

GENERAL ELECTRIC COMPANY

Developing Analytics to Correct Electric Utility Network Model Errors

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General Electric Company (GE) is a leading global manufacturer and provider of industrial equipment, technology, and software. 40% of the world's electricity is managed by GE software. GE is in the process of establishing a software subsidiary which includes Grid Analytics, a newly established team developing analytics software for electric utilities. The Grid Analytics team is preparing to launch its first three analytics products: Network Connectivity, Storm Readiness, and Effective Inertia. The Tauber Team was tasked with developing the Network Connectivity product to bring release 1.0 to market while researching and beginning development on release 2.0.

The Network Connectivity product identifies and corrects errors in the network models that electric utilities rely on for operations management and planning. The error rate within utilities' network models is estimated to be 10-20%, or 15 to 30 million customers in the U.S. market. Due to manual updates made during outage restoration and grid expansion, network records are subject to errors. These errors result in operational challenges for utilities, such as deployment of crews to the wrong location during an outage response, or difficulty managing the voltage volatility caused by high penetration of distributed energy resources (DERs) which include solar panels and home battery systems.

As part of release 1.0, the Tauber Team created analytics to identify meter-transformer pair mismatches and recommend the correct connections. The team navigated erroneous records and worked with operationally-focused subject matter experts to create algorithms that leveraged distributed computing to process millions of data points. Initial recommendations were provided for a large utility with upwards of 5 million customers.

In parallel, the team conducted research for release 2.0 of the Network Connectivity product, which is intended to identify network records where transformers are incorrectly assigned to one of three phases. The Tauber Team interviewed customers to accurately define the problem statement, explored data sources available from electric utilities, and researched the competitive landscape. The team devised an analytic approach that ensured product differentiation from competitors and a significant addressable market size. The Tauber Team proceeded to collect and filter data, engineer features, and develop an unsupervised learning algorithm that identified errors and recommended corrections.

Eliminating network record errors is estimated to provide a small utility with 500k customers an operational cost savings of \$2.9MM over five years. Furthermore, GE is targeting \$15MM in sales from Network Connectivity in 2019-20.