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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Staff's Second Data Request on OUC's Review of Electric Utility Hurricane Preparedness and Restoration Actions

Docket No. 20170215-EU

Filed: January 18, 2018

ORLANDO UTILITIES COMMISSION RESPONSES TO STAFF'S SECOND DATA REQUEST

The Orlando Utilities Commission (OUC), by and through its undersigned counsel, provides the following responses to Staff's Second Data Request.

Staff Question 1.

For each year, please complete the following tables summarizing the number of miles of transmission and distribution underground facilities by county from 2006 through 2017.

Transmission			
Year			
County	**Overhead to Underground**	**New Construction**	**Total Miles**

Distribution			
Year			
County	**Overhead to Underground**	**New Construction**	**Total Miles**

OUC Response to Questions 1:

Electrical system physical statistics for the period 2007-2017 are shown on pages 34-35 of the 2017 OUC Financial and Statistical Report included as Attachment 1 hereto. The Orlando Utilities Commission has distribution facilities in Orange and Osceola Counties. In addition, the Orlando Utilities Commission has transmission facilities in Orange, Osceola, Brevard and Polk Counties. OUC is very proud of its focus and commitment on expanding the amount and overall percentage of underground facilities on its system.

For the period 2007-2017, the Orlando distribution system expanded from 59.1% to 64.1% underground. This was accomplished with a near net zero increase in overhead circuit miles (738.3 miles in 2007 vs. 738.7 miles in 2017) and a net increase of 251 underground circuit miles (1065.9 miles in 2007 vs. 1316.9 miles in 2017).

During the same period, the percentage of the St. Cloud system that was underground expanded from 37.5% to 46%. The overhead system expanded by 23.8 miles (236.5 miles in 2007 vs. 260.3 miles in 2017) and the underground system expanded by 79.3 miles (142 miles in 2007 vs. 221.3 miles in 2017).

For both systems, the increase in the percentage of underground facilities was due primarily to new construction. There has been a small amount of conversion of existing overhead facilities to underground. However, the very high cost to implement such projects has limited those efforts.

<u>Staff Question 2.</u>

For Hurricanes Hermine, Matthew, Irma, Maria, and Nate, please provide a complete copy of the utility's post-storm forensic review of damaged infrastructure. If a forensic review was not performed or not documented, please explain why.

<u>OUC Response to Questions 2:</u>

<u>Hurricane Hermine</u>

No significant damage to any facilities.

<u>Hurricane Matthew</u>

Transmission System – No significant damage.

Substations – No significant damage.

Distribution System – No formal forensic analysis report was prepared. Physical damages to the system were minimal. Internal review of the storm damages found that they were primarily caused by falling trees and medium to large sized branches.

<u>Hurricane Irma</u>

Transmission System – No significant damage.

Substations – No significant damage.

Distribution System – The following is a summary of major distribution items replaced due to storm damage:

Wood Poles: 117
Concrete Poles: 7
Primary Wire: 67,242 feet
Secondary Cable: 28,696 feet
Overhead transformers: 57
Pad-mounted transformers: 16

Analysis: No formal forensic analysis report was prepared. Internal review resulted in the following findings. Almost all damage to overhead facilities resulted from trees and medium to large size branches falling into and tearing down distribution facilities. The damage to pad-mounted transformers primarily resulted from: 1) falling trees; or 2) displacement due to up-rooting of trees; or 3) water intrusion. There were no damages reported that were caused by flooding.

<u>Hurricane Maria</u>

No significant damage to any facilities.

<u>Hurricane Nate</u>

No significant damage to any facilities.

<u>Staff Question 3.</u>

For Hurricanes Hermine, Matthew, Irma, and Nate, please provide the name, frequency, and description of non- Emergency Operations Centers related coordination efforts with local governments before, during, and after restoration, including the following.

- **a. Storm preparation**
- **b. Critical infrastructure**
- **c. Tree trimming, planting or relocation of trees**
- **d. Hardening and underground projects**
- **e. Shared facilities**
- **f. Other**

<u>OUC Response to Questions 3:</u>

OUC houses its IT backup center at the City of Orlando emergency operations center. Other than that, OUC does not have any non-emergency coordination efforts with other local government entities other than occasionally participating in joint disaster preparedness drills.

<u>Staff Question 4.</u>

Please complete the following tables on county and state Emergency Operations Centers staffing for Hurricanes Hermine, Matthew, Irma, Maria, and Nate.

Staffing for County Emergency Operations Centers		
Number of Utility Personnel	**Function**	**Total Man-Hours**

Staffing for State Emergency Operations Center		
Number of Utility Personnel	**Function**	**Total Man-Hours**

OUC Response to Questions 4:

Hurricane Hermine

No staffing was required for Hurricane Hermine.

Hurricane Matthew

Staffing for County Emergency Operations Centers		
Number of Utility Personnel	Function	Total Man-Hours
4	Emergency Operations Support	161

Staffing for State Emergency Operations Center		
Number of Utility Personnel	Function	Total Man-Hours
1	Director of State Legislative Affairs	36

Hurricane Irma

Staffing for County Emergency Operations Centers		
Number of Utility Personnel	Function	Total Man-Hours
21	Emergency Operations Support	737

Staffing for State Emergency Operations Center		
Number of Utility Personnel	Function	Total Man-Hours
1	Director of State Legislative Affairs	40

Hurricane Maria

No staffing was required for Hurricane Maria.

Hurricane Nate

No staffing was required for Hurricane Nate.

Staff Question 5.

Please provide the following information for utility interconnections with customer-owned solar generation that did not operate as designed and consistent with the tariff during the extreme weather events that occurred in 2015 through 2017.

a. **The number of failures.**
b. **A description of the cause or causes of such failures.**
c. **Possible failure remediation and associated cost.**
d. **Discuss whether the failures contributed to an increase or decrease in the utility's service restoration time and, if possible, provide an estimate of the duration impact.**
e. **Discuss whether the failures contributed to an increase or decrease in the utility's service restoration costs and, if possible, provide an estimate of the restoration cost impact.**

OUC Response to Questions 5:

None

Staff Question 6.

Please provide the following information for utility interconnections with customer-owned solar generation that operated as designed and consistent with the tariff during the extreme weather events that occurred in 2015 through 2017.

a. **Discuss whether these interconnections contributed to an increase or decrease in the utility's service restoration time and, if possible, provide an estimate of the duration impact.**
b. **Discuss whether these interconnections increased or decreased the utility's service restoration costs and, if possible, provide an estimate of the restoration cost impact.**

OUC Response to Questions 6:

None

Staff Question 7.

Without compromising safety, are there changes to the utilities interconnection with customer-owned solar generation that would enable the customer's facilities to be energized by its solar generation should the utility be unable to provide electric service due to a future storm damaging utility infrastructure?

a. **If yes, please provide the following information:**
- **Please describe the suggested changes to the utility's interconnection.**
- **If the utility is not pursuing the interconnection changes please explain why.**

OUC Response to Questions 7:

Any energy on the grid during an outage event can endanger the lives of Line Crews.
Just as with whole home electric generators, current solar inverter requirements (IEEE 1547) require inverters to power down without grid synchronization. During an outage, the customer

must power down their solar system and keep the OUC distribution and transmission systems safe for repairs. Just as with whole home generators, there is currently both demand-side technology and supply-side technology that would allow customer solar arrays to be isolated from the distribution and transmission system during power up and this technology would allow operation of customer solar installations even if the electric grid is down.

In the case of the solar arrays, the inverters would need a source of energy to allow the system to power up and the use of an ATS (referred to as ATS (Automatic Transfer Switch) would ensure their energized systems do not feed back into the grid during an outage repair. These systems would provide the grid sync required by the solar inverter to energize and start producing power while disconnected from the utility system.

OUC is not currently pursuing the supply-side isolation technology because it is only a benefit to the individual customer that installs a solar array or whole home generator and in OUC's opinion that is a cost that should be borne by each customer individually. OUC believes that it is the customer's responsibility to invest in an ATS if needed.

Staff Question 8.

Without compromising safety, please describe potential changes to a customer's facilities that the customer can implement to enable the customer's facilities to be energized by its solar generation should the utility be unable to provide electric service due to a future storm event that damages utility infrastructure. Include in your response whether the utility makes it a practice to inform the customer of such options.

OUC Response to Questions 8:

For customers to energize a solar array or battery system during a grid outage without damaging the utility facilities or endangering line crews, they would need to isolate those systems from the electric distribution and transmission systems in order to allow those systems to power up their inverters without feeding energy back into the grid during an outage repair.

Some battery backup systems can be installed between electric service point and the solar array and can act as a standalone power system provided an ATS is installed to automatically isolate the array from the de-energized transmission and distribution system. By installing solar on the load side of the battery, the system would isolate itself in the case of an outage. This would require a significant system to cover the entire building or a smaller subset of the house to be wired for this purpose. OUC does not currently promote this solution as the cost makes it impractical for the typical customer.

Staff Question 9.

Without compromising safety, please describe any potential changes to rules or tariffs pertaining to utility interconnections with customer-owned solar generation that would

enable the customer's facilities to be energized by its solar generation should the utility be unable to provide electric service due to a future storm event that damages utility infrastructure.

OUC Response to Questions 9:

OUC is not pursuing any such changes at this time.

Staff Question 10.

Please provide the following information for utility interconnections with utility-scale solar generation that did not operate as designed during the extreme weather events that occurred in 2015 through 2017.

a. **The number of failures.**
b. **A description of the cause or causes of such failures.**
c. **Possible failure remediation and associated cost.**
d. **Discuss whether the failures contributed to an increase or decrease in the utility's service restoration time and, if possible, provide an estimate of the duration impact.**
e. **Discuss whether the failures contributed to an increase or decrease in the utility's service restoration costs and, if possible, provide an estimate of the restoration cost impact.**

OUC Response to Questions 10:

N/A. It is the practice of OUC to require any utility scale assets at OUC sites to be shut down during storm events for safety and damage mitigation. There are no third party utility scale systems currently in OUC's service territory.

Staff Question 11.

Please provide the following information for utility interconnections with utility-scale solar generation that operated as designed during the extreme weather events that occurred in 2015 through 2017.

a. **Discuss whether these interconnections contributed to an increase or decrease in the utility's service restoration time and, if possible, provide an estimate of the duration impact.**
b. **Discuss whether these interconnections increased or decreased the utility's service restoration costs and, if possible, provide an estimate of the restoration cost impact.**

OUC Response to Questions 11:

See OUC Response to Question 6.

Respectfully submitted,

W. CHRISTOPHER BROWDER
Office of General Counsel
Orlando Utilities Commission
100 W. Anderson Street
Orlando, Florida 32802
(407)236-9698

ATTACHMENT 1

PAGES 34-35 OF THE 2017 OUC FINANCIAL AND STATISTICAL REPORT

ELECTRIC DISTRIBUTION RELIABILITY DATA

Years Ended September 30	2017	2016	2015	2014
Orlando/Orange County				
Average service availability index (ASAI)	0.9999	0.9999	0.9999	0.9999
Average customer outage in minutes (SAIDI) (1)	45.60	52.60	29.90	50.30
Average customer interruption duration index in minutes (CAIDI) (1)	70.80	79.70	58.40	66.40
Average length of service interruption in minutes (L-Bar) (1)	77.40	98.80	74.60	89.30
St. Cloud/Osceola County				
Average service availability index (ASAI)	0.9999	0.9999	0.9999	0.9999
Average customer outage in minutes (SAIDI) (2)	45.10	30.80	40.60	66.00
Average customer interruption duration index in minutes (CAIDI) (2)	58.40	64.20	66.90	59.70
Average length of service interruption in minutes (L-Bar) (2)	80.00	91.60	83.70	99.20

ELECTRIC PHYSICAL STATISTICS

	2017	2016	2015	2014
Transmission system (circuit miles)				
69KV	36.6	36.5	36.5	36.5
115KV	129.3	126.9	126.9	125.9
230KV	227.4	227.4	227.4	227.2
Total transmission circuit miles	393.3	390.8	390.8	389.6
Number of substations				
OUC substations	31	31	31	31
STC substations	4	4	4	4
Total Substations	35	35	35	35
Orlando distribution system (circuit miles)				
Overhead	738.7	739.6	737.8	741.5
Underground	1,316.9	1,292.2	1,270.0	1,248.9
Total Orlando circuit miles	2,055.6	2,031.8	2,007.8	1,990.4
St. Cloud distribution system (circuit miles)				
Overhead	260.3	260.9	247.4	250.7
Underground	221.3	210.3	188.5	183.5
Total St. Cloud circuit miles	481.6	471.2	435.9	434.2
Total OUC & St. Cloud circuit miles	2,537.2	2,503.0	2,443.7	2,424.6
Distribution expenses per circuit mile (3)	$ 9,415	$ 7,868	$ 8,063	$ 7,516
Percentages of Orlando distribution system (circuit miles)				
Overhead	35.9%	36.4%	36.8%	37.3%
Underground	64.1%	63.6%	63.2%	62.7%
Percentages of St. Cloud distribution system (circuit miles)				
Overhead	54.0%	55.4%	56.8%	57.7%
Underground	46.0%	44.6%	43.2%	42.3%

(1) One time non-excludable weather events impacted 2016 and 2014.

(2) The L-Bar and SAIDI statistics are highly variable due to the small volume of events in the area. The St. Cloud/Osceola system was not significantly impacted by some of the summer storm activity seen in Orlando. During 2014, St. Cloud/Osceola County experienced an active summer storm season.

(3) In 2017, Distribution expenses increased primarily due to increased staffing levels to support maintenance projects, including the I-4 Ultimate project.

	2013	2012	2011	2010	2009	2008	2007
	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
	40.70	31.70	41.20	28.70	33.40	33.20	44.13
	54.50	50.30	57.70	52.90	52.70	43.50	52.03
	78.50	74.20	68.30	70.20	69.30	67.70	70.79
	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9998
	28.10	80.50	42.80	61.80	55.00	38.20	56.97
	53.10	64.20	45.80	34.90	42.20	40.50	39.16
	86.80	81.00	63.90	62.50	63.40	65.30	67.23
	36.5	36.5	36.5	36.5	36.5	36.5	36.5
	125.9	125.9	130.7	130.7	130.7	129.1	129.1
	227.2	227.2	227.2	227.2	227.2	227.2	226.5
	389.6	389.6	394.4	394.4	394.4	392.8	392.1
	31	31	32	32	32	30	30
	4	4	4	4	4	4	4
	35	35	36	36	36	34	34
	738.6	749.3	746.0	746.8	738.8	747.9	738.3
	1,214.6	1,202.2	1,181.4	1,158.7	1,145.2	1,104.6	1,065.9
	1,953.2	1,951.5	1,927.4	1,905.5	1,884.0	1,852.5	1,804.2
	248.2	250.7	244.2	242.6	241.8	240.2	236.5
	177.1	167.0	158.3	154.7	153.9	150.8	142.0
	425.3	417.7	402.5	397.3	395.7	391.0	378.5
	2,378.5	2,369.2	2,329.9	2,302.8	2,279,7	2,243.5	2,182.7
	$ 6,167	$ 6,347	$ 6,318	$ 7,344	$ 7,316	$ 6,396	$ 6,125
	37.8%	38.4%	38.7%	39.2%	39.2%	40.4%	40.9%
	62.2%	61.6%	61.3%	60.8%	60.8%	59.6%	59.1%
	58.4%	60.0%	60.7%	61.1%	61.1%	61.4%	62.5%
	41.6%	40.0%	39.3%	38.9%	38.9%	38.6%	37.5%