



# Improve Reliability and Reduce Your Costs

*Up to 5 percent of production availability is lost annually due to unscheduled slowdowns and shutdowns. Just nine asset classes account for the majority of this loss.*

## What if you could...

- ...mitigate production losses caused by unplanned shutdowns and slowdowns—sometimes worth millions per year?
- ...use predictive diagnostics to reduce your maintenance costs—up to 50% per incident?
- ...identify accelerated heat exchanger fouling and improve fired heater efficiency—saving millions from your fuel bill?

Your critical business challenges are all interdependent. A single unplanned shutdown or slowdown can have a cascading effect, whether you manage a refinery, or chemical or petrochemical facility. If equipment reliability suffers, so will throughput, costs, and margins. Poor reliability can even cause safety and environmental incidents. On top of all of this, experienced staff is retiring.

Your operations are complex and variable, and the regulatory world today is volatile. You are doing all you can to maintain or increase your profit margins, but it isn't easy. You certainly don't want to add to your challenges by running your plants inefficiently.

Reliability and efficiency suffer not because critical assets are unmonitored. It's often because less critical, but still essential assets lack adequate monitoring. Issues with these assets can cause a slowdown, shutdown, or HSE incident, while also draining efficiency and reliability across your facility.

## UNPLANNED SHUTDOWNS AND SLOWDOWNS SACRIFICE VALUABLE PRODUCTION

Studies have shown that up to 5 percent of production is lost annually due to equipment being unavailable—with just seven asset classes accounting for the majority of the loss. The majority of these essential assets are only periodically monitored due to the perception that online, real-time measurement is expensive. This leaves operators and maintenance personnel without sufficient insight into the health of their equipment. The situation is becoming more of a concern as experienced personnel retire and take their vast stores of knowledge with them.

## MAINTENANCE COSTS ARE INCREASING

Maintenance of these same seven asset classes can consume close to 60 percent of the total maintenance budget. These assets are usually maintained using preventive maintenance where the asset is "repaired" on a routine basis whether it needs it or not. If the equipment does fail, repair costs are typically 50 percent higher than if the problem had been addressed prior to failure.

<i>Critical Assets</i>	<i>Essential Assets</i>
<ul style="list-style-type: none"> <li>• <i>Already monitored</i></li> <li>• <i>Higher probability of failure and higher impact</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Medium probability, medium-to-high impact failure risk</i></li> <li>• <i>Could cause slowdown, shutdown, or HSE incident</i></li> <li>• <i>Unmonitored or monitored with periodic manual rounds</i></li> </ul>
<i>Seven Essential Assets</i>	
<ul style="list-style-type: none"> <li>• <i>Air cooled heat exchangers</i></li> <li>• <i>Blowers</i></li> <li>• <i>Cooling towers</i></li> <li>• <i>Non-critical compressors</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Heat exchangers</i></li> <li>• <i>Pipes and vessels</i></li> <li>• <i>Pumps</i></li> </ul>

## RELIABILITY ISSUES MAY CAUSE ENVIRONMENTAL AND SAFETY INCIDENTS

People are put in harm's way during trips to hazardous areas for preventive maintenance or diagnostic data collection. Equipment reliability problems can lead to leaks and fires, and operators lack the information they need to identify abnormal operations and avoid incidents.

### Integrated Solutions for More Effective Decision Support

Historically, many plants were built with the minimum instrumentation needed to safely operate. Additional measurements are often required to optimize and monitor asset health. However, the refining, chemical, and petrochemical industries have changed in the last 20 years, making automated monitoring more affordable. With affordable monitoring, plants no longer have to just accept unplanned shutdowns, high maintenance costs, and decreased reliability.

#### INCREASE PROCESS AVAILABILITY

Give your operations and maintenance personnel the full picture so they know when statistically significant changes occur in the process and the equipment. Automatically capture key operating parameters over the operating range of the equipment and identify before something goes wrong, gaining access to expertise for evaluating data, resulting in better-informed and corrective actions.

#### Gain insight into process health

Alert your operators to process condition changes so they can take action to avoid slowdowns or shutdowns.

#### IMPROVE ASSET RELIABILITY

Receive online updates about equipment health, enabling operators to know when equipment has reached a warning stage, or has escalated to critical, without being overwhelmed by nonessential alarms. Determine the root causes of “bad actors” to reduce repeat failures.

Easily gather fault-alert data about equipment so repeat failures can be analyzed and addressed. Ensure equipment is not run to failure.

#### Know when to perform condition-based maintenance before asset failure

Only perform turnarounds and maintenance on equipment that needs maintenance. See the trend of an asset’s health and know when the cost to operate exceeds the cost to maintain. Maintain equipment on the most cost-effective schedule. Avoid periodic, preventive maintenance by measuring equipment health using predictive diagnostics.

#### MITIGATE SAFETY AND ENVIRONMENTAL RISKS

Receive early warnings on degrading equipment to prevent leaks before causing a hazardous incident. Minimize trips into hazardous areas that put your people in harm’s way.

#### Reduce trips to the field

Reduce periodic, schedule-based rounds to monitor equipment health. Conduct maintenance safely and efficiently.

*“Manual monitoring only catches about 2 seconds of data every month. It is worth making sure that your important equipment has continuous monitoring.”*

**Sr. Machinery Reliability Lead**  
Major Global Refiner

# ESSENTIAL ASSET MONITORING

Detect abnormal situations, spot imminent failure, and be alerted to potentially hazardous situations involving your equipment in a timely manner, with Emerson's Essential Asset Monitoring Suite.

## AIR COOLED HEAT EXCHANGERS



Avoid cooling-constrained operations caused by:

- High vibration and bearing temperature
- Operating near known resonance frequency
- Louver/pitch actuator mechanical defects
- Exchanger fouling and excessive cooling
- Fan icing

## BLOWERS



Ensure fired heaters and boilers don't trip due to blower failure as a result of:

- High vibration and bearing temperature
- Low differential pressure
- Operating near known resonance frequency
- Louver mechanical defects
- Plugged suction filter

## NON-CRITICAL COMPRESSORS



Receive early warnings to avoid unexpected compressor outages as a result of:

- High vibration
- Low differential pressure
- High differential temperature
- Instability
- Control vane defect
- Plugged suction filter

## COOLING TOWERS



Prevent limited cooling tower capacity caused by:

- High and low cooling tower efficiency
- Excessive and insufficient makeup and blowdown flow
- High and low cycles of concentration
- Scaling and corrosion potential
- Pumps and fans faults

## HEAT EXCHANGERS



Avoid unit turndown and improve the cleaning strategy of heat exchangers by monitoring conditions such as:

- High fouling rate
- High lost-energy cost
- Optimal time to clean

## PUMPS



Prevent pump damage and failure (even on second-tier pumps) resulting from:

- High vibration and bearing temperature
- Low differential pressure
- Pre-cavitation and cavitation
- Seal flush faults
- Hydrocarbon leaks
- Plugged suction strainer

## PIPES AND VESSELS



Combine continuous monitoring of your corrosion devices with monitoring and detection of process conditions that lead to corrosion. EAM for Pipes and Vessels determines system corrosion health and detects high corrosion from:

- Combination of temperature, flow, sulfur, and acid number
- Dew point
- Desalter malfunction
- pH balance

## Ready to Explore Essential Asset Monitoring at Your Facility?

An effective essential asset monitoring program has been shown to save up to 13 percent of maintenance costs, reclaim 0.9 percent of lost production, and save up to 2 percent of preheat energy costs every year.

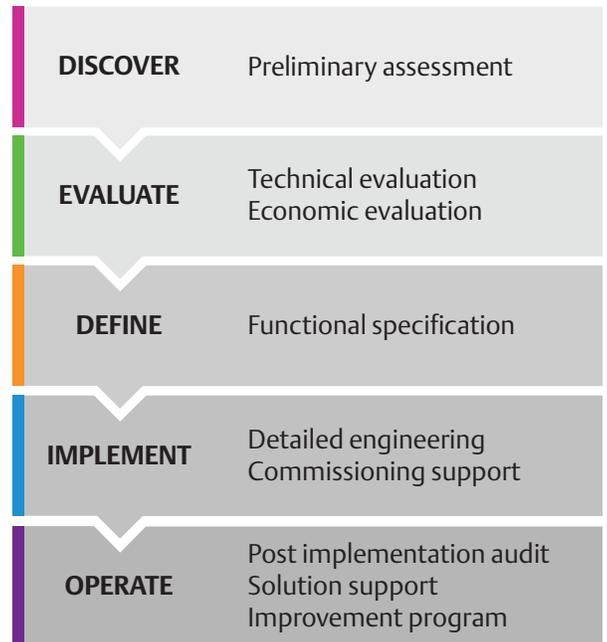
You can achieve a low risk, but effective solution to improve reliability and reduce costs with an expert assessment from Emerson. Bringing decades of experience solving complex problems at plants across the globe, our experts can help you identify and justify asset monitoring improvements that will reduce unplanned shutdowns, slowdowns, and maintenance costs. You will be able to deliver quantifiable and lasting improvements to give you a proven edge over your competitors.

After your assessment, you can choose which steps to take to begin improving your plant availability and reliability immediately. We can identify where automation would have the most significant benefits, including reducing your risk exposure and giving you access to more effective decision support.

You can trust that your solution will be scaled to meet your needs and that you will be supported from project justification to installation and beyond.

### ACT NOW

Take steps to improve your Refining, Chemical, or Petrochemical facilities today by contacting us at: [www.EmersonProcess.com/Explore-EAM](http://www.EmersonProcess.com/Explore-EAM)



[www.EmersonProcess.com/  
AssetMonitoring](http://www.EmersonProcess.com/AssetMonitoring)

©2013 Emerson Process Management. All rights reserved.

The Emerson logo is a trademark and service mark of Emerson Electric Co.

The contents of this publication are presented for information purposes only, and while effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available on request. We reserve the right to modify or improve the designs or specifications of our products at any time without notice.

