

Reducing Operational Expenditure (OpEx)

Jonas Berge

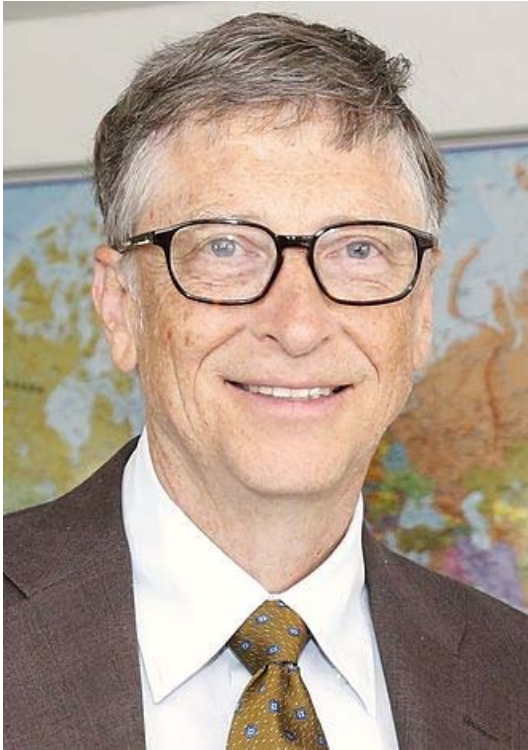
Director, Applied Technology

8 April 2016

Performance Without Compromise



What Do These Folks Have in Common?



https://en.wikipedia.org/wiki/Bill_Gates



<http://www.biography.com/people/warren-buffett-9230729>



<http://www.linkedin.com/in/smartdigital>



Topics Covered

- Save time and money
- Plant modernization audit
- Business model transformation



Where is Does the Money Go?

- Reliability, Maintenance, and Integrity
- Energy Efficiency
- Operations



Reliability, Maintenance, and Integrity

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Reliability, Maintenance, and Integrity Challenges

- Reactive maintenance
 - Costly repairs
- Cost of unscheduled downtime
 - Lost production
- Preventive maintenance manpower
 - Routine inspection and testing rounds
 - Routing parts replacement
 - Routine cleaning



Vibration



Valve Leak



Corrosion



Steam Trap



Temperature

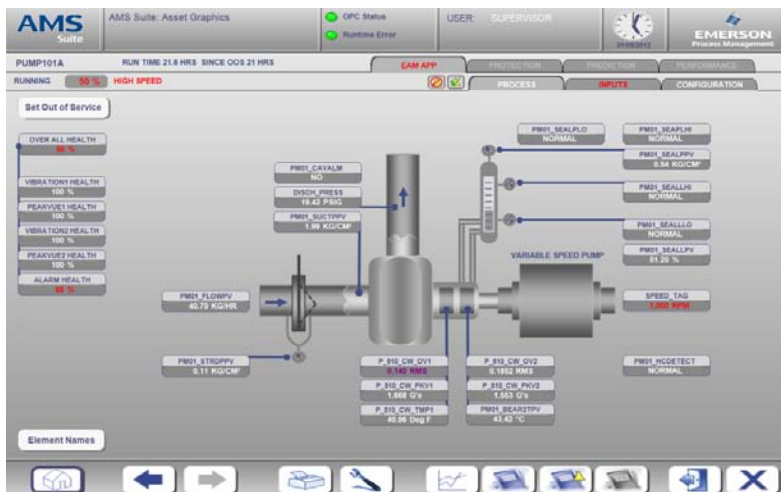


Power

Reliability, Maintenance, and Integrity Solutions

- Save Time and Money

- Automate manual data collection
- Analytics software diagnose equipment
 - Detect issues early and repair before failure
 - Reduce unnecessary part replacement
 - Reduce unnecessary cleaning



Vibration



Valve Leak



Corrosion



Steam Trap



Temperature

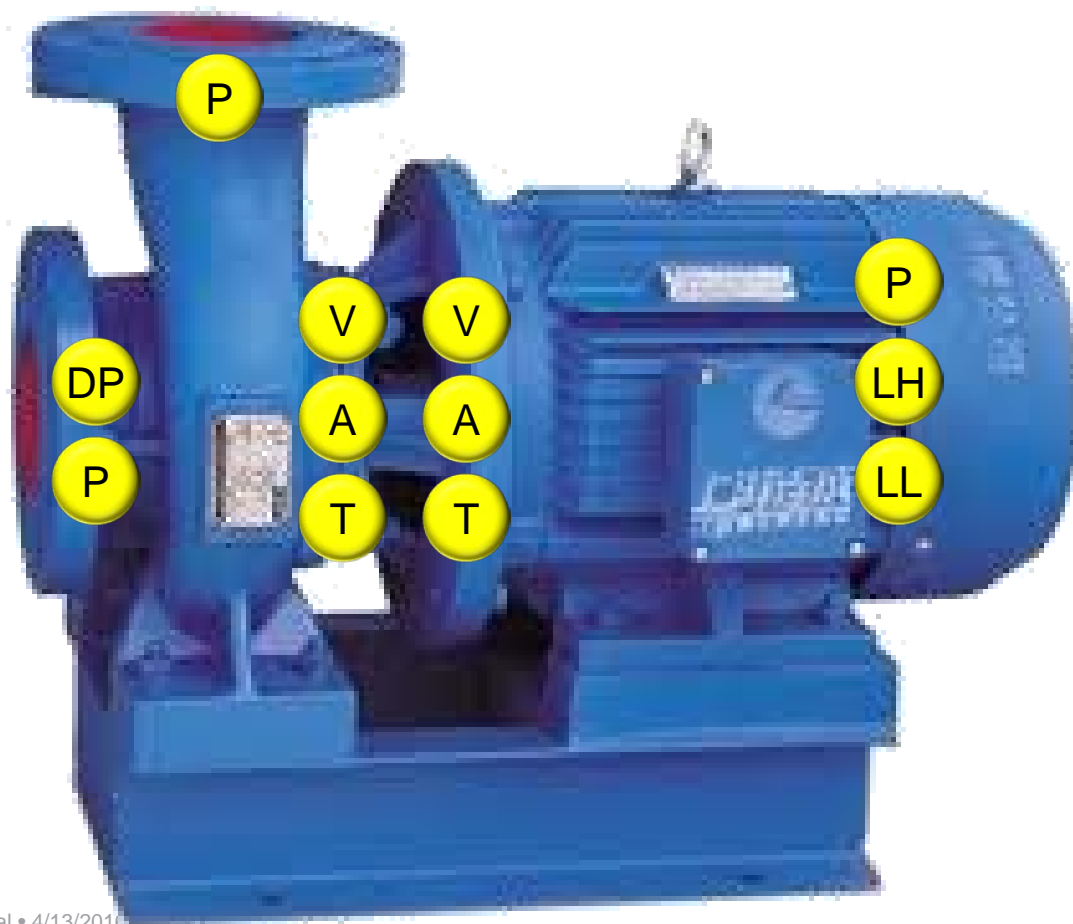


Power

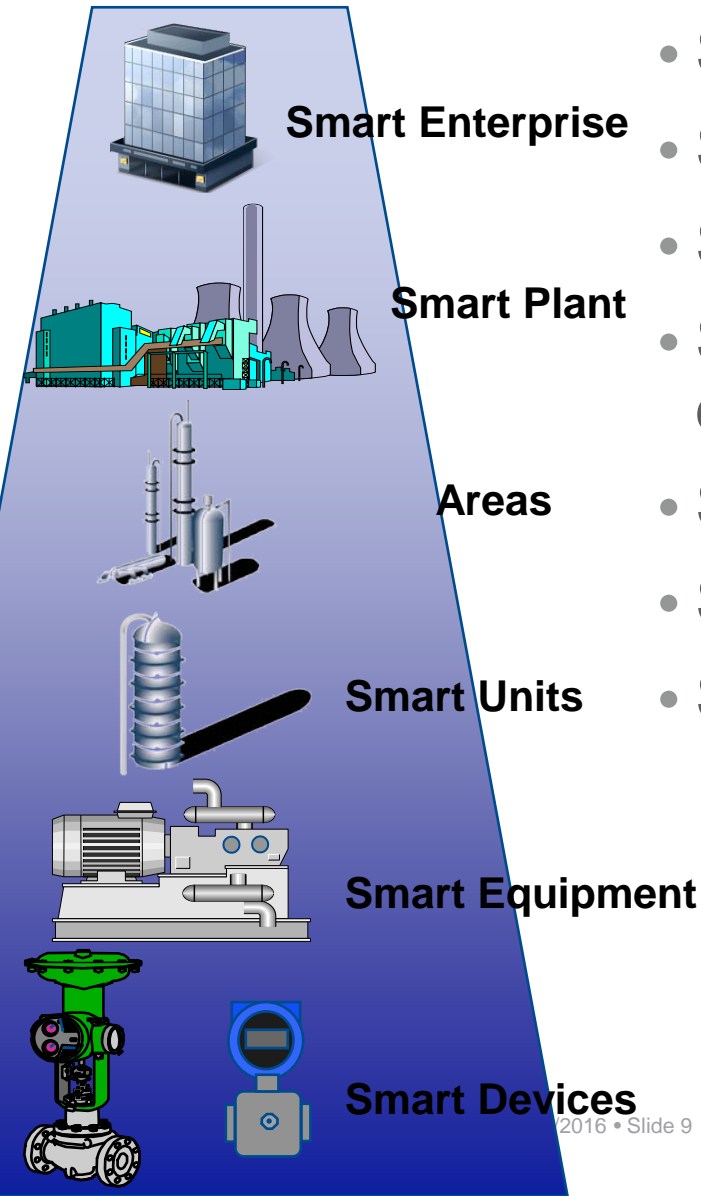


Smart Connected Equipment

- Sensors and software turn dumb equipment into smart connected equipment



Emerson: Not Just Device Diagnostics Anymore

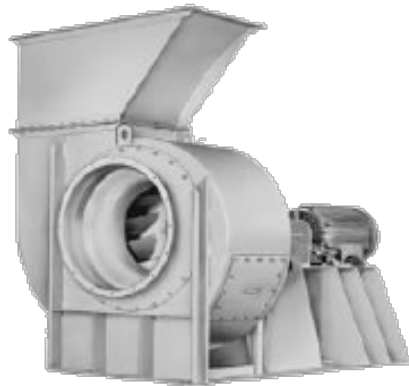


- Smart pump – diagnostics
- Smart cooling tower – diagnostics
- Smart blower – diagnostics
- Smart air cooled heat exchanger – diagnostics
- Smart compressor – diagnostics
- Smart steam traps – diagnostics
- Smart relief valves – diagnostics

Standard
solutions
packages

Turnaround Challenge

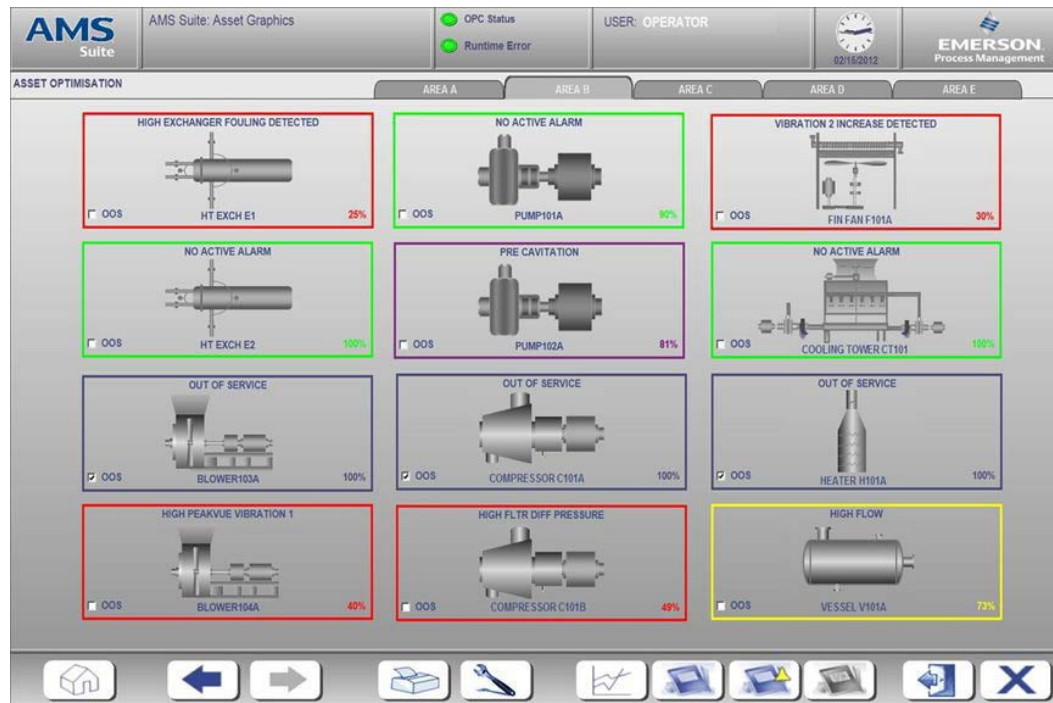
- Frequent and long turnarounds
 - Routine overhaul
- Cost of scheduled downtime
 - Lost production



Turnaround Solution

- Save Time and Money

- The same sensors and software
 - Determine which equipment need cleaning and overhaul
 - Minimize turnaround scope - reduce duration
 - Extend period between turnarounds



Energy Efficiency

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Energy Efficiency and Loss Control Challenge

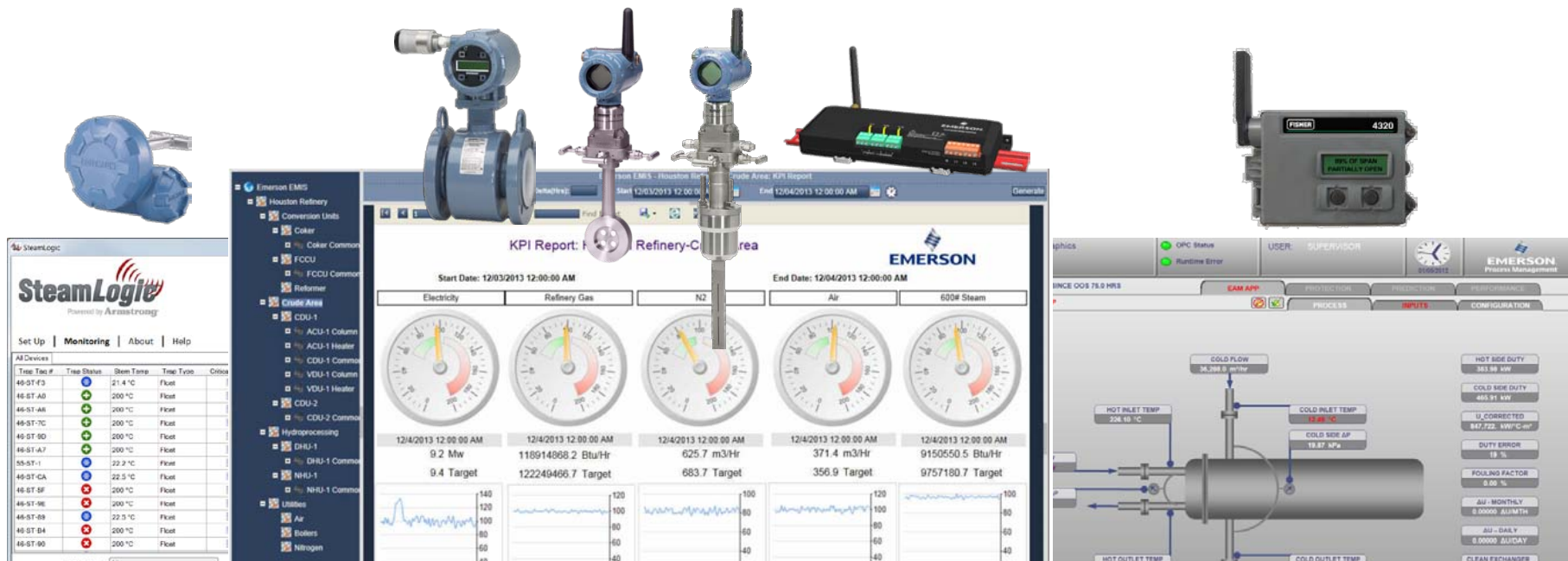
- Inefficiency: fouling, plugging, excess fan speed, poor insulation
 - Increased energy consumption
- Venting and flaring: passing, simmering, releases
 - Product loss
- Other waste: open valves, equipment idle, leaks, trap failures
 - Increased utility consumption



Energy Efficiency and Loss Control Solutions

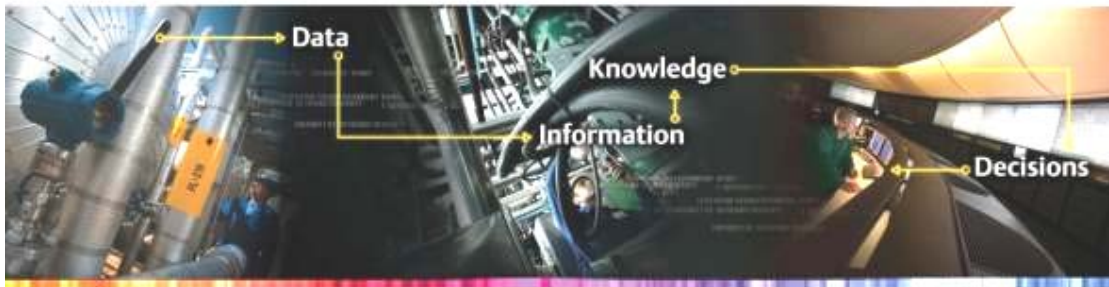
- Save Time and Money

- Manage energy consumption with finer granularity
 - Detect, pin-point, and troubleshoot overconsumption
- Equipment performance monitoring
 - Detect inefficiency to schedule cleaning, optimize fan speeds
- Relief valve and steam trap monitoring
 - Schedule overhaul and replacement



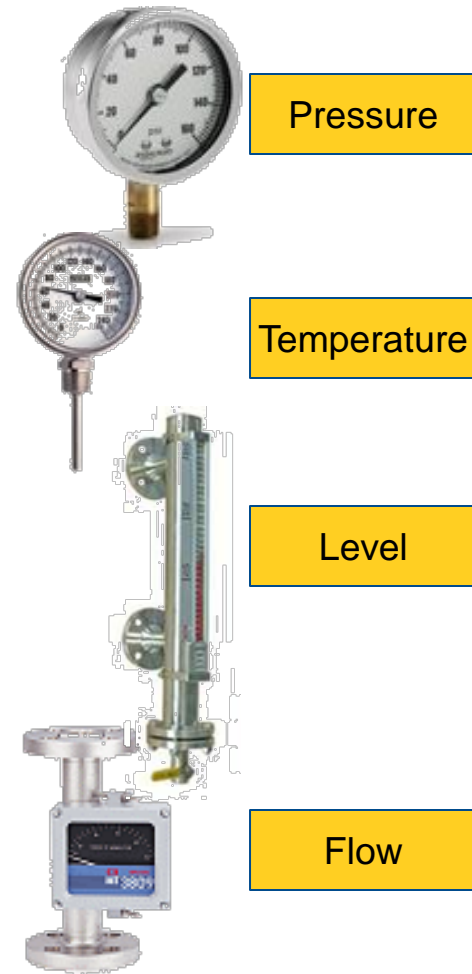
Operation

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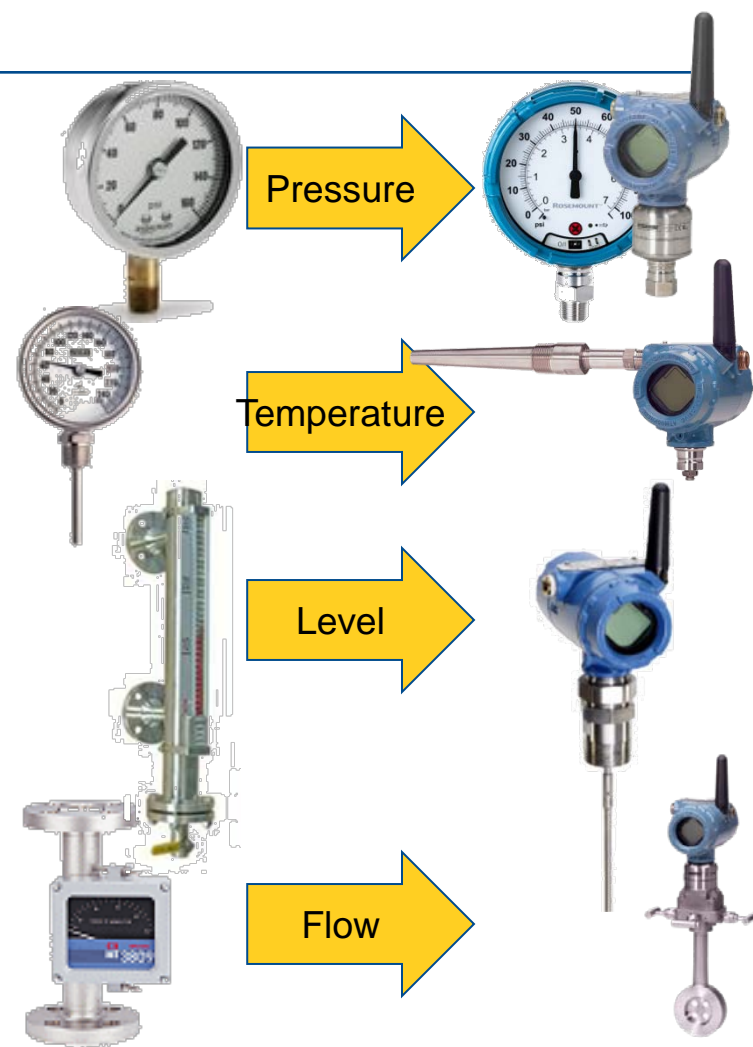
Operations Challenges

- Field operations manpower
 - Manual data collection



Operations Solutions

- Automate manual data collection
 - More time for taking action



Benefits of Pervasive Use of Sensors

- Every department in the plant benefits
- Shared infrastructure

Reliability	Maintenance	Integrity	Energy	HS&E	Operations
<ul style="list-style-type: none">•Improved reliability•Reduced downtime	<ul style="list-style-type: none">•Lower maintenance cost•Shorter turnarounds•Longer between turnarounds	<ul style="list-style-type: none">•Improved integrity•Reduced corrosion control cost	<ul style="list-style-type: none">•Greater energy efficiency•Lower energy and utility cost•Reduced flaring and venting•Reduced losses	<ul style="list-style-type: none">•Reduced incidents•Faster incident response•Compliance•Reduced emissions	<ul style="list-style-type: none">•Improved productivity

Plant Modernization Audit

- No site walk down required
- Areas reviewed
 - Reliability & Maintenance
 - Energy Efficiency & Loss Control
 - Health, Safety, & Environmental (HS&E)
 - Process Operations Productivity
- Report generated



- How many pumps are critical and should be monitored?
- Are mechanical seals monitored as per API standard 682, edition 2014 (using transmitters)?
- How many fans/blowers are critical and should be monitored?
- How many ACHEs are critical and should be monitored?
- How many compressors are critical but not yet monitored (e.g. compressed air)?
- How many cooling towers are critical and should be monitored?
- How many pipe lines experience corrosion and should be monitored?
- How many maintenance round (portable) vibration, temperature, steam trap, valve leak, and corrosion test points should be automated?

Remote Monitoring Services

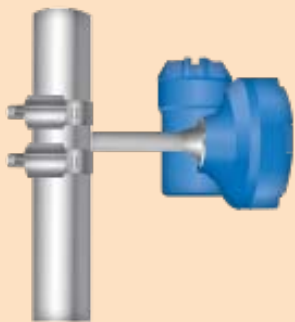
Business model transformation with IIoT and the cloud

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Elements of Successful Adoption

SENSING



ANALYTICS



SERVICES



- Outsource services to our experts
- Plant focuses on core competencies

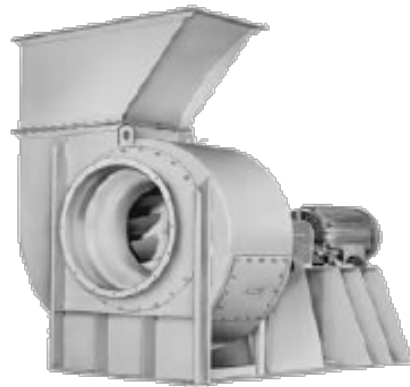
Remote Monitoring Service - Singapore Operations Centre

- Steam traps are monitored by analytics software in the cloud
- Exception and monthly savings reports are compiled and reviewed by subject matter experts



Remote Monitoring Services - Using Same Infrastructure

- Steam traps
- Relief valves
- Control valves
- Vibration
- Corrosion



EMERSON
Process Management

New Business Model

Traditional Purchase

- Plant owns the devices
- Capital expenditure (CapEx) investment
- Plant personnel generate reports from the data
- Plant personnel run & maintain the system

Remote Monitoring Service by Emerson

- Emerson owns the devices
- Operational expenditure (OpEx)
 - Monthly subscription: per tag per month
- Emerson provides reports
- Emerson is responsible for administration of the system

An Independent System

- The remote monitoring system is totally isolated from the plant control system
- No access to the plant's control system can be gained through the remote monitoring system

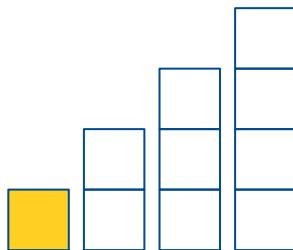


Control and
Safety System

Remote
monitoring
system

Non-Critical System

- The remote monitoring system is not used for control or safety
- Automatic data collection and analysis
- Even if 3G network is congested or even down it does not impact the process



Non-Process Data

- The data used for condition monitoring is simple equipment diagnostics
 - Non-confidential
- Plants traditionally share manually collected maintenance data with service providers
- Confidential process data is not part of the remote monitoring system



Conclusion

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Process Management

Summary

- Save time and money
 - Second layer of automation
- Plant modernization audit
 - Identify gaps
- Transformation the services
 - Remote Monitoring Service

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Let's Stay Connected

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