



# Presenso Case Study: Predicting Failures in a Wind Farm



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## BACKGROUND

For wind farms, minimizing Operations and Maintenance (O&M) costs is of critical importance. On average, O&M accounts for up to 30% of the cost per kWh produced over the life of each wind turbine.

A large wind farm was faced with unusually high O&M costs and most of the maintenance related shutdowns were unplanned ones. Because of its remote location, crane rental contributes a disproportionately high percentage of asset and part replacement costs. Furthermore, it typically takes more time to transport replacement equipment and parts than it does to perform repairs.

During the waiting period, turbine disruptions result in lost energy generation. In total, approximately 5% of revenue was lost due to unplanned shutdowns.

In this brief document, we describe the joint work done with BaxEnergy, Presenso's partner and a leading service provider in the field of data management and remote monitoring solutions.

In this work, BaxEnergy and Presenso's engineers had put the Presenso analytic engine to the test, to determine its accuracy and the time in which Presenso's engine alerted on the upcoming failures.

## CHALLENGE

For the purpose of the joint study, BaxEnergy provided Presenso with one year of accumulated historical data from one of their connected wind farms. The wind farm selected was of 14 2MW turbines.

Each one of the turbines contains almost 60 different sensors measuring the different temperatures, vibrations, wind speeds and different electrical performance indicators.

The challenge facing Presenso was to detect as many possible failures and as early as possible before any alert was activated on the traditional SCADA and monitoring systems.

## RESULTS

The Presenso solution results were as follows:

- Correct Alerts (True Positives): 38 out 40 alerts
- False Alerts (False Positives): 2 out of 40 alerts
- Missed Failures (False Negatives): 8

**Alerts were triggered ~52 hours in average before downtimes.**

**When averaging the top 30% of alert, the alert time gap increased to 148 hours before the actual failure reporting in the SCADA system.**

## BENEFITS

The primary purpose of Machine Learning for Predictive Asset Maintenance is an overall improvement in operational and financial metrics due to the following factors:

- (a) **Optimized Maintenance Scheduling**
- (b) **Reduced Maintenance Budget**
- (c) **Higher Uptime / Revenue**

## SUMMARY AND CONCLUSION

O&M budget optimization is a significant driver of long-term wind farm profitability. This Use Case demonstrates that Presenso Unsupervised Machine Learning solution provided highly accurate predictions that resulted in optimizing O&M budgets and improving Uptime metrics.

Mr. Vincenzo Carbone, Commercial Director of BaxEnergy Strategic Business Unit adds:

*"We at BaxEnergy have tried a number of predictive analytics companies, and as of now, Presenso has been the most concrete and accurate in their results. Moreover, the synergy among the highly-skilled technical teams greatly helped in the implementation of this solution for the Wind industry."*