



# SMART MANUFACTURING PLATFORM

4 Focus Areas  
X  
5 Savings Outcomes!

# PRODUCTION PERFORMANCE



## 1. Actionable Intelligence - Not Just Data!

Identification of critical issues that can generate potential losses within a given shift.  
Recommendation of corrective actions.

## 2. Anomaly Discovery via Machine Learning

Smart discovery of process/production anomalies during operation.  
Driving proactive actions to eliminate losses!

## 3. Tracking Plan - A Virtual Supervisor

Smart tracking of deviation from plan in three dimensions - production time, production volume and materials usage.

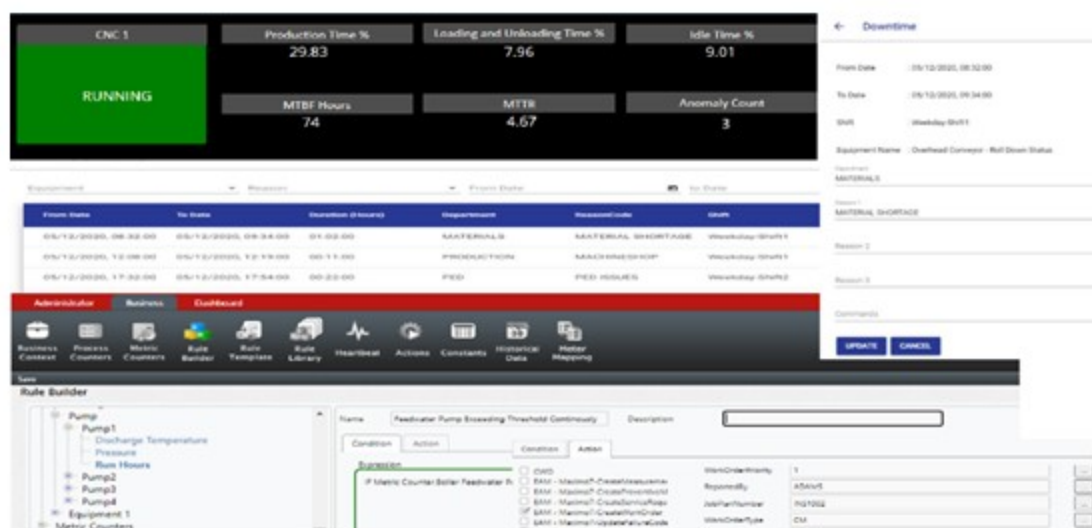
## 4. Empowerment via Labor Productivity

Smart tracking of operator output and empowering operators to eliminate errors and omissions in their performance.

## 5. Elimination of Non-Value-Added Costs

Smart integration of production to enterprise systems for automated reporting of real-time production performance.

# ASSET PERFORMANCE



## 1. Prediction of the “Next” Failure

Estimating the probable time for the “next failure” using a combination of physics and statistics based models.

## 2. Predictive Maintenance

Automated generation of predictive maintenance actions to reduce or eliminate unplanned downtimes.

## 3. Optimization of Asset Performance

Smart tracking of Key Performance Metrics and continuous optimization of asset behavior using machine learning.

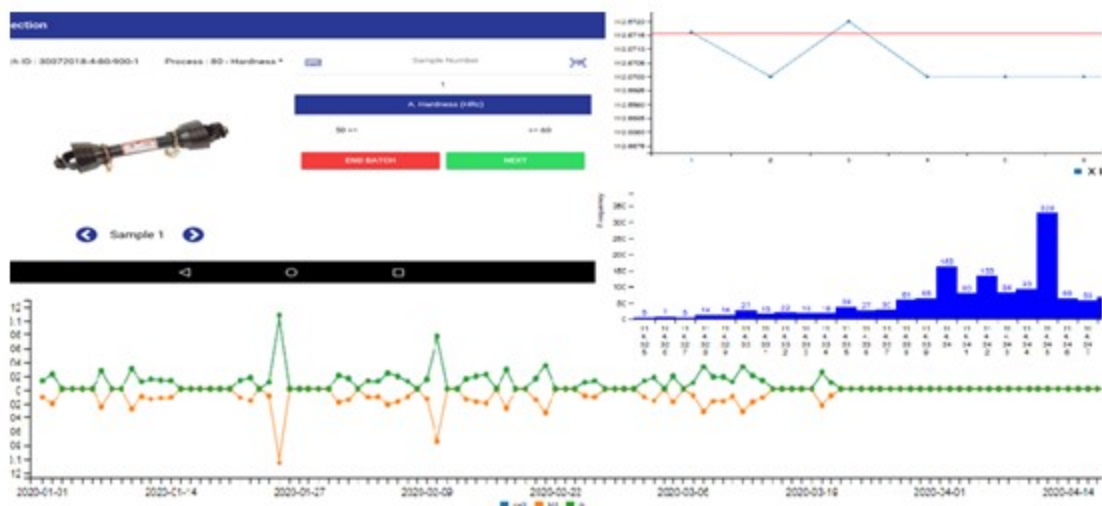
## 4. Improvement of Maintenance Effectiveness

Smart tracking of reliability of business-critical assets & auto generation of preventive maintenance.

## 5. Elimination of Non-Value- Added Costs

Automated integration of production equipment to enterprise asset management systems for generating predictive, preventive & corrective maintenance work orders.

# QUALITY PERFORMANCE



## 1. Elimination of Errors and Omissions in Quality Inspections

Recording measurements directly (objectively) from measuring instruments using digital attachments. Elimination of data input errors and/or omissions.

## 2. Tracking Cost of Quality

Computing “cost of poor quality” for each batch or process and associating rejects to specific root causes.

## 3. Integration of Supplier Quality

Real-time remote and concurrent visibility of supplier batch/process quality to an OEM customer, prior to dispatch!

## 4. Automate Visual Inspections

Achieving accuracy and speed in the inspection of visual defects using an integrated machine vision system.

## 5. Empowerment via Augmented Reality

Providing real-time instructions for inspections/assembly using wearable glasses.

# ENERGY PERFORMANCE



## 1. Establishing Last Mile Connectivity

Establishing the last mile connectivity to major energy guzzlers in the plant using a non-intrusive sensor.

## 2. Automated Baseline

Automatic computation of “business as usual” profiles of energy consumption of a machine/process for every product type.

## 3. Production-Energy Optimization

Smart computation of energy consumption for every product (energy intensity) produced.

## 4. Comparison of Energy Usage

Comparison of the energy performances of identical machines to understand why one machine is behaving better than the others!

## 5. Implementation of Energy Saving Strategies

Smart computation of the expected savings & implementation of energy savings strategies to reduce energy consumption.

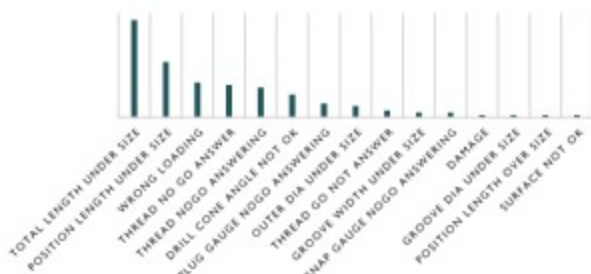
# INDUSTRY USE CASES

## PRODUCTION PERFORMANCE MANAGEMENT

A Tier 1 supplier tracks performance of CNC Machines in order to make incremental changes to improve performance within a shift.

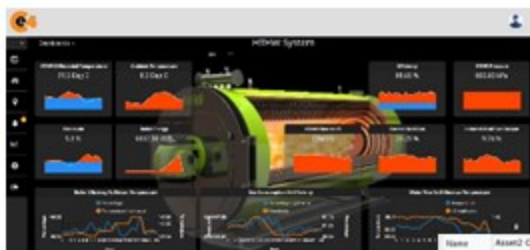


## DEFECT CHARACTERIZATION



A Tier 2 supplier avoids human errors and omissions by automating the assignment of root causes of quality defects.

## ASSET PERFORMANCE IMPROVEMENT



Large Utility achieves unified visibility of KPIs & early warnings of anomalies in its boilers' operating performance.

A Wastewater Treatment Plant Achieves Usage-Based Preventive Maintenance across its 600+ Pumps using a single Logical Rule.



# INDUSTRY USE CASES

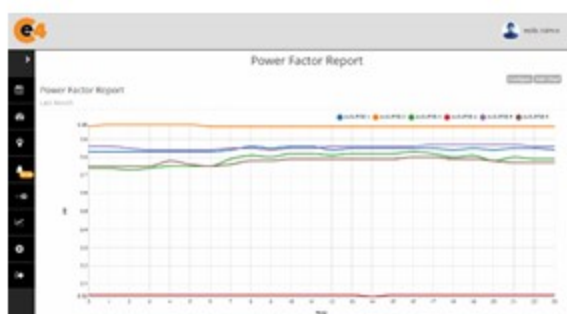
## QUALITY PERFORMANCE MANAGEMENT



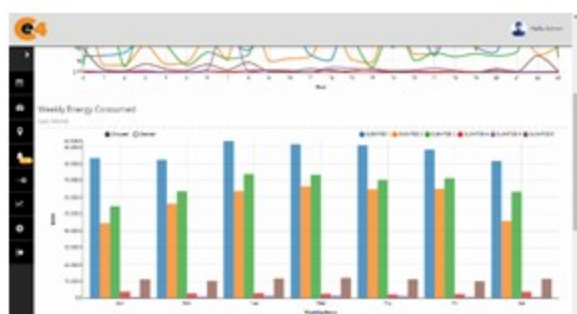
An Auto Parts Supplier objectively records (without human data entry), In-Process & End-of-Line QC measurements.

An Automotive OEM remotely tracks in real-time Supplier Batch Quality before shipment & whether OEM's QC Plans have been followed completely.

## ENERGY PERFORMANCE MANAGEMENT



A Top Food Processor tracks, logs & is notified of Power Quality events to curb utility penalties.



A Tractor OEM monitors & reduces weekly energy consumption of a Paint Line across different shifts.

The screenshot shows a 'Saving Plan Details' form. It includes fields for 'Strategy' (set to 'LoadCycling'), 'Level' (set to 'Empare de L1'), 'Unit' (set to 'KWH'), 'Start Plan' (20190511), and 'End Plan' (20190831). There are also checkboxes for 'Day' (checked for 'Sunday, Tuesday') and 'Hours' (set to '4'). 'Add' and 'Remove' buttons are visible.

A Printing Plant implements energy savings strategies (e.g. Load Shedding) during specific shift periods.

## EDGE SPECIFICATIONS

### BorgConnect® Hub:

Quad core Cortex-A72 (ARM v8) 64-bit SoC @  
1.5GHz;  
Wi-Fi; Bluetooth;  
Gigabit Ethernet;  
Operating temperature: 0 - 50°C ambient.

### PROTOCOLS SUPPORTED

MODBUS RTU, MODBUS TCP, UART, MQTT

### STANDARD INTERFACES

I2C, SPI, RS232, RS485, UART, Relay  
Control, HMI, Analog (4-20mA, 0-5V,  
0-10V), Digital Sensors, Industrial LAN, AV,  
USB, Bluetooth, Wi-Fi, MTConnect.

### DATA ADAPTORS

PLC, SCADA, Historian, OPC®, Maximo®,  
Oracle® EAM, SQL® Server, SAP®.

## SERVER SPECIFICATIONS

### 1. On-premise server model

#### PHYSICAL SERVER

Octa-core Processor;  
12 GB of RAM;  
100 GB of HDD.

#### OPERATING SYSTEM

Linux.

#### DATABASE TECHNOLOGY

MySQL.

### 2. Cloud Service Model

AWS, Azure.  
Offered as a service.

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