



awesense



Case Study: Energy & Utilities, Digital Modernization

Creating a New Paradigm

A Northwestern utility changed the status-quo of how utilities use data and analytics to solve issues and make the distribution grid far more reliable.

This utility started its digital transformation program with the rollout of its smart-meter program. This billion dollar investment was a part of their ambitious grid modernization goal which were in line with its clean-energy objectives. However, the smart-meters ultimately did not deliver on their promised insight. The utility was plagued with thousands of false-positive tamper flags which backlogged field crew work-orders and were suddenly overwhelmed with different types of data flowing from new metering infrastructure but didn't have analytical capabilities to make sense of it all. Furthermore, with data silos spread across the organization, analytics teams couldn't use other sensor data (SCADA devices, reclosers, DERs, etc.) together with meter data easily. The utility came to Awesense to provide enhanced grid visibility, monitoring and energy-flow analysis.

OBJECTIVE

This Northwestern based utility needed a way to better identify problematic areas in their grid, and at the same time meet the demands of future technology. With the integration of Awesense's True Grid Intelligence platform, we helped them achieve their modernization and digitization goals for their grid.

UTILITY OVERVIEW

- Serves 4M customers
- 95% of power from clean and renewables sources
- 18,000 km of transmission lines
- 55,000 km distribution lines
- 2M smart meters

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THE PROBLEM

The utility has a very large service territory, making it very difficult to monitor the massive distribution grid. Only a portion of the distribution system was covered by SCADA devices with varying degrees of accuracy. The utility lacked effective data to measure energy delivered to the medium voltage grid. With such a large distribution network, we also realized there was a huge need to correct GIS, connectivity and topology data. With inaccurate connectivity and GIS data, it would be impossible to make critical decisions related to asset health, disaster recovery and forecasting.

Without a GIS that displayed live energy-flow and which integrated analysis into the maps themselves, they had very limited situational awareness. They were not responding as effectively as possible to alerts and issues within the grid. Additionally, valuable Information was not being transmitted from field technician to the operations team as there was no medium which facilitated easy 2-way communication.

THE SOLUTION

With Awesense's help, the utility proceeded in three key stages:

- » **Build a correct GIS, Connectivity & topology model**
 - Validated, estimated and corrected GIS element and connectivity data to identify and ensure an accurate dataset. This was done through a mixture of automated and manual corrections which require more detailed attention.
 - Having accurate GIS & Connectivity information was crucial to ensure decisions being made were correct. The operations team could be sure that metered consumption was linked to correct transformers, phases and feeders.
 - By firstly focusing on the importance of GIS, connectivity and topology accuracy, they utility moved from GIS to Location Intelligence.
- » **Ingest data from all measurement sources active in the grid into TGI**
 - Set up a flow of information from the utility's existing measurement sources: smart-meters, SCADA devices, DERs, etc. and populate within TGI's dynamic GIS visualization solution. This created an easily-accessible, comprehensive location for all energy-flow data.
 - Because of the large geographical service area, certain areas in the grid severely lacked measurement data. Over 5000 Awesense Raptor sensors were used to enrich data sparse areas like these and locations which required more thorough monitoring.

» Continuous Analysis and Monitoring

- Using TGI's analysis and monitoring features, the utility conducted investigations into high-risk areas in the grid. Using TGI's Distributed Energy Flow Intelligence analysis, they have segmented the grid and can understand areas which are imbalanced and need closer attention.
- Using TGI's grid alerts feature, TGI users are alerted of any issue within the grid - the operations team customize thresholds to be notified of things such as unusually low/high voltage, fluctuating current, low power factor, overloaded transformers/feeders. This enables proactivity instead of reactivity when treating and dealing with problems in the grid.
- Using TGI's mobile work-orders, field crews can be dispatched directly from the platform and receive custom instructions on what assets/areas need to be upgraded and fixed.

RESULTS

Thanks to the constant improvement of the GIS & Connectivity accuracy using field technician feedback and TGI's algorithms, they now have a thoroughly accurate model of the distribution grid. This data is essential as they proceed to the next phases of their grid modernization programme, including the installation of an ADMS - which depends on accurate data for optimal operation.

The utility has also ingested the sensor data and associated analytics from TGI into its Hadoop data lake. This allows for use of the data in other internal applications. This provides multiple teams across the company with access to accurate, comprehensive information on timely load data in localized areas of the distribution system.

They monitor over 33 million data points per day from **2,715,484 sensors through TGI**. They use combined data from all measurement points to facilitate more accurate forecasting and plan more effectively for asset upgrades and changes in the grid. As Renewables & DERs enter the grid, areas which are receiving high levels of penetration are closely monitored to ensure no interruption of supply.

Other benefits realized include:

- » Rectification of metering and billing errors
- » Identification of malfunctioning grid equipment
- » Removal of inefficient distribution system configurations



If you would like to learn more about how we help utilities move to the next-generation of modernization, contact us at sales@awesense.com.

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