

Pervasive Sensing™:

“The more you sense, the more you solve”

Fabio Camerin

Wireless

**Business Development Manager –
Emerson Process Management Italy**



EMERSON™
Process Management

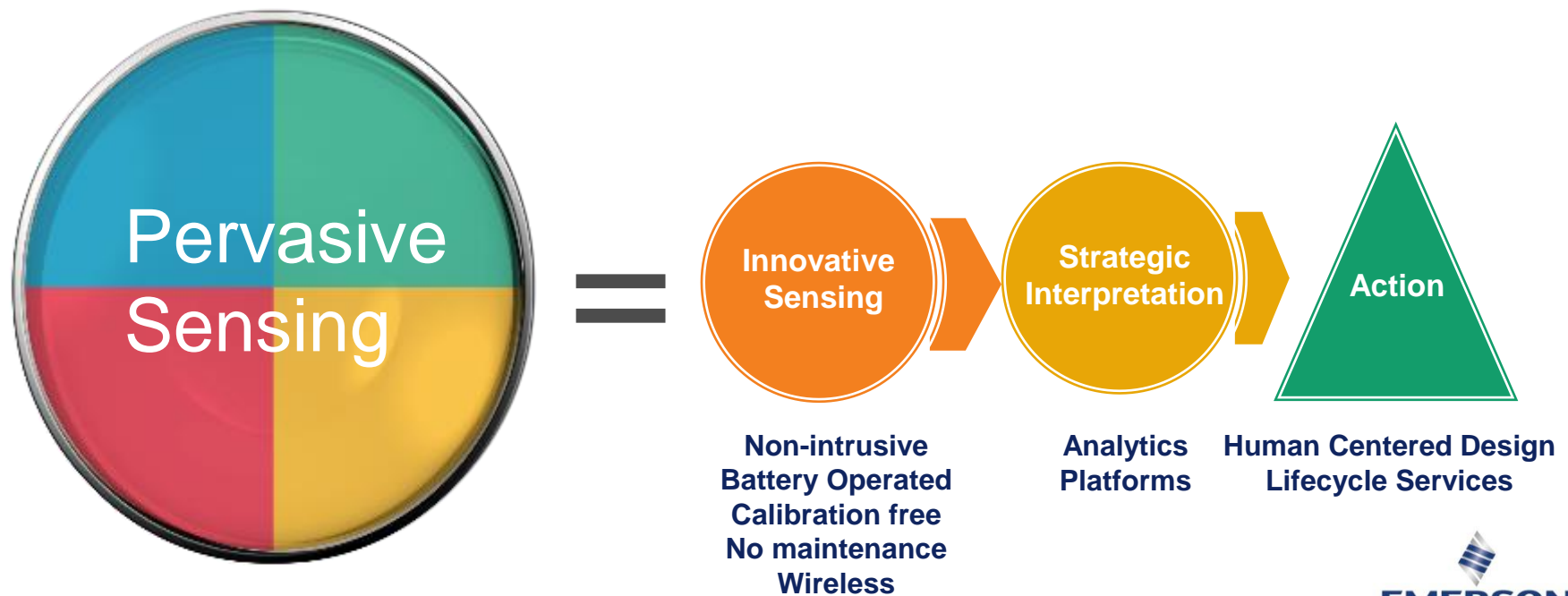
Today's Business Challenges



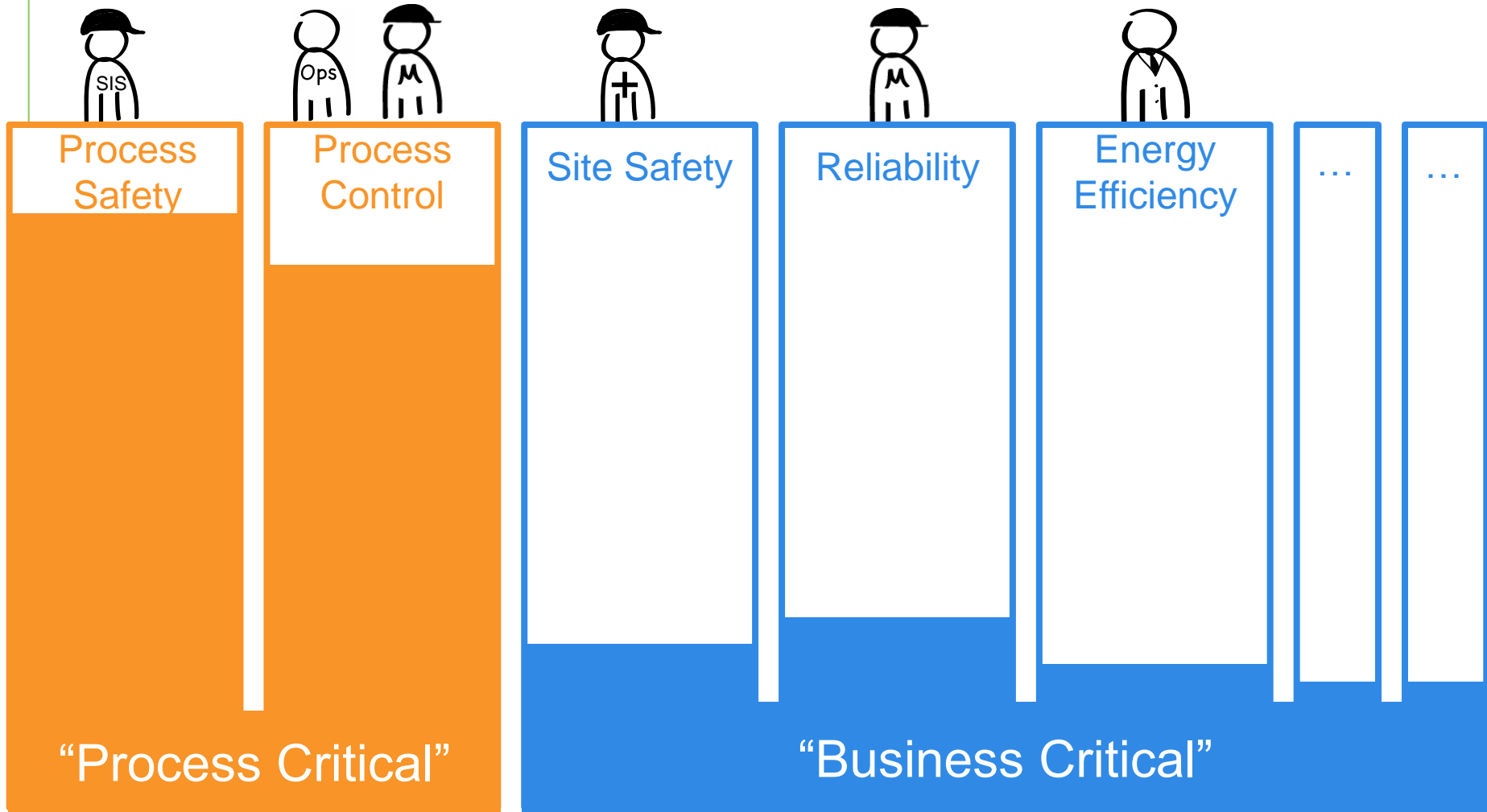
The next generation of instrumentation must deliver high-value, *Business Critical* information...

Advanced Sensing for Your Biggest Challenges

Improving your Operational Excellence by using **the power of advanced sensing everywhere** to gather data and transform it into actionable information.

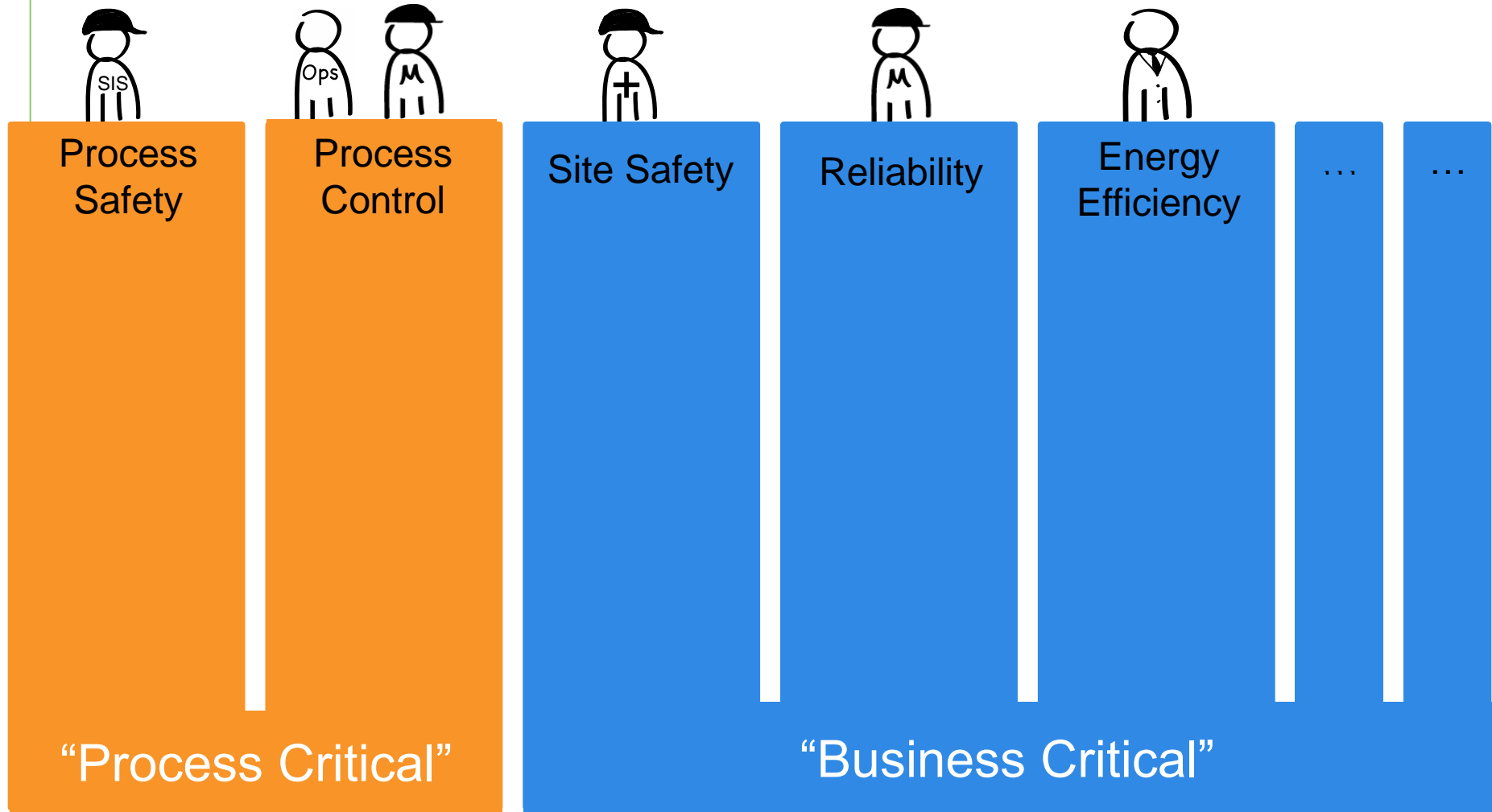


Traditional Instrumentation Market



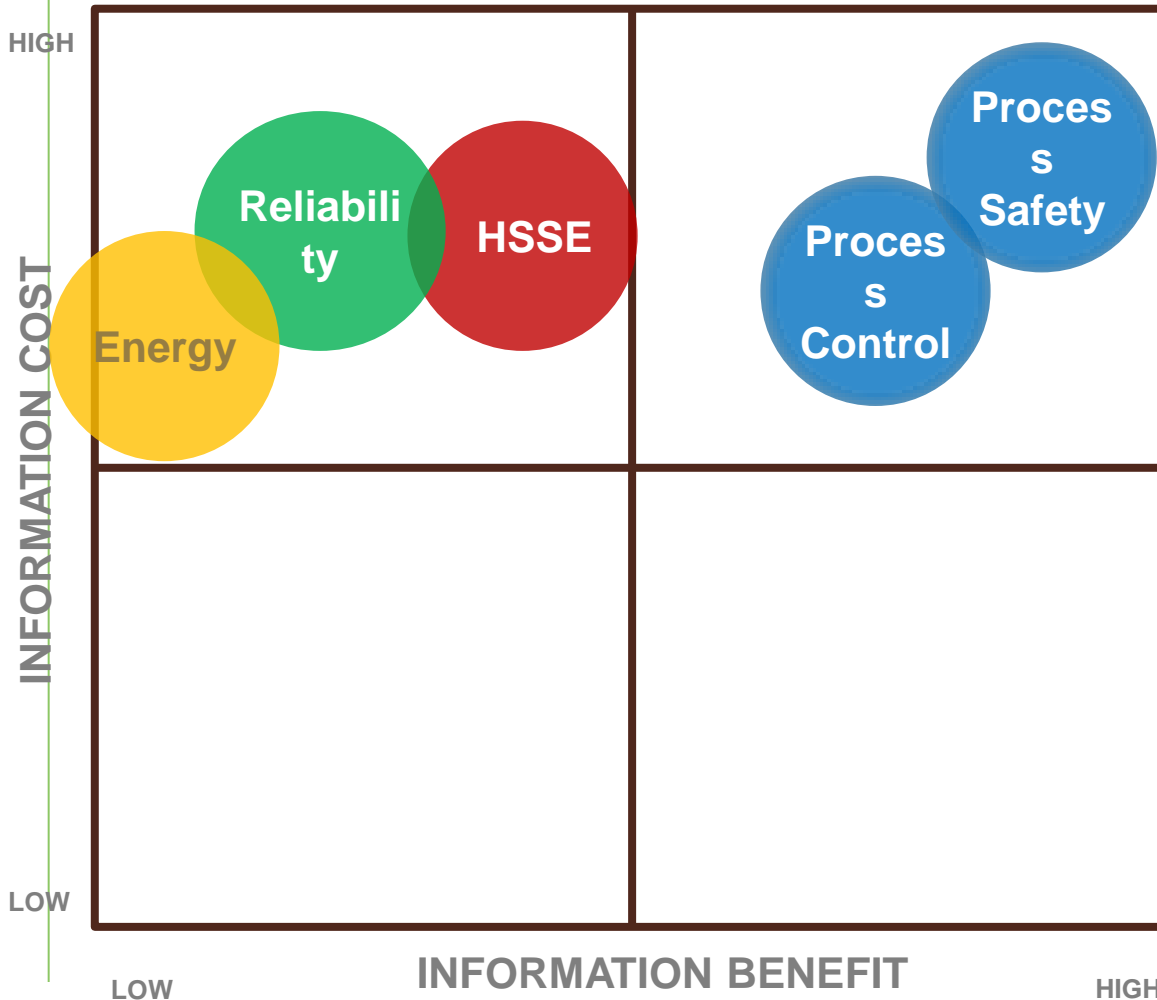
PERVASIVE SENSING™

Pervasive Sensing™: new business critical information for plants



PERVASIVE SENSING™

What has Prevented Pervasive Sensing™ Historically? Why now is the Time



Previously

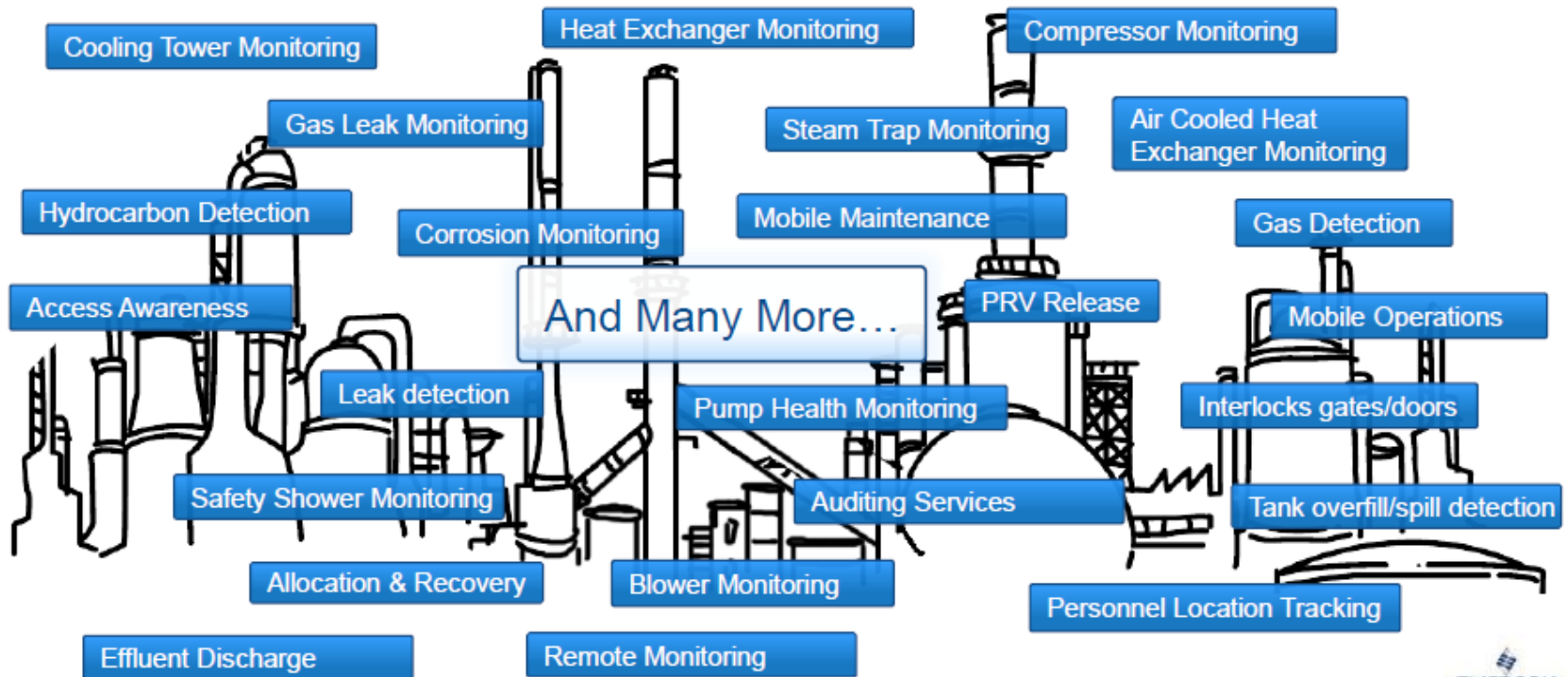
- cost of deployment
- info benefit was low
- previously immeasurable
- data was raw
- technology complex to install

Now

- innovative sensors
- wireless communications
- non-intrusive installation
- mobile and location technology
- advanced analytic capabilities
- embedded expertise
- power technology

Pervasive sensing™: the new way to solve critical business decisions in your plant

Pervasive Sensing Opportunities in Your Business



Plant Performance Blind Spot to Operational Excellence

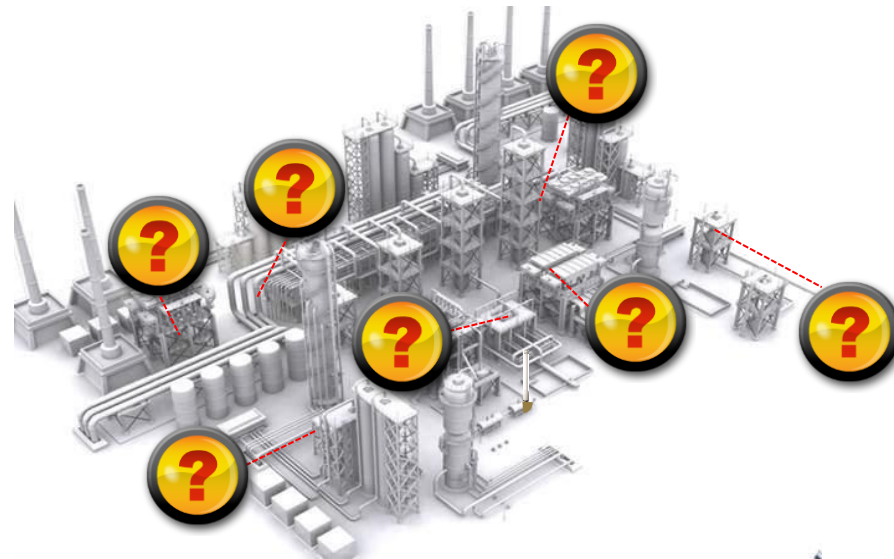
Undetected
Conditions



Abnormal
Situations



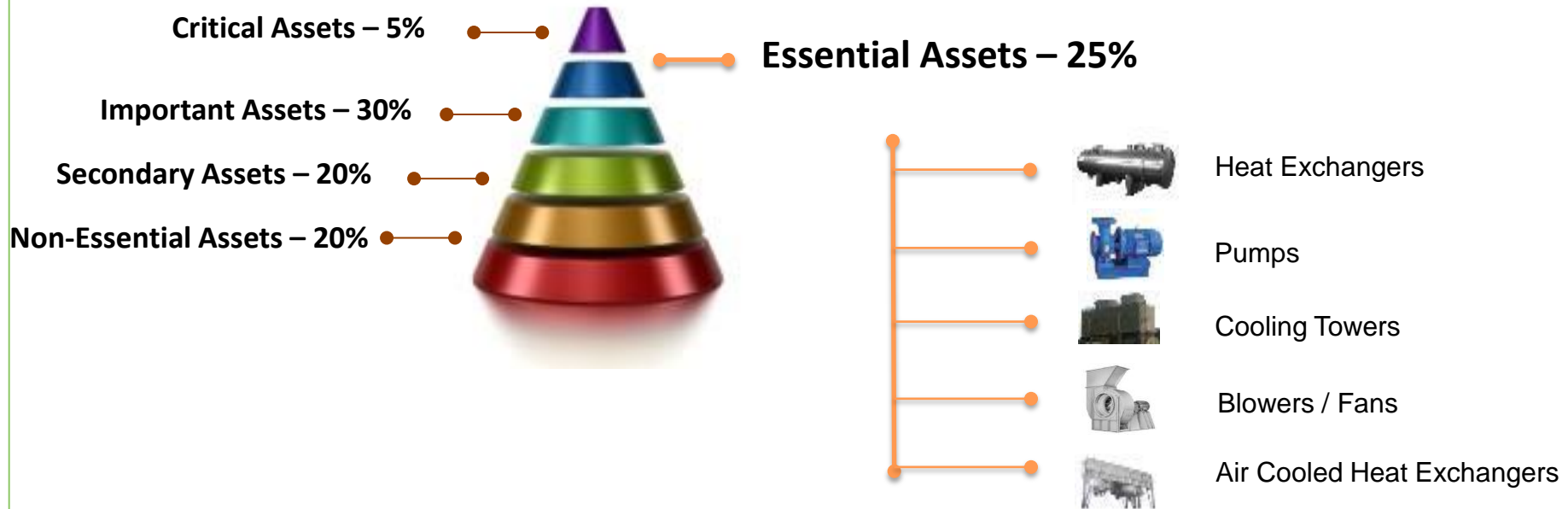
Avoidable
Consequences



- 25% of Essential Equipment Missing On-line Measurements
- Can't Effectively Manage What We Don't Timely Measure

**You can INCREASE Availability while DECREASING
Maintenance costs**

What are “Essential” Assets?



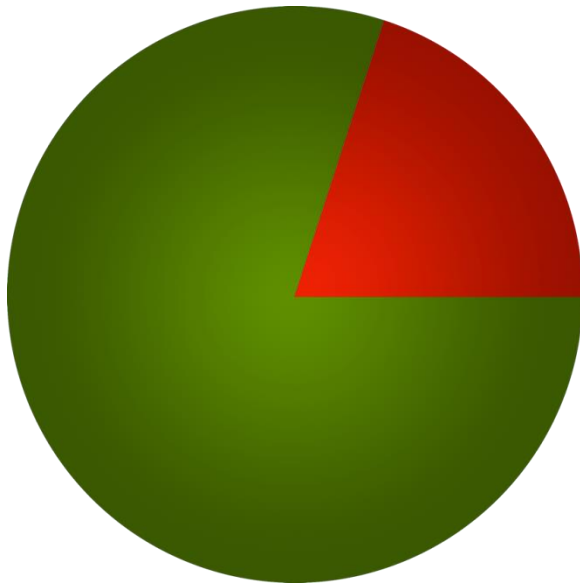
Essential Assets characteristics:

- No online monitoring, infrequent manual readings
- Failures are not **easily** predictable
- Outage could cause process slowdowns or shutdowns



Historically The Focus Has Primarily Been On Process Monitoring, Not Asset Health

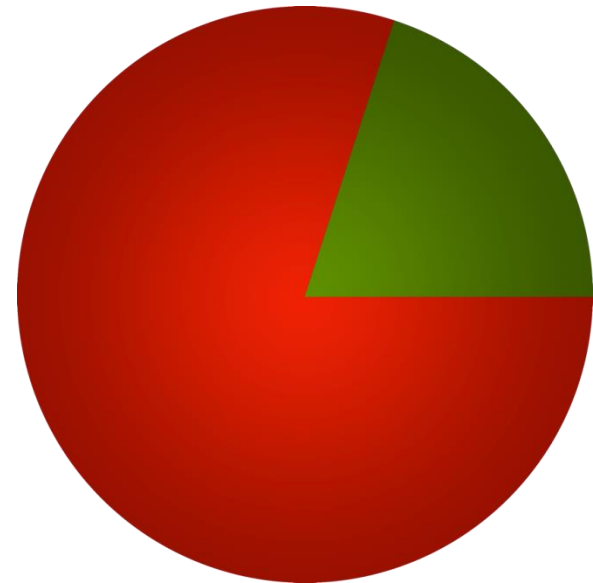
Process Measurements



PROCESS MEASUREMENTS

MANUAL CHECK OR MISSING

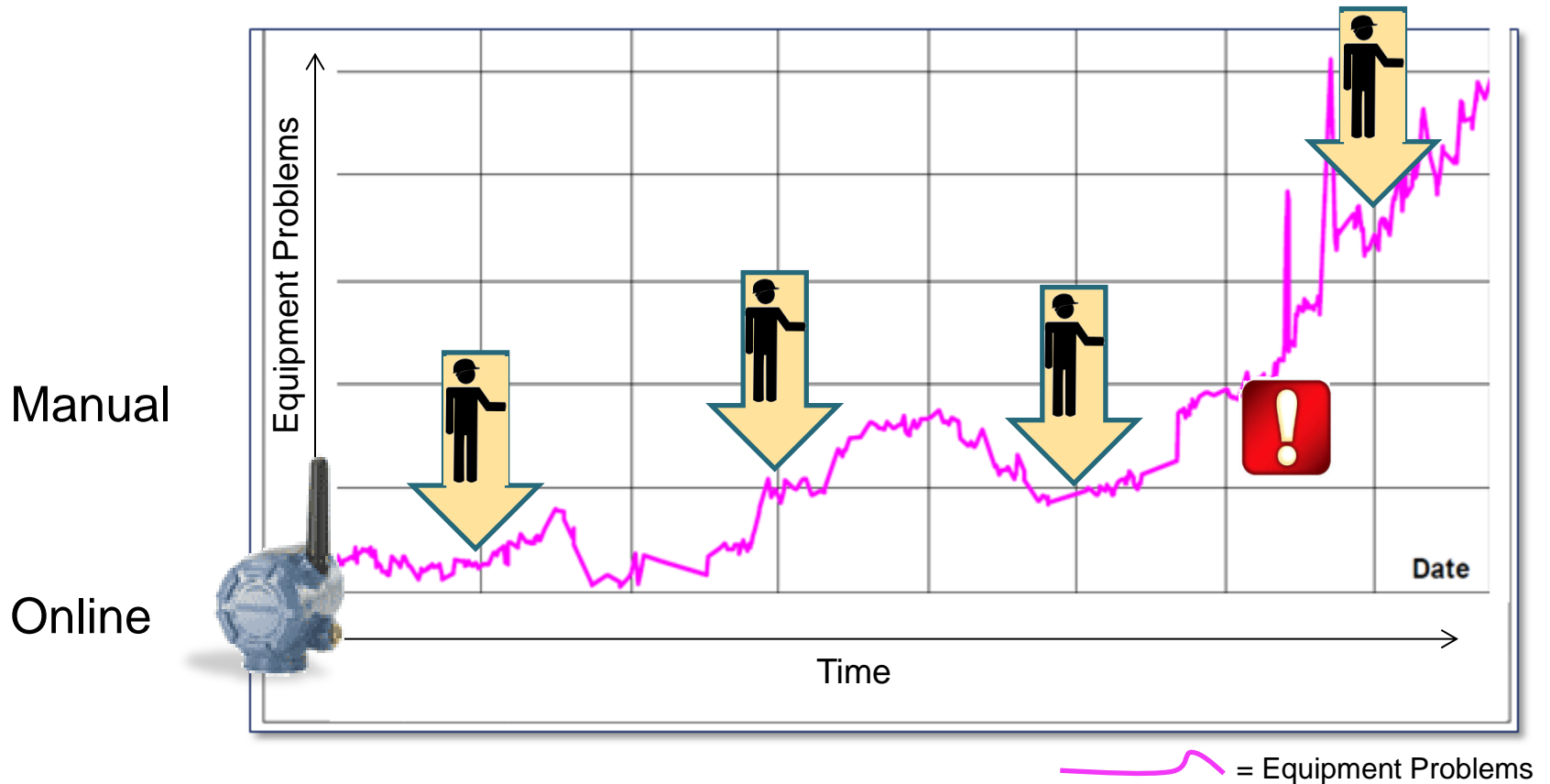
Asset Health



ASSET HEALTH MONITORING

MANUAL CHECK OR MISSING

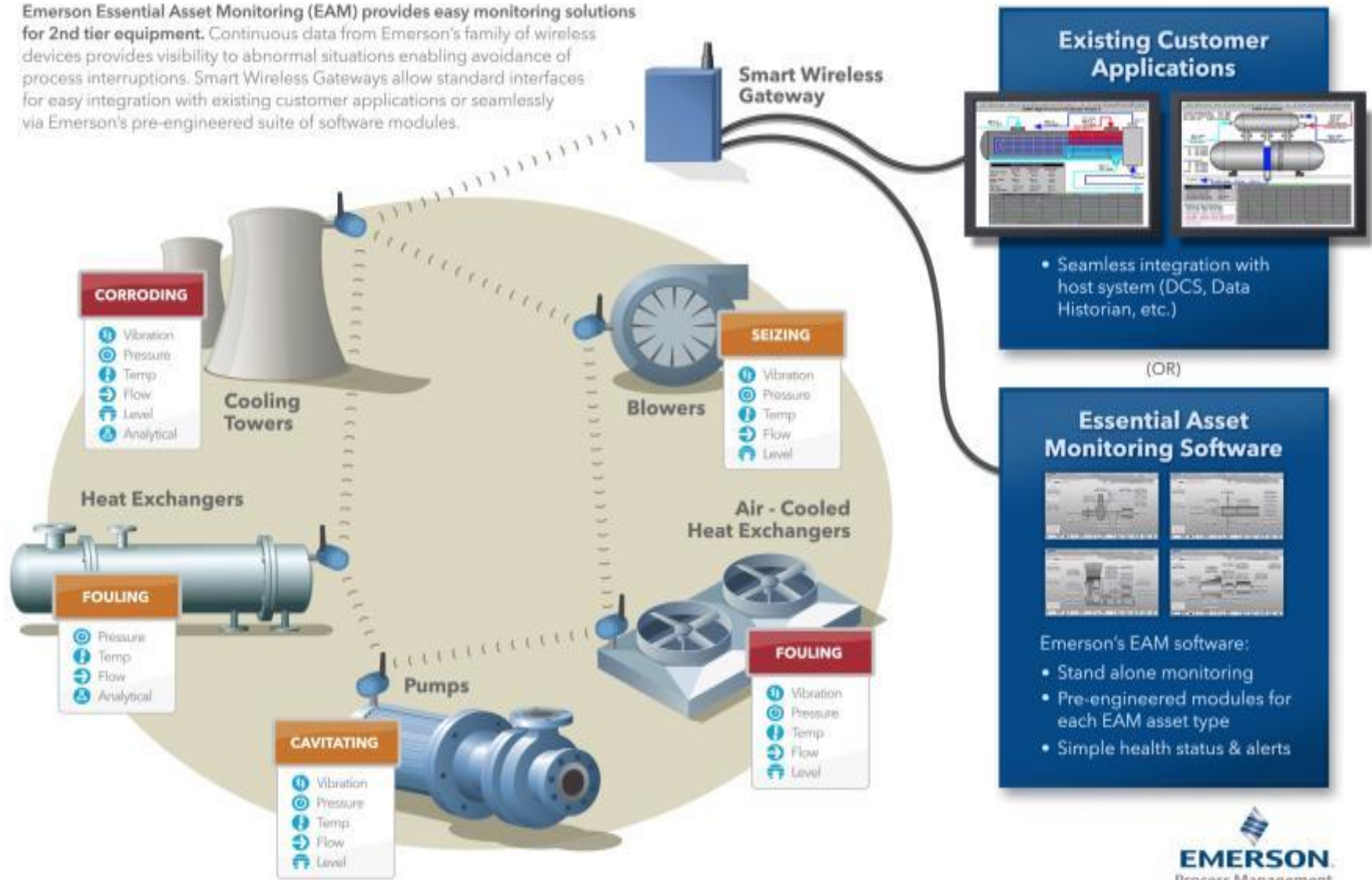
Asset Health: Online vs Manual Monitoring



- Manual monitoring (ex. portable) is just too late
- Predictive monitoring ensures early warning and can often calculate root cause

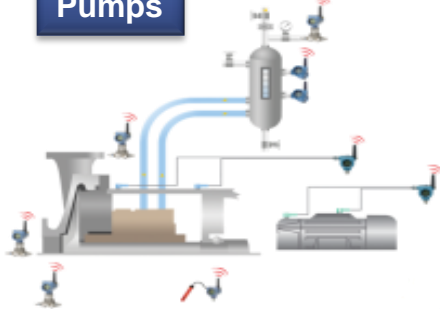
Essential Asset Monitoring Ecosystem

Emerson Essential Asset Monitoring (EAM) provides easy monitoring solutions for 2nd tier equipment. Continuous data from Emerson's family of wireless devices provides visibility to abnormal situations enabling avoidance of process interruptions. Smart Wireless Gateways allow standard interfaces for easy integration with existing customer applications or seamlessly via Emerson's pre-engineered suite of software modules.

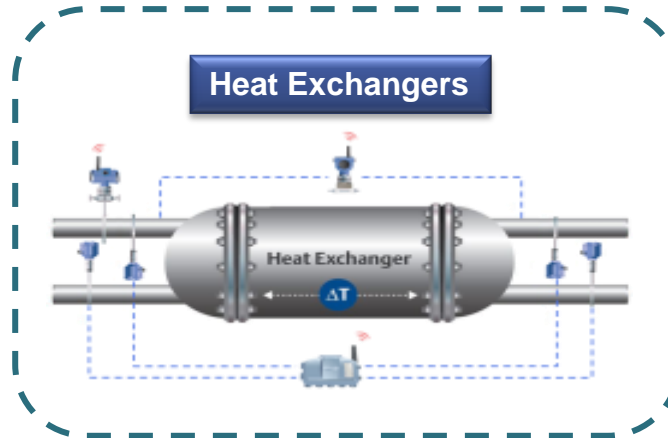


Essential Asset Monitoring

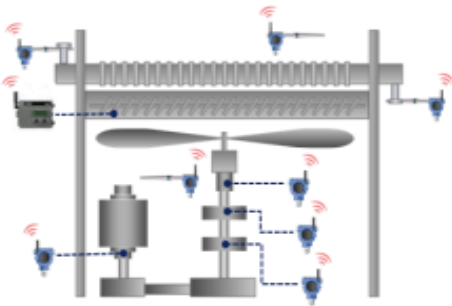
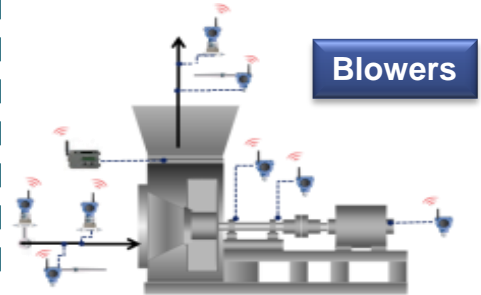
Pumps



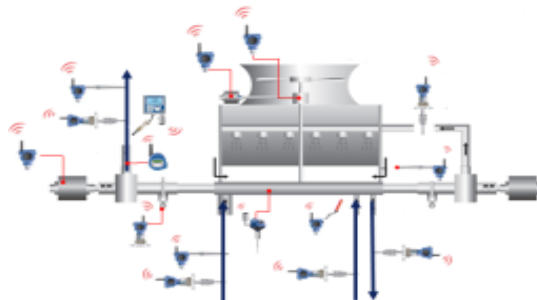
Heat Exchangers



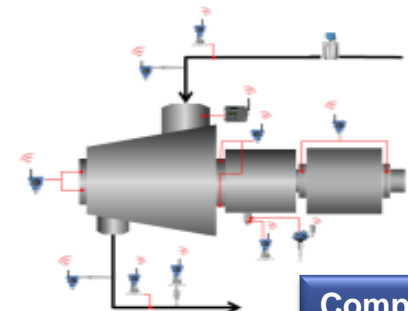
Blowers



Fin Fans



Cooling Towers

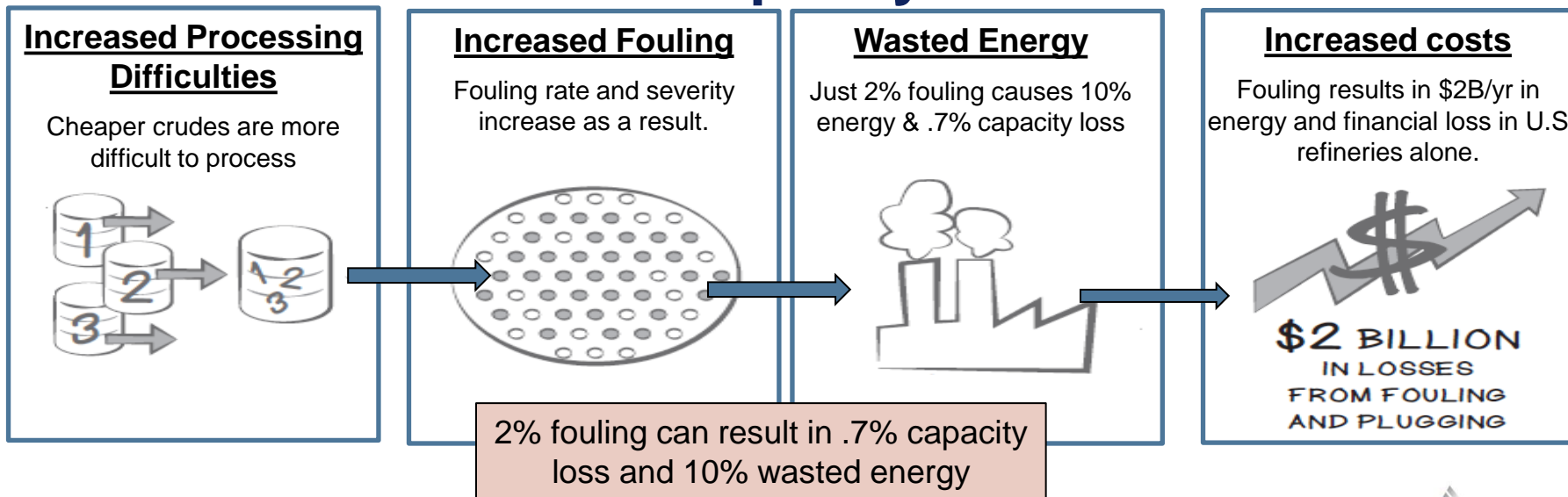


Compressors

Heat Exchangers: Fouling is a Big Problem



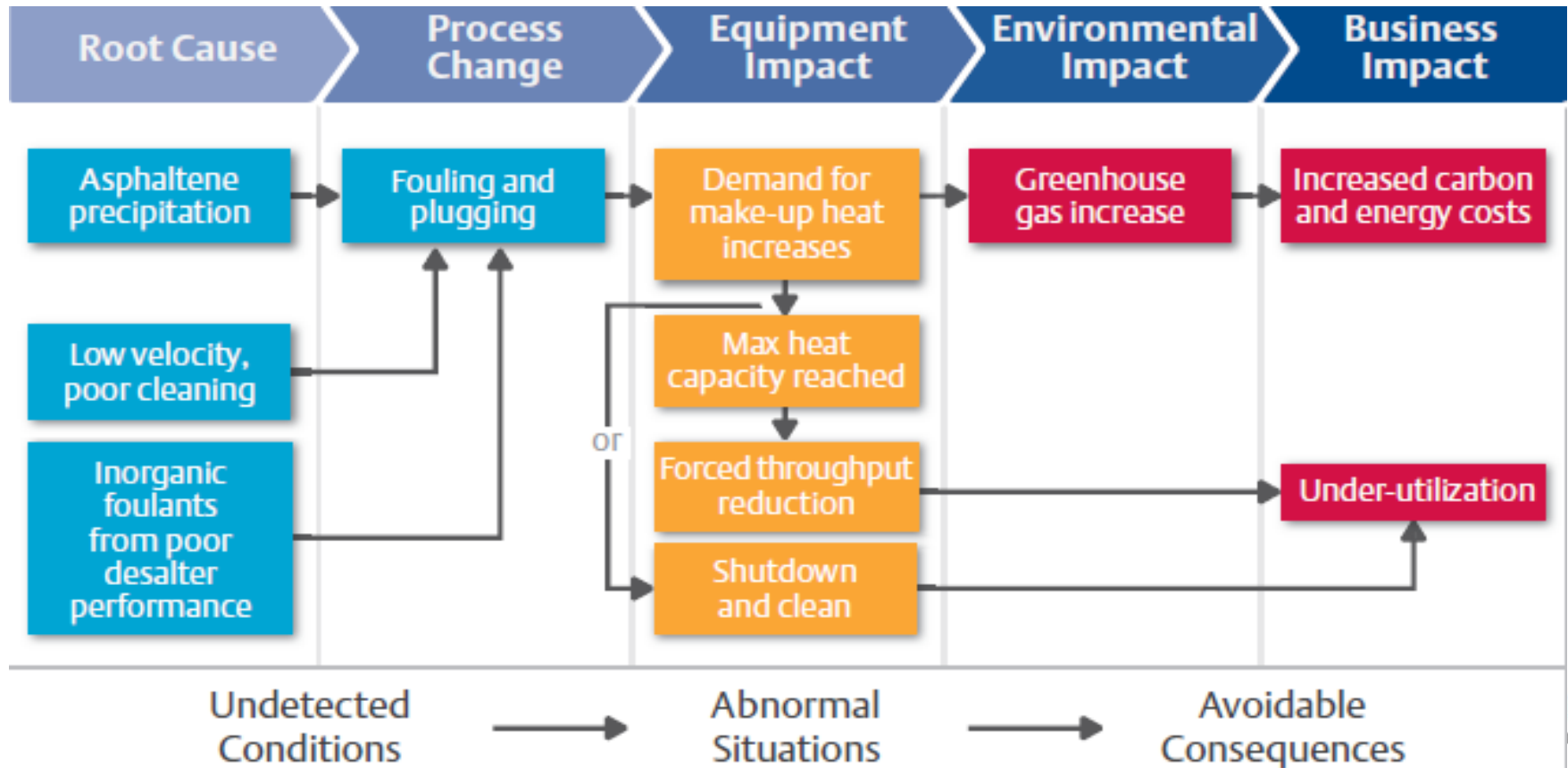
- Just 2% of heat exchanger fouling causes a 10% energy loss
- Early detection can save average refinery over \$3M in lost energy and capacity costs



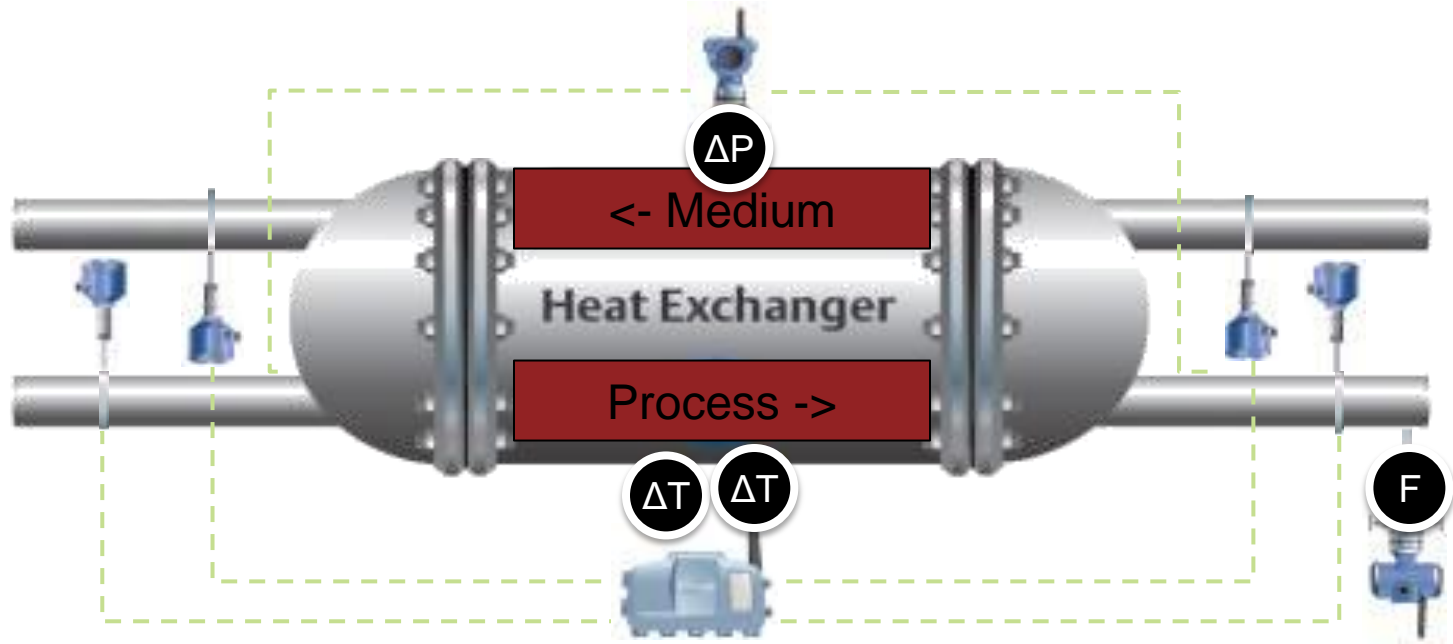
Anatomy of Heat Exchanger Failure

Q: Most common fouling in crude process?

A: Asphaltene Precipitation

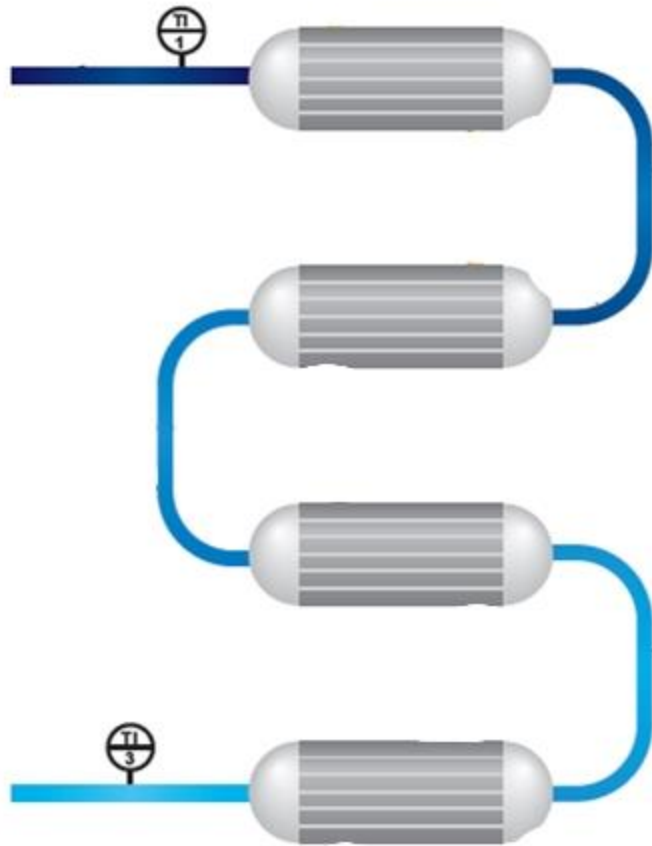


Recommended Monitoring



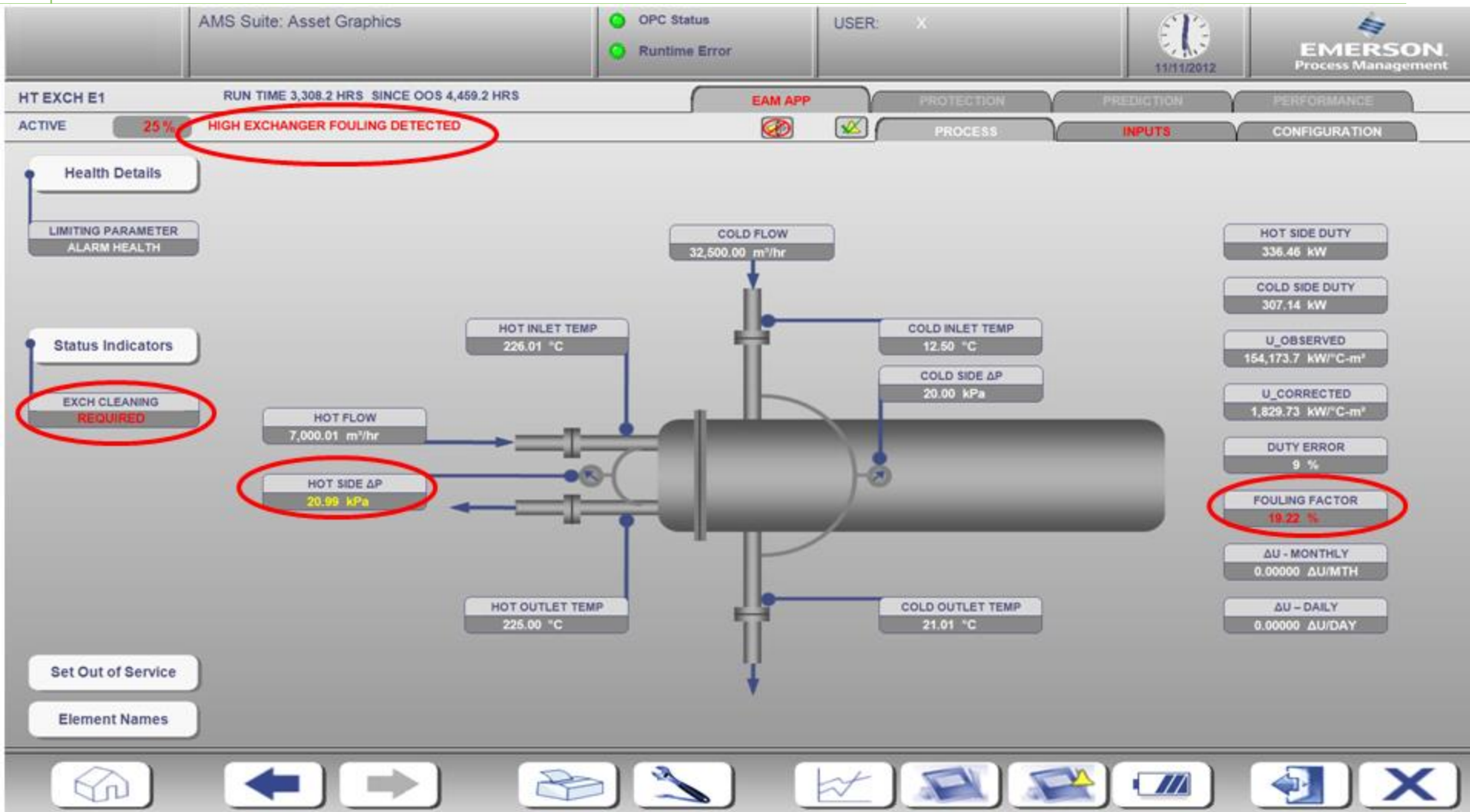
Measurement	Problem / Indication
Wireless Process Δ Temp Wireless Medium Δ Temp Process Δ Pressure Process Output Flow	Significant reduction in heat transfer AND pressure/flow
848T 4 sensors 3051S 3051S DP Flow	Isolate fouling to a particular exchanger

Multiple exchangers in a single service

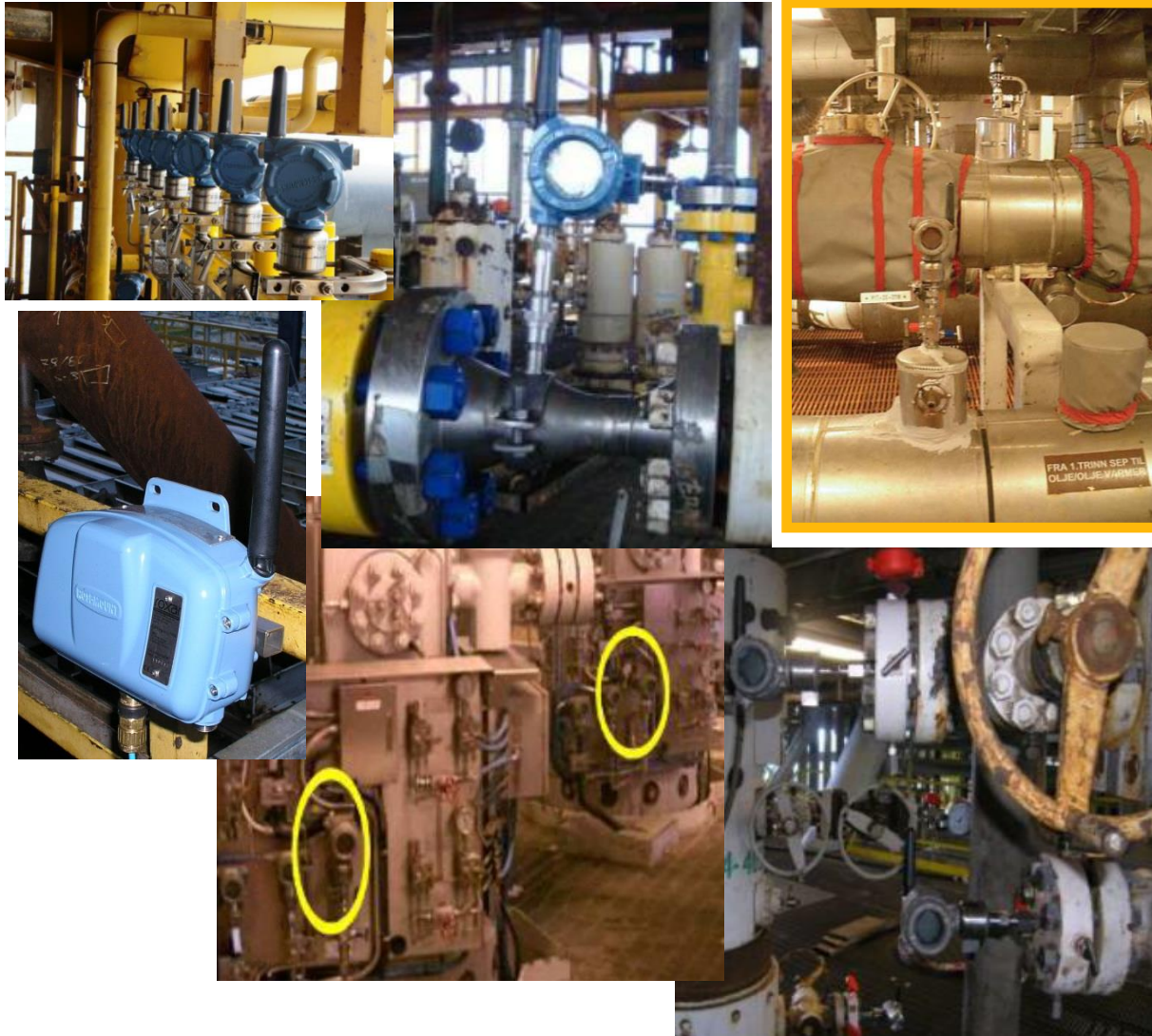


- Δ Temp for process stream is often measured across the entire **bank of heaters in series**
 - No way to know which exchanger is fouling, so all must be cleaned
- Adding temp measurement to intermediate exchangers isolates specific offender
- If existing empty thermowells allow for easy install of wireless temperature

Actionable data, seamless integration for a user friendly interface



Offshore applications: hundreds pervasive sensing installed



- Flow line temperatures
- Scrubber level
- Drains
- Gas temperature
- Whellhead pressure
- Flame arrestor pressure
- Manual valve position
- Level of drill water, sea water, potable water, diesel
- Flow and temperature of heat exchangers
- etc.etc.etc



**Thank
You**



EMERSON[™]
Process Management