



CUSTOMER CASE STUDY

DTE Energy uses the PI System™ to improve outage response time, increase efficiency

DTE Energy - www.dteenergy.com
Industry - Transmission and distribution
Partner - ESRI

Challenge

- Shorten delays and inefficiencies associated with restoring power after an outage

Solution

- The PI System takes in sensor data and notifies employees about potential issues

Result

- Visualize sensor data in real time to shortened outage times and reduced need for proactive patrols

When the power goes out, customers and utility companies want it to be restored as quickly as possible. Before adopting the PI System, DTE Energy – the 12th-largest utility in the United States, serving over 2.2 million customers in Michigan – faced challenges in promptly identifying and triaging issues. Now, team members receive notifications when things go wrong and can respond more quickly and efficiently to common issues like trees falling on power lines or routine equipment failures as soon as they arise. The smart fault utility project is the latest iteration in DTE's long history with the PI System, which dates back to 1997.

Quickly locating faults from a distance

Any number of problems can disrupt electric service – everything from downed trees to curious animals to routine equipment failures. A power company like DTE can't control or predict many of these issues. Its only option is to acknowledge and respond to them as quickly as possible to restore service to customers. DTE's strategy was to adopt a process called fault locating. The process involves installing indicators strategically along the circuit, then using current direction to isolate faults, rather than sending someone out to investigate the entire circuit manually.

The PI System collects data from fault sensors on the grid and sends it to its Distributed Resources System Operation Center (DRSOC) network and then to the PI Server. Additionally, PI Integrator for Esri ArcGIS pushes geospatial data into the Esri ArcGIS system. Fault sensors in the field communicate back to a central system using cellular or Wi-Fi data. Once the data is in the PI System, it generates Notifications via email and SMS when a fault is detected. Integration with Esri ArcGIS allows crews to view the data on a map on their phones while out in the field.

"The business challenge here was to determine where to send crews during an outage," said Cameron Sherding, a software and controls engineer for DTE Energy. The goal is to visualize [sensor] data in real time ... to minimize patrol times and reduce the customer outage minutes."

Creating situational awareness and visibility

DTE created a naming convention for its sensors and streamlined notifications from the PI System to avoid confusion and help users quickly make sense of what they were seeing. The company also use PI ProcessBook and PI Vision to create data visualizations for planning and analytics. Employees can look at historical data from a site or sites and see the information that's critical for troubleshooting.

Beyond analytics and reporting, the PI System is a game changer for DTE's storm-response team because it allows the team to quickly see which circuits are faulty and where power is out. Dashboards are color

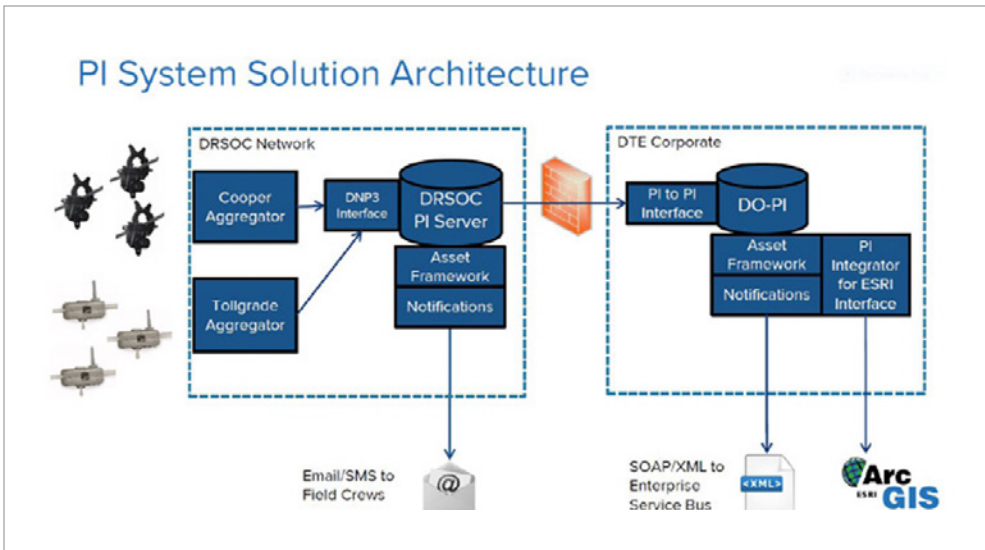
coded to indicate each issue's severity. As with the dashboards, notifications are set up to give the right people the right information at the right time.

Thanks to a collaboration with ESRI, fault indicators are also mapped to provide a spatial representation of where issues occur. This view, combined with data from the PI System, creates a framework for DTE's team to zoom out from individual incidents and identify broader regional issues that impact a large number of customers over time.

"I've been hearing a lot about this Internet of Things. This is a good example of that ... putting out these low-cost sensors, incorporating them into the PI System."

- **Cameron Sherding,**

Senior Software and Controls Engineer, DTE Energy



DTE Energy used fault sensors and the PI System to monitor outages on its power grid and alert provide field crews with real-time data on outages so they could restore service to customers quickly and efficiently.

PI System saves 500,000 customer-outage minutes

The work that DTE's team put into installing sensors and enabling notifications pays off every day as inevitable outages occur in the system. In one case, a supervisor received notifications about a circuit-level outage and, thanks to the fault indicators, could clearly

see which part of the circuit was impacted and quickly dispatched a crew to repair it. Sherding estimates that this process took about five minutes, compared to the hours it would take to send a crew out to find the faults manually. DTE estimates that improvements like this one will help the company reduce customer outages by about 500,000 minutes per year.

For more information about DTE Energy and the PI System, [watch the full presentation here.](#)