5G ENERGY LTD.

e4

Digitalized Intelligent Production Energy Optimization

UNIFIED PRODUCTION ENERGY INTELLIGENCE

Become Energy-Aware Anywhere, Anytime, and at Any Level of Granularity

eC4 is a digitalized intelligent Production Energy Optimization platform that connects non-intrusively to plant equipment and proactively uncovers inefficiencies to ensure optimal energy intensity.

eC4 enables "intelligent control of energy use" to optimize 2 key relationships: energy vs. production, energy vs. equipment performance.

Site 1, 2,.... N

- Equipment by Type
- Equipment by Line / Department
- Equipment by Area
- Equipment by Criticality
- Power Quality
- Existing Plant Automation
- Production & Weather Data

Non-Intrusive Current Sensors

Meters

eC4 Intelligent Node

eC4 Energy Intelligence Dashboard

eC4 Machine Intelligence Dashboard

eC4 Power Quality Dashboard

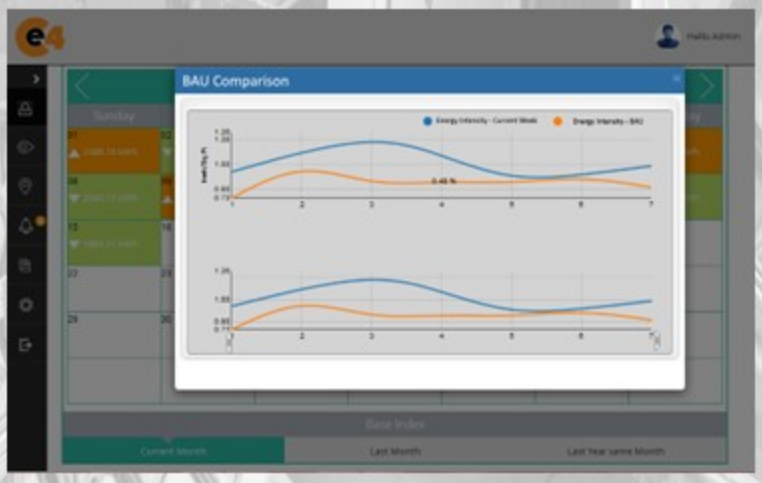
Reduce Annual Energy Costs by up to 25%

C-Suite
Manufacturing
Finance
Maintenance
Operations
Sustainability

GENERATE SAVINGS USING REAL-TIME ANALYTICS

Apply *eC4* Energy-Saving Strategies

ESTABLISH, AND TRACK AGAINST, A BASELINE OF ENERGY USE/INTENSITY



Understand Typical Energy Usage Patterns & Discover Anomalies

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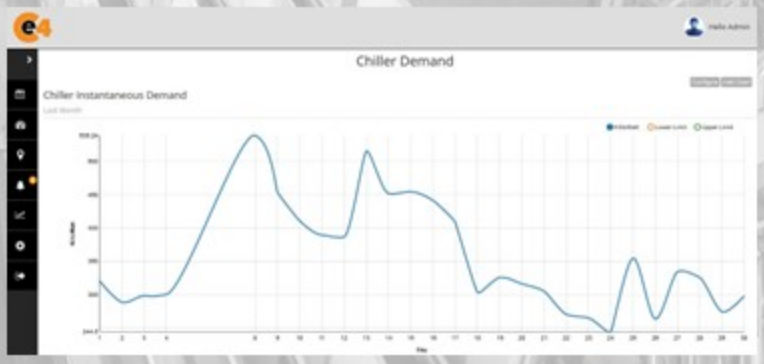
Apply Business Rules Based on Physics to Identify Root Cause

MONITOR MACHINE DEMAND & BALANCE LOADS



Apply *eC4 Load Shedding*, *eC4 Pre-Cooling*, or *eC4 Load Cycling* Savings Strategies

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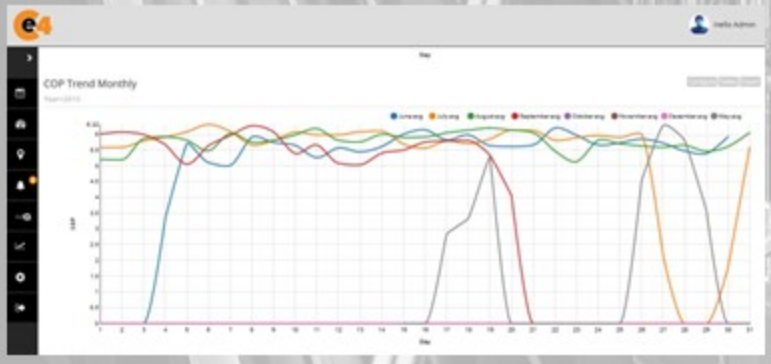
Reduce Demand Charges by up to 10%

TRACK & CORRELATE MACHINE KPIs: UNCOVER PERFORMANCE ISSUES



Apply Machine Intelligence to Identify Potential Failure Patterns

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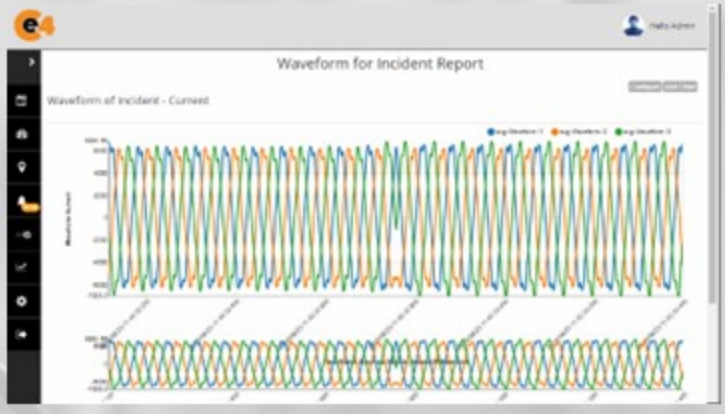
Proactively Avoid Unplanned Downtime (up to 40%) & Associated Failure Costs

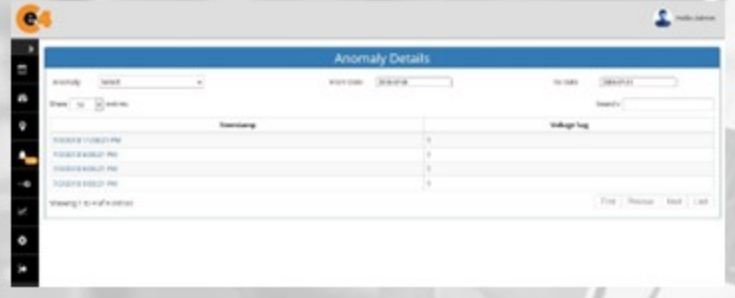
MINIMIZE POWER QUALITY INCIDENTS

Real-time Intelligence to Proactively Uncover, Isolate, and Reduce Events

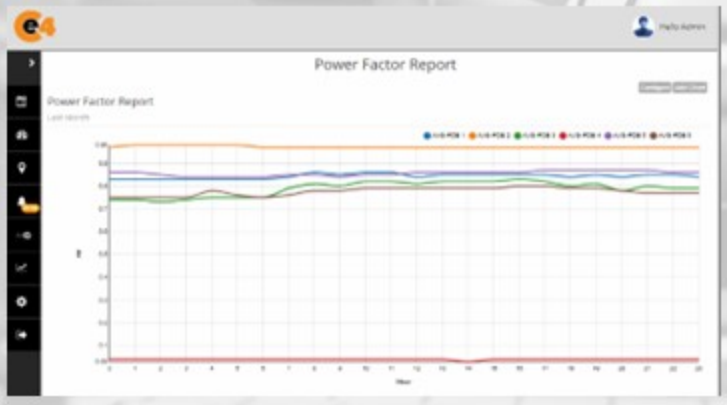
Have Real-Time Visibility into Power Quality Characteristics



View Real-Time Waveform Trends to Identify Abnormalities in Power Quality



Track Frequency of Recurrences of Power Quality Incidents to Proactively Take Action



Track Power Factor; Reduce Utility Penalties

EQUIPMENT ENERGY - PERFORMANCE MONITORING

Use Energy Consumption Patterns as an Indicator of Machine Performance Degradation

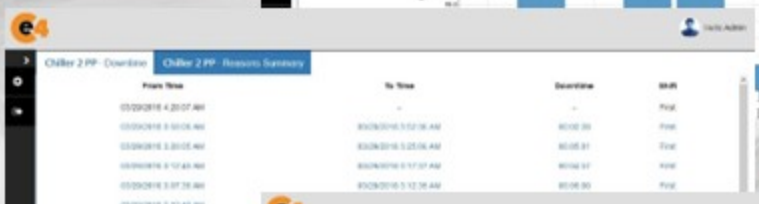



PLANT EQUIPMENT

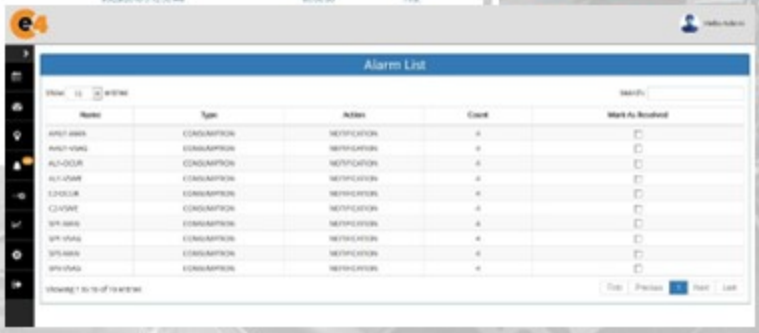
Historical & Current
Operational, Weather & Machine Data

Equipment Energy - Performance Dashboard

Outlier Discovery



Outlier Root Cause Analysis



'Learned' Rules to Avoid Recurring Failures

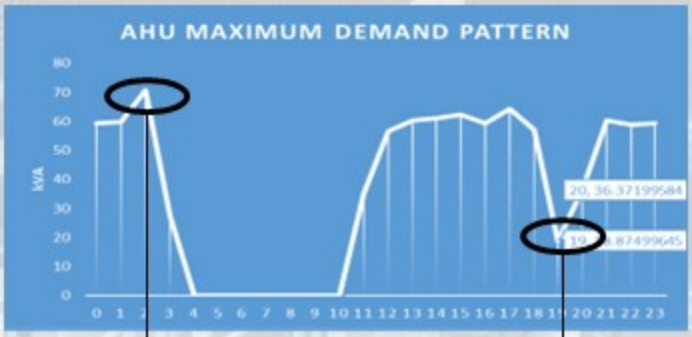
Real-Time Maintenance Triggered in 5G's *Enterprise Gateway* Platform

Maintenance Personnel

Enterprise Gateway

COMMON INDUSTRY USE CASES

1. DYNAMIC OPTIMIZATION OF DAILY PRODUCTION DEMAND

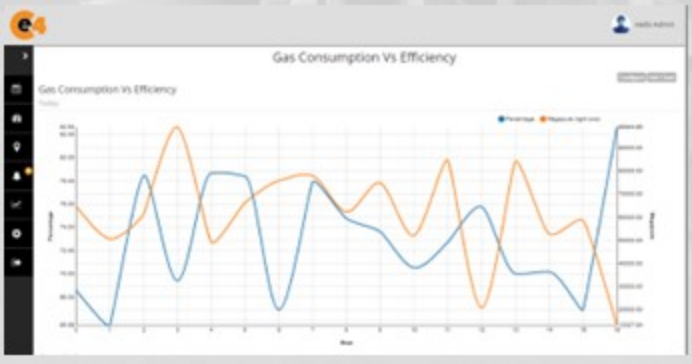


Opportunistic and Dynamic Reduction of Demand by Shedding Non-Critical Loads.

In a Press Shop, *eC4* Achieved Demand Savings of 10% via Applying "*eC4* Demand Shaving" Strategies by Recommending Cycling/Shedding of the Different Non-Critical Loads Opportunistically.

2. PROGNOSIS OF FAILURES VIA MACHINE INTELLIGENCE

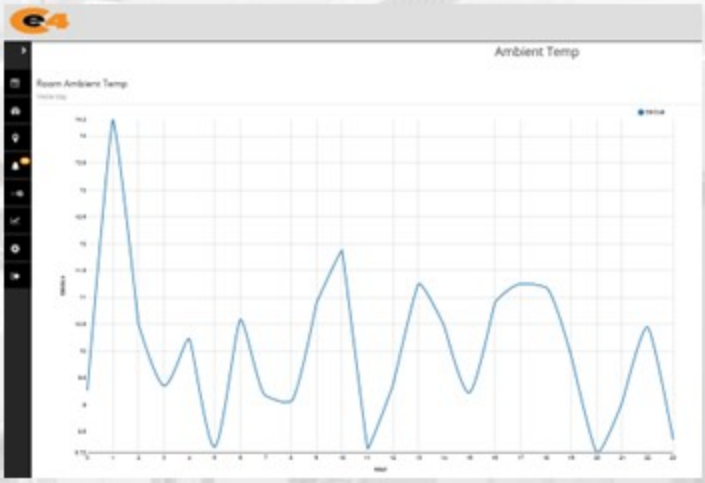
Monitoring/Correlating Trends of Process Variables in Critical Equipment (such as Boilers, Chillers, Industrial Fryers, Furnaces, etc.) to Identify Anomalies in Real-Time.



In a Utility Plant of a Large Educational Campus, *eC4* Implemented *Machine Intelligence* to Identify Anomalous Concurrent Patterns in the Values for Efficiency and Energy Consumption of the Boiler which Led to Predictive Maintenance and Prevention of a Costly Failure!

COMMON INDUSTRY USE CASES

3. OPTIMIZATION OF ENERGY CONSUMPTION IN THE MAINTENANCE OF IDEAL AMBIENT CONDITIONS IN LABORATORIES AND ELECTRONICS PRODUCTION

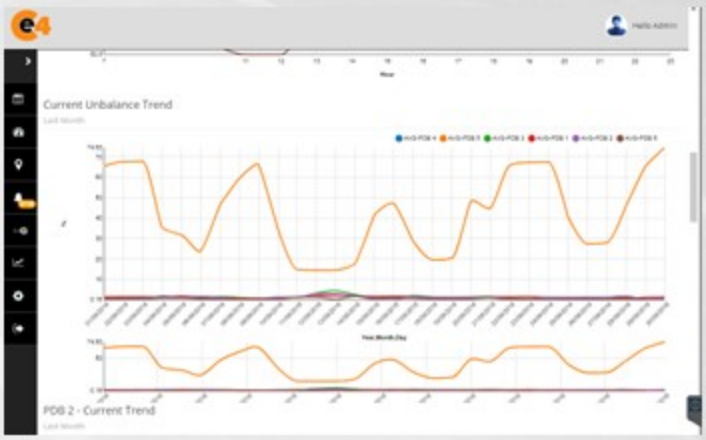


Tracking of Ambient Conditions (Temperature, Humidity, etc.) and Energy Optimized Setpoint Adjustment of Fans, Air Handlers, Pumps, Compressors, etc. for Electronics Production.

eC4 has Saved Several Million Dollars in a Telecom Major over the Last 5 Years by Preventing Production Stoppages due to Undesired Ambient Conditions, and by Achieving this via Optimized Energy Consumption.

4. IDENTIFICATION OF ELECTRICAL FAULTS VIA ENERGY DATA

Using Energy Usage Patterns to Uncover Potential Hidden Faults in the Electrical Systems Connected to Equipment.



eC4 Identified Unbalanced Loading in the Panel of the Lighting System of a Large Industrial Building that Led to an Early Resolution of the Problem and Prevention of a Loss of £250k!

eC4 DASHBOARD

PHYSICAL/CLOUD SERVER:

- Quad Core Processor with minimum of 8 GB of RAM and 500 GB of HDD/SSD;
- Cloud: Azure, AWS.

OPERATING SYSTEM:

- Windows 2012, 2016 with SQL Server®.

DATABASE TECHNOLOGY:

- Microsoft® SQL Server® 2008;
- Microsoft® SQL Server® 2012.

DATA ADAPTERS:

- Microsoft® SQL Server®.

COMPATIBLE WITH:

- PLCs, Historians;
- IIoT Sensors;
- TCP/IP;
- MODBUS.

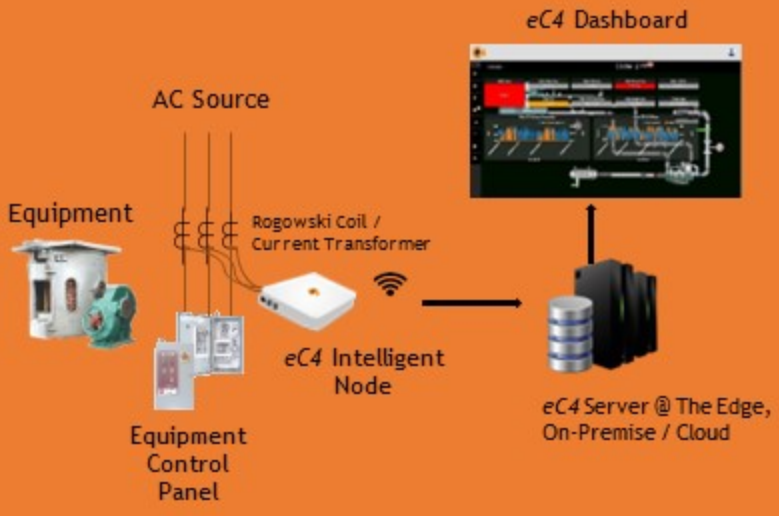
eC4 INTELLIGENT NODE

SPECIFICATIONS:

- Wi-Fi (IEEE 802.11n);
- Bluetooth 4.1 Classic, BLE;
- Compatibility: 50Hz & 60 Hz Systems;
- Sampling Frequency: up to 1 MHz;
- 3-Phase Non-Intrusive Connection to Power Lines using Current Transformers (up to 150A) and/or Rogowski Coils (up to 50,000A);
- Mounting: Din-Rail.

STANDARD INTERFACES:

- USB;
- RS 232 / RS 485.



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