

Dominion Energy

Case Study



Transmission team improves asset management with AI-enabled software for visual analysis

About Dominion Energy

Dominion is an American energy company headquartered in Richmond, VA that manages 6,800 miles of transmission lines in VA and NC, with 47,000 structures. They also have 58,510 miles of distribution lines in VA, NC and SC. Dominion Energy embraces innovation and uses of new technology to better serve their customers.

PROJECT OBJECTIVE

As part of Dominion Energy's transmission capacity planning, a key requirement was to understand the insulator type (porcelain, polymer or glass) used at each transmission structure. Dominion had seen polymer insulators failing before their 30-year expected lifespan and wanted to replace insulators nearing their end of life. By identifying structures with polymer insulators, Dominion could move faster with their asset replacement to maintain the reliability of the transmission infrastructure.

SITUATION

Dominion collected oblique imagery from helicopters and stored it in folders on network drives. Helicopters fly above 500 feet, and oblique imagery is typically captured at a 40-45-degree angle adding more distance, so image quality was not high. Analyzing these images with traditional methods was time consuming and they were constrained by their O&M budget. Dominion saw this project as a good opportunity to explore whether AI analysis would be feasible with their existing data.

SOLUTION

Dominion Energy worked with Buzz Solutions' PowerAI software platform for inspection image analysis. PowerAI allows electric utilities to maximize the value of visual data from aerial and ground-level infrastructure inspections. The software automates visual inspection data management, mapping and condition analysis using pre trained AI visual algorithms.

90%+

Accuracy in
analysis results

70%+

Time savings for
image analysis

70%+

Worker-hour savings
for image analysis

Asset identification accelerates insulator replacement programs

PROJECT RESULTS

In the first phase of the project, PowerAI analyzed 500 images from two circuits with steel monopoles and steel lattice towers. PowerAI was integrated with the utility's AWS cloud storage to ingest the image data.

Because the images were from helicopters and the quality of images was not high, tuning the AI detection model was crucial for success. Dominion Energy subject matter experts utilized the PowerAI human-in-the-loop tools to review and annotate images. Within 5 weeks, Buzz Solutions tuned the detection model for polymer insulators to achieve accuracy greater than 90%.

With the demonstrated success in phase one, PowerAI was then used to analyze an additional 4,300 images. In this phase, the number of structure types was expanded to include H-frames, wood tri-poles, and concrete poles. Using tuned detection algorithms, PowerAI analyzed the 4,300 images within a few hours.

With PowerAI Dominion Energy was able to:

- Improve asset management
- Preempt potential insulator failures
- Utilize existing imagery
- Reduce image analysis workload
- Get results sooner
- Streamline workflows

"With PowerAI we were able to accurately identify all polymer insulators on 4,300 structures in hours. This improved asset management while eliminating hundreds of hours of manual image analysis work."

- **Matt Rogers**, Dominion Energy

WHAT'S NEXT?

Buzz Solutions is working with Dominion Energy to integrate PowerAI with the utility's SAP work order and asset management system.

With higher resolution imagery from drones and experience with AI technology, Dominion Energy has exciting opportunities to automate inspections for numerous infrastructure condition issues including broken or flashed insulators, rusted or corroded tower structures, and misaligned or damaged hardware. With PowerAI software, Dominion Energy can scale their inspection programs while avoiding resource bottlenecks in image analysis.

