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November 15, 2022

**VIA ELECTRONIC FILING**

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

Re: *Review of Storm Protection Plan pursuant to Rule 25-6.030, F.A.C., Duke Energy Florida, LLC.; Docket No. 20220050-EI*

Dear Mr. Teitzman:

On November 10, 2022, the Commission issued Order No. PSC-2022-0388-PCO-EI and Amended Final Order No. PSC-2022-0388A-FOF-EI on November 14, 2022 respectively, regarding Duke Energy Florida, LLC's ("DEF"), 2023-2032 Storm Protection Plan ("SPP") stating, *in DEF's current SPP, the Transmission Loop Radial-Fed Substation ("LRFS") Program involves the construction of new redundant infrastructure, rather than the enhancement or hardening of existing facilities...it does not strengthen existing transmission facilities for storm hardening purposes.* Accordingly, DEF is providing the attached Amended Exhibit No. \_\_\_(BML-1) of witness Brian Lloyd removing the LRFS program.

Thank you, and if you have any questions or concerns regarding this filing, please do not hesitate to contact me at (850) 521-1428.

Sincerely,

*s/Matthew R. Bernier*

Matthew R. Bernier

MRB/mw  
Attachments

CERTIFICATE OF SERVICE

Docket No. 20220050-EI

I HEREBY CERTIFY that a true copy of the above-mentioned document has been furnished to the following individuals via e-mail on this 15<sup>th</sup> day of November, 2022.

s/ Matthew R. Bernier

Attorney

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# DUKE ENERGY Storm Protection Plan

## Florida Program Descriptions

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# PROGRAM DESCRIPTIONS

The following sections of this document describe each of Duke Energy Florida's ("DEF") Storm Protection Plan ("SPP") Programs. This exhibit includes the Program vision, description, costs, and estimated benefits from completion of the Program.

Note: Shifts of scope may occur between years to optimize benefits delivery to customers and execution efficiencies.

At the Commission's direction and under its supervision, DEF has engaged in significant storm hardening activities since the 2006 adoption of the Storm Hardening Rule (Rule 25-6.0342, F.A.C., since repealed, due to the adoption of § 366.96, Fla. Stat., and subsequent adoption of Rule 25-6.030, F.A.C.). After the 2016/2017 storm seasons, the Commission initiated its "Review of Florida's Electric Utility Hurricane Preparedness and Restoration Actions 2018"<sup>1</sup> to evaluate the efficacy of the approximately 12 years of hardening efforts. As a result of the analysis performed in that docket, the Commission determined that "Florida's aggressive storm hardening programs are working."<sup>2</sup> This conclusion was borne out by several observations: the length of outages from the 2016/2017 storm season was reduced markedly from the 2004-2005 storm season, hardened overhead distribution facilities performed better than non-hardened facilities, and underground facilities performed much better than overhead facilities.<sup>3</sup>

DEF agrees with the Commission's determination. In recognition of the efficacy of the storm hardening plans implemented since 2006, DEF's initial SPP ("SPP 2020") carried on the storm hardening work included in the Company's 2019-2021 Storm Hardening Plan ("SHP"); as such, the programs that were carried over from the SHP into the SPP are the very programs the Commission has previously acknowledged "are grounded in substantive strengthening and protection of the utility's electric facilities. Programs include tree trimming, pole inspections, hardening of feeders and laterals, and undergrounding."<sup>4</sup> DEF's current SPP ("SPP 2023") will continue these programs and build upon them, adding incremental investment over the life of the Plan. DEF will also continue researching and investigating additional technologies and programs.

That said, DEF also agrees with the Commission's recognition that "[n]o amount of preparation can eliminate outages in extreme weather events"<sup>5</sup> so while DEF's Plan is designed with an eye toward strengthening the system and reducing outages and outage duration, it must be understood that there is no panacea and individual storms will produce unique challenges.

<sup>1</sup> *Review of electric utility hurricane preparedness and restoration actions*, Docket No. 20170215-EU.

<sup>2</sup> *Id.* at p. 1.

<sup>3</sup> *See id.* at pp. 2-3.

<sup>4</sup> *See id.* at p. 9.

<sup>5</sup> *Id.* at p. 6.

# Distribution Programs

## Florida Program Summaries

# Feeder Hardening

## Vision

Feeder Hardening is a long-term program that will systematically upgrade the feeder backbone to meet the National Electric Safety Code (“NESC”) 250C extreme wind load standard. The existing backbone is approximately 6,300 miles on 1,411 feeders.

## Description

The Feeder Hardening program will enable the feeder backbone to better withstand extreme weather events. This includes strengthening structures, updating basic insulation level (“BIL”) to current standards, updating conductor to current standards, relocating difficult to access facilities, relocating or undergrounding facilities to address clearance encroachments, replacing oil filled equipment as appropriate, and incorporates the Company’s pole inspection and replacement activities.

### Structure Strengthening

Structure strengthening includes upgrading existing poles and other facilities as necessary to align with the NESC 250C extreme wind load standard. For example, a stronger pole class reduces the extent of damage incurred on feeder lines during extreme wind events. Other related hardware upgrades will occur simultaneously, such as insulators, crossarms, support brackets, and guys.

### BIL

While upgrading feeders to the extreme wind load standard, the Company will also upgrade the BIL to further harden the system. Upgrading the BIL involves framing for more space between phases, more wood material between insulator mounting points, application of the larger standard insulator sizes, and moving arresters to the lowest level of the primary space.

### Conductor Upgrades

As part of Feeder Hardening, DEF will replace any deteriorated or undersized conductor on the feeder backbone. This conductor is more susceptible to storm damage. It will be replaced with our current standard conductor.

### Relocating Difficult to Access Facilities

Where practical, feeder sections that traverse hard to access areas, such as wetlands, will be relocated to truck-accessible routes. These line sections often suffer damage in extreme wind load events and, due to their location, are among the most expensive and longest to restore outages.

### Relocating or Undergrounding Facilities to Address Clearance Encroachments

While upgrading feeders to the extreme wind load standards, the Company will review clearances with non-company owned structures and assets to determine if there will be adequate clearances with the proposed, hardened structures. If inadequate, the Company will relocate the facilities or install underground facilities where necessary.

### Replacing Oil-Filled Equipment

While working to upgrade each feeder, hydraulic (oil-filled) reclosers will be upgraded to electronic reclosers (vacuum interrupters) with communications and remote Supervisory Control and Data Acquisition (“SCADA”) control capability, as available. Electronic reclosers enable remote visibility and control. Real-time operational information is remotely available, such as current per phase, voltage per phase, var flow per phase, health condition of the device, on-board battery health, fault information, and interrupter status by phase. This real-time data will

help target restoration efforts helping to reduce outage durations. Additionally, these devices can cause negative environmental impacts. Electronic reclosers are vacuum interruption devices and have no internal oil.



Figure 1: SCADA enabled Electronic Recloser

### Pole Inspection and Replacement

Per Commission Order No. 2006-0144-PAA-EI, pole inspection is performed on an 8-year cycle. These inspections determine the extent of pole decay and any associated loss of strength. The information gathered from these inspections is used to determine pole replacements and to effectuate the extension of pole life through treatment and reinforcement.

### Cost

It is expected that the 10-year cost will be approximately \$2.0B Capital and \$49M O&M. This would cover approximately 2,100 miles of feeder hardening and costs of the pole inspection and replacement activities.

	DEF		
	2023	2024	2025
<b>Feeder Hardening</b>			
Totals	\$163,275,499	\$147,020,015	\$171,460,041
Feeder Hardening	\$145,418,235	\$129,142,665	\$153,550,611
Capital	\$142,706,530	\$126,786,600	\$150,749,250
O&M	\$ 2,711,705	\$ 2,356,065	\$ 2,801,361
Total Units	170	150	174
<b>Pole Inspection/Replacement</b>			
Totals	\$ 17,857,264	\$ 17,877,350	\$ 17,909,430
Capital	\$ 16,486,848	\$ 16,478,550	\$ 16,481,570
O&M	\$ 1,370,416	\$ 1,398,800	\$ 1,427,860
Total Units	1,692	1,650	1,610

## Cost Benefit Comparison

The Feeder Hardening Program began in 2021 and is estimated to take 30 years to complete. Based on today's costs, the Program will cost an estimated \$6B in Capital and \$103M in Program O&M. At completion, approximately 6,300 feeder miles will be hardened.

When the Feeder Hardening Program is complete, DEF estimates it will reduce the cost of extreme weather events on the Distribution system by approximately \$15M to \$18M annually based on today's costs.

When the Feeder Hardening Program is complete, DEF estimates it will reduce Distribution MED Customer Minutes Interrupted ("CMI") by approximately 111 million to 139 million minutes annually. CMI reduction is used as a proxy for reduction in extreme weather event duration for the average customer.

## Prioritization Methodology

Work will be prioritized using the following process.

1. Probability of Damage: To prioritize the work in the Florida regions, the Transmission and Distribution systems were modeled, and weather simulations were run to provide probabilistic exposure frequency for all asset locations. The weather modeling uses the FEMA Hazus and Sea, Lake, and Overland Surges from Hurricanes ("SLOSH") models, which contain the weather data for storms over the last 200 years. Using the geographical locations of the Florida assets and the historic storm paths embedded in the Hazus model, a spatial correlation of future storm exposure can be derived. To determine probability of damage given that exposure, eight years of historical outage data was provided and correlated with the closest weather tower to determine the conditions during historic failures recorded in the outage data. Then, the expected quantities of asset failure for simulated future weather exposure conditions was derived by combining simulated weather patterns with historical asset failure through conditional probability methods.
2. Consequence of Damage: Once the output of probabilistic damage is assessed, the probable impact to customers is considered. This step considers number of customers served by a given asset (e.g., each pole, or segment of conductor on a feeder), observed outage durations, the mix of customers, and critical facilities. This step is performed both for the existing configuration of each feeder and the hardened configuration resulting from the particular program. The difference between the existing condition and the hardened configuration is the program impact.
3. Distribution subject matter experts then use these outputs to determine the optimum deployment plan considering factors such as current projects in the area, critical customers, operational knowledge, resource availability and efficiency.

## Year 1 Project List

## 2023 Planned Duke Energy Florida - Feeder Hardening Program

Location	Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Finish Date	
Bay Hill	K67	1.8	1912	\$ 1,476,750	\$ 27,320	1/1/2023	12/31/2023
Bay Hill	K68	4.9	1860	\$ 4,026,000	\$ 74,481	1/1/2023	12/31/2023
Bay Hill	K73	1.7	875	\$ 1,410,750	\$ 26,099	1/1/2023	12/31/2023
Bay Hill	K76	1.9	836	\$ 1,526,250	\$ 28,236	1/1/2023	12/31/2023
Boggy Marsh	K957	2.7	2937	\$ 2,260,500	\$ 41,819	1/1/2023	12/31/2023
Boggy Marsh	K959	8.0	1172	\$ 6,591,750	\$ 121,947	1/1/2023	12/31/2023
Central Park	K495	2.3	1123	\$ 1,914,000	\$ 35,409	1/1/2023	12/31/2023
Central Park	W0494	2.2	127	\$ 1,782,000	\$ 32,967	1/1/2023	12/31/2023
Central Park	W0497	2.9	62	\$ 2,376,000	\$ 43,956	1/1/2023	12/31/2023
Central Park	W0500	1.1	285	\$ 932,250	\$ 17,247	1/1/2023	12/31/2023
Clearwater	C10	2.9	1148	\$ 2,359,500	\$ 43,651	1/1/2023	12/31/2023
Clearwater	C11	2.7	1161	\$ 2,252,250	\$ 41,667	1/1/2023	12/31/2023
Clearwater	C12	2.3	1263	\$ 1,856,250	\$ 34,341	1/1/2023	12/31/2023
Clearwater	C18	2.6	2049	\$ 2,178,000	\$ 40,293	1/1/2023	12/31/2023
Crown Point	K278	1.5	1932	\$ 1,204,500	\$ 22,283	1/1/2023	12/31/2023
Curlew	C4973	4.2	1831	\$ 3,432,000	\$ 63,492	1/1/2023	12/31/2023
Curlew	C4976	4.5	2221	\$ 3,696,000	\$ 68,376	1/1/2023	12/31/2023
Curlew	C4985	2.0	1305	\$ 1,683,000	\$ 31,136	1/1/2023	12/31/2023
Curlew	C4987	3.0	902	\$ 2,458,500	\$ 45,482	1/1/2023	12/31/2023
Curlew	C4989	4.1	2096	\$ 3,374,250	\$ 62,424	1/1/2023	12/31/2023
Curlew	C4990	3.7	1689	\$ 3,060,750	\$ 56,624	1/1/2023	12/31/2023
Curlew	C4991	3.2	2982	\$ 2,598,750	\$ 48,077	1/1/2023	12/31/2023
Gateway	X111	1.2	316	\$ 998,250	\$ 18,468	1/1/2023	12/31/2023
Gateway	X113	2.9	2229	\$ 2,417,250	\$ 44,719	1/1/2023	12/31/2023
Gateway	X123	1.9	60	\$ 1,584,000	\$ 29,304	1/1/2023	12/31/2023
Gateway	X125	1.9	340	\$ 1,534,500	\$ 28,388	1/1/2023	12/31/2023
Lake Aloma	W0151	2.8	1720	\$ 2,301,750	\$ 42,582	1/1/2023	12/31/2023
Lake Aloma	W0153	2.7	642	\$ 2,252,250	\$ 41,667	1/1/2023	12/31/2023
Maitland	M80	3.5	1397	\$ 2,879,250	\$ 53,266	1/1/2023	12/31/2023
Maitland	M82	3.2	600	\$ 2,615,250	\$ 48,382	1/1/2023	12/31/2023
Maitland	W0079	3.3	1253	\$ 2,730,750	\$ 50,519	1/1/2023	12/31/2023
Maitland	W0086	1.2	386	\$ 998,250	\$ 18,468	1/1/2023	12/31/2023
Oakhurst	J224	4.0	2349	\$ 3,316,500	\$ 61,355	1/1/2023	12/31/2023
Oakhurst	J227	2.1	1951	\$ 1,732,500	\$ 32,051	1/1/2023	12/31/2023
Rio Pinar	W0968	3.1	3449	\$ 2,582,250	\$ 47,772	1/1/2023	12/31/2023
Rio Pinar	W0970	5.0	2966	\$ 4,125,000	\$ 76,313	1/1/2023	12/31/2023
Rio Pinar	W0975	4.3	2665	\$ 3,572,250	\$ 66,087	1/1/2023	12/31/2023
Seven Springs	C4501	5.6	2398	\$ 4,620,000	\$ 85,470	1/1/2023	12/31/2023
Seven Springs	C4508	4.2	2395	\$ 3,481,500	\$ 64,408	1/1/2023	12/31/2023
Sky Lake	W0363	4.8	2128	\$ 3,927,000	\$ 72,650	1/1/2023	12/31/2023
Sky Lake	W0365	3.1	2531	\$ 2,516,250	\$ 46,551	1/1/2023	12/31/2023
Sky Lake	W0366	2.7	960	\$ 2,186,250	\$ 40,446	1/1/2023	12/31/2023
Sky Lake	W0367	2.9	201	\$ 2,367,750	\$ 43,803	1/1/2023	12/31/2023
Sky Lake	W0368	5.4	1298	\$ 4,422,000	\$ 81,807	1/1/2023	12/31/2023
Vinoy	X70	3.1	2046	\$ 2,532,750	\$ 46,856	1/1/2023	12/31/2023
Vinoy	X71	2.5	1867	\$ 2,037,750	\$ 37,698	1/1/2023	12/31/2023
Vinoy	X72	4.8	3070	\$ 3,968,250	\$ 73,413	1/1/2023	12/31/2023
Vinoy	X78	1.9	2500	\$ 1,600,500	\$ 29,609	1/1/2023	12/31/2023
Cross Bayou	J141	3.8	1202	\$ 3,102,000	\$ 57,387	1/1/2023	12/31/2023
Cross Bayou	J143	1.9	1291	\$ 1,592,250	\$ 29,457	1/1/2023	12/31/2023
Cross Bayou	J148	3.7	826	\$ 3,019,500	\$ 55,861	1/1/2023	12/31/2023
Econ	W0320	4.7	2845	\$ 3,910,500	\$ 72,344	1/1/2023	12/31/2023
Econ	W0321	6.1	1413	\$ 5,057,250	\$ 93,559	1/1/2023	12/31/2023

## Feeder Pole Inspections

Amended Exhibit No. \_\_\_\_ (BML-1)

Location	Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Finish Date
WILLISTON	A124	939	1516	\$ 37,560	1/1/2023	12/31/2023
WILLISTON	A125	2	0	\$ 80	1/1/2023	12/31/2023
ALACHUA	A143	95	162	\$ 3,800	1/1/2023	12/31/2023
ALACHUA	A144	38	30	\$ 1,520	1/1/2023	12/31/2023
GE ALACHUA	A185	4	0	\$ 160	1/1/2023	12/31/2023
GE ALACHUA	A186	369	556	\$ 14,760	1/1/2023	12/31/2023
LURAVILLE	A192	369	699	\$ 14,760	1/1/2023	12/31/2023
ARCHER	A195	182	458	\$ 7,280	1/1/2023	12/31/2023
ARCHER	A196	283	494	\$ 11,320	1/1/2023	12/31/2023
FORT WHITE	A20	357	609	\$ 14,280	1/1/2023	12/31/2023
O' BRIEN	A379	391	758	\$ 15,640	1/1/2023	12/31/2023
GEORGIA PACIFIC	A45	688	1360	\$ 27,520	1/1/2023	12/31/2023
TRENTON	A90	504	1207	\$ 20,160	1/1/2023	12/31/2023
TRENTON	A91	95	134	\$ 3,800	1/1/2023	12/31/2023
NEWBERRY	A94	59	83	\$ 2,360	1/1/2023	12/31/2023
CROSS BAYOU	J140	113	1583	\$ 4,520	1/1/2023	12/31/2023
CROSS BAYOU	J141	104	1200	\$ 4,160	1/1/2023	12/31/2023
CROSS BAYOU	J142	90	3322	\$ 3,600	1/1/2023	12/31/2023
CROSS BAYOU	J143	85	1290	\$ 3,400	1/1/2023	12/31/2023
CROSS BAYOU	J144	9	5	\$ 360	1/1/2023	12/31/2023
CROSS BAYOU	J145	95	1219	\$ 3,800	1/1/2023	12/31/2023
CROSS BAYOU	J146	70	732	\$ 2,800	1/1/2023	12/31/2023
CROSS BAYOU	J147	218	3023	\$ 8,720	1/1/2023	12/31/2023
CROSS BAYOU	J148	66	826	\$ 2,640	1/1/2023	12/31/2023
CROSS BAYOU	J150	177	1928	\$ 7,080	1/1/2023	12/31/2023
LAKE PLACID	K1066	296	1427	\$ 11,840	1/1/2023	12/31/2023
MARLEY ROAD	K120	0	0	\$ -	1/1/2023	12/31/2023
LAKE MARION	K1286	465	4105	\$ 18,600	1/1/2023	12/31/2023
LAKE MARION	K1287	507	2396	\$ 20,280	1/1/2023	12/31/2023
LAKE MARION	K1288	237	1603	\$ 9,480	1/1/2023	12/31/2023
LAKE PLACID	K1320	557	2289	\$ 22,280	1/1/2023	12/31/2023
ARBUCKLE CREEK	K1361	48	1192	\$ 1,920	1/1/2023	12/31/2023
LEISURE LAKES	K1415	633	2068	\$ 25,320	1/1/2023	12/31/2023
WEST DAVENPOR	K1521	151	2145	\$ 6,040	1/1/2023	12/31/2023
WEST DAVENPOR	K1523	23	2191	\$ 920	1/1/2023	12/31/2023
WEST DAVENPOR	K1524	101	1962	\$ 4,040	1/1/2023	12/31/2023
WEST DAVENPOR	K1526	136	3486	\$ 5,440	1/1/2023	12/31/2023
WEST DAVENPOR	K1529	75	2720	\$ 3,000	1/1/2023	12/31/2023
FISHEATING CREE	K1560	765	2565	\$ 30,600	1/1/2023	12/31/2023
HAINES CITY	K16	226	996	\$ 9,040	1/1/2023	12/31/2023
HAINES CITY	K17	342	2130	\$ 13,680	1/1/2023	12/31/2023
CHAMPIONS GATE	K1761	9	2187	\$ 360	1/1/2023	12/31/2023
CHAMPIONS GATE	K1762	33	3445	\$ 1,320	1/1/2023	12/31/2023
CHAMPIONS GATE	K1763	13	2225	\$ 520	1/1/2023	12/31/2023
CHAMPIONS GATE	K1764	7	2029	\$ 280	1/1/2023	12/31/2023
HAINES CITY	K18	248	3041	\$ 9,920	1/1/2023	12/31/2023
NORTH RIDGE	K1825	61	225	\$ 2,440	1/1/2023	12/31/2023
HAINES CITY	K19	136	533	\$ 5,440	1/1/2023	12/31/2023
HAINES CITY	K20	160	1230	\$ 6,400	1/1/2023	12/31/2023
HAINES CITY	K21	469	2614	\$ 18,760	1/1/2023	12/31/2023
HAINES CITY	K22	213	2375	\$ 8,520	1/1/2023	12/31/2023
LAKE PLACID NOR	K24	133	950	\$ 5,320	1/1/2023	12/31/2023
LAKE PLACID NOR	K27	70	570	\$ 2,800	1/1/2023	12/31/2023
LOUGHMAN	K5078	57	1119	\$ 2,280	1/1/2023	12/31/2023
LOUGHMAN	K5079	153	2474	\$ 6,120	1/1/2023	12/31/2023
LOUGHMAN	K5086	6	2330	\$ 240	1/1/2023	12/31/2023
SEBRING EAST	K541	36	621	\$ 1,440	1/1/2023	12/31/2023
SEBRING EAST	K542	73	109	\$ 2,920	1/1/2023	12/31/2023
LAKE PLACID	K757	381	935	\$ 15,240	1/1/2023	12/31/2023
LAKE PLACID	K758	253	1376	\$ 10,120	1/1/2023	12/31/2023
INTERCESSION CI	K966	202	622	\$ 8,080	1/1/2023	12/31/2023
INTERCESSION CI	K967	108	1443	\$ 4,320	1/1/2023	12/31/2023

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Location	Unit Count	Customer Count	Capital Cost	Start Date	Finish Date	
EUSTIS SOUTH	M1054	57	642	\$ 2,280	1/1/2023	12/31/2023
EUSTIS SOUTH	M1055	162	1402	\$ 6,480	1/1/2023	12/31/2023
EUSTIS SOUTH	M1056	173	1766	\$ 6,920	1/1/2023	12/31/2023
EUSTIS SOUTH	M1057	68	1509	\$ 2,720	1/1/2023	12/31/2023
EUSTIS SOUTH	M1058	243	1948	\$ 9,720	1/1/2023	12/31/2023
EUSTIS SOUTH	M1059	140	1731	\$ 5,600	1/1/2023	12/31/2023
LISBON	M1517	217	1663	\$ 8,680	1/1/2023	12/31/2023
LISBON	M1518	122	1840	\$ 4,880	1/1/2023	12/31/2023
LISBON	M1519	242	2045	\$ 9,680	1/1/2023	12/31/2023
LISBON	M1520	283	1680	\$ 11,320	1/1/2023	12/31/2023
LOCKHART	M400	86	308	\$ 3,440	1/1/2023	12/31/2023
LOCKHART	M402	105	618	\$ 4,200	1/1/2023	12/31/2023
LOCKHART	M406	89	1703	\$ 3,560	1/1/2023	12/31/2023
LOCKHART	M412	165	1805	\$ 6,600	1/1/2023	12/31/2023
LOCKHART	M415	27	47	\$ 1,080	1/1/2023	12/31/2023
LOCKHART	M417	99	1127	\$ 3,960	1/1/2023	12/31/2023
UMATILLA	M4405	164	757	\$ 6,560	1/1/2023	12/31/2023
UMATILLA	M4407	327	2270	\$ 13,080	1/1/2023	12/31/2023
UMATILLA	M4408	162	1399	\$ 6,480	1/1/2023	12/31/2023
EUSTIS	M499	150	1448	\$ 6,000	1/1/2023	12/31/2023
EUSTIS	M500	122	1754	\$ 4,880	1/1/2023	12/31/2023
EUSTIS	M501	192	1144	\$ 7,680	1/1/2023	12/31/2023
EUSTIS	M503	215	1441	\$ 8,600	1/1/2023	12/31/2023
EUSTIS	M504	241	2013	\$ 9,640	1/1/2023	12/31/2023
TAVARES EAST	M580	98	700	\$ 3,920	1/1/2023	12/31/2023
TAVARES EAST	M581	166	1364	\$ 6,640	1/1/2023	12/31/2023
KELLY PARK	M821	177	1987	\$ 7,080	1/1/2023	12/31/2023
KELLY PARK	M822	164	402	\$ 6,560	1/1/2023	12/31/2023
JASPER	N191	446	831	\$ 17,840	1/1/2023	12/31/2023
JASPER	N191 OLD	1	0	\$ 40	1/1/2023	12/31/2023
JASPER	N192	285	959	\$ 11,400	1/1/2023	12/31/2023
JENNINGS	N195	278	481	\$ 11,120	1/1/2023	12/31/2023
WHITE SPRINGS	N375	330	730	\$ 13,200	1/1/2023	12/31/2023
TURNER PLANT	W0761	258	1953	\$ 10,320	1/1/2023	12/31/2023
TURNER PLANT	W0762	190	1444	\$ 7,600	1/1/2023	12/31/2023
TURNER PLANT	W0763	204	1712	\$ 8,160	1/1/2023	12/31/2023
TURNER PLANT	W0764	111	1352	\$ 4,440	1/1/2023	12/31/2023
BAYWAY	X100	45	798	\$ 1,800	1/1/2023	12/31/2023
THIRTY SECOND ST	X22	297	2379	\$ 11,880	1/1/2023	12/31/2023
THIRTY SECOND ST	X23	115	1135	\$ 4,600	1/1/2023	12/31/2023
THIRTY SECOND ST	X24	195	1283	\$ 7,800	1/1/2023	12/31/2023
THIRTY SECOND ST	X25	125	982	\$ 5,000	1/1/2023	12/31/2023
THIRTY SECOND ST	X26	206	1489	\$ 8,240	1/1/2023	12/31/2023
THIRTY SECOND ST	X27	196	2852	\$ 7,840	1/1/2023	12/31/2023
THIRTY SECOND ST	X28	190	2377	\$ 7,600	1/1/2023	12/31/2023
THIRTY SECOND ST	X29	192	2123	\$ 7,680	1/1/2023	12/31/2023
THIRTY SECOND ST	X30	395	2985	\$ 15,800	1/1/2023	12/31/2023
SIXTEENTH STREET	X31	330	3714	\$ 13,200	1/1/2023	12/31/2023
SIXTEENTH STREET	X32	1	22	\$ 40	1/1/2023	12/31/2023
SIXTEENTH STREET	X33	44	926	\$ 1,760	1/1/2023	12/31/2023
SIXTEENTH STREET	X34	333	2999	\$ 13,320	1/1/2023	12/31/2023
SIXTEENTH STREET	X35	3	214	\$ 120	1/1/2023	12/31/2023
SIXTEENTH STREET	X36	98	1016	\$ 3,920	1/1/2023	12/31/2023
THIRTY SECOND ST	X37	371	2460	\$ 14,840	1/1/2023	12/31/2023
SIXTEENTH STREET	X43	169	1286	\$ 6,760	1/1/2023	12/31/2023
SIXTEENTH STREET	X45	259	2104	\$ 10,360	1/1/2023	12/31/2023
SIXTEENTH STREET	X46	298	2637	\$ 11,920	1/1/2023	12/31/2023
VINOY	X70	171	2050	\$ 6,840	1/1/2023	12/31/2023
VINOY	X71	107	1877	\$ 4,280	1/1/2023	12/31/2023
VINOY	X72	295	3083	\$ 11,800	1/1/2023	12/31/2023
VINOY	X75	0	1	\$ -	1/1/2023	12/31/2023
VINOY	X76	2	146	\$ 80	1/1/2023	12/31/2023
VINOY	X78	165	2510	\$ 6,600	1/1/2023	12/31/2023
VINOY	X79	0	837	\$ -	1/1/2023	12/31/2023
VINOY	X80	7	489	\$ 280	1/1/2023	12/31/2023
BAYWAY	X96	86	2873	\$ 3,440	1/1/2023	12/31/2023
BAYWAY	X97	68	1695	\$ 2,720	1/1/2023	12/31/2023
BAYWAY	X99	112	3305	\$ 4,480	1/1/2023	12/31/2023
Additional Inspection	TBD	3781		\$ 151,240	1/1/2023	12/31/2023

Feeder Pole Replacements		Amended Exhibit No. ____ (BML-1)						
Location	Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Finish Date		
WILLISTON	A124	56	1516	\$ 545,664	\$ 8,288	1/1/2023	12/31/2023	
ALACHUA	A143	6	162	\$ 58,464	\$ 888	1/1/2023	12/31/2023	
GE ALACHUA	A186	22	556	\$ 214,368	\$ 3,256	1/1/2023	12/31/2023	
LAKE MARION	K1286	28	4105	\$ 272,832	\$ 4,144	1/1/2023	12/31/2023	
HAINES CITY	K18	15	3041	\$ 146,160	\$ 2,220	1/1/2023	12/31/2023	
SEBRING EAST	K541	2	621	\$ 19,488	\$ 296	1/1/2023	12/31/2023	
JASPER	M192	17	959	\$ 165,648	\$ 2,516	1/1/2023	12/31/2023	
SIXTEENTH STREET	X33	3	926	\$ 29,232	\$ 444	1/1/2023	12/31/2023	
SIXTEENTH STREET	X36	6	1016	\$ 58,464	\$ 888	1/1/2023	12/31/2023	
VINOY	X78	10	2510	\$ 97,440	\$ 1,480	1/1/2023	12/31/2023	
BAYWAY	X96	5	2873	\$ 48,720	\$ 740	1/1/2023	12/31/2023	
ALACHUA	A144	2	30	\$ 19,488	\$ 296	1/1/2023	12/31/2023	
LURAVILLE	A192	22	699	\$ 214,368	\$ 3,256	1/1/2023	12/31/2023	
LAKE MARION	K1287	30	2396	\$ 292,320	\$ 4,440	1/1/2023	12/31/2023	
NORTHRIDGE	K1825	4	225	\$ 38,976	\$ 592	1/1/2023	12/31/2023	
SEBRING EAST	K542	4	109	\$ 38,976	\$ 592	1/1/2023	12/31/2023	
JENNINGS	M195	17	481	\$ 165,648	\$ 2,516	1/1/2023	12/31/2023	
SIXTEENTH STREET	X34	20	2999	\$ 194,880	\$ 2,960	1/1/2023	12/31/2023	
THIRTY SECOND S	X37	22	2460	\$ 214,368	\$ 3,256	1/1/2023	12/31/2023	
BAYWAY	X97	4	1695	\$ 38,976	\$ 592	1/1/2023	12/31/2023	
ARCHER	A195	11	458	\$ 107,184	\$ 1,628	1/1/2023	12/31/2023	
LAKE MARION	K1288	14	1603	\$ 136,416	\$ 2,072	1/1/2023	12/31/2023	
HAINES CITY	K19	8	533	\$ 77,952	\$ 1,184	1/1/2023	12/31/2023	
LAKE PLACID	K757	23	935	\$ 224,112	\$ 3,404	1/1/2023	12/31/2023	
WHITE SPRINGS	M375	20	730	\$ 194,880	\$ 2,960	1/1/2023	12/31/2023	
SIXTEENTH STREET	X43	10	1286	\$ 97,440	\$ 1,480	1/1/2023	12/31/2023	
BAYWAY	X99	7	3305	\$ 68,208	\$ 1,036	1/1/2023	12/31/2023	
ARCHER	A196	17	494	\$ 165,648	\$ 2,516	1/1/2023	12/31/2023	
LAKE PLACID	K1320	33	2289	\$ 321,552	\$ 4,884	1/1/2023	12/31/2023	
HAINES CITY	K20	10	1230	\$ 97,440	\$ 1,480	1/1/2023	12/31/2023	
LAKE PLACID	K758	15	1376	\$ 146,160	\$ 2,220	1/1/2023	12/31/2023	
TURNER PLANT	W0761	15	1953	\$ 146,160	\$ 2,220	1/1/2023	12/31/2023	
SIXTEENTH STREET	X45	16	2104	\$ 155,904	\$ 2,368	1/1/2023	12/31/2023	
FORT WHITE	A20	21	609	\$ 204,624	\$ 3,108	1/1/2023	12/31/2023	
ARBUCKLE CREEK	K1361	3	1192	\$ 29,232	\$ 444	1/1/2023	12/31/2023	
HAINES CITY	K21	28	2614	\$ 272,832	\$ 4,144	1/1/2023	12/31/2023	
INTERCESSION CI	K966	12	622	\$ 116,928	\$ 1,776	1/1/2023	12/31/2023	
TURNER PLANT	W0762	11	1444	\$ 107,184	\$ 1,628	1/1/2023	12/31/2023	
SIXTEENTH STREET	X46	18	2637	\$ 175,392	\$ 2,664	1/1/2023	12/31/2023	
O' BRIEN	A379	23	758	\$ 224,112	\$ 3,404	1/1/2023	12/31/2023	
LEISURE LAKES	K1415	38	2068	\$ 370,272	\$ 5,624	1/1/2023	12/31/2023	
HAINES CITY	K22	13	2375	\$ 126,672	\$ 1,924	1/1/2023	12/31/2023	
INTERCESSION CI	K967	7	1443	\$ 68,208	\$ 1,036	1/1/2023	12/31/2023	
TURNER PLANT	W0763	12	1712	\$ 116,928	\$ 1,776	1/1/2023	12/31/2023	
VINOY	X70	10	2050	\$ 97,440	\$ 1,480	1/1/2023	12/31/2023	
GEORGIA PACIFIC	A45	41	1360	\$ 399,504	\$ 6,068	1/1/2023	12/31/2023	
WEST DAVENPOR	K1521	9	2145	\$ 87,696	\$ 1,332	1/1/2023	12/31/2023	
LAKE PLACID NOF	K24	8	950	\$ 77,952	\$ 1,184	1/1/2023	12/31/2023	
EUSTIS SOUTH	M1054	3	642	\$ 29,232	\$ 444	1/1/2023	12/31/2023	
TURNER PLANT	W0764	7	1352	\$ 68,208	\$ 1,036	1/1/2023	12/31/2023	
VINOY	X71	6	1877	\$ 58,464	\$ 888	1/1/2023	12/31/2023	
TRENTON	A90	30	1207	\$ 292,320	\$ 4,440	1/1/2023	12/31/2023	
WEST DAVENPOR	K1523	1	2191	\$ 9,744	\$ 148	1/1/2023	12/31/2023	
LAKE PLACID NOF	K27	4	570	\$ 38,976	\$ 592	1/1/2023	12/31/2023	
EUSTIS SOUTH	M1055	10	1402	\$ 97,440	\$ 1,480	1/1/2023	12/31/2023	
BAYWAY	X100	3	798	\$ 29,232	\$ 444	1/1/2023	12/31/2023	
VINOY	X72	18	3083	\$ 175,392	\$ 2,664	1/1/2023	12/31/2023	
TRENTON	A91	6	134	\$ 58,464	\$ 888	1/1/2023	12/31/2023	
WEST DAVENPOR	K1524	6	1962	\$ 58,464	\$ 888	1/1/2023	12/31/2023	
LOUGHMAN	K5078	3	1119	\$ 29,232	\$ 444	1/1/2023	12/31/2023	
EUSTIS SOUTH	M1056	10	1766	\$ 97,440	\$ 1,480	1/1/2023	12/31/2023	
THIRTY SECOND S	X22	18	2379	\$ 175,392	\$ 2,664	1/1/2023	12/31/2023	
NEWBERRY	A94	4	83	\$ 38,976	\$ 592	1/1/2023	12/31/2023	
WEST DAVENPOR	K1526	8	3486	\$ 77,952	\$ 1,184	1/1/2023	12/31/2023	

Location		Unit Count	Customer Count	Capital Cost	Cont. Cost	Start Date	Finish Date
LOUGHMAN	K5079	9	2474	\$ 87,696	\$ 1,332	1/1/2023	12/31/2023
EUSTIS SOUTH	M1057	4	1509	\$ 38,976	\$ 592	1/1/2023	12/31/2023
THIRTY SECOND S	X23	7	1135	\$ 68,208	\$ 1,036	1/1/2023	12/31/2023
CROSS BAYOU	J140	7	1583	\$ 68,208	\$ 1,036	1/1/2023	12/31/2023
WEST DAVENPOR	K1529	4	2720	\$ 38,976	\$ 592	1/1/2023	12/31/2023
EUSTIS SOUTH	M1058	15	1948	\$ 146,160	\$ 2,220	1/1/2023	12/31/2023
THIRTY SECOND S	X24	12	1283	\$ 116,928	\$ 1,776	1/1/2023	12/31/2023
CROSS BAYOU	J141	6	1200	\$ 58,464	\$ 888	1/1/2023	12/31/2023
FISHEATING CREE	K1560	46	2565	\$ 448,224	\$ 6,808	1/1/2023	12/31/2023
EUSTIS SOUTH	M1059	8	1731	\$ 77,952	\$ 1,184	1/1/2023	12/31/2023
THIRTY SECOND S	X25	7	982	\$ 68,208	\$ 1,036	1/1/2023	12/31/2023
CROSS BAYOU	J142	5	3322	\$ 48,720	\$ 740	1/1/2023	12/31/2023
HAINES CITY	K16	14	996	\$ 136,416	\$ 2,072	1/1/2023	12/31/2023
LISBON	M1517	13	1663	\$ 126,672	\$ 1,924	1/1/2023	12/31/2023
THIRTY SECOND S	X26	12	1489	\$ 116,928	\$ 1,776	1/1/2023	12/31/2023
CROSS BAYOU	J143	5	1290	\$ 48,720	\$ 740	1/1/2023	12/31/2023
HAINES CITY	K17	21	2130	\$ 204,624	\$ 3,108	1/1/2023	12/31/2023
LISBON	M1518	7	1840	\$ 68,208	\$ 1,036	1/1/2023	12/31/2023
THIRTY SECOND S	X27	12	2852	\$ 116,928	\$ 1,776	1/1/2023	12/31/2023
CROSS BAYOU	J144	1	5	\$ 9,744	\$ 148	1/1/2023	12/31/2023
CHAMPIONS GATI	K1761	1	2187	\$ 9,744	\$ 148	1/1/2023	12/31/2023
LISBON	M1519	15	2045	\$ 146,160	\$ 2,220	1/1/2023	12/31/2023
THIRTY SECOND S	X28	11	2377	\$ 107,184	\$ 1,628	1/1/2023	12/31/2023
CROSS BAYOU	J145	6	1219	\$ 58,464	\$ 888	1/1/2023	12/31/2023
CHAMPIONS GATI	K1762	2	3445	\$ 19,488	\$ 296	1/1/2023	12/31/2023
LISBON	M1520	17	1680	\$ 165,648	\$ 2,516	1/1/2023	12/31/2023
THIRTY SECOND S	X29	11	2123	\$ 107,184	\$ 1,628	1/1/2023	12/31/2023
CROSS BAYOU	J146	4	732	\$ 38,976	\$ 592	1/1/2023	12/31/2023
CHAMPIONS GATI	K1763	1	2225	\$ 9,744	\$ 148	1/1/2023	12/31/2023
LOCKHART	M400	5	308	\$ 48,720	\$ 740	1/1/2023	12/31/2023
THIRTY SECOND S	X30	24	2985	\$ 233,856	\$ 3,552	1/1/2023	12/31/2023
CROSS BAYOU	J147	13	3023	\$ 126,672	\$ 1,924	1/1/2023	12/31/2023
LOCKHART	M402	6	618	\$ 58,464	\$ 888	1/1/2023	12/31/2023
SIXTEENTH STREE	X31	20	3714	\$ 194,880	\$ 2,960	1/1/2023	12/31/2023
CROSS BAYOU	J148	4	826	\$ 38,976	\$ 592	1/1/2023	12/31/2023
LOCKHART	M406	5	1703	\$ 48,720	\$ 740	1/1/2023	12/31/2023
CROSS BAYOU	J150	11	1928	\$ 107,184	\$ 1,628	1/1/2023	12/31/2023
LOCKHART	M412	10	1805	\$ 97,440	\$ 1,480	1/1/2023	12/31/2023
LAKE PLACID	K1066	18	1427	\$ 175,392	\$ 2,664	1/1/2023	12/31/2023
LOCKHART	M415	2	47	\$ 19,488	\$ 296	1/1/2023	12/31/2023
LOCKHART	M417	6	1127	\$ 58,464	\$ 888	1/1/2023	12/31/2023
UMATILLA	M4405	10	757	\$ 97,440	\$ 1,480	1/1/2023	12/31/2023
UMATILLA	M4407	20	2270	\$ 194,880	\$ 2,960	1/1/2023	12/31/2023
UMATILLA	M4408	10	1399	\$ 97,440	\$ 1,480	1/1/2023	12/31/2023
EUSTIS	M499	9	1448	\$ 87,696	\$ 1,332	1/1/2023	12/31/2023
EUSTIS	M500	7	1754	\$ 68,208	\$ 1,036	1/1/2023	12/31/2023
EUSTIS	M501	12	1144	\$ 116,928	\$ 1,776	1/1/2023	12/31/2023
EUSTIS	M503	13	1441	\$ 126,672	\$ 1,924	1/1/2023	12/31/2023
EUSTIS	M504	14	2013	\$ 136,416	\$ 2,072	1/1/2023	12/31/2023
TAVARES EAST	M580	6	700	\$ 58,464	\$ 888	1/1/2023	12/31/2023
TAVARES EAST	M581	10	1364	\$ 97,440	\$ 1,480	1/1/2023	12/31/2023
KELLY PARK	M821	11	1987	\$ 107,184	\$ 1,628	1/1/2023	12/31/2023
KELLY PARK	M822	10	402	\$ 97,440	\$ 1,480	1/1/2023	12/31/2023
JASPER	N191	27	831	\$ 263,088	\$ 3,996	1/1/2023	12/31/2023
Additional Replacem	TBD	241		\$ 2,348,304	\$ 35,668	1/1/2023	12/31/2023

# Lateral Hardening

## Vision

Lateral Hardening is a long-term Program that will systematically upgrade and harden branch line sections fed by the feeder backbone. There will be two main approaches, undergrounding and overhead hardening. The existing lateral system is approximately 11,800 miles on 1,411 feeders.

## Description

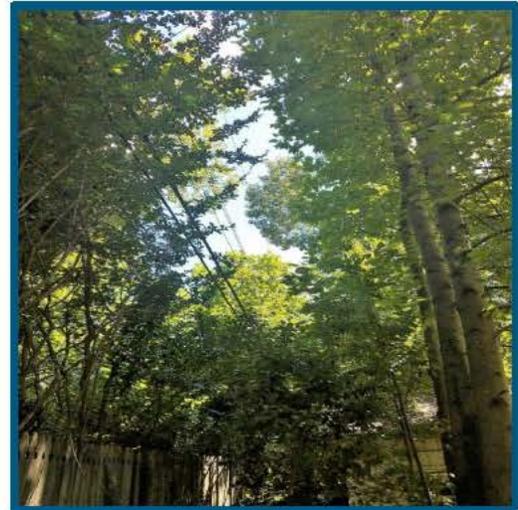
The Lateral Hardening Program will enable branch lines to better withstand extreme weather events. This will include undergrounding of the laterals most prone to damage during extreme weather events and overhead hardening of those laterals less prone to damage.

### Lateral Undergrounding

Lateral segments that are most prone to damage resulting in outages during extreme weather events will be placed underground. Doing so will greatly reduce both damage costs and outage duration for DEF customers. Lateral Undergrounding focuses on branch lines that historically experience the most outage events, contain assets of greater vintage, are susceptible to damage from vegetation, and/or often have facilities that are inaccessible to trucks. These branch lines will be replaced with a modern, updated, and standard underground design of today.



*Figure 1: An example of residential customers that would be candidates for Undergrounding due to section of line and service in heavily vegetated areas.*



*Figure 2: Section of lines that runs through backlot and heavily vegetated areas will be underground.*

### Lateral Hardening Overhead

The overhead hardening strategy includes structure strengthening, deteriorated conductor replacement, removing open secondary wires, replacing fuses with automated line devices, pole replacement (when needed), line relocation, and/or hazard tree removal.

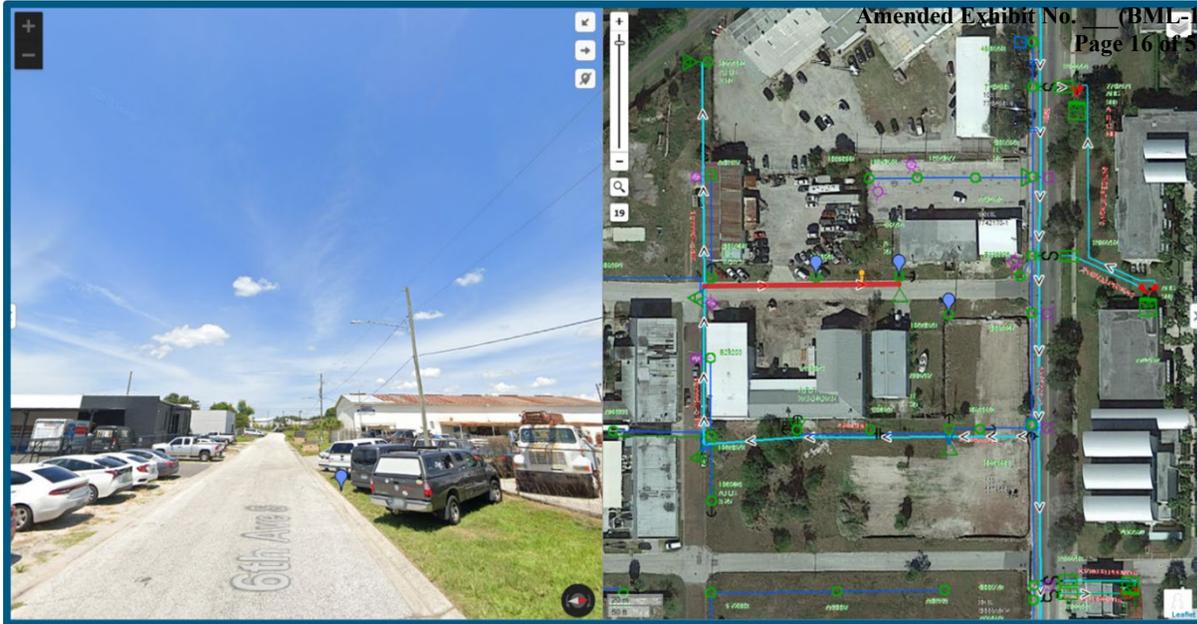


Figure 3: The teal tap line branches off the main road through an open lot to side streets where it splits again. It serves a few customers with minimal, to no vegetation. The street view is a view of the red line where there are no vegetation concerns.

### Structure Strengthening

Structure Strengthening includes upgrading existing poles and other facilities as necessary to align with the NESC 250C extreme wind loading standard. For example, a stronger pole class reduces the extent of damage incurred on lateral lines during extreme wind events. Other related hardware upgrades will occur simultaneously, such as installation of insulators, crossarms, support brackets, and guys.

### Conductor Upgrades

As part of Lateral Hardening Overhead, DEF will replace any deteriorated or undersized conductor on the lateral. This conductor is more susceptible to storm damage. It will be replaced with our current standard conductor.

### Upgrade Open Wire Secondary

Removing the open secondary wire will mitigate outages during extreme weather conditions. This activity will eliminate an older design standard that is susceptible to wires contacting vegetation and debris. Modern triplex cable will be installed to replace the open wire secondary.





Figure 4: Three examples of open wire secondary that will be addressed

## Fusing

DEF will replace current one-time use fuses with automated line devices (“ALD”), which are small vacuum reclosers, to improve lateral performance in extreme weather events. ALDs use current fuse holders and do not generally require pole reframing. The reclosing capability inherent in the ALD will reduce outage events for downstream customers. ALDs will also serve as the temporary fault clearing device, thus reducing momentary interruptions for customers upstream on the feeder.



Figure 5: Installed ALD

## Line Relocation

Where practical, lateral line sections that traverse hard to access areas, such as wetlands, will be relocated to truck accessible routes. These line sections often suffer damage in extreme wind load events, and due to their location are among the most expensive to repair and take the longest to restore to service from an outage.

## Hazard Tree

During the upgrade process DEF will identify hazard trees in the area surrounding the lateral requiring remediation. A hazard tree is a tree that is dead, structurally unsound, dying, diseased, leaning, or otherwise in a condition that is likely to result in striking electrical lines or other assets. Once identified, hazard trees are assigned to a contractor for remediation. When hazard trees are located in areas where DEF does not have the legal right to mitigate the danger, DEF or its contractor will work with the property owner to gain access and remediate.

## Pole Inspection and Replacement

Per Commission Order No. PSC-2006-0144-PAA-EI, pole inspection is performed on an 8-year cycle. These inspections determine the extent of pole decay and any associated loss of strength. The information gathered from these inspections is used to determine pole replacements and to effectuate the extension of pole life through treatment and reinforcement.

## Cost

It is expected that the 10-year cost will be approximately \$2.9B Capital and \$74M O&M. This would cover approximately 1,300 miles of Lateral Hardening Underground, approximately 1,700 miles of Lateral Hardening Overhead, and costs of the pole inspection and replacement activities.

	DEF		
	2023	2024	2025
<b>Lateral Hardening</b>			
Totals	\$208,405,519	\$243,029,355	\$275,622,172
Lateral Hardening	\$162,495,319	\$197,047,439	\$229,569,352
Capital	\$160,310,990	\$194,171,453	\$226,204,650
O&M	\$ 2,184,329	\$ 2,875,986	\$ 3,364,702
Total Units	179	249	286
<b>Pole Inspection/Replacement</b>			
	\$ 45,910,200	\$ 45,981,916	\$ 46,052,820
Capital	\$ 42,386,400	\$ 42,384,828	\$ 42,381,180
O&M	\$ 3,523,800	\$ 3,597,088	\$ 3,671,640
Total Units	4,350	4,244	4,140

## Cost Benefit Comparison

The Lateral Hardening Program began in 2022 and is estimated to take 40 years to complete. Based on today's costs, the Program will cost an estimated \$11B in Capital and \$154M in Project O&M. At completion, approximately 11,800 lateral miles will be hardened.

When the Lateral Hardening Program is complete, DEF estimates it will reduce the cost of extreme weather events on the Distribution system by approximately \$111M to \$139M annually based on today's costs.

When the Lateral Hardening Program is complete, DEF estimates it will reduce Distribution MED CMI by approximately by 351 million to 439 million minutes annually. CMI reduction is used as a proxy for reduction in extreme weather event duration for the average customer.

## Prioritization Methodology

The following steps are used to prioritize the work:

1. Probability of Damage: To prioritize the work in the Florida regions, the Transmission and Distribution systems were modeled, and weather simulations were run to provide probabilistic exposure frequency for all asset locations. The weather modeling uses the

FEMA Hazus and SLOSH models, which contain the weather data for storms over the last 200 years. Using the geographical locations of the Florida assets and the historic storm paths embedded in the Hazus model, a spatial correlation of future storm exposure can be derived. To determine probability of damage given that exposure, eight years of historical outage data was provided and correlated with the closest weather tower to determine the conditions during historic failures recorded in the outage data. Then, the expected quantities of asset failure for simulated future weather exposure conditions was derived by combining simulated weather patterns with historical asset failure through conditional probability methods.

2. Consequence of Damage: Once the output of probabilistic damage is assessed, the probable impact to customers is considered. This step considers number of customers served by a given asset (e.g. each pole, or segment of conductor on a feeder), observed outage durations, the mix of customers, and critical facilities. This step is performed both for the existing configuration of each feeder, and the hardened configuration resulting from the particular program. The difference between the existing condition and the hardened configuration is the program impact.
3. Distribution subject matter experts then use these outputs to determine the optimum deployment plan considering factors such as current projects in the area, critical customers, operational knowledge, resource availability and efficiency.

# Year 1 Project List

## 2023 Planned Duke Energy Florida - Lateral Hardening Program

Location	Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Finish Date
<b>Lateral Hardening Underground</b>						
Bay Hill	K67	0.29	1912	\$ 359,287	\$ 4,491	1/1/2023 12/31/2023
Bay Hill	K68	1.75	1860	\$ 2,168,108	\$ 27,101	1/1/2023 12/31/2023
Bay Hill	K73	0.44	875	\$ 545,124	\$ 6,814	1/1/2023 12/31/2023
Bay Hill	K76	1.70	836	\$ 2,106,162	\$ 26,327	1/1/2023 12/31/2023
Boggy Marsh	K957	0.42	2937	\$ 520,346	\$ 6,504	1/1/2023 12/31/2023
Boggy Marsh	K959	0.91	1172	\$ 1,127,416	\$ 14,093	1/1/2023 12/31/2023
Central Park	K495	4.05	1123	\$ 5,017,622	\$ 62,720	1/1/2023 12/31/2023
Central Park	W0494	0.41	127	\$ 507,957	\$ 6,349	1/1/2023 12/31/2023
Central Park	W0497	0.21	62	\$ 260,173	\$ 3,252	1/1/2023 12/31/2023
Central Park	W0500	1.79	285	\$ 2,217,665	\$ 27,721	1/1/2023 12/31/2023
Clearwater	C10	0.86	1148	\$ 1,065,470	\$ 13,318	1/1/2023 12/31/2023
Clearwater	C11	2.22	1161	\$ 2,750,400	\$ 34,380	1/1/2023 12/31/2023
Clearwater	C12	1.30	1263	\$ 1,610,595	\$ 20,132	1/1/2023 12/31/2023
Clearwater	C18	0.51	2049	\$ 631,849	\$ 7,898	1/1/2023 12/31/2023
Crown Point	K278	0.77	1932	\$ 953,968	\$ 11,925	1/1/2023 12/31/2023
Curlew	C4973	1.26	1831	\$ 1,561,038	\$ 19,513	1/1/2023 12/31/2023
Curlew	C4976	1.01	2221	\$ 1,251,308	\$ 15,641	1/1/2023 12/31/2023
Curlew	C4985	1.37	1305	\$ 1,697,319	\$ 21,216	1/1/2023 12/31/2023
Curlew	C4987	0.24	902	\$ 297,341	\$ 3,717	1/1/2023 12/31/2023
Curlew	C4989	1.41	2096	\$ 1,746,876	\$ 21,836	1/1/2023 12/31/2023
Curlew	C4990	1.03	1689	\$ 1,276,087	\$ 15,951	1/1/2023 12/31/2023
Curlew	C4991	0.60	2982	\$ 743,351	\$ 9,292	1/1/2023 12/31/2023
Gateway	X111	0.45	316	\$ 557,514	\$ 6,969	1/1/2023 12/31/2023
Gateway	X113	0.77	2229	\$ 953,968	\$ 11,925	1/1/2023 12/31/2023
Gateway	X123	1.01	60	\$ 1,251,308	\$ 15,641	1/1/2023 12/31/2023
Gateway	X125	0.37	340	\$ 458,400	\$ 5,730	1/1/2023 12/31/2023
Lake Aloma	W0151	1.18	1720	\$ 1,461,924	\$ 18,274	1/1/2023 12/31/2023
Lake Aloma	W0153	0.47	642	\$ 582,292	\$ 7,279	1/1/2023 12/31/2023
Maitland	M80	3.66	1397	\$ 4,534,444	\$ 56,681	1/1/2023 12/31/2023
Maitland	M82	1.49	600	\$ 1,845,989	\$ 23,075	1/1/2023 12/31/2023
Maitland	W0079	3.90	1253	\$ 4,831,784	\$ 60,397	1/1/2023 12/31/2023
Maitland	W0086	2.16	386	\$ 2,676,065	\$ 33,451	1/1/2023 12/31/2023
Oakhurst	J224	3.09	2349	\$ 3,828,260	\$ 47,853	1/1/2023 12/31/2023
Oakhurst	J227	2.78	1951	\$ 3,444,195	\$ 43,052	1/1/2023 12/31/2023
Rio Pinar	W0968	0.96	3449	\$ 1,189,362	\$ 14,867	1/1/2023 12/31/2023
Rio Pinar	W0970	0.77	2966	\$ 953,968	\$ 11,925	1/1/2023 12/31/2023
Rio Pinar	W0975	0.73	2665	\$ 904,411	\$ 11,305	1/1/2023 12/31/2023
Seven Springs	C4501	1.60	2398	\$ 1,982,270	\$ 24,778	1/1/2023 12/31/2023
Seven Springs	C4508	0.13	2395	\$ 161,059	\$ 2,013	1/1/2023 12/31/2023
Sky Lake	W0363	3.91	2128	\$ 4,844,173	\$ 60,552	1/1/2023 12/31/2023
Sky Lake	W0365	1.85	2531	\$ 2,292,000	\$ 28,650	1/1/2023 12/31/2023
Sky Lake	W0366	3.88	960	\$ 4,807,006	\$ 60,088	1/1/2023 12/31/2023
Sky Lake	W0367	0.16	201	\$ 198,227	\$ 2,478	1/1/2023 12/31/2023
Sky Lake	W0368	3.10	1298	\$ 3,840,649	\$ 48,008	1/1/2023 12/31/2023
Vinoy	X70	2.36	2046	\$ 2,923,849	\$ 36,548	1/1/2023 12/31/2023
Vinoy	X71	1.64	1867	\$ 2,031,827	\$ 25,398	1/1/2023 12/31/2023
Vinoy	X72	2.60	3070	\$ 3,221,189	\$ 40,265	1/1/2023 12/31/2023
Vinoy	X78	2.39	2500	\$ 2,961,016	\$ 37,013	1/1/2023 12/31/2023
Cross Bayou	J141	2.33	1202	\$ 2,886,681	\$ 36,084	1/1/2023 12/31/2023
Cross Bayou	J143	2.10	1291	\$ 2,601,730	\$ 32,522	1/1/2023 12/31/2023
Cross Bayou	J148	1.41	826	\$ 1,746,876	\$ 21,836	1/1/2023 12/31/2023
Econ	W0320	2.53	2845	\$ 3,134,465	\$ 39,181	1/1/2023 12/31/2023
Econ	W0321	3.77	1413	\$ 4,670,725	\$ 58,384	1/1/2023 12/31/2023
Fifty-first Street	X108	8.23	1726	\$ 10,196,303	\$ 127,454	1/1/2023 6/30/2023

Location	Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Finish Date
<b>Lateral Hardening Overhead</b>						
Bay Hill	K67	0.56	1,912	\$ 263,659	\$ 4,378	1/1/2023 12/31/2023
Bay Hill	K68	1.49	1,860	\$ 701,522	\$ 12,978	1/1/2023 12/31/2023
Bay Hill	K73	0.31	875	\$ 145,954	\$ 2,700	1/1/2023 12/31/2023
Bay Hill	K76	0.38	836	\$ 178,912	\$ 3,310	1/1/2023 12/31/2023
Boggy Marsh	K957	0.12	2,937	\$ 56,498	\$ 1,045	1/1/2023 12/31/2023
Boggy Marsh	K959	2.83	1,172	\$ 1,332,421	\$ 24,650	1/1/2023 12/31/2023
Central Park	K495	2.08	1,123	\$ 979,306	\$ 18,117	1/1/2023 12/31/2023
Central Park	W0494	0.30	127	\$ 141,246	\$ 2,613	1/1/2023 12/31/2023
Central Park	W0497	0.27	62	\$ 127,121	\$ 2,352	1/1/2023 12/31/2023
Central Park	W0500	0.94	285	\$ 442,571	\$ 8,188	1/1/2023 12/31/2023
Clearwater	C10	0.90	1,148	\$ 423,738	\$ 7,839	1/1/2023 12/31/2023
Clearwater	C11	1.80	1,161	\$ 847,476	\$ 15,678	1/1/2023 12/31/2023
Clearwater	C12	0.46	1,263	\$ 216,577	\$ 4,007	1/1/2023 12/31/2023
Clearwater	C18	0.49	2,049	\$ 230,702	\$ 4,268	1/1/2023 12/31/2023
Crown Point	K278	0.34	1,932	\$ 160,079	\$ 2,961	1/1/2023 12/31/2023
Curlou	C4973	0.73	1,831	\$ 343,699	\$ 6,358	1/1/2023 12/31/2023
Curlou	C4976	0.52	2,221	\$ 244,826	\$ 4,529	1/1/2023 12/31/2023
Curlou	C4985	0.53	1,305	\$ 249,535	\$ 4,616	1/1/2023 12/31/2023
Curlou	C4987	0.13	902	\$ 61,207	\$ 1,132	1/1/2023 12/31/2023
Curlou	C4989	1.22	2,096	\$ 574,400	\$ 10,626	1/1/2023 12/31/2023
Curlou	C4990	1.76	1,889	\$ 828,643	\$ 15,330	1/1/2023 12/31/2023
Curlou	C4991	1.74	2,982	\$ 819,227	\$ 15,156	1/1/2023 12/31/2023
Gateway	X111	0.29	316	\$ 136,538	\$ 2,526	1/1/2023 12/31/2023
Gateway	X113	0.71	2,229	\$ 334,282	\$ 6,184	1/1/2023 12/31/2023
Gateway	X123	0.26	60	\$ 122,413	\$ 2,265	1/1/2023 12/31/2023
Gateway	X125	0.15	340	\$ 70,623	\$ 1,307	1/1/2023 12/31/2023
Lake Alama	W0151	0.73	1,720	\$ 343,699	\$ 6,358	1/1/2023 12/31/2023
Lake Alama	W0153	1.19	642	\$ 560,276	\$ 10,365	1/1/2023 12/31/2023
Maitland	M80	1.07	1,397	\$ 503,777	\$ 9,320	1/1/2023 12/31/2023
Maitland	M82	0.77	600	\$ 362,531	\$ 6,707	1/1/2023 12/31/2023
Maitland	W0079	2.60	1,253	\$ 1,224,132	\$ 22,646	1/1/2023 12/31/2023
Maitland	W0086	1.76	386	\$ 828,643	\$ 15,330	1/1/2023 12/31/2023
Oakhurst	J224	2.67	2,349	\$ 1,257,089	\$ 23,256	1/1/2023 12/31/2023
Oakhurst	J227	3.81	1,951	\$ 1,793,824	\$ 33,186	1/1/2023 12/31/2023
Rio Pinar	W0968	0.31	3,449	\$ 145,954	\$ 2,700	1/1/2023 12/31/2023
Rio Pinar	W0970	1.02	2,966	\$ 480,236	\$ 8,884	1/1/2023 12/31/2023
Rio Pinar	W0975	1.89	2,665	\$ 889,950	\$ 16,462	1/1/2023 12/31/2023
Seven Springs	C4501	1.44	2,398	\$ 677,981	\$ 12,543	1/1/2023 12/31/2023
Seven Springs	C4508	1.72	2,395	\$ 809,810	\$ 14,981	1/1/2023 12/31/2023
Sky Lake	W0363	3.91	2,128	\$ 1,840,906	\$ 34,057	1/1/2023 12/31/2023
Sky Lake	W0365	1.52	2,531	\$ 715,646	\$ 13,239	1/1/2023 12/31/2023
Sky Lake	W0366	0.80	960	\$ 376,656	\$ 6,968	1/1/2023 12/31/2023
Sky Lake	W0367	0.36	201	\$ 169,495	\$ 3,136	1/1/2023 12/31/2023
Sky Lake	W0368	2.84	1,298	\$ 1,337,129	\$ 24,737	1/1/2023 12/31/2023
Winay	X70	2.06	2,046	\$ 969,889	\$ 17,943	1/1/2023 12/31/2023
Winay	X71	0.64	1,867	\$ 301,325	\$ 5,575	1/1/2023 12/31/2023
Winay	X72	3.81	3,070	\$ 1,793,824	\$ 33,186	1/1/2023 12/31/2023
Winay	X78	2.16	2,500	\$ 1,016,971	\$ 18,814	1/1/2023 12/31/2023
Crazz Bayou	J141	0.84	1,202	\$ 395,489	\$ 7,317	1/1/2023 12/31/2023
Crazz Bayou	J143	0.94	1,291	\$ 442,571	\$ 8,188	1/1/2023 12/31/2023
Crazz Bayou	J148	1.44	826	\$ 677,981	\$ 12,543	1/1/2023 12/31/2023
Econ	W0320	0.64	2,845	\$ 301,325	\$ 5,575	1/1/2023 12/31/2023
Econ	W0321	2.45	1,413	\$ 1,153,509	\$ 21,340	1/1/2023 12/31/2023
SUN LAKES	K1137	0.31	33	\$ 148,185	\$ 2,741	1/1/2023 12/31/2023
MIDWAY	K1475	0.11	2,896	\$ 51,404	\$ 951	1/1/2023 12/31/2023
ALTAMONTE	M575	0.27	323	\$ 129,341	\$ 2,393	1/1/2023 12/31/2023
PILSBURY	X252	0.97	1,030	\$ 457,531	\$ 8,464	1/1/2023 12/31/2023
SIXTEENTH STREET	X36	0.65	1,016	\$ 305,166	\$ 5,646	1/1/2023 12/31/2023
ULMERTON	J241	0.80	123	\$ 376,710	\$ 6,969	1/1/2023 12/31/2023
BAYBORO	X19	0.19	17	\$ 87,928	\$ 1,627	1/1/2023 12/31/2023
MEADOW WOODS EAS	K1060	0.17	2,262	\$ 81,345	\$ 1,505	1/1/2023 12/31/2023

Location	Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Finish Date	
BELLEVIEW	A3	121	521	\$ 568,756	\$ 10,522	1/1/2023	12/31/2023
CURRY FORD	W0596	0.46	1,607	\$ 217,465	\$ 4,023	1/1/2023	12/31/2023
SILVER SPRINGS SHO	A128	1.32	25	\$ 623,179	\$ 11,529	1/1/2023	12/31/2023
WELCH ROAD	M542	1.33	1,765	\$ 624,874	\$ 11,560	1/1/2023	12/31/2023
UCF	W1017	0.67	1,383	\$ 316,668	\$ 5,858	1/1/2023	12/31/2023
FOUR CORNERS	K1404	0.92	999	\$ 432,579	\$ 8,003	1/1/2023	12/31/2023
BAYVIEW	C655	0.48	757	\$ 224,787	\$ 4,159	1/1/2023	12/31/2023
POINCIANA NORTH	K629	0.45	1,427	\$ 213,924	\$ 3,958	1/1/2023	12/31/2023
NORTHEAST	W289	1.03	1,018	\$ 487,078	\$ 9,011	1/1/2023	12/31/2023
LAKE EMMA	M423	0.16	864	\$ 75,152	\$ 1,390	1/1/2023	12/31/2023
LARGO	J409	0.78	2,271	\$ 365,126	\$ 6,755	1/1/2023	12/31/2023
WESTRIDGE	K421	0.71	2,204	\$ 335,723	\$ 6,211	1/1/2023	12/31/2023
ALDERMAN	C5001	0.25	1,397	\$ 116,339	\$ 2,152	1/1/2023	12/31/2023
PIEDMONT	M477	0.28	1,574	\$ 132,411	\$ 2,450	1/1/2023	12/31/2023
SUNFLOWER	W0475	0.33	2,493	\$ 155,160	\$ 2,870	1/1/2023	12/31/2023
NEW PORT RICHEY	C441	0.30	2,068	\$ 143,057	\$ 2,647	1/1/2023	12/31/2023
ORANGE BLOSSOM	A310	0.19	1,575	\$ 89,328	\$ 1,653	1/1/2023	12/31/2023
WINTER PARK EAST	W0925	0.87	2,335	\$ 411,741	\$ 7,617	1/1/2023	12/31/2023
CHAMPIONS GATE	K1762	0.20	3,445	\$ 92,416	\$ 1,710	1/1/2023	12/31/2023
DELTONA	W4553	0.33	1,110	\$ 155,288	\$ 2,873	1/1/2023	12/31/2023
BAYWAY	W97	0.85	1,695	\$ 398,475	\$ 7,372	1/1/2023	12/31/2023
LAKE EMMA	M428	0.45	1,876	\$ 211,389	\$ 3,911	1/1/2023	12/31/2023
LAKE LUNTZ	K3287	0.38	1,200	\$ 177,255	\$ 3,279	1/1/2023	12/31/2023
THIRTY SECOND STRE	W24	1.86	1,283	\$ 874,681	\$ 16,182	1/1/2023	12/31/2023
PIEDMONT	M471	0.63	1,672	\$ 297,693	\$ 5,507	1/1/2023	12/31/2023

### Lateral Pole Inspections

WILLISTON	A124	2671	1516	\$ 106,840	1/1/2023	12/31/2023
WILLISTON	A125	4	-	\$ 160	1/1/2023	12/31/2023
ALACHUA	A143	269	162	\$ 10,760	1/1/2023	12/31/2023
ALACHUA	A144	108	30	\$ 4,320	1/1/2023	12/31/2023
GEALACHUA	A185	10	-	\$ 400	1/1/2023	12/31/2023
GEALACHUA	A186	1049	556	\$ 41,960	1/1/2023	12/31/2023
LURAVILLE	A192	1051	699	\$ 42,040	1/1/2023	12/31/2023
ARCHER	A195	518	458	\$ 20,720	1/1/2023	12/31/2023
ARCHER	A196	806	494	\$ 32,240	1/1/2023	12/31/2023
FORT WHITE	A20	1016	609	\$ 40,640	1/1/2023	12/31/2023
O'BRIEN	A379	1114	758	\$ 44,560	1/1/2023	12/31/2023
GEORGIA PACIFIC	A45	1960	1360	\$ 78,400	1/1/2023	12/31/2023
TRENTON	A90	1433	1207	\$ 57,320	1/1/2023	12/31/2023
TRENTON	A91	269	134	\$ 10,760	1/1/2023	12/31/2023
NEWBERRY	A94	168	83	\$ 6,720	1/1/2023	12/31/2023
CROSS BAYOU	J140	320	1583	\$ 12,800	1/1/2023	12/31/2023
CROSS BAYOU	J141	296	1200	\$ 11,840	1/1/2023	12/31/2023
CROSS BAYOU	J142	257	3322	\$ 10,280	1/1/2023	12/31/2023
CROSS BAYOU	J143	243	1290	\$ 9,720	1/1/2023	12/31/2023
CROSS BAYOU	J144	24	5	\$ 960	1/1/2023	12/31/2023
CROSS BAYOU	J145	270	1219	\$ 10,800	1/1/2023	12/31/2023
CROSS BAYOU	J146	198	732	\$ 7,920	1/1/2023	12/31/2023
CROSS BAYOU	J147	3021	3023	\$ 24,840	1/1/2023	12/31/2023
CROSS BAYOU	J148	186	826	\$ 7,440	1/1/2023	12/31/2023
CROSS BAYOU	J150	503	1928	\$ 20,120	1/1/2023	12/31/2023
LAKE PLACID	K1066	842	1427	\$ 33,680	1/1/2023	12/31/2023
MARLEY ROAD	K120	1	-	\$ 40	1/1/2023	12/31/2023
LAKE MARION	K1286	1322	4105	\$ 52,880	1/1/2023	12/31/2023
LAKE MARION	K1287	1442	2396	\$ 57,680	1/1/2023	12/31/2023
LAKE MARION	K1288	676	1603	\$ 27,040	1/1/2023	12/31/2023
LAKE PLACID	K1320	1586	2289	\$ 63,440	1/1/2023	12/31/2023
ARBUCKLE CREEK	K1361	138	1192	\$ 5,520	1/1/2023	12/31/2023
LEISURE LAKES	K1415	1803	2068	\$ 72,120	1/1/2023	12/31/2023
WEST DAVENPORT	K1521	430	2145	\$ 17,200	1/1/2023	12/31/2023
WEST DAVENPORT	K1523	67	2191	\$ 2,680	1/1/2023	12/31/2023
WEST DAVENPORT	K1524	289	1962	\$ 11,560	1/1/2023	12/31/2023
WEST DAVENPORT	K1526	387	3486	\$ 15,480	1/1/2023	12/31/2023
WEST DAVENPORT	K1529	213	2720	\$ 8,520	1/1/2023	12/31/2023

Location		Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Finish Date
FISHEATING CREEK	K1560	2177	2565		\$ 87,080	1/1/2023	12/31/2023
HAINES CITY	K16	645	996		\$ 25,800	1/1/2023	12/31/2023
HAINES CITY	K17	975	2130		\$ 39,000	1/1/2023	12/31/2023
CHAMPIONS GATE	K1761	24	2187		\$ 960	1/1/2023	12/31/2023
CHAMPIONS GATE	K1762	93	3445		\$ 3,720	1/1/2023	12/31/2023
CHAMPIONS GATE	K1763	37	2225		\$ 1,480	1/1/2023	12/31/2023
CHAMPIONS GATE	K1764	19	2029		\$ 760	1/1/2023	12/31/2023
HAINES CITY	K18	707	3041		\$ 28,280	1/1/2023	12/31/2023
NORTHRIDGE	K1825	172	225		\$ 6,880	1/1/2023	12/31/2023
HAINES CITY	K19	387	533		\$ 15,480	1/1/2023	12/31/2023
HAINES CITY	K20	457	1230		\$ 18,280	1/1/2023	12/31/2023
HAINES CITY	K21	1334	2614		\$ 53,360	1/1/2023	12/31/2023
HAINES CITY	K22	607	2375		\$ 24,280	1/1/2023	12/31/2023
LAKE PLACID NORTH	K24	380	950		\$ 15,200	1/1/2023	12/31/2023
LAKE PLACID NORTH	K27	200	570		\$ 8,000	1/1/2023	12/31/2023
LOUGHMAN	K5078	162	1119		\$ 6,480	1/1/2023	12/31/2023
LOUGHMAN	K5079	437	2474		\$ 17,480	1/1/2023	12/31/2023
LOUGHMAN	K5086	18	2330		\$ 720	1/1/2023	12/31/2023
SEBRING EAST	K541	102	621		\$ 4,080	1/1/2023	12/31/2023
SEBRING EAST	K542	206	109		\$ 8,240	1/1/2023	12/31/2023
LAKE PLACID	K757	1083	935		\$ 43,320	1/1/2023	12/31/2023
LAKE PLACID	K758	720	1376		\$ 28,800	1/1/2023	12/31/2023
INTERCESSION CITY	K966	574	622		\$ 22,960	1/1/2023	12/31/2023
INTERCESSION CITY	K967	309	1443		\$ 12,360	1/1/2023	12/31/2023
EUSTIS SOUTH	M1054	164	642		\$ 6,560	1/1/2023	12/31/2023
EUSTIS SOUTH	M1055	461	1402		\$ 18,440	1/1/2023	12/31/2023
EUSTIS SOUTH	M1056	493	1766		\$ 19,720	1/1/2023	12/31/2023
EUSTIS SOUTH	M1057	194	1509		\$ 7,760	1/1/2023	12/31/2023
EUSTIS SOUTH	M1058	690	1948		\$ 27,600	1/1/2023	12/31/2023
EUSTIS SOUTH	M1059	398	1731		\$ 15,920	1/1/2023	12/31/2023
LISBON	M1517	616	1663		\$ 24,640	1/1/2023	12/31/2023
LISBON	M1518	346	1840		\$ 13,840	1/1/2023	12/31/2023
LISBON	M1519	688	2045		\$ 27,520	1/1/2023	12/31/2023
LISBON	M1520	807	1680		\$ 32,280	1/1/2023	12/31/2023
LOCKHART	M400	244	308		\$ 9,760	1/1/2023	12/31/2023
LOCKHART	M402	297	618		\$ 11,880	1/1/2023	12/31/2023
LOCKHART	M406	255	1703		\$ 10,200	1/1/2023	12/31/2023
LOCKHART	M412	471	1805		\$ 18,840	1/1/2023	12/31/2023
LOCKHART	M415	77	47		\$ 3,080	1/1/2023	12/31/2023
LOCKHART	M417	283	1127		\$ 11,320	1/1/2023	12/31/2023
UMATILLA	M4405	466	757		\$ 18,640	1/1/2023	12/31/2023
UMATILLA	M4407	931	2270		\$ 37,240	1/1/2023	12/31/2023
UMATILLA	M4408	461	1399		\$ 18,440	1/1/2023	12/31/2023
EUSTIS	M499	426	1448		\$ 17,040	1/1/2023	12/31/2023
EUSTIS	M500	347	1754		\$ 13,880	1/1/2023	12/31/2023
EUSTIS	M501	547	1144		\$ 21,880	1/1/2023	12/31/2023
EUSTIS	M503	613	1441		\$ 24,520	1/1/2023	12/31/2023
EUSTIS	M504	685	2013		\$ 27,400	1/1/2023	12/31/2023
TAVARES EAST	M580	278	700		\$ 11,120	1/1/2023	12/31/2023
TAVARES EAST	M581	474	1364		\$ 18,960	1/1/2023	12/31/2023
KELLY PARK	M821	503	1987		\$ 20,120	1/1/2023	12/31/2023
KELLY PARK	M822	467	402		\$ 18,680	1/1/2023	12/31/2023
JASPER	N191	1268	831		\$ 50,720	1/1/2023	12/31/2023
JASPER	N191 OLD	3	0		\$ 120	1/1/2023	12/31/2023
JASPER	N192	812	959		\$ 32,480	1/1/2023	12/31/2023
JENNINGS	N195	790	481		\$ 31,600	1/1/2023	12/31/2023
WHITE SPRINGS	N375	940	730		\$ 37,600	1/1/2023	12/31/2023
TURNER PLANT	W0761	734	1953		\$ 29,360	1/1/2023	12/31/2023
TURNER PLANT	W0762	539	1444		\$ 21,560	1/1/2023	12/31/2023
TURNER PLANT	W0763	581	1712		\$ 23,240	1/1/2023	12/31/2023
TURNER PLANT	W0764	315	1352		\$ 12,600	1/1/2023	12/31/2023
BAYWAY	X100	128	798		\$ 5,120	1/1/2023	12/31/2023

Location	Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Finish Date
THIRTYSECOND STRE	X22	847	2379	\$ 33,880	1/1/2023	12/31/2023
THIRTYSECOND STRE	X23	327	1135	\$ 13,080	1/1/2023	12/31/2023
THIRTYSECOND STRE	X24	558	1293	\$ 22,240	1/1/2023	12/31/2023
THIRTYSECOND STRE	X25	354	982	\$ 14,160	1/1/2023	12/31/2023
THIRTYSECOND STRE	X26	585	1489	\$ 23,400	1/1/2023	12/31/2023
THIRTYSECOND STRE	X27	556	2852	\$ 22,240	1/1/2023	12/31/2023
THIRTYSECOND STRE	X28	540	2377	\$ 21,600	1/1/2023	12/31/2023
THIRTYSECOND ST	X29	545	2123	\$ 21,800	1/1/2023	12/31/2023
THIRTYSECOND ST	X30	1123	2985	\$ 44,920	1/1/2023	12/31/2023
SIXTEENTH STREET	X31	941	3714	\$ 37,640	1/1/2023	12/31/2023
SIXTEENTH STREET	X32	1	22	\$ 40	1/1/2023	12/31/2023
SIXTEENTH STREET	X33	125	926	\$ 5,000	1/1/2023	12/31/2023
SIXTEENTH STREET	X34	949	2999	\$ 37,960	1/1/2023	12/31/2023
SIXTEENTH STREET	X35	9	214	\$ 360	1/1/2023	12/31/2023
SIXTEENTH STREET	X36	279	1016	\$ 11,160	1/1/2023	12/31/2023
THIRTYSECOND ST	X37	1055	2460	\$ 42,200	1/1/2023	12/31/2023
SIXTEENTH STREET	X43	480	1286	\$ 19,200	1/1/2023	12/31/2023
SIXTEENTH STREET	X45	736	2104	\$ 29,440	1/1/2023	12/31/2023
SIXTEENTH STREET	X46	847	2637	\$ 33,880	1/1/2023	12/31/2023
VINOY	X70	487	2050	\$ 19,480	1/1/2023	12/31/2023
VINOY	X71	306	1877	\$ 12,240	1/1/2023	12/31/2023
VINOY	X72	839	3083	\$ 33,560	1/1/2023	12/31/2023
VINOY	X75	1	1	\$ 40	1/1/2023	12/31/2023
VINOY	X76	6	146	\$ 240	1/1/2023	12/31/2023
VINOY	X78	469	2510	\$ 18,760	1/1/2023	12/31/2023
VINOY	X79	1	837	\$ 40	1/1/2023	12/31/2023
VINOY	X80	20	489	\$ 800	1/1/2023	12/31/2023
BAYWAY	X96	244	2873	\$ 9,760	1/1/2023	12/31/2023
BAYWAY	X97	193	1695	\$ 7,720	1/1/2023	12/31/2023
BAYWAY	X99	320	3305	\$ 12,800	1/1/2023	12/31/2023
Additional Inspections	TBD	3082		\$ 123,280	1/1/2023	12/31/2023

### Lateral Pole Replacements

WILLISTON	A124	160	1516	\$ 1,559,040	\$ 23,680	1/1/2023	12/31/2023
ALACHUA	A143	16	162	\$ 155,904	\$ 2,368	1/1/2023	12/31/2023
LAKE MARION	K1286	79	4105	\$ 769,776	\$ 11,692	1/1/2023	12/31/2023
JASPER	N192	49	959	\$ 477,456	\$ 7,252	1/1/2023	12/31/2023
SIXTEENTH STREET	X33	8	926	\$ 77,952	\$ 1,184	1/1/2023	12/31/2023
VINOY	X78	28	2510	\$ 272,832	\$ 4,144	1/1/2023	12/31/2023
VINOY	X80	1	489	\$ 9,744	\$ 148	1/1/2023	12/31/2023
ALACHUA	A144	6	30	\$ 58,464	\$ 888	1/1/2023	12/31/2023
LAKE MARION	K1287	87	2396	\$ 847,728	\$ 12,876	1/1/2023	12/31/2023
JENNINGS	N195	47	481	\$ 457,468	\$ 6,956	1/1/2023	12/31/2023
SIXTEENTH STREET	X34	57	2999	\$ 555,408	\$ 8,436	1/1/2023	12/31/2023
BAYWAY	X96	15	2873	\$ 146,160	\$ 2,220	1/1/2023	12/31/2023
GE ALACHUA	A185	1		\$ 9,744	\$ 148	1/1/2023	12/31/2023
LAKE MARION	K1288	41	1603	\$ 399,504	\$ 6,068	1/1/2023	12/31/2023
WHITE SPRINGS	N375	56	730	\$ 545,664	\$ 8,288	1/1/2023	12/31/2023
SIXTEENTH STREET	X35	1	214	\$ 9,744	\$ 148	1/1/2023	12/31/2023
BAYWAY	X97	12	1695	\$ 116,928	\$ 1,776	1/1/2023	12/31/2023
GE ALACHUA	A186	63	556	\$ 613,872	\$ 9,324	1/1/2023	12/31/2023
LAKE PLACID	K1320	95	2289	\$ 925,680	\$ 14,060	1/1/2023	12/31/2023
TURNER PLANT	W0761	44	1953	\$ 428,736	\$ 6,512	1/1/2023	12/31/2023
SIXTEENTH STREET	X36	17	1016	\$ 165,648	\$ 2,516	1/1/2023	12/31/2023
BAYWAY	X99	19	3305	\$ 185,136	\$ 2,812	1/1/2023	12/31/2023
LURAVILLE	A192	63	699	\$ 613,872	\$ 9,324	1/1/2023	12/31/2023
ARBUCKLE CREEK	K1361	8	1192	\$ 77,952	\$ 1,184	1/1/2023	12/31/2023
TURNER PLANT	W0762	32	1444	\$ 311,808	\$ 4,736	1/1/2023	12/31/2023
THIRTYSECOND ST	X37	63	2460	\$ 613,872	\$ 9,324	1/1/2023	12/31/2023
ARCHER	A195	31	458	\$ 302,064	\$ 4,588	1/1/2023	12/31/2023
LEISURE LAKES	K1415	108	2068	\$ 1,052,352	\$ 15,984	1/1/2023	12/31/2023
TURNER PLANT	W0763	35	1712	\$ 341,040	\$ 5,180	1/1/2023	12/31/2023
SIXTEENTH STREET	X43	29	1286	\$ 282,576	\$ 4,292	1/1/2023	12/31/2023
ARCHER	A196	48	494	\$ 467,712	\$ 7,104	1/1/2023	12/31/2023
WEST DAVENPORT	K1521	26	2145	\$ 253,344	\$ 3,848	1/1/2023	12/31/2023

Location	Unit Count	Customer Count	Capital Cost	O&M Cost	Plant No.	Final Date
TURNER PLANT	W0764	19	1352	\$ 185,136	\$ 2,812	1/1/2023
SIXTEENTH STREET	W45	44	2104	\$ 428,736	\$ 6,512	1/1/2023
FORT WHITE	A20	61	609	\$ 594,384	\$ 9,028	1/1/2023
WEST DAVENPORT	K1523	4	2191	\$ 38,976	\$ 592	1/1/2023
BAYWAY	W100	8	798	\$ 77,952	\$ 1,184	1/1/2023
SIXTEENTH STREET	W46	51	2637	\$ 496,944	\$ 7,548	1/1/2023
O' BRIEN	A379	67	758	\$ 652,848	\$ 9,916	1/1/2023
WEST DAVENPORT	K1524	17	1962	\$ 165,648	\$ 2,516	1/1/2023
THIRTY SECOND STRE	W22	51	2379	\$ 496,944	\$ 7,548	1/1/2023
WINOY	W70	29	2050	\$ 282,576	\$ 4,292	1/1/2023
GEORGIA PACIFIC	A45	118	1360	\$ 1,149,792	\$ 17,464	1/1/2023
WEST DAVENPORT	K1526	23	3486	\$ 224,112	\$ 3,404	1/1/2023
THIRTY SECOND STRE	W23	20	1135	\$ 194,880	\$ 2,960	1/1/2023
WINOY	W71	18	1877	\$ 175,392	\$ 2,664	1/1/2023
TRENTON	A90	86	1207	\$ 837,984	\$ 12,728	1/1/2023
WEST DAVENPORT	K1529	13	2720	\$ 126,672	\$ 1,924	1/1/2023
THIRTY SECOND STRE	W24	33	1283	\$ 321,552	\$ 4,884	1/1/2023
WINOY	W72	50	3083	\$ 487,200	\$ 7,400	1/1/2023
TRENTON	A91	16	134	\$ 155,904	\$ 2,368	1/1/2023
FISHEATING CREEK	K1560	131	2565	\$ 1,276,464	\$ 19,388	1/1/2023
THIRTY SECOND STRE	W25	21	982	\$ 204,624	\$ 3,108	1/1/2023
NEWBERRY	A94	10	83	\$ 97,440	\$ 1,480	1/1/2023
HAINES CITY	K16	39	996	\$ 380,016	\$ 5,772	1/1/2023
THIRTY SECOND STRE	W26	35	1489	\$ 341,040	\$ 5,180	1/1/2023
CROSS BAYOU	J140	19	1583	\$ 185,136	\$ 2,812	1/1/2023
HAINES CITY	K17	58	2130	\$ 565,152	\$ 8,584	1/1/2023
THIRTY SECOND STRE	W27	33	2852	\$ 321,552	\$ 4,884	1/1/2023
CROSS BAYOU	J141	18	1200	\$ 175,392	\$ 2,664	1/1/2023
CHAMPIONS GATE	K1761	1	2187	\$ 9,744	\$ 148	1/1/2023
THIRTY SECOND STRE	W28	32	2377	\$ 311,808	\$ 4,736	1/1/2023
CROSS BAYOU	J142	15	3322	\$ 146,160	\$ 2,220	1/1/2023
CHAMPIONS GATE	K1762	6	3445	\$ 58,464	\$ 888	1/1/2023
THIRTY SECOND ST	W29	33	2123	\$ 321,552	\$ 4,884	1/1/2023
CROSS BAYOU	J143	15	1290	\$ 146,160	\$ 2,220	1/1/2023
CHAMPIONS GATE	K1763	2	2225	\$ 19,488	\$ 296	1/1/2023
THIRTY SECOND ST	W30	67	2985	\$ 652,848	\$ 9,916	1/1/2023
CROSS BAYOU	J144	1	5	\$ 9,744	\$ 148	1/1/2023
CHAMPIONS GATE	K1764	1	2029	\$ 9,744	\$ 148	1/1/2023
SIXTEENTH STREET	W31	56	3714	\$ 545,664	\$ 8,288	1/1/2023
CROSS BAYOU	J145	16	1219	\$ 155,904	\$ 2,368	1/1/2023
HAINES CITY	K18	42	3041	\$ 409,248	\$ 6,216	1/1/2023
CROSS BAYOU	J146	12	732	\$ 116,928	\$ 1,776	1/1/2023
NORTHRIDGE	K1825	10	225	\$ 97,440	\$ 1,480	1/1/2023
CROSS BAYOU	J147	37	3023	\$ 360,528	\$ 5,476	1/1/2023
HAINES CITY	K19	23	533	\$ 224,112	\$ 3,404	1/1/2023
CROSS BAYOU	J148	11	826	\$ 107,184	\$ 1,628	1/1/2023
HAINES CITY	K20	27	1230	\$ 263,088	\$ 3,996	1/1/2023
CROSS BAYOU	J150	30	1928	\$ 292,320	\$ 4,440	1/1/2023
HAINES CITY	K21	80	2614	\$ 779,520	\$ 11,840	1/1/2023
LAKE PLACID	K1066	51	1427	\$ 496,944	\$ 7,548	1/1/2023
HAINES CITY	K22	36	2375	\$ 350,784	\$ 5,328	1/1/2023
LAKE PLACID NORTH	K24	23	950	\$ 224,112	\$ 3,404	1/1/2023
LAKE PLACID NORTH	K27	12	570	\$ 116,928	\$ 1,776	1/1/2023
LOUGHMAN	K5078	10	1119	\$ 97,440	\$ 1,480	1/1/2023
LOUGHMAN	K5079	26	2474	\$ 253,344	\$ 3,848	1/1/2023
LOUGHMAN	K5086	1	2330	\$ 9,744	\$ 148	1/1/2023
SEBRING EAST	K541	6	621	\$ 58,464	\$ 888	1/1/2023
SEBRING EAST	K542	12	109	\$ 116,928	\$ 1,776	1/1/2023
LAKE PLACID	K757	65	935	\$ 633,360	\$ 9,620	1/1/2023
LAKE PLACID	K758	43	1376	\$ 418,992	\$ 6,364	1/1/2023
INTERCESSION CITY	K966	34	622	\$ 331,296	\$ 5,032	1/1/2023
INTERCESSION CITY	K967	19	1443	\$ 185,136	\$ 2,812	1/1/2023
EUSTIS SOUTH	M1054	10	642	\$ 97,440	\$ 1,480	1/1/2023
EUSTIS SOUTH	M1055	28	1402	\$ 272,832	\$ 4,144	1/1/2023
EUSTIS SOUTH	M1056	30	1766	\$ 292,320	\$ 4,440	1/1/2023
EUSTIS SOUTH	M1057	12	1509	\$ 116,928	\$ 1,776	1/1/2023
EUSTIS SOUTH	M1058	41	1948	\$ 399,504	\$ 6,068	1/1/2023
EUSTIS SOUTH	M1059	24	1731	\$ 233,856	\$ 3,552	1/1/2023

Location		Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Finish Date
LISBON	M1517	37	1663	\$ 360,528	\$ 5,476	1/1/2023	12/31/2023
LISBON	M1518	21	1840	\$ 204,624	\$ 3,108	1/1/2023	12/31/2023
LISBON	M1519	41	2045	\$ 399,504	\$ 6,068	1/1/2023	12/31/2023
LISBON	M1520	48	1630	\$ 467,712	\$ 7,104	1/1/2023	12/31/2023
LOCKHART	M400	15	308	\$ 146,160	\$ 2,220	1/1/2023	12/31/2023
LOCKHART	M402	18	618	\$ 175,392	\$ 2,664	1/1/2023	12/31/2023
LOCKHART	M406	15	1703	\$ 146,160	\$ 2,220	1/1/2023	12/31/2023
LOCKHART	M412	28	1805	\$ 272,832	\$ 4,144	1/1/2023	12/31/2023
LOCKHART	M415	5	47	\$ 48,720	\$ 740	1/1/2023	12/31/2023
LOCKHART	M417	17	1127	\$ 165,648	\$ 2,516	1/1/2023	12/31/2023
UMATILLA	M4405	28	757	\$ 272,832	\$ 4,144	1/1/2023	12/31/2023
UMATILLA	M4407	56	2270	\$ 545,664	\$ 8,288	1/1/2023	12/31/2023
UMATILLA	M4408	28	1399	\$ 272,832	\$ 4,144	1/1/2023	12/31/2023
EUSTIS	M499	26	1448	\$ 253,344	\$ 3,848	1/1/2023	12/31/2023
EUSTIS	M500	21	1754	\$ 204,624	\$ 3,108	1/1/2023	12/31/2023
EUSTIS	M501	33	1144	\$ 321,552	\$ 4,884	1/1/2023	12/31/2023
EUSTIS	M503	37	1441	\$ 360,528	\$ 5,476	1/1/2023	12/31/2023
EUSTIS	M504	41	2013	\$ 399,504	\$ 6,068	1/1/2023	12/31/2023
TAVARES EAST	M580	17	700	\$ 165,648	\$ 2,516	1/1/2023	12/31/2023
TAVARES EAST	M581	28	1364	\$ 272,832	\$ 4,144	1/1/2023	12/31/2023
KELLY PARK	M821	30	1987	\$ 292,320	\$ 4,440	1/1/2023	12/31/2023
KELLY PARK	M822	28	402	\$ 272,832	\$ 4,144	1/1/2023	12/31/2023
JASPER	N191	76	831	\$ 740,544	\$ 11,248	1/1/2023	12/31/2023
Additional Replacements	TED	219		\$ 2,133,936	\$ 32,412	1/1/2023	12/31/2023

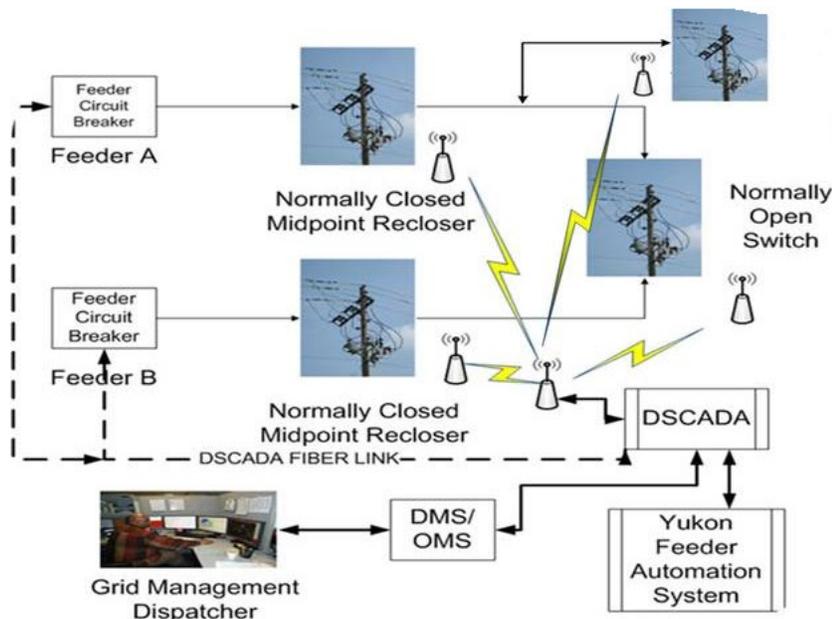
# Self-Optimizing Grid – SOG

## Vision

The SOG Program started as part of DEF's Grid Investment Plan which was partially funded through the 2017 Revised and Restated Settlement Agreement and was later continued through SPP 2020. DEF plans to continue this Program through SPP 2023 and at completion in 2025, approximately 80% of the distribution feeders on the DEF system will have the ability to automatically reroute power around damaged line sections. 100% of the distribution feeders will have automated switching capability.

## Description

The current grid has limited ability to reroute and rapidly restore power. The SOG Program is established to address both issues.



The SOG Program consists of three (3) major components: capacity, connectivity, and automation and intelligence. The SOG Program redesigns key portions of the distribution system and transforms it into a dynamic smart-thinking, self-healing network. The grid will have the ability to automatically reroute power around trouble areas, like a tree on a power line, to quickly restore power to the maximum number of customers and rapidly dispatch line crews directly to the source of the outage. Self-healing technologies can reduce outage impacts by as much as 75 percent on affected feeders.

The **SOG Capacity projects** focus on expanding substation and distribution line capacity to allow for two-way power flow. **SOG Connectivity projects** create tie points between circuits. **SOG Automation projects** provide intelligence and control for the SOG operations; Automation projects enable the grid to dynamically reconfigure around trouble and restore customers not impacted by an outage.

## Cost

The SOG Program is planned to be completed in 2025. Below are the projected units and costs for 2023-2025:

Self-Optimizing Grid (SOG)	DEF		
	2023	2024	2025
Totals	\$ 77,339,715	\$136,715,154	\$136,715,488
Automation	\$ 58,844,463	\$ 87,035,148	\$ 87,035,500
Capital	\$ 57,130,194	\$ 84,500,000	\$ 84,500,000
O&M	\$ 1,714,269	\$ 2,535,148	\$ 2,535,500
Total Units	783	1,138	1,111
Connectivity & Capacity	\$ 18,495,252	\$ 49,680,006	\$ 49,679,988
Capital	\$ 17,869,806	\$ 48,000,000	\$ 48,000,000
O&M	\$ 625,446	\$ 1,680,006	\$ 1,679,988

## Cost Benefit Comparison

Costs from 2023 through 2025 are approximately \$340M Capital and \$11M O&M.

At completion, with more customers automatically restored through automated switching, cost reductions can be achieved through better targeting of restoration efforts and personnel. SOG enables the grid to rapidly reroute power around damaged line sections. Accordingly, the benefit from the completion of this program is a reduction in customers affected by long duration outages as a result of extreme weather events, increased ability to target restoration efforts, and enhancement of overall reliability via anticipated decrease in CMI.

When the SOG Program is complete, DEF estimates it will reduce Distribution MED CMI by approximately by 179 million to 224 million minutes annually. CMI reduction is used as a proxy for reduction in extreme weather event duration for the average customer.

## Prioritization Methodology

The following steps are used to prioritize the work:

1. Probability of Damage: SOG does not directly reduce damage but rather is intended to reduce the duration of outages, thus SOG impacts are conservatively assessed after other hardening projects. Since other hardening projects reduce equipment failures and outages, the simulated SOG impacts are evaluated against this new hardened baseline. To prioritize the work in the Florida regions, the Transmission and Distribution systems were modeled, and weather simulations were run to provide probabilistic exposure frequency for all asset locations. The weather modeling uses the FEMA Hazus and SLOSH models, which contain the weather data for storms over the last 200 years. Using the geographical locations of the Florida assets and the historic storm paths embedded in the Hazus model, a spatial correlation of future storm exposure can be derived. To determine probability of damage given that exposure, eight years of historical outage data was provided and correlated with the closest weather tower to determine the conditions during historic failures recorded in the outage data. Then, the expected quantities of asset failure for simulated future weather exposure conditions was derived by combining simulated weather patterns with historical asset failure through conditional probability methods.
2. Consequence of Damage: Once the output of probabilistic damage is assessed, the probable impact to customers is considered. This step considers number of customers

served by a given asset (e.g., each pole, or segment of conductor on a Feeder), observed

outage durations, the mix of customers, and critical facilities. For SOG, this step is

performed based on the hardened configuration of the feeder after completion of the Feeder Hardening program (see above for a description of the Feeder Hardening program).

3. Consequence of Automation: Because the program benefits are tied to reduction in outage length and customers affected during outages, these values were calculated as a part of the simulation described in steps 1 and 2, with the addition of SOG automation. The outage time reduction varied feeder by feeder, based on number of customers served, historic observed outage durations by asset class on each feeder, the reduction impact of feeder hardening on the feeder, and current level of automation.
4. Distribution subject matter experts then use these outputs to determine the optimum deployment plan considering factors such as current projects in the area, critical customers, operational knowledge, resource availability and efficiency.

## Year 1 Project List

2023 Planned Duke Energy Florida - SOG (Self Optimizing Grid)								
Location	Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Finish Date		
<b>Self Optimizing Grid - Automation</b>								
LAKE BRYAN	K232	3	1110	\$ 165,000	\$ 5,047	7/1/2023	9/30/2023	
INTERNATIONAL D	K4817	1	1562	\$ 70,000	\$ 2,141	7/1/2023	9/30/2023	
ORANGWOOD	K228	1	103	\$ 55,000	\$ 1,682	10/1/2023	12/31/2023	
INTERNATIONAL D	K4815	4	1979	\$ 240,000	\$ 7,341	7/1/2023	9/30/2023	
HUNTERS CREEK	K40	1	2165	\$ 55,000	\$ 1,682	1/1/2023	3/31/2023	
HUNTERS CREEK	K43	1	1623	\$ 55,000	\$ 1,682	1/1/2023	3/31/2023	
HUNTERS CREEK	K48	3	1808	\$ 165,000	\$ 5,047	1/1/2023	3/31/2023	
CIRCLE SQUARE	A251	4	2333	\$ 250,000	\$ 7,647	4/1/2023	6/30/2023	
CIRCLE SQUARE	A253	1	1441	\$ 55,000	\$ 1,682	4/1/2023	6/30/2023	
BITHLO	W0951	2	1709	\$ 140,000	\$ 4,282	1/1/2023	3/31/2023	
BITHLO	W0952	2	812	\$ 140,000	\$ 4,282	1/1/2023	3/31/2023	
BITHLO	W0955	2	1318	\$ 140,000	\$ 4,282	1/1/2023	3/31/2023	
BITHLO	W0956	2	2212	\$ 140,000	\$ 4,282	1/1/2023	3/31/2023	
CLEARWATER	C12	2	1262	\$ 110,000	\$ 3,365	1/1/2023	12/31/2023	
LARGO	J404	1	3167	\$ 70,000	\$ 2,141	4/1/2023	6/30/2023	
ULMERTON WEST	J682	4	2513	\$ 280,000	\$ 8,565	4/1/2023	6/30/2023	
DUNEDIN	C106	2	814	\$ 140,000	\$ 4,282	4/1/2023	6/30/2023	
DUNEDIN	C107	2	2273	\$ 140,000	\$ 4,282	4/1/2023	6/30/2023	
HIGHLANDS	C2806	1	3102	\$ 70,000	\$ 2,141	4/1/2023	6/30/2023	
CLEARWATER	C7	2	1232	\$ 140,000	\$ 4,282	1/1/2023	12/31/2023	
NARCOOSSEE	W0212	2	1973	\$ 140,000	\$ 4,282	1/1/2023	3/31/2023	
NARCOOSSEE	W0219	4	2154	\$ 280,000	\$ 8,565	1/1/2023	3/31/2023	
PINECASTLE	W0391	2	1335	\$ 140,000	\$ 4,282	7/1/2023	9/30/2023	
WEKIVA	M101	4	998	\$ 235,000	\$ 7,188	7/1/2023	9/30/2023	
WEKIVA	M107	2	1904	\$ 125,000	\$ 3,823	7/1/2023	9/30/2023	
WEKIVA	M115	1	758	\$ 70,000	\$ 2,141	7/1/2023	9/30/2023	
DOUGLAS AVENUE	M1704	2	972	\$ 140,000	\$ 4,282	10/1/2023	12/31/2023	
DINNER LAKE	K1687	2	689	\$ 140,000	\$ 4,282	7/1/2023	9/30/2023	
DINNER LAKE	K1688	2	923	\$ 140,000	\$ 4,282	7/1/2023	9/30/2023	
DINNER LAKE	K1689	1	1273	\$ 70,000	\$ 2,141	7/1/2023	9/30/2023	
COUNTRY OAKS	K1443	3	1128	\$ 210,000	\$ 6,423	10/1/2023	12/31/2023	
LAKE OF THE HILLS	K1885	3	1177	\$ 210,000	\$ 6,423	10/1/2023	12/31/2023	
DUNDEE	K3246	2	443	\$ 140,000	\$ 4,282	10/1/2023	12/31/2023	
CYPRESSWOOD	K561	2	1139	\$ 140,000	\$ 4,282	10/1/2023	12/31/2023	
OAKHURST	J221	1	1959	\$ 70,000	\$ 2,141	1/1/2023	12/31/2023	
OAKHURST	J224	5	2424	\$ 350,000	\$ 10,706	1/1/2023	12/31/2023	
OAKHURST	J228	2	2784	\$ 140,000	\$ 4,282	1/1/2023	12/31/2023	
SEMINOLE	J890	3	2704	\$ 210,000	\$ 6,423	1/1/2023	3/31/2023	
SEMINOLE	J893	1	1665	\$ 70,000	\$ 2,141	1/1/2023	3/31/2023	
OAKHURST	J223	4	1804	\$ 280,000	\$ 8,565	1/1/2023	12/31/2023	
OAKHURST	J225	4	1988	\$ 280,000	\$ 8,565	1/1/2023	12/31/2023	
OAKHURST	J226	2	2999	\$ 140,000	\$ 4,282	1/1/2023	12/31/2023	
OAKHURST	J227	9	2041	\$ 630,000	\$ 19,270	1/1/2023	12/31/2023	
OAKHURST	J229	4	2941	\$ 235,000	\$ 7,188	1/1/2023	12/31/2023	
OAKHURST	J230	6	2701	\$ 420,000	\$ 12,847	1/1/2023	12/31/2023	
WALSINGHAM	J552	2	2561	\$ 140,000	\$ 4,282	4/1/2023	6/30/2023	
WALSINGHAM	J557	4	3096	\$ 250,000	\$ 7,647	4/1/2023	6/30/2023	
WINTER GARDEN	K201	4	2506	\$ 280,000	\$ 8,565	4/1/2023	6/30/2023	
WINTER GARDEN	K203	3	738	\$ 210,000	\$ 6,423	4/1/2023	6/30/2023	
WINTER GARDEN	K204	3	2347	\$ 210,000	\$ 6,423	4/1/2023	6/30/2023	
CROWN POINT	K279	3	1499	\$ 210,000	\$ 6,423	1/1/2023	12/31/2023	
MONTVERDE	K4831	1	1864	\$ 70,000	\$ 2,141	7/1/2023	9/30/2023	
MONTVERDE	K4834	2	1647	\$ 140,000	\$ 4,282	7/1/2023	9/30/2023	
WINTER GARDEN	K202	1	723	\$ 70,000	\$ 2,141	4/1/2023	6/30/2023	
OCOE	M1096	1	1944	\$ 70,000	\$ 2,141	7/1/2023	9/30/2023	
WESTRIDGE	K426	3	2660	\$ 165,000	\$ 5,047	10/1/2023	12/31/2023	
BOGGY MARSH	K957	2	3021	\$ 110,000	\$ 3,365	1/1/2023	12/31/2023	
MAXIMIO	X151	2	2353	\$ 210,000	\$ 6,423	10/1/2023	12/31/2023	
MONTVERDE	K4841	6	8701	\$ 382,000	\$ 11,685	7/1/2023	9/30/2023	
LAKE EMMA	M428	17	12489	\$ 1,158,000	\$ 35,421	10/1/2023	12/31/2023	
UCF	W1012	14	12741	\$ 869,000	\$ 26,581	10/1/2023	12/31/2023	

Location		Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Final Date
APALACHICOLA	N58	6	5363	\$ 450,000	\$ 13,765	10/1/2023	6/30/2023
WALSINGHAM	J556	16	7193	\$ 1,200,000	\$ 36,705	4/1/2023	6/30/2023
APOPKA SOUTH	M722	3	2293	\$ 225,000	\$ 6,882	10/1/2023	12/31/2023
MAITLAND	M85	21	11395	\$ 1,575,000	\$ 48,176	1/1/2023	12/31/2023
MAITLAND	M84	8	4105	\$ 540,000	\$ 16,517	1/1/2023	12/31/2023
MAITLAND	M82	42	8880	\$ 2,490,000	\$ 76,164	1/1/2023	12/31/2023
BAY HILL	K77	10	2978	\$ 750,000	\$ 22,941	1/1/2023	12/31/2023
LAKE ALOMA	W0151	10	2378	\$ 750,000	\$ 22,941	1/1/2023	12/31/2023
RIO PINAR	W0968	25	9731	\$ 1,875,000	\$ 57,352	1/1/2023	12/31/2023
CURLEW	C4376	30	11486	\$ 2,250,000	\$ 68,823	1/1/2023	12/31/2023
CLEARWATER	C17	30	6620	\$ 1,800,000	\$ 55,058	1/1/2023	12/31/2023
CROSS BAYOU	J147	33	12481	\$ 2,445,000	\$ 74,787	1/1/2023	12/31/2023
CURLEW	C4389	25	14124	\$ 1,875,000	\$ 57,352	1/1/2023	12/31/2023
CURLEW	C4390	30	11321	\$ 2,250,000	\$ 68,823	1/1/2023	12/31/2023
VINDY	X72	35	15735	\$ 2,625,000	\$ 80,293	1/1/2023	12/31/2023
CLEARWATER	C5	35	17931	\$ 2,625,000	\$ 80,293	1/1/2023	12/31/2023
VINDY	X71	10	4382	\$ 750,000	\$ 22,941	1/1/2023	12/31/2023
CLEARWATER	C18	15	8253	\$ 1,125,000	\$ 34,411	1/1/2023	12/31/2023
GATEWAY	X113	7	2360	\$ 525,000	\$ 16,059	1/1/2023	12/31/2023
CROSS BAYOU	J142	25	12575	\$ 1,875,000	\$ 57,352	1/1/2023	12/31/2023
GATEWAY	X112	16	6232	\$ 1,200,000	\$ 36,705	1/1/2023	12/31/2023
CURLEW	C4391	18	9557	\$ 1,350,000	\$ 41,294	1/1/2023	12/31/2023
CROSS BAYOU	J140	16	9593	\$ 1,200,000	\$ 36,705	1/1/2023	12/31/2023
CLEARWATER	C16	17	9775	\$ 1,275,000	\$ 39,000	1/1/2023	12/31/2023
CURLEW	C4385	7	3009	\$ 525,000	\$ 16,059	1/1/2023	12/31/2023
SEVEN SPRINGS	C4502	7	3413	\$ 525,000	\$ 16,059	1/1/2023	12/31/2023
SEVEN SPRINGS	C4507	8	5510	\$ 600,000	\$ 18,353	1/1/2023	12/31/2023
CROSS BAYOU	J150	12	6674	\$ 900,000	\$ 27,529	1/1/2023	12/31/2023
BAY HILL	K67	25	10448	\$ 1,875,000	\$ 57,352	1/1/2023	12/31/2023
MAITLAND	W0087	17	12082	\$ 1,275,000	\$ 39,000	1/1/2023	12/31/2023
CENTRAL PARK	K495	9	1430	\$ 675,000	\$ 20,647	1/1/2023	12/31/2023
CENTRAL PARK	W0500	22	1908	\$ 1,650,000	\$ 50,470	1/1/2023	12/31/2023
CENTRAL PARK	W0493	11	405	\$ 825,000	\$ 25,235	1/1/2023	12/31/2023

### Self Optimizing Grid - Capacity and Conductor

FERN PARK	M907	2700	1400	\$ 445,500	\$ 15,593	1/1/2023	3/31/2023
CIRCLE SQUARE	A250	430	2315	\$ 70,350	\$ 2,483	4/1/2023	6/30/2023
CITRUS HILLS	A285	10850	927	\$ 1,790,250	\$ 62,659	1/1/2023	3/31/2023
ULMERTON WEST	J682	1362	2513	\$ 224,730	\$ 7,866	4/1/2023	6/30/2023
DUNEDIN	C106	1817	814	\$ 299,805	\$ 10,493	4/1/2023	6/30/2023
DUNEDIN	C107	1003	2273	\$ 165,495	\$ 5,792	4/1/2023	6/30/2023
HIGHLANDS	C2806	1901	3102	\$ 313,665	\$ 10,978	4/1/2023	6/30/2023
DINNER LAKE	K1687	2200	689	\$ 363,000	\$ 12,705	7/1/2023	9/30/2023
LAKEWOOD	K1694	500	1429	\$ 82,500	\$ 2,888	1/1/2023	3/31/2023
DUNDEE	K3246	3200	443	\$ 528,000	\$ 18,480	10/1/2023	12/31/2023
FIFTY-FIRST STREET	X102	4400	3816	\$ 726,000	\$ 25,410	1/1/2023	3/31/2023
KENNETH CITY	X51	2850	1127	\$ 470,250	\$ 16,459	7/1/2023	9/30/2023
FORTIETH STREET	X84	5550	2245	\$ 915,750	\$ 32,051	7/1/2023	9/30/2023
MAXIMIO	X151	1025	2353	\$ 190,632	\$ 6,672	10/1/2023	12/31/2023
MONTVERDE	K4841	672	8701	\$ 125,000	\$ 4,375	7/1/2023	9/30/2023
LAKE EMMA	M428	1118	12489	\$ 208,000	\$ 7,280	10/1/2023	12/31/2023
UCF	W1012	877	12741	\$ 163,100	\$ 5,709	10/1/2023	12/31/2023
APALACHICOLA	N58	5739	5363	\$ 1,067,478	\$ 37,362	10/1/2023	12/31/2023
WALSINGHAM	J556	1464	7193	\$ 272,261	\$ 9,529	4/1/2023	6/30/2023
MAITLAND	M85	2640	11395	\$ 491,040	\$ 17,186	1/1/2023	12/31/2023
LAKE ALOMA	W0151	4005	2378	\$ 744,930	\$ 26,073	1/1/2023	12/31/2023
RIO PINAR	W0968	5100	9731	\$ 948,600	\$ 33,201	1/1/2023	12/31/2023
CROSS BAYOU	J147	6750	12481	\$ 1,255,500	\$ 43,943	1/1/2023	12/31/2023
CLEARWATER	C18	2160	8253	\$ 401,760	\$ 14,062	1/1/2023	12/31/2023
GATEWAY	X113	516	2360	\$ 96,000	\$ 3,360	1/1/2023	12/31/2023
CROSS BAYOU	J142	3200	12575	\$ 595,200	\$ 20,832	1/1/2023	12/31/2023
CURLEW	C4391	2690	9557	\$ 500,340	\$ 17,512	1/1/2023	12/31/2023
CROSS BAYOU	J140	7280	9593	\$ 893,760	\$ 31,282	1/1/2023	12/31/2023
CLEARWATER	C16	8760	9775	\$ 1,969,400	\$ 68,929	1/1/2023	12/31/2023
CURLEW	C4385	2050	3009	\$ 209,100	\$ 7,319	1/1/2023	12/31/2023
BAY HILL	K67	2000	10448	\$ 204,000	\$ 7,140	1/1/2023	12/31/2023
MAITLAND	W0087	2800	12082	\$ 520,800	\$ 18,228	1/1/2023	12/31/2023

# Underground Flood Mitigation

## Vision

The Underground Flood Mitigation program is a targeted Program to harden existing underground distribution facilities in locations that are prone to storm surge during extreme weather events. This Program will address the areas identified as being at high risk for significant flooding by installing submersible equipment within 20 years.

## Description

Underground Flood Mitigation will harden existing underground line and equipment to withstand storm surge through the use of DEF’s current storm surge standards. This involves the installation of specialized stainless-steel equipment, submersible connections and concrete pads with increased mass. The primary purpose of this hardening activity is to minimize the equipment damage caused by storm surge and thus reduce customer outages and/or expedite restoration after the storm surge has receded.

For selected locations, DEF would utilize a concrete pad with increased weight and stainless steel tiedowns and change all the connections to waterproof (submersible) connections. Conventional switchgear would be replaced with submersible switchgears that are able to withstand the storm surge.

## Cost

It is expected that the 10-year cost will be approximately \$15M.

UG Flood Mitigation	DEF		
	2023	2024	2025
Totals	\$ 1,000,000	\$ 1,500,000	\$ 1,500,000
Capital	\$ 1,000,000	\$ 1,500,000	\$ 1,500,000
O&M	\$ -	\$ -	\$ -
Total Units	98	143	140

## Cost Benefit Comparison

The Underground Flood Mitigation Program is scheduled to start in 2022 and estimated to take 20 years to complete. Based on today’s costs, the Program will cost an estimated \$26M in Capital.

When the Underground Flood Mitigation Program is complete, DEF estimates it will reduce the cost of extreme weather events on the Distribution system by approximately \$1M to \$1.3M annually based on today’s costs.

When the Underground Flood Mitigation Program is complete, DEF estimates it will reduce Distribution MED CMI by approximately 1M to 1.3M minutes annually. CMI reduction is used as a proxy for reduction in extreme weather event duration for the average customer.

## Prioritization Methodology

Work will be prioritized using the following process.

1. **Probability of Damage:** To prioritize the work in the Florida regions, the Transmission and Distribution systems were modeled, and weather simulations were run to provide probabilistic exposure frequency for all asset locations. The weather modeling uses the FEMA Hazus and SLOSH models, which contain the weather data for storms over the last 200 years. Using the geographical locations of the Florida assets and the historic storm paths embedded in the Hazus model, a spatial correlation of future storm exposure can be derived. To determine probability of damage given that exposure, eight years of historical outage data was provided and correlated with the closest weather tower to determine the conditions during historic failures recorded in the outage data. Then, the expected quantities of asset failure for simulated future weather exposure conditions was derived by combining simulated weather patterns with historical asset failure through conditional probability methods.
2. **Consequence of Damage:** Once the output of probabilistic damage is assessed, the probable impact to customers is considered. This step considers number of customers served by a given asset (e.g., each pole, or segment of conductor on a feeder), observed outage durations, the mix of customers, and critical facilities. This step is performed both for the existing configuration of each feeder, and the hardened configuration resulting from completion of the program. The difference between the existing condition and the hardened configuration is the program impact.
3. Distribution subject matter experts then use these outputs to determine the optimum deployment plan considering factors such as current projects in the area, critical customers, operational knowledge, resource availability and efficiency.

## Year 1 Project List

2023 Planned Duke Energy Florida - Underground Flood Mitigation							
Location	Unit Count	Customer Count	Capital Cost	O&M Cost	Start Date	Finish Date	
<b>Underground Flood Mitigation</b>							
Floramar	C4002	98	1000	\$ 1,000,000		4/1/2023	10/31/2023

# Distribution Vegetation Management

## Vision

DEF will continue to utilize a fully Integrated Vegetation Management (IVM) to minimize the impact of vegetation on the distribution assets.

## Description

DEF Distribution will continue a fully IVM program focused on trimming feeders and laterals on an average 3 and 5-year cycles respectively. This corresponds to trimming approximately 1,930 miles of feeder backbone and 2,455 miles of laterals annually. The IVM program consists of the following: routine maintenance “trimming”, hazard tree removal, herbicide applications, vine removal, customer requested work, and right-of-way brush “mowing” where applicable. The IVM program incorporates a combination of condition, time since last trim and reliability-driven prioritization of work to reduce event possibilities during extreme weather events and enhance overall reliability.

Additionally, a hazard tree patrol is conducted every year on all three-phase circuits. Hazard trees are defined as trees that are dead, dying, structurally unsound, diseased, leaning or otherwise defective. The trees that are located within the right of way are removed prior to hurricane season each year, hazard trees that are located outside the right of way require landowner permission prior to removal. The contact with the landowner is initiated, permission for removal and the removal is also targeted for completion prior to hurricane season. If a feeder circuit is relocated or circuit height changes, an additional hazard tree assessment will be conducted in the line segments that will be impacted.

DEF will optimize the IVM program costs against reliability and storm performance objectives to harden the system for extreme weather events. There are four key objectives for optimization:

- Customer and employee safety;
- Tree-caused outage minimization, with the objective to reduce the number of tree-caused outages, particularly in the “preventable” category;
- Effective cost management; and
- Customer satisfaction.

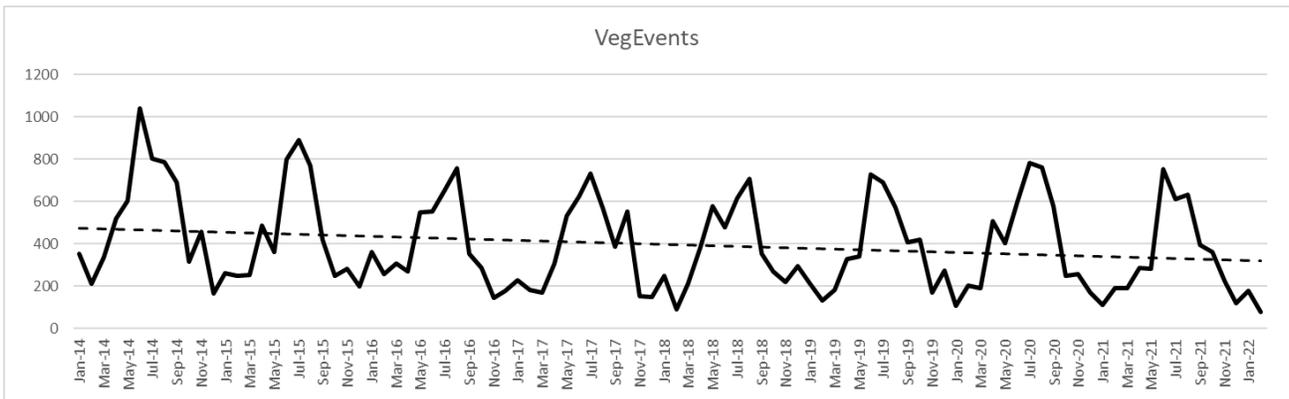
## Cost

It is expected that the 10-year cost will be approximately \$23M Capital and \$517M O&M. This would cover the inspection and vegetation remediation activities. The circuit maintenance work performed is predominantly billed under a unit-based contract structure and not differentiated between labor and equipment. The estimated contractor ratio is 95% and the estimated utility personnel ratio is 5%.

2023-2025 Labor / Equipment Breakout		
	Labor	Equipment
Utility Personnel Totals	\$ 6,633,579	\$ 205,163
Capital	\$ 590,225	\$ 18,255
O&M	\$ 6,043,354	\$ 186,908
Contract Personnel Totals	\$ 104,314,057	\$ 34,358,323
Capital	\$ 4,136,373	\$ 1,378,791
O&M	\$ 100,177,684	\$ 32,979,532

VM - Distribution	DEF		
	2023	2024	2025
Totals	\$ 47,111,034	\$ 48,492,628	\$ 49,907,460
Capital	\$ 1,981,185	\$ 2,040,620	\$ 2,101,839
O&M	\$ 45,129,849	\$ 46,452,008	\$ 47,805,621
Approximate Miles	4,383	4,398	4,398

## Cost Benefit Comparison



DEF’s Distribution IVM program is focused on ensuring the safe and reliable operation of the distribution system by minimizing vegetation-related interruptions and ensuring adequate conductor-to-vegetation clearances, while maintaining compliance with regulatory, environmental and safety requirements/standards. The chart above shows a reduction in vegetation related outage events over the past 5 years and demonstrates the effectiveness of the IVM program. Activities focus on the removal and/or control of incompatible vegetation within and along the right of way to minimize the risk of vegetation-related outages.

## Prioritization Methodology

As part of the IVM program, DEF uses a comprehensive circuit prioritization model to minimize tree-caused outages by focusing on the feeders and or laterals that rate high in the model. Prioritization ranking factors are based on past feeder or lateral performance and probable future performance. Examples of the criteria used in prioritization include tree-caused outages in prior years, outages per vegetated mile, and total tree customer minutes of interruption. As systems and technologies continue to evolve and mature, DEF intends to leverage emerging technologies/systems and analytics to evaluate numerous variables coupled with local knowledge to optimize the annual planning and scheduling of work. DEF follows the ANSI 300 standard for pruning and the guide “Pruning Trees Near Electric Utility Lines” by Dr. Alex L. Shigo.

# Transmission Programs

## Florida Program Summaries

# Structure Hardening

## Vision

The Structure Hardening program focuses on DEF's transmission structures throughout the state. As part of the program, all wood poles on the Florida transmission system will be replaced with non-wood structures within 15 years. In addition, Structure Hardening will upgrade lattice tower structure types that have failed during extreme weather and/or fail inspection.

## Description

The Transmission Structure Hardening program addresses existing vulnerabilities on the system. This will enable the transmission system to better withstand extreme weather events. This program includes wood to non-wood upgrades, tower upgrades, adding cathodic protection, automating gang operated air break switches, Overhead Groundwire upgrades, and structure inspections.



*Figure 1: Wood Pole to Non-Wood Upgrade candidate*

## Wood to Non-Wood Upgrade

This activity upgrades wood poles to non-wood material such as steel or concrete. Wood pole failure has been the predominate structure damage to the transmission system during extreme weather. This strengthens structures by eliminating damage from woodpeckers and wood rot. The new structures will be more resistant to damage from extreme weather events. Other related hardware upgrades will occur simultaneously, such as insulators, crossarms, switches, and guys. This will upgrade an identified 20,520 wood poles.

## Tower Upgrade

Tower Upgrade will prioritize towers based on inspection data and enhanced weather modeling. The upgrade activities will replace tower types that have previously failed during extreme weather events. Over 700 towers have been identified as having this design type.

In addition, the tower upgrade activities will upgrade lattice towers identified by visual ground inspections, aerial drone inspections and data gathered during cathodic protection installations (discussed below). This will improve the ability of the transmission grid to sustain operations during extreme weather events by reducing outages and improving restoration times. Other related hardware upgrades will occur simultaneously such as insulators, cathodic protection, and guys.

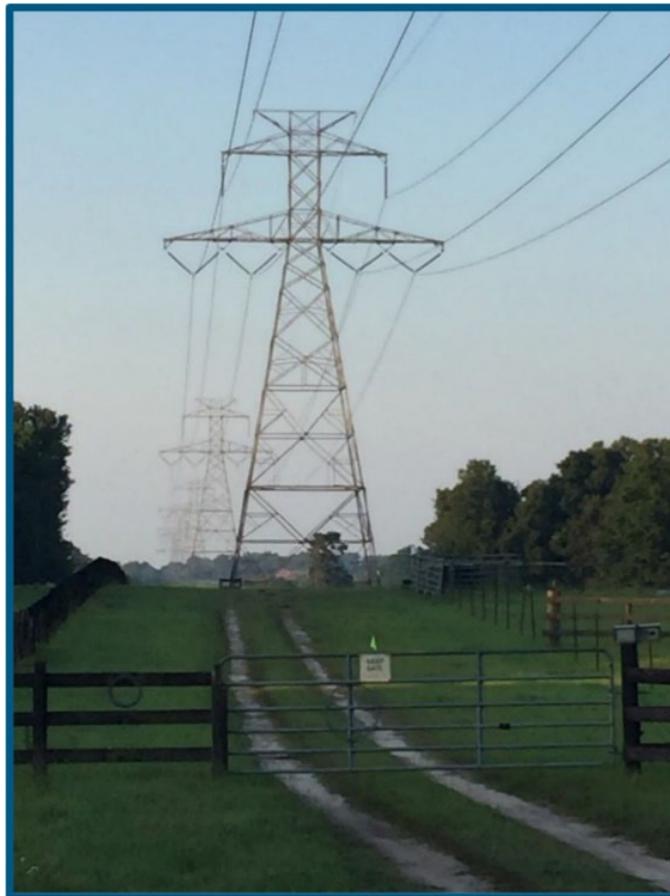


Figure 2: Double Circuit Tower

## Cathodic Protection

The purpose of the Cathodic Protection (CP) activities is to mitigate active groundline corrosion on the lattice tower system. This will be done by installing passive CP systems comprised of anodes on each leg of lattice towers. The anodes serve as sacrificial assets that corrode in

place of structural steel, preventing loss of structure strength to corrosion. Each CP project will address all towers on a line from beginning point to end point.

The following tangible benefits will be gained related to hardening the lattice system:

- Site Classification - Subsurface investigation and cathodic protection installation on all lattice structures, prioritizing lines based on system criticality, age, and potential storm impact. Galvanization and member thickness measurements will be taken on all legs and diagonals, and structural steel will be classified by corrosion severity. Concrete piers will be classified on concrete health, cracking, and rebar corrosion. This system evaluation will identify any potential weak spots resulting from ground line corrosion on DEF's lattice system.
- Corrosion Mitigation – Each lattice-structure tower leg will have cathodic protection installed on it in order to arrest the corrosion process.
- Corrosion Database – Soil conditions recorded at each tower site will include resistivity, soil pH, redox, and half-cell potentials. These values will be saved into a database which will be used to help classify areas of DEF's system prone to corrosion. This information will be used to aid in condition-based maintenance of system infrastructure.

### Gang Operated Air Break (GOAB)

The GOAB line switch automation project is a 20-year initiative that will upgrade 160 switch locations with modern switches enabled with SCADA communication and remote-control capabilities. Automation will add resiliency to the transmission system. Later years will include adding new switch locations to add further resiliency to the transmission system. Transmission line switches are currently manually operated and cannot be remotely monitored or controlled. Switching, a grid operation often used to section off portions of the transmission system in order to perform equipment maintenance or isolate trouble spots to minimize impacts to customers, has historically required a technician to go to the site and manually operate one or more-line switches. The GOAB upgrade increases the number of remote-controlled switches to support faster isolation of trouble spots on the transmission system and more rapid restoration following line faults.



Figure 3: DEF Manually Operated Switch

## Overhead Ground Wire (OHGW)

Florida is known for a high concentration of lightning events, which continually stress the existing grid protection. Deteriorated overhead ground wire reduces the protection of the conductor and exposes the line to repeated lightning damage and risk of failure impacting the system. This initiative will also reduce the safety risk due to the required removal of OHGW prior to any restoration work on the system. By targeting deteriorated OHGW on lines with high lightning events, the benefit of this activity will be maximized. An added benefit is upgrading to fiber optic OHGW, facilitating high-speed relaying and enhanced communication and control between stations and centralized control centers.

## Structure Inspections and Drone Inspections

The transmission system's inspection activities include all types of structures, line hardware, guying, and anchoring systems. Inspections include:

- Aerial helicopter Transmission Line Inspections
- Wood Pole Line Patrols
- Wood Pole Sound and Bore Line Patrol – 8-year cycle
- Non-wood Structure Line Patrols – 6-year cycle

DEF will continue to conduct drone inspections on targeted lattice tower lines. The intent of these continued inspections is to identify otherwise difficult to see structure, hardware, or insulation vulnerabilities through high resolution imagery. DEF has incorporated drone patrols into the inspections because drones have the unique ability to provide a close vantage point with multiple angles on structures that is unattainable through aerial or ground patrols with binoculars.

## Cost

DEF estimates the 10-year cost will be approximately \$1.6B Capital and \$34M O&M, and will entail approximately:

- 18,000 wood to non-wood poles;
- 700 tower replacements;
- Cathodic protection for all towers;
- 70 GOABs;
- 700 miles of OHGW; and
- system inspection cycles, ground and aerial.

Structure Hardening	DEF		
	2023	2024	2025
Totals	\$142,483,532	\$153,550,338	\$167,661,144
Capital	\$139,177,289	\$150,194,566	\$164,210,798
O&M	\$ 3,306,243	\$ 3,355,772	\$ 3,450,346
Total Units	2,235	2,221	2,214

## Cost Benefit Comparison

The Structure Hardening Program began in 2021 and is estimated to take 30 years to complete. Based on today's cost, the program is estimated to cost \$2.6B in Capital and \$71M in Project O&M. At completion, approximately:

- 20,520 wood to non-wood poles;
- 720 tower replacements;
- Cathodic protection for all towers;
- 160 GOABs;
- 1,500 miles of OHGW; and
- System inspections.

When the Structure Hardening Program is complete, DEF estimates it will reduce the cost of extreme weather events on the Transmission system by approximately \$14M to \$18M annually based on today's costs.

When the Structure Hardening Program is complete, DEF estimates it will reduce Transmission MED CMI by approximately 13 million to 17 million minutes annually. CMI reduction is used as a proxy for reduction in extreme weather event duration for the average customer.

Transmission system damage can result in severe consequences in both cost and outage duration. The estimation of benefits represents an annual average expected value based on historical data and does not represent what could happen in individual events or scenarios in which severe damage occurs on critical parts of the Transmission system.

## Prioritization Methodology

Work will be prioritized using the following processes:

1. **Probability of Damage:** To prioritize the work in the Florida regions, the Transmission and Distribution systems were modeled, and weather simulations were run to provide probabilistic exposure frequency for all asset locations. The weather modeling uses the FEMA Hazus and SLOSH models, which contain the weather data for storms over the last 200 years. Using the geographical locations of the Florida assets and the historic storm paths embedded in the Hazus model, a spatial correlation of future storm exposure can be derived. To determine probability of damage given that exposure, eight years of historical outage data was provided and correlated with the closest weather tower to determine the conditions during historic failures recorded in the outage data. Then, the expected quantities of asset failure for simulated future weather exposure conditions was derived by combining simulated weather patterns with historical asset failure through conditional probability methods.
2. **Consequence of Damage:** Once the output of probabilistic damage is assessed, the probable impact to customers is considered. This step considers number of customers served by a given asset (e.g. each pole, or segment of conductor on a line), observed outage durations, the mix of customers, and critical facilities. This step is performed both for the existing configuration of each asset, and the hardened configuration resulting from completion of the Program. The difference between the existing condition and the hardened configuration is the program impact.
3. Transmission subject matter experts then use these outputs to determine the optimum deployment plan considering factors such as current projects in the area, critical customers, operational knowledge, and resource availability.

# Year 1 Project List

2023 Planned Duke Energy Florida - Pole Replacement						
Location	Unit Count	Customer Count	Project Cost - Capital	Project Cost - O&M	Start Date	Finish Date
ALAFAYA - OVIEDO 69KV	2	10294	\$ 106,492.00	\$ 2,630.00	3/30/2023	6/30/2023
ALTAMONTE - MAITLAND 69KV	20	5780	\$ 1,064,920.00	\$ 26,300.00	3/30/2023	6/30/2023
ALTAMONTE - NORTH LONGWOOD CKT1 69KV	11	6311	\$ 585,706.00	\$ 14,465.00	3/30/2023	6/30/2023
ALTAMONTE - SANFORD (FP&L) 230KV	21	1**	\$ 1,118,166.00	\$ 27,615.00	3/30/2023	6/30/2023
ALTAMONTE - SPRING LAKE 230KV	17	0*	\$ 905,182.00	\$ 22,355.00	3/30/2023	6/30/2023
AVALON - CLERMONT EAST 69KV	17	0*	\$ 905,182.00	\$ 22,355.00	3/30/2023	6/30/2023
BARNUM CITY - WESTRIDGE 69KV	17	6814	\$ 905,182.00	\$ 22,355.00	3/30/2023	6/30/2023
BROOKRIDGE - BROOKSVILLE WEST (BBW CKT) 115KV	32	0*	\$ 1,703,872.00	\$ 42,080.00	3/30/2023	6/30/2023
BROOKRIDGE - BROOKSVILLE WEST (BWX CKT) 115KV	6	0*	\$ 319,476.00	\$ 7,890.00	3/30/2023	6/30/2023
CLARCONA - OCOEE 69KV	24	4991	\$ 1,277,904.00	\$ 31,560.00	3/30/2023	6/30/2023
CLEARWATER - EAST CLEARWATER 69KV	35	0*	\$ 1,863,610.00	\$ 46,025.00	3/30/2023	6/30/2023
CLEARWATER - HIGHLANDS 69KV	16	0*	\$ 851,936.00	\$ 21,040.00	3/30/2023	6/30/2023
CYPRESSWOOD - HAINES CITY 69KV	37	4005	\$ 1,970,102.00	\$ 48,655.00	3/30/2023	6/30/2023
DAVENPORT - HAINES CITY 69KV	57	7976	\$ 3,035,022.00	\$ 74,955.00	3/30/2023	6/30/2023
DAVENPORT-WEST DAVENPORT	25	9255	\$ 1,331,150.00	\$ 32,875.00	3/30/2023	6/30/2023
DEBARY PL - LAKE EMMA 230KV	12	2731	\$ 638,952.00	\$ 15,780.00	3/30/2023	6/30/2023
DELAND - DELTONA 69KV	8	0*	\$ 425,968.00	\$ 10,520.00	3/30/2023	6/30/2023
DESOTO CITY - LAKE PLACID NORTH 69KV	23	3400	\$ 1,224,658.00	\$ 30,245.00	3/30/2023	6/30/2023
DISSTON - KENNETH 115KV	1	6489	\$ 53,246.00	\$ 1,315.00	3/30/2023	6/30/2023
DISSTON - STARKEY ROAD 69KV	21	4916	\$ 1,118,166.00	\$ 27,615.00	3/30/2023	6/30/2023
DUNDEE - LAKE WALES 69KV	41	2069	\$ 2,183,086.00	\$ 53,915.00	3/30/2023	6/30/2023
DUNNELLON TOWN - RAINBOW LK EST SEC 69KV RA	46	6188	\$ 2,449,316.00	\$ 60,490.00	3/30/2023	6/30/2023
EATONVILLE - SPRING LAKE 69KV	10	0*	\$ 532,460.00	\$ 13,150.00	3/30/2023	6/30/2023
EUSTIS SOUTH - SORRENTO 69KV	95	4912	\$ 5,058,370.00	\$ 124,925.00	3/30/2023	6/30/2023
FISHEATING CREEK - LAKE PLACID 69KV	5	3772	\$ 266,230.00	\$ 6,575.00	3/30/2023	6/30/2023
FISHEATING CREEK - SUN N LAKES 69KV	149	12451	\$ 7,933,654.00	\$ 195,935.00	6/30/2023	9/30/2023
FT WHITE - HIGH SPRINGS 69KV	58	5327	\$ 3,088,268.00	\$ 76,270.00	6/30/2023	9/30/2023

Location	Unit Count	Customer Count	Project Cost - Capital	Project Cost - O&M	Start Date	Finish Date
HIGGINS PL - CURLEW CKT2 115KV	5	0*	\$ 266,230.00	\$ 75.00	6/30/2023	9/30/2023
LAKE WALES - WEST LAKE WALES CKT#1 69KV	51	0*	\$ 2,715,546.00	\$ 67,065.00	6/30/2023	9/30/2023
LAKE WALES - WEST LAKE WALES CKT#2 69KV	49	0*	\$ 2,609,054.00	\$ 64,435.00	6/30/2023	9/30/2023
LOCKHART - SPRING LAKE 230KV	18	0*	\$ 958,428.00	\$ 23,670.00	6/30/2023	9/30/2023
LOCKHART - WOODSMERE 230KV	2	0*	\$ 106,492.00	\$ 2,630.00	6/30/2023	9/30/2023
MAXIMO - 51ST ST 115KV	103	6876	\$ 5,484,338.00	\$ 135,445.00	6/30/2023	9/30/2023
MEADOW WOODS SOUTH - HUNTER CREEK 69KV	16	5581	\$ 851,936.00	\$ 21,040.00	6/30/2023	9/30/2023
MEADWDS SOUTH - TAFT 69KV	40	0*	\$ 2,129,840.00	\$ 52,600.00	6/30/2023	9/30/2023
MONTVERDE - WINTER GARDEN 69KV	52	7229	\$ 2,768,792.00	\$ 68,380.00	6/30/2023	9/30/2023
OAKHURST - WALSINGHAM 69KV	36	5048	\$ 1,916,856.00	\$ 47,340.00	6/30/2023	9/30/2023
PALM HARBOR - TARPON SPRINGS 69KV	38	0*	\$ 2,023,348.00	\$ 49,970.00	6/30/2023	9/30/2023
RIO PINAR PL - EAST ORANGE 69KV	28	6741	\$ 1,490,888.00	\$ 36,820.00	6/30/2023	9/30/2023
SKY LAKE - SOUTHWOOD (OUC) 230KV	20	1***	\$ 1,064,920.00	\$ 26,300.00	6/30/2023	9/30/2023
UMERTON WEST - WALSINGHAM 69KV	18	5958	\$ 958,428.00	\$ 23,670.00	6/30/2023	9/30/2023
AVON PARK PL - DESOTO CITY 69KV	72	0*	\$ 3,833,712.00	\$ 94,680.00	6/30/2023	9/30/2023
DUNNELTON TOWN - HOLDER 69KV	51	0*	\$ 2,715,546.00	\$ 67,065.00	6/30/2023	9/30/2023
HOLDER - INVERNESS 69KV	41	6216	\$ 2,183,086.00	\$ 53,915.00	6/30/2023	9/30/2023
BAY RIDGE - SORRENTO 69KV	36	2645	\$ 1,916,856.00	\$ 47,340.00	6/30/2023	9/30/2023
LEESBURG - OKAHUMPKA 69KV	11	2436	\$ 585,706.00	\$ 14,465.00	6/30/2023	9/30/2023
TROPIC TERRACE 115KV TAPLINE	55	3483	\$ 2,928,530.00	\$ 72,325.00	6/30/2023	9/30/2023
PIEDMONT - PLYMOUTH 69KV	9	0*	\$ 479,214.00	\$ 11,835.00	6/30/2023	9/30/2023
VANDOLAH - MYAKKA PREC 69KV RADIAL	33	2699	\$ 1,757,118.00	\$ 43,395.00	6/30/2023	9/30/2023
BARBERVILLE - DELAND WEST 69KV	41	4185	\$ 2,183,086.00	\$ 53,915.00	9/30/2023	11/30/2023
OVIDO - WINTER SPRINGS 69KV	20	0*	\$ 1,064,920.00	\$ 26,300.00	9/30/2023	11/30/2023
ALAFAYA - UCF 69KV	29	5045	\$ 1,544,134.00	\$ 38,135.00	9/30/2023	11/30/2023
CAMP LAKE - CLERMONT 69KV	53	5296	\$ 2,822,038.00	\$ 69,695.00	9/30/2023	11/30/2023
BAY RIDGE - KELLY PK 69KV	29	2637	\$ 1,544,134.00	\$ 38,135.00	9/30/2023	11/30/2023
MAITLAND - WINTER PARK 69KV	27	0*	\$ 1,437,642.00	\$ 35,505.00	9/30/2023	11/30/2023
TBD	120		\$ 19,275,493.00	\$ 213,209.00	9/30/2023	11/30/2023
Engineering/Materials for 2024 Project	0		\$ 4,644,702.00		1/30/2023	11/30/2023

Notes: \* Customer count is zero due to GRID Redundancy

\*\* Interconnection point with FP&L

\*\*\* Interconnection point with OUC

**2023 Planned Duke Energy Florida - Tower Replacements**

Location	Unit Count	Customer Count	Project Cost - Capital	Project Cost - O&M	Start Date	Finish Date
WINTER PARK EAST - WINTER SPRINGS 230KV	19	0*	\$ 4,519,528.00	\$ 55,285.00	3/16/2023	9/30/2023
ECON - WINTER PARK EAST 230KV	2	0*	\$ 480,472.00	\$ 5,820.00	3/16/2023	9/30/2023

Notes: \* Customer count is zero due to GRID Redundancy

**2023 Planned Duke Energy Florida - Cathodic Protection**

Location	Unit Count	Customer Count	Project Cost - Capital	Project Cost - O&M	Start Date	Finish Date
SPP - (CFW) Central Florida - Windermere - Cathodic Protection	105	0*	\$ 999,865	22,184	6/30/2023	11/30/2023
CFO - Central Florida - Silver Springs	107	0*	1,022,385	22,684	6/30/2023	11/30/2023
NC - Northeast - Curlew	50	0*	477,750	10,600	6/30/2023	11/30/2023

Notes: \* Customer count is zero due to GRID Redundancy

**2023 Planned Duke Energy Florida - GOAB**

Location	Unit Count	Customer Count	Project Cost - Capital	Project Cost - O&M	Start Date	Finish Date
Crystal River North Tap	1	2485	397,202	1,796	9/1/2023	10/31/2023
Port St. Joe Industrial Tap	1	745	397,202	1,796	9/1/2023	10/31/2023
Ochlockonee Tap	1	2362	565,028	1,796	11/1/2023	1/31/2024
City of Fort Meade Tap	1	1*	\$1,820,284	1,796	11/1/2023	1/31/2024
Taunton Road Tap	1	2,752	\$1,820,284	1,796	11/1/2023	1/31/2024

Notes: \* Interconnection point with municipality (City of Fort Meade)

**2023 Planned Duke Energy Florida - OH Ground Wires**

Location	Unit Count	Customer Count	Project Cost - Capital	Project Cost - O&M	Start Date	Finish Date
Parnell Road Tap to Wauchula City Tap	13	2807	\$ 2,623,925	0	9/30/2023	3/30/2024
Babson Park Tap - Indian Lake Estates Tap	5	3708	\$ 975,215	0	9/30/2023	3/30/2024
SPP Indian Lakes Estates Tapline - Poles & Static	13	1982	\$ 2,535,559	0	9/30/2023	3/30/2024
Crooked Lake - Babson Park Tap	7	1978	\$ 1,365,301	0	9/30/2023	3/30/2024

## 2023 Planned Duke Energy Florida - Ground Patrol Inspections

Amended Exhibit No. \_\_\_\_ (BML-1)

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Location	Unit Count	Customer Count	Start Date	Finish Date
INTERCESSION CITY DE-ENERGIZED 69KV, ICLW-7, 69.0 KV	1	0 <sup>(6)</sup>	3/16/2023	6/30/2023
LAKE MARION - MIDWAY 69KV, LMP-1, 69.0 KV	212	9524	3/16/2023	6/30/2023
CAMP LAKE - FERNDALE SEC 69KV RADIAL, CLFX-1, 69.0 KV	4	3976	3/16/2023	6/30/2023
CAMP LAKE - GROVELAND - CAMP LAKE LOOP 69KV, CLG-1, 69.0 KV	239	5560	3/16/2023	6/30/2023
BARBERVILLE - DELAND WEST 69KV, DWB-1, 69.0 KV	177	4185	3/16/2023	6/30/2023
BAYVIEW - TRI CITY 115KV, HD-2, 115.0 KV	12	4188	3/16/2023	6/30/2023
FISHEATING CREEK - SUN N LAKES 69KV, ALP-SUC-1, 69.0 KV	476	12451	3/16/2023	6/30/2023
CHIEFLAND-GA PACIFIC 69KV, CGP-1/IS-5, 69.0 KV	106	4616	3/16/2023	6/30/2023
CASSADAGA - SMYRNA UTILITIES 115KV, CNS-1, 115.0 KV	92	1 <sup>(2)</sup>	3/16/2023	6/30/2023
COUNTRY OAKS - EAST LAKE WALES 69KV, LEL-1, 69.0 KV	158	3004	3/16/2023	6/30/2023
COUNTRY OAKS - LAKE WALES 69KV, LEL-2, 69.0 KV	65	0 <sup>(1)</sup>	3/16/2023	6/30/2023
NEWBERRY - TRENTON 69KV, NT-1, 69.0 KV	198	1835	3/16/2023	6/30/2023
LAKE ALOMA - WINTER PARK EAST 69KV, WL-1, 69.0 KV	51	3277	3/16/2023	6/30/2023
COLEMAN - SUMTERVILLE 69KV, BCF-4, 69.0 KV	61	8	3/16/2023	6/30/2023
HOMELAND - MULBERRY 69KV, BH-2, 69.0 KV	68	0 <sup>(1)</sup>	3/16/2023	6/30/2023
BAY RIDGE - KELLY PK 69KV, BK-1, 69.0 KV	86	2637	3/16/2023	6/30/2023
LAKE LOUISA SEC - CLERMONT EAST 69KV - HAINES CITY, CEB-3, 69.0 KV	105	12589	3/16/2023	6/30/2023
CRYSTAL RIVER SOUTH 115KV - LECANTO, CSB-1, 115.0 KV	85	3454	3/16/2023	6/30/2023
HOLDER - INVERNESS 69KV, HB-3, 69.0 KV	195	6216	3/16/2023	6/30/2023
ATWATER - US HYDRO WOODRUFF DAM 115KV, QX-2, 115.0 KV	96	4 <sup>(5)</sup>	3/16/2023	6/30/2023
ALTAMONTE - SPRING LAKE 230KV, ASW-1, 230.0 KV	64	0 <sup>(1)</sup>	3/16/2023	6/30/2023
ARCHER - GINNIE 230KV, FO-1, 230.0 KV	181	1 <sup>(3)</sup>	3/16/2023	6/30/2023
LARGO - PALM HARBOR 230KV, LTL-1, 230.0 KV	153	0 <sup>(1)</sup>	3/16/2023	6/30/2023
HOLOPAW - POINSETT (FP&L) 230KV, WLXF-2, 230.0 KV	159	1 <sup>(4)</sup>	3/16/2023	6/30/2023
TRI CITY - ULMERTON 115KV, HD-8, 115.0 KV	12	0 <sup>(1)</sup>	3/16/2023	6/30/2023
SOUTH POLK - SOUTH FT MEADE 115KV RADIAL, AF2-2, 0.0 KV	75	3	3/16/2023	6/30/2023
MARTIN WEST - MARTIN 69KV RADIAL, MM-1, 69.0 KV	28	3506	3/16/2023	6/30/2023
EUSTIS SOUTH - SORRENTO 69KV, SES-1, 69.0 KV	173	4912	3/16/2023	6/30/2023
LAKE LOUISA SEC - CLERMONT EAST 69KV - WILDWOOD, CEB-4, 69.0 KV	3	0	3/16/2023	6/30/2023
BELLEVIEW - MARICAMP 69KV, CFO-SSB-1, 69.0 KV	26	13190	3/16/2023	6/30/2023
BEVERLY HILLS - HOLDER 115KV, HBB-1, 115.0 KV	83	3336	3/16/2023	6/30/2023
HIGGINS PL - SAFETY HARBOR 115KV, HD-7, 115.0 KV	11	0 <sup>(1)</sup>	3/16/2023	6/30/2023
OCCIDENTAL SWIFT CREEK #1 - OCCIDENTAL METERING 115KV, JS-3, 115.0 KV	261	721	3/16/2023	6/30/2023
OCC SWIFT CREEK #1 - OCC SWIFT CREEK #2 115KV, SCSC-1, 115.0 KV	33	1 <sup>(3)</sup>	3/16/2023	6/30/2023
IDYLVILD - PHIFER CEC 69KV RADIAL, IR-1, 69.0 KV	131	1583	3/16/2023	6/30/2023
APALACHICOLA - CARRABELLE 69KV, JA-1, 69.0 KV	249	6477	3/16/2023	6/30/2023
(PX-1) - PORT ST JOE - CALLAWAY (GULF PWR), PX-1, 230.000 KV	148	1 <sup>(4)</sup>	3/16/2023	6/30/2023

		Amended Exhibit No.	____ (BML-1)	
BROOKRIDGE - BROOKSVILLE WEST (BBW CKT) 115KV, BBW-1, 115.0 KV	134	33468	3/16/2023	6/30/2023
BROOKSVILLE WEST - SILVERTHORNE WREC 115KV RADIAL, BWSX-1, 115.0 KV	39	16794	3/16/2023	6/30/2023
FT GREEN SPRINGS - VANDOLAH #2 CKT 69KV, VFGS-1, 69.0 KV	77	3	3/16/2023	6/30/2023
BARCOLA - FT MEADE 69KV, BF-1, 69.0 KV	110	1 <sup>(3)</sup>	3/16/2023	6/30/2023
COUNTRY OAKS - DUNDEE 69KV, DCO-1, 69.0 KV	182	0 <sup>(1)</sup>	3/16/2023	6/30/2023
HANSON - CHERRY LAKE TREC 115KV RADIAL, HC-1, 115.0 KV	36	1628	3/16/2023	6/30/2023
FT MEADE - SAND MOUNTAIN 69KV RADIAL, FSM-1, 69.0 KV	34	185	3/16/2023	6/30/2023
ALAFAYA - UCF 69KV, AUCF-1, 69.0 KV	137	5045	3/16/2023	6/30/2023
HOLDER - INGLIS 69KV, IB-1, 69.0 KV	46	6268	3/16/2023	6/30/2023
NEW RIVER - ZEPHYRHILLS NORTH 115KV, ZNR-1, 115.0 KV	144	5511	3/16/2023	6/30/2023
DUNDEE - LAKE WALES 69KV, ICLW-3, 69.0 KV	148	2069	3/16/2023	6/30/2023
GA PACIFIC - TRENTON 69KV, IS-2, 69.0 KV	74	0 <sup>(6)</sup>	3/16/2023	6/30/2023
CHAMPIONS GATE - DAVENPORT 69KV, ICLW-5, 69.0 KV	73	4709	3/16/2023	6/30/2023
BUSHNELL EAST - SUMTERVILLE 69KV, BCF-5, 69.0 KV	67	0 <sup>(1)</sup>	3/16/2023	6/30/2023
SILVER SPRINGS - SILVER SPRINGS SHORES 69KV, OCF-1, 69.0 KV	201	0 <sup>(1)</sup>	3/16/2023	6/30/2023
BAY RIDGE - SORRENTO 69KV, SB-1, 69.0 KV	93	2645	3/16/2023	6/30/2023
ALTAMONTE - DOUGLAS AVE 69KV, ASL-1, 69.0 KV	77	2455	3/16/2023	6/30/2023
FT WHITE - HIGH SPRINGS 69KV, FH-1, 69.0 KV	232	5327	3/16/2023	6/30/2023
(AO-1) - ALAFAYA - OVIEDO, AO-1, 69.000 KV	58	10294	3/16/2023	6/30/2023
IDYLWILD - UNIVERSITY FLA 69KV, IG-GUF-1, 69.0 KV	51	1 <sup>(2)</sup>	3/16/2023	6/30/2023
CHIEFLAND - INGLIS 69KV, IS-1, 69.0 KV	422	2870	3/16/2023	6/30/2023
LOCKHART - WOODSMERE 230KV, ASW-2, 230.0 KV	44	0 <sup>(1)</sup>	3/16/2023	6/30/2023
JASPER - OCC SWIFT CREEK #1 115KV, JS-1, 115.0 KV	108	1 <sup>(3)</sup>	3/16/2023	6/30/2023
QUINCY - ATTAPULGUS (GA PWR) 69KV, QB-1, 69.0 KV	117	3 <sup>(5)</sup>	3/16/2023	6/30/2023
IDYLWILD - WILLISTON 69KV, SI-3, 69.0 KV	208	3075	3/16/2023	6/30/2023
REEDY LAKE - DISNEY WORLD NORTHWEST 69KV, CET-3, 69.0 KV	54	2340	3/16/2023	6/30/2023
MONTICELLO - BOSTON (GA PWR) 69KV, DB-2, 69.0 KV	101	2 <sup>(5)</sup>	3/16/2023	6/30/2023
INGLIS CKT#2 - POWER CKT#2, IT-CKT2, 115.000 KV	2	0 <sup>(1)</sup>	3/16/2023	6/30/2023
40TH ST - 51ST ST 115KV, FSF-FSP-1, 69.0 KV	6	0 <sup>(1)</sup>	3/16/2023	6/30/2023
CYPRESSWOOD - HAINES CITY 69KV, ICLW-2, 69.0 KV	155	4005	3/16/2023	6/30/2023
INTERCESSION CITY PL - CABBAGE ISLAND 69KV, ICP-1, 69.0 KV	91	0 <sup>(1)</sup>	3/16/2023	6/30/2023
CRAWFORDVILLE - PORT ST JOE 230KV, CPS-1, 230.0 KV	743	0 <sup>(1)</sup>	3/16/2023	6/30/2023
MIDWAY - POINCIANA 69KV, LMP-2, 69.0 KV	49	0 <sup>(1)</sup>	3/16/2023	6/30/2023
LIBERTY - HOSFORD TEC 69KV RADIAL, JH-3, 69.0 KV	21	3013	3/16/2023	6/30/2023
BAYBORO - CENTRAL PLAZA 115KV, BCP-1, 115.0 KV	69	0 <sup>(1)</sup>	3/16/2023	6/30/2023
CITRUS HILLS - INVERNESS 115KV, BI-1, 115.0 KV	50	2189	3/16/2023	6/30/2023
BROOKRIDGE - TWIN COUNTY RANCH 115KV - CLEARWATER, CRB-1, 115.0 KV	124	3048	3/16/2023	6/30/2023
HAVANA - QUINCY 69KV, TQ-1, 69.0 KV	5	1505	3/16/2023	6/30/2023
HAVANA - TALLAHASSEE 69KV, TQ-HH-1, 69.0 KV	194	10197	3/16/2023	6/30/2023
DOUGLAS AVE - SPRING LAKE 69KV, ASL-2, 69.0 KV	62	2345	3/16/2023	6/30/2023
BOGGY MARSH - LAKE LOUISA SEC 69KV, CEB-2, 69.0 KV	217	909	3/16/2023	6/30/2023
CENTRAL FLA - LAKE ELLA (SEC) 69KV, CFO-3, 69.0 KV	11	0 <sup>(1)</sup>	3/16/2023	6/30/2023
DALLAS - SILVER SPRINGS SHORES 69KV, DW-OCF-1, 69.0 KV	270	12271	3/16/2023	6/30/2023
NORTH BARTOW - ORANGE SWITCHING STA 69KV, FMB-3, 69.0 KV	65	0 <sup>(1)</sup>	3/16/2023	6/30/2023
ATWATER - QUINCY 115KV, QX-1, 115.0 KV	173	0 <sup>(1)</sup>	3/16/2023	6/30/2023
TURNER PL - DELTONA EAST 115KV, TDE-1, 115.0 KV	83	0 <sup>(1)</sup>	3/16/2023	6/30/2023
LAKE WEIR - CENTRAL TOWER CEC 69KV RADIAL, LC-1, 69.0 KV	190	5576	3/16/2023	6/30/2023
HUDSON - LAKE TARPON 230KV, CC-5, 230.0 KV	99	0 <sup>(1)</sup>	3/16/2023	6/30/2023
BRONSON - NEWBERRY 230KV, CF-2, 230.0 KV	165	0 <sup>(1)</sup>	3/16/2023	6/30/2023
FT WHITE - NEWBERRY 230KV, CF-3, 230.0 KV	300	0 <sup>(1)</sup>	3/16/2023	6/30/2023
AVALON - CAMP LAKE 230KV - WILDWOOD, CFW-3, 230.0 KV	3	0 <sup>(1)</sup>	3/16/2023	6/30/2023
LOCKHART - SPRING LAKE 230KV, ASW-3, 230.0 KV	51	0 <sup>(1)</sup>	3/16/2023	6/30/2023
BEVERLY HILLS - LECANTO 115KV, CSB-2, 0.0 KV	125	3708	3/16/2023	6/30/2023
FLORIDA GAS TRANSMISSION - ST MARKS EAST 230KV, CP-3, 230.0 KV	489	0 <sup>(1)</sup>	3/16/2023	6/30/2023

Location	Unit Count	Customer Count	Project Cost - Capital	Project Cost - O&M	Start Date	Finish Date
BUSHNELL EAST - CENTER HILL RADIAL 69KV, BW-1, 69.0 KV	73		4154	3/16/2023	6/30/2023	Page 46 of 86
LAKE WALES - WEST LAKE WALES CKT#2 69KV, WLL-1, 69.0 KV	105		0 <sup>(1)</sup>	3/16/2023	6/30/2023	
ALDERMAN - CURLEW 115KV, HTW-1, 115.0 KV	8		6975	3/16/2023	6/30/2023	
CYPRESSWOOD - DUNDEE 69KV, ICLW-1, 69.0 KV	35		2371	3/16/2023	6/30/2023	
DEBARY PL - ORANGE CITY 230KV, DDW-1, 230.0 KV	95		0 <sup>(1)</sup>	3/16/2023	6/30/2023	
DELAND WEST - SILVER SPRINGS 230KV, SDW-1, 230.0 KV	622		0 <sup>(1)</sup>	3/16/2023	6/30/2023	
FT GREEN #6 69KV TAP, VFGS-1-TL3, 69.0 KV	66		1 <sup>(3)</sup>	3/16/2023	6/30/2023	
MT DORA EAST SEC 69KV TAP DE-ENERGIZED, SES-1-TL1-DE, 69.0 KV	10		0 <sup>(6)</sup>	3/16/2023	6/30/2023	
LADY LAKE 69KV TAP, DLL-OCF-1-TL1, 69.0 KV	3		4542	3/16/2023	6/30/2023	
BOWLING GREEN PREC 69KV TAP, FFG-1-TL1, 69.0 KV	1		2828	3/16/2023	6/30/2023	
ALAFAYA - OVIEDO (AO-1A) - LOCKWOOD TAP, AO-1A, 69.000 KV	48		6028	3/16/2023	6/30/2023	
BLICHTON SEC 69KV TAP, MS-1-TL1, 69.0 KV	136		2426	3/16/2023	6/30/2023	
CONTINENTAL SEC 69KV TAP, BCF-2-TL1, 69.0 KV	2		16041	3/16/2023	6/30/2023	
OAK CITY (CITY OF TALLAHASSEE) 69KV TAP, TQ-HH-1-TL3, 69.0 KV	6		1 <sup>(2)</sup>	3/16/2023	6/30/2023	
LITTLE PAYNE CREEK #2 69KV TAP, FFG-1-TL8, 69.0 KV	3		1 <sup>(3)</sup>	3/16/2023	6/30/2023	
TOWN OF HAVANA SUTTERS CREEK 69KV TAP, TQ-HH-1-TL4, 69.0 KV	11		1 <sup>(2)</sup>	3/16/2023	6/30/2023	
LYNNE CEC 69KV TAP, LC-1-TL1, 69.0 KV	71		5576	3/16/2023	6/30/2023	
DIXIE SEC 69KV TAP, BCF-BW-2-TL2, 69.0 KV	2		1 <sup>(2)</sup>	3/16/2023	6/30/2023	
PEMBROKE 69KV TAP, FMB-1-TL3, 69.0 KV	7		19	3/16/2023	6/30/2023	
GOSPEL ISLAND SEC 69KV TAP, HB-3-TL1, 69.0 KV	38		6268	3/16/2023	6/30/2023	
MT DORA EAST SEC 69KV TAP, SES-1-TL1, 69.0 KV	39		4884	3/16/2023	6/30/2023	
DACO 69KV TAP, FFG-1-TL10, 69.0 KV	2		1 <sup>(3)</sup>	3/16/2023	6/30/2023	
NORALYN #1 69KV TAP, BH-2-TL1, 69.0 KV	2		1 <sup>(3)</sup>	3/16/2023	6/30/2023	
SUMTERVILLE SEC 69KV TAP, BCF-BW-2-TL3, 69.0 KV	1		674	3/16/2023	6/30/2023	

Notes: \* The total inspection cost for 2023 is \$500k O&M

1 – Zero customers due to redundancy

2 - Interconnection point with municipality

3 - Interconnection point with industrial customer

4 - Interconnection point with other utilities

5 - Interconnection point with utility and municipalities

6 – De-energized line

### 2023 Planned Duke Energy Florida - Drone Inspections

Location	Unit Count	Customer Count	Project Cost - Capital	Project Cost - O&M	Start Date	Finish Date
(CCF) Crystal River - Central Florida 230kV	211	0*	\$0.00	\$ 48,319.00	3/16/2023	9/30/2023
(NC) Northeast - Curlew 230kV	87	0*	\$0.00	\$ 19,923.00	3/16/2023	9/30/2023
(UL) Ulmerton - Largo 230kV	26	0*	\$0.00	\$ 5,954.00	3/16/2023	9/30/2023
(CFW) Central Florida - Windermere 230kV	135	0*	\$0.00	\$ 30,804.00	3/16/2023	9/30/2023

Notes: \* Customer count is zero due to GRID Redundancy

# Substation Flood Mitigation

## Vision

Substation Flood Mitigation is a targeted program upgrading 10 sites identified as being at risk for significant flooding during extreme weather events.

## Description

The Substation Flood Mitigation program builds in protection for substations most vulnerable to flood damage using flood plain and storm surge data. It includes a systematic review and prioritization of substations at risk of flooding to determine the proper mitigation solution, which may include elevating or modifying equipment, or relocating substations altogether.

Flood mitigation will be a targeted application of mitigation measures for substations. New assets could include control houses, relays, or total station rebuilds to increase elevation, etc.

## Cost

It is expected that the 10-year cost will be approximately \$38M Capital. This would cover approximately 8 substations on the DEF system.

Substation Flood Mitigation	DEF		
	2023	2024	2025
Totals	\$ 3,800,000	\$ 3,800,000	\$ 3,800,000
Capital	\$ 3,800,000	\$ 3,800,000	\$ 3,800,000
O&M	\$ -	\$ -	\$ -
Total Units	2	2	2

## Cost Benefit Comparison

The Substation Flood Mitigation Program is scheduled to start in 2023 and estimated to take 15 years to complete. Based on today's costs, the Program will cost an estimated \$38M in Capital. At the completion of the Program 10 targeted substations will be hardened with flood mitigation strategies.

When the Substation Flood Mitigation Program is complete, DEF estimates it will reduce the cost of extreme weather events on the Transmission system by approximately \$0.6M to \$0.7M annually based on today's costs.

When the Substation Flood Mitigation Program is complete, DEF estimates it will reduce Transmission MED CMI by approximately 6 million to 8 million minutes annually. CMI reduction is used as a proxy for reduction in extreme weather event duration for the average customer.

Transmission system damage can result in severe consequences in both cost and outage duration. The estimation of benefits represents an annual average expected value based on historical data and do not represent what could happen in individual events or scenarios in which severe damage occurs on critical parts of the Transmission system.

## Prioritization Methodology

Work will be prioritized using the following processes:

1. **Probability of Damage:** To prioritize the work in the Florida regions, the Transmission and Distribution systems were modeled, and weather simulations were run to provide probabilistic exposure frequency for all asset locations. The weather modeling uses the FEMA Hazus and SLOSH models, which contain the weather data for storms over the last 200 years. Using the geographical locations of the Florida assets and the historic storm paths embedded in the Hazus model, a spatial correlation of future storm exposure can be derived. To determine probability of damage given that exposure, eight years of historical outage data was provided and correlated with the closest weather tower to determine the conditions during historic failures recorded in the outage data. Then, the expected quantities of asset failure for simulated future weather exposure conditions was derived by combining simulated weather patterns with historical asset failure through conditional probability methods.
2. **Consequence of Damage:** Once the output of probabilistic damage is assessed, the probable impact to customers is considered. This step considers number of customers served by a given asset (e.g. each pole, or segment of conductor on a line), observed outage durations, the mix of customers, and critical facilities. This step is performed both for the existing configuration of each asset, and the hardened configuration resulting from completion of the program. The difference between the existing condition and the hardened configuration is the program impact.
3. Transmission subject matter experts then use these outputs to determine the optimum deployment plan considering factors such as current projects in the area, critical customers, operational knowledge, and resource availability.

## Year 1 Project List

2023 Planned Duke Energy Florida - Substation Flood Mitigation						
Location	Unit Count	Customer Count	Project Cost - Capital	Project Cost - O&M	Start Date	Finish Date
Cross Bayou	1	15521	\$ 1,900,000	0	11/1/2023	6/30/2024
Ulmerton West	1	12459	\$ 1,900,000	0	11/1/2023	6/30/2024

# Loop Radially-Fed Substations *(Modified by the FPSC)*



# Substation Hardening

## Vision

The Substation Hardening Program started as part of DEF's Grid Investment Plan which was partially funded through the 2017 Revised and Restated Settlement Agreement and continued through SPP 2020. DEF is continuing this Program through SPP 2023. The Substation Hardening Program will focus on upgrading oil breakers and electromechanical relays. The Program will eliminate 317 oil breakers within 15 years. Within 20 years, this Program will also upgrade approximately 300 electromechanical relay groups to electronic relays to properly isolate line faults and reduce storm restoration duration by automating fault identification.

## Description

Substation Hardening will address two major components: 1) Upgrading oil breakers to state-of-the-art gas or vacuum breakers to mitigate the risk of catastrophic failure and extended outages during extreme weather events; and 2) Upgrading electromechanical relays to digital relays will provide communications and enable DEF to respond and restore service more quickly from extreme weather events.

### Breaker Upgrades

Replacing oil circuit breakers with state-of-the-art breakers will result in the transmission system being able to more effectively and consistently isolate faults, reclose after momentary interruptions, and improve the customer experience through fewer interruptions. Oil circuit breakers are more unreliable than gas or vacuum breakers, especially in circumstances where they are operating numerous times over a short period, such as during extreme weather events. When oil circuit breakers are repeatedly called to operate, they can generate arcing gasses within the oil tank that can accumulate and result in catastrophic failure. Existing vintage oil breakers are less reliable when isolating line faults and can contribute to increased and longer customer outages when there is a failure.

### Electronic Relays

The Electronic Relay upgrades eliminate noncommunicating electromechanical and solid-state relays with digital relays. Upgrading to modern relay designs with communication capabilities and microprocessor technologies will enable quicker restoration from outage events. Another benefit is increased overall system intelligence, which will improve restoration planning. One digital relay replaces a variety of legacy single-function electromechanical relays. Two-way communications and event recording capabilities allow them to provide device performance information following a system event to support continuous system design and operational improvements.

Grid automation will be implemented to reduce duration and impacts from system issues. Digital relays will be installed to add remote monitoring and operations to key assets, which allows for rapid service response and better protection and monitoring of equipment during extreme weather events. Restoration times will be reduced due to remote monitoring and control which will allow quicker pinpointing and resolution of issues.

## Cost

The estimated 10-year cost for Substation Hardening Program is expected to be approximately \$133M.

This would upgrade approximately 80 oil filled breakers and approximately 140 relay groups on the DEF system.

Substation Hardening	DEF		
	2023	2024	2025
Totals	\$ 9,500,000	\$ 11,500,000	\$ 14,000,000
Capital	\$ 9,500,000	\$ 11,500,000	\$ 14,000,000
O&M	\$ -	\$ -	\$ -
Total Units	16	18	21

## Cost Benefit Comparison

The Substation Hardening Program is estimated to take 20 years to complete. Based on today's costs, the Program will cost an estimated \$199M in Capital.

When the Substation Hardening Program is complete, DEF estimates it will reduce the cost of extreme weather events on the Transmission system by approximately \$90,000 to \$120,000 annually based on today's costs.

When the Substation Hardening Program is complete, DEF estimates it will reduce Transmission MED CMI by approximately 6 million to 8 million minutes annually. CMI reduction is used as a proxy for reduction in extreme weather event duration for the average customer.

Transmission system damage can result in severe consequences in both cost and outage duration. The estimation of benefits represents an annual average expected value based on historical data and do not represent what could happen in individual events or scenarios in which severe damage occurs on critical parts of the Transmission system.

## Prioritization Methodology

Work will be prioritized using the following processes:

1. **Probability of Damage:** To prioritize the work in the Florida regions, the Transmission and Distribution systems were modeled, and weather simulations were run to provide probabilistic exposure frequency for all asset locations. The weather modeling uses the FEMA Hazus and SLOSH models, which contain the weather data for storms over the last 200 years. Using the geographical locations of the Florida assets and the historic storm paths embedded in the Hazus model, a spatial correlation of future storm exposure can be derived. To determine probability of damage given that exposure, eight years of historical outage data was provided and correlated with the closest weather tower to determine the conditions during historic failures recorded in the outage data. Then, the expected quantities of asset failure for simulated future weather exposure conditions was derived by combining simulated weather patterns with historical asset failure through conditional probability methods.
2. **Consequence of Damage:** Once the output of probabilistic damage is assessed, the probable impact to customers is considered. This step considers number of customers served by a given asset (e.g. each pole, or segment of conductor on a line), observed

outage durations, the mix of customers, and critical facilities. This step is performed both for the existing configuration of each asset, and the hardened configuration at project completion. The difference between the existing condition and the hardened configuration is the program impact.

3. Transmission subject matter experts then use these outputs to determine the optimum deployment plan considering factors such as current projects in the area, critical customers, operational knowledge, and resource availability.

## Year 1 Project List

2023 Planned Duke Energy Florida - Substation Hardening						
Location	Unit Count	Customer Count	Project Cost - Capital	Project Cost - O&M	Start Date	Finish Date
Belleview	1	1753	\$ 315,151	\$0.00	3/1/2023	4/30/2023
Bithlo	1	2144	\$ 315,151	\$0.00	3/1/2023	4/30/2023
Econ	1	1455	\$ 315,151	\$0.00	3/1/2023	4/30/2023
Bay Hill	4	5002	\$ 1,363,965	\$0.00	12/1/2023	6/30/2024
Starkey Road	4	13780	\$ 2,727,929	\$0.00	12/1/2023	5/31/2024
Monticello	1	886	\$ 710,701	\$0.00	12/1/2023	5/31/2024
Elfers	4	9397	\$ 2,966,609	\$0.00	9/1/2023	3/31/2024
Engineering/Materials for 2024 Projects	0	5573	\$ 785,343	\$0.00	12/1/2023	4/30/2024

# Transmission Vegetation Management

## Vision

DEF will continue to utilize Integrated Vegetation Management (IVM) to minimize the impact of vegetation on the transmission assets.

## Description

DEF's Transmission IVM program is focused on ensuring the safe and reliable operation of the transmission system by minimizing vegetation-related interruptions and adequate conductor-to-vegetation clearances, while maintaining compliance with regulatory, environmental, and safety requirements or standards. The program activities focus on the removal and/or control of incompatible vegetation within and along the right of way to minimize the risk of vegetation-related outages and ensure necessary access within all transmission line corridors. The IVM program includes the following activities: planned threat and condition-based work, reactive work that includes hazard tree mitigation, and floor management (herbicide, mowing, and hand cutting operation).

## Cost

It is expected that the 10-year cost will be approximately \$126M Capital and \$127M O&M. This would cover the inspection and vegetation remediation activities. The estimated contractor ratio is 93%. The estimated utility personnel ratio is 7%.

2023-2025 Labor / Equipment Breakout		
	Labor	Equipment
<b>Utility Personnel Totals</b>	<b>\$ 4,980,707</b>	<b>\$ 199,050</b>
Capital	\$ 2,988,424	\$ 102,213
O&M	\$ 1,992,283	\$ 96,836
<b>Contract Personnel Totals</b>	<b>\$ 44,006,170</b>	<b>\$ 20,708,785</b>
Capital	\$ 20,546,379	\$ 9,668,884
O&M	\$ 23,459,791	\$ 11,039,901

VM - Transmission	DEF		
	2023	2024	2025
<b>Totals</b>	<b>\$ 21,840,896</b>	<b>\$ 24,894,658</b>	<b>\$ 23,159,158</b>
Capital	\$ 10,312,889	\$ 12,052,127	\$ 10,940,884
O&M	\$ 11,528,007	\$ 12,842,530	\$ 12,218,273
Approximate Miles	550	550	550

## Cost Benefit Comparison

The IVM program's planned threat and condition-based work includes danger tree identification and mitigation, reactive work that includes hazard tree mitigation, and floor management (herbicide, mowing, and hand cutting operation) to reduce event possibilities during extreme weather events and enhance overall system reliability.

## Prioritization Methodology

Planned work for DEF is conditioned based and is prioritized and scheduled using threats and conditions identified through patrols, inspections and assessments while considering factors like the date of previous work activities and outage history. Set trigger distances identify incompatible vegetation within and outside the Transmission Right of Way that does not allow for safe or reliable operations of the transmission facilities under all operating conditions. These distances allow for approximately 6 years of typical vegetation re-growth and support minimum safe worker distances. As systems and technologies can be developed and implemented, DEF intends to leverage those technologies/systems and analytics to evaluate numerous variables coupled with local knowledge to optimize the risk-based planning and scheduling of work.

# Revenue Requirements and Rate Impacts

**Rule 25-6.030(3)(g):** An estimate of the annual jurisdictional revenue requirements for each year of the Storm Protection Plan.

Estimated Annual Jurisdictional Revenue Requirements for Each Year of the Storm Protection Plan										
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
(\$ Millions)	\$ 149.4	\$ 221.3	\$ 296.4	\$ 380.3	\$ 455.7	\$ 530.4	\$ 601.4	\$ 672.5	\$ 739.9	\$ 806.7

**Rule 25-6.030(3)(h):** An estimate of rate impacts for each of the first three years of the Storm Protection Plan for the utility's typical residential, commercial, and industrial customers.

Estimated SPP Rate Impacts			
Residential \$/1,000 kWh	2023	2024	2025
(1) Estimated SPP Rate Impact	\$4.21	\$6.52	\$8.73
(2) Typical Commercial % Increase from prior year Bill	1.0%-1.2%	1.4%-1.6%	1.3%-1.5%
(3) Typical Industrial % Increase from prior year Bill	0.8%-1.2%	1.2%-1.7%	1.1%-1.6%

- (1) Estimates the first three years of the SPP Residential Rate factor.
- (2) Commercial & Industrial % increase incorporates base rate increases set forth in DEF's 2021 Settlement, approved in Order No. PSC-2021-0202A-AS-EI.