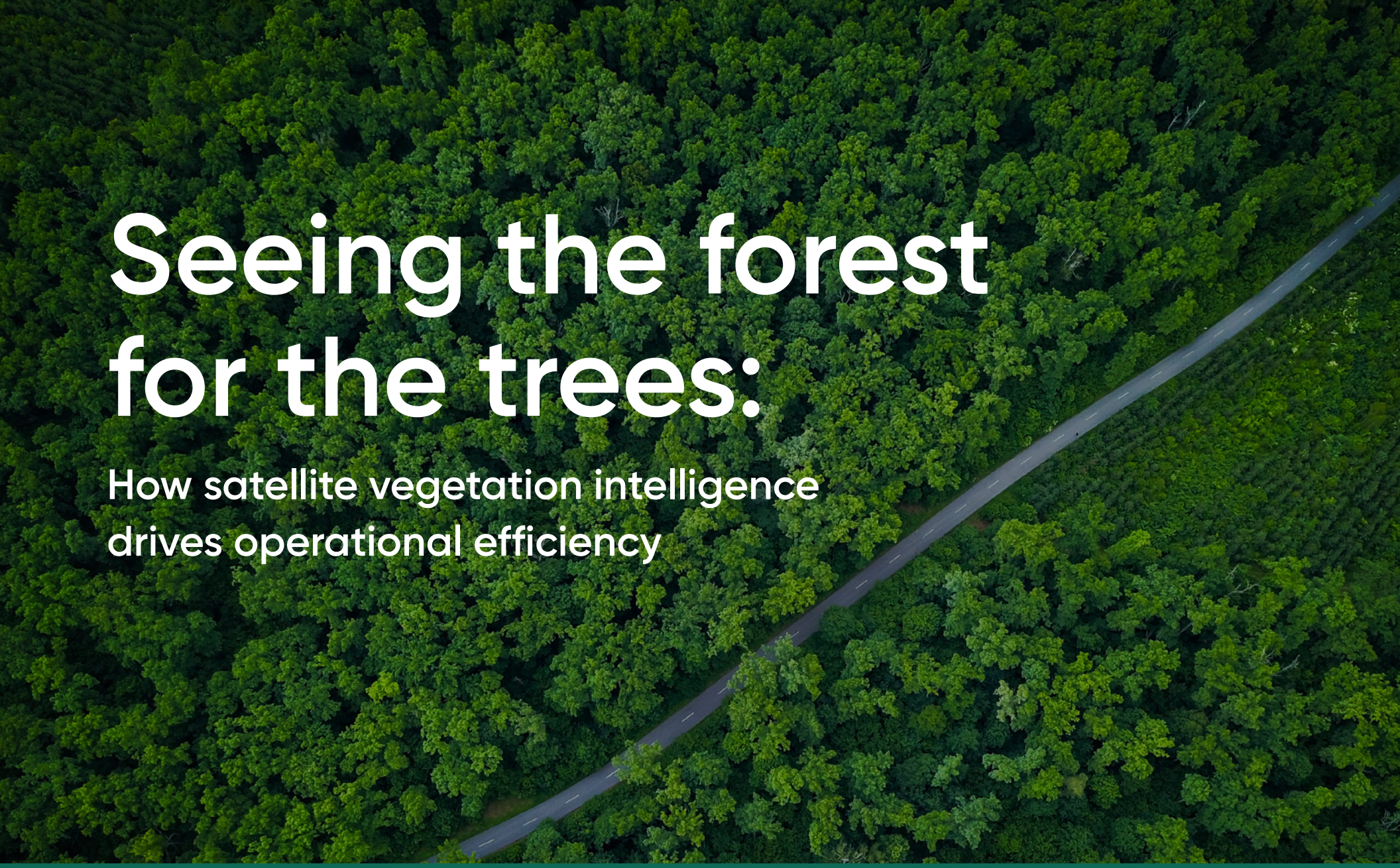

Seeing the forest for the trees:

How satellite vegetation intelligence drives operational efficiency

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Utilities today have reached an inflection point — grid resiliency is more important and more challenging than ever due to aging infrastructure and an increase in weather-driven outages. According to a recent **study**, weather-related power outages increased by 78% from 2011 to 2021 compared to the preceding decade.

At the same time, maintaining operational efficiency in the face of rising costs and persistent labor shortages is complicated at best and often extremely difficult. Utilities are under pressure to make their existing budgets go further without passing rate increases on to customers while still maintaining reliable power supplies and service.

Vegetation management plays a key role in all of these issues. In some regions of the U.S., trees cause **more than 90%** of outages, and vegetation goes hand-in-hand with any type of weather-related outage. Vegetation and power lines are also critical factors in wildfires, and while only a small percentage of wildfires are directly **caused** by electric utilities, the costs and damages can be enormous.

Utilities are well aware of the importance of vegetation management, which is why it's frequently their largest operations and maintenance line item. And yet, vegetation management is too often addressed in static, time-based pruning cycles that rely subjective on manual inspections. To meet the needs of today's grid and improve reliability, resiliency and efficiency, utilities must look to advanced technologies and satellite data to implement a new way of working.

With established technologies like GIS and LiDAR available, utility decision-makers may wonder why satellite data is important. "We've reached the point where the technology is mature, the cost has come down and the high-resolution quality is there," says Brian Lafayette, Head of Business Strategy at Overstory, a leading provider of satellite vegetation intelligence. "Now this technology can help utilities adjust to a changing landscape and be more targeted and efficient in how they approach vegetation management."

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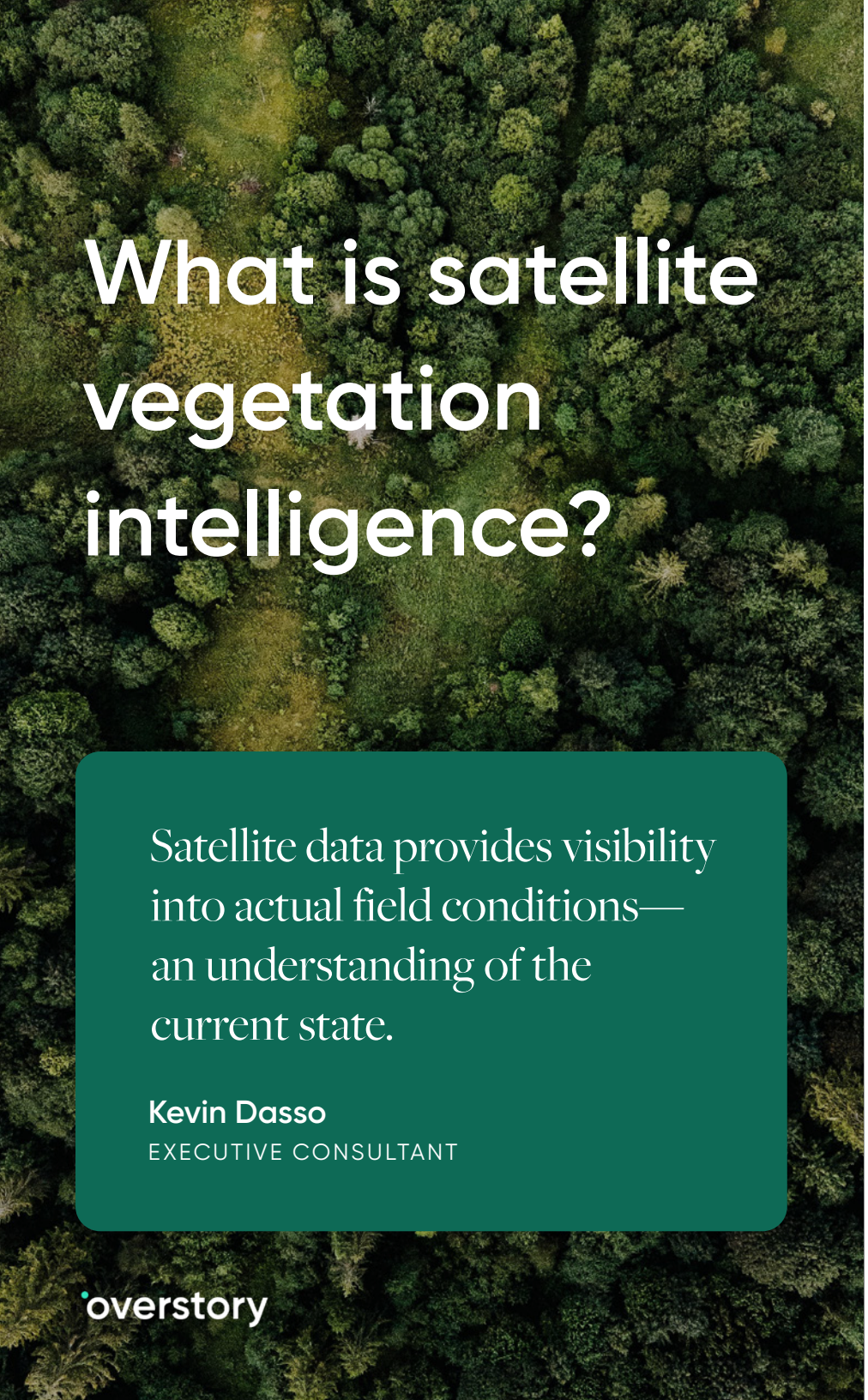
Brian Lafayette
HEAD OF BUSINESS STRATEGY,
OVERSTORY

Let's take a closer look at what satellite vegetation intelligence is and what it can do for utilities.



What is satellite vegetation intelligence?

> Satellite data provides visibility into actual field conditions—an understanding of the current state.
>
> **Kevin Dasso**
> EXECUTIVE CONSULTANT

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Machine learning algorithms use satellite imagery to analyze vegetation, which informs vegetation management programs. For utilities that have thousands of miles of lines to monitor, satellites can review greater distances more quickly and thoroughly than any on-the-ground inspections. The data also allows utilities to see encroachments along rights-of-way, asset conditions, and tree and landscape health.

“Satellite data provides visibility into actual field conditions — an understanding of the current state,” says Kevin Dasso, Executive Consultant for the electric utility industry and former Vice President with PG&E. This speed is crucial because while LiDAR is extremely detailed and a valuable tool for utilities, it takes longer to obtain and process than satellite data. “You don’t want to find out three or four months later that you have hazard conditions,” Dasso adds.

This ability to thoroughly assess risks is a key factor in how this technology makes a difference for utilities.

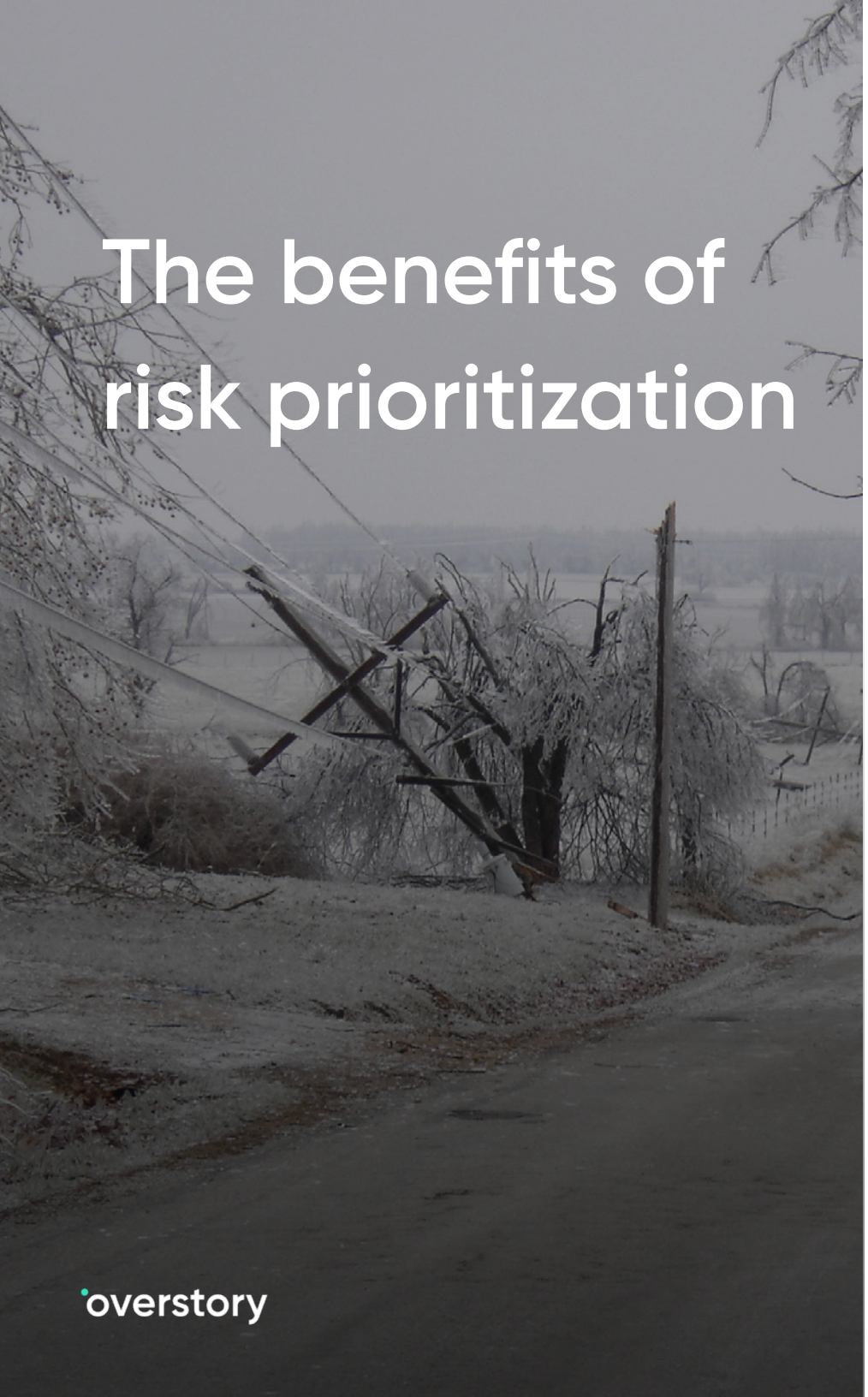
How utilities can apply satellite vegetation intelligence

Is satellite data just an overwhelming amount of information? How can utilities make sense of and utilize this data? One of its most valuable use cases is to assess vegetation conditions and inform objective risk assessment frameworks. With up-to-date information, utilities can prioritize hazards, hotspots and side trimming, thereby addressing risks in the most effective manner.

For example, Overstory collaborates with utilities to develop a risk framework configured to their existing trim specifications. These frameworks aggregate data and rank spans in order of compliance so that utilities can prioritize maintenance based on conditions, not the length of time since the last trimming cycle.

"There is a strong correlation between spans that don't meet trim specs and those most likely to have an outage in the following year," Lafayette explains. "In fact, in one case, we found high-risk spans were 22 times more likely to have an outage in the next year compared to low-risk spans."

Crucially, this satellite data has been independently validated by foot patrols. In a double-blind experiment with one investor-owned utility, they found that in over 90% of cases, spans marked as high risk by Overstory were flagged as areas in need of trimming by foresters who hadn't seen the satellite data.



The benefits of risk prioritization

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Prioritizing vegetation maintenance provides numerous benefits to utilities. First, it addresses hazard trees and high-risk areas faster, which can mean more outages are prevented and costly problems are averted before they happen. The visibility provided by satellite data allows utilities to reallocate resources toward areas most likely to have an outage and locations where outages would affect the most people.

Relatedly, this facilitates more efficient use of labor and financial resources. As Phil Chen, Strategic Solutions Lead with Overstory, explains, “Many utilities send work planners ahead of crews. Now, with satellite-informed insights, you can determine where those planners are most needed.”

Labor prioritization also improves contracting for hotspot and trimming crews. Utilities can more easily move from time and materials to unit-based contracting structures because they can identify which spans need maintenance in a given year. By knowing how many units there are and how much work must be done, utilities can request and receive more accurate and cost-effective bids.

Sho-Me Power Electric Cooperative in Missouri, for example, was able to move to lump-sum bidding processes for side trimming, and satellite data led to savings on hotspot maintenance as well. They could better quantify hotspots with data from Overstory, which allowed them to keep one crew on retainer, instead of two. “We saw an increase in bids when we moved to fixed-price contracts. With only needing one hotspot crew, we saw significant savings,” says Josh Holland, Construction Engineering and Operations Director with Sho-Me.

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> **Josh Holland**
> CONSTRUCTION ENGINEERING AND OPERATIONS DIRECTOR, SHO-ME

Technology + Expertise: Developing a Risk Framework for Sho-Me Power

When Sho-Me Power Electric Cooperative began digitizing their vegetation management processes, they knew they needed to streamline the prioritization of hotspot maintenance and side trimming. They have 1,800 miles of network to evaluate, so they developed a customized risk framework using Overstory's satellite data and their institutional expertise with their territory.

"We basically looked at the distance from the centerline and created weighted scores," says Josh Holland, Construction Engineering and Operations Director with Sho-Me. Any encroachment within 10 feet of the centerline was classified as a hotspot for immediate maintenance. "After we eliminated the hotspots, we looked at the 15-foot range and kept moving out to the edge of the right-of-way," Holland explains.

They weighted each score based on the risk posed by each location's proximity to the centerline. "After that, we calculated the square footage of encroachment. Was it 3% encroachment or 30%? A larger area is higher risk so maybe that becomes a hotspot," he says.

With this objective, data-driven framework, Sho-Me was able to remove 64% more trees than they would have without Overstory's data. Plus, they accomplished it without increasing their budget. The visibility provided by satellite data and analysis made all the difference in their revamped approach. Holland says, "Now, instead of looking for the proverbial needle in a haystack, we have data on what's a problem and what we need to address."

Integrating satellite vegetation intelligence with existing operations

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As with any new tool, satellite data needs to fit into utilities' existing toolboxes. Satellite data is not a replacement for LiDAR or all foot patrols — these methods have important roles to play. LiDAR provides detailed assessments and conductor-level models, and no technology can completely replace the expertise developed by staff — many nearing retirement age — through years of experience with vegetation.

Satellite data can, however, provide large-scale system views and drive informed decision-making. It creates efficiencies with constrained labor resources by deploying crews where they are most needed and can make the most significant impact.

The right systems will also provide easy access to the data rather than act as a black box. Utilities should work with partners that provide data and analysis openly so that teams build trust in the data. "Take the image of a crucial line and compare it to LiDAR," Holland recommends. "Once you know you can trust the data, you'll feel confident making the case to your board or other leadership about using this technology," he says.

Best practices for implementation

Utilities that have begun utilizing satellite intelligence for vegetation management have learned key lessons about making the most of this data. Best practices that utility decision-makers can implement include:

Develop processes to quickly identify hazards

Review the data for hotspots or hazard trees that can cause an immediate outage, and address those before or while planning for annual trimming activities.

Utilize data in advance of storms

Identify high-priority areas that may be impacted and evaluate what preparations you can make to prevent problems before a weather event strikes.

Conduct post-trimming quality control

Once treatment is complete, use satellite imagery to evaluate the quality of the work that was done. “Did your contractor do what they were supposed to? You can get a much bigger sample to evaluate the quality with satellite data as opposed to statistical sampling from foot patrols,” Dasso says.

The future of vegetation management

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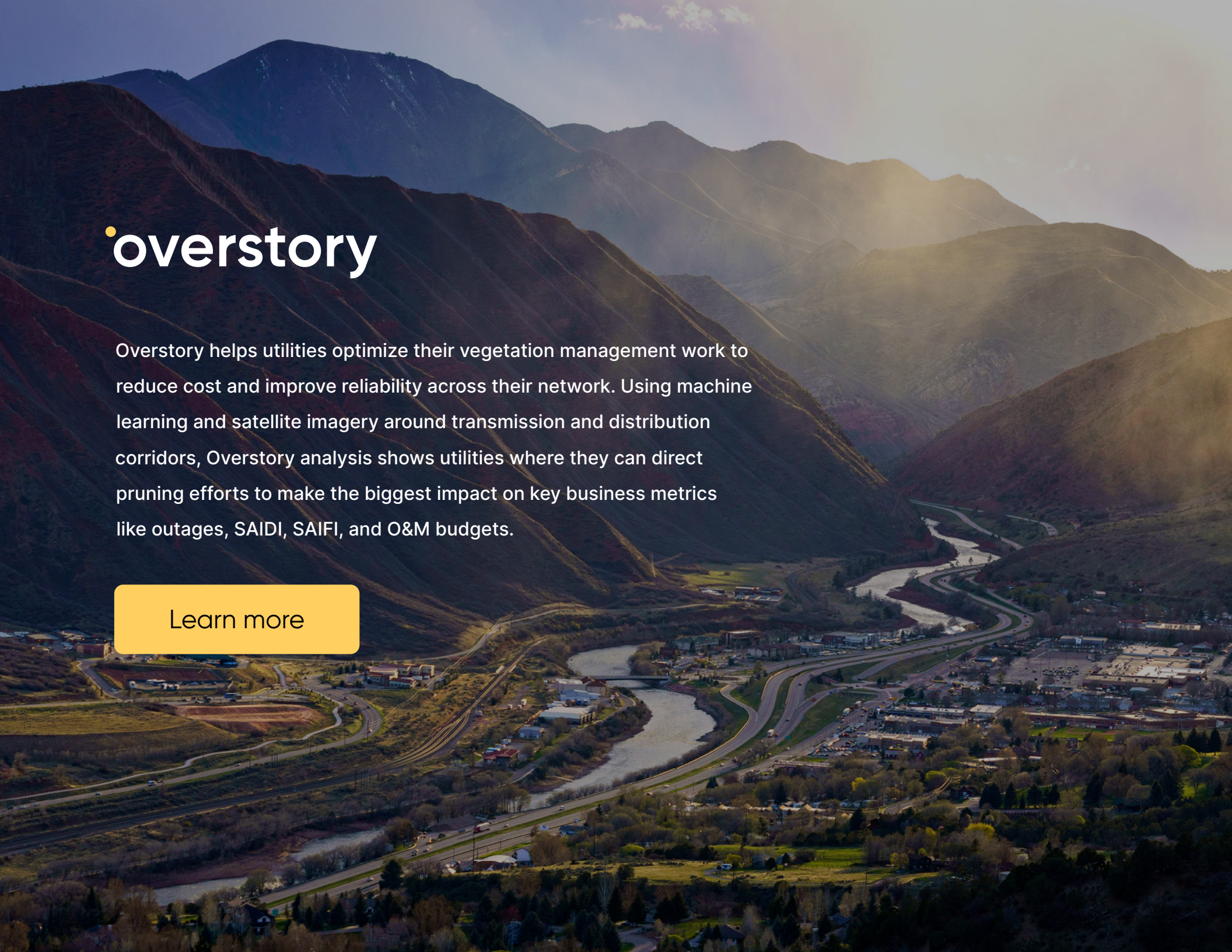
With powerful satellite intelligence and the right partner to provide and analyze it, utilities can more effectively manage their lines and infrastructure for greater grid resiliency. Addressing hazards more quickly and moving to cost-efficient contracting structures saves utilities on short- and long-term costs, making budgets and labor resources go further.

While satellite intelligence isn't meant to replace all other technologies and institutional knowledge, it's a powerful way to augment and improve ways of working. "AI is the way of the future," Holland says. "Do you want to wait 10 years and be behind, or do you want to be proactive?"

With thoughtful planning and forward-looking vision, utilities can make the most of this cutting-edge technology and be ready for tomorrow's challenges to their grids.

Connect with Overstory to see how satellite vegetation intelligence can improve your operations.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Overstory helps utilities optimize their vegetation management work to reduce cost and improve reliability across their network. Using machine learning and satellite imagery around transmission and distribution corridors, Overstory analysis shows utilities where they can direct pruning efforts to make the biggest impact on key business metrics like outages, SAIDI, SAIFI, and O&M budgets.
Learn more