Are you ready to meet the challenges?

21st century AI/ML technology is the key to the cost-effective management of your Vegetation Management headache

Introduction

- Electric power outages caused by the natural world colliding with overhead lines is something utilities have been battling for the past 100 years.

- Managing vegetation in our transmission and distribution corridors is key in providing a safe and reliable supply of electricity to our customers and field workers.

- Many T&D companies are still using legacy methods of manually surveying power line corridors to identify encroaching vegetation on annual fixed cycles and as a consequence, the Vegetation Management programs represent one of the largest recurring maintenance expenses for T&D companies.

- Innovation around the application of Artificial Intelligence (AI) and Machine Learning (ML) will fundamentally change the way utilities manage vegetation forever.

"Tree contacts with power lines account for more than 30 per cent of power outages in North America, causing power failures, structure fires and serious property damage".

– THE ELECTRICITY FORUM SEP 2020

California investor-owned utilities (IOUs) spend more than a billion dollars annually on tree trimming activities "and we are still not able to prevent utility ignited wildfires as the last two seasons have demonstrated."

– POWER ENGINEERING INTERNATIONAL

"More than 2,000 ignitions have been reported since 2014 and most of them resulted in fires of less than a quarter acre. Contact between electric equipment and vegetation is the leading cause, representing roughly a quarter of all fire ignitions. This finding makes it clear that Vegetation Management is critical for fire hazard reduction".

– POWER GRID INTERNATIONAL – 5/1/18
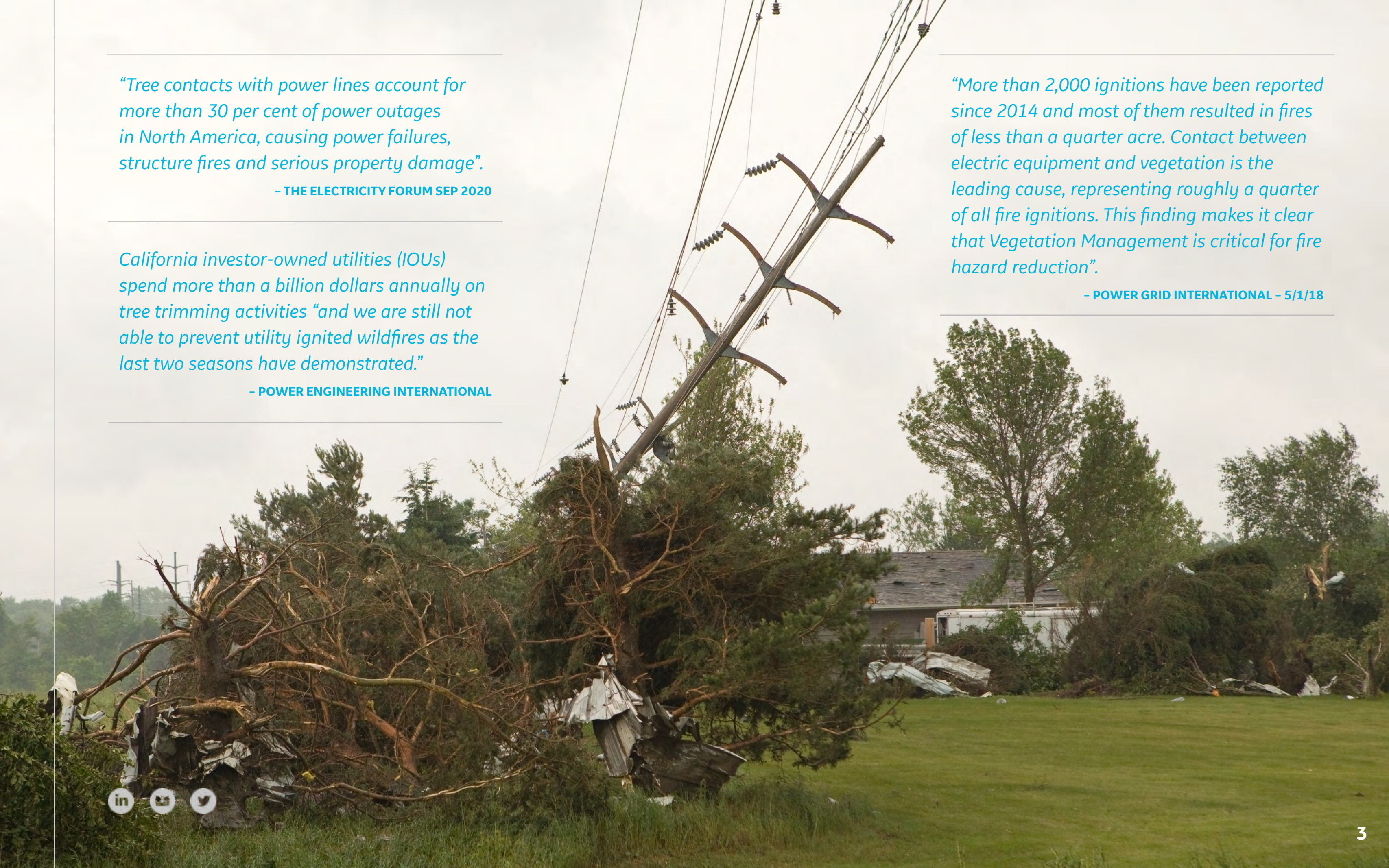
A modern grid needs a Vegetation Management solution built around 21st century technology

- Today's AI & ML technology enables utilities to analyze data faster and more accurately than ever before.

- The provision of more timely and accurate data from the field when combined with vegetation growth rate data will enable progressive utilities to move away from relatively ineffective time-based programs to condition based programs to deliver optimized tree trimming plans.

- Faster and more accurate data will enable the planning teams to make substantially better decisions driving down costs and minimizing risk to key workers and the general public.

...traditional Vegetation Management processes won't keep pace

Legacy survey methods (land-based line patrol) are very expensive, time consuming and can have unacceptable liability risk. Often, the 'images' collected using this approach have a lot of variation and integrity issues due to inconsistent perspectives, focal accuracies and distance from the target objects. Another major challenge with the legacy method is in data management.

How to efficiently centralize and process the raw data, associate images (or point cloud blobs) with specific assets or trees, and extract the risk classifications so that asset managers can optimize their overall condition-based asset and vegetation risk management programs?

Reliance on 20th century tools and processes will leave you behind in the race to meet the expectations of 21st century technology savvy employees

The time to TRANSFORM is now.

A recent global trend is that most T&D power utilities are suddenly more open to improving their inspection processes and survey data portfolio, so long as the new options are techno-economically superior, meaning that they can maintain or improve reliability for less money.

The business case looks at the potential value generated by using data driven visual images captured by many different sources (drones, fixed-wing, helicopters, satellites, humans, sensors) to drive Vegetation Management decisions. The fundamental business change that is being driven is two-fold:

• Move from an annual rotational trimming strategy to a pure risk-based strategy that identifies and categorizes overgrowth encroachment risk across the entire territory. This drives the highest priority trimming in the current year.

• Move from a distance-based vendor payment model to a volume-based payment model. This shifts payments from miles or kilometers covered to actual areas trimmed.

Can you really afford the increased costs and associated risks of not employing a 21st century technology driven solution?

What if you could...

The primary use case for Vegetation Management is managing vegetation encroachment relative to power lines. These encroachment rules are generally driven by local regulatory bodies. Encroachment rules can be further delineated by asset or voltage type. Although the business value drivers are compelling, the challenges of pulling it all together can be daunting to T&D utilities.

- What if GE could reduce your current OPEX spend on Vegetation Management programs?

- What if GE could improve the decisions your team is making to improve safety, reliability, and regulatory compliance?

- And what if GE could significantly reduce the time your key resources spend on Vegetation Management activities?

GE's Vegetation management solution provides your team with the tools they need to make better data driven decisions around asset and Vegetation Management programs to improve the reliability and safety of your grid.

With GE, you can. Here's how...

"Trees are the number one cause of power outages and removing these trees is critical, especially with fierce storms happening more frequently".

– T&D WORLD EVERSOURCE VEGETATION MANAGEMENT MANAGER ALAN CAREY 14 SEP 2020

THE CHALLENGE:
Traditional approaches are expensive

Today global T&D utilities pay large sums to manage vegetation programs to drive reduced outages, increased compliance, improved safety and reduce the probability of catastrophic events like fires or major regional outages. It is estimated that all large utilities pay at least a $100 million per year on Vegetation Management programs. For example, California utilities pay in total over $1 billion a year on Vegetation Management.

Traditional approaches to Asset Inspection and Vegetation Management are slow and often based on Fixed Annual Cycles. Visual inspections generate large amounts of data which are often reviewed manually, which is labor and time expensive. Measuring electrical corridors, trees, incursions, and clearances with LiDAR mounted on helicopters or similar is standard industry practice, but how do you turn this data into insights to improve reliability and safety with less cost?

$1B

Amount California Utilities pay per year on Vegetation Management

THE GE SOLUTION:
Actionable insights to reduce costs

AI-enabled data management solutions are available and offer utilities a clear upgrade path from their legacy vegetation and risk management programs.

When you partner with GE, you'll get access to our Visual Intelligence Platform, targeted at T&D utilities and providing analytics services such as Vegetation Management. These services are intended for use by Asset Managers and Vegetation Managers to derive visual intelligence of their specified areas. It improves your existing capabilities by giving your team the tools they need to make data-driven decisions that, combined with their own experience, will reduce the operational costs of inspections while improving the decisions on asset and Vegetation Management and improving the reliability and safety of your network.

A data-driven visual intelligence program supported by effective analytics can generate the following[1]:
- **21.7% cost savings on an annual basis vs. current costs**
- **74.1% return on investment**
- **30% reduction in outages**

THE CHALLENGE:
Manual processes are slow and inefficient

Utilities usually gather and process inspection data manually. They use teams of low-cost human resources, sometimes student employees. It often takes several months to complete the analysis of the data and then translate it into a legitimate vegetation risk calculation.

From there, asset and vegetation managers need to spend another few weeks or months trying to correct data integrity issues caused either by poor or incomplete image collection, incorrect association to assets, and incorrect risk classifications.

Finally, the next year's risk-based mitigation strategy can be created using the cleansed data.

Optimizing data processing time and tree trimming plans is crucial and can only be achieved through proper data management pipelines and advanced processing capabilities.

THE GE SOLUTION:
Better Time to Value through AI at scale and automated processing pipelines

Predictive analytics are changing the way digital utilities make business decisions as the benefits of AI and ML are recognized across the industry

GE's Visual Intelligence Platform supports the ingestion of all major visual inspection file types. This allows for the optimal blend of image types to drive the highest value through the core Vegetation Management and Asset Inspection use cases.

The platform comes with a built-in AI Engine for auto-recognition and prediction. These

built-in AI features drive automated identification of encroachment areas (driven by each utility's parameters) and asset defects with increased precision provided through additional training.

All visual inspection data is automatically ingested and processed, reducing significantly the need for manual quality review tasks.

The Visual Intelligence Platform is available today and through built in automation can deliver value quickly.

The Challenge:
Visual Data processing is complex...

A typical inspection data portfolio would include digital red-green-blue (RGB) photographs, infrared (IR) images or video (thermal imaging), light detection and ranging (LiDAR, pulsed laser imaging). In addition, utilities often conduct manual observations by tagging the database with indicators such as 'Yes', 'No' or '1-2-3-4' against issues like corrosion, structural defects and danger trees.

The size of the digital information can be measured in 10s or 100s of Petabytes (PB) per year. This large volume of data needs to be processed at scale and generate insights that will be turned into action, which often requires integrating with other software.

The U.S. Department of Energy (DOE) said power outages cost more than $150 billion annually, so it's important for utilities to manage, not only the safety and comfort of customers, but also for the bottom line.[2]

Proactive communication about power outages and estimated restoration times play a key role in increased Customer satisfaction, with one study showing overall satisfaction increasing **24 points** when customers are alerted to an outage.[3]

THE GE SOLUTION:
GE's Visual Intelligence Platform

A key aspect of our Visual Intelligence Platform involves multi-sensor data management, the starting point being a distribution of inspection data (RGB, LiDAR, IR, etc.).

We streamline data ingestion pipelines to enable asset and vegetation risk calculations to be significantly more automated than traditional methods. We are leveraging a federated image classification AI engine that automatically identifies many of the important T&D asset types, as well as critical defect types.

Key features include:
- Capturing and transmitting very large inspection files
- Processing these large files on a platform or product that specializes in 2D and 3D visual rendering
- Applying AI and ML to auto-identify high risk encroachment areas
- Dynamically creating growth models as well as height and volume estimation for vegetation
- Driving output results to actual trimming schedules with location data or integrating with existing work-order management systems
- Scaling to support infrastructures that can be many thousands of miles long
- Integrating with current mission critical T&D software that includes GIS, ADMS and/or EMS

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WHEN YOU PARTNER WITH GE, YOU'LL BE ABLE TO:

• Significantly reduce your current OPEX spent on Vegetation Management programs

• Improve the decisions your team is making improving safety, reliability and regulatory compliance

• Reduce the time your key resources spend on Vegetation Management activities

Ready to get started?

CONTACT GE TODAY

Footnotes

[1] Information was compiled from industry sources including a very large DSO in Europe.

[2] Forbes: How Power Utilities are planning to weather the storm. Feb 2019.

[3] JD Power Electric Utility Business Customer Satisfaction Study, November 2019

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