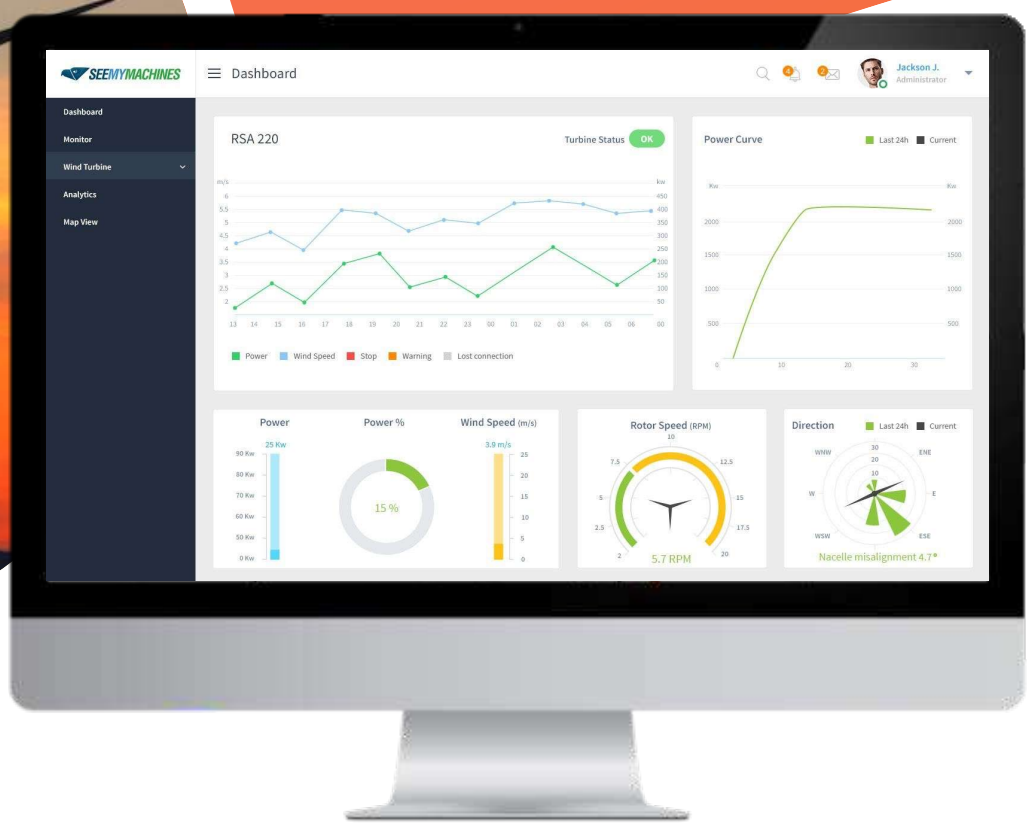
LEVERAGING

OPERATIONAL EFFICIENCY AT WIND FARMS



A cloud-based IoT solution with advanced analytical capabilities for condition monitoring and performance tracking of equipment at wind farms.

QBurst

PROJECT **OVERVIEW**

Managing hundreds of remotely located turbines involves mobilization of a large number of technicians and significant investment in time and money. Performance monitoring of turbines at wind farms can be an expensive affair that most companies wish to do away with. IoT addresses this problem with advanced sensors that capture key performance indicators such as vibration, speed, and temperature, accessible from a centralized dashboard. The analytics dashboard features intuitive graphs and charts that present operational and conditional parameters on a single screen for easy monitoring and diagnostics.

CLIENT **PROFILE**

A leading developer and operator of renewable energy projects across Asia, focused on providing sustainable energy solutions generated from wind farms and solar power.

BUSINESS **REQUIREMENT**

The client required a centralized dashboard to monitor operations at remotely located wind farms. The solution would provide the management with a bird's-eye view into power generated as well as operational and conditional aspects of turbines, wind masts, and key components at substations and farms.

- Consolidated view into performance and condition of wind turbines at farms with remote monitoring of relevant statistics
- Real-time monitoring capability to track key KPIs
- Real-time analytics to quickly identify and mitigate technical problems that can disrupt operations
- Capture and store data for future analysis

QBURST **SOLUTION**

We developed a cloud-based Industrial IoT solution to monitor wind turbines (including blades, gearbox, bearings, and generator), wind masts, and other critical components at the client's wind farms spread across multiple locations. The collected data is consolidated by the analytical engine and insights are presented via a centralized dashboard.

Real-time Performance and Production Monitoring

The solution collects data from wind farm equipment by interfacing with backend systems. This data is then transmitted to a cloud-based backend, which analyzes the data using statistical and data mining techniques to detect subtle changes in system behavior, making it easy for analysis and planning corrective action. This strategy significantly reduces the time, effort, and cost involved in manual and periodic monitoring and maintenance practices.

Solution Components

- Web and mobile-based interface to monitor wind farm infrastructure
- Backend analytics engine to consolidate, process, and derive insights
- Cloud-based service for data storage and retrieval

Efficient Tracking of Complex Operating Environments

The platform provides a web-based interface to access equipment data from anywhere through secure and authorized access. Data from turbines, wind masts, and substations will be available through Open Platform Communications (OPC) servers. The solution will interface with OPC servers to fetch and transmit data to the cloud for computation and analysis. This data is displayed through a web-based dashboard using graphs and other visual elements. Additionally, the solution can be cost-effectively customized and scaled up to accommodate any number of sites including solar, biomass, hydro, and geothermal power stations.

KEY **FEATURES**

Monitor turbine parameters such as generator and rotor speed, nacelle and gearbox oil temperature, yaw deviation, pitch angle, nacelle position and power.

Detect underperformance by comparing the power curve provided by the turbine manufacturer with actual power output.

Track average power production time relative to wind speeds on a visually intuitive time-series graph.

View farm and turbine data by navigating the tree view with drill-down facility to view status of each turbine/ substation.

Intuitive warning alerts to help detect asset performance issues with easily recognizable color codes for timely maintenance and corrective action.

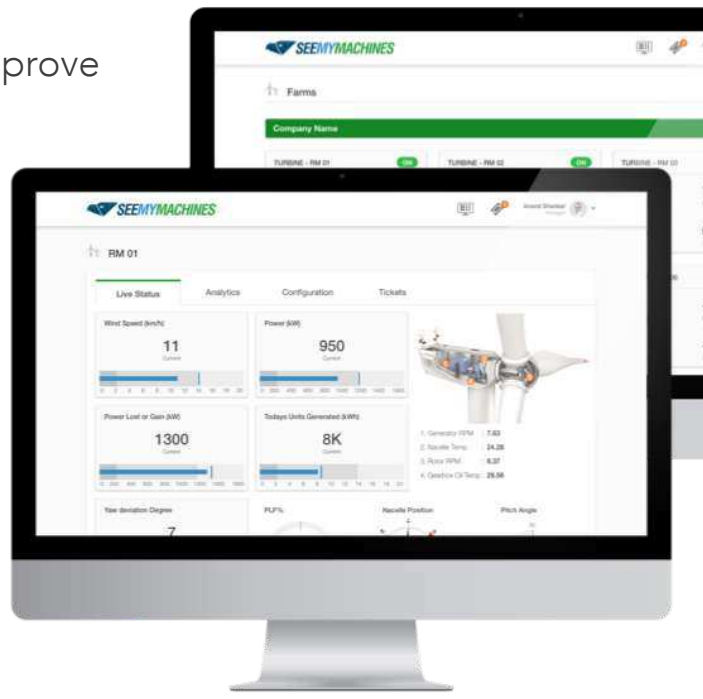
CMMS plug-in module supports alerts and calendar-based maintenance management system with push notifications. View and manage maintenance/service records.

TECHNOLOGIES

- Apache Kafka
- Apache Spark
- HDFS
- MongoDB
- Scala
- Python
- OPC

BUSINESS **BENEFITS**

- Improved ROI through effective turbine monitoring by tracking changes in input and output parameters as well as performance indicators
- Bird's-eye view into operational status of equipment at wind farms helps improve equipment utilization and power generation
- Alarm and notification features help technicians take quick action on critical issues
- Advanced analytical capabilities facilitates predictive maintenance, extending asset life
- Significant reduction of time, effort, and cost involved in manual and periodic monitoring practices



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