

OCTOBER 2017 WIND STORM



EVERSOURCE
ENERGY

Introduction

Modern technology, army of workers, help restore power quickly to hundreds of thousands impacted by high winds

Late in the week of October 23, 2017, national and New England weather experts were predicting significant rainfall and a period of wind gusts capable of causing localized power outages late in the weekend. Eversource's New Hampshire electric operations team immediately began to prepare for a likely outage response, and focused attention on the seacoast region where forecasters expected the strongest winds. Tree and line crews were standing by and ready.

And then, a change in the forecast: A combination of weather events came together to form what is known in meteorological terms as a "bombogenesis"—an extreme low pressure area that traveled further west than expected and produced damaging winds in nearly all 211 New Hampshire communities served by Eversource, as well as in neighboring Maine and other New England



states. Prolonged wind gusts in the overnight hours, combined with trees still laden with foliage, resulted in significant damage to the Eversource system. The extent of that damage was exemplified by the more than 400 poles that needed to be replaced—second only to the catastrophic 2008 ice storm.

At the height of the storm, 217,681 customers were without power—the fourth largest outage in New Hampshire history. Most, however, had their power restored by Eversource within 72 hours.

And while the storm produced the challenge of restoring numerous and widely scattered individual outages throughout the state, the outcome could have been far worse.

Eversource's recent emphasis on state-of-the-art technologies that can sense where an outage occurs and then reroute power to many impacted customers helped get the lights back on quickly in many areas. In addition, Eversource's aggressive schedule of tree trimming around the state helped minimize the number of weak or overgrown trees from succumbing to the power of the wind. Finally, a rapid mobilization of nearly 1,500 Eversource and

"With our crews and support teams leading the way, the tireless, cooperative efforts of an army of workers in the field, as well as outstanding cooperation from the local and state leaders and emergency responders all helped us to safely restore power to our customers sooner than we had projected."

**—Bill Quinlan,
NH Electric Operations President**

contractor crews as the storm's impact was becoming evident was key to getting power restored to the majority of impacted customers within 72 hours. And just 48 hours after the storm hit and damage was being assessed, Eversource customers were receiving estimated restoration times for all affected communities.

This report presents an overview of Eversource's preparation, restoration, and communication strategies leading up to and through the October 29, 2017 wind storm power restoration in New Hampshire. Our sincerest thanks to all who helped us achieve another safe and successful restoration, and to our customers for their support, encouragement, and patience during an especially challenging restoration event.

October 2017 Wind Storm Restoration

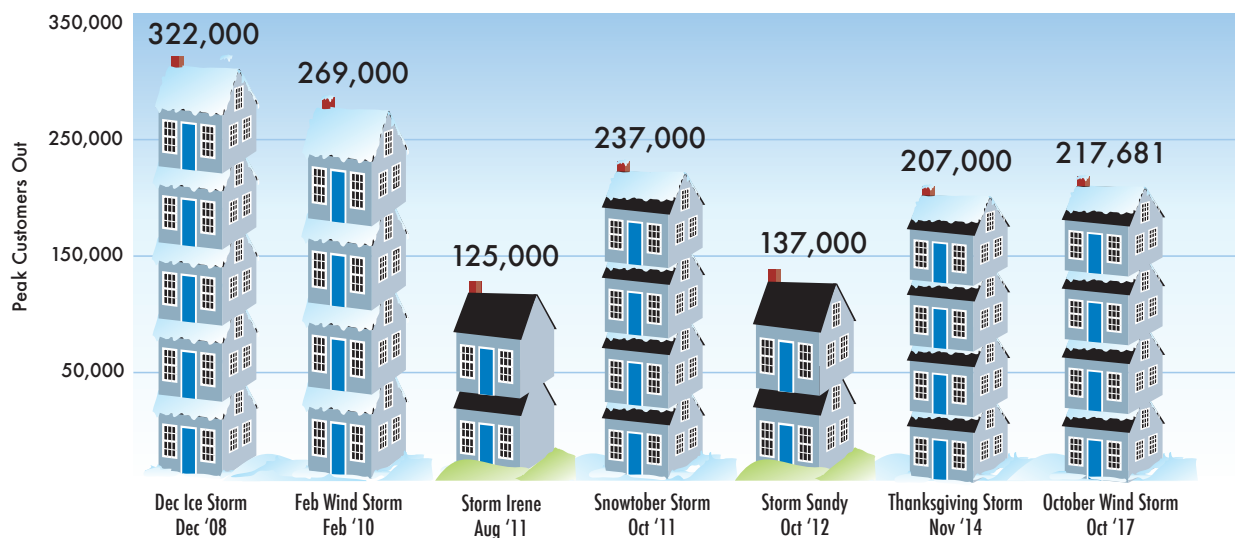
Key Statistics

Number of Electric Customers Statewide Without Power at Peak	275,806
Number of Eversource NH Customers Without Power at Peak	217,681
Total Number of Eversource NH Customers Impacted and Restored	316,375
Number of Outage Events	4,035
Total Number of Crews Restoring Power to Eversource Customers	865
Customer Calls	67,290 in five days
Percent of Calls Answered Within 30 Seconds	43.4%
Miles of New Electric Cabling Restrung	24.06 (about the distance between Nashua and Goffstown)
Damaged Utility Poles Replaced	408
Utility Pole Crossarms Replaced	403
Transformers Replaced	463
Duration of Restoration Effort	6 days

October Wind Storm: Fourth Largest Outage in New Hampshire History

U.S. crews assisting in the restoration came from as far away as Kentucky and Tennessee.

Canadian crews from New Brunswick and Quebec also assisted.



Preparation and Restoration

The October 2017 wind storm restoration timeline, from the first forecast until its substantial completion:

Thursday, October 26

Eversource begins monitoring initial weather reports for possible high winds and flooding rains late afternoon Sunday and Sunday night. Early projections are that the worst impact would be along the seacoast. All Operations departments are alerted to prepare their teams for an outage response, and supplies are stocked and ready to respond.

Friday, October 27

Eversource Operations holds an Incident Management Team storm call in the early afternoon with department leaders to begin mobilization efforts in anticipation of likely outages, especially along and within 30 miles of the New Hampshire seacoast. Forecasters at two weather agencies agree that the chances of a “worst case” scenario of the system moving to the west are only at about 20 percent. Based on that information, Eversource begins plans to stage additional line and tree crews in the eastern part of the state by early Sunday evening, with all other teams around the state on alert.



“This was an exceptionally destructive storm, with widespread damage to the electric system throughout New Hampshire; however, Eversource’s new system automation technology combined with the hundreds of line and tree crews who worked tirelessly around the clock helped us to successfully restore power to nearly 300,000 impacted customers within the first 72 hours.”

**—Joe Purington,
Vice President NH Operations**

Sunday, October 29

With the forecast remaining steady for damaging winds overnight, Eversource opens its Incident Command Center at 11 p.m., ready to mobilize crews as needed and making preliminary outreach to mutual aid crews. But the storm that began as a weak area of low pressure in the Carolinas received moisture and energy from ex-Tropical Storm Phillipe, moved west up the St. Lawrence Valley where it underwent rapid “bombogenesis”—a rapid deepening of pressures within a storm that result in rapid wind increases. Rather than being confined to the eastern portions of the state, the storm’s high winds roared for several hours overnight throughout New Hampshire, peaking at more than 60 MPH in many locations and 131 MPH atop Mount Washington. At the peak of the storm, 217,681 Eversource customers in New Hampshire were without power—including 36 communities left completely in the dark.

Monday, October 30

As daylight dawned, the evidence of destruction became clearer—numerous roads throughout the state were closed by washouts from heavy rain or from fallen trees, slowing initial damage assessment response. Nevertheless, in the overnight hours, Eversource had restored power to more than 45,000 customers, many of those through the company’s newly-implemented intelligent switching technology that provides situational awareness so that operators can reroute power to as many customers as possible. Early morning, Eversource requests hundreds of additional line and tree crews through the North Atlantic Mutual Assistance Group. Companies from New Brunswick, Quebec, Kentucky and Tennessee immediately send crews. Demand for additional resources is high due to extensive damage in other surrounding states. A staging area is established at Manchester Airport where mutual aid crews will arrive and be deployed. Eversource’s liaison to the New Hampshire Public Utilities Commission is now stationed at the state’s Emergency Operations Center to facilitate timely communication. Damage assessment and road clearing continue throughout the day, and by evening, efforts by Eversource crews and the company’s automation technology have restored power to 168,000 customers since the beginning of the storm.

Tuesday, October 31

With more than 30,000 customers' power restored in the overnight hours, and an additional 73 line crews and 56 tree crews from the eastern U.S. and Canada arriving at the Manchester Airport staging area, Eversource announces a statewide global estimated time of restoration (substantially complete) by Friday. Tree crews and damage assessors make great progress during the day as roads are cleared, and late in the day, Eversource posts the first town-by-town estimated time of restoration on the company's website and social media channels. Throughout the storm and restoration, customers increasingly use texting, Facebook, and Twitter to inquire of restoration times and provide locations of outages in their communities.

Wednesday, November 1

As many larger clusters of customers are continually brought back online, damage reports make it increasingly evident that there are an exceptional number of individual and scattered outages in nearly every impacted community in the state. Restoring these areas is a slow process since it can mean multiple line crews and vehicles on a rural road working to get the lights back on to a handful of customers. However, by day's end, fewer than 13,000 customers remain without power, with nearly 300,000 customers having power restored since the beginning of the storm. More than 1,500 line workers, service workers, and tree workers from several states are working throughout the state to complete the restoration as quickly as possible. Progress has been significant enough to enable decommissioning of the Manchester Airport mutual aid staging area.

Thursday, November 2

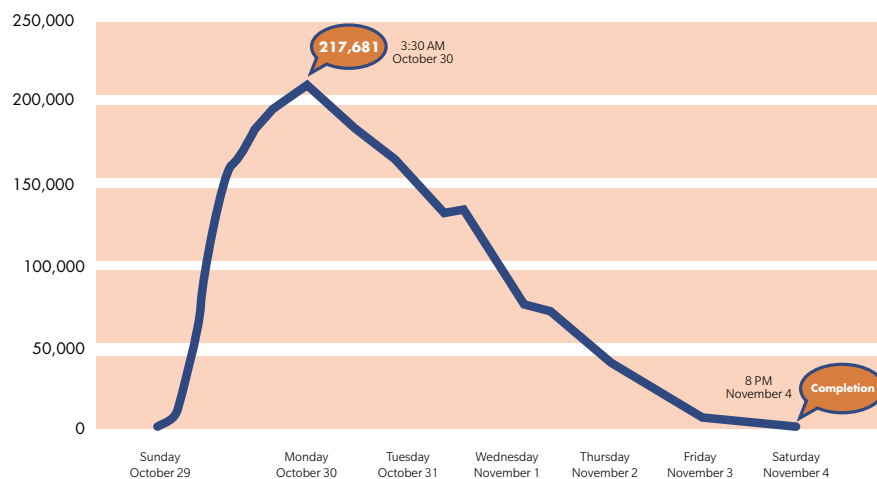
With fewer than 5,000 scattered outages throughout the state, crews are moved strategically to support areas most in need, particularly the rural North Country and communities to the south and east of the Lakes Region. Communications outreach includes phone calls to individual customers still without power, and regular updating of the town-by-town restoration estimates.

Friday, November 3

Meeting its Friday goal of a global estimated time of "substantially complete" restoration for the state's communities, Eversource focuses on the fewer than 1% of its customers still without power, with crews working through the night and into the weekend to get the lights on in mostly rural areas and remote sections of the North Country.

Restoration Graph

Peak Number of Customers Without Power



Adhering to Safety-for-all Best Practices

Throughout the year, "Safety First and Always" is a top priority for Eversource. We have a proud tradition of achieving and promoting safety excellence, and whether it was helping to clear roads and power lines from fallen trees and branches, replacing several hundred broken poles, or reconnecting service from our lines to customer homes and business, Eversource crews adhered to industry best practices by working safely for themselves and the public throughout the October 2017 wind storm restoration.

We also made every effort to ensure that our customers stayed safe throughout the restoration. Through Eversource's communications teams, Eversource made safety a priority in media reports and press releases, and in text, call, and email messaging to customers and employees alike, including:

- Reminders throughout the day to workers in the field about driving and walking with extreme caution;
- An emphasis on safe generator installation and operating practices;
- Regular media alerts regarding avoidance of downed lines of any kind.

A New Era of Outage Restoration & Situational Awareness

Since mid-2015, Eversource has employed a satellite-based technology that provides 24/7 “eyes on the system,” improving the speed and efficiency by which power is restored during an outage. Distribution Automation (DA) technology uses pole-top devices that can quickly communicate trouble spots to a device controller at the bottom of the pole (pictured). The device controller then relays the critical information to Eversource’s state-of-the-art Integrated Electric Operations Center (IEOC) in Manchester for analysis and response.



In essence, Distribution Automation technology allows Eversource to remotely monitor electric circuits on our system, and more quickly switch and reroute power so that more customers can keep their lights on during an outage, such as during the October 2017 wind storm. From January through October alone, DA devices helped save more than 166,000 customers from a prolonged outage. The

technology also speeds our crews’ response because we can more quickly identify specific trouble spots during an outage.

During the high winds of October 29 and 30, which affected nearly 60 percent of Eversource customers in New Hampshire, 71,000 customers had their power quickly restored through a combination of automated and operator actions.

“You guys restored power back to my home quickly—thank you (also Quebec crews) for doing that, working through the storm and the holiday!”

—John Hines, Raymond

Here’s how Distribution Automation technology works:

- A pole-top recloser—a small circuit breaker device that can isolate a trouble spot on the power line—measures all the electrical quantities of the power that’s flowing through its portion of the line.
- Say a tree or large branch falls on a distribution line along a street in your neighborhood; the recloser will open, which de-energizes the line, and it also “sees” the location of the trouble spot nearby or further down the line.
- The information is sent to the device controller at the bottom of the pole where the computer-like system converts the information into a digital format and then relays it to Eversource’s IEOC.
- Eversource system operators then quickly analyze the DA information to determine where the tree or branch fell and reroutes power to adjacent circuits, restoring as many customers as possible.
- The information from the device controller also helps pinpoint where the tree or large branch fell so that Eversource crews can respond and make repairs more quickly and efficiently.

More than 1,000 DA units have been installed on key Eversource circuits statewide, all keeping an eye on Eversource’s entire New Hampshire distribution system around the clock.

How We Restore Power

“Why does power restoration to some areas take longer than others?”

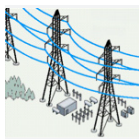
The manner in which power is restored, and why some neighbors can have power while others across the street do not, is perhaps the biggest question Eversource gets during any major restoration effort. The answer is complex, because the electric power grid around your community acts like a giant circulatory system with numerous arteries and veins that may seem to go everywhere but are actually very much interconnected. Because electric power line “veins” are added over the years to accommodate growing communities and businesses, while they ultimately connect to a main power source, the “artery” in which they receive that power may be completely different than the one across the street.

Eversource understands it can be frustrating to see a neighbor’s lights back on while you are still in the dark. It’s simply because power circuits do not always follow streets or area geography. If you see a repair crew drive by your house during an outage but not stop, do not assume you have been forgotten. It is likely that we are assessing outages further down the “artery” that may be affecting the “vein” leading to your home.

Here’s how we restore power: During severe weather conditions, there could be numerous breaks or outages between the substation (source of electrical power) and a residence or business, which means that repairs must be completed sequentially—beginning at the substation and ending at the residence or business.

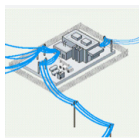
When widespread damage occurs, it is impossible to restore power to everyone at the same time. Eversource gives priority to hospitals, fire, police and safety facilities, and elderly care facilities. We continue to repair damage based on restoring power to the greatest number of customers in the shortest period of time.

Here’s a snapshot of the process:



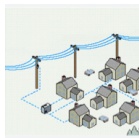
High-Voltage Transmission Lines

Transmission structures and cables that supply power to transmission substations (and thousands of customers) rarely fail. But when damage occurs, these facilities must be repaired before other parts of the system can operate.



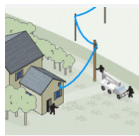
Distribution Substation

Each substation serves hundreds or thousands of customers. When a major outage occurs, line crews inspect substations to determine if problems stem from transmission lines feeding into the substation, the substation itself, or if problems exist down the line.



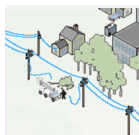
Main Distribution Lines

If the problem cannot be isolated at a distribution substation, distribution lines are checked. These lines carry power to large groups of customers in entire communities or neighborhoods.



Tap Lines

If local outages persist, supply lines, called tap lines, are inspected. These lines deliver power to transformers, either mounted on poles or placed on pads for underground service, outside businesses, schools, and homes.



Individual Homes

If your home remains without power, the service line between a transformer and your residence may need to be repaired.

REMINDER: ALWAYS CALL EVERSOURCE TO REPORT AN OUTAGE TO HELP LINE CREWS ISOLATE THE TROUBLE SPOT AFFECTING YOUR HOME OR BUSINESS.

Proactive Tree Trimming for a More Reliable System



“Thank you Eversource for all your efforts and progress updates. A special thanks to your linemen and tree crews for their difficult and hard work. It’s appreciated!”
—Dick Richards, via Facebook

New England is home to some of the most forested states in the country, and leading them all is New Hampshire. The number one cause of a power outage is falling tree limbs that down wires and break other electrical equipment, such as what occurred during the October 2017 wind storm. No tree is immune to high winds, but a major part of Eversource maintenance of more than 13,000 miles of overhead transmission and distribution lines throughout New Hampshire includes trimming nearby trees and vegetation that may threaten the reliability of our electric system.

A positive tree-trimming result: No outage in the October 2017 wind storm resulted from trees falling onto our transmission lines.

Throughout the year, our vegetation management professionals undertake several types of tree trimming programs, ranging from trimming and pruning around all electric distribution lines (the lines you see along your street) on a 4-year schedule, to removing hazard trees that are decayed, insect-infested, damaged, or structurally weak.

How Eversource trims trees responsibly for greater reliability:

- Through October, out of more than 2,870 miles of distribution lines scheduled to receive vegetation management in 2017, our certified arborists and contractor tree crews had trimmed 2,257 miles and removed more than 11,354 hazard trees.
- Eversource is also in the midst of a 6-year reliability program on our transmission rights-of-ways (ROW) that are critical to delivering electricity from a power generation source to your neighborhood electrical distribution system. This program includes:
 - Clearing all potentially interfering trees (trees that mature greater than 30 feet in height) that have grown into the peripheral edges of a ROW’s actual easement limits over time.
 - Assessing and protecting wetlands and critical wildlife habitats.
 - Community outreach and communication, and working with state and local officials to carefully follow all environmental and permitting processes, as well as any historical considerations.
 - Inspection of structures and other electrical equipment for possible repairs or replacement. This overall system hardening of our rights-of-ways will improve reliability and reduce the risk of outages, especially during a major storm.

Eversource follows federally-required best management practices when pruning, cutting and removing tall-growing trees and selected invasive shrubs on all of our rights-of-ways.

The Growing Impact of Social Media Communications

Keeping customers informed through an ever-increasing demand for responsive social media channels is a key part of Eversource's multifaceted communications effort

When Eversource began integrating the social media tool Twitter into its public communications during the restoration following the historic 2008 ice storm, it marked the beginning of exponential growth in the way in which customers choose to not just connect with Eversource but to have a responsive relationship with our social media team, which relays expert and timely information from our systems operations professionals. Today, Eversource is renowned throughout the energy industry for its leadership in social media communications, and that leadership continued during the October 2017 wind storm.

During the 2008 ice storm, there were 1,900 Twitter followers. Six years later, that number had soared to more than 22,000 during the restoration following the Thanksgiving 2014 snowstorm. And by the time our interactive restoration communications rolled out during the October 2017 wind storm, more than 46,000 Twitter users were "following" us for the latest information.

Similarly, customers are increasingly turning to Facebook to let us know of outage locations in their neighborhoods, inquire about restoration times, and learn of our progress through the latest photos and reports from the field. As recently as the Thanksgiving 2014 restoration, Eversource's New Hampshire Facebook page totaled 13,000 followers. That number has since doubled to more than 26,700 customers and friends.

To reach this growing audience, Eversource's social media team:

- For the first time during a restoration effort, utilized the additional resources of Customer Care representatives who are ready to interact with customers in a timely fashion as members of our Social Care Team
- Provided safety guidelines to customers, including specifics on generator use
- Explained the restoration process following a major storm
- Went into the field with crews to video the progress and the challenges presented by the storm's significant damage
- Received photos from customers that showed specific locations of damage in their communities
- Posted regular updates of town-by-town estimated restoration times
- Served as a communications conduit when technical difficulties made traditional call-in or online services intermittently unavailable during the restoration
- Provided private messaging to those customers having detailed questions

Social Media Impact

October 30 through November 3, 2017

Combined Social Media

Total Eversource Posts	1,698
Total Incoming Messages	11,906
Private Inbound Messages	4,065

Twitter

Total Followers	46,490
Eversource Tweets	686
Inbound Messages	4,347

Facebook

Total Followers	26,779
Eversource Outbound Posts	1,012
Inbound Messages	7,559

"@EversourceNH Thank you for all the crews that have worked tirelessly this past week to restore power to our homes #windham #grateful"

— @KatWoma_26, via Twitter

A Comprehensive Customer Strategy



Even as social media grows as a customer preference for communicating with Eversource, we continue to employ a comprehensive communications strategy to every demographic, including telephone and email campaigns that alert customers to prepare before a storm, safety during a restoration, and updates on the restoration progress. As the October 2017 wind storm's damage assessment and restoration approaches became clearer, within 48 hours, Eversource's corporate communications team directed customers to a town-by-town listing on the company's website and social media channels that indicated estimated time for substantial completion in each impacted community.

Communications and Media Relations

Eversource's Media Relations personnel provided updates three times a day to the media and public via the company's website and dedicated news blog. Many of these updates served as resources for radio and television reports by state and regional media outlets, including a front-page story in the *New Hampshire Union Leader* on the benefits of Eversource's lineworker troubleshooter teams throughout the year and especially during a major restoration. Each media update included safety reminders, such as proper use of generators and wires-down awareness.

"Thanks so much for the update and your hard work during this difficult time. We look forward (a lot!) to getting our power back today."

—Dan Dutra, via Facebook

Community Outreach

During the restoration effort, Eversource community relations specialists and their liaisons were deployed to the company's area work centers throughout New Hampshire where they provided regular communications to community officials and emergency responders. This focused outreach also helps to speed the restoration process in local communities as our community relations specialists relay important information to Eversource operations from local observers concerning key trouble spots (such as blocked roads and downed lines).

In addition, Eversource's governmental affairs team provided updates to elected officials on the restoration process, especially in those regions that were especially hard-hit during the storm, while our liaisons to the New Hampshire Public Utilities Commission worked out of the state's Emergency Operations Center so that two-way communications could be relayed quickly, accurately, and efficiently.

Customer Care

During the restoration that followed the October 2017 wind storm, it was all hands on deck at Eversource's Manchester Call Center as customer service representatives worked the phones and social media to communicate with customers:

- Customer care representatives answered more than 64,750 customer calls;
- More than 43 percent of all calls were answered in less than 30 seconds;
- From Sunday, October 29 until the restoration's substantial completion on Friday, November 3, the Manchester Call Center conducted regular phone, email, and cell phone text initiatives concerning critical care support, how to report an outage, and updates on the restoration process.

Looking Ahead

Highlights from the October 2017 Storm

Communications Is King

With every storm, and in our day-to-day operations, there is nothing more important to our customers and our teams in the field than reliable communications. The exponential growth of online and state-of-the-art digital communications has resulted in tremendous opportunity to serve our customers better than ever—allowing Eversource to remotely reroute power when the lights go out, and giving customers faster access to the information they need most. Especially during a storm, Eversource is committed to utilizing the most convenient communications tools possible. Sometimes, even the best tools fall short and present challenges, such as when our online outage reporting and restoration updates experienced technical difficulties and were intermittently unavailable during the October 2017 wind storm. We understand the stress and disruption a power outage can cause in our customers' lives, and are making every effort to ensure these and other popular communications tools deliver the important information our customers count on, when they need it.

Tree Trimming Continues To Make A Difference

Throughout the year, Eversource adheres to best practices in trimming trees along our electric lines, balancing the need for keeping our lines and equipment clear of tree growth while preserving the natural beauty of our scenic roads and landscapes. Removing numerous trees and branches when they fall on energized wires, such as was the case in the October 2017 wind storm, understandably doesn't happen fast enough for our customers. But safety for the public and restoration crews, and helping communities open blocked roads, remain our top priority. With each storm, the question is posed: "Why can't you just bury all the lines?" The cost, and the technical and geographical challenges, make that option prohibitive on a large scale. However, Eversource's tree trimming programs continue to make a difference in helping to make storms like this one less disruptive than they could have been, and we will continue to make them a priority on behalf of our customers. Specifically, our aggressive program of identifying and removing unhealthy or decaying trees helped to greatly reduce the likelihood of weak trees succumbing to the forces of nature and further damaging the electric system. In addition, Eversource's focused attention on keeping our rights-of-way clear of intruding vegetation meant that no outage from this storm resulted from trees falling onto our transmission lines. And throughout the year, we communicate with customers about how to plant the right tree in the right place.

Advanced Planning Means Everything

Consistent with previous storm preparations, all Eversource New Hampshire employees, regardless of job function, were ready for a potential restoration effort 48 hours before the wind storm swept through on Sunday, October 29, 2017. One example of where preparation paid off was having the right off-road equipment in place once the identification and type of repairs needed was collected from system operations, the automated outage management system, damage assessors, and helicopter inspections. This storm resulted in an exceptional number of individual outages in rural areas, and Eversource's New Hampshire Transmission Line Operations Department played a key role in placing the right equipment in the right location. As the storm restoration proceeded, the team ensured that off-road equipment and crews were strategically placed in each region of the state. Advanced planning meant that crews were able to respond to an issue quicker, and move the right equipment to the site to accomplish the task at hand. Maintaining this response approach, and continuing to work closely with Eversource's transmission contractors to determine available equipment and crews, will continue to improve the speed at which Eversource can address off-road power issues during future storm restorations.

Community Voices

"Your employees have maintained an extremely helpful and professional attitude throughout this entire storm and the subsequent recovery. The response time for restoring power to the communities is unparalleled to anything I have seen in the past."

—Leigh Nichols,
Director of Public Works, Wakefield

"Over the years, we have lost power and when it comes back on, it is like your world is back to normal. We were without power for just two days. Thank you for the crews that go out in all kinds of weather night and day, and the dangers they face. They leave their families on holidays, birthdays, etc.—it's a job but a much-appreciated job."

—Donna and Bill Lancaster, Grantham

"My husband and I were so thankful to all of the workers and so grateful to have our power back. We got to see firsthand the dangers these men are faced with, how hard they are working, and as quickly as possible. I know it's frustrating to all that have to be without power for a period of time, but I really hope the workers that are dedicating their lives 24 hours a day are getting treated with the utmost respect."

—Nadine Scholes, New Boston

"I want to thank you for your quick response to Gilford Street in Manchester. The homeowner was very concerned about the wires that were in his yard and the fact that he was expecting children for Trick or Treat. The crew from Eversource responded to his residence in approximately 30 minutes and the wires were made safe. Thank you for your quick response and your dedication to our community."

—Bill Berry, Alderman Ward 10,
Manchester

"I just want to say thank you to Eversource and all their hard-working men and women who have been busting their butts, working overtime and doing double and triple shifts to make sure that all their customers have their power restored."

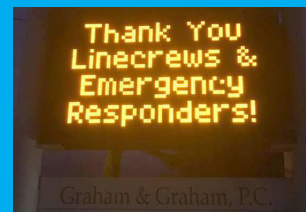
—Nathan Cullinane, via Facebook

"Please thank all your line crews for working 24/7 to reconnect us back to the power grid after the storm. They have a tough job and it must seem thankless at times. We sure appreciate them!"

—Linda Darrow, Center Barnstead

"@EversourceNH Thanks for everything your crews do to get power restored safely and as promptly as possible in very dangerous situations."

—John Beaudoin, via Twitter



"Gratitude from
hard-hit Laconia. "

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