The background of the slide is a photograph of an industrial facility, likely a chemical plant, during sunset or sunrise. The sky is a warm, golden-yellow color. In the foreground, several large, metallic pipes run diagonally across the frame, with some black bands or sensors attached to them. In the background, several tall, dark smokestacks or distillation columns are visible against the bright sky. The overall scene conveys a sense of industrial scale and modern infrastructure.

Unleashing Power of Digitization in Chemical Plant Operations – Predictive Maintenance and Energy Management

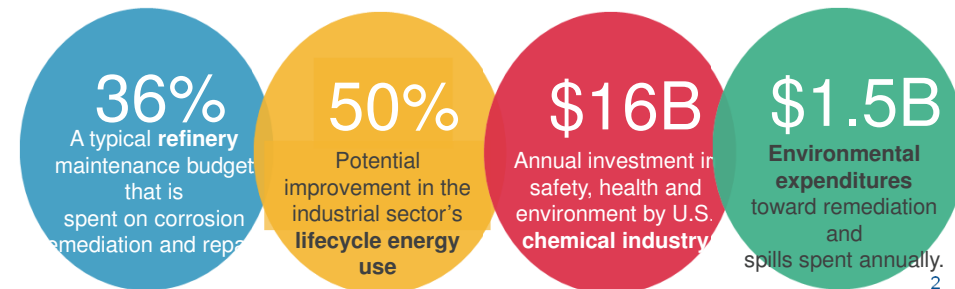
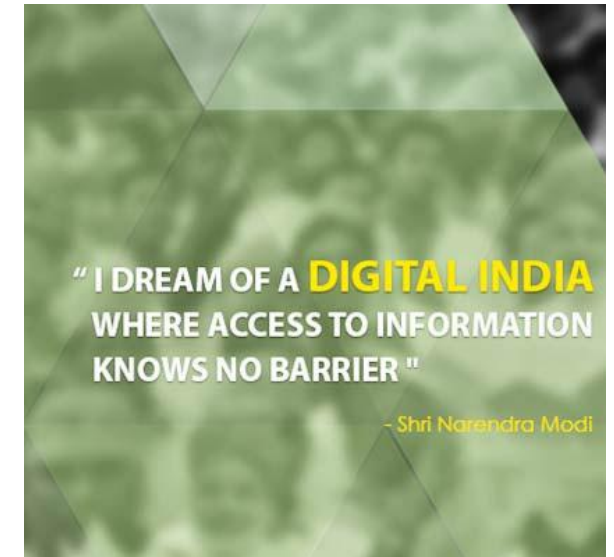
~The Path to Top Quartile Performance

Khushbu Chaplot Chaudhary

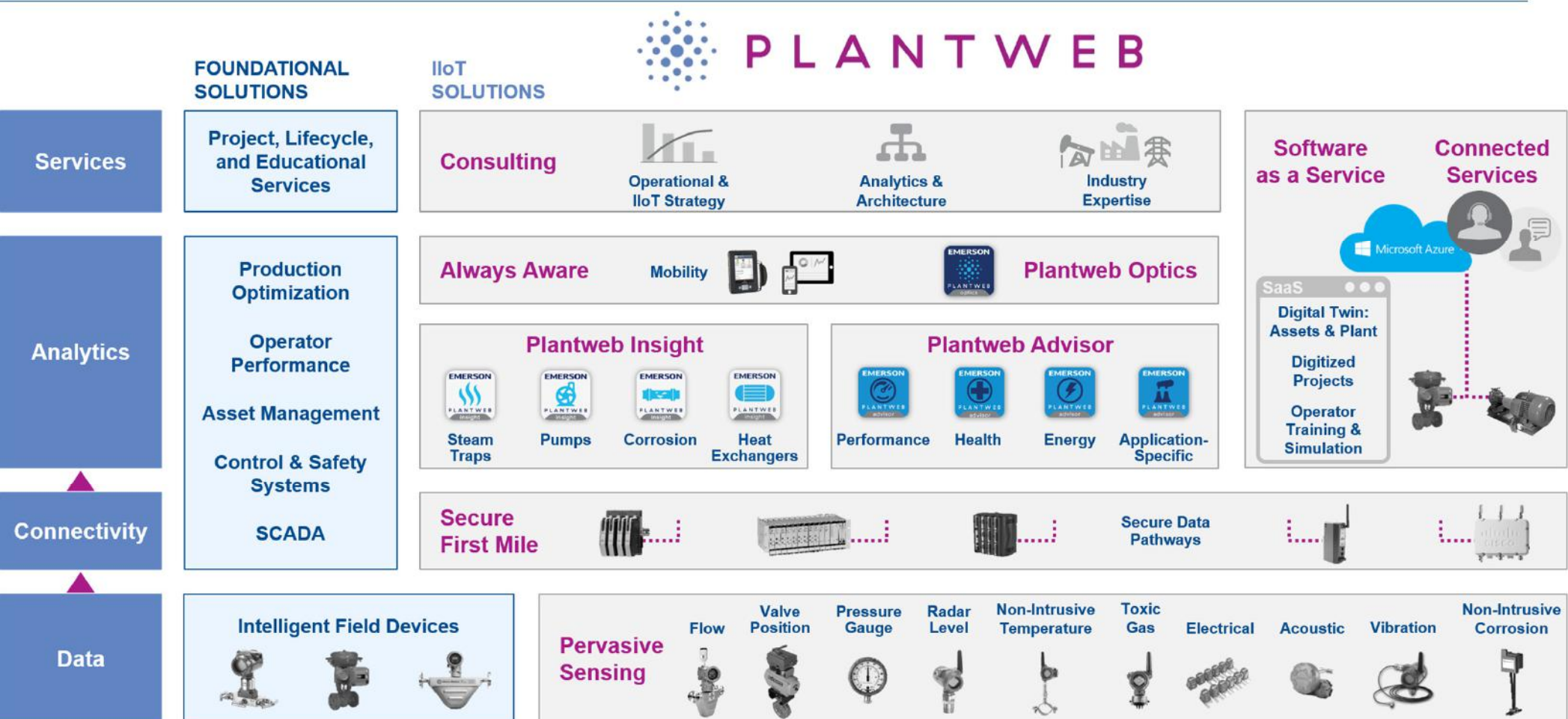
What & Why Industrial Internet of Things?

IoT devices **connect through computer networks** to exchange data with the operator, businesses, manufacturers, and other connected devices, mainly **without requiring human interaction**.

<http://www.ic3.gov/media/2015/150910.aspx>



The Plantweb Digital Ecosystem: Enabling Top Quartile Performance With the Industry's Broadest Integrated Portfolio of IIoT Solutions



Emerson Named 'Industrial IoT Company of the Year' from IoT Breakthrough



“The award recognizes Emerson’s extensive innovation and leadership in driving IIoT technologies and strategies for customers in manufacturing industries*.”

Press Release: [\(link\)](#)

“Emerson has harnessed the power of Industrial IoT for customers through its Plantweb™ digital ecosystem to enable broader process automation and deeper data insights that can improve operations.”



Emerson was selected from more than 3000 applicants around the world.



Source: IoT Breakthrough (iotbreakthrough.com)

* - Manufacturing industries include: Oil & Gas, Food & Beverage, Chemical, Life Sciences, Power, Water & Wastewater

Garners Industry Praise through Awards

2017 Vaaler Award

Chemical Processing

Bestowed to products that promise to significantly improve the operations and economics of plants.

Assessed for technical significance, novelty or uniqueness, and breadth of applicability.



2017 Processing Breakthrough Award

Processing Magazine

Recognized as influential and innovative product that made contributions to the process industry.

Novel solution that help navigate tough processing environments, meet changing standards, and provide monitoring.



2017 Oil and Gas Engineering Product of the Year

Oil and Gas Engineering

First solution to win Gold Award for Data & Analytics



Control Engineering 2018 Engineers' Choice Award

Control Engineering

Winner of the Software-Diagnostic category.

Selected out of more than 90 product nominations based on technologies advancement, service to the industry and market impact.



Making History With Wireless: Solving Customer Problems With The Right Products And Expertise

51

EMERSON WIRELESS
PRODUCTS
AVAILABLE TODAY



WIRELESS NETWORKS

32,100+

OPERATING GLOBALLY

7

SOLUTIONS FOR PLANT
OPERATIONS INCLUDING MOBILITY,
BRIDGING, TRACKING, SAFETY,
DATA BACKHAUL AND VIDEO

10+

BILLION
OPERATING HOURS



4100+

EMERSON
WIRELESS
EXPERTS



10 YEARS
OF WIRELESS INNOVATION

PROVEN
INTEGRATION
WITH ALL

11

MAJOR AUTOMATION
SUPPLIERS



146

OPERATING IN
COUNTRIES



9

EMERSON HAS WON WIRELESS INFRASTRUCTURE
CATEGORY **2009-2017** (9 CONSECUTIVE YEARS).
CONTROL READERS' CHOICE AWARDS

Remote monitoring of Pressure Relief Valves

Plant: Fuel Refining Unit

Challenge: Unable to detect the losses due to faulty PRV and Flare Control Valves

Solution: Non-intrusive type of wireless acoustic transmitter installed on the PRVs

Benefits:

- Real time detection of passing valves
- Easy to install, non-intrusive & Online real time data availability



Wireless Acoustic transmitter installed on PRV

“Identification of leaking PRV & attending them on real time basis along with real time detection of passing valves is beneficial” - *Plant Operator*

Pervasive Sensing adopted by Major Users for efficient Energy Intensity Index



हिन्दुस्तान पेट्रोलिएम कॉर्पोरेशन लिमिटेड

(भारत सरकार उपक्रम) पंजीकृत कार्यालय : 17, जमशेदजी टाटा रोड, मुंबई - 400 020.

HINDUSTAN PETROLEUM CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE) REGISTERED OFFICE : 17, JAMSHEDJI TATA ROAD, MUMBAI - 400 020.

मुंबई रिफाइनरी, पो. ऑ. बॉक्स नं. 18820, बी. डी. पाटील मार्ग, माहुल, मुंबई - 400 074.

MUMBAI REFINERY, P. O. BOX NO. 18820, B. D. PATIL MARG, MAHUL, MUMBAI - 400 074.

टेलीफोन : TELEPHONE : 2507 6000, फॅक्स : FAX : 2554 2008, तार - हिनरिफ, TELEGRAM - HINREF

TO WHOM SO EVER IT MAY CONCERN

This is to certify that M/s Emerson Process Management India Private Limited have successfully installed and commissioned Wireless Acoustics Transmitter (Model 708 – Qty = 75) at HPCL-Mumbai Refinery, Mahul Road, Chembur, Mumbai. The application was to improve energy efficiency (Energy Intensity Index) with acoustics monitoring of steam traps and Pressure Safety Relief Valves (PSVs).

The wireless system has been seamlessly integrated with our Honeywell DCS system and Process Historian Trend system..

Wireless Technology helped us with faster installation and commissioning leading to significant cost reduction and project completion schedule.

M/s Emerson provided prompt and timely services for erection and commissioning of the system.

For Hindustan Petroleum Corporation Ltd, Mumbai Refinery)

Best Regards,

Sign & Stamp

[Signature] 17/7/2014

Indian Journal of Fertilisers, Vol. 13 (6) pp.66-69 (4 pages)

Implementation of Wireless Instrumentation in a Brown Field NPK Granulation Plant

Vinod Patel and Jairam Saindane

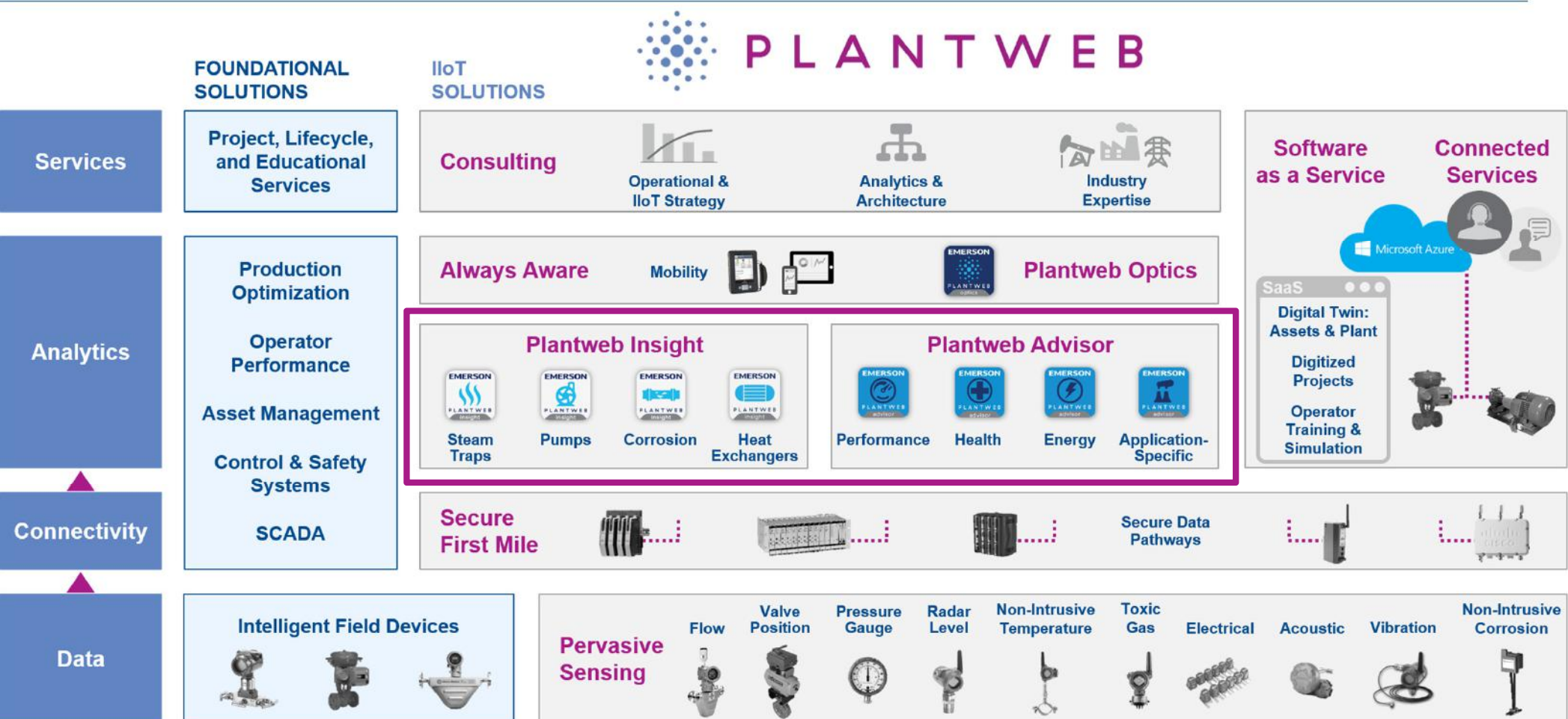
Deepak Fertilisers and Petrochemicals Corporation Limited

Plot 32, Sector 16, Vashi, Navi Mumbai

Abstract

Deepak Fertilisers and Petrochemicals Limited (DFPCL) is India's leading producer of Industrial Chemicals, Petrochemicals and Fertilisers located in Taloja near Mumbai. DFPCL commissioned a NPK granulation plant having two trains of 1000 MTPD capacity each. M/s Inco Spain is the licensor and M/s tkIS India was engineering consultant. DFPCL was evaluating various latest technologies for their upcoming project. After evaluation DFPCL & tkIS jointly decided to go for non-critical open loops on wireless technology. The benefits of wireless technology include flexibility, scalability, maintenance free and lower capex cost. During implementation, hook up of existing plant feed (ammonia and phosphoric Acid) to new NPK DCS was also a concern due to long distance (2 to 3 km) from NPK control room. This was successfully done using wireless thumb adaptor which was specifically needed for monitoring the data.

The Plantweb Digital Ecosystem: Enabling Top Quartile Performance With the Industry's Broadest Integrated Portfolio of IIoT Solutions



Analytics and Applications Enable Expanded On-Premise Expertise



Plantweb Insight: Lightweight analytics with pre-configured algorithms for specific asset classes

Plantweb Advisor: Enterprise-wide analytics with customizable algorithms and displays

-  Relevant Time **Asset Monitoring**
-  **Abnormal Situation** Identification
-  Pre-Packaged **Analytics**
-  **Seamless** Integration
-  **Minimal Configuration**
-  Simple, **Actionable Interface**



Rigorous analysis of Equipment **Performance** & Efficiency

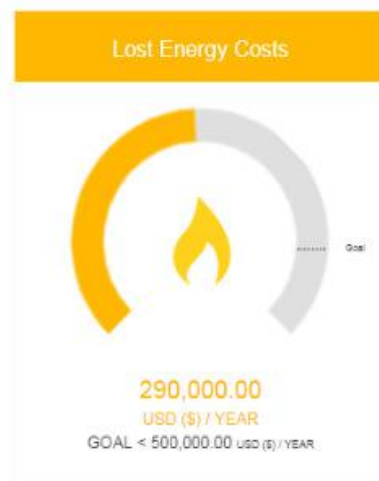


Plant, Unit, and Equipment **Health** analytics

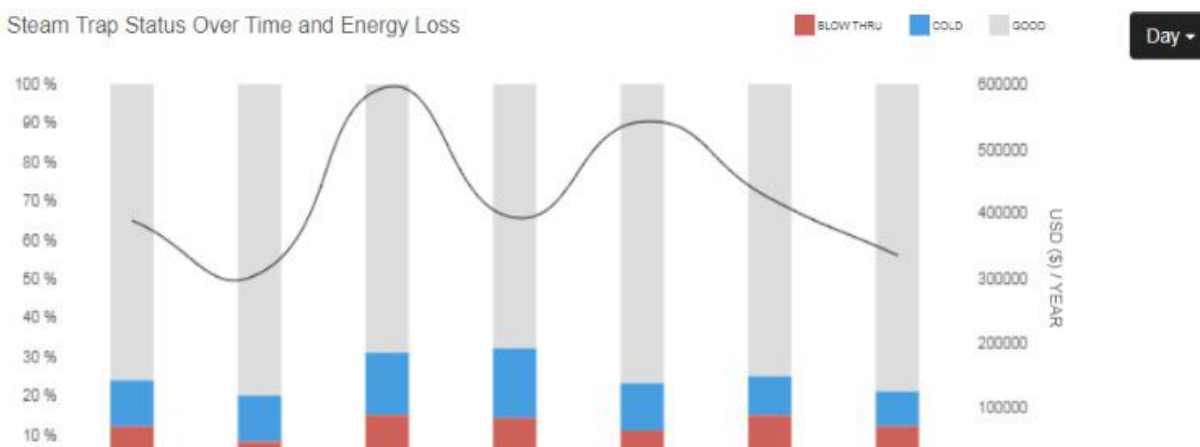
Comprehensive management of **Energy** Consumption, Costs, and Emissions



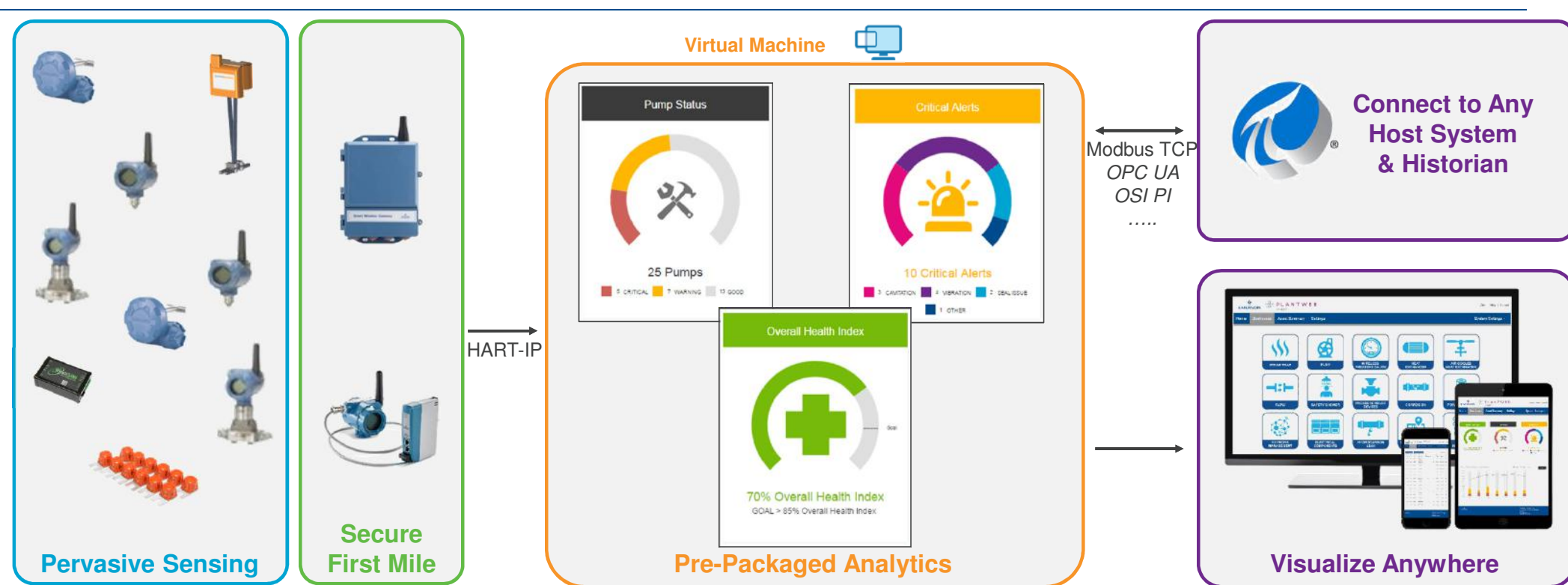
Insight App



Steam Trap Status Over Time and Energy Loss



Plantweb Insight Contains Pre-Built Analytics for Seamless Integration with Minimal Configuration



**Minimal Barriers To Entry Create An Easy To Implement Solution With Fast Results
INDEPENDENT OF THE PLANT CONTROL SYSTEM**

Emerson's Plantweb Insight Portfolio of Applications Focus on Monitoring Essential Assets and Equipment



Identify Steam Trap Failures Instantly

Acoustic



Predictive Health Monitoring

Pressure
Temperature
Vibration
Level



Know Before You Go

Wireless Pressure Gauge



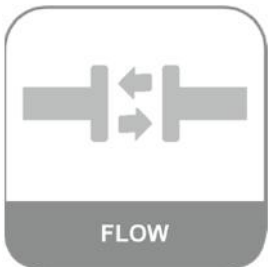
Predictive Health Monitoring

Temperature
Pressure
Flow



Predictive Health Monitoring

Temperature
Pressure
Vibration



Constant Temp Calculated Flow

Pressure



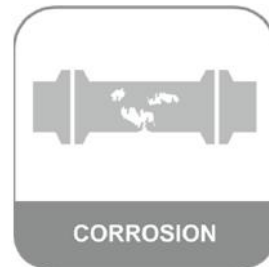
Know When PRD is Open and Closed

Discrete



Faster Reaction to Pulled Safety Shower

Pressure
Discrete



Identify Metal Loss Immediately

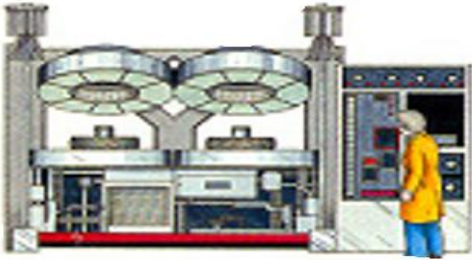
Non-intrusive corrosion



Wireless Network Management

All Wireless
Devices

Major Tyre Manufacturer adopts wireless steam trap monitoring at 6 sites

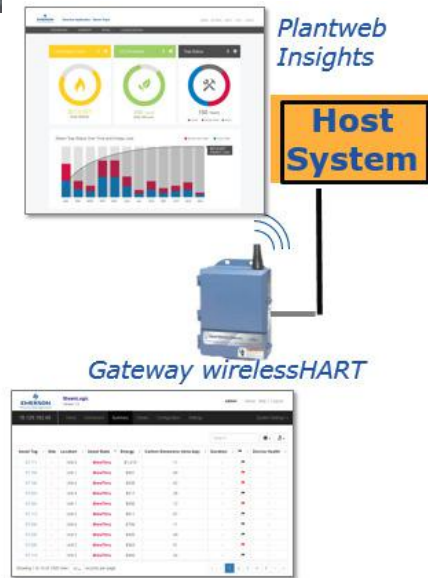
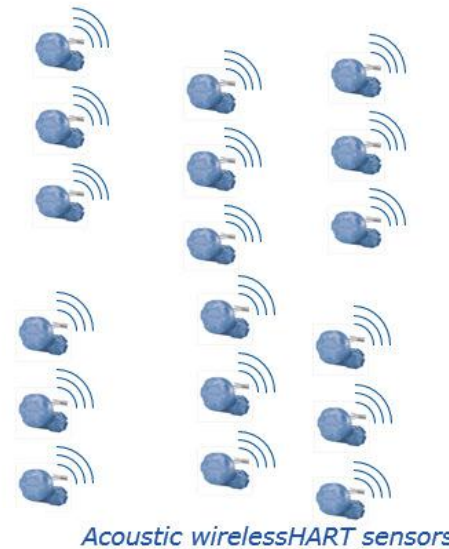


- In **Curing Press** tyres get their final shape & tread pattern
- It utilizes steam to heat (cure) the green tyre. Curing transforms the tacky & pliable material to a non-tacky, less pliable, long-lasting state at over 300 degC for 12-25 mins



Industrial IoT Connection:

- Improve personnel safety, productivity & reliability
- Improve yield, throughput & product quality
- Predictive diagnostics and analytic tools allowed for preventive maintenance and prioritization



Plantweb is Putting Companies on the Path to Top Quartile Operations



Customer: Petrochemical Manufacturer, SEA

Pain: High energy costs associated with steam loss when traps failed (often going undetected for 3-4 weeks)

Solution: Insight App using Wireless steam trap monitoring on range of high-value product streams

3 month payback, reduced downtime, and 7tons/yr CO2 emissions



Customer: Specialty Chemical, China

Pain: Manual rounds, costly shutdowns, high maintenance costs, and safety concerns on operator rounds

Solution: Steam Trap Insight App monitoring to analyze data and alert operators of abnormalities

67% operator round reduction



Customer: Fertilizer Manufacturer, India

Pain: Preventative maintenance on Pump costly and time consuming, yet still misses failure conditions

Solution: Pump Insight App

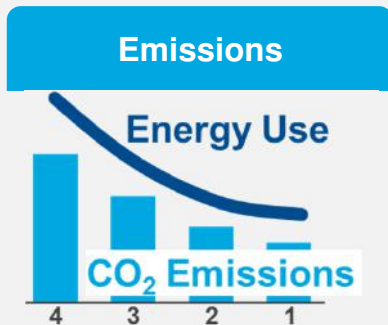
Replicated to their sites
Vibration – PeakVue

Advisor App

Plantweb Advisor is a Suite of Complementary Enterprise Solutions for Equipment Analytics

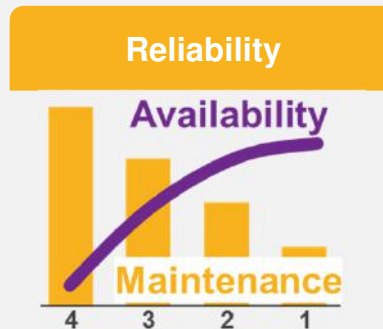
Energy Advisor

1 Energy Intensity
(Actual vs. Target)



Health Advisor

2 Equipment Health
(Actual vs. Baseline)

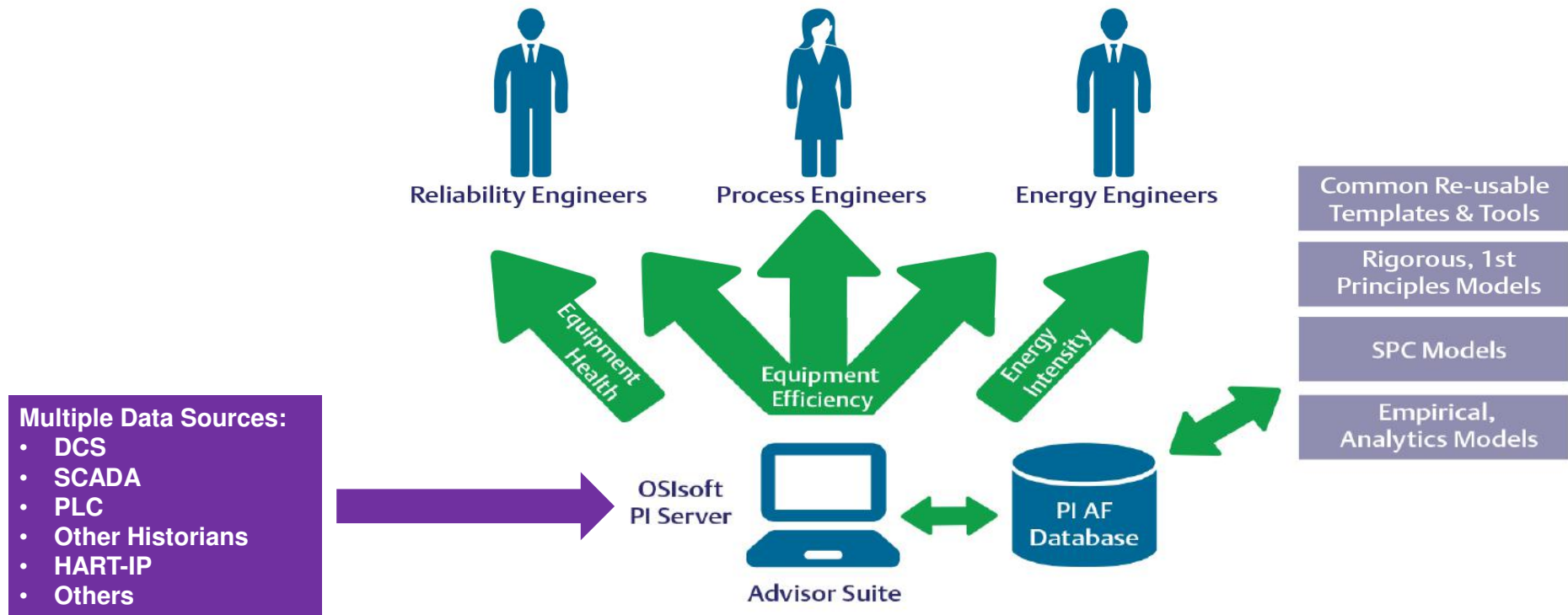


Performance Advisor

3 Equipment Efficiency
(Actual vs. Design)

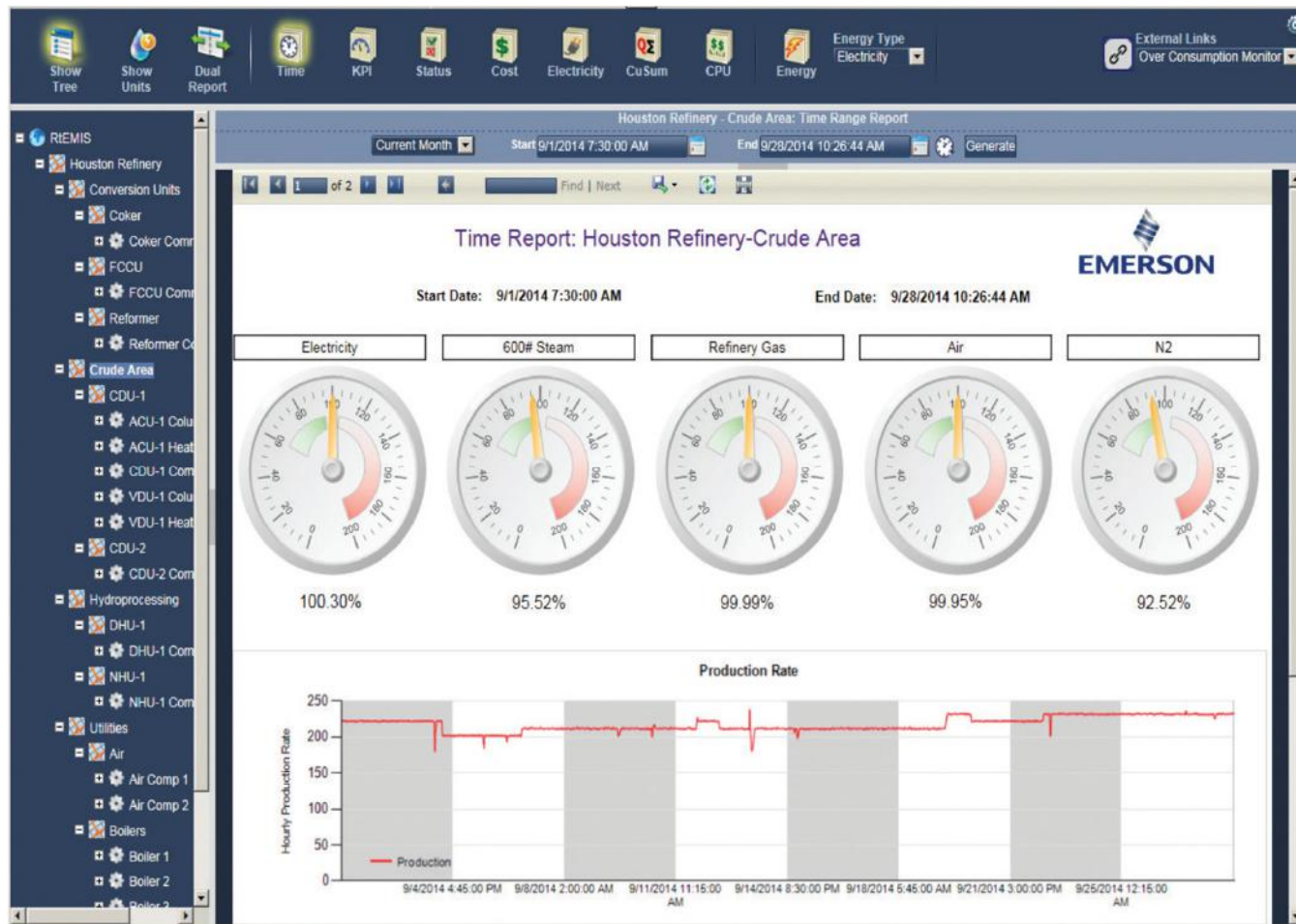


Plantweb Advisor Uses a Common Data Architecture to Provide Relevant Information and Insights to Key Stakeholders



Provides a Single Source of Truth, Minimizes Islands of Information and Leverages Existing Investments in Sensors, Networking and Software

Plantweb Energy Advisor allows Customers to Better Manage Site Energy Consumption, Energy Costs and Emissions



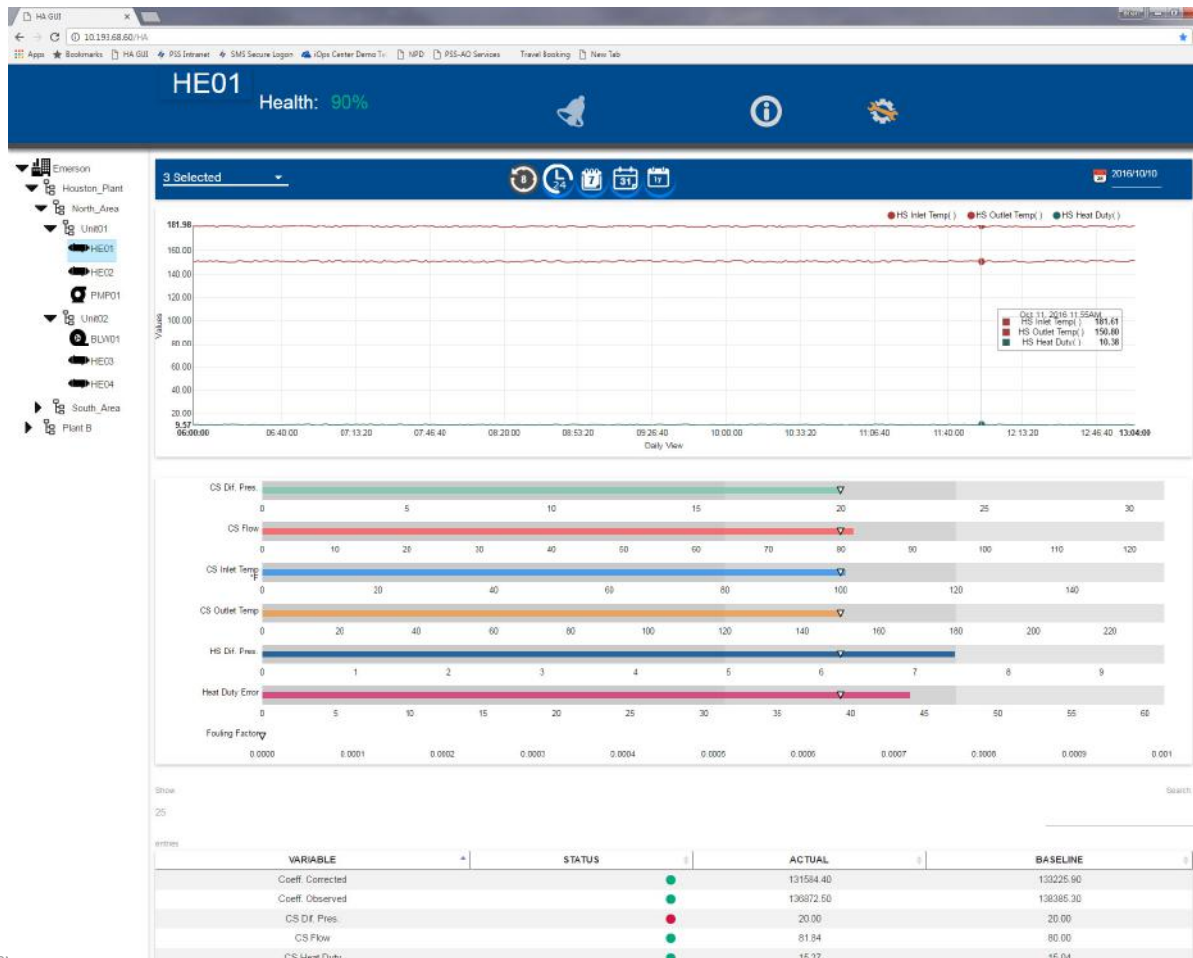
Manage Energy Across the Facility

- Provides overall Site Energy efficiency – **aggregates energy used by equipment, unit, area, plant**
- Easy drill-down to identify energy problem areas
- Know **actual vs. target** at any given time
- Uses **statistical models** from historical data

Reduce energy consumption and increase energy visibility

Plantweb Health Advisor Provides Plant, Unit and Equipment Health Analytics

Reliability



Minimize Unplanned Shutdowns and Slowdowns

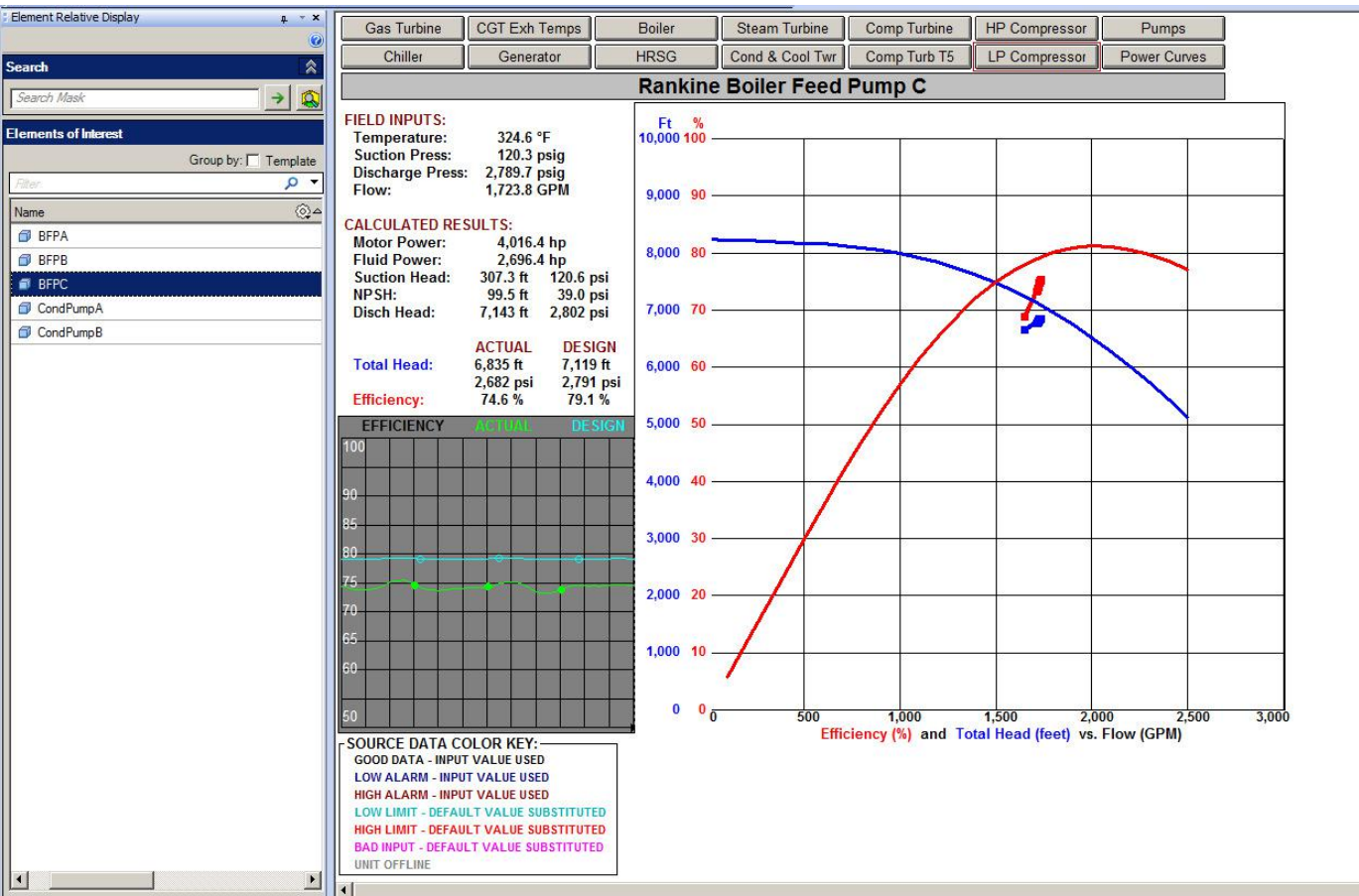
- Combines process and equipment data
- **Statistical based analytics**
- Monitors equipment health against **baseline**
- Automatic calculation of operating limits
- Provides Overall Equipment Health (0-100%)
- **Early warning** when operating outside of normal conditions
- Dashboards allow drill-down and asset filtering

Plantweb Performance Advisor Provides a More Rigorous Analysis Around Equipment Efficiency

Production

Understand Financial Impact of How Equipment is Operating

- Intuitive graphical displays show actual performance against design
- Uses industry standard **ASME-PTC thermodynamic 1st principle** models
- Models and Calculations are pre-engineered
- Uses equipment curves and asset specific **design data**



Standard Software Applications are available for all Common Equipment Types

Common Process Assets*

- Air Cooled Heat Exchanger
- Blower
- Simple Compressor
- Cooling Tower
- Heat Exchanger
- Pump
- Reciprocating Compressor

Utility Assets**

- Air Cooled Condenser
- Biomass Boiler
- Boiler
- Deaerator
- Gas Turbine
- Generator
- HRSG (Heat Recovery Steam Generator)
- Reciprocating Compressor
- Steam Distribution
- Steam Turbine
- Water Cooled Condenser



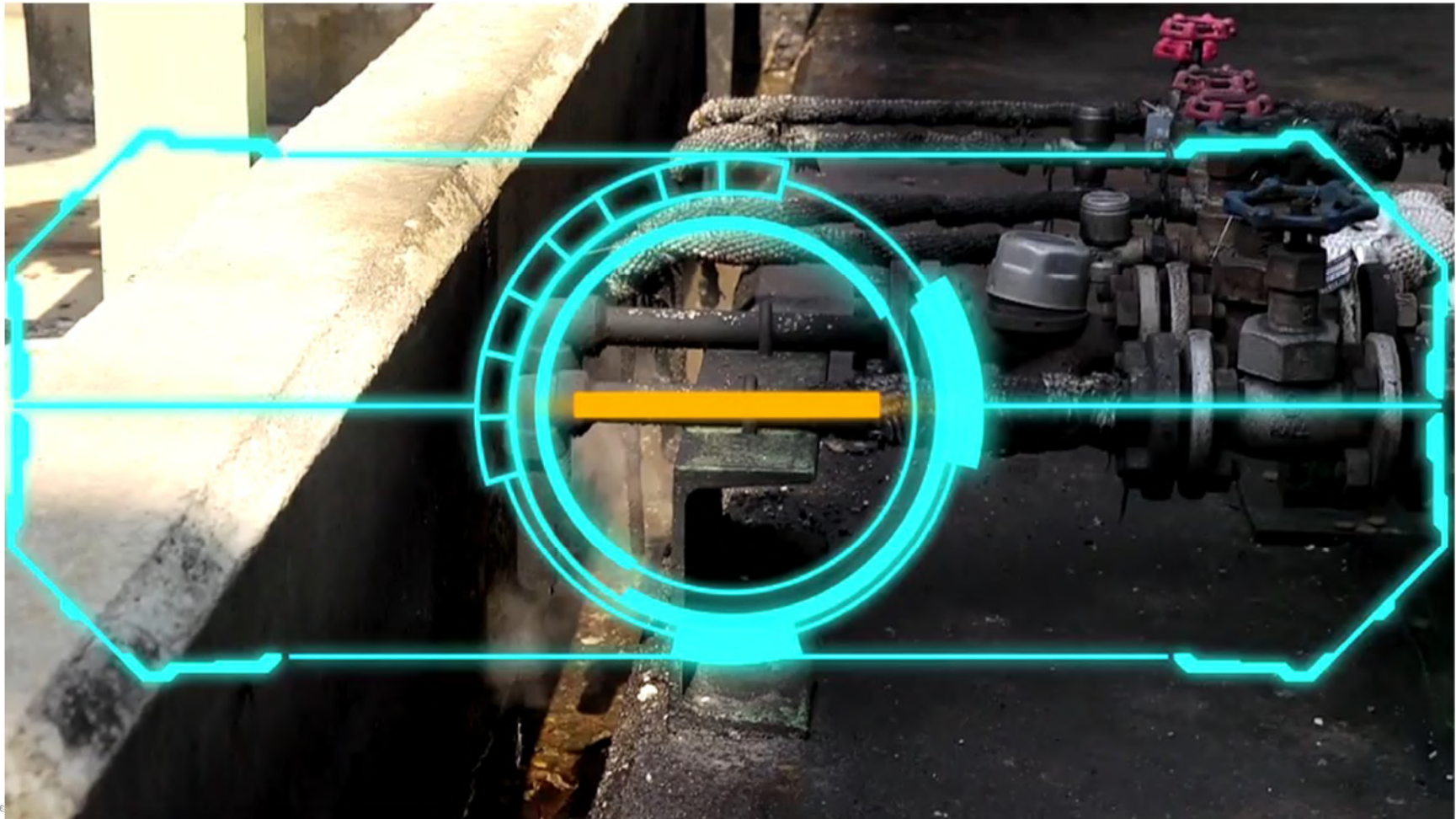
**Health and Performance Advisor*

***Performance Advisor*

Additional Assets Easily Added to the Portfolio by End Users or by Emerson

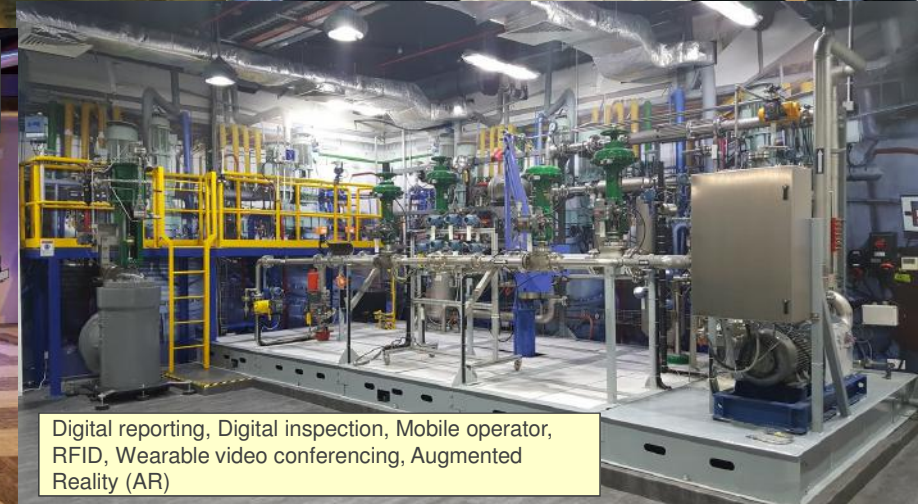
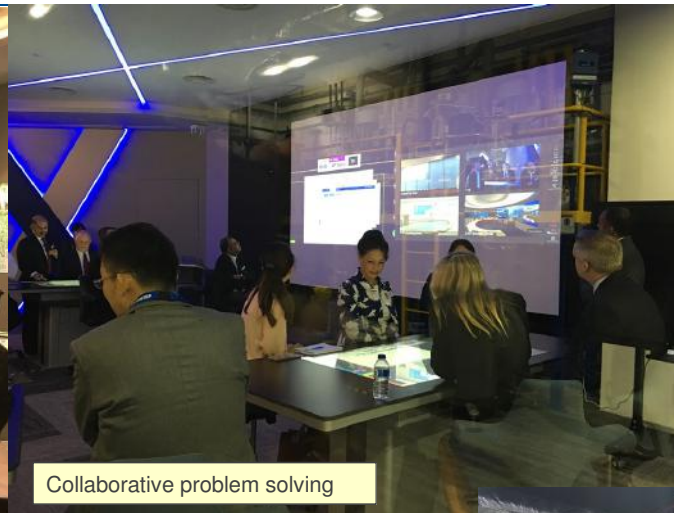
Connected Services

Connected Services – Chemical Reference



Singapore Solution Centre

Digital Transformation: Experience the New Way of Working At Emerson Solutions Center in Singapore



Q&A