

May 1, 2020

VIA ELECTRONIC MAIL

Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

RE: Docket 3628 – 2019 Service Quality Report (Electric Operations)

Dear Ms. Massaro:

On behalf of The Narragansett Electric Company d/b/a National Grid (National Grid or the Company), enclosed, please find an electronic version¹ of the Company's Annual Service Quality Report which assesses the quality of the Company's electric operations for the performance period of January 1, 2019 through December 31, 2019 (the 2019 Service Quality Report or Report). As indicated in the Report, the Company's actual performance results for both reliability and customer service was within acceptable levels and, as a result, the Company did not incur any penalties for calendar year 2019.

The 2019 Service Quality Report stems from the Company's electric Service Quality Plan (the SQ Plan) as approved by the Public Utilities Commission (the PUC or Commission) through Order Nos. 18294, 19020, and 22456.² The purpose of the SQ Plan is to ensure that ratepayers receive a reasonable level of service. To this end, the SQ Plan establishes penalties and offsets relating to performance standards in four categories comprising of service reliability and customer service: (i) interruption frequency; (ii) interruption duration; (iii) customer contact survey; and (iv) telephone calls answered within 20 seconds. For each category, a benchmark or range representing acceptable performance is set forth. If the Company's performance falls below the acceptable range in any of the four categories, a penalty is assessed. For additional details on the SQ Plan, please see Attachment 1 of the Settlement Agreement.³

¹ Per practice during the COVID-19 emergency period, the Company is providing a PDF version of the 2019 Service Quality Report. The Company will provide the Commission Clerk with a hard copy and, if needed, additional hard copies of the Report at a later date.

² Through Order No. 18294, the PUC approved a Settlement Agreement between the Company and the Division of Public Utilities and Carriers (Division) which incorporated the SQ Plan to be effective January 1, 2005 (the Settlement Agreement). The SQ Plan also includes amendments made in 2007 (Order No. 19020) and 2016 (Order No. 22456).

³ See [http://www.ripuc.ri.gov/eventsactions/docket/3628-NEC-Ord18294\(7-12-05\).pdf](http://www.ripuc.ri.gov/eventsactions/docket/3628-NEC-Ord18294(7-12-05).pdf)

Luly E. Massaro, Commission Clerk
Docket 3628 – 2019 Service Quality Report
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Section 1 of the Report includes descriptions of each of the performance standards, the targeted performance levels for 2019 with their related dollar values, and the actual 2019 results with the applicable annual penalty or offset. Section 2 of the Report provides a summary calculation of the Company's annual penalty or offset for each of the four categories for 2019. As shown in Column (i), there is no annual penalty for calendar year 2019.

In addition, the Plan requires the Company to report on additional aspects of service quality: (1) the worst performing circuits; (2) trouble/non-outage calls received; (3) annual meter reading performance; and (4) information on Major Event Days. In accordance with the SQ Plan, Major Event Days are excluded from the calculation of the reliability performance standards for the purposes of penalty and offset assessment. Section 3 summarizes the results of these reporting requirements.

Thank you for your attention to this filing. If you have any questions, please contact me at 401-784-4263.

Sincerely,

A handwritten signature in blue ink, appearing to read "Andrew S. Marcaccio".

Andrew S. Marcaccio

Enclosures

cc: Docket 3628 Service List
Christy Hetherington, Esq.
John Bell, Division

Certificate of Service

I hereby certify that a copy of the cover letter and any materials accompanying this certificate was electronically transmitted to the individuals listed below.

The paper copies of this filing are being hand delivered to the Rhode Island Public Utilities Commission and to the Rhode Island Division of Public Utilities and Carriers.

Joanne M. Scanlon

May 1, 2020
Date

**National Grid – Electric Service Quality Plan – Compliance - Docket 3628
Service List Updated 5/1/2020**

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The Narragansett Electric Company
d/b/a National Grid

2019 Service Quality Report

May 1, 2020

Submitted to:
Rhode Island Public Utilities Commission
RIPUC Docket No. 3628

Submitted by:

nationalgrid

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**SECTION 1: RELIABILITY AND CUSTOMER SERVICE PERFORMANCE
STANDARDS**

Interruption Frequency and Duration

Under the Service Quality Plan, an interruption is defined as the loss of electric service to more than one customer for more than one minute. The interruption duration is defined as the period of time, measured in minutes, from the initial notification of the interruption event to the time when service has been restored to the customers. Interruptions are tracked using System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI). SAIFI is calculated by dividing the total number of customers interrupted by the total number of customers served. SAIFI measures the number of times per year the average customer experienced an interruption. This is an average, so in any given year some customers will experience no interruptions, and some will experience several interruptions. SAIDI measures the length of interruption time that the average customer experienced for the year. It is calculated by dividing the total customer minutes of interruption by the total number of customers served.

Certain events are defined as Major Event Days and are excluded from the calculation of reliability performance standards for the purpose of penalty and offset assessment. There were six Major Event Days that occurred during 2019. The Major Event Days are February 25, April 15, October 16, October 17, October 31 and November 1.

<u>2019 Total Frequency Standard</u>		<u>2019 Frequency (SAIFI) Results</u>	
<u>Frequency of Interruptions per Customer</u>	<u>(Penalty)/Offset</u>	<u>Frequency of Interruptions per Customer</u>	<u>Annual (Penalty)/Offset</u>
Greater than 1.18	(\$916,000)		
1.06-1.18	linear interpolation		
0.84-1.05	\$0	1.02	\$0
0.75-0.83	linear interpolation		
Less than 0.75	\$229,000		

<u>2019 Duration (SAIDI) Standard</u>		<u>2019 Duration (SAIDI) Results</u>	
<u>Duration of Interruptions (minutes)</u>	<u>(Penalty)/Offset</u>	<u>Duration of Interruptions (minutes)</u>	<u>Annual (Penalty)/Offset</u>
Greater than 89.9	(\$916,000)		
72.0-89.9	linear interpolation		
45.9-71.9	\$0	68.2	\$0
36.7-45.8	linear interpolation		
Less than 36.7	\$229,000		

CUSTOMER SERVICE PERFORMANCE STANDARDS

Customer Contact Survey

The customer contact survey results are based on responses from National Grid’s Rhode Island customers from a survey performed by an independent third-party consultant, Praxis Research Partners. Praxis surveys a random sample of customers who have contacted National Grid recently to determine their level of satisfaction with their most recent contact with the Company regarding any call reason. Survey results are based on a composite measure of two questions from National Grid’s internal contactor survey: (1) Overall, on a scale from 1 to 10, where 1 means “dissatisfied”, and 10 means “satisfied”, how satisfied are you with the services provided by National Grid? (2) Overall, on a scale from 1 to 10, where 1 means “dissatisfied”, and 10 means “satisfied”, how satisfied are you with the quality of service provided by the telephone representative? The individual score for each question is the percentage of respondents who provided a rating of “8”, “9”, or “10” on a 10-point scale, where 1 means “dissatisfied”, and 10 means “satisfied”. The “percent satisfied” composite score is a simple arithmetic average of the satisfaction score from each question.

<u>2019 Customer Contact Standard</u>		<u>2019 Customer Contact Results</u>	
<u>Percent Satisfied</u>	<u>(Penalty)/Offset</u>	<u>Percent Satisfied</u>	<u>Annual (Penalty)/Offset</u>
Less than 74.4%	(\$184,000)		
74.4%-78.7%	linear interpolation		
78.8%-87.6%	\$0	80.4%	\$0
87.7%-92.0%	linear interpolation		
More than 92.0%	\$46,000		

Telephone Calls Answered Within 20 Seconds

The calls answered performance standard reflects the annual percentage of calls answered within 20 seconds. “Calls answered” include calls answered by a customer service representative (CSR) and calls completed within the Voice Response Unit (VRU). The time to answer is measured once the customer makes a selection to either speak with a CSR or use the VRU.

<u>2019 Calls Answered Standard</u>		<u>2019 Calls Answered Results</u>	
<u>% Answered Within 20 Seconds</u>	<u>(Penalty)/Offset</u>	<u>% Answered Within 20 Seconds</u>	<u>Annual (Penalty)/Offset</u>
Less than 53.5%	(\$184,000)		
53.5% - 65.7%	linear interpolation		
65.8% - 90.4%	\$0	77.91%	\$0
90.5% - 100.0%	linear interpolation, to maximum of \$46,000		

SECTION 2: CALCULATION OF PENALTY/OFFSET

National Grid
2019 Results of Service Quality Plan
Calculation of Penalty/Offset

<u>Performance Standard</u>	Potential <u>Penalty</u> (a)	Potential <u>Offset</u> (b)	2019 <u>Results</u> (c)	Maximum <u>Penalty</u> (d)	One Std Dev. Worse <u>Than Mean</u> (e)	<u>Mean</u> (f)	One Std Dev. Better <u>Than Mean</u> (g)	Maximum <u>Offset</u> (h)	Annual (Penalty)/ <u>Offset</u> (i)
Reliability - Frequency	\$ 916,000	\$229,000	1.024	1.18	1.05	0.94	0.84	0.75	\$0
Reliability - Duration	\$ 916,000	\$229,000	68.2	89.9	71.9	57.5	45.9	36.7	\$0
Customer Service - Customer Contact Survey	\$ 184,000	\$ 46,000	80.4%	74.4%	78.8%	83.2%	87.6%	92.0%	\$0
Customer Service - Telephone Calls Answered	\$ 184,000	\$ 46,000	77.91%	53.5%	65.8%	78.1%	90.4%	100.0%	\$0
Total Penalty/Offset	\$ 2,200,000	\$550,000							\$0

Notes:

Columns (a), (b), and (d)-(h) are per the Amended Electric Service Quality Plan, RIPUC Docket No. 3628.

Column (c) represents the actual 2019 annual results for the performance standards listed in the first column.

Column (i) is calculated as follows:

- For Reliability Standards:
 - If Column (c) is between Column (g) and Column (e): \$0
 - If Column (c) is between Column (h) and Column (g): $[\text{Column (g) - Column (c)}] \div [\text{Column (g) - Column (h)}] \times \text{Column (b)}$
 - If Column (c) is between Column (e) and Column (d): $[\text{Column (c) - Column (e)}] \div [\text{Column (d) - Column (e)}] \times \text{Column (a)}$
 - If Column (c) is greater than Column (d): 100% of Column (a)
 - If Column (c) is less than Column (h): 100% of Column (b)
- For Customer Service Standards:
 - If Column (c) is between Column (e) and Column (g): \$0
 - If Column (c) is between Column (g) and Column (h): $[\text{Column (c) - Column (g)}] \div [\text{Column (e) - Column (d)}] \times \text{Column (b)}$
 - If Column (c) is between Column (d) and Column (e): $[\text{Column (e) - Column (c)}] \div [\text{Column (e) - Column (d)}] \times \text{Column (a)}$
 - If Column (c) is less than Column (d): 100% of Column (a)
 - If Column (c) is greater than Column (h): 100% of Column (b)

SECTION 3: ADDITIONAL REPORTING CRITERIA

Under the Company's Service Quality Plan, the following additional reporting criteria are required to be filed with the PUC.

1. **Reporting Requirement:** Each quarter, the Company will file a report of 5% of all circuits designated as worst performing on the basis of customer frequency. Included in the report will be:
 1. The circuit ID and location.
 2. The number of customers served.
 3. The towns served.
 4. The number of events.
 5. The average duration.
 6. The total customer minutes.
 7. A discussion of the cause or causes of events.
 8. A discussion of the action plan for improvements including timing.

Results: The Company filed its first quarter 2019 feeder ranking results on August 28, 2019, the second quarter results on September 20, 2019, the third quarter results on February 4, 2020 and fourth quarter results on March 4, 2020.

2. **Reporting Requirement:** The Company will track and report monthly the number of calls it receives in the category of Trouble, Non-Outage. This includes inquiries about dim lights, low voltage, half-power, flickering lights, reduced TV picture size, high voltage, frequently burned-out bulbs, motor running problems, damaged appliances and equipment, computer operation problems, and other non-interruptions related inquiries.

Results: The Company filed the required Trouble, Non-Outage reports during 2019, with the final report for the 13 months ended December 2019 filed on January 21, 2020.

3. **Reporting Requirement:** The Company will report its annual meter reading performance as an average of monthly percentage of meters read.

Results: During 2019, the Company's annual meter reading performance (as an average of monthly percentage of meters read) was 99.15%, compared to 99.06% during 2018, and 97.43% during 2017. The following table details the percentage of meters read per month for 2019, 2018, and 2017.

**The Narragansett Electric Company
Monthly Percentage of Meters Read**

	2019	2018	2017
January	99.21%	98.93%	98.50%
February	99.23%	99.01%	98.34%
March	99.26%	98.19%	98.32%
April	99.29%	99.11%	98.60%
May	99.32%	99.13%	98.92%
June	99.29%	99.19%	98.94%
July	99.24%	99.11%	98.96%
August	99.22%	99.16%	98.96%
September	99.12%	99.24%	98.95%
October	98.70%	99.21%	98.92%
November	99.03%	99.19%	82.62%
December	98.94%	99.20%	98.94%
YTD Average	99.15%	99.06%	97.43%

4. **Reporting Requirement:** For each event defined as a Major Event Day, the Company will prepare a report, which will be filed annually as part of the annual SQ filing, detailing the following information:
1. Start date/Time of event.
 2. Number/Location of crews on duty (both internal and external crews).
 3. Number of crews assigned to restoration efforts.
 4. The first instance of mutual aid coordination.
 5. First contact with material suppliers.
 6. Inventory levels: pre-event/daily/post-event.
 7. Date/Time of request for external crews.
 8. Date/Time of external crew assignment.
 9. # of customers out of service by hour.
 10. Impacted area.
 11. Cause.
 12. Weather impact on restoration.
 13. Analysis of protective device operation.
 14. Summary of customers impacted.

Results: IEEE Std. 1366-2012¹ identifies reliability performance during both day-to-day operations and Major Event Days. Major Event Days represent those few days during the year on which the energy delivery system experienced stresses beyond that normally expected, such as severe weather. A day is considered a Major Event Day if the daily SAIDI exceeds a threshold value, calculated using the IEEE methodology. For 2019 the T_{MED} value was 5.05 minutes of SAIDI (using IEEE Std. 1366-2012 methodology). There were six days during four separate storms that exceeded this threshold in 2019. These four storms occurred on February 25, April 15, October 16-17, and October 31-November 1. The storms are described below.

¹ RIPUC Order No 19020 refers to IEEE Std. 1366-2003. This standard has been superseded by IEEE Std. 1366-2012. The updated standard requires no changes for identifying Major Event Days or calculating thresholds.

February 25, 2019 Storm

1. Start Date and Time of event: The storm began in the late morning on Monday, Feb 25, 2019 with scattered interruptions starting at approximately 7:00 a.m. and peaked around 7:25 p.m. on Monday Feb 25, 2019. The peak reached 17,009 customers interrupted.
2. Number/Location of crews on duty (both internal and external crews): The Company secured 309.5 internal and external field crews to restore power to customers in Rhode Island, consisting of approximately 170 external crews and 139.5 internal crews. The internal and external field crew numbers included transmission and distribution overhead line, forestry, substation, and underground personnel.
3. Number of crews assigned to restoration efforts: At peak, the Company had the following crews performing restoration activities throughout the impacted areas in the state.

<u>Location</u>	<u>Crew Type</u>	<u># Crews</u>
Rhode Island	Internal Overhead Line	60.5 crews total
	External Overhead Line	106 crews total
	Internal Wire Down	25 crews total
	Internal Transmission	1 crews total
	Internal Underground	10 crews total
	Internal Substation	9 crews total
	Contractor Forestry	64 crews total

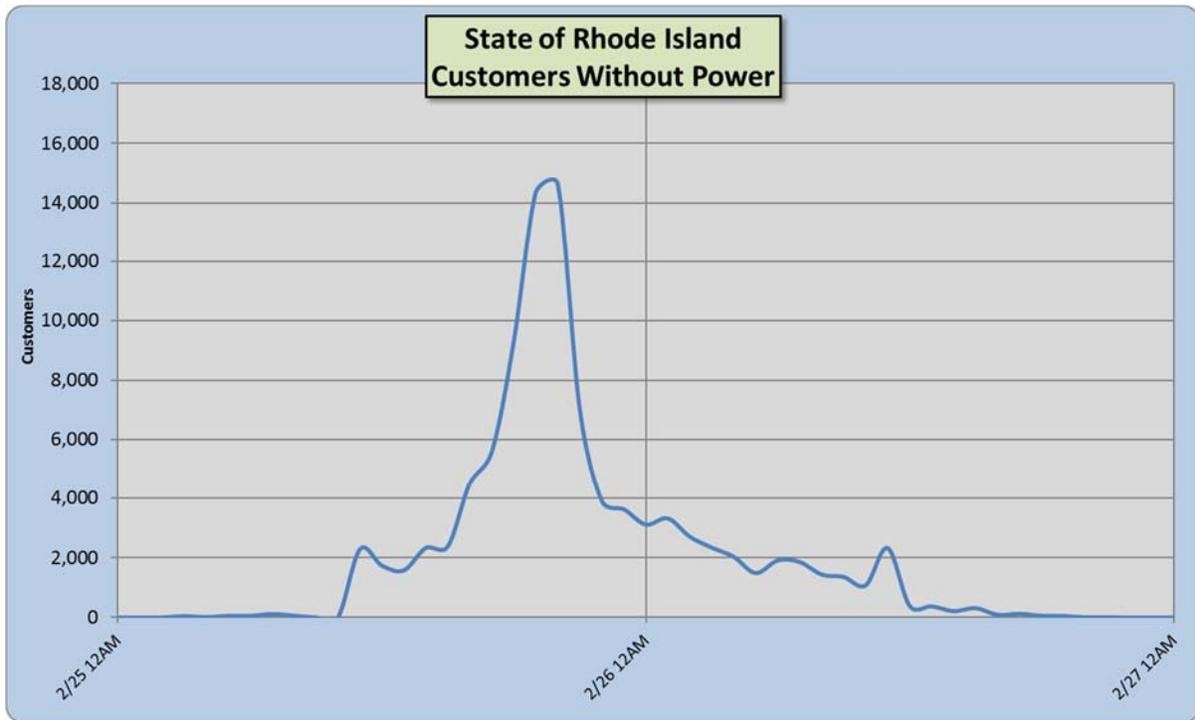
4. The first instance of mutual aid coordination: The Company did not call for mutual aid coordination for this event.
5. The first contact with material suppliers: The first contact with material suppliers was February 25, 2019.
6. Inventory levels: Pre-event/Daily/Post-event: Inventory levels and issues are summarized in the table below. Balances represent actual day-end totals. The balances do not include "no cost", pre-capitalized items, such as transformers. These items are not reported as inventory on the balance sheet. The inventory positions indicate those inventories held in RI and those allocated to RI stored in National Grid's Central Warehouse located in Whitinsville, MA.

<u>Date</u>	<u>RI Inventory Location</u>	<u>NEDC total</u>	<u>RI ELEC %</u>	<u>Allocated NEDC Inventory</u>	<u>Total Narragansett Electric Inventory</u>
2/25/2019	\$1,615,382.37	\$35,948,525.71	22.70%	\$8,153,047.36	\$9,768,429.73

7. Date/Time of request for External Crews: Given the potential magnitude of the Storm and forecast of hazardous winds, the Company secured crews in advance from its contractors of choice and other outside contractors to support restoration efforts for all New England as part of its regional preparation for the Storm, consistent with its Emergency Response Plan. By 8:00 a.m. on Monday, February 25, the Company had 60.5 internal overhead line crews, 106 external overhead line crews, 64 external forestry crews, 10 internal underground crews, 18 internal substation resources, 1 internal transmission crew, and 50 internal wires down resources. The Company established two staging sites to support restoration across the state at the Community College of Rhode Island in Warwick and the Twin River Casino in Lincoln.

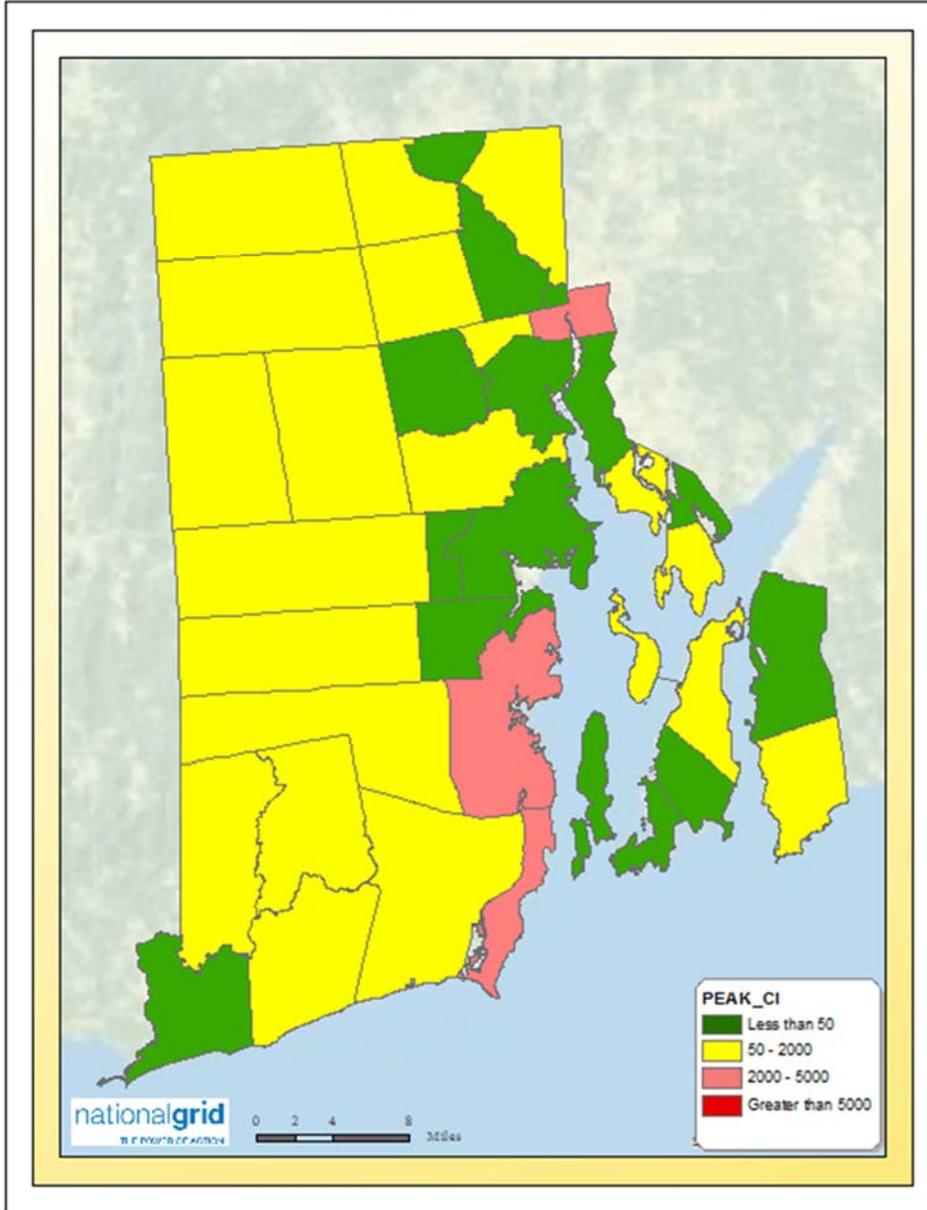
8. Date/Time of external Crews assignment: External crews were first assigned and began working on outages beginning on Monday, February 25, 2019, at approximately 12:00 a.m. through the end of the Storm.

9. # of customers out graph (graphs following):

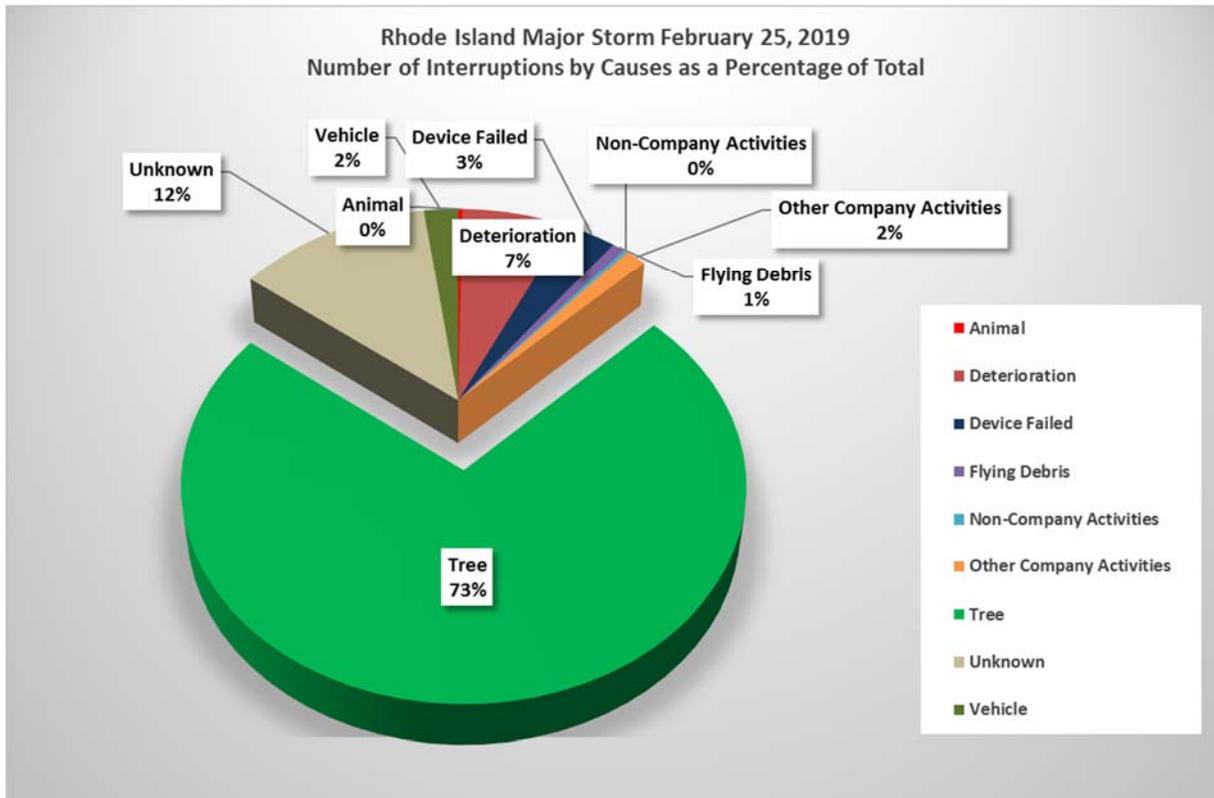


10. Impacted area: The following map shows the towns that were impacted by the storm and the customers interrupted during the storm.

**Customer Interrupted by Town at Company Peak
RI 02/25/2019 - 02/26/2019**



11. Cause: February storm caused widespread destruction to Rhode Island’s electric infrastructure resulting in interruptions to customers. The causes of interruptions are shown in the table below.



12. Weather impact on restoration: The February 25, 2019 Storm was a significant weather event that resulted in moderate damage to the Company's electrical system. The Storm brought widespread hazardous winds to the Company's service territory. Much of Rhode Island experienced wind gusts in the 50 to 55 mph range, with a peak gust of 56 mph in Providence.

The Company experienced interruptions in 36 of the 38 Rhode Island communities it serves. The Towns of West Greenwich and Little Compton were affected most heavily with approximately 71 and 52 percent of their customers impacted, respectively, by the event.

13. Analysis of Protective Device Operation: National Grid maintains a wide array of protection and interrupting devices designed to separate faulted components from the electrical system while containing outages to the smallest area practicable. On the distribution system, those devices include fuse cutouts, reclosers, and circuit breakers of various designs. On the transmission system, interrupting devices include circuit breakers, air-break switches, and circuit switchers. Protection relays are used to detect the faults and operate the interrupting device(s) to isolate a faulted component(s).

For the distribution system, design standards exist that indicate how protection devices are to be deployed and coordinated with other devices. Distribution engineers evaluate such devices under normal and fault conditions. Where recent performance may indicate a need for improvement, National Grid performs engineering studies and makes improvements. During a major storm like this event, outages in the distribution system may be far too extensive to assess the function and coordination of individual protection devices in detail, as the focus of storm response is on service restoration. A meaningful analysis would be difficult to perform unless there were specific indications of protection equipment mis-operation.

Protection standards, guides and practices also exist and are followed in the design of the National Grid's transmission system. Post event analysis of all interruptions in the National Grid Bulk Electric System (BES) is performed to confirm proper operation of protection systems. If an improper operation is identified, further analysis is conducted to identify the cause, propose and implement a solution. In addition, National Grid undertakes analysis of transmission and substation protection devices and coordination where there is evidence of a mis-operation.

14. Summary of Customers Impacted: The February storm caused the following customer impact:

February 25, 2019 - During this storm, on February 25, 2019 Rhode Island experienced a total of 224 interruptions that affected 36,238 customers and 5,456,514 customer minutes of interruption. On average these interruptions resulted in 0.073 SAIFI, 10.97 minutes of SAIDI. Since a SAIDI value of 10.97 minutes exceeded the threshold value of 5.05 minutes, February 25, 2019 qualified as a Major Event Day under the IEEE methodology.

February 26, 2019 - During this storm, on February 26, 2019 Rhode Island experienced a total of 37 interruptions that affected 5,459 customers and 475,357 customer minutes of interruption. On average these interruptions resulted in 0.011 SAIFI, 0.95 minutes of SAIDI. Since a SAIDI value of 0.96 minutes is less than the threshold value of 5.05 minutes, February 26 is not qualified as a Major Event Day under the IEEE methodology.

April 15, 2019 Lightning Storm

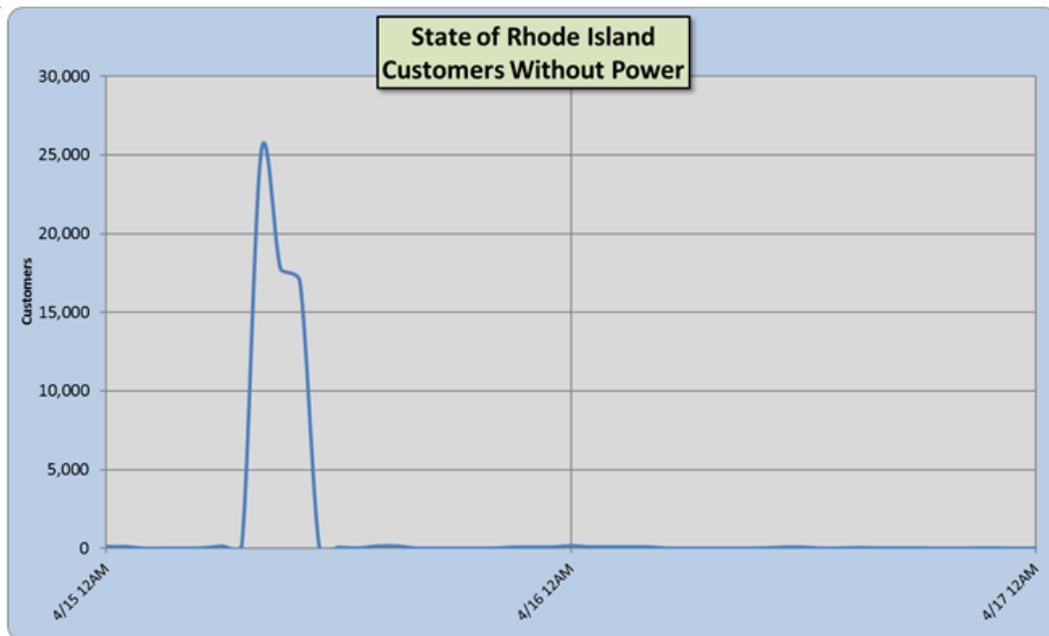
1. Start Date and Time of event: The storm began in the late morning on Monday, April 15, 2019 with scattered interruptions starting at approximately 6:00 a.m. and peaked around 7:15 p.m. on Monday, April 15, 2019. The peak reached 25,189 customers interrupted.
2. Number/Location of crews on duty (both internal and external crews): The Company secured 105 internal and external field crews to restore power to customers in Rhode Island, consisting of approximately 53 external crews and 52 internal crews. The internal and external field crew numbers included distribution overhead line, forestry, substation, and underground personnel.
3. Number of crews assigned to restoration efforts: At peak, the Company had the following crews performing restoration activities throughout the impacted areas in the State.

<u>Location</u>	<u>Crew Type</u>	<u># Crews</u>
Rhode Island	Internal Overhead Line	34 crews total
	Internal Underground	11 crews total
	Internal Substation	14 crews total
	Contractor Forestry	53 crews total

4. The first instance of mutual aid coordination: The Company did not call for mutual aid coordination for this event.
5. The first contact with material suppliers: The first contact with material suppliers was April 15, 2019.
6. Inventory levels: pre-event/daily/post-event: Inventory levels and issues are summarized in the table below. Balances represent actual day-end totals. The balances do not include "no cost", pre-capitalized items, such as transformers. These items are not reported as inventory on the balance sheet. The inventory positions indicate those inventories held in Rhode Island and those allocated to RI stored in National Grid's Central Warehouse located in Whitinsville, MA.

<u>Date</u>	<u>RI Inventory Location</u>	<u>NEDC total</u>	<u>RI ELEC %</u>	<u>Allocated NEDC Inventory</u>	<u>Total Narragansett Electric Inventory</u>
4/15/2019	\$1,610,461.06	\$35,948,526.00	23.50%	\$8,440,147.75	\$10,050,608.81

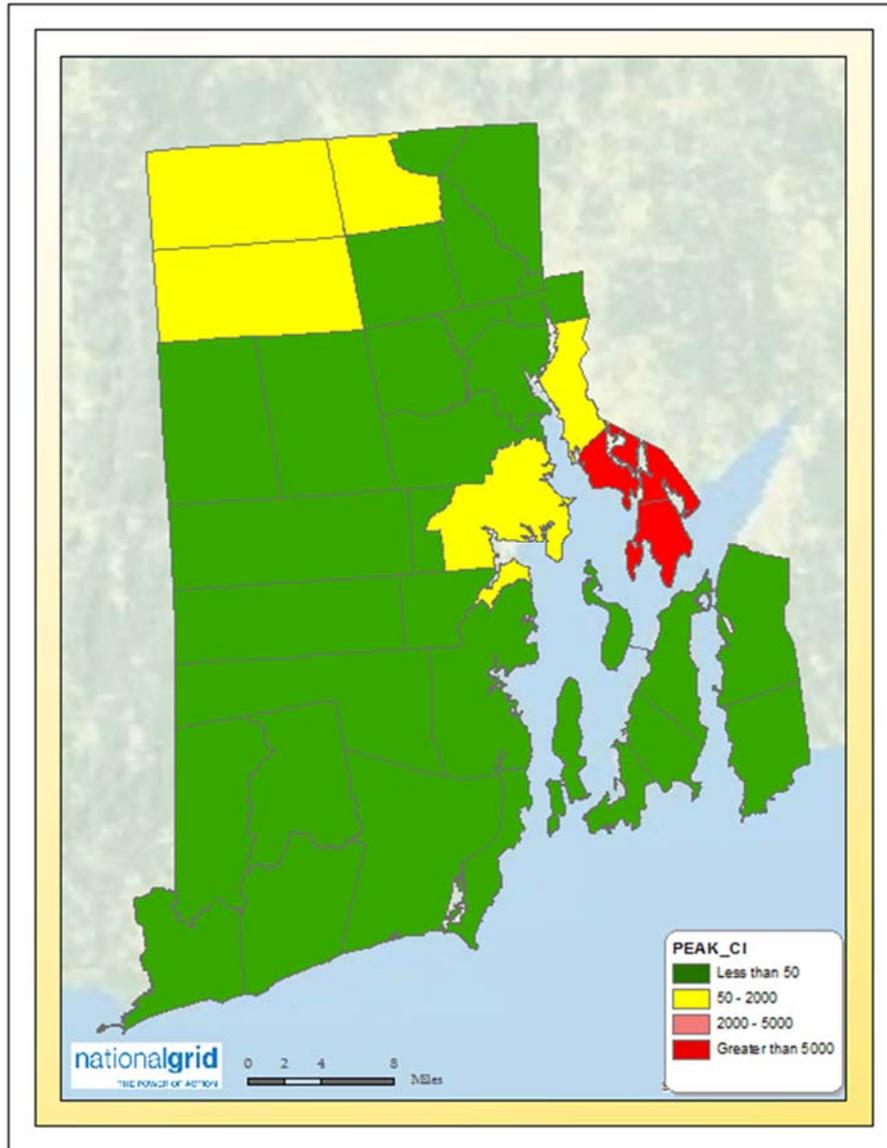
7. Date/Time of request for external Crews: External crews were not requested for this storm.
8. Date/Time of external Crews assignment: External crews were not requested for this storm.
9. # of customers out graph (graphs following):



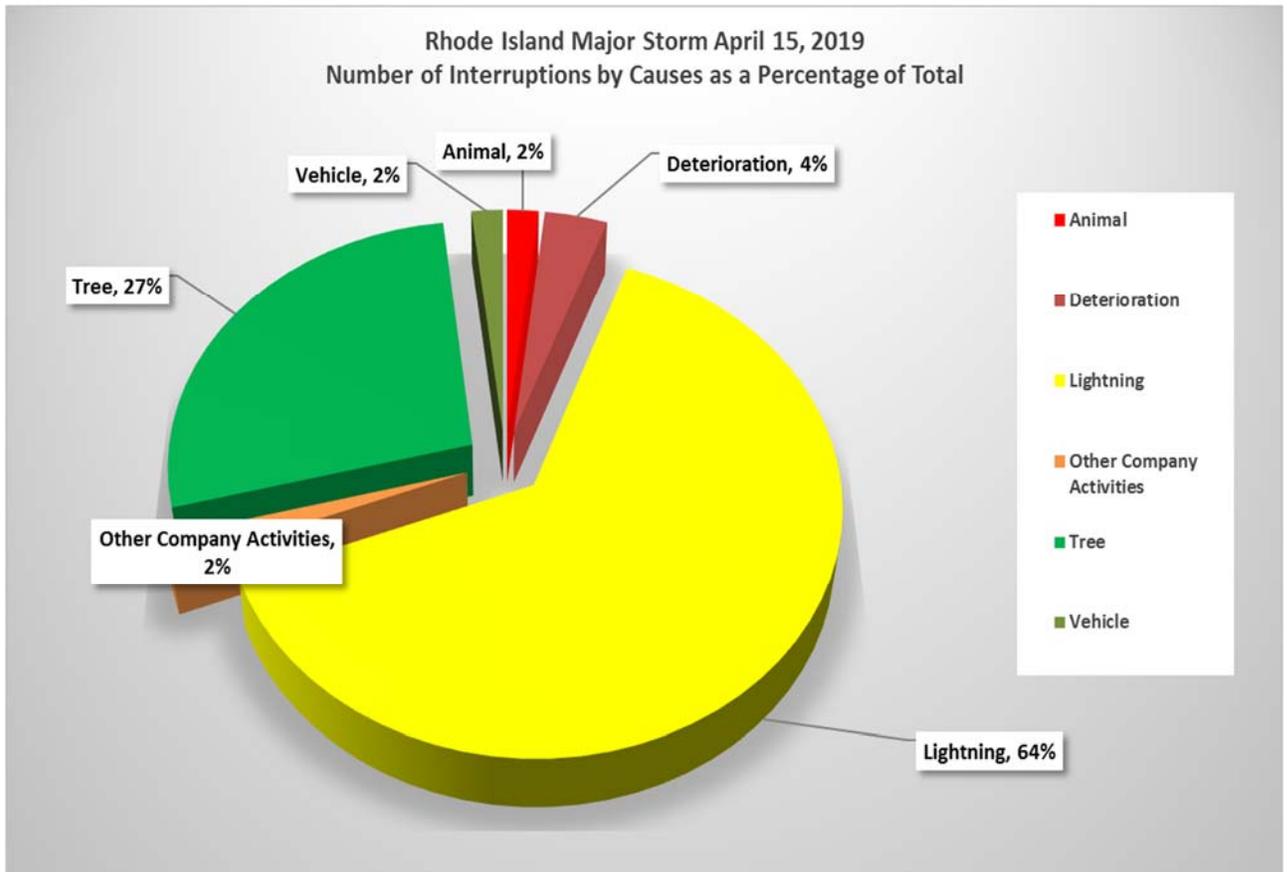
April 15, 2019

10. Impacted area: The following map shows the towns that were impacted by the storm and the customers interrupted during the storm.

**Customer Interrupted by Town at Company Peak
RI 04/15/2019**



11. Cause: April lightning storm caused some destruction to Rhode Island's electric infrastructure resulting in interruptions to customers. The causes of interruptions are shown in the table below.



12. Weather impact on restoration: The April 15, 2019 Storm was a mild weather event that resulted in some damage to the Company's electrical system. There was a transmission line lockout caused by lightning.
13. Analysis of Protective Device Operation: National Grid maintains a wide array of protection and interrupting devices designed to separate faulted components from the electrical system while containing outages to the smallest area practicable. On the distribution system, those devices include fuse cutouts, reclosers, and circuit breakers of various designs. On the transmission system, interrupting devices include circuit breakers, air-break switches, and circuit switchers. Protection relays are used to detect the faults and operate the interrupting device(s) to isolate a faulted component(s). For the distribution system, design standards exist that indicate how protection devices are to be deployed and coordinated with other devices. Distribution engineers evaluate such devices under normal and fault conditions. Where recent performance may indicate a need for improvement, National Grid performs engineering studies and makes improvements. During a major storm like this event, outages in the distribution system may be far too extensive to assess the function and coordination of individual protection

devices in detail, as the focus of storm response is on service restoration. A meaningful analysis would be difficult to perform unless there were specific indications of protection equipment mis-operation.

Protection standards, guides and practices also exist and are followed in the design of the National Grid's transmission system. Post event analysis of all interruptions in the National Grid Bulk Electric System (BES) is performed to confirm proper operation of protection systems. If an improper operation is identified, further analysis is conducted to identify the cause, propose and implement a solution. In addition, National Grid undertakes analysis of transmission and substation protection devices and coordination where there is evidence of a mis-operation.

14. Summary of Customers Impacted: During this storm, on April 15, 2019 Rhode Island experienced a total of 31 interruptions that affected 26,023 customers and 4,027,424 customer minutes of interruption. On average these interruptions resulted in 0.052 SAIFI, 8.09 minutes of SAIDI. Since a SAIDI value of 8.09 minutes exceeded the threshold value of 5.05 minutes, April 15, 2019 qualified as a Major Event Day under the IEEE methodology.

October 16-17, 2019 Storm

1. Start Date and Time of event: The storm began in the late night on Wednesday, October 16, 2019 with scattered interruptions starting at approximately 9:00 p.m. and peaked around 1:25 a.m. on Thursday October 17, 2019. The peak reached 36,737 customers interrupted.
2. Number/Location of crews on duty (both internal and external crews): The Company secured 248 internal and external field crews¹ to restore power to customers in Rhode Island, consisting of approximately 141 external crews and 107 internal crews. The internal and external field crew numbers included transmission and distribution overhead line, forestry, substation, and underground personnel.
3. Number of crews assigned to restoration efforts: At peak, the Company had the following crews performing restoration activities throughout the impacted areas in the state.

<u>Location</u>	<u>Crew Type</u>	<u># Crews</u>
Rhode Island	Internal Overhead Line	35 crews total
	External Overhead Line	75 crews total
	Internal Wire Down	81 crews total
	Internal Transmission	1 crews total
	Internal Underground	12 crews total
	Damage Appraisal	20 crews total
	Internal Substation	33 crews total
	Contractor Forestry	54 crews total

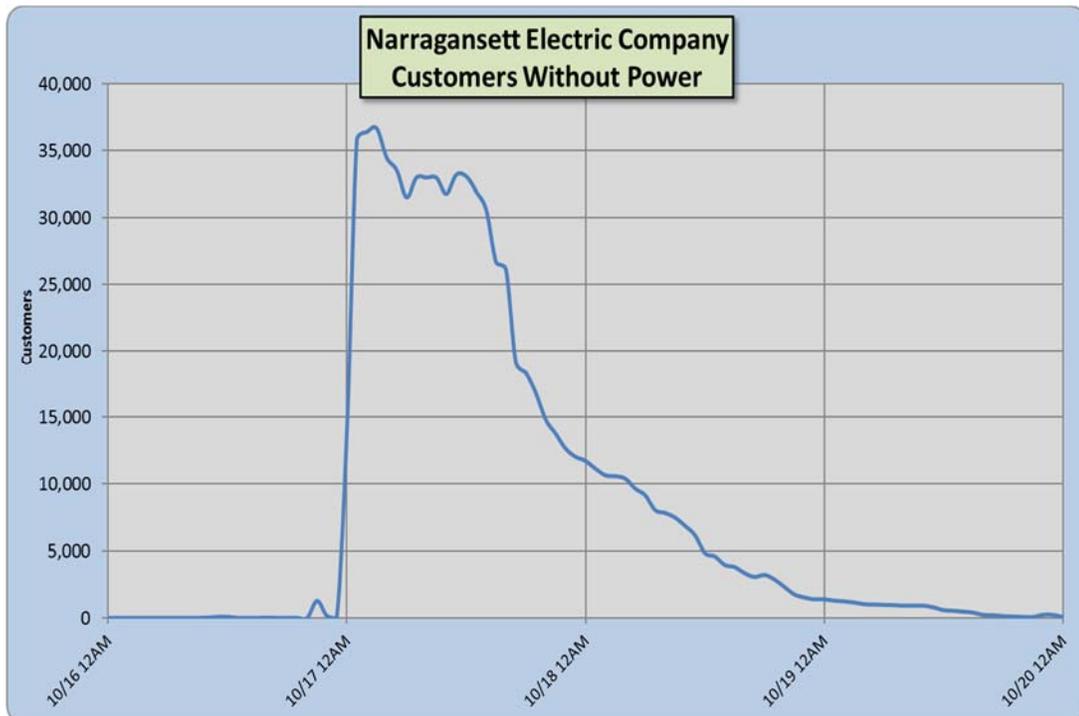
4. The first instance of mutual aid coordination: The State Incident Commander for National Grid’s Rhode Island Company requested mutual assistance from companies in the North Atlantic Mutual Assistance Group (NAMAG) to support restoration for this event starting October 17, 2019 7:00 a.m.
5. The first contact with material suppliers: The first contact with material suppliers was October 16, 2019.
6. Inventory levels: pre-event/daily/post-event: Inventory levels and issues are summarized in the table below. Balances represent actual day-end totals. The balances do not include "no cost", pre-capitalized items, such as transformers. These items are not reported as inventory on the balance sheet. The inventory positions indicate those inventories held in Rhode Island and those allocated to RI stored in National Grid’s Central Warehouse located in Whitinsville, MA.

<u>Date</u>	<u>RI Inventory Location</u>	<u>NEDC total</u>	<u>RI ELEC %</u>	<u>Allocated NEDC Inventory</u>	<u>Total Narragansett Electric Inventory</u>
10/16/2019	\$1,580,148.07	\$34,054,276.00	22.20%	\$7,555,030.58	\$9,135,178.65
10/17/2019	\$1,580,148.07	\$34,054,276.00	22.20%	\$7,555,030.58	\$9,135,178.65

7. Date/Time of request for external Crews: Given the potential magnitude of the Storm and forecast of hazardous winds, the Company secured crews in advance from its contractors of choice and other outside contractors to support restoration efforts for all New England as part of its regional preparation for the Storm, consistent with its Emergency Response Plan. The Company secured 248 internal and external field crews to restore power to customers in Rhode Island, consisting of approximately 141 external crews and 107 internal crews.

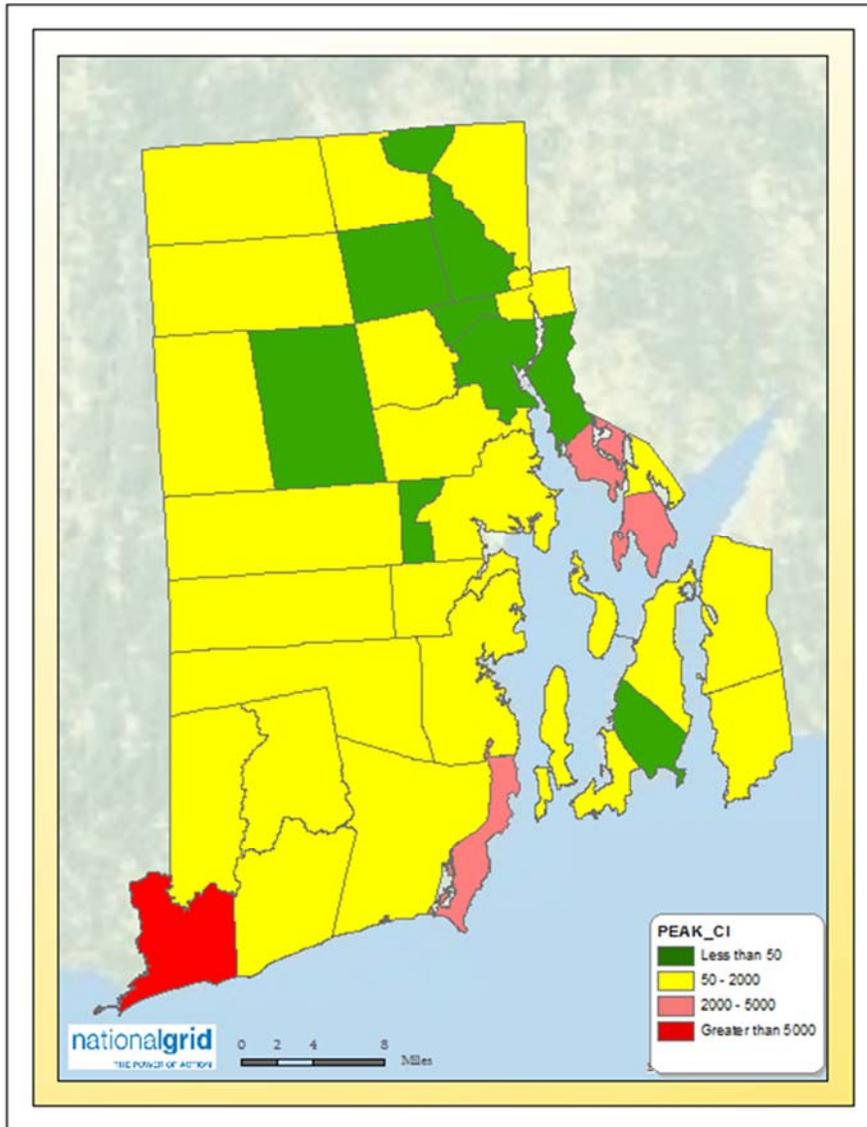
8. Date/Time of external Crews assignment: External crews were first assigned and began working on outages beginning on Thursday, October 17, 2019, at approximately 7:00 a.m. through the end of the Storm.

9. # of customers out graph (graphs following):

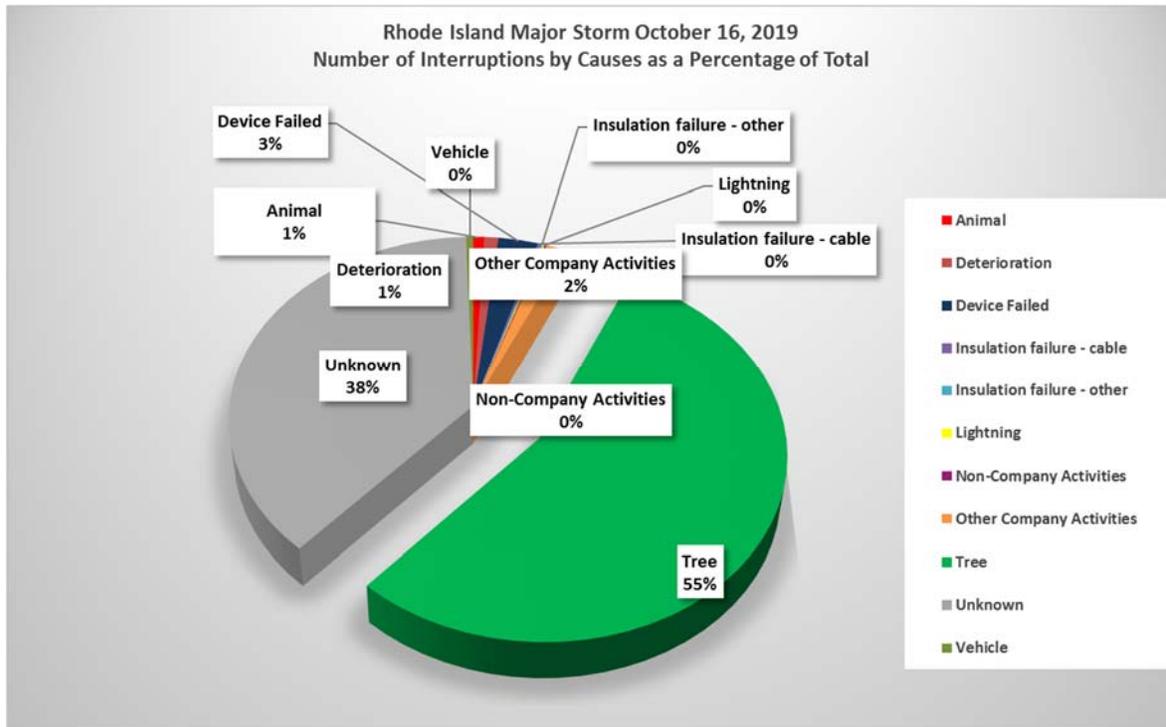


10. Impacted area: The following map shows the towns that were impacted by the storm and the customers interrupted during the storm.

**Customer Interrupted by Town at Company Peak
RI 10/16/2019 to 10/19/2019**



11. Cause: February storm caused widespread destruction to Rhode Island's electric infrastructure resulting in interruptions to customers. The causes of interruptions are shown in the table below.



12. Weather impact on restoration: The October 16-17, 2019 Storm was a significant weather event that resulted in moderate damage to the Company’s electrical system. The Storm brought widespread rain and hazardous winds to the Company’s service territory. Much of Rhode Island experienced wind gusts in the 40 to 50 mph range, with coastal areas seeing 55 to 65 mph gusts. The Town of Westerly experienced a peak gust of 70 mph. The Towns of Westerly and Gloucester were affected most heavily with approximately 85 and 59 percent of their customers impacted, respectively, by the event.
13. Analysis of Protective Device Operation: National Grid maintains a wide array of protection and interrupting devices designed to separate faulted components from the electrical system while containing outages to the smallest area practicable. On the distribution system, those devices include fuse cutouts, reclosers, and circuit breakers of various designs. On the transmission system, interrupting devices include circuit breakers, air-break switches, and circuit switchers. Protection relays are used to detect the faults and operate the interrupting device(s) to isolate a faulted component(s). For the distribution system, design standards exist that indicate how protection devices are to be deployed and coordinated with other devices. Distribution engineers evaluate such devices under normal and fault conditions. Where recent performance may indicate a need for improvement, National Grid performs engineering studies and makes improvements. During a major storm like this event, outages in the distribution system may be far too extensive to assess the function and coordination of individual protection

devices in detail, as the focus of storm response is on service restoration. A meaningful analysis would be difficult to perform unless there were specific indications of protection equipment mis-operation.

Protection standards, guides and practices also exist and are followed in the design of the National Grid's transmission system. Post event analysis of all interruptions in the National Grid Bulk Electric System (BES) is performed to confirm proper operation of protection systems. If an improper operation is identified, further analysis is conducted to identify the cause, propose and implement a solution. In addition, National Grid undertakes analysis of transmission and substation protection devices and coordination where there is evidence of a mis-operation.

14. Summary of Customers Impacted:

October 16, 2019 - During this storm, on October 16, 2019 Rhode Island experienced a total of 81 interruptions that affected 15,442 customers and 16,820,937 customer minutes of interruption. On average these interruptions resulted in 0.031 SAIFI, 33.92 minutes of SAIDI. Since a SAIDI value of 33.92 minutes exceeded the threshold value of 5.05 minutes, October 16, 2019 qualified as a Major Event Day under the IEEE methodology.

October 17, 2019 - During this storm, on October 17, 2019 Rhode Island experienced a total of 462 interruptions that affected 43,359 customers and 31,045,840 customer minutes of interruption. On average these interruptions resulted in 0.087 SAIFI, 62.61 minutes of SAIDI. Since a SAIDI value of 62.61 minutes exceeded the threshold value of 5.05 minutes, October 17, 2019 qualified as a Major Event Day under the IEEE methodology.

October 18, 2019 - During this storm, on October 18, 2019 Rhode Island experienced a total of 25 interruptions that affected 614 customers and 184,225 customer minutes of interruption. On average these interruptions resulted in 0.0012 SAIFI, 0.37 minutes of SAIDI. Since a SAIDI value of 0.37 minutes was less than the threshold value of 5.05 minutes, October 18, 2019 is not qualified as a Major Event Day under the IEEE methodology.

October 19, 2019 - During this storm, on October 19, 2019 Rhode Island experienced a total of 28 interruptions that affected 508 customers and 57,833 customer minutes of interruption. On average these interruptions resulted in 0.001 SAIFI, 0.12 minutes of SAIDI. Since a SAIDI value of 0.12 minutes was less than the threshold value of 5.05 minutes, October 19, 2019 is not qualified as a Major Event Day under the IEEE methodology.

October 31 - November 1, 2019 Wind Storm

1. Start Date and Time of event: The storm began in the late morning on Thursday, Oct 31, 2019 with scattered interruptions starting at approximately 10:00 a.m. and peaked around 3:58 a.m. on Friday, Nov 1, 2019. The peak reached 36,524 customers interrupted.
2. Number/Location of crews on duty (both internal and external crews): The Company secured 269 internal and external field crews to restore power to customers in Rhode Island, consisting of approximately 129 external crews and 140 internal crews. The internal and external field crew numbers included transmission and distribution overhead line, forestry, substation, and underground personnel.
3. Number of crews assigned to restoration efforts: At peak, the Company had the following crews performing restoration activities throughout the impacted areas in the state.

<u>Location</u>	<u>Crew Type</u>	<u># Crews</u>
Rhode Island	Internal Overhead Line	35 crews total
	External Overhead Line	31 crews total
	Internal Wire Down	35 crews total
	Internal Transmission	2 crews total
	Internal Underground	11 crews total
	Internal Substation	29 crews total
	Contractor Forestry	43 crews total

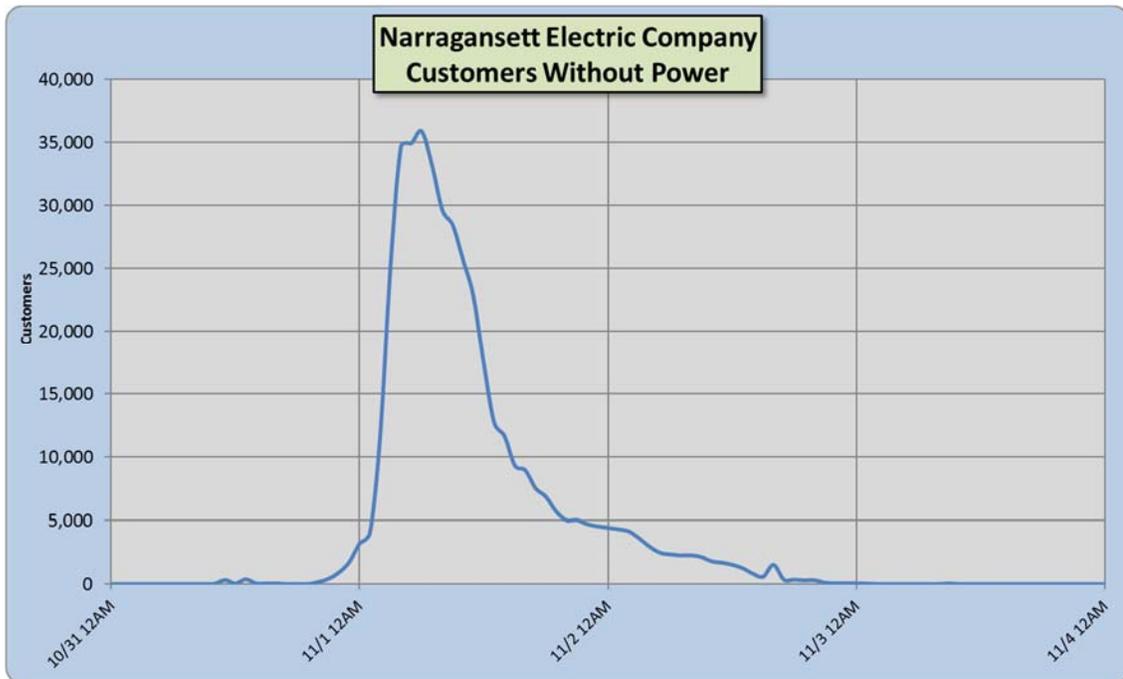
4. The first instance of mutual aid coordination: The State Incident Commander for National Grid’s Rhode Island Company requested mutual assistance from companies in the North Atlantic Mutual Assistance Group (NAMAG) to support restoration for this event starting November 1, 2019 7:00 a.m.
5. The first contact with material suppliers: The first contact with material suppliers was October 31, 2019.
6. Inventory levels: pre-event/daily/post-event: Inventory levels and issues are summarized in the table below. Balances represent actual day-end totals. The balances do not include "no cost", pre-capitalized items, such as transformers; these items are not reported as inventory on the balance sheet. The inventory positions indicate those inventories held in Rhode Island and those allocated to RI stored in National Grid’s Central Warehouse located in Whitinsville, MA.

<u>Date</u>	<u>RI Inventory Location</u>	<u>NEDC total</u>	<u>RI ELEC %</u>	<u>Allocated NEDC Inventory</u>	<u>Total Narragansett Electric Inventory</u>
10/31/2019	\$1,580,148.07	\$34,054,276.00	22.20%	\$7,555,030.58	\$9,135,178.65
11/1/2019	\$1,311,836.68	\$34,603,309.57	21.50%	\$7,455,532.00	\$8,767,368.68

7. Date/Time of request for external Crews: Given the potential magnitude of the Storm and forecast of hazardous winds, the Company secured crews in advance from its contractors of choice and other outside contractors to support restoration efforts for all New England as part of its regional preparation for the Storm, consistent with its Emergency Response Plan. The Company secured 269 internal and external field crews to restore power to customers in Rhode Island, consisting of approximately 129 external crews and 140 internal crews.

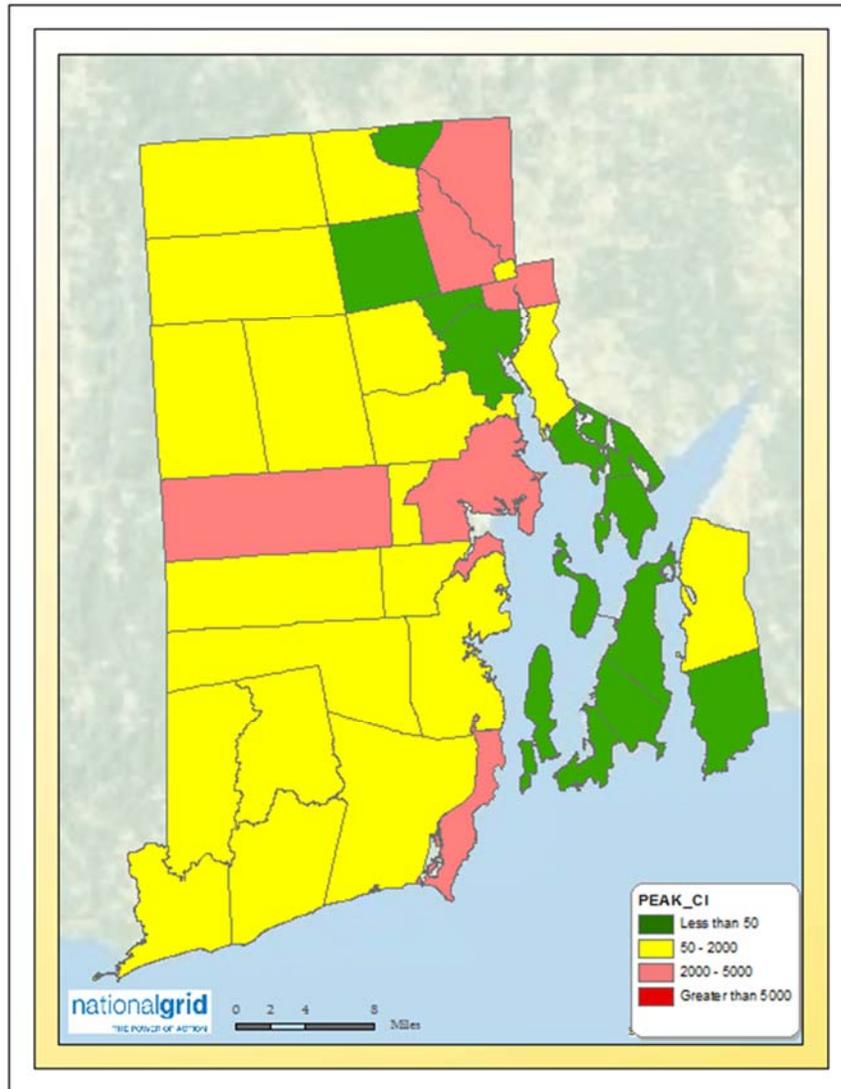
8. Date/Time of external Crews assignment: External crews were first assigned and began working on outages beginning on Friday, November 1, 2019, at approximately 7:00 a.m. through the end of the Storm.

9. # of customers out graph (graphs following):

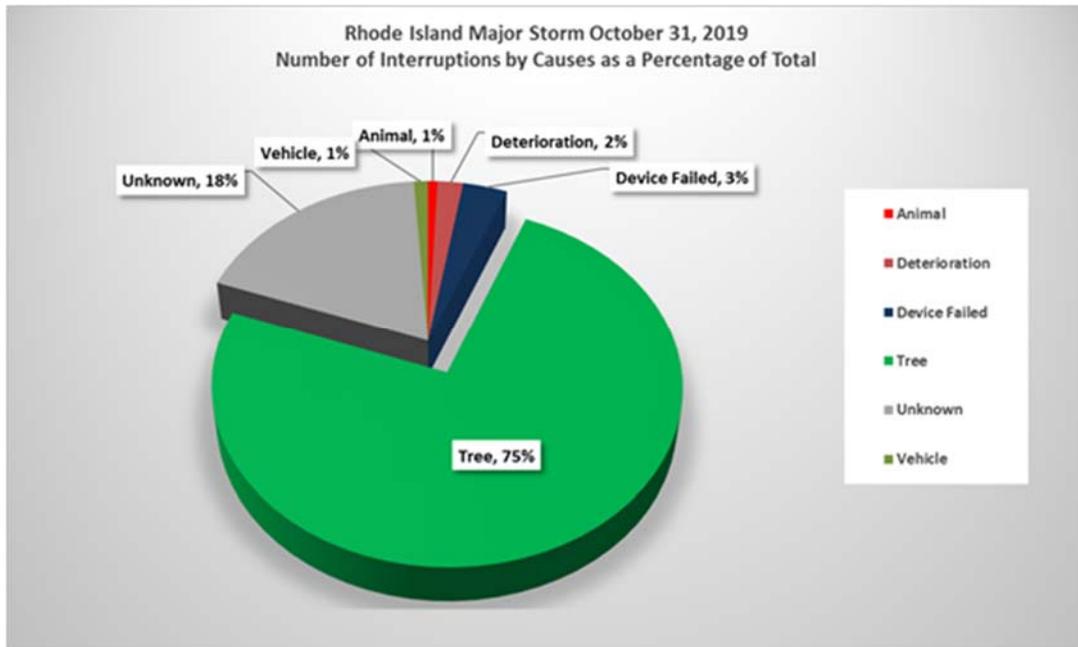


10. Impacted area: The following map shows the towns that were impacted by the storm and the customers interrupted during the storm.

**Customer Interrupted by Town at Company Peak
RI 10/31/2019 to 11/03/2019**



11. Cause: October 31 storm caused widespread destruction to Rhode Island's electric infrastructure resulting in interruptions to customers. The causes of interruptions are shown in the table below.



12. Weather impact on restoration: The October 31, 2019 Storm was a significant weather event that resulted in moderate damage to the Company's electrical system. The Storm brought widespread rain and hazardous winds to the Company's service territory. Much of Rhode Island experienced wind gusts in the 40 to 50 mph range, with interior areas seeing 55 to 60 mph gusts. The Towns of Foster and Hopkinton were affected most heavily with approximately 88 and 39 percent of their customers impacted, respectively, by the event.
13. Analysis of Protective Device Operation: National Grid maintains a wide array of protection and interrupting devices designed to separate faulted components from the electrical system while containing outages to the smallest area practicable. On the distribution system, those devices include fuse cutouts, reclosers, and circuit breakers of various designs. On the transmission system, interrupting devices include circuit breakers, air-break switches, and circuit switchers. Protection relays are used to detect the faults and operate the interrupting device(s) to isolate a faulted component(s). For the distribution system, design standards exist that indicate how protection devices are to be deployed and coordinated with other devices. Distribution engineers evaluate such devices under normal and fault conditions. Where recent performance may indicate a need for improvement, National Grid performs engineering studies and makes improvements. During a major storm like this event, outages in the distribution system may be far too extensive to assess the function and coordination of individual protection devices in detail, as the focus of storm response is on service restoration. A meaningful analysis would be difficult to perform unless there were specific indications of protection equipment mis-operation.

Protection standards, guides and practices also exist and are followed in the design of the National Grid's transmission system. Post event analysis of all interruptions in the National Grid Bulk Electric System (BES) is performed to confirm proper operation of protection systems. If an improper operation is identified, further analysis is conducted to identify the cause, propose and implement a solution. In addition, National Grid undertakes analysis of transmission and substation protection devices and coordination where there is evidence of a mis-operation.

14. Summary of Customers Impacted:

October 31, 2019 - During this storm, on October 31, 2019 Rhode Island experienced a total of 63 interruptions that affected 11,676 customers and 3,059,222 customer minutes of interruption. On average these interruptions resulted in 0.023 SAIFI, 6.17 minutes of SAIDI. Since a SAIDI value of 6.17 minutes exceeded the threshold value of 5. minutes, October 31, 2019 qualified as a Major Event Day under the IEEE methodology.

November 1, 2019 - During this storm, on November 1, 2019 Rhode Island experienced a total of 254 interruptions that affected 43,949 customers and 23,336,315 customer minutes of interruption. On average these interruptions resulted in 0.089 SAIFI, 46.98 minutes of SAIDI. Since a SAIDI value of 46.98 minutes exceeded the threshold value of 5.05 minutes, November 1, 2019 qualified as a Major Event Day under the IEEE methodology.

November 2, 2019 - During this storm, on November 2, 2019 Rhode Island experienced a total of 42 interruptions that affected 1,456 customers and 139,181 customer minutes of interruption. On average these interruptions resulted in 0.0029 SAIFI, 0.28 minutes of SAIDI. Since a SAIDI value of 0.28 minutes was less than the threshold value of 5.05 minutes, November 2, 2019 is not qualified as a Major Event Day under the IEEE methodology. On November 3, 2019, the restoration was going on. But SAIDI on November 3 was much less than 5.05 and is not qualified as a Major Event Day.