



## Client Overview

- The client develops, sells and services energy analytics software to renewable energy producers, OEMs, transmission and distribution utilities, and other energy companies.

## Business Requirements

### Demand Forecasting

- The data flux from the Weather reports, Energy Consumption and IoT Sensors is of high frequencies and volumes
- Using the data, create a model of High Accuracy and Less Variance forecasting values

### Survival Analysis

- Use of data sources from Weather forecast reports, Wind Turbine sensor data from many wind turbines
- Predict failures in advance, for enough device repair and maintenance time

## Application Overview

- A weekly energy generation fluctuation of just 1% owing to erratic weather would translate into millions of dollars of made or lost revenue. Wind energy companies therefore want to be able to predict power generation to the highest possible degree of accuracy. In addition to forecasting power generation, Indium also formulating models to identify at-risk turbines for predictive maintenance.

## Implementation Approach

### Demand Forecasting

- Generalized Additive Modelling to achieve high accuracy and less variance results, with the high volume, high frequency data being handled using OpenTSdb.
- Non-parametric regression for more generalization, piecewise splines, and Model saved in a PMML Object for inflowing data to generate demand forecasting results.

### Survival Analysis

- OpenTSdb handled unbalanced data, while Survival Analysis was used to determine the probability of failure for a given window of time.
- Used Isolation Forest and Advanced Outlier Detection methods.

# Advanced Analytics Solutions for an Energy Utilities Business



## Technology

- R, Python, Grafana, Neural Networks, Open TSdb, PostgreSQL



## Business Impact

### Demand Forecasting

- Reduced surplus and inventory costs by 5% for DISCOMS.
- With better inputs for financial, operational planning and budgeting, revenue management process became proactive and efficient.

### Survival Analysis

- Energy grids get alerted and turbines repaired before they go out of the order. This projected a significant 5-6% cost savings in repair and maintenance.
- Enhanced Predictive Maintenance aided the client business to maximize revenue recovery, reducing sunk costs by 2-3%.





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