Optimize spending and improve grid reliability with data-driven vegetation management

By Tom Martin
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There’s no denying the benefits that trees, plants, and vegetation bring to a community. Their presence produces oxygen, scrubs the air, sequesters carbon, and improves the natural aesthetic of a region. But it’s not all sunshine and roses where this flora intersects with utility infrastructure, and managing vegetation and tree growth around power lines is an important responsibility that rests on the shoulders (and budgets) of utilities.

Interested in making this a reality at your utility?

Enter your email address in the box below and we’ll reach out to discuss the possibilities for using predictive data science to save money, address inefficiencies, and improve grid reliability.

Vegetation management plays a critical role in fire-hazard mitigation and ensures safe, reliable transmission and distribution of electricity across the grid. It’s a complicated and costly process that can be greatly improved with modern, data-driven optimizations. As a leading data science company, E Source’s recently expanded focus on grid and asset management, along with our investments in data science services, has given us a unique opportunity to help utilities enhance vegetation-management operations by cutting costs, improving system reliability, and optimizing crew work plans and schedules.

Utilities have historically approached vegetation management with a cyclical, cadence-based approach—inspecting and trimming the areas around their lines on a set schedule. It’s a decades-old method that requires a lot of boots on the ground. It has generally worked well enough, but there are obvious inefficiencies to treating all areas of the grid as equal in terms of vegetation-management risk. A lack of meaningful data and computing power has left utilities with few options for addressing inefficiencies in the process.

Now, advances in technology and predictive data science are providing new opportunities for utilities to

evaluate existing vegetation-management processes, achieve operational efficiencies, and save money.

How to apply predictive data science to vegetation management

The key to achieving operational efficiencies with vegetation management is granularity at both the transmission and distribution level. Our vegetation-management module—part of the E Source Digital Grid Solutions suite of asset life-cycle management solutions—provides a current-state assessment of the vegetation in an area, all the way down to the polygon scale. That means you get a literal "view from above" that shows individual trees mapped onto the grid with data collected from LiDAR scans.

Risk scores and propensity models can be used in "what if" scenario evaluations to forecast the effects of initiatives such as spraying a certain herbicide or deferring the removal of hazard trees in certain areas.

By combining methodologies from forestry, environmental science, statistics, and computer science with historical utility data such as maintenance and inspection records, asset types, outage records, and more, and plugging that data into artificial intelligence and machine-learning models, we can calculate a vegetation risk score. You can use the risk scores to prioritize areas to focus on, helping to reduce operating costs while maintaining system reliability.

Budget planners can also benefit from our data science services. They can use the risk scores and propensity models in "what if" scenario evaluations to forecast the effects of initiatives such as spraying a certain herbicide or deferring the removal of hazard trees in certain areas.

Not all utilities are taking their analysis all the way down to the polygon level—some are calculating risk scores at the grid level on the distribution side. Breaking a territory down into quarter-mile squares and assigning risk scores to each square allows for granularity without being thrown off by some of the natural noise that occurs in the data. They're not analyzing vegetation on an individual tree level, but at the grid and feeder level. Using predictive data, a data science company such as E Source can help improve budgeting, efficiency, and reliability.

What to expect after implementing a risk-based solution

Utilities that take a risk-based approach to vegetation management typically see a 10% to 20% reduction in operating costs, with no negative effects on safety or reliability. Our data science services approach will help you dramatically reduce the amount you spend on expensive data-collection methods, and some utilities are even able to fully fund their data-science-based optimizations with the money they save by reducing the number of expensive LiDAR scans.

One of our clients was planning to do midcycle tree-trimming work when our analysis revealed that 28% of the predicted outage duration was being created by only 4% of the utility's high-risk areas. By targeting only the highest-risk areas, our client reduced targeted trim miles by 80%—from 800 to 180 circuit miles—while simultaneously improving overall grid reliability.

Learn how utilities can lower operations costs and improve reliability by applying predictive data and machine learning to vegetation management. With data science, utilities will also minimize problems from unplanned work and ultimately improve safety and customer satisfaction. Check out our webinar Optimizing vegetation management: Why data allows us to make better decisions than ever before to learn more.

Deploy risk-based vegetation management for better outage prediction

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