Does tree trimming reduce power outages?

We love to stay in a warm and fully functioning house during a snowstorm. At the end of a busy day, prolonged by a cold, messy commute home, we like to take a hot shower and nestle in a cozy bed. At the same time, we adore our trees, prize our shaded driveways and roads in summer, and adore the beautiful landscape around us. When the power goes out, though, our plans for a well-deserved rest in warmth, comfort, and safety, and many other plans as well, get turned upside down—and we know the vast majority of power outages during storms are caused by trees or tree branches falling on power lines. So, we need to learn how to reconcile our need for reliable power delivery during storms with the careful preservation of our trees.

At the Eversource Energy Center of the University of Connecticut, research has led to new ways of evaluating the effectiveness of vegetation management in preventing power outages while protecting our valued trees. According to *Emmanouil Anagnostou*, Center Director and Professor of Civil and Environmental Engineering, "The goal is to find an optimal combination of grid hardening investments that maximizes the reliability of the electric system while minimizing the impact on roadside vegetation." To meet this goal, *Anagnostou* says, "We have developed a methodology based on outage modeling and weather patterns that allows us to predict weather-related power outage reductions from different tree-trimming scenarios."

Eversource Energy Center researchers have used the methodology, accepted for publication in Electric Power Systems Research[1], to compare the actual power outages that occurred during 2017 to the outages that would, hypothetically, have occurred had Eversource not performed enhanced tree trimming.

Results of the evaluation were "impressive," says *Anagnostou*. We found that, although the enhanced tree trimming done by Eversource is focused primarily on only a very small percentage of the power lines on the backbone of its distribution system, the number of outages during storms would have been 10 to 30 percent higher without it.

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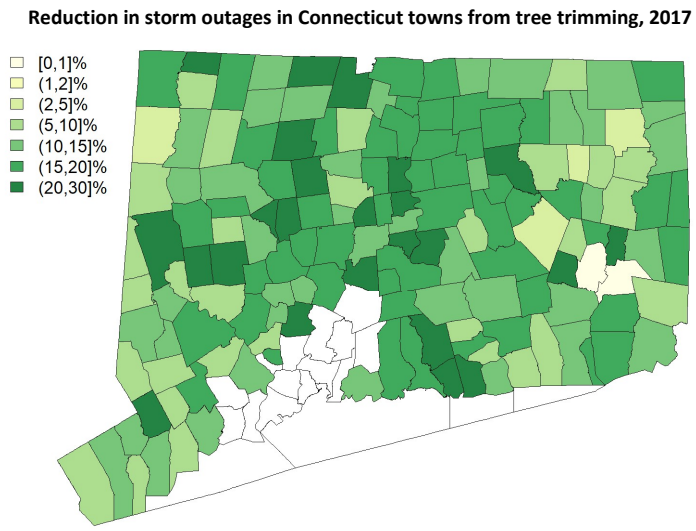
[1]Cerrai, Diego, Peter Watson and Emmanouil N. Anagnostou, Impact of Enhanced Tree Trimming on Electric Power Grid Resilience, Electric Power Systems Research.



The map to the left illustrates these reductions in power outages in 2017 for Connecticut towns as the result of tree trimming. The October 2017 storm alone could have caused 30,000 additional customer outages and outages of up to five days' duration. Further analysis indicates that, without enhanced tree trimming, each of the back-to-back nor'easters in March 2018 would have caused tens of thousands more outages than actually happened.

In closing, the Eversource Energy Center's new vegetation management evaluation methodology, to appear in the Electric Power Systems Research journal, revealed the effectiveness of the localized enhanced tree trimming program performed in Connecticut on the core of its distribution system. Future work will focus on translating these storm outage reductions into economic benefits for the population and the utility itself.

In addition to enhanced tree trimming, Eversource performs a less invasive but more widespread standard tree trimming, consisting of the removal of branches around overhead lines. The effectiveness of the standard tree trimming program is being evaluated and will be reported in a future study.