continue to invest in capital improvements to our distribution system and incur  
11 O&M expenses to maintain it to preserve the reliability gains we have achieved and  
12 that our customers expect. To accomplish these objectives, the Company needs  
13 \$1,718 million for distribution capital investments and \$300.5 million for  
14 distribution O&M expenses over the 2025-2027 period. These expenditures are  
15 reasonable and necessary to continue to reliably distribute power to our customers  
16 in a cost-effective manner.

17  
18 **II. DEF'S DISTRIBUTION SYSTEM AND INVESTMENTS MADE SINCE**  
19 **THE 2021 SETTLEMENT AGREEMENT**

20 **Q. Please generally describe the Company's distribution system.**

21 A. DEF's distribution system reliably delivers power to almost 2 million customers  
22 across a service area in north and west central Florida that is 20,000 square miles

1 and includes the densely populated areas around Clearwater, Orlando, and St.  
2 Petersburg, along with rural areas in both coastal and inland areas. DEF's  
3 distribution system includes approximately 18,000 circuit miles of overhead  
4 primary voltage distribution conductors, approximately 16,000 miles of  
5 underground primary voltage distribution cable, distribution substations, and  
6 related poles, transformers, secondary cables, secondary wires, and other material  
7 and equipment, such as bucket trucks, to provide reliable service. To ensure that  
8 DEF reliably delivers power around the clock to its customers, DEF must  
9 continually invest in capital additions and replacements and incur the necessary  
10 expenses to operate and maintain the distribution system.

11  
12 **Q. How does the Company manage its distribution system?**

13 A. DEF manages its distribution system through a zone and regional support network.  
14 The service territory is split into four separate zones (North Central, South Central,  
15 North Coastal and South Coastal), which are further separated into three areas each  
16 with each area maintaining local control over design, construction, maintenance,  
17 and restoration activities. The Company's lighting program, geographic  
18 information system ("GIS") technology, distribution control center, health and  
19 safety, emergency preparedness, training, procurement, and contract management  
20 are all supplied through a zone and regional support network. This design allows  
21 the Company to provide quick and responsive support to customers in each area  
22 and fosters a sense of local ownership when working with our customers.

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**Q. Please summarize your understanding of DEF’s last base rate settlement agreement.**

A. I understand that DEF entered into a comprehensive settlement agreement with key consumer groups, that was approved by the Commission, in 2021, which I will refer to as the 2021 Settlement Agreement. My understanding is that it confirmed the transfer of costs associated with hardening and resiliency previously recovered through base rates to the SPPCRC, while maintenance and growth costs continue to be recovered through base rates. It also provided additional revenue requirements necessary for Customer Delivery investments to maintain reliability and meet new customer growth needs. To that end, since the 2021 Settlement Agreement was approved, the Company has continued to invest in the system to enhance the reliability and resilience of the distribution grid. Some examples of these investments and how they have benefitted customers include the following examples:

- Apalachicola substation (April 2023): A second 20 MVA transformer bank was added and one of the existing feeders was relocated to the new bank, more than doubling the capacity of the substation. The scope of substation work also included upgrading the control house and other improvements. Approximately 3,500 feet of feeder near the substation was upgraded to increase the capacity of the circuit.

- 1 • Monastery substation (July 2021): A second 30 MVA transformer was added  
2 and approximately one mile of new feeder was installed. The new feeder  
3 relieved the existing feeders and provided backup to the Halifax hospital.
- 4 • Dog Island System wide maintenance (2023): Rebuild existing overhead lines  
5 and facilities to meet extreme wind and coastal construction standards, thus  
6 improving the reliability of the service for the customers on the island.
- 7 • Monticello N69 - SR 259 (2022): Increase the capacity of the distribution circuit  
8 by rebuilding the line with larger overhead conductor and underground cable.
- 9 • Murray Rd Upgrade (2023): Increase the capacity and resiliency of the  
10 distribution circuit by rebuilding the line with larger overhead conductor, which  
11 will allow for more switching options thus improving the overall reliability for  
12 the customer served in this area.
- 13 • Replaced 685 miles of underground cable that reached end of life to ensure that  
14 reliability levels for customers were maintained.

15  
16 **Q. You mentioned the SPP cost recovery clause. What is the SPP cost recovery**  
17 **clause?**

18 A. The SPP cost recovery clause was created by the Florida legislature to achieve “the  
19 objectives of reducing restoration costs and outage times associated with extreme  
20 weather events and enhancing reliability.” (Section 366.96(3), Florida Statutes).  
21 DEF has submitted, and the Commission has approved, the first two iterations of  
22 its plans in response to this legislative directive, which include a series of carefully

1 designed programs to achieve those very specific objectives. While some of this  
2 work was previously recovered in DEF's base rates, some of the work was  
3 accelerated or expanded.

4  
5 In 2006, in response to the damage caused by the active 2004-2005 hurricane  
6 seasons, the Commission adopted Rule 25-6.042, F.A.C. (the "Storm Hardening  
7 Rule"). As required by the Rule, under the Commission's direction, DEF has made  
8 significant investments in storm hardening to prepare its electric system to  
9 withstand and/or quickly recover from storm damage. Luckily, Florida enjoyed  
10 relatively calm storm seasons from 2006 through 2016.

11  
12 However, over the last several years, Florida has experienced active storm seasons  
13 including landfalls and near landfalls from several named storms, including  
14 multiple major storms. In response, during the 2019 legislative session, the Florida  
15 legislature passed the Storm Protection Plan Cost Recovery Statute, codified as  
16 section 366.96, Florida Statutes ("SPP Statute").

17  
18 DEF's Storm Protection Plan is designed to cost-effectively "strengthen [the  
19 Company's] infrastructure to withstand extreme weather conditions by promoting  
20 overhead hardening of electrical transmission and distribution facilities, the  
21 undergrounding of certain electrical distribution lines, and vegetation  
22 management." The SPP, as a whole, is projected to achieve the multi-pronged goals



1 of reducing storm restoration costs and outage times and improving overall  
2 reliability.

3  
4 With the establishment of the SPP Statute, costs associated with the distribution  
5 SPP programs (Feeder Hardening, Lateral Hardening, Self-Optimizing Grid,  
6 Underground Flood Mitigation, and Vegetation Management) are now proposed  
7 for recovery through the SPPCRC instead of through base rates.

8  
9 **Q. Since DEF is now recovering storm-hardening costs through the SPPCRC,**  
10 **what type of distribution costs are now included in base rates?**

11 A. The distribution system investments included in this base rate request are  
12 representative of more typical distribution investment for increased customer  
13 growth, storm restoration, and maintenance of distribution facilities and are not  
14 duplicative of any funds recovered through the SPPCRC. In addition, costs are  
15 rising as inflation and interest rates have increased significantly in recent years  
16 leading to higher labor and material costs for new and replacement assets. The costs  
17 included in this case are for programs and initiatives focused on maintaining  
18 reliability, investing in the electric grid to prepare for incremental growth over the  
19 next several years, and continuing to provide DEF customers with a high level of  
20 electric service.

21  
22 **Q. What are the major Customer Delivery capital investment programs?**

1 A. DEF's Customer Delivery's work is organized into four major distribution  
2 programs: 1) Expansion, 2) Restore, 3) Maintenance and 4) Major Projects. All  
3 Expansion, Restore and Maintenance costs are recovered in base rates and Major  
4 Projects work is either recovered through base rates or the SPPCRC, depending on  
5 the nature of the project.

6  
7 **Q. Please provide additional details regarding Customer Delivery's Expansion**  
8 **program.**

9 A. This program represents distribution line construction work for adding customers  
10 to DEF's distribution system and includes costs of internal/external resources,  
11 materials, and support costs. Due to the nature of customer requests for this type of  
12 work, forecasting for new customer additions is performed using a combination of  
13 historical trends, analysis of load predictions and understanding of current pricing  
14 of materials and resources.

15  
16 **Q. Please provide additional details regarding Customer Delivery's Restore**  
17 **work.**

18 A. Restore is a reactionary process across Customer Delivery. The purpose of the  
19 Restore process is to provide safe, efficient, and timely restoration of electric  
20 service to all Duke Energy customers. The Restore process starts with the report of  
21 an outage event. The process stops when service is restored and made safe. An  
22 outage event may be the result of weather, equipment failure, vegetation, animals,

1 or Public Damages. Public Damages to Company property units, for example  
2 vehicle accidents hitting poles, are also included in the Restore process.  
3

4 **Q. Please provide additional details regarding Customer Delivery’s Maintenance**  
5 **work.**

6 A. This program represents replacement of upgrades of and life extensions to existing  
7 assets to maintain and/or improve the reliability and integrity of DEF’s distribution  
8 system as well as long-lived assets that support operations. Specific device-level  
9 improvements are measured and prioritized at a system level to ensure maximum  
10 benefit for resources expended.  
11

12 **Q. Please provide additional details regarding Customer Delivery’s Major**  
13 **Projects work.**

14 A. This program represents large capacity increase projects such as substation  
15 additions or upgrades; relocation work associated with roadway expansion; major  
16 conversions; and new customers, as well as technology, software and equipment  
17 deployments/upgrades identified to modernize grid activities. Also included in  
18 Major Projects are those dedicated to storm hardening the system to make it more  
19 resilient through the SPP. These SPP projects, which are not included in base rates,  
20 include Feeder and Lateral Hardening, Pole Replacements, and Self-Optimizing  
21 Grid.  
22

1 **Q. How does DEF ensure the reliable distribution of power to its customers?**

2 A. The Company's work in this area generally falls into three categories which I  
3 discuss in more detail below: 1) ongoing maintenance of the distribution network;  
4 2) integration of new customer load, including electric vehicles and solar resources;  
5 and 3) programs aimed at improving reliability.

6

7 **Ongoing Maintenance**

8 **Q. Please elaborate on the Company's ongoing maintenance of the distribution**  
9 **network.**

10 A. With respect to maintaining the distribution network, DEF has maintenance and  
11 replacement programs for capacitors, underground cable, transformers, regulators,  
12 reclosers, and pad mounted switchgear. The pole inspection and replacement  
13 program and annual vegetation management trim cycles have moved out of our  
14 base rates and into clause recovery under the SPP; however, DEF maintains a base  
15 rate budget to address reactive pole replacement and vegetation management for  
16 issues discovered during day-to-day operations.

17

18 **Q. What maintenance activities are necessary to maintain a reliable distribution**  
19 **system for DEF's customers?**

20 A. DEF has inspection and replacement programs for poles, capacitors, underground  
21 cable, transformers, regulators, reclosers, riser retrofit, arrestor retrofit, and pad  
22 mounted switchgear in addition to follow up on reactive maintenance for issues

1 discovered during normal day-to-day outage response or customer queries. Please  
2 see Exhibit BL-3 for more detail on the Company's distribution maintenance  
3 programs.

4  
5 **Integration of New Customer Load**

6 **Q. The State of Florida continues to be one of the fastest growing states. Has DEF**  
7 **considered this in its rate case?**

8 A. Yes. DEF has taken this into consideration with its planned investments and  
9 maintenance cost estimates included in this rate case. In order to provide electrical  
10 service to a growing customer base, DEF must construct line extensions or upgrades  
11 to new customer loads and expand its grid capacity to prepare for this growth.

12  
13 **Q. Does the Company anticipate demand for electricity to increase over the next**  
14 **several years?**

15 A. Yes. DEF expects and is planning for incremental growth over the next several  
16 years. Although incremental load increase may be partially offset by improved  
17 energy efficiency and renewable energy, DEF still expects a net gain due to the  
18 demands of an interconnected home paired with electric cars and pools as well as  
19 continued growth of residential customer count. Please see the Direct Testimony of  
20 Benjamin Borsch for further detail on load growth expectations. No matter how  
21 electricity demand trends evolve, capacity must always be added at the point of  
22 service and DEF's plan includes resources to expand grid capacity.

1

2 **Q. How is the Company planning for load growth and additional customer**  
3 **demand?**

4 A. DEF monitors the demand on the distribution infrastructure, including feeders,  
5 branch lines and transformers. For feeders, the Company's planning group tracks  
6 current loading and forecasted loading based upon historical and proposed growth  
7 in the areas served, planning for new or upgraded feeders at least two years out.  
8 Area designers also share any new incremental load growth of 1000 kW or more  
9 for tracking purposes. The centralized subdivision teams employ conceptual  
10 planning to aggregate all expected load for subdivisions, both current and proposed,  
11 to avoid reworking in developed areas. DEF continuously monitors economic  
12 conditions and customer requested work on the distribution system and can adjust  
13 the workforce based upon the location and type of work.

14

15 **Q. As more consumers and companies transition to electric vehicles, how does**  
16 **that impact DEF's investment needs?**

17 A. As discussed further in the testimony of Witness Tim Duff, Florida is second only  
18 to California in the number of electric vehicles on the road and we anticipate this  
19 number will continue to grow significantly. There were approximately 44,000  
20 electric vehicles in DEF's territory by the end of the third quarter of 2023. The  
21 electrification of vehicles increases demand on the electric grid and requires DEF  
22 to plan for this at multiple levels. For example, as consumers transition to electric

1 vehicles, they typically install Level 2 chargers at their residence.<sup>1</sup> Level 2 chargers  
2 typically are rated at 40 amps up to 100 amps at 240 volts. A 40 amp charger is  
3 similar to the load pulled by a large hot water heater; however, while a hot water  
4 heater comes on at full load for 15 minutes at a time, the electric vehicle chargers  
5 will be pulling full load for 6 to 8 hours in a single session. These Level 2 chargers  
6 increase the load on the typical residential transformer; therefore, DEF must take  
7 this into consideration when sizing its equipment. Beyond Level 2 chargers, the  
8 number of Level 3 or DC Fast Chargers, are projected to dramatically increase over  
9 the next several years. These “super chargers” require significant capacity on the  
10 system and, at times, are in less dense areas such as along highways; therefore,  
11 requiring line extensions to serve.

12  
13 **Q. How does DEF integrate new customer load?**

14 A. To integrate new customer load, a DEF Designer visits every site to assess  
15 production and potential impacts to grid. The DEF Designer will review existing  
16 loading on DEF assets, such as transformers and wire/cable, to determine if the  
17 proposed new load can be served without the need for modification or upgrade. If  
18 a modification or upgrade is required, a work order is only created for the supported  
19 line extension or upgrade. DEF also maintains a grid capacity program and  
20 upgrades and adds additional feeders based upon loading in high growth areas.

21  

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<sup>1</sup> Level 1 chargers are the standard 120 volt outlets in most residences.

1 **Q. What is the process that DEF uses to increase grid capacity for future growth?**

2 A. DEF has a Capacity Planning Engineering department that studies the distribution  
3 grid and substation transformers to determine where grid capacity investments are  
4 required to maintain service to customers. The Capacity Planning Engineers utilize  
5 a load forecasting tool that creates five-year forecasts of load growth, coupled with  
6 spot load information identified by DEF Distribution Designers based on field  
7 assessments conducted as described above. The DEF Capacity Planning  
8 Engineering department has also begun incorporating fleet electrification cluster  
9 forecasting into the capacity planning process. All of these data points are utilized  
10 to predict where overload situations will exist due to customer growth and identify  
11 solutions such as conductor upgrades; substation transformer upgrades; substation  
12 transformer or breaker additions; or net new substations. The solutions identified  
13 by this process are including in the System Capacity and Retail Capacity investment  
14 programs. These investments ensure that DEF can provide service to the continued  
15 growth in the state without impacting the reliability of the existing customers.

16  
17 **Q. How does DEF integrate solar resources?**

18 A. The integration of solar on the Company's distribution system is mostly behind the  
19 meter by individual residential and business customers and is generally sized  
20 between 8 kW and 100 kW; however, there are some larger installations as well.  
21 Similar to the integration of new customer load described above, DEF reviews each  
22 customer's Interconnection Application and Interconnection Agreement. For larger



1 customer-owned solar PV systems especially if sized greater than 100 kW, DEF  
2 studies the customer's installation to ensure the existing infrastructure can accept  
3 excess customer solar energy production with no adverse impacts on neighboring  
4 customers or equipment that could create safety or reliability concerns. The  
5 Company's goal is to protect its customers, employees, and the distribution  
6 grid. DEF has seen an increase in customer-owned renewable generation from  
7 around 21,200 customers at the end of 2019 to about 82,000 as of December 2023.  
8 This represents about a 386% increase in customers with renewable generation  
9 added to the distribution grid in four years' time. Solar customers are using the grid  
10 and distribution assets 24/7. Solar customers continuously rely on the grid in three  
11 different ways for bi-directional power flow – (1) solar customers require the grid  
12 to receive their excess solar energy production to when they cannot use it, (2) to  
13 balance their load at their premise to maintain good power quality, and/or (3) to  
14 receive power from the Company when their solar generator is not producing  
15 enough electricity for the premise.

16  
17 **Upgrades to Improve Reliability**

18 **Q. What kinds of reliability improvements has the Company made in recent**  
19 **years?**

20 A. To improve reliability, the Company has undertaken several initiatives, including  
21 a Recloser Replacement subprogram that installs automated line disconnect  
22 devices, an Outage Investigation program, and a Major Reliability program. In

1 addition to these programs, DEF continues to utilize construction standards on new  
2 facilities that provide high levels of reliability, such as conduit, to better protect  
3 underground cable and larger poles and insulators that provide higher basic  
4 insulation levels and are more resistant to damage and executing grid improvement  
5 program changes (which are now part of the recovery clause under the Storm  
6 Protection Plan) such as self-healing grid capability. The Company continues to  
7 improve its storm response and restoration.  
8

9 **Q. What is the Recloser Replacement Program?**

10 A. In 2019, the Company started installing automated line disconnect devices, such as  
11 the TripSaver, on power lines to help limit the frequency and duration of service  
12 interruptions. TripSavers are installed on local power lines that branch from the  
13 main power lines serving an area and are essentially similar in action to a recloser.  
14 When there is a temporary issue that could cause an outage requiring a first  
15 responder, TripSaver responds in seconds to clear a temporary fault resulting in the  
16 customer experiencing no outage. In addition, by containing issues at the feeder  
17 level and isolating them as a localized event, TripSavers allow the Company to  
18 reduce its overall exposure to momentary outages, power quality complaints, and  
19 fault tolerance of branch lines. The Company installed 4,700 TripSavers in 2021,  
20 3,300 in 2022, 1,100 in 2023, and is projected to install 1,300 in 2024.  
21

22 **Q. What is the Outage Follow-Up Investigation Program?**

1 A. Outage Follow-Up Investigations are designed to provide both operational and  
2 strategic benefits for the sample of outages where we do post-outage, field  
3 investigations.

4 • Operational – The investigations are designed to prevent a similar outage at  
5 the same site from the same primary root cause. The investigations also can find  
6 and fix unrepaired damage related to the recent outage that could cause a repeat  
7 outage.

8 • Strategic – The information collected from the Outage Follow-Up  
9 investigations is used to determine the drivers for outages that impact larger  
10 numbers of our customers, develop programs to address the outage causes (e.g.  
11 Overhead Transformer Retrofit, Riser Pole Retrofit, Arrester Station Retrofit), and  
12 drive needed improvements to existing construction standards or new construction  
13 standards.

14  
15 **Q. What is the Major Reliability Program?**

16 A. The Major Reliability program involves replacement of existing assets and/or  
17 installation of new assets to address sections of the distribution grid that do not  
18 meet service level expectations for our customers. A thorough analysis is performed  
19 to determine the most efficient way to replace the assets while minimizing the  
20 interruptions of our customers. Some analysis includes reliability performance,  
21 frequency of outages, line patrol, conductor replacement to improve power quality,  
22 overhead to underground conversion, etc.

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**Q. Could the Company have saved costs if it opted to maintain the same reliability levels rather than make these investments?**

A. No. Investments made to improve reliability are intended to reduce the frequency and duration of customer outages. Beyond the benefit that the customers are not as impacted by outages, reducing outages have inherent cost savings. Each outage that is prevented is a reduction in the need to dispatch a resource to restore service. Reducing outages through these reliability investments helps to offset increasing cost pressures for restoration, including growth of the Company’s customer base that requires increased quantity of assets to serve; aging infrastructure that has higher likelihood of failure; and increased costs of materials and labor due to inflation. Despite these headwinds, DEF’s distribution restoration costs have trended downward over the last six years as a result of investment in the grid.

**Q. Why did the Company decide to make the reliability improvements?**

A. The Company’s focus on customer needs and satisfaction led to the recognition that in a tightly interconnected world where individuals and companies rely on “always on” technology, we have a part to play in ensuring customers have quality power available at all times. In the past, loss of power was an inconvenience, but today it pauses life and can have a real dollar cost impact. DEF wants to help ensure our customers experience the best power delivery available.

1 **Vision Florida**

2 **Q. What is Vision Florida?**

3 A. Vision Florida refers to a pilot program that the Commission approved as part of  
4 the 2021 Settlement Agreement. Specifically, paragraph 25 states:

5 The Parties recognize that several factors are making future electric and  
6 grid investment a more dynamic environment. DEF shall be allowed to  
7 implement a Vision Florida pilot program. This program may consist of  
8 capital and Operating & Maintenance (“O&M”) investments associated  
9 with but not limited to: up to four Emergency Relief Microgrid projects;  
10 a floating solar pilot project at the Hines generating station; an  
11 investment in some form of hydrogen power; and solar plus storage  
12 projects that are intended to delay or avoid future transmission or  
13 distribution investments (for example - substation, breaker, or line  
14 upgrades and it will incorporate a partnership with the local community  
15 to assist in siting). O&M investments in this program will be deferred  
16 for recovery in conjunction with DEF’s next general base rate case over  
17 a 5-year period. As Vision Florida eligible capital projects go in service,  
18 DEF shall be authorized to defer all financial impacts associated with the  
19 capital projects to a regulatory asset, which will be allowed to earn an  
20 AFUDC carrying cost and will be recovered in DEF’s next base rate  
21 proceeding. Total costs under this pilot shall not exceed \$100 million in  
22 capital and \$12 million in O&M. These expenditures may be incurred at  
23 any time during 2021 – 2025.

24  
25 I will explain the process for selecting projects. Then I, along with Witnesses  
26 Reginald Anderson and Hans Jacob, will describe the specific projects in detail.

27  
28 **Q. How did DEF determine which projects to pursue as part of the Vision Florida  
29 pilot program?**

30 A. DEF Leadership created the Vision Florida Core Team to develop processes for  
31 selecting pilots and providing governance and oversight. DEF then created the  
32 Vision Florida Board, a group of employees that provides cross-functional  
33 leadership and expertise as part of the project intake, selection, and oversight

1 process. These are key components of a comprehensive application process to  
2 evaluate and select projects that maximize customer benefits, while providing  
3 technological and geographic diversity. Projects are selected that use renewable  
4 technology solutions to offset traditional investments, improve resilience, and help  
5 meet carbon reduction goals. Vision Florida consists of Community Pilots and  
6 Technology Pilots. Community Pilots focus on providing: (1) Cost savings for  
7 customers, (2) Load shaping, (3) Distributed energy solutions, and (4) Solutions  
8 that defer or eliminate the need for traditional capital investment. Technology Pilots  
9 concentrate on: (1) The future of the grid, including renewable solutions and  
10 resilience, (2) New projects that complement existing DEF Business Unit  
11 strategies, and (3) Exploring dynamic approaches versus traditional solutions.

12  
13 **Q. What criteria did the Company use to select the projects that would make up**  
14 **the Vision Florida pilot program?**

15 A. The Vision Florida Core Team developed overarching selection criteria to filter  
16 proposed projects. These include: (1) Deploy microgrids, hydrogen, floating solar  
17 or other innovative technologies to prepare for the future of the grid, (2) Implement  
18 projects prior to the conclusion of Vision Florida in 2025, (3) Prefer lower cost  
19 projects (less than \$20M in capital spending and \$2M in O&M spending), (4)  
20 Encourage cross-functional problem solving, (5) Deploy new technologies or  
21 existing solutions in innovative ways, and (6) Align with enterprise and business  
22 unit strategies for carbon and resiliency goals.

23

1 **Q. Based on those criteria, what projects did DEF select to complete as part of**  
2 **the Vision Florida Program?**

3 A. DEF has selected five projects: (1) Floating solar at the Hines Energy Complex  
4 (“Hines Floating Solar”); (2) Residential Battery Storage; (3) Linear Generator &  
5 Microgrid; (4) Hydrogen Production & Storage System at the DeBary site  
6 (“DeBary Hydrogen”); and (5) Suwannee Long-Duration Energy Storage  
7 (“Suwannee”). I will provide additional details on the first three projects, while  
8 Reginald Anderson will explain the DeBary Hydrogen project and Hans Jacob will  
9 provide details on the Suwannee project.

10  
11 **Q. What is the Hines Floating Solar project?**

12 A. The Hines Floating Solar project is a floating solar installation in Bartow, Florida.  
13 The project is located in and around the cooling pond within the Duke Energy Hines  
14 Energy Complex. The bifacial solar panels are affixed to floating blocks and then  
15 anchored to the bottom of the pond to remain stationary.

16  
17 **Q. How does this project benefit customers?**

18 A. This project directly exports power from the solar array to the associated feeder and  
19 support customers on that feeder. Long-term, the intent is to monitor the efficiency  
20 of the solar panels, expected to be improved by the cooling effects of the water.  
21 Furthermore, deploying the solar array in a cooling pond would also allow DEF to  
22 learn about the technology and evaluate the possibility of deploying similar projects

1 in the future. The ability to deploy solar arrays in bodies of water would allow solar  
2 energy to be deployed closer to load centers which is traditionally a challenge due  
3 to lack of land availability.

4  
5 **Q. What will the estimated project cost and what is the projected in-service date?**

6 A. The estimated total project cost is \$3.2 million and was placed in service on  
7 December 11, 2023.

8  
9 **Q. What is the Residential Energy Storage project?**

10 A. The Residential Energy Storage project will install up to 100 customer sited  
11 residential energy storage systems along a feeder in the Hunter's Creek area of  
12 Central Florida. These systems will be owned and operated by DEF to determine  
13 the viability of residential battery storage as a suitable option to defer distribution  
14 feeder upgrades through peak load shaving.

15  
16 **Q. How does this project benefit customers?**

17 A. This project benefits customers by allowing DEF to determine if utility-owned  
18 residential storage is a viable option to:

- 19 • Test and evaluate the impact of a grid-edge, distributed energy technology on  
20 both the feeder and the overall distribution system.
- 21 • Provide customers with backup power during periods when utility service is  
22 unavailable.



- 1 • Add capacity to the grid by charging the storage systems during times when
- 2 lower cost generation is in excess and then dispatching the systems during
- 3 periods of peak demand.
- 4 • Manage residential peak demand by addressing grid constraints associated with
- 5 vehicle electrification.
- 6 • Evaluate viability of residential battery storage as a suitable option to defer
- 7 distribution feeder upgrades through peak load shaving.

8

9 **Q. What will the estimated project cost and what is the projected in-service date?**

10 A. The estimated project cost is \$3.4M, with a projected in-service date of Q2 2024.

11

12 **Q. What is the Linear Generator project?**

13 A. This project in Orange County will install two (2) 240kW Mainspring Linear

14 Generators and associated equipment on DEF's primary feeder serving a

15 customer's facility. A linear generator is a type of technology that converts motion

16 along a straight line into electricity using chemical energy. It can rapidly increase

17 or decrease generation, working in parallel with other energy sources such as solar

18 while matching the customer power needs. The linear generators will enable DEF

19 to integrate and evaluate a new distributed energy system technology capable of

20 using natural gas and hydrogen fuel mix for generation. The project will also allow

21 testing of the linear generators within a microgrid environment.

22

1 **Q. How does this project benefit customers?**

2 A. This project benefits customers by allowing DEF to gain learning in the following  
3 areas:

- 4 • Evaluating a new generation technology capable of using multiple fuel mixes.
- 5 • Understand linear generator integration and operation within a microgrid.
- 6 • Developing and running specific scenarios to test and ensure proper usage of  
7 this type of generation resource for this and future microgrid installations.
  - 8 ○ Black start and grid forming
  - 9 ○ Load following
  - 10 ○ Frequency control
- 11 • Resiliency benefit of efficient, persistent 24/7 generation.
- 12 • Support for carbon neutrality and resiliency when using fuels such as hydrogen,  
13 landfill gas, and ammonia.

14  
15 **Q. What is the estimated project cost and what is the projected in-service date?**

16 A. The estimated project cost is \$6M, and the projected in-service date is Q2 2025.  
17

18 **III. OPERATIONAL PERFORMANCE OF DEF'S DISTRIBUTION SYSTEM**

19 **Q. Have the distribution investments that the Company has made since the 2021**  
20 **Settlement Agreement allowed it to meet its operational performance and**  
21 **customer satisfaction goals?**

22 A. Yes. DEF's principal goal is to deliver safe and reliable electric service at

1 reasonable prices. We measure this goal based on customer satisfaction, safety, and  
2 reliability of the Company’s distribution system, while responsibly managing  
3 operational and capital expenditures for the benefit of our customers.  
4

5 **Q. What reliability metrics does the Company use to determine that it is**  
6 **providing reliable distribution service to its customers?**

7 A. DEF, along with others in the industry, uses several metrics to measure reliability  
8 of service. Primary among those metrics are:

- 9 • System Average Interruption Duration Index (“SAIDI”) – a composite indicator  
10 of outage frequency and duration. SAIDI is calculated by dividing the customer  
11 minutes of interruptions by the number of customers served on a system.
- 12 • Customer Average Interruption Duration Index (“CAIDI”) – an indicator of  
13 average interruption duration, or the time to restore service to interrupted  
14 customers. CAIDI is calculated by dividing the total system customer minutes  
15 of interruption by the number of customer interruptions.  
16
- 17 • System Average Interruption Frequency Index (“SAIFI”) – an indicator of  
18 average service interruption frequency experienced by customers on a system.  
19 SAIFI is calculated by dividing the number of customer interruptions by the  
20 number of customers served.  
21
- 22 • Momentary Average Interruption Event Frequency Index (“MAIFIE”) – an  
23 indicator of average frequency of momentary interruptions, or the number of  
24 times there is a loss of service of less than one minute. MAIFIE is calculated by  
25 dividing the number of momentary interruption events recorded on primary  
26 circuits by the number of customers served.  
27
- 28 • Customers Experiencing More Than Five Interruptions (“CEMI5”) – the  
29 percentage of retail customers who have experienced more than five service  
30 interruptions of one minute or longer duration during the year.

31  
32 **Q. How has DEF’s distribution system performed under these metrics?**

1 A. Our system has performed well, and we have continued to provide safe, reliable,  
2 and affordable electric service to our customers. DEF's reliability metric results  
3 from 2018-2023 are provided in Exhibit BL-2 to my testimony. Over the 5-year  
4 period from 2018-2022, DEF's SAIDI, SAIFI, CAIDI, MAIFIE and CEMI5 results  
5 are all trending favorably (downward). When compared to EIA-861 annual federal  
6 reliability filing results from 26 other United States investor-owned utilities with  
7 similar system characteristics as the Company, DEF's SAIFI trend is improving at  
8 a faster rate than the group's average from 2014-2022. The group's average SAIDI  
9 was also a worsening trend from 2014-2022, while DEF's SAIDI trend is improving  
10 for the same period. The system improvements and process enhancements,  
11 previously discussed, will continue to improve DEF's reliability performance and  
12 metrics.

13  
14 **Q. How does the Company communicate to customers when there are outages  
15 and provide high levels of service to its distribution customers?**

16 A. Providing customers with a high level of communication that can be tailored to  
17 their personal needs has intrinsic value, as recognized by many companies in other  
18 industries providing consumer products and services. DEF aims to provide this high  
19 level of service and communication to its customers during outages. For example,  
20 the Company proactively provides Initial Time of Restoration ("ITR") and  
21 Estimated Time of Restoration ("ETR") alerts to help customers plan around the  
22 inconvenience of being without power. In addition, DEF provides customers with

1 access to an outage map for real-time information on outages in their  
2 neighborhoods.

3  
4 By proactively discovering and targeting customer needs and requests, DEF can  
5 provide a more focused and tailored level of service to its customers. While a  
6 commercial project customer may find value connecting directly with the local  
7 Engineering Design Associate, a residential subdivision builder may find more  
8 value in our builder portal and concierge team to help monitor multiple projects.  
9 Similarly, while some residential customers may find that tracking energy  
10 consumption is critical to their needs, others may decide that limiting interruptions  
11 in service is their highest priority. By communicating with customers and assessing  
12 their needs, DEF can more readily deliver the services customers desire.

13  
14 **Q. What steps has the Company taken related to distribution resources to**  
15 **improve customer satisfaction?**

16 A. DEF has focused heavily on improving response times to customer inquiries related  
17 to new growth or questions about service improvements. The Company set  
18 expectations on turnaround times, updating customers on construction timelines,  
19 and meeting customer goals for power delivery.

20  
21 The Company is also improving digital transformation efficiencies with programs  
22 like Ping It, which allows Company employees to remotely connect to and check

1 the status of a smart meter in lieu of sending a technician to the premises. By  
2 checking remotely, the Company can save significant time and travel costs. The  
3 Ping It program is especially useful during major storm events where the Company  
4 can use Ping It to determine which customers are out of power without the need for  
5 them to call and report an outage.

6  
7 DEF is also focused on supporting the state's residential and commercial builders  
8 and developers. The Company delivered a specialized portal and mobile application  
9 for builders and developers to provide an improved customer experience through a  
10 pilot with one of Florida's largest residential builders to tie its scheduling software  
11 into the portal for ordering construction power, running underground trenching and  
12 permanent metered power, and transmitting an average of 40 service requests per  
13 week to DEF. The Company is developing further plans to make this service  
14 available to other large builders and developers wishing to interface their  
15 construction systems with DEF's request process. There currently are 8,550  
16 registered users in Florida participating in the builder portal. DEF's New  
17 Construction team is available to offer a demonstration of the Builder Portal and  
18 the services that can be completed through the Portal. In addition, our Customer  
19 Experience team has created a video that will be added to the registration page on  
20 how to use the Builder Portal.

21  
22 The Company has also held Builder Summits across the service territory inviting

1 builders and developers the opportunity to meet with members of our Residential  
2 Development and New Construction team members to ask questions, raise issues,  
3 and offer feedback on areas to improve the new construction process.

4  
5 The Company also recently made it easier for customers to report outages on the  
6 website and via the Company mobile application, adding to the proactive  
7 communication of outage updates to customers, via text or email, and up-to-date  
8 information on the new in-house built outage maps without requiring the customer  
9 to call.

10  
11 In 2020, the Customer Delivery organization completed a reorganization effort that  
12 aligned the structure to the areas that are served by DEF, putting local leadership  
13 over all operational aspects of the customer experience, including reliability, new  
14 customer expansions and modification requests. This allows direct contact and  
15 assistance to DEF customers. For example, each area has a Reliability Technologist  
16 that monitors reliability for the customers in the area and generates projects to  
17 improve reliability; these Technologists also respond directly to customer inquiries  
18 regarding service interruptions.

19  
20 DEF has also dedicated an Engineering Design Associate position to each of our  
21 operations centers. This position allows our customers to have a local point of  
22 contact via phone or email for any construction-related issue they may have with

1 DEF. The Engineering Design Associate is highly focused on customer service but  
2 has considerable knowledge of the electrical distribution system and construction.  
3 DEF also has a local position with a focus on repair and replacement of failed  
4 facilities. If a customer experiences an issue with a bad underground service  
5 conductor or reported street light cable that requires additional work, our customers  
6 will receive timely work updates along with a local contact name and number for  
7 any follow-up questions.  
8

9 **Q. Does DEF engage stakeholders in its efforts to make the grid more reliable and**  
10 **resilient?**

11 A. Yes. DEF identifies projects where customers may be impacted by the construction  
12 of grid improvement projects and communicates with those customers to help them  
13 understand the work that is being completed, how it benefits the community, and  
14 the construction timelines for the project. For example, the Company worked with  
15 a homeowners' association in Pinellas County to organize a community meeting to  
16 educate residents on the benefits of undergrounding powerlines, address any  
17 concerns, and obtain their approval for easements necessary to make the  
18 improvements to provide more reliable service. Recently, DEF completed the first  
19 substation optimization project in Florida in the Panhandle working closely with  
20 the community and local government to explain the work process, determine  
21 equipment placement around environmentally sensitive areas, and minimize the  
22 impact to the residents and local businesses.



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**Q. What actions has the Company taken to control its costs while continuing to provide reliable distribution service?**

A. Distribution manages its costs as part of its normal course of business. For example, Distribution optimizes resource schedules for construction and restoration activities, conducts peer reviews of design work to ensure the most economical design is utilized, and requires authorization for construction exceptions that differ from the original design. In addition to these ongoing cost management activities, over the period of 2018 to 2023, Distribution has implemented the following:

- Ping It: In 2022, Distribution identified opportunities through a Process and Productivity Cost Savings review. As previously discussed, one area identified for cost savings opportunities was the reduction of truck rolls for issues on the customer side of the point of service. Through the use of the recently deployed Advanced Metering Infrastructure (“AMI”), DEF was able to identify when a customer called in to report an outage but there was no interruption to electric service. By determining that there was no outage, DEF could communicate that the trouble was on the customer’s side of the meter and eliminate an unnecessary deployment of a line tech and truck. This reduces overall costs and allows DEF’s line resources to focus on actual outages and improve overall service.
- Process and Productivity Cost Savings: DEF identified opportunities that focused on optimizing resources on capital projects, reducing project O&M

1 costs, and managing business support costs such as travel, training, and fleet  
2 expenses.

- 3 • Substation Optimization: DEF is executing base rate maintenance work  
4 with Storm Protection Plan (“SPP”) work when all such work is associated  
5 with the same substation. DEF maintains discrete accounting to maintain  
6 separation of SPP costs from base rate maintenance work. The focus on this  
7 work is to improve the overall reliability and resiliency of the service  
8 provided to customers served from specific substations. This allows  
9 construction crews to work more efficiently as well as for design and  
10 engineering to be completed without extra trips. This allows both base rate  
11 maintenance work and SPP work to benefit from a reduction in travel time  
12 and set up and reduces the impacts of maintenance of traffic and planned  
13 outages on customers.

14  
15 **Q. How does DEF ensure it has the appropriate level of resources needed to**  
16 **operate, maintain, and invest in the distribution system?**

17 A. DEF keeps its workforce trained, engaged and nimble to adjust to differing  
18 workload demands. The Company watches trends and uses contract labor for  
19 periods of high demand or workload. DEF has moved from hourly sourcing (i.e.,  
20 using time and equipment) for our contract labor to a per unit costing for work tasks  
21 performed. This change improves job forecasting by knowing in advance what a  
22 task will cost. It encourages contractors to look for and avoid obstacles to timely

1 work completion because they are better rewarded for working efficiently. DEF  
2 leverages Duke Energy's combined size to improve vendor pricing and supply,  
3 striving for the highest quality products at the best prices with on time delivery. The  
4 Company's corporate-wide software, Maximo, allows for better streamlining of  
5 materials used in construction, improved supply chain management, and improved  
6 scheduling. These improvements have allowed DEF to better work with customers  
7 on installing facilities as they are needed rather than based upon availability of  
8 material and labor.

9  
10 **Q. Can you provide an example where the Company has taken measures to adjust**  
11 **staffing without decreasing services?**

12 A. DEF has evaluated what number of the Company's full-time employees are needed  
13 to meet our growing customer base and related needs. DEF continuously reviews  
14 the types of work required and determines if the work is ongoing baseline work or  
15 special project or limited occurrence work. DEF will then employ contract labor,  
16 with DEF employee oversight, for the non-baseline type work. DEF tries to ensure  
17 that customer-facing work is performed by DEF employees to the greatest extent  
18 practicable. While contract crews may provide engineering and construction tasks,  
19 the goal is for all Company-to-customer interactions to be through a DEF employee.

20  
21 One such example is the Centralized Design group which DEF uses to provide  
22 optimum subdivision designs utilizing specialized software to help ensure our

1 builder partners always receive a similar product regardless of project location.  
2 Designs are created by Centralized Design and shared with the customer-facing  
3 Residential Design team to allow the customer-facing employees to spend time  
4 meeting customer needs and ensuring timely construction. Centralized Design is  
5 staffed with a baseline number of employees and augmented with contract  
6 engineering firms as needed to meet peak demands.  
7

8 **Q. Please discuss the Company's use of contractors.**

9 A. DEF uses a vetting process to identify contractors eligible to work in the DEF  
10 system. The Company establishes contract pricing through a blind-bidding process  
11 for both contract engineering and construction resources. DEF managers and  
12 resource schedulers are aware of both the quality of work and the unit pricing of  
13 the contractors for each type of work they perform, and they assign work  
14 accordingly.  
15

16 **Q. Does the Company have any recruiting practices specific to lineworkers or  
17 veterans to support the distribution grid?**

18 A. Yes. As Melissa Seixas introduced in her testimony, the Company actively recruits  
19 distribution lineworkers through programs with Lake Sumter State College, South  
20 Florida State College, St. Petersburg College, and Valencia College to ensure we  
21 attract and develop a skilled workforce that is representative of the communities  
22 DEF serves. DEF is committed to providing support for these programs in the forms

1 of engaging regularly and meaningfully on campus, providing guest speakers and  
2 work demonstrations, supporting community connections to help market the  
3 college's program, and providing expertise in curriculum. DEF hires between 40-  
4 100 Apprentices each year to advance Line Technicians and replenish the attrition  
5 we experience.

6  
7 Also, DEF is proud to employ veterans. The Company utilizes the Recruit  
8 Military platform to engage transitioning and civilian-experienced military veteran  
9 men and women in addition to attending military career fairs and participating in  
10 the SkillBridge program, which provides retiring and transitioning service members  
11 the opportunity to participate in industry training programs while transitioning out  
12 of their military careers. Since 2020, DEF has hired 97 individuals that have  
13 identified themselves as a veteran to support the distribution grid. We are thankful  
14 to have these employees to assist DEF in modernizing the grid and maintaining  
15 reliable service.

16  
17 **Q. Please provide more information about the Company's procurement**  
18 **activities.**

19 A. DEF works to obtain the best available pricing for the materials used on the  
20 distribution system. Through a job kitting system, key materials needed to construct  
21 a job are packaged and sent from the main store's location, minimizing the amount  
22 of construction inventory needed to be stored locally in each operations center. In

1 fact, Southeastern Electric Exchange recently selected Duke Energy for a 2024  
2 Industry Excellence Award for its transformer acquisition strategy amidst the recent  
3 material availability challenges seen across the industry.  
4

5 **Storm Response**

6 **Q. Please discuss the Company's hurricane and major storm response efforts.**

7 A. DEF is proud of its hurricane and major storm response efforts, and I detail our  
8 success in restoring power further below. DEF has implemented the Incident  
9 Command Structure ("ICS") Event Response Organization to rapidly and  
10 efficiently support a successful emergency response throughout the organization.  
11 The ICS is the nationally accepted model for responding to incidents in accordance  
12 with the National Incident Management System. The ICS establishes an organized  
13 way to respond to emergencies using standard job roles, forms, and terminology.  
14 This method of organizing an emergency response is used for short- and long-term  
15 operations across the government, industry, and private sector. As a common  
16 structure, the ICS ensures a fast and efficient emergency response. The most  
17 important benefit provided by an ICS-based organization is the clear identification  
18 of the response leader and the response leader's chain of command. This approach  
19 is designed to optimize Duke Energy's operational, planning, and logistics  
20 capabilities while providing effective communication to our customers and  
21 partners. DEF has also made improvements to its hurricane and major storm  
22 response. One example is crew tracking enhancements, including daily timesheets

1 and an exception approval process for time reporting, lodging, meals, and fuel.  
2 These improvements increase the amount of work done during productive daylight  
3 hours, lower overall event cost, and reduce the number of restoration days. As  
4 briefly mentioned above, the Company also developed a way to use GIS technology  
5 to improve its hurricane response. After Hurricanes Hermine and Matthew in 2016  
6 and Irma in 2017, DEF developed a way to help its crews navigate debris-covered  
7 and flooded roads. DEF was able to utilize this improvement in the Company's  
8 response to Hurricanes Ian, Nicole and Idalia while partnering with local  
9 emergency response personnel. The Company uses GIS technology, which is often  
10 more reliable than using GPS routing, to monitor changing road conditions,  
11 understand how flooding is affecting customers and equipment, and help crews  
12 reach their locations safely and quickly.

13  
14 **Q. Does DEF perform any storm drills or simulations outside of hurricane**  
15 **season?**

16 A. Yes. DEF conducts annual exercises to prepare for major weather events that have  
17 the potential to disrupt electric service to customers in Florida. The drills are  
18 intended to assess the effectiveness of the Transmission and Distribution teams to  
19 respond to major weather events. Team members participating in the exercises are  
20 expected to respond as if there were an actual event and to apply their knowledge  
21 of the emergency response plan to restore power to customers safely and efficiently.  
22 Identification of knowledge, tool, and process gaps to be addressed prior to the start

1 of each hurricane season is a key outcome of the exercises.

2  
3 **Q. Is DEF’s service territory more prone to severe weather and storms than that**  
4 **of other utilities?**

5 A. Yes. Florida leads the nation in the number of named, or tropical storm landfalls  
6 and has the highest average probability of future landfalls.<sup>2</sup> It is projected that these  
7 storm events will increase in severity, and the accompanying rainfall and storm  
8 surge impacts will intensify and be felt further inland.<sup>3</sup> Florida is a historical path  
9 of major hurricanes, which increases the risk of vegetation-related outages from  
10 tree species with low wind resistance. Examples of these species prevalent in DEF’s  
11 territory are laurel oak, water oak, pecans, and sand pines in North Florida as well  
12 as Australian Pines, Melaleuca, Washington palms, and queen palms in  
13 South/Central Florida. In addition, the various types of vegetation seen in the region  
14 contribute to outages during extreme weather events. Pine tree species cover a large  
15 portion of DEF’s Northern footprint and are very sensitive to wind damage,  
16 flooding, and salt inundation which are typical conditions during storm events  
17 especially with storm surges. Storm surges affect soil stability around trees  
18 rendering them more prone to fall and cause customer outages. Salt inundation from  
19 storm surges typically kills impacted trees within two years which can also lead to  
20 more vegetation-related outages. Much of the affected dead and dying trees are

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<sup>2</sup> Colorado State University, *CSU Tropical Cyclone Impact Probabilities*, [https://tropical.colostate.edu/TC\\_impact.html](https://tropical.colostate.edu/TC_impact.html) (last visited Mar. 15, 2024).

<sup>3</sup> See Li, L., Chakraborty, P. *Slower decay of landfalling hurricanes in a warming world*. *Nature* 587, 230–234 (Nov. 11, 2020).



1 outside DEF's right-of-way easements therefore preventing pre-emptive removal  
2 unless a customer grants permission for removal. Approximately 48% of DEF's  
3 Transmission system footprint and approximately 66% of DEF's Distribution  
4 system footprint is forested. In addition, approximately 26% of DEF's territory has  
5 a wetland classification, which impacts several upland tree species when these areas  
6 get inundated, especially water and laurel oak decline. Trees impacted by storm  
7 surges may become susceptible to insect infestation and debris from these trees  
8 frequently impact DEF facilities causing increased vegetation related outages.  
9 Florida's climate provides a year-round growing season which is a continuous  
10 challenge to maintain fast growing species near our facilities. The large population  
11 of palm trees in South and Central Florida pose a specific challenge to DEF's  
12 distribution system due to their aggressive growth habit with a propensity to  
13 produce two sets of fronds per year. While DEF maintains a tree trim cycle, palm  
14 tree fronds are frequently blown into power lines and transformers, causing  
15 momentary flickering and outages during storms due to their rapid growth.

16  
17 In addition, DEF's service territory is comprised of both the most densely populated  
18 county in the state (Pinellas), as well as some of the most rural counties in the state.  
19 The geographic span of DEF's service territory impacts storm restoration in that it  
20 takes longer to restore power in more rural areas.

21  
22 **Q. Are there other factors unique to DEF's service territory that further enhance**

1           **this storm risk?**

2   A.    Yes. DEF’s service area is also unique since the state of Florida is a peninsula with  
3           two coastlines (Gulf of Mexico to the west and the Atlantic Ocean to the east);  
4           therefore, two sea breezes develop – one along the west coast and one along the  
5           east coast. When prevailing winds are light (very typical in the summer months),  
6           the continued replacement of the rising warmer air by the cooler oceanic air pushes  
7           the sea breezes inland. With both sea breezes moving inland, they eventually collide  
8           over the interior peninsula. This collision causes the air to rise even more and  
9           creates thunderstorms.

10

11           Thus, the geographical location combined with the shape of Florida’s peninsula is  
12           the main reason for frequent thunderstorms during the warm season. Florida also  
13           has some of the highest total lightning density in the United States.<sup>4</sup> While Florida  
14           is not the only place with sea breeze thunderstorms, it is unique in the fact that it  
15           has sea breezes develop on both coasts and the inland collision of these sea breezes  
16           produces larger, longer-lasting, stronger thunderstorms, which occur almost daily.

17

18   **Q.    What are some of the recent extreme weather events experienced in the DEF**  
19           **service territory?**

20   A.    Since 2021, customers in DEF’s service territory experienced Hurricanes Ian,  
21           Nicole, Elsa, and Idalia.

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<sup>4</sup> [Vaisala Lightning 2016-2023](#)

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**Q. Can you share more details on the Company’s response to the hurricanes mentioned above?**

A. Yes. Hurricane Elsa impacted DEF’s territory Tuesday, July 6, 2021, and made landfall as a Tropical Storm on Wednesday, July 7, 2021, near Horseshoe Beach. The 65 mph winds and heavy rains lasted for several hours over DEF’s North Coastal area before exiting the system in the early evening the following day. The storm impacted over 30,000 DEF customers with more than 2,000 resources mobilizing to restore service to these Floridians within 24 hours of Elsa exiting DEF territory.

With sustained winds of 150 mph, Hurricane Ian made landfall on September 28, 2022, as the fourth-strongest hurricane to hit Florida and the fifth-most-powerful hurricane to hit the United States. This powerful storm led to over 1.1 million customers losing power. DEF mobilized nearly 10,000 line workers, tree professionals, damage assessors, and support personnel to safe locations in its Florida service area. Additional line workers and support personnel from Duke Energy’s service territories in Indiana, Kentucky and Ohio assisted in restoration efforts. Through the work of these nearly 10,000 resources and the investments that have been made in the grid, DEF restored power to 97% of customers within 72 hours.

1 Hurricane Nicole made landfall on November 10, 2022, on the east coast of Florida  
2 as a Category 1 hurricane with widespread rainfall and strong winds. DEF's service  
3 territory experienced an array of damage spanning from broken poles, down wire  
4 and trees on our Transmission and Distribution infrastructure. Through teamwork  
5 and dedication, line workers restored power to 98% of impacted customers within  
6 12 hours of Hurricane Nicole leaving the Company's service territory. This storm  
7 impacted over 303,000 customers. To expedite restoration, Duke Energy's logistics  
8 team staged 5,000 workers across the state. During Hurricanes Ian and Nicole, our  
9 self-healing technology helped avoid nearly 215,000 extended customer power  
10 outages, saving more than 200 million minutes of total lost outage time. Duke  
11 Energy was awarded the Emergency Recovery Award from the Edison Electric  
12 Institute for its response to Hurricane Nicole.

13  
14 Hurricane Idalia made landfall on Wednesday, August 30, 2023, near Keaton Beach  
15 quickly moving ashore between Perry and Salem, with maximum sustained winds  
16 of 125 mph. In addition to major hurricane force winds, Idalia produced devastating  
17 storm surge along coastal communities causing severe flooding and widespread  
18 destruction. Hurricane Idalia impacted more than 200,000 customers in DEF's  
19 service territory. More than 5,000 line workers, tree professionals, damage  
20 assessors, and support personnel were staged strategically throughout the state to  
21 respond and restore power to customers and communities as quickly and safely as  
22 possible. Self-Optimizing Grid investments have helped Florida customers avoid

1 7.6 million minutes of interruption during Hurricane Idalia. Duke Energy was  
2 selected for a 2024 Industry Excellence Award by Southeastern Electric Exchange  
3 for its response to Hurricane Idalia.

4  
5 While restoration costs associated with these extreme weather events are not  
6 recovered through this base rate proceeding, DEF's ongoing preparedness practices  
7 described above contribute to the excellence in restoration following hurricanes and  
8 other major events.

9  
10 **IV. DEF'S DISTRIBUTION SYSTEM CAPITAL AND O&M EXPENSES**

11 **Q. What are the Company's distribution capital and O&M requests?**

12 A. The distribution capital expenditures and O&M requests included in this case are:

	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>Total 2025-2027</b>
<b>Capital Expenditures</b>	\$571.9M	\$570.5M	\$575.6M	\$1,718M
<b>O&amp;M</b>	\$96.6M	\$99.6M	\$104.3M	\$300.5M

13  
14 **Q. Are DEF's capital and O&M requests duplicative of any activities taken or**  
15 **that will be taken in response to the storm hardening initiatives or SPP**  
16 **requirements?**

17 A. No. DEF's capital and O&M requests are not duplicative of any funds previously  
18 requested under storm hardening, now replaced by the SPP. DEF has accounting

1 tools in place to charge and track work under SPP separately even when the same  
2 employees are doing regular and SPP work.  
3

4 **Q. How does DEF determine its capital and O&M distribution annual budgets?**

5 A. DEF sets distribution capital and O&M annual budgets each year with growth  
6 forecast and reliability needs in mind. Each budgeted program and department is  
7 monitored throughout the year for adherence to the budget. Planned distribution  
8 system upgrades related to expected growth are monitored and scheduled based  
9 upon an overall expansion plan. As new customers join the DEF distribution grid,  
10 the Company's customer-facing design team ensures cost effective designs are  
11 created to minimize capital expenditure and future O&M maintenance spend.  
12

13 **Q. Have recent economic conditions impacted DEF's distribution capital and  
14 O&M expenses?**

15 A. DEF reviews capital and O&M expenditures on an ongoing basis to verify both  
16 current and forecasted need for the projects. State and municipal partners have  
17 reviewed and adjusted some road projects, either delaying or cancelling them,  
18 resulting in some reallocation and adjustment in capital funds. Inflation has also  
19 impacted project costs, in that both labor and materials have increased. O&M  
20 expenses have also been mitigated through reduction in travel and other expenses  
21 where possible.  
22

1 **Q. Are the Company's distribution O&M requests within the FPSC O&M**  
2 **benchmark costs?**

3 A. Yes. This is shown in MFR C-37.  
4

5 **Q. What are the projections for the Company's distribution O&M costs per**  
6 **customer 2025 through 2027?**

7 A. As shown in MFR C-33, distribution expenses are projected to remain lower than  
8 2022 actual expenses with projected values of \$47.44, \$48.13, and \$49.60 per  
9 customer in 2025, 2026, and 2027, respectively. In fact, 2027 distribution expense  
10 per customer is projected to be \$2.39 per customer less than 2022 actuals.  
11

12 **Q. Are DEF's distribution system capital and O&M requests reasonable and**  
13 **necessary?**

14 A. Yes. DEF's capital and O&M requests are necessary for DEF to continue to provide  
15 reliable distribution service to customers and build for new customer growth. DEF  
16 will need to continue to maintain existing overhead and underground infrastructure.  
17 Maintaining the infrastructure will require continued vigilance and reasonable  
18 funding of our pole replacement, transformer replacement, and other programs  
19 summarized in Exhibit BL-3. DEF also continues its environmental stewardship by  
20 mitigating potential hazards to waterways by oil-filled equipment and ensuring  
21 hazards to birds and other animals are mitigated at every location DEF performs  
22 work.

1

2

DEF has proven to be a good steward of capital and O&M funds while continuing

3

to improve the reliability of the distribution system consistent with customer needs

4

and expectations. However, as the expanding distribution system ages, it requires

5

additional expense to maintain it. DEF must continue the capital investments and

6

O&M expenses necessary to meet future customer growth needs, replace assets as

7

they reach the end of their useful life, maintain existing distribution assets, and

8

reliably serve our customers. DEF will continue this focus on reasonable and

9

efficient spending on future distribution capital and O&M expenses to continue to

10

deliver cost efficient, reliable, and safe energy.

11

12

**Q. Does this conclude your direct testimony?**

13

A. Yes, it does.

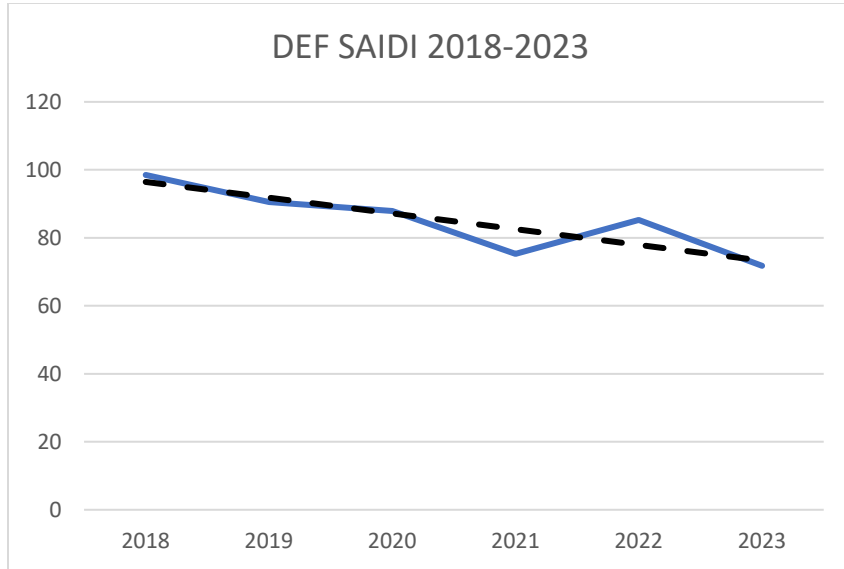


**List of MFRs Sponsored or Co-Sponsored**

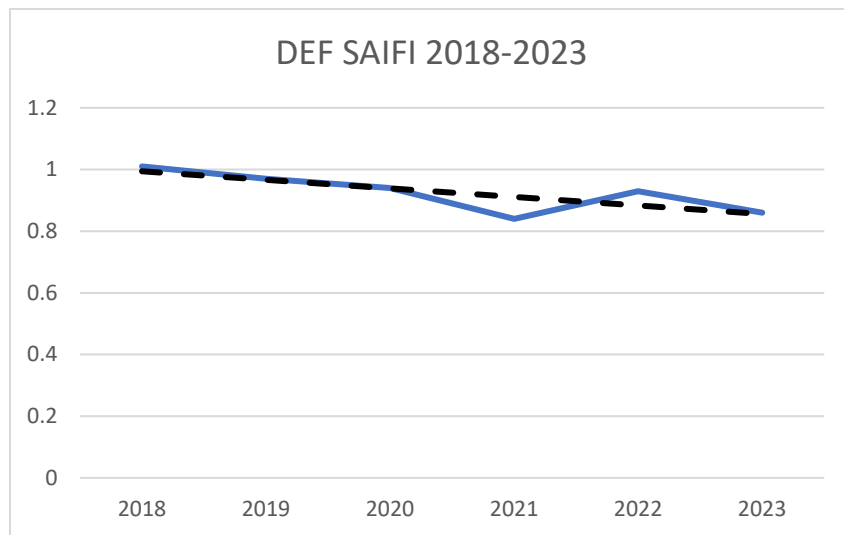
B-7	Plant Balances By Account And Sub-Account
B-8	Monthly Balances Test Year - 13 Months
B-9	Depreciation Reserve Balances By Account And Sub-Account
B-10	Monthly Reserve Balances Test Year - 13 Months
B-11	Capital Additions And Retirements
B-13	Construction Work In Progress
C-6	Budgeted Versus Actual Operating Income And Expenses
C-8	Detail Of Changes In Expenses
C-9	Five Year Analysis - Change In Cost
C-15	Industry Association Dues
C-16	Outside Professional Services
C-33	Performance Indices
C-34	Statistical Information
C-35	Payroll & Fringe Benefit Increases Compared To CPI
C-36	Non-Fuel Operation And Maintenance Expense Compared To CPI
C-37	O&M Benchmark Comparison By Function
C-41	O&M Benchmark Comparison By Function
C-43	Security Costs

**FPSC Methodology:**

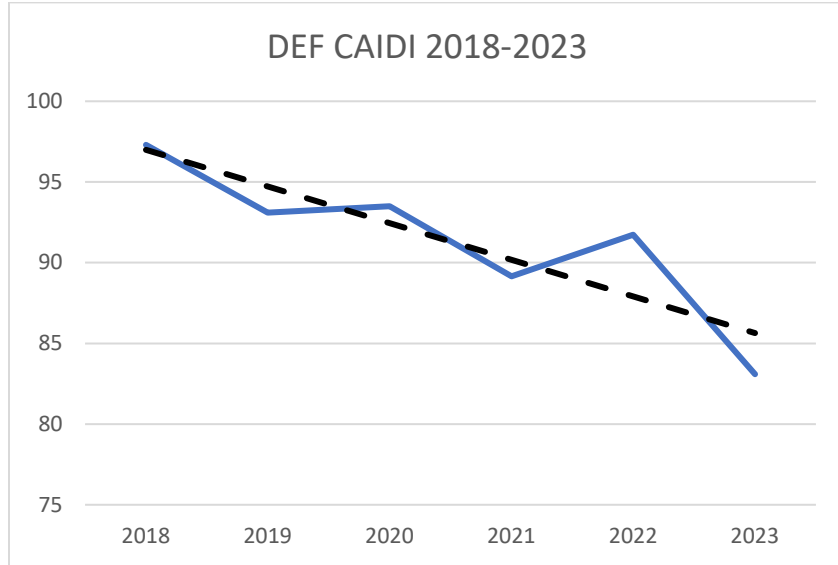
**Figure 1 – DEF Historic SAIDI**



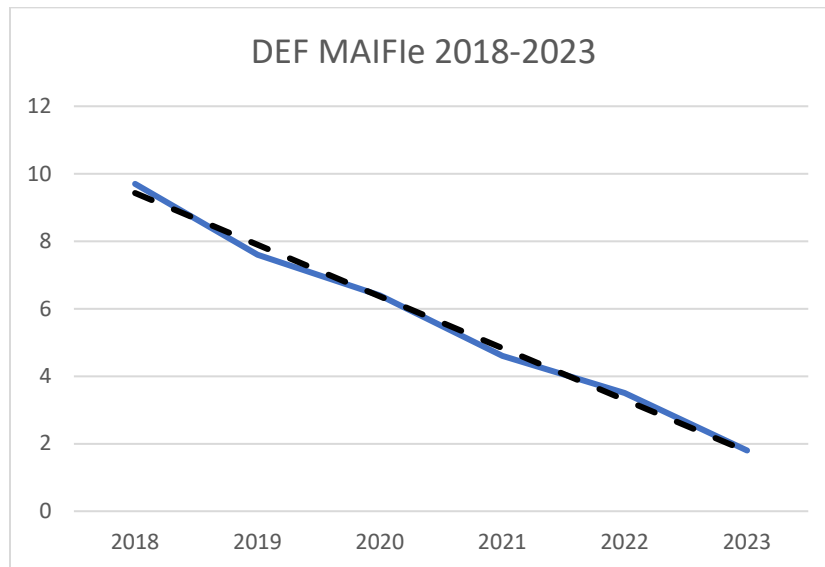
**Figure 2 – DEF Historic SAIFI**



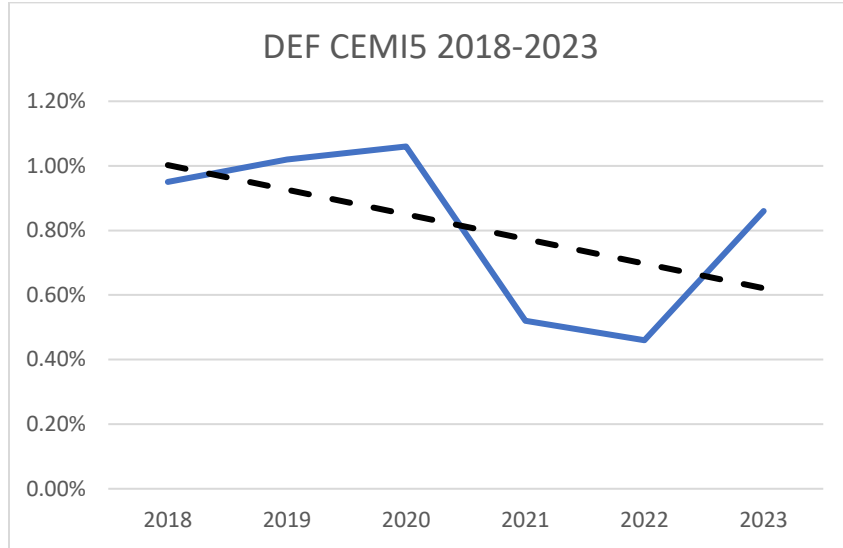
**Figure 3 – DEF Historic CAIDI**



**Figure 4 – DEF Historic MAIFle**

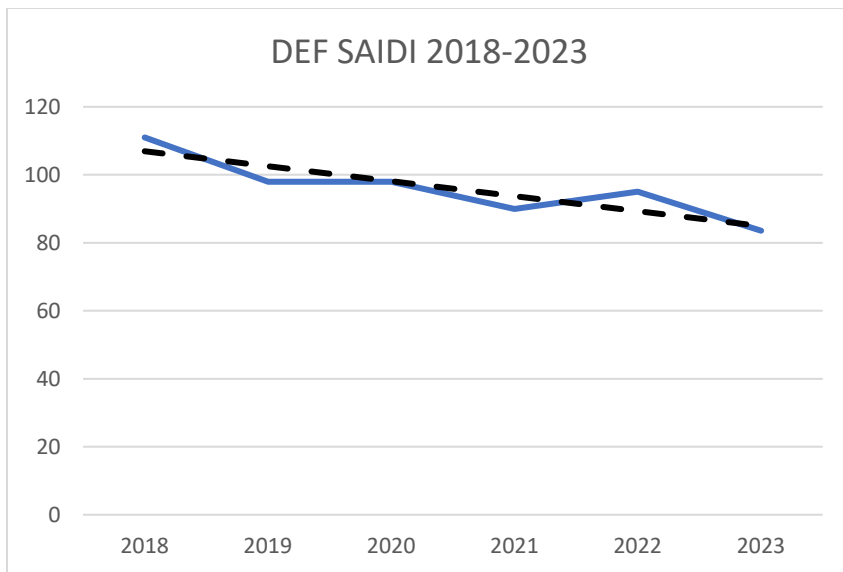


**Figure 5 – DEF Historic CEMI5**

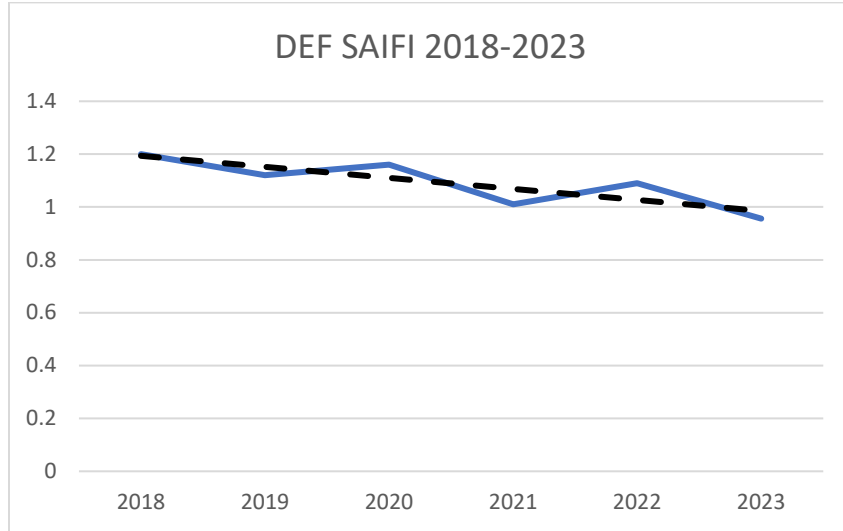


**IEEE Methodology:**

**Figure 6 – DEF Historic SAIDI**

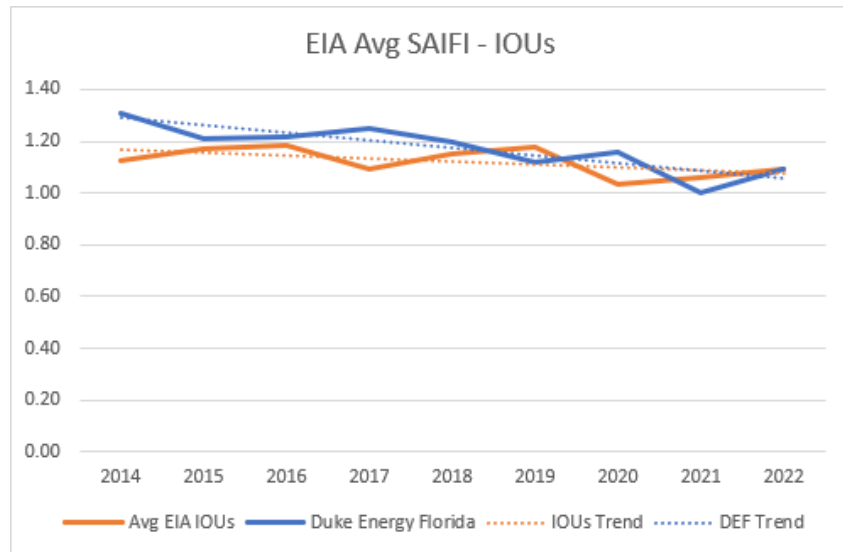


**Figure 7 – DEF Historic SAIFI**

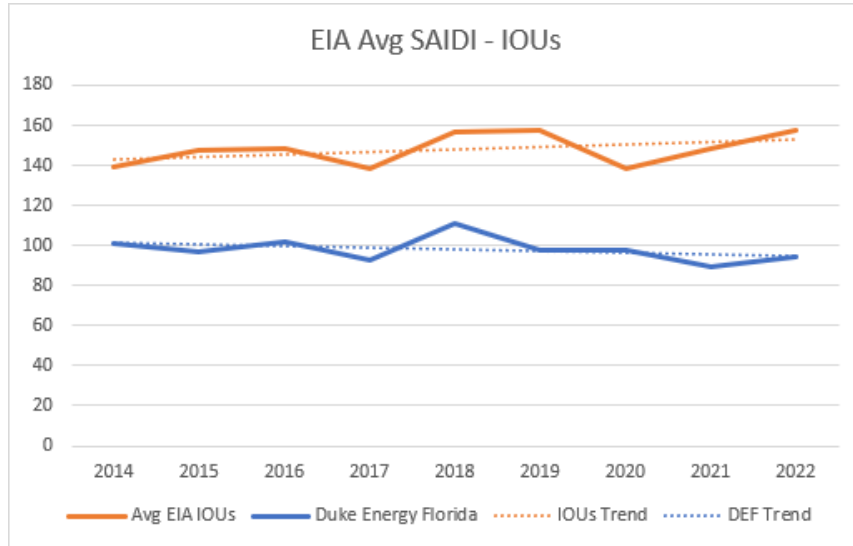


**DEF SAIDI/SAIFI vs. EIA-861 Comparison:**

The following graphs show how Duke Energy Florida’s (DEF) SAIFI & SAIDI compares to a group of peer US Electric IOUs using the Federal Government’s EIA-861 reliability data from 2014-2022 (the most recent year available). The first graph shows annual and trended SAIFI results for DEF in blue and a peer group average in orange. DEF’s SAIFI is improving at a much faster trend than the peer group average from 2014-2022. Additionally, DEF’s SAIFI was equal to or better than the peer group for 3 of the last 4 years of available data.



The second graph shows annual and trended SAIDI results for DEF in blue and a peer group average in orange. DEF's SAIDI is not only significantly better than the peer group average, but it also has an improving trend while the peer group's average trend is worsening.



This benchmarking of the standard reliability indices, SAIFI & SAIDI, supports the conclusion that DEF is performing well in providing reliable electric service to our customers by reducing the frequency and duration of outages as compared to a peer group average.

These are the IOUs selected for our peer group comparisons. At a high level we selected utilities of similar size, similar geography, and where system characteristics were publicly available similar system characteristics as Duke Energy's regulated utilities. In addition, we selected some Northeast & West Coast IOUs to have a large enough sample size for the peer group.

<b>EIA-861 Utility Names</b>
AEP Texas Central Company
AEP Texas North Company
Alabama Power Co
Ameren Illinois Company
Appalachian Power Co (VA)
Appalachian Power Co (WV)
Baltimore Gas & Electric Co
Dominion Energy South Carolina, Inc
Entergy Louisiana LLC
Florida Power & Light
Georgia Power Co
Indiana Michigan Power Co (IN)

Indiana Michigan Power Co (MI)
Kentucky Utilities Co
Louisville Gas & Electric Co
Ohio Power Co
Pacific Gas & Electric Co.
PECO Energy Co
Potomac Electric Power Co (DC)
Potomac Electric Power Co (MD)
Public Service Co of Oklahoma
San Diego Gas & Electric Co
South Carolina Electric & Gas Company
Southern California Edison Co
Tampa Electric Co (TECO)
Union Electric Co - (MO)
Virginia Electric & Power Co

## **DEF Distribution Maintenance Programs**

### **Pole Replacement Program**

The maintenance pole replacement program is DEF's reactive, non-inspection based program, which involves poles found-in-field by operations or engineering and not associated with an outage, public damage, or pole inspection. The reactive program complements DEF's inspection program, which comprehensively addresses all distribution poles on an eight-year cycle, by allowing DEF to address emergent issues arising between inspections.

### **Capacitor Replacement Program**

The capacitor replacement program replaces entire capacitor banks or individual components including the controller, cutouts, arrestors, or switches. Targets are identified remotely via the distribution supervisory control and data acquisition system ("DSCADA") and prioritized based on power factor and voltage support needs on each circuit.

### **Underground Cable Replacement Programs**

The underground cable programs involve the replacement of underground primary, secondary or service cable due to testing results or failure. Primary cables are what make up the electric distribution system upstream of transformers. Secondary and service cables are downstream of transformers. Service cables refer to the last span of cable connecting a DEF facility to a customer.



**Transformer Maintenance Program**

A transformer provides the final voltage transformation in the electric distribution system, stepping down the voltage used in the distribution lines to the level used by the customer. The transformer programs involve the replacement of overhead and padmount transformers resulting from oil leaks, inspection follow up, overload or corrective maintenance.

A customer may request to replace, paint or modify a padmount unit's external appearance due to fading, rusting or other external damage. DEF personnel visit the site to assess the unit's integrity. Any unit with near-term enclosure integrity issues (e.g., potential rust-through or other reliability issue that is likely to manifest within six years or less) would be scheduled for replacement within a timeframe corresponding to the condition of the equipment. If no near-term enclosure issues exist but the original paint has degraded and new paint can prudently and reasonably extend the life of the unit beyond six years, DEF coordinates the painting of the unit to extend its useful life.

**Other**

DEF also maintains a grid capacity program to upgrade and add additional feeders based upon loading in high growth areas, which I will discuss further below. DEF has continued the Self-Optimizing Grid program under the Storm Protection Plan with a plan of finishing the 80% saturation goal by the end of 2025. DEF monitors outages and their causes to look for patterns and identify customers with repeat outages or power quality issues. The

Company's design team and construction crews also work to resolve any deficiencies found in the distribution system while performing work or designs. One such program, implemented in 2016 is Standing Orders, allowing DEF's crews to address needed repairs or upgrades to facilities while in the field performing other work, thereby improving reliability and power quality while saving a second trip for crews and design teams.