

innovations

IN PROCESS CONTROL



“The comprehensive energy management project is expected to reduce powerhouse energy consumption by three to five per cent.”

Andrew Rees
Senior Engineer, Tata Steel

Read the full story on pages 8 and 9

Making a difference for those in the know



“The combination of the EDF Energy Asset Management Specialists and Emerson service experts working together to develop detailed work processes for streamlined maintenance practices, and the use of real time data and plant diagnostics, will move West Burton CCGT towards world class maintenance practices.”

Darren Ramshaw, Engineering and Maintenance Manager, EDF Energy

EDF Energy’s new Combined Cycle Gas Turbine (CCGT) power station at West Burton in the UK, places significant focus on compliance with governmental regulations and the safety of plant personnel and assets such as instruments and process equipment. Emerson’s AMS Suite predictive maintenance software will help optimise maintenance practices at the plant and enable the plant’s managers to quickly access integrated asset health information from multiple data sources, view real-time analyses and reports, and develop management strategies to improve plant performance. www.EmersonProcess.com/IM001

“Micro Motion Coriolis flowmeters have all the approvals we need, as well as providing the accurate and reliable data that this fiscal application demands.”

Philippe Fauvel, Cryostar

Micro Motion® Coriolis flowmeters have European, Asian, Australian and U.S. approvals for cryogenic fluids in custody transfer applications.

www.EmersonProcess.com/IM002

“Based on a successful implementation, at some point in the future we are perhaps, looking towards a plant with no wires.”

Emmett Martin, Site Services & Automation Manager, GlaxoSmithKline

Emerson’s Smart Wireless technology is enabling GlaxoSmithKline to monitor water usage at its Cork plant in Ireland.

www.EmersonProcess.com/SmartWireless

“Based on our recent positive experience with the DeltaV system’s electronic marshalling, we know we can rely on Emerson to deploy this game-changing functionality on our PVC project.”

Franck Jouault, System Manager for Solvay Tavaux

Emerson’s DeltaV™ electronic marshalling and CHARMS increases project flexibility and reduces cost while reducing downtime at Solvay plant.

www.EmersonProcess.com/IM004

“Emerson’s Smart Wireless experience was far in front of other vendors, and this experience gave us great confidence with our own application.”

Nicolas Delfosse, Process Engineer Surface Chemistry, AkzoNobel

AkzoNobel improves storage tank heating control and gas vent monitoring using Smart Wireless technology.

www.EmersonProcess.com/IM005

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Welcome to innovations.



At Emerson, we have a history of embracing our customers’ challenges and using the knowledge gained to develop a range of solutions that help customers maintain their competitive edge. The next big global challenge is that of

Energy Management, which includes lowering the cost of energy and reducing emissions. This issue of Innovations introduces Emerson’s new approach to energy management – one that turns nearly 100-year old models upside down.

For many manufacturers, energy has become the largest single component of their operating costs. While up to now much effort has been spent in improving process system yields and energy consumption, little concerted effort has been spent on reducing the cost of energy generation at process facilities. Today, the energy generation and distribution areas of process plants represent significant areas for improvement and merit a renewed focus on their operation.

That’s why Emerson is announcing its Smart Energy Initiative, a global programme aimed at helping manufacturers make significant changes in their energy and emissions profile. This initiative focuses on helping customers lower their cost of energy, reduce emissions and improve the reliability of their energy production and operation.

We do this through a unique combination of world class consultants backed by the broadest range of technologies which enable customers to take full advantage of every opportunity to improve operations and lower their costs.

This combination of Expertise and Innovation is helping customers achieve unprecedented results, some of which we will share with you here.

Bob Sharp

President, Emerson Process Management Europe



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SUSTAINABLE ENERGY EFFICIENCY



Independent energy management consultant,

David Stockill with Steve Offer, Industrial Energy Consultant at Emerson Process Management, explain how advanced instrumentation and control systems are fundamental to achieve sustainable energy management improvements.

Energy saving initiatives in the process industry have had a chequered history. A regular part of industrial life, especially since the end of “cheap oil” in the mid 1970s, the tools and techniques are well known and can generate an attractive earning power. But industry has not moved on to new higher levels of energy efficiency. Universal feedback from suppliers and customers points to issues surrounding the long term sustainability of improvement programmes. Benefit erosion is common. Yet in simple terms energy saving appears attractive – solid, understandable technology and good payback.

How does this come about?

Whilst single large CapEx items can make a structural change in energy performance (e.g. installation of a co-gen unit) a plant’s energy performance is generally driven by a large set of (sometimes conflicting) factors:

- Adherence to operational targets
- Maintenance activities (equipment efficiency and reliability)
- Employed technology
- Design standards
- Culture and competency
- Balancing yield/margin/energy

There is no single factor that “sets” energy. Operating environments continually change. Energy efficient operation requires continual attention to all these factors. As a result, energy has often “slipped through the gaps” and has deteriorated at the expense of short term gains and budgetary pressures. This was not helped by low energy prices in the early 2000s. Priorities were elsewhere.

There is no magic “silver bullet”. Sustainable energy efficiency requires a combination of technology plus procedural and housekeeping approaches and is being encapsulated in the new standards on Energy and CO₂ Management (e.g. ISO 50001). Detailed point solutions are



typically simple and well known but the overall management is a more complex picture.

Fundamentally it is a control problem; both at a management level – using process data to analyse performance and drive improvement, and at an operational level – using modern control techniques to operate closer to (energy efficient) constraints. Accurate, reliable plant energy measurements plus a Distributed Control System and Process Historian provide the foundation to build a consistent approach to energy management.

This must be complemented by Systematic Management to ensure long term sustainability and drive improvement. This sets the entire corporate framework in which the differing levels of control operate. ISO 50001 specifies requirements for an organisation to establish, implement, maintain and improve an Energy Management System. It applies to all aspects affecting energy use, which can be monitored and influenced by an organisation.

The key approach is adopting a fit-for purpose vision, which defines the aims and provides the basic checks on management commitment and organisation, together with step-by-step approach to operational improvement:

- Review current energy management effectiveness
- Define management responsibilities
- Develop simple performance review
- Identify and implement initial low level applications. Quick wins
- Review and Improve.

The picture emerges of high quality process energy measurements, archived in a site-wide process historian, accessed through user-oriented (PC)

interfaces. Modern control, modelling and data analysis tools utilise this data. New measurement techniques (e.g. wireless technology) allow easy access to energy variables, which were traditionally excluded from plant instrumentation. Surrounding this is a formalised management process, which determines the accountabilities and processes to ensure continuous performance appraisal and improvement.

Increasing energy costs are here for at least the mid-term. Greenhouse gas issues will not go away. Energy efficiency is back on the agenda; it is a tangible link between day-to-day industrial operation and emissions that can be influenced at all levels. Unless previous cycles are to be repeated, the adoption of systematic management techniques coupled with modern control technology is an essential strategy in ensuring long term sustained energy efficiency.

www.EmersonProcess.com/IndustrialEnergy
www.stockillenergy.co.uk



SMART ENERGY INITIATIVE



Rising fossil fuel prices and global mandates for reduced

emissions demand more than incremental efficiencies in energy management - explains Chip Rennie, Director of Global Industrial Energy for Emerson Process Management. That's why we have introduced our Smart Energy Initiative - a fundamentally new platform that can change energy economics globally.

For many industrial companies, energy comprises 30% or more of a facility's overall operating costs. When this is combined with higher prices for fossil fuels and new global emissions mandates, it's no surprise that industrial customers are increasingly looking to waste fuels, biomass, and other renewable sources as a solution to these challenges.

To enable customers to use more renewable fuels, lower energy costs and reduce emissions, Emerson has announced the "Smart Energy Initiative", a global programme designed to combine its unmatched industrial energy expertise with advanced energy management technologies.

Emerson technologies and expertise provide the industry's only turnkey energy optimisation programme to help refiners, chemical producers, and other manufacturers significantly reduce energy costs and emissions.

Emerson's new Industrial Energy Group will specifically focus on modernising and improving the performance of powerhouses, the onsite utilities that provide steam and electricity to power industrial operations, while also improving how the manufacturing process consumes energy. Improving energy efficiency at a customer site by just 1%-2% can translate into hundreds of thousands of euros in savings, and substituting waste fuel for purchased fuel can save millions of euros annually

New patent-pending innovation

At the heart of Emerson's integrated technology platform is its "True Energy" technology, a patent-pending innovation for calculating the actual calorific values of fuel sources, which makes reliable energy production predictable and repeatable.

For the first time, Emerson's proprietary suite of software, combined with field control technologies, enables the powerhouse to interchangeably use the most available and affordable renewable or waste fuels to consistently create steam to power their operations. It also delivers 21st century combustion solutions for greater efficiency and reliability when using waste and other renewable fuels.

Helping customers meet global emissions mandates

Modernising industrial powerhouses for greater sustainability not only reduces energy costs but also helps companies reduce emissions and meet global regulatory mandates. There has been tremendous growth for certain projects, such as biomass-to-energy conversion, where many customers are running on renewable fuels 95% of the time.

Recent applications of Emerson's industrial energy solutions include increased steam production from scrap wood at a commercial power facility, more stable operation of a university's utility boilers, and more stable and efficient consumption of by-product gases at a steel mill.

Emerson expertise and critical technologies

Emerson technologies that add real-time intelligent capabilities to the energy-generating process are Emerson's SmartProcess™ Boiler and SmartProcess Energy Management software.

SmartProcess Boiler technology delivers real-time combustion control solutions to address the inconsistent nature of renewable and waste fuel sources, automating and simplifying management of sudden changes in calorific value or the availability of those fuels.

SmartProcess Energy Management runs in real-time, closed-loop control to balance steam systems, manage electrical demand swings and upsets, identify opportunities to buy and sell power, improve efficiency, and run an entire industrial utility at the lowest cost automatically.

www.EmersonProcess.com/IndustrialEnergy

IMPROVING ENERGY EFFICIENCY



Boiler upgrades are helping Tata Steel make better use

of 'indigenous' waste fuels that are by-products of the manufacturing process, explains Andrew Rees, manager of the upgrade project. The upgrades are part of a comprehensive energy management project that will help Tata Steel achieve its vision of becoming energy self-sufficient.

Tata Steel's Port Talbot facility in Wales is Britain's largest integrated steel mill, making over four and a half million tonnes per year of high-quality sheet steel for the automotive, construction and household appliance markets. It includes two blast furnaces and a basic oxygen furnace, as well as continuous casters and a strip rolling mill.

Tata Steel operates seven steam boilers at the site and these require frequent attention by plant operators and the use of supplemental natural gas to compensate for the varying energy content of the waste fuels being used. Tata Steel needed to increase energy efficiency and maximise the use of waste fuels, reducing emissions as well as reliance on purchased fuels.

Emerson has already upgraded controls on three of the site's steam boilers and Tata Steel decided to upgrade the controls of its largest steam boiler using energy management technologies and services from Emerson Process Management.

The boiler upgrades are helping Tata Steel make better use of 'indigenous' waste fuels – such as

blast furnace gas, BOS (basic oxygen steelmaking) gas and coke oven gas – that are by-products of the manufacturing process. The improved controls are part of a comprehensive energy management project that's expected to reduce powerhouse energy consumption by three to five per cent and help Tata Steel achieve its vision of becoming energy self-sufficient.

Emerson conducted a study to identify opportunities for improving powerhouse operations at the Port Talbot facility, as well as providing an integrated combustion control, burner management, and energy management solution. The solution included Emerson's SmartProcess Energy and SmartProcess Boiler optimisation technologies, DeltaV digital automation system with model predictive control, DeltaV SIS process safety system, Rosemount® and Micro Motion measurement instruments, Fisher® control valves, and Bettis™ and Hytork™ valve actuators. Emerson also trained Tata Steel's operators using a simulator installed in the powerhouse, enabling them to gain experience with the new controls without affecting operations.

Following the upgrade, operational stability has greatly increased, and energy costs have decreased as better use of waste fuels has reduced the need for natural gas. Using more waste fuel to power the boilers instead of burning it in flares also helps reduce emissions. And the new safety system enables an orderly process shutdown if necessary.

"Using waste fuels is an attractive way to reduce costs and emissions, but it's also challenging because of their variable energy content," said Chip Rennie, director of Emerson Process Management's Global Industrial Energy Group. "Emerson's technology significantly reduces the effects of that variability so users can maximise low-cost fuel use – while consistently meeting steam demands. In a tough business climate, complicated by unpredictable energy prices and tighter emission controls, the winners will be companies like Tata Steel who turn those opportunities to their advantage."

www.EmersonProcess.com/IndustrialEnergy

Wireless acoustic transmitter helps save energy and reduce environmental impact

Monitoring of steam traps and pressure relief valves, reduces steam trap failures and enables fuel cost reductions of 10-20% each year



Steam production is a significant operating expense for processing plants and about 20% of the steam leaving a boiler is typically lost through failing steam traps. To help processing plants monitor these critical devices and significantly reduce their energy expenses and environmental impact, Emerson has introduced the Rosemount 708 Wireless Acoustic Transmitter.

The new Smart Wireless device combines temperature measurement with acoustic "listening" that provides unparalleled visibility into the state of steam traps and pressure relief valves, without the effort of a manual inspection. This enables dramatic decreases in steam trap failures and fuel cost reductions of 10-20% each year.

The Rosemount 708 Wireless Acoustic Transmitter provides visibility to pressure relief valves by alerting operators when a valve has opened in as little as a single second. The time-stamped alerts can be compared against process conditions or environmental reporting to help identify the

root cause of a release, so that preventive actions can be taken to reduce future emissions.

Using a non-intrusive, *WirelessHART*® monitoring system, operators can monitor traps throughout the plant, even in remote and hard-to-reach locations, with greater than 99% data reliability. Real-time alerts identify which areas need attention, so operators can make informed decisions on how to act.

The Rosemount 708 Wireless Acoustic Transmitter offers a fast and easy implementation and minimal on-going maintenance, taking advantage of the devices, tools, and knowledge already in the processing plant. The rugged transmitter features a 10-year battery life and engineered polymer housing that is intrinsically safe, weather proof and chemically resistant.

www.EmersonProcess.com/IM012

Electronic Marshalling technology now available for hazardous locations

I/O in hazardous areas traditionally requires explosion-proof mounting or isolation barriers. These approaches are costly, require space for additional barrier and termination cabinets, and need on-going maintenance to ensure safety requirements are met. IS CHARMs builds on the innovative Electronic Marshalling and single-channel characterisation module (CHARM) technology. This provides significant savings in system design, installation cost and ease of maintenance, with intrinsically safe circuitry for field wiring into hazardous areas, including Zone 1, Zone 0 or Class 1 Div1. www.EmersonProcess.com/IM010

New digital DP level technology improves performance and reduces costs

DP measurement systems on tall vessels and distillation towers have traditionally required excessive lengths of impulse piping or capillary which are costly to install and require regular maintenance. Emerson's Rosemount 3051S Electronic Remote Sensor system is a breakthrough technology that replaces mechanical impulse piping with two 3051S pressure sensors. Differential pressure is calculated in one of the two sensors and the system delivers improved performance, simplified installation and maintenance, and additional process insight and diagnostics. www.Rosemount.com/3051SERS

Pinch valve allows automated control of low volume, sterile liquids

Manually-operated pinch valves give inefficient and poor control when used for low flow rate, low pressure control of sterile liquids. Emerson's new Baumann™ 85000 sanitary pinch valve provides fully automatic operation for high value applications within the biotechnical and pharmaceutical industries. Compact and lightweight, the 85000 pinch valve with the FIELDVUE™ controller provides an installed equal percentage flow characteristic for control accuracy. The digital controller also enables valve diagnostics that monitor the operating health of the valve assembly. www.EmersonProcess.com/IM008

Monitoring of subsea production wells improves offshore safety

Accessing information from behind the casing in subsea production wells has always been difficult. Emerson's new instrument - the Roxar Downhole Wireless PT Sensor System – Annulus B will measure online and in real-time, previously inaccessible pressure and temperature information. The new wireless instrument attaches to the same cable as the reservoir monitoring gauges and will detect any variations in pressure behind the casing string. It will provide early warning of these conditions and allow remedial action to be taken. www.EmersonProcess.com/IM011

Further information

Emerson Process Management is always looking for new and innovative ways to enable customers to connect with them. These include local country websites, the award winning Emerson Process Experts blog – which includes an automatic translation tool, social media pages and twitter.

Websites

Please visit www.EmersonProcess.eu and select your country from the dropdown menu on the left.

Blogs

Emerson Process Experts

Connecting with the people behind the technologies and expertise. Site equipped with automatic translation.

www.EmersonProcessxperts.com

DeltaV News

DeltaV - Emerson's digital automation system for process control.

news.easydeltav.com

Modelling and Control

The dynamic world of process control, site equipped with automatic translation.

www.modelingandcontrol.com

The Emerson Global Life Sciences Blog

Timely, targeted and relevant information for professionals in the life sciences industry.

www.emersonlifesciences.blogspot.com

Analytic Expert

Discussing the application of liquid and gas analysers.

www.analyticexpert.com

Micro Motion Online Community

Online resource for Coriolis flow & density measurement. Contains a blog and forums.

community.micromotion.com/home.php

LinkedIn

Enter the following group names into the search bar in LinkedIn

DeltaV Digital Automation System

DeltaV SIS Process Safety System

Emerson Global User Exchange

Syncade suite

Micro Motion

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www.facebook.com/EmersonProcessXperts

Micro Motion

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DeltaV

www.EmersonProcess.com/DeltaVFacebook

Emerson Process Management

www.facebook.com/EmersonProcessManagement

Rosemount Process Level

www.EmersonProcess.com/ProcessLevelFacebook

YouTube

www.youtube.com/user/EmersonPlantWeb

www.youtube.com/user/DeltaVsystem

www.youtube.com/MicroMotionVideos

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Emerson People

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People Active in Process Automation

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