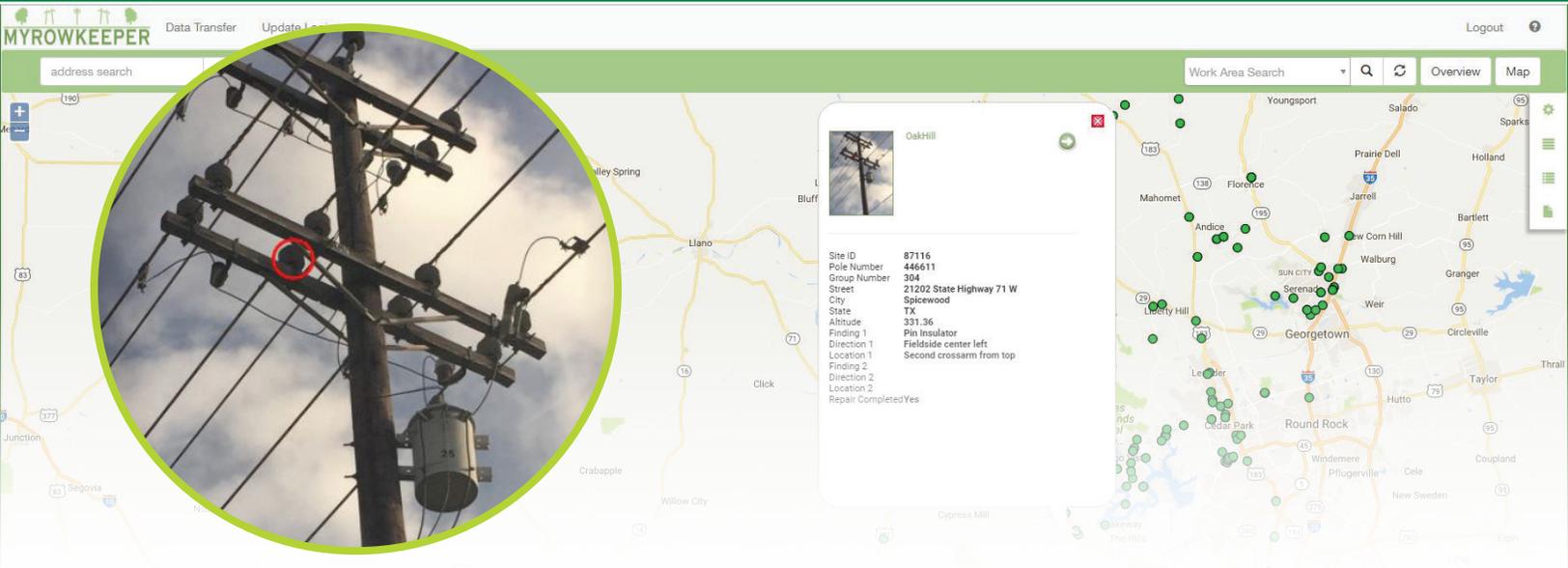


# PREDICTIVE-BASED MAINTENANCE MAKES BIG IMPACT ON RELIABILITY FOR PEDERNALES ELECTRIC COOPERATIVE



Electric utilities routinely measure success on reliability, determined by limiting downtime for customers. Equipment replacement generally occurs only when it has reached its maximum years of service or after it has caused an outage. But Pedernales Electric Cooperative (PEC), located deep in the heart of Texas, is striving for a new approach to making a greater impact on reliability.

“We’ve been able to put a team into the field that looks for things we cannot see and listens for things we cannot hear,” said J.P. Donley, PEC’s Director of System Maintenance Engineering and Energy Innovations Department.

With 21,000 line miles across an 8,100 square-mile territory based in Johnson City—located about 50 miles west of

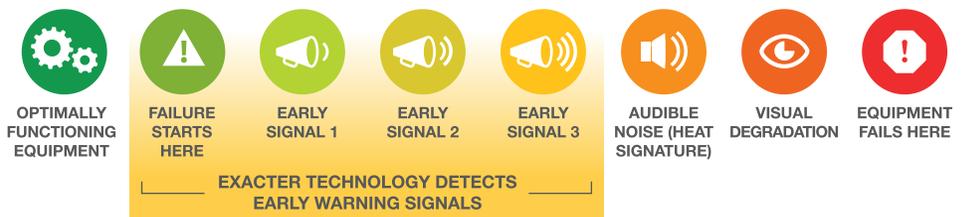
Austin in Texas Hill Country—improving reliability based on asset health required a different method than what had been done before.

Donley worked with Davey Resource Group (DRG), which performed a full-system analysis of historical data to identify outages caused by failing equipment. Upon determining the historically worst-performing divisions throughout PEC’s system, DRG began a pilot program, conducting scans

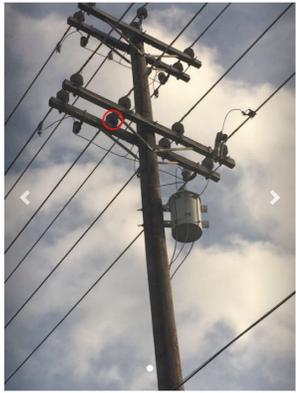
along more than 700 line miles of three-phase main line.

These inspections, which included infrared scans and Exacter predictive analytics, pinpointed equipment with problematic conditions that required timely attention, particularly those in early- or late-stage failure—totaling 128 components. Notably, repairs were needed an average of every 5.5 miles, and lightning arresters alone accounted for nearly 30 percent of the work.

## Early Warning & Detection of Problematic Conditions



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### PEC Identified Repairs

Pole Number 440611	Group Number 304
Street 21202 State Highway 71 W	City Spicewood
State TX	Picture pecJuly2016 304 2016-07-07 05_16_img.jpg
Latitude N 30.350621°	Longitude W 98.064519°
Altitude 323.58	Finding 1 Pin Insulator
Direction 1 Fieldside center left	Location 1 Second crossarm from top
Finding 2	Direction 2
Location 2	Repair Completed Yes
Date Repaired /0/0	Customer Impact Number 658
Last Changed Date 08/02/2016	Last Changed Time 08:00:00
Last Changed By John Garrison	Remote ID DRG20160902_53
Site ID 87116	Y 30.350621
X -98.064519	Inventory Date 08/02/2016
Comment	Work Area OakHill



Each piece of equipment was prioritized for maintenance by DRG's criticality measure, which applies a customer impact number to each location, pinpointed using PEC's GIS connectivity data. This analysis determined that if all 128 components had failed, PEC would have incurred 3.3 million customer minutes of interruption, or CMI—equating to a system average interruption duration index (SAIDI) rate of more than 12.3 minutes

In the year since repairs were complete in early spring 2016, PEC has seen a CMI reduction of 22 percent on outages related to overhead equipment across the entire distribution system. In particular, the area of the pilot program experienced a 15 percent improvement one year after repairs were completed.

Overall, the total system CMI related to equipment improved by 24 percent. To note, events caused by faulty arresters increased by 24 percent, but this is suspected to be due to end-of-life issues of equipment installed a decade ago. With this in mind, the DRG program continues to be

valuable as findings from Exacter and infrared scans immediately bring matters to PEC's attention that must be addressed.

Previously, crews were either called to make repairs after outages occurred, or they performed maintenance on a time-based program, replacing equipment per a pre-determined length of time in service rather than due to its actual performance or condition.

With the new predictive approach, the cooperative can rely on valuable reports that flag specific components before catastrophic failure or outage occurs. The data included precise GPS locations, maps and images of each noted piece of equipment, helping to further improve the overall efficiency of its maintenance program. Knowing exactly where to go for repairs, crews can address vulnerable equipment during normal business hours rather than being dispatched after hours to areas where failure occurred.

"We adopted a very non-traditional approach for our staff and linemen, who were used to driving down the road and

looking at every piece of equipment," Donley said. "DRG's asset health assessment with Exacter did the work for them."

PEC's operations team also experienced a change in their perception in how they define worst-performing circuits—determining performance not just on total outages, but more specifically on customer impact, focused on member concentration.

With the pilot complete and proven successful, other circuits are now being reviewed, Donley said.

"Overall, we are very pleased with the outcome," Donley said. "This gives us a predictive tool to use that impacts the vast portion of our territory in a short period of time."

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## FOR MORE INFORMATION, CONTACT:

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