

GENERAL ELECTRIC COMPANY

Developing Analytics to Predict Maintenance Needs for Electric Utility Assets

Student Team:

Nicholas Paris – EGL (BSE Computer Science & MS Data Science)

Morgan Sadler – Master of Business Administration

Aseem Tuli – Master of Science in Engineering in Industrial & Operations Engineering

Project Sponsors:

Devang Gandhi – Senior Staff Data and Analytics Scientist

Mahesh Asati – Senior Director of Data and Analytics

Matt Schnugg – VP Data Science and Analytics Engineering

Faculty Advisors:

Seth Guikema – College of Engineering

John Silberholz – Ross School of Business

General Electric Company (GE) is a leading global manufacturer and provider of industrial equipment, technology, and software. GE's software for electric utilities is used to manage 40% of the world's electricity. The GE SmartSignal software monitors and provides early and actionable warnings of impending equipment and process problems on more than 16,000 assets, worth approximately \$37B across industries around the world.

SmartSignal detects and identifies events and abnormal behavior in industrial power generation equipment. SmartSignal provides exception-based notifications of developing problems to users, along with diagnoses and prioritizations. The Tauber Team was tasked with developing a new tool designed to work alongside SmartSignal. To ensure system availability, the new tool will notify utility providers of any system issues and estimate the time by which a maintenance action is required. Utility providers can use this Time to Action metric to determine how much remaining useful life exists on an asset and schedule maintenance activities appropriately.

To develop the Time to Action analytic, the Tauber team analyzed data from over 100 assets over a 2-year period and created a data set to build and train a machine learning model. The team navigated data gaps, using data interpolation techniques, and worked with experts in data analytics to create an algorithm that can beat a statistical median estimation of time to action 70% of the time, for the tested failure mode. An automated data pipeline and modeling technique has been implemented to ensure that this analytic can be tested and implemented on different power generation assets and sites, worldwide.

The implementation of this analytic across all assets and failure modes in a power plant will allow customers of GE to take a large step towards predictive maintenance practices. Implementing predictive maintenance, alongside SmartSignal technology, is estimated to provide a small utility operating a 250 MW power plant with \$1.4MM in operational savings over 5 years. Furthermore, GE is estimated to see top line growth in the Power Generation segment between \$2 and \$5 million annually within four years of analytic implementation as utilities upgrade their SmartSignal solutions to include predictive capabilities.