

May 1, 2021

**VIA ELECTRONIC MAIL**

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

**RE: Docket 3628 – 2020 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 version<sup>1</sup> 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, 2020 through December 31, 2020 (the 2020 Service Quality Report or Report). As indicated in the Report, the Company performance for both reliability and customer service was within acceptable levels and, as a result, the Company did not incur a penalty.

The 2020 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.<sup>2</sup> The purpose of the SQ Plan is to ensure that ratepayers receive a reasonable level of service. To this end, the SQ Plan establishes performance standards for service reliability, which includes the categories of interruption frequency and interruption duration, and for customer service, which includes the categories of customer contact and telephone calls answered. 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. The Company cannot earn a monetary award for exceeding expectations; however, it can accrue offsets for good performance in one category which may be used to offset a penalty incurred in the other categories. For additional details on the SQ Plan, please see Attachment 1 of the Settlement Agreement.<sup>3</sup>

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<sup>1</sup> Per practice during the COVID-19 emergency period, the Company is providing a PDF version of the 2020 Service Quality Report. The Company will provide the Commission Clerk with five (5) hard copies and, if needed, additional hard copies of the Report at a later date.

<sup>2</sup> 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).

<sup>3</sup> 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  
May 1, 2021  
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For 2020, the Company did not incur a penalty. Specifically, the Company's performance fell within an acceptable range for each of the four categories, meaning there were no penalties assessed. Although not needed, the Company did not accrue any offsets for exemplary performance. For a summary of the results, please see Section 2 of the Report.

In addition, the Report: (1) References quarterly reports filed by the Company that detail the worst performing circuits; (2) References monthly reports filed by the Company that detail trouble/non-outages; (3) Calculates the Company's annual meter reading performance; and (4) Identifies Major Event Days. In accordance with the SQ Plan, Major Event Days are not factored into the Company's performance under this Report and are separately analyzed and reported. For additional details on these items, please see Section 3 of the Report.

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 3, 2021  
Date

**National Grid – Electric Service Quality Plan – Compliance - Docket 3628  
Service List Updated 5/3/2021**

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	<a href="mailto:Andrew.marcaccio@nationalgrid.com">Andrew.marcaccio@nationalgrid.com</a> ;	
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	<a href="mailto:John.bell@dpuc.ri.gov">John.bell@dpuc.ri.gov</a> ;	
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<b>Original &amp; 9 copies file w/:</b> Luly E. Massaro, Commission Clerk Public Utilities Commission 89 Jefferson Boulevard Warwick, RI 02888	<a href="mailto:Luly.massaro@puc.ri.gov">Luly.massaro@puc.ri.gov</a> ;	401-780-2107
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The Narragansett Electric Company  
d/b/a National Grid

# **2020 Service Quality Report**

May 1, 2021

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 penalty and offset assessment. There were six Major Event Days that occurred during 2020. The Major Event Days are February 7, April 13, August 4, September 30, October 7, and November 30.

<b><u>2020 Total Frequency Standard</u></b>		<b><u>2020 Frequency (SAIFI) Results</u></b>	
<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	0.945	\$0
0.75-0.83	linear interpolation		
Less than 0.75	\$229,000		

<b><u>2020 Duration (SAIDI) Standard</u></b>		<b><u>2020 Duration (SAIDI) Results</u></b>	
<u>Duration of Interruptions</u> <u>(minutes)</u>	<u>(Penalty)/Offset</u>	<u>Duration of</u> <u>Interruptions</u> <u>(minutes)</u>	<u>Annual</u> <u>(Penalty)/Offset</u>
Greater than 89.9	(\$916,000)		
72.0-89.9	linear interpolation		
45.9-71.9	\$0	69.1	\$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>2020 Customer Contact Standard</u>		<u>2020 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	86.3%	\$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 selects to either speak with a CSR or use the VRU.

<u>2020 Calls Answered Standard</u>		<u>2020 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	81.98%	\$0
90.5% - 100.0%	linear interpolation, to maximum of \$46,000		



**SECTION 2: CALCULATION OF PENALTY/OFFSET**

**National Grid**  
2020 Results of Service Quality Plan  
Calculation of Penalty/Offset

<u>Performance Standard</u>	Potential Penalty (a)	Potential Offset (b)	2020 Results (c)	Maximum Penalty (d)	One Std Dev. Worse Than Mean (e)	Mean (f)	One Std Dev. Better Than Mean (g)	Maximum Offset (h)	Annual (Penalty)/Offset (i)
Reliability - Frequency	\$ 916,000	\$229,000	0.945	1.18	1.05	0.94	0.84	0.75	\$0
Reliability - Duration	\$ 916,000	\$229,000	69.1	89.9	71.9	57.5	45.9	36.7	\$0
Customer Service - Customer Contact Survey	\$ 184,000	\$ 46,000	86.3%	74.4%	78.8%	83.2%	87.6%	92.0%	\$0
Customer Service - Telephone Calls Answered	\$ 184,000	\$ 46,000	82.0%	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 2020 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 2020 feeder ranking results on July 20, 2020, the second quarter results on December 18, 2020, the third quarter results on March 19, 2021 and fourth quarter results on March 26, 2021.

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 2020, with the final report for the 13 months ended December 2020 filed on January 21, 2021.

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

**Results:** During 2020, the Company's annual meter reading performance (as an average of monthly percentage of meters read) was 98.19%, compared to 99.15% during 2019, and 99.06% during 2018. The following table details the percentage of meters read per month for 2020, 2019, and 2018.

**Monthly Percentage of Meters Read**

	<b>2020</b>	<b>2019</b>	<b>2018</b>
January	99.01%	99.21%	98.93%
February	99.07%	99.23%	99.01%
March	98.72%	99.26%	98.19%
April	97.85%	99.29%	99.11%
May	97.88%	99.32%	99.13%
June	97.67%	99.29%	99.19%
July	97.92%	99.24%	99.11%
August	97.05%	99.22%	99.16%
September	98.27%	99.12%	99.24%
October	98.32%	98.70%	99.21%
November	98.38%	99.03%	99.19%
December	98.17%	98.94%	99.20%
YTD Average	98.19%	99.15%	99.06%

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 Service Quality 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. 1366-2012<sup>1</sup> 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 2020 the T<sub>MED</sub> value was 6.03 minutes of SAIDI (using IEEE Std. 1366-2012 methodology). There were six storms that exceeded this threshold in 2020. These six storms occurred on February 7, April 13, August 4, September 30, October 7 and November 30. The storms are described below.

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<sup>1</sup> 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 7, 2020 Storm**

1. Start Date and Time of event:

The storm began in the early afternoon on Friday, Feb 7, 2020 with scattered interruptions starting at approximately 7:00 a.m. and peaked around 5:07 p.m. on Feb 7, 2020. The peak reached 42,695 customers interrupted.

2. Number/Location of crews on duty (both internal and external crews):

The Company secured 341 internal and external field crews<sup>1</sup> to restore power to customers in Rhode Island, consisting of approximately 202 external crews and 139 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	141 crews total
	External Overhead Line	165 crews total
	Internal Wire Down	131 crews total
	Internal Transmission	3 crews total
	Internal Underground	12 crews total
	Internal Substation	50 crews total
	Contractor Forestry	160 crews total

4. The first instance of mutual aid coordination:

The first call for mutual aid coordination for this event started at February 7, 2020; 5:30 p.m.

5. The first contact with material suppliers:

The first contact with material suppliers started on February 7, 2020.

6. Inventory levels: Pre-event/Daily/Post-event:

<b>Event Date</b>	<b>RI Inventory Locations</b>	<b>Allocated NEDC Inventory</b>	<b>Total Inventory</b>
2/7/2020	\$748,855	\$7,654,538	\$8,403,393

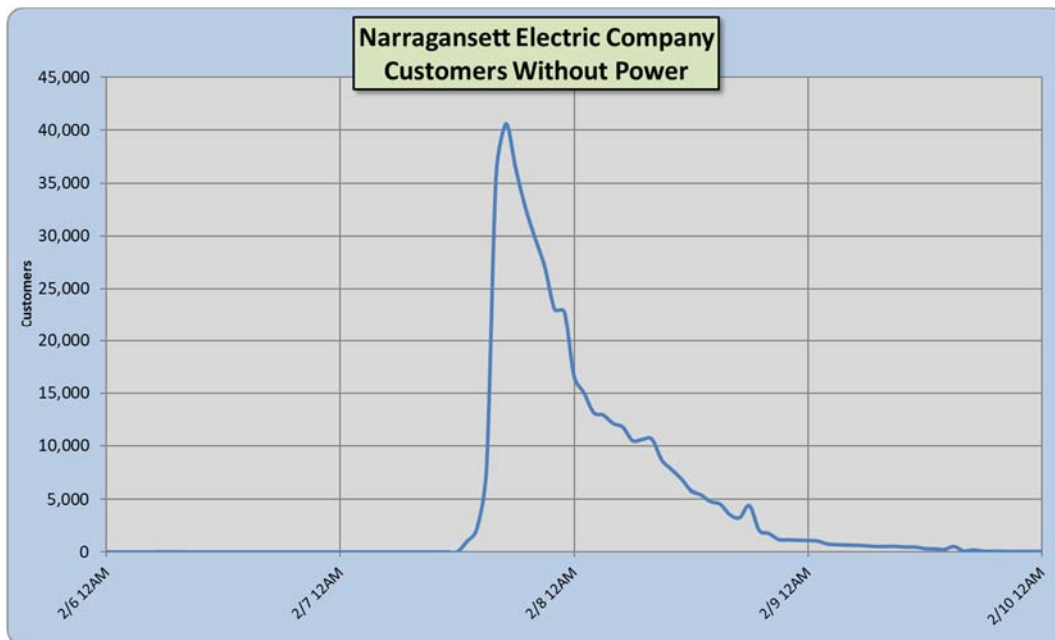
7. Date/Time of request for External Crews:

Given the potential magnitude of the Storm and forecast of precipitation and hazardous winds, the Company secured crews in advance from its contractors of choice to support restoration efforts for all New England as part of its regional preparation for the Storm, consistent with its Emergency Response Plan.

8. Date/Time of external Crews assignment:

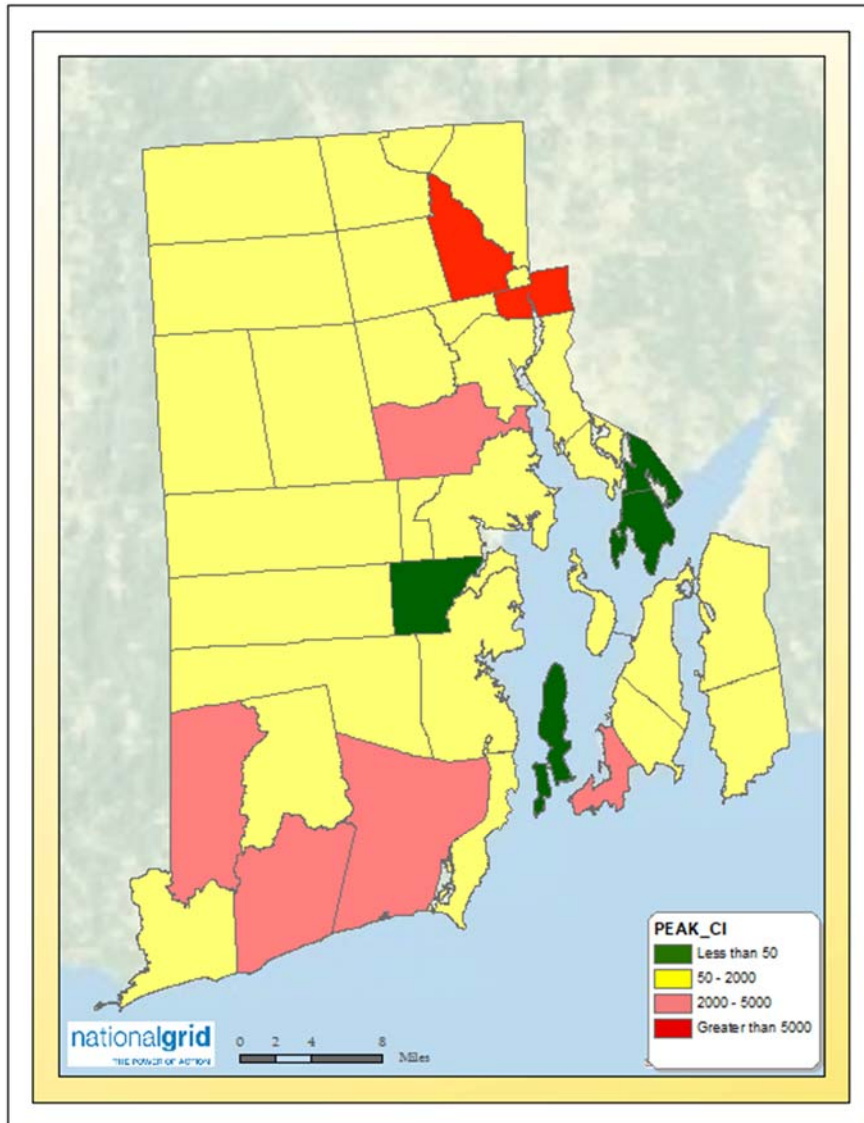
Mutual Assistance was assigned to duty starting 5:30pm on February 7, 2020.

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

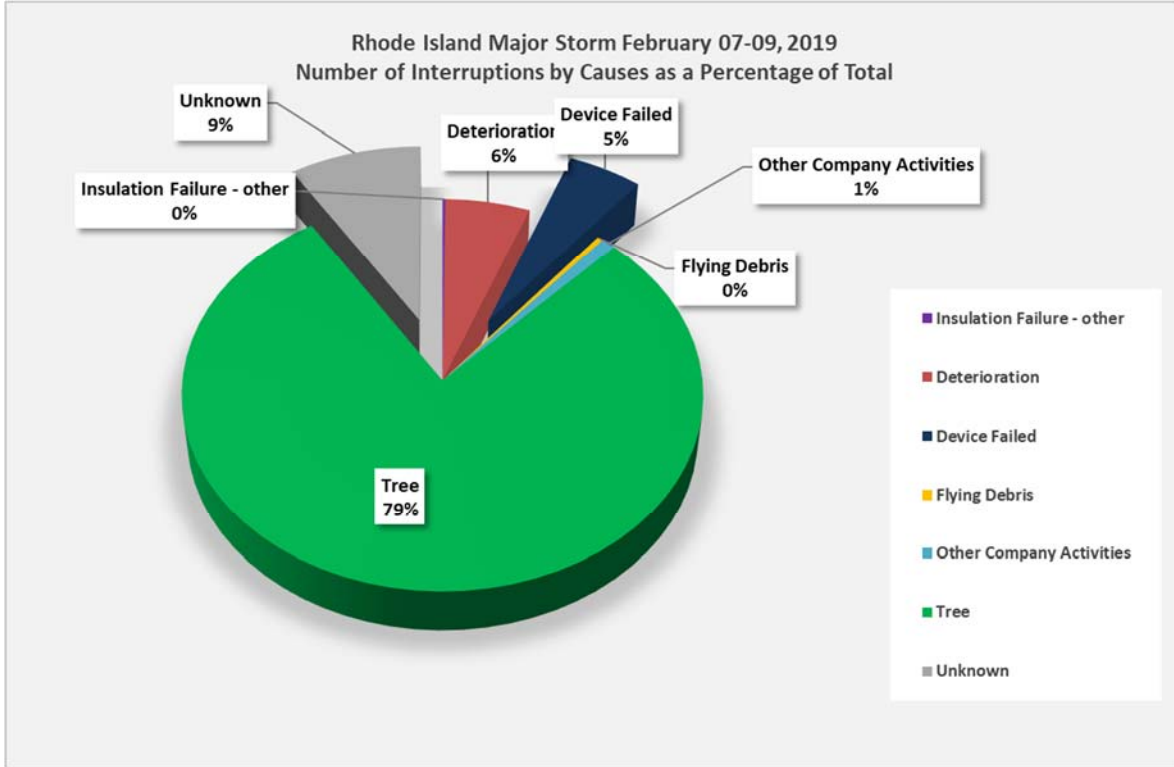


10. Impacted area:

**Customer Interrupted by Town at Company Peak  
RI 02/07/2020 to 02/08/2020**



11. Cause:



12. Weather impact on restoration:

The February 7-8, 2020 Storm was a significant weather event that resulted in moderate damage to the Company’s electrical system. The Storm brought some rain and widespread hazardous winds to the Company’s service territory. Much of Rhode Island experienced wind gusts in the 40 to 55 mph range, with some areas seeing 55 to 60 mph gusts. The City of Providence experienced peak gusts of 60 mph. The Towns of Little Compton and Lincoln were affected most heavily with approximately 100 and 76 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:

##### **February 7, 2020**

During this storm, on February 7, 2020 Rhode Island experienced a total of 251 interruptions that affected 55,732 customers and 26,545,799 customer minutes of interruption. On average these interruptions resulted in 0.112 SAIFI, 53.31 minutes of SAIDI. Since a SAIDI value of 53.31 minutes exceeded the threshold value of 6.03 minutes, February 07, 2019 qualified as a Major Event Day under the IEEE methodology.

##### **February 8, 2020**

During this storm, on February 8, 2020 Rhode Island experienced a total of 39 interruptions that affected 951 customers and 210,966 customer minutes of interruption. On average these interruptions resulted in 0.002 SAIFI, 0.42 minutes of SAIDI. Since a SAIDI value of 0.42 minutes is less than the threshold value of 6.03 minutes, February 08 is not qualified as a Major Event Day under the IEEE methodology.

## April 13, 2020 Storm

1. Start Date and Time of event:

The storm began in the early morning on Monday, April 13, 2020 with scattered interruptions starting at approximately 6:00 a.m. and peaked around 6:21 p.m. on April 13, 2020. The peak reached 21,104 customers interrupted.

2. Number/Location of crews on duty (both internal and external crews):

The Company secured 323 internal and external field crews to restore power to customers in Rhode Island, consisting of approximately 123 external crews and 206 internal crews. The internal and external field crew numbers included transmission and distribution overhead line, forestry, substation, wires-down, 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	134 crews total
	External Overhead Line	106 crews total
	Internal Wire Down	212 crews total
	Internal Transmission	2 crews total
	Internal Underground	26 crews total
	Internal Substation	60 crews total
	Contractor Forestry	131 crews total

4. The first instance of mutual aid coordination:

The first call for mutual aid coordination for this event started at April 14, 2020, 8:00 a.m.

5. The first contact with material suppliers:

The first contact with material suppliers started on April 13, 2020.

6. Inventory levels: Pre-event/Daily/Post-event:

Event Date	RI Inventory Locations	Allocated NEDC Inventory	Total Inventory
4/13/2020	\$720,506	\$7,193,930	\$7,914,435

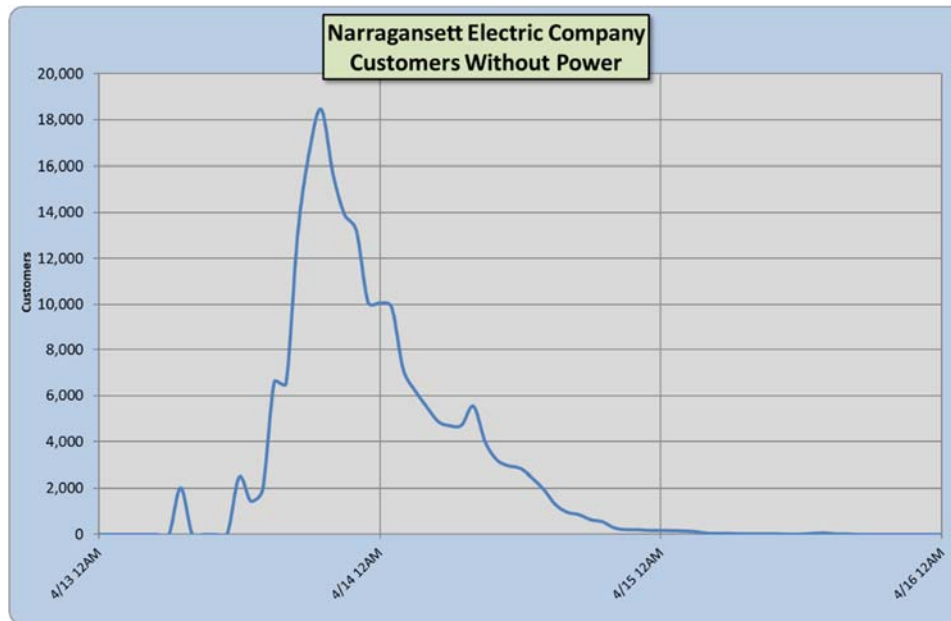
7. Date/Time of request for External Crews:

Given the potential magnitude of the Storm and forecast of significant rain and 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 first North Atlantic Mutual Assistance Group call was on April 11, 2020, 10:30pm.

8. Date/Time of external Crews assignment:

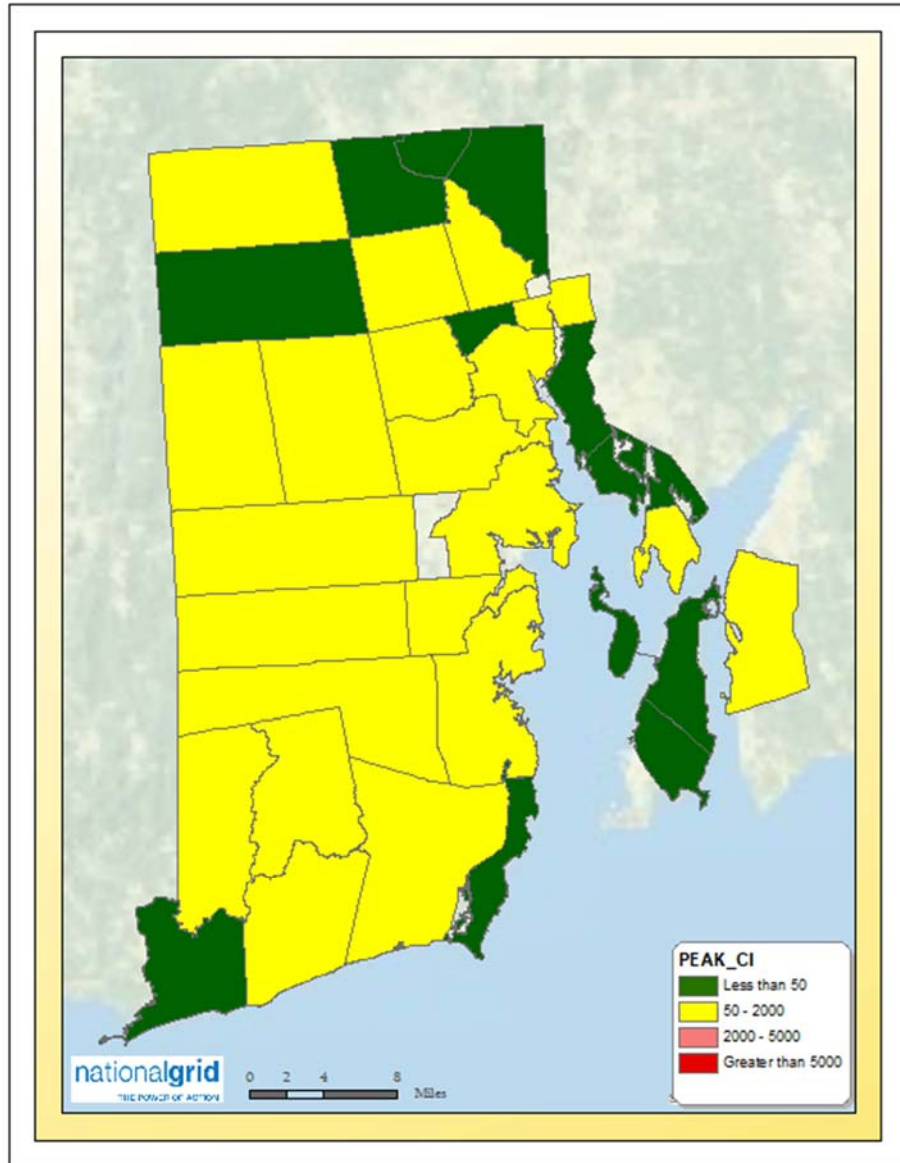
Mutual Assistance was assigned to duty starting 5:30pm on February 7, 2020.

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

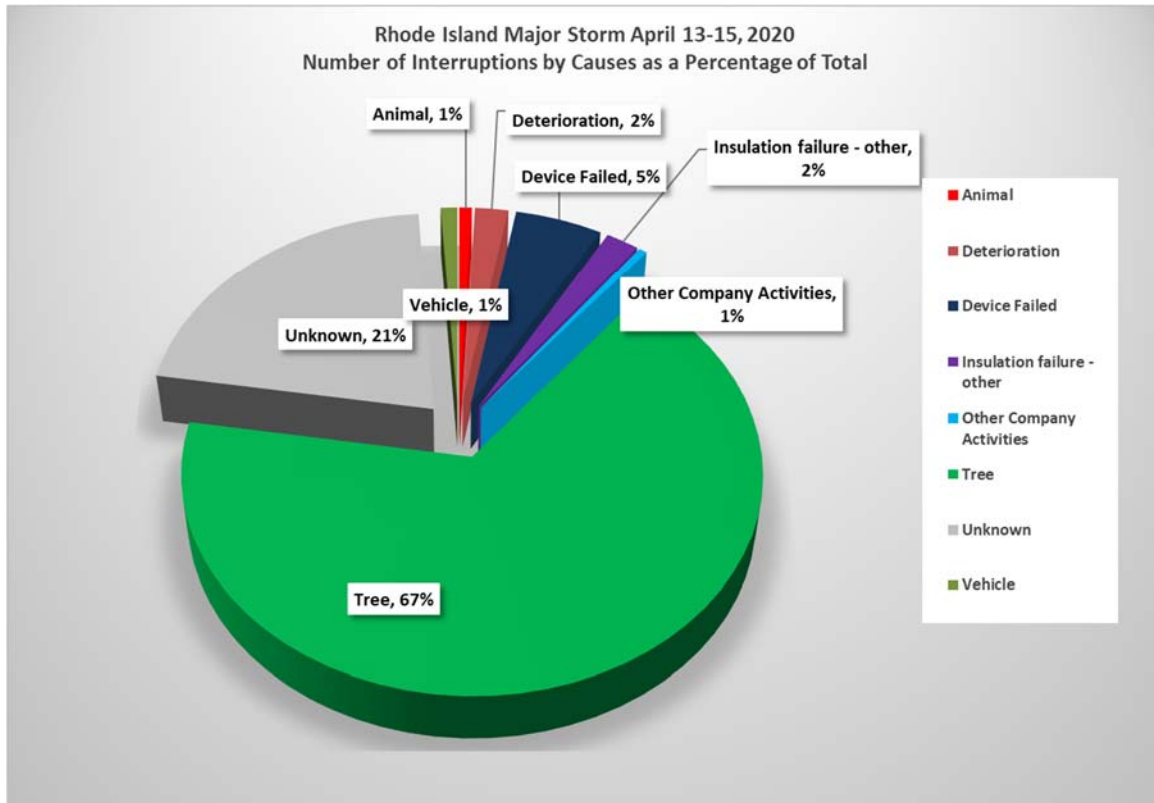


10. Impacted area:

**Customer Interrupted by Town at Company Peak  
RI 04/13/2020 to 04/15/2020**



11. Cause:



12. Weather impact on restoration:

The April 13, 2020 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. The Towns of Burrillville and Glocester were affected most heavily with approximately 94 and 80 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:

##### **April 13, 2020**

During this storm, on April 13, 2020 Rhode Island experienced a total of 253 interruptions that affected 31,432 customers and 12,319,294 customer minutes of interruption. On average these interruptions resulted in 0.0631 SAIFI, 24.73 minutes of SAIDI. Since a SAIDI value of 24.73 minutes exceeded the threshold value of 6.03 minutes, April 13, 2020 qualified as a Major Event Day under the IEEE methodology.

##### **April 14, 2020**

During this storm, on April 14, 2020 Rhode Island experienced a total of 53 interruptions that affected 2,303 customers and 230,332 customer minutes of interruption. On average these interruptions resulted in 0.0046 SAIFI, 0.46 minutes of SAIDI. Since a SAIDI value of 0.46 minutes is less than the threshold value of 6.03 minutes, April 14, 2020 is not qualified as a Major Event Day under the IEEE methodology. The restoration continued April 15, 2020. The SAIDI on April 15, 2020 is 0.05 min and will not be qualified as Major storm day.

**August 4, 2020 Storm Isaias**

1. Start Date and Time of event:

The storm began in the afternoon on Tuesday, August 4, 2020 with scattered interruptions starting at approximately 3:00 p.m. and peaked around 6:49 p.m. on August 4, 2020. The peak reached 115,339 customers interrupted.

2. Number/Location of crews on duty (both internal and external crews):

The Company secured 372 internal and external field crews to restore power to customers in Rhode Island, consisting of approximately 186 external crews and 186 internal crews. The internal and external field crew numbers included transmission and distribution overhead line, forestry, substation, wires-down, 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	196 crews total
	External Overhead Line	577 crews total
	Internal Wire Down	204 crews total
	Internal Transmission	4 crews total
	Internal Underground	40 crews total
	Internal Substation	144 crews total
	Contractor Forestry	332 crews total

4. The first instance of mutual aid coordination:

The first call for mutual aid coordination for this event started at August 4, 2020, 8:00 p.m.

5. The first contact with material suppliers:

The first contact with material suppliers started on August 4, 2020.

6. Inventory levels: Pre-event/Daily/Post-event:

Event Date	RI Inventory Locations	Allocated NEDC Inventory	Total Inventory
8/4/2020	\$910,217	\$7,153,908	\$8,064,125

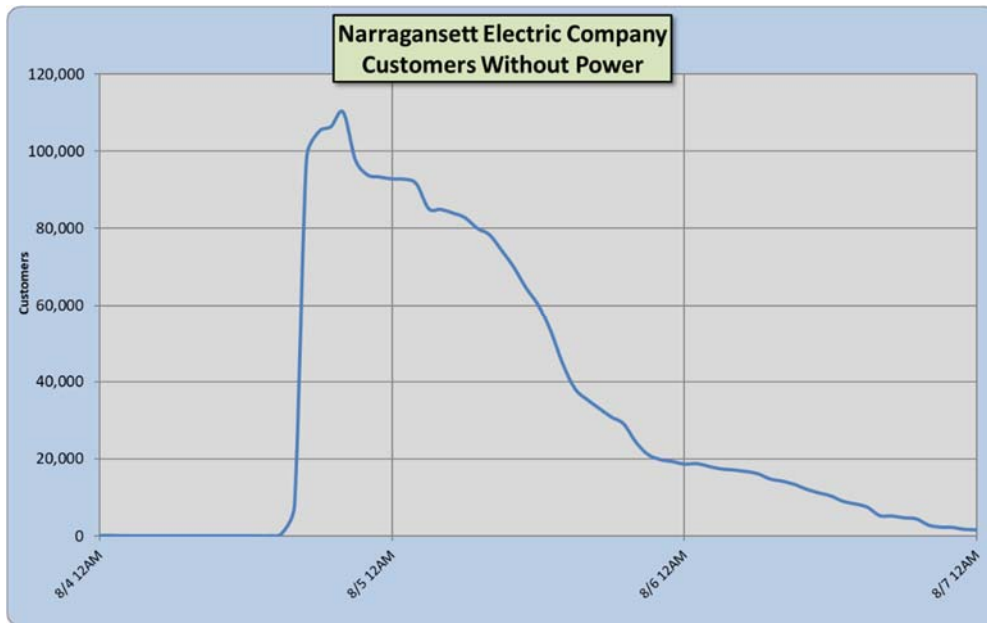
7. Date/Time of request for External Crews:

The State Incident Commander for National Grid’s Rhode Island and Massachusetts electric distribution operating companies requested mutual assistance from companies in the North Atlantic Mutual Assistance Group (“NAMAG”) to support restoration for this event. The first North Atlantic Mutual Assistance Group call was on July 31, 2020, 3:00 pm.

8. Date/Time of external Crews assignment:

Mutual Assistance was assigned to duty starting 8:00pm on August 4, 2020.

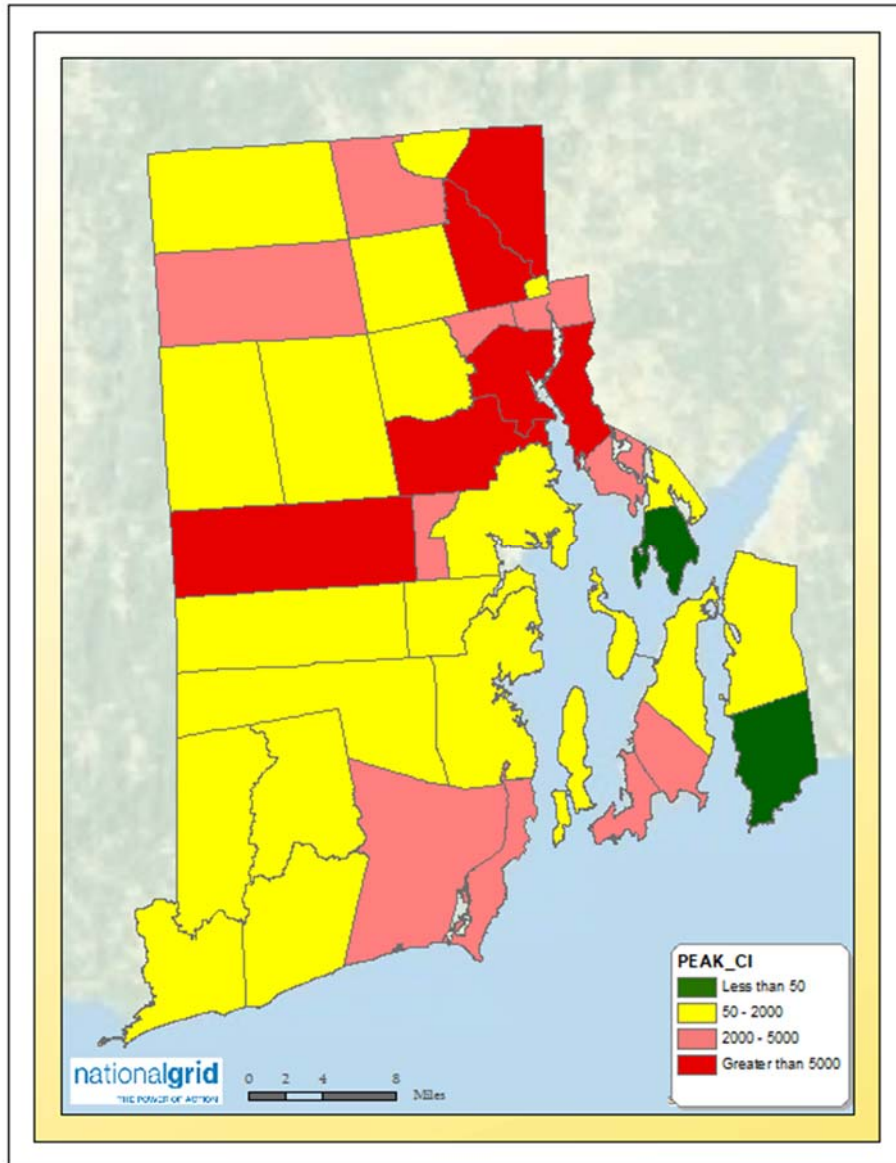
9. # of customers out graph (graphs following):



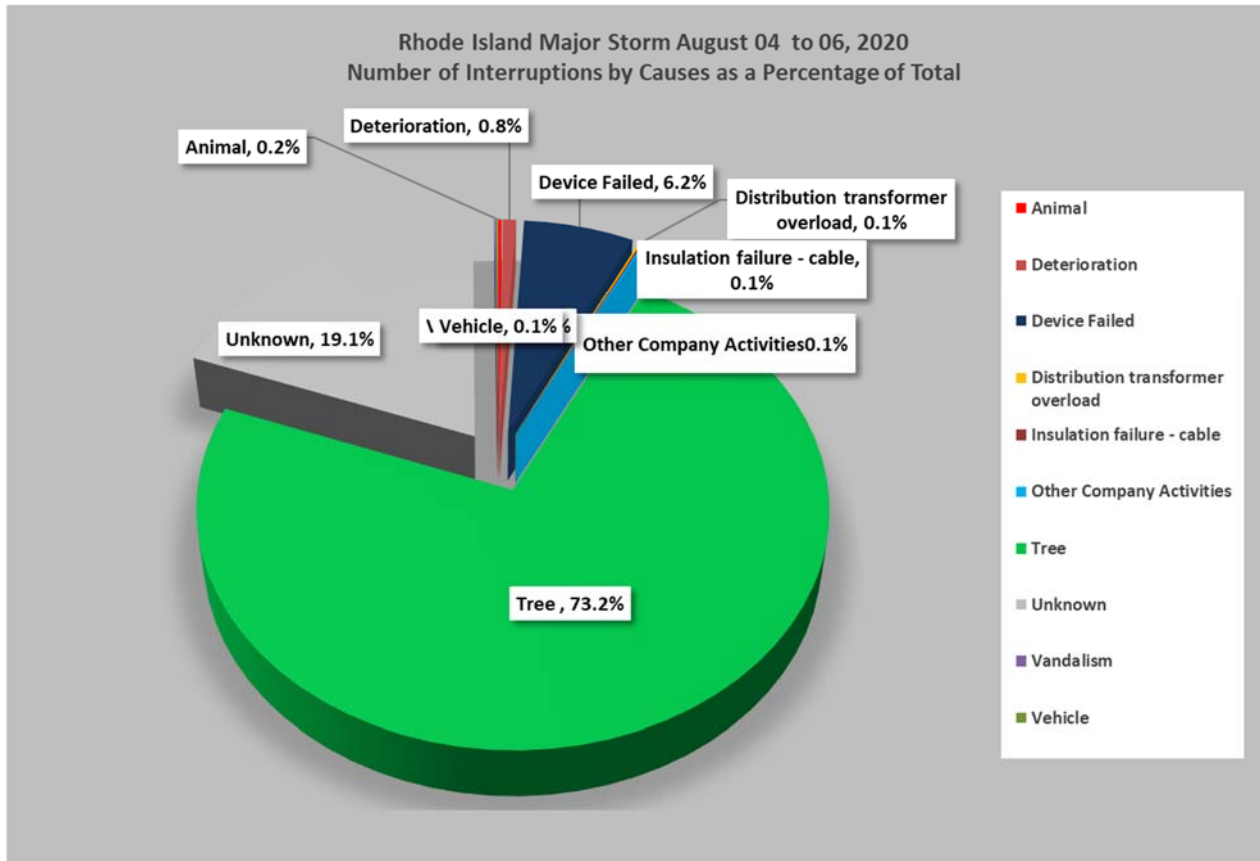


10. Impacted area:

**Customer Interrupted by Town at Company Peak  
RI 08/04/2020 to 08/06/2020**



11. Cause:



12. Weather impact on restoration:

Tropical Storm Isaias was a significant weather event that resulted in significant damage to the Company's electrical system. The Storm brought widespread rain and hazardous winds to 5 the Company's service territory. The Towns of Exeter and Coventry were affected most heavily with approximately 96 and 79 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:

##### **August 4, 2020**

During this storm, on August 4, 2020 Rhode Island experienced a total of 572 interruptions that affected 130,386 customers and 141,204,376 customer minutes of interruption. On average these interruptions resulted in 0.262 SAIFI, 283.464 minutes of SAIDI. Since a SAIDI value of 283.464 minutes exceeded the threshold value of 6.03 minutes, August 4, 2020 qualified as a Major Event Day under the IEEE methodology.

##### **August 5, 2020**

During this storm, on August 5, 2020 Rhode Island experienced a total of 73 interruptions that affected 2,602 customers and 693,650 customer minutes of interruption. On average these interruptions resulted in 0.005 SAIFI, 1.39 minutes of SAIDI. Since a SAIDI value of 1.39 minutes is less than the threshold value of 6.03 minutes, August 5, 2020 is not qualified as a Major Event Day under the IEEE methodology. The restoration continued August 6, 2020. The SAIDI on August 6, 2020 is 0.499 min and will not be qualified as Major storm day.

**September 30, 2020 Storm**

1. Start Date and Time of event:

The storm began in the early morning on Wednesday, September 30, 2020 with scattered interruptions starting at approximately 4:00 a.m. and peaked around 8:38 p.m. on September 30, 2020. The peak reached 24,458 customers interrupted.

2. Number/Location of crews on duty (both internal and external crews):

The Company secured a total of 286 internal and external field crews to restore power to customers in Rhode Island, consisting of approximately 126 external crews and 160 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	136 crews total
	External Overhead Line	97 crews total
	Internal Wire Down	50 crews total
	Internal Transmission	2 crews total
	Internal Underground	25 crews total
	Internal Substation	72 crews total
	Contractor Forestry	68 crews total

4. The first instance of mutual aid coordination:

No mutual aid was called for this storm.

5. The first contact with material suppliers:

The first contact with material suppliers started on September 30, 2020.

6. Inventory levels: Pre-event/Daily/Post-event:

<b>Event Date</b>	<b>RI Inventory Locations</b>	<b>Allocated NEDC Inventory</b>	<b>Total Inventory</b>
9/30/2020	\$1,006,312	\$6,946,754	\$7,953,067

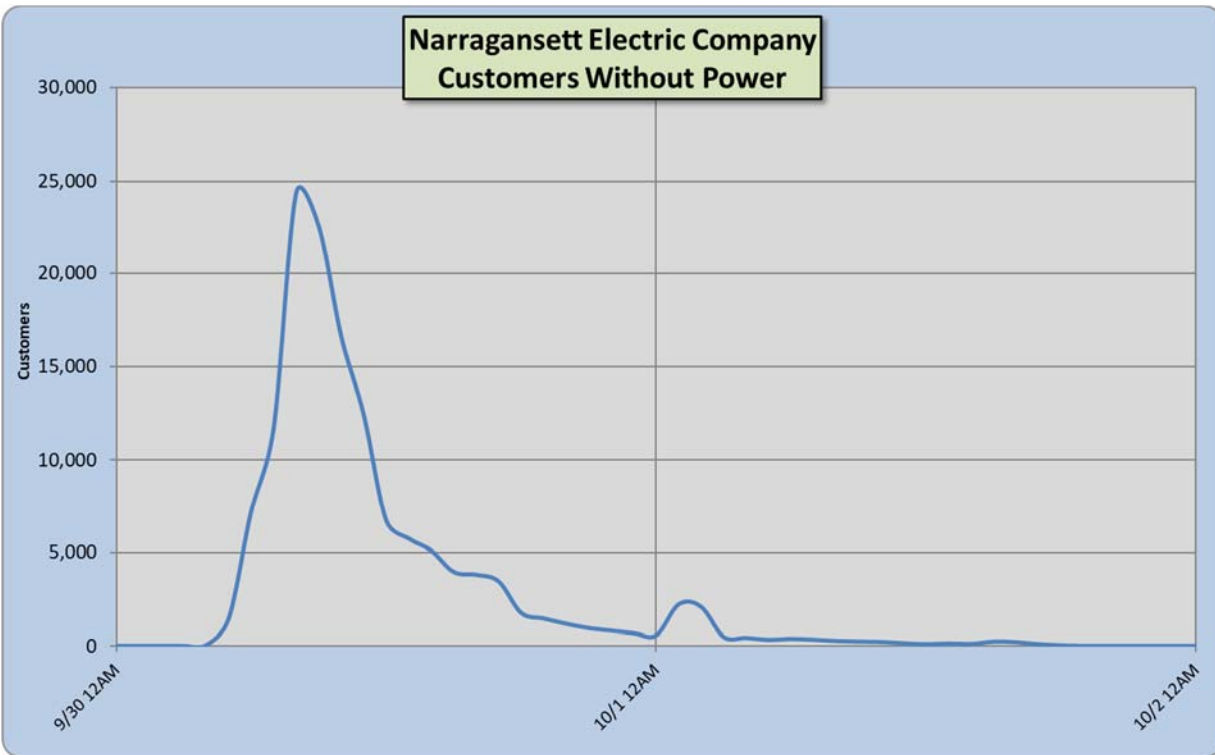
7. Date/Time of request for External Crews:

The State Incident Commander for National Grid’s Rhode Island was able to obtain sufficient external contractor crews, as well as some Forestry crews from the Company’s sister utility in New York, to supplement restoration efforts in New England. No additional assistance was required from companies in the North Atlantic Mutual Assistance Group (“NAMAG”) to support restoration for this event.

8. Date/Time of external Crews assignment:

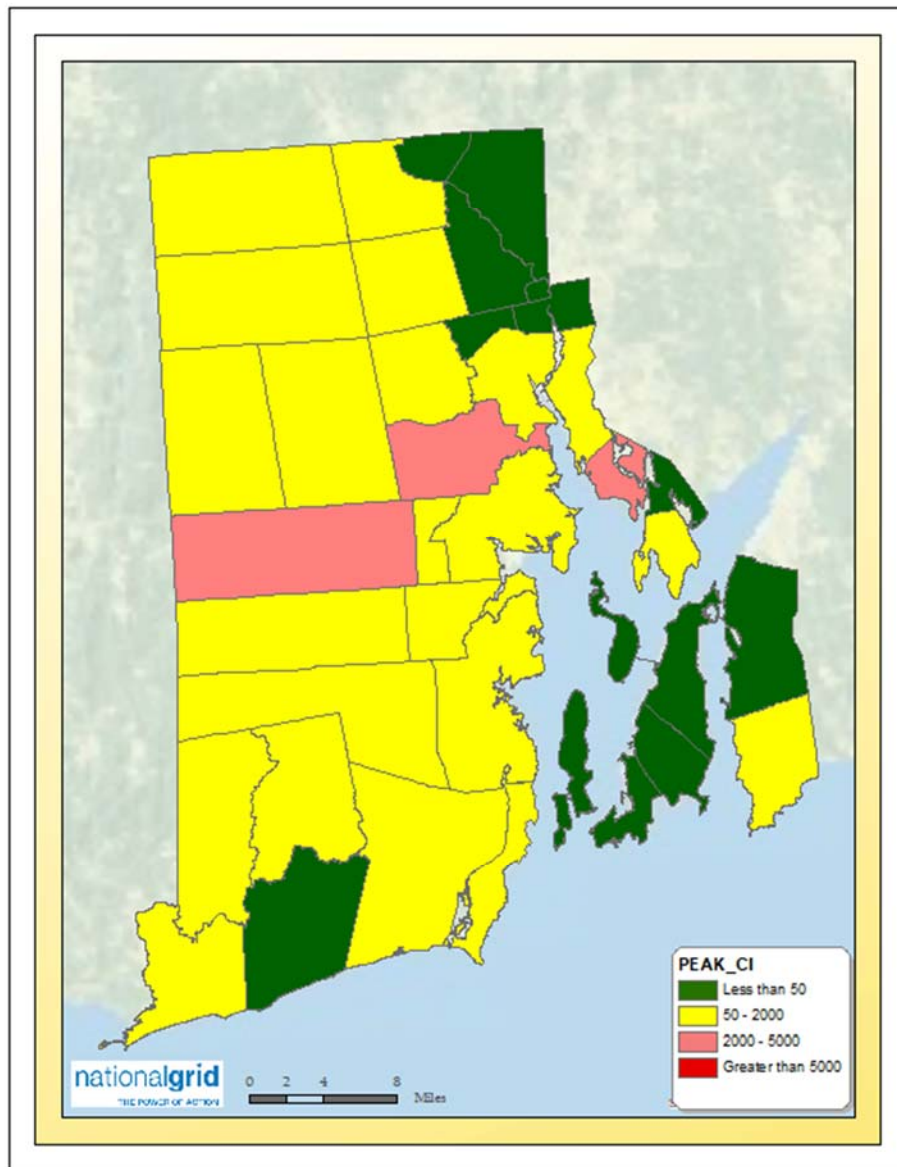
Mutual Assistance was not called for this storm.

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

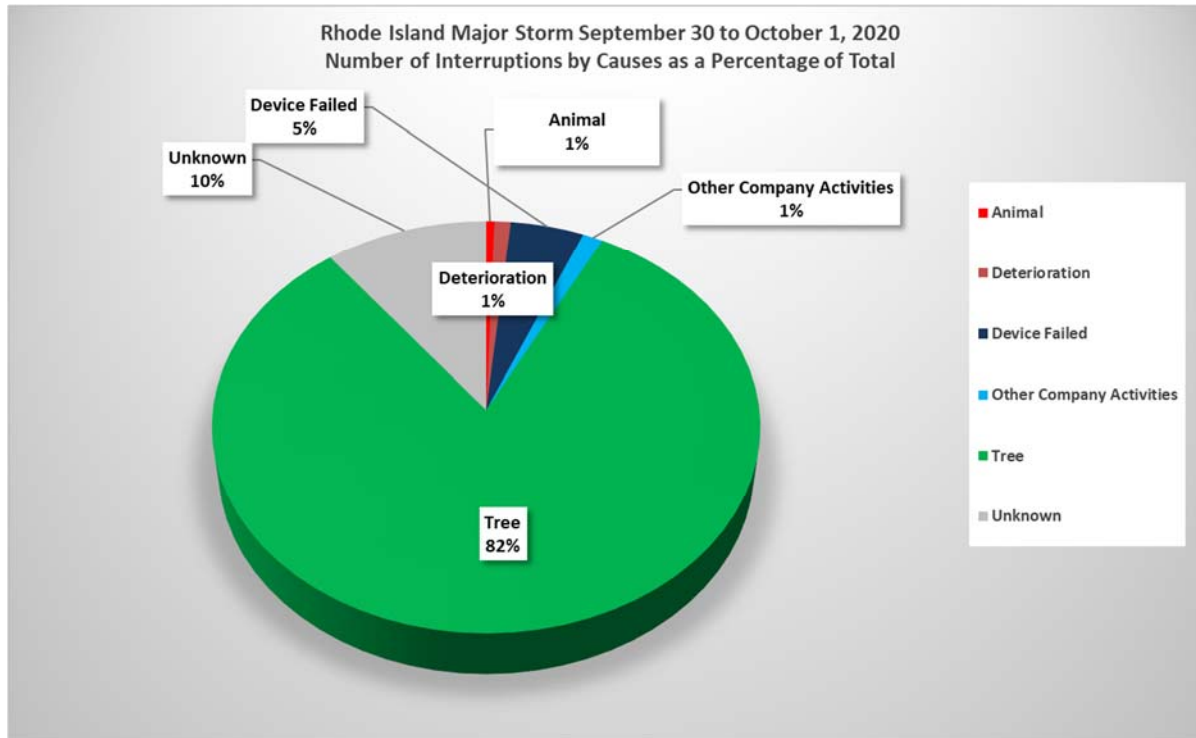


10. Impacted area:

**Customer Interrupted by Town at Company Peak  
RI 09/30/2020 to 10/01/2020**



11. Cause:



12. Weather impact on restoration:

The September 29-30, 2020 Storm was a significant weather event that resulted in moderate damage to the Company's electrical system. The Storm brought some rain, thunderstorms, and widespread hazardous winds to the Company's service territory. Parts of Rhode Island experienced wind gusts in the 40 to 50 mph range, with some areas seeing even higher gusts. The City of Providence experienced a peak gust of 56 mph. The Towns of Jamestown, Glocester, and Coventry were affected most heavily with approximately 47 percent of their customers impacted 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:

##### **September 30, 2020**

During this storm, on September 30, 2020 Rhode Island experienced a total of 348 interruptions that affected 34,721 customers and 10,092,529 customer minutes of interruption. On average these interruptions resulted in 0.070 SAIFI, 20.25 minutes of SAIDI. Since a SAIDI value of 20.25 minutes exceeded the threshold value of 6.03 minutes, September 30, 2020 qualified as a Major Event Day under the IEEE methodology.

##### **October 1, 2020**

During this storm, on October 1, 2020 Rhode Island experienced a total of 64 interruptions that affected 2,421 customers and 247,822 customer minutes of interruption. On average these interruptions resulted in 0.005 SAIFI, 0.497 minutes of SAIDI. Since a SAIDI value of 0.497 minutes is less than the threshold value of 6.03 minutes, October 1, 2020 is not qualified as a Major Event Day under the IEEE methodology.



**October 7, 2020 Storm**

1. Start Date and Time of event:

The storm began in the morning on Wednesday, October 7, 2020 with scattered interruptions starting at approximately 10:00 a.m. and peaked around 7:41 p.m. on October 7<sup>th</sup>, 2020. The peak reached 42,814 customers interrupted.

2. Number/Location of crews on duty (both internal and external crews):

The Company secured a total of 247 internal and external field crews to restore power to customers in Rhode Island, consisting of approximately 115 external crews and 132 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	183 crews total
	External Overhead Line	194 crews total
	Internal Wire Down	72 crews total
	Internal Transmission	3 crews total
	Internal Underground	31.5 crews total
	Internal Substation	108 crews total
	Contractor Forestry	171 crews total

4. The first instance of mutual aid coordination:

Mutual aid was not called for this storm.

5. The first contact with material suppliers:

The first contact with material suppliers started on October 7, 2020.

6. Inventory levels: Pre-event/Daily/Post-event:

Event Date	RI Inventory Locations	Allocated NEDC Inventory	Total Inventory
10/7/2020	\$908,625	\$6,904,389	\$7,813,015

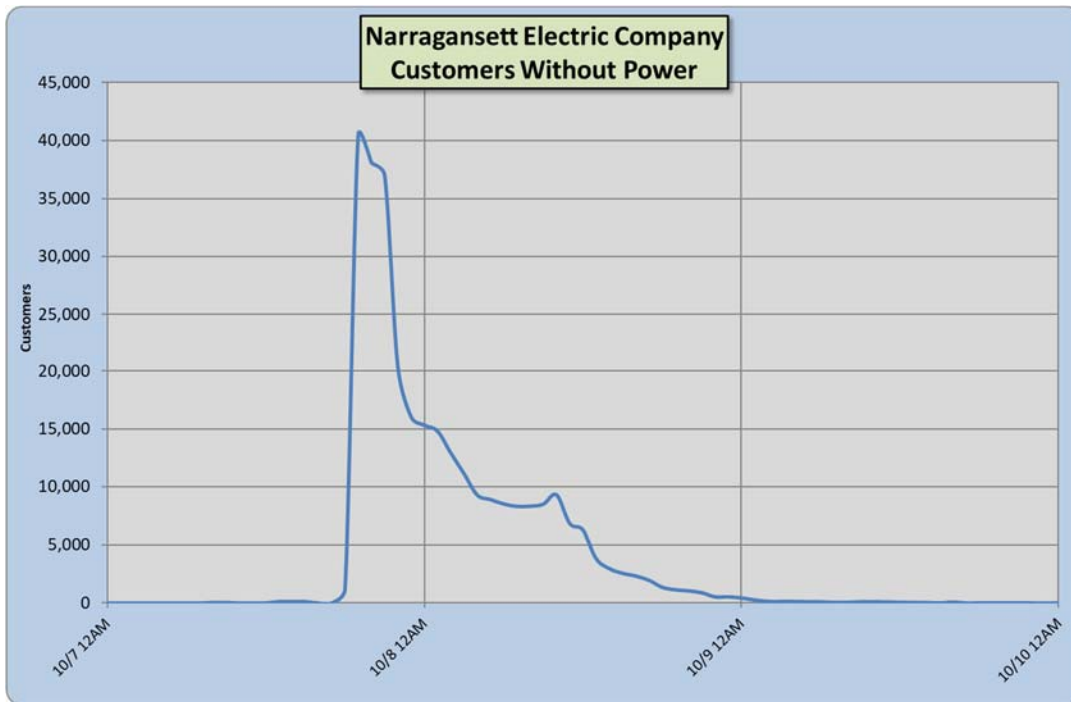
7. Date/Time of request for External Crews:

The State Incident Commander for National Grid’s Rhode Island was able to obtain sufficient external contractor crews, as well as some Forestry crews from the Company’s sister utility in New York, to supplement restoration efforts in New England. No additional assistance was required from companies in the North Atlantic Mutual Assistance Group (“NAMAG”) to support restoration for this event.

8. Date/Time of external Crews assignment:

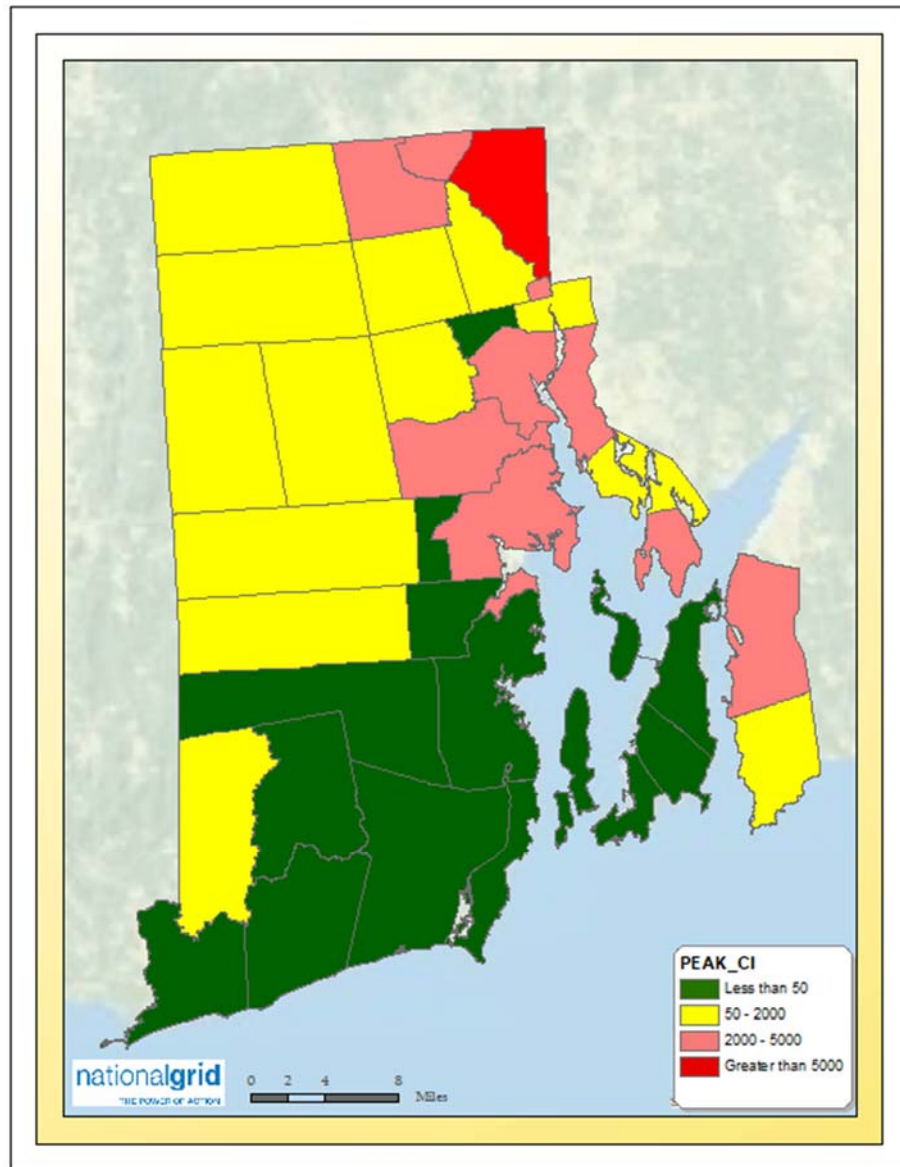
Mutual Assistance was not called for this storm.

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

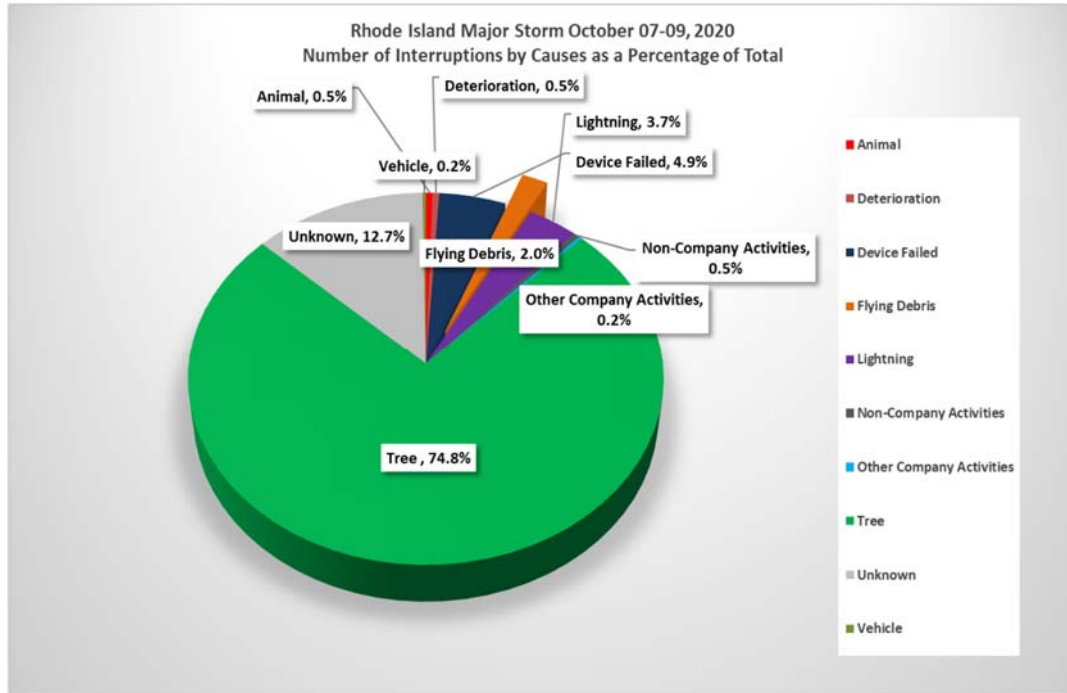


10. Impacted area:

**Customer Interrupted by Town at Company Peak  
RI 10/07/2020 to 10/09/2020**



11. Cause:



12. Weather impact on restoration:

The October 7-9, 2020 Storm was a significant weather event that resulted in moderate damage to the Company’s electrical system. The Storm brought some rain, thunderstorms, and widespread hazardous winds to the Company’s service territory. Parts of Rhode Island experienced wind gusts in the 45 to 55 mph range, with some areas seeing even higher gusts. The Towns of North Smithfield and Little Compton and the City of Central Falls were affected most heavily with between approximately 36-45 percent of their customers impacted 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 7, 2020**

During this storm, on October 7, 2020 Rhode Island experienced a total of 243 interruptions that affected 43,866 customers and 17,835,777 customer minutes of interruption. On average these interruptions resulted in 0.088 SAIFI, 35.78 minutes of SAIDI. Since a SAIDI value of 35.78 minutes exceeded the threshold value of 6.03 minutes, October 7, 2020 qualified as a Major Event Day under the IEEE methodology.

##### **October 8, 2020**

During this storm, on October 8, 2020 Rhode Island experienced a total of 88 interruptions that affected 3,124 customers and 230,332 customer minutes of interruption. On average these interruptions resulted in 0.0063 SAIFI, 1.35 minutes of SAIDI. Since a SAIDI value of 0.46 minutes is less than the threshold value of 6.03 minutes, October 8, 2020 is not qualified as a Major Event Day under the IEEE methodology. The restoration continued October 9, 2020. The SAIDI on October 9, 2020 is 0.07 min and will not be qualified as Major storm day.

**November 30, 2020 Storm**

1. Start Date and Time of event:

The storm began in the morning on Wednesday, November 30, 2020 with scattered interruptions starting at approximately 8:00 a.m. and peaked around 4:20 p.m. on November 30, 2020. The peak reached 36,461 customers interrupted.

2. Number/Location of crews on duty (both internal and external crews):

The Company secured a total of 272 internal and external field crews to restore power to customers in Rhode Island, consisting of approximately 151 external crews and 121 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	122 crews total
	External Overhead Line	131 crews total
	Internal Wire Down	64 crews total
	Internal Transmission	2 crews total
	Internal Underground	22 crews total
	Internal Substation	96 crews total
	Contractor Forestry	116 crews total

4. The first instance of mutual aid coordination:

Mutual aid was not called for this storm.

5. The first contact with material suppliers:

The first contact with material suppliers started on November 30, 2020.

6. Inventory levels: Pre-event/Daily/Post-event:

<b>Event Date</b>	<b>RI Inventory Locations</b>	<b>Allocated NEDC Inventory</b>	<b>Total Inventory</b>
11/30/2020	\$915,345	\$6,760,606	\$7,675,951

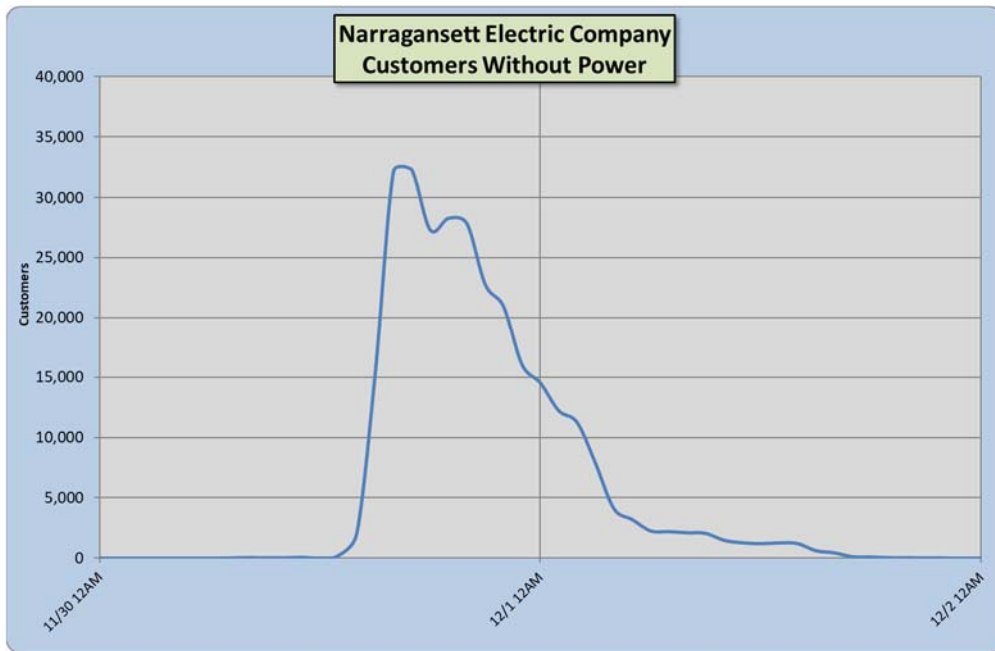
7. Date/Time of request for External Crews:

The State Incident Commander for National Grid’s Rhode Island was able to obtain sufficient external contractor crews, as well as some Forestry crews from the Company’s sister utility in New York, to supplement restoration efforts in New England. No additional assistance was required from companies in the North Atlantic Mutual Assistance Group (“NAMAG”) to support restoration for this event.

8. Date/Time of external Crews assignment:

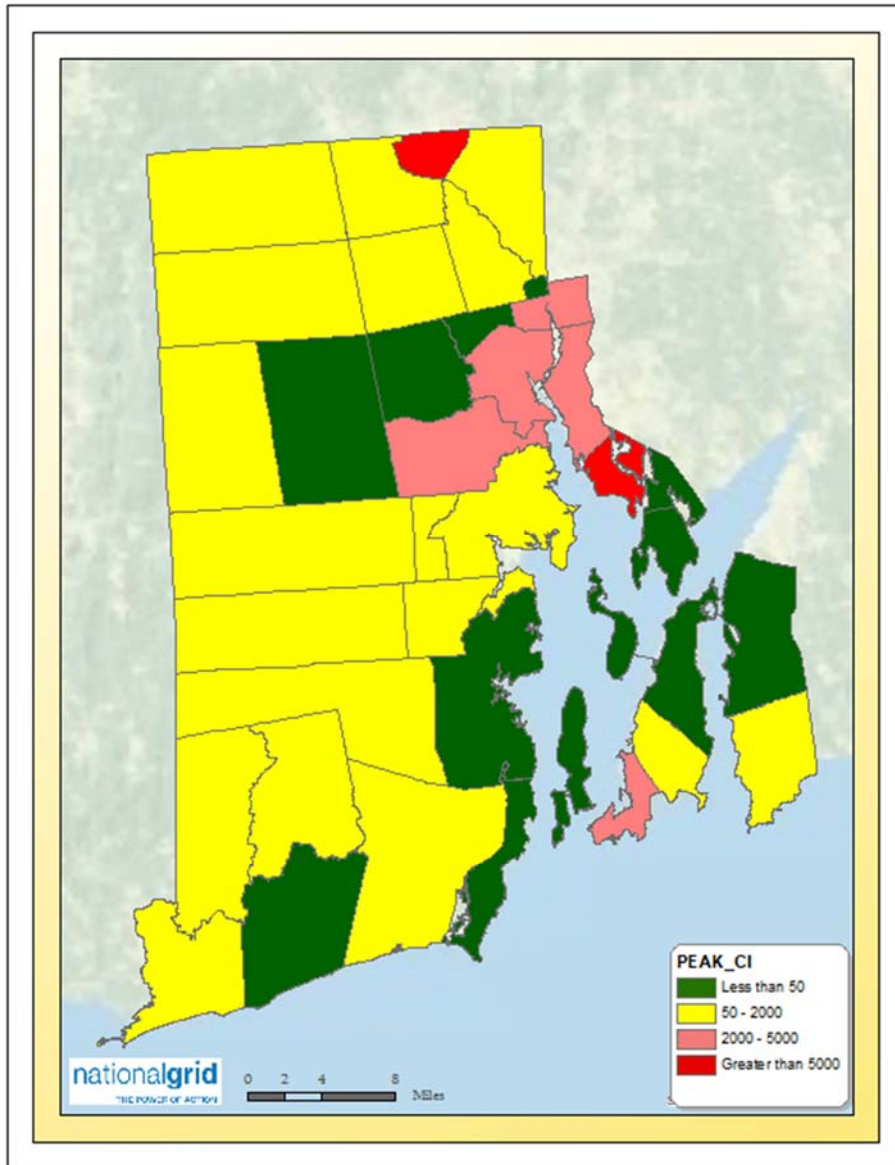
Mutual Assistance was not called for this storm.

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



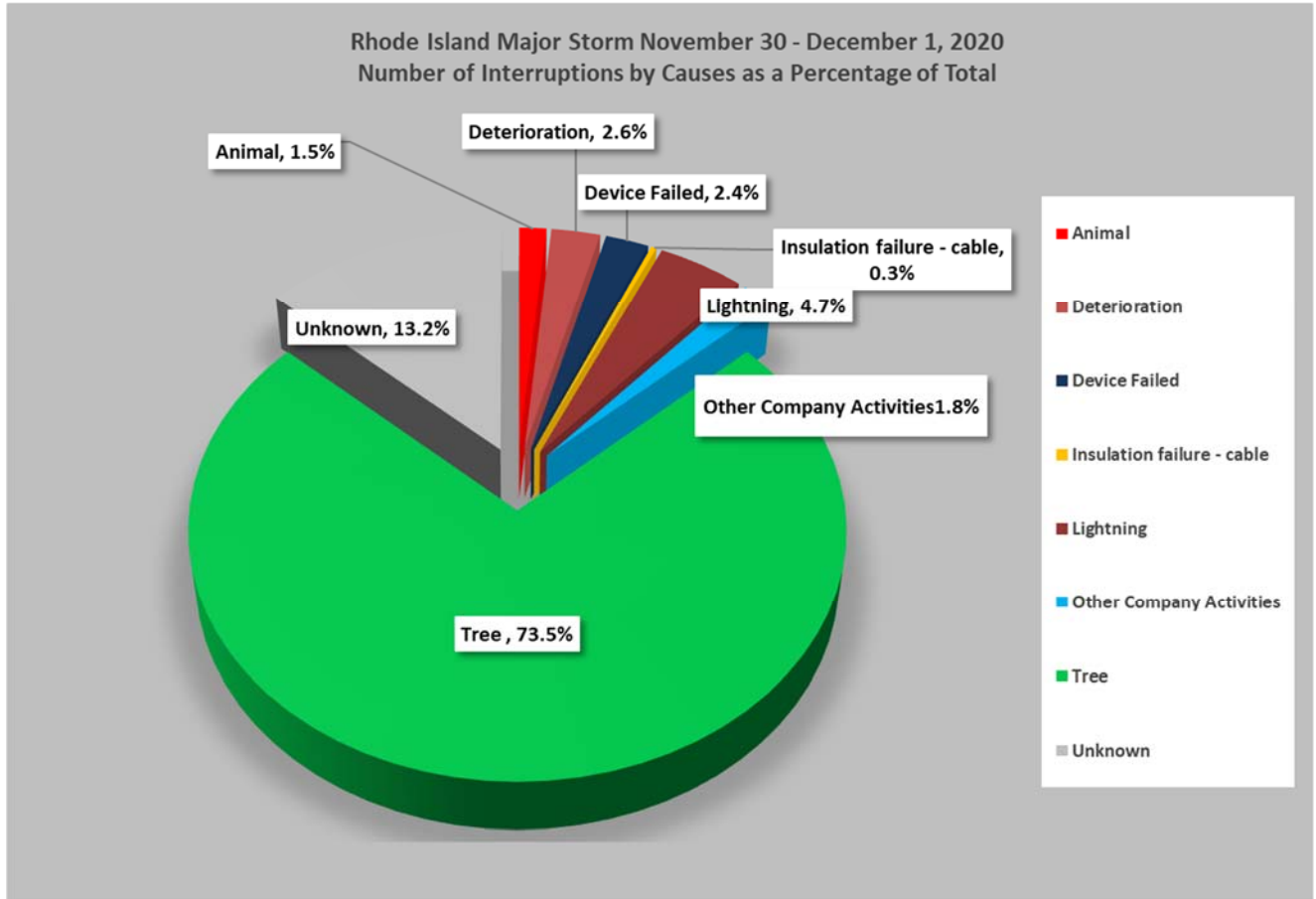
10. Impacted area:

**Customer Interrupted by Town at Company Peak  
RI 11/30/2020 to 12/01/2020**





11. Cause:



12. Weather impact on restoration:

The November 30, 2020 Storm was a significant weather event that resulted in significant damage to the Company's electrical system. The Storm brought a line of thunderstorms with heavy rain and hazardous wind gusts to portions of the Company's service territory. Eastern and especially coastal areas experienced wind gusts in the 45–50 mph range, with Providence experiencing a peak gust of 58 mph. The Towns of Barrington and Exeter were affected most heavily with approximately 98 and 52 percent of their customers impacted by the event, respectively.

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:

##### **November 30, 2020**

During this storm, on November 30, 2020 Rhode Island experienced a total of 211 interruptions that affected 56,284 customers and 17,170,899 customer minutes of interruption. On average these interruptions resulted in 0.113 SAIFI, 34.47 minutes of SAIDI. Since a SAIDI value of 34.47 minutes exceeded the threshold value of 6.03 minutes, November 30, 2020 qualified as a Major Event Day under the IEEE methodology.

##### **December 1, 2020**

During this storm, on December 1, 2020 Rhode Island experienced a total of 88 interruptions that affected 3,124 customers and 230,332 customer minutes of interruption. On average these interruptions resulted in 0.0063 SAIFI, 1.35 minutes of SAIDI. Since a SAIDI value of 0.46 minutes is less than the threshold value of 6.03 minutes, December 1, 2020 is not qualified as a Major Event Day under the IEEE methodology.