Make Power and Utilities a Business Advantage

Steam generation accounts for about 28 percent of the energy used by the petroleum refining industry, 47 percent in the chemical industry, and 76 percent in the forest products industry.

U.S. Department of Energy Efficiency and Renewable Energy

What if...

...when steam demand changed, you didn't need manual operator intervention?

...you could maintain high efficiencies at all times?

...as utilities load varied, you could still maximize the use of lowest cost fuels?

...you could automatically operate within emissions and other constraints while simultaneously being in your best cost position?

In the utility operation, you aren't just responsible for delivering steam, electricity, and other utilities to the production processes—you're key to the entire site's profitability. Powerhouse performance not only impacts production rates and quality targets, but also significantly affects the cost of goods sold.

But you don't operate in a static environment. In fact, the only constants in your world are demand swings and unforeseen events. Fuels are inconsistent, machinery breaks, and human error disrupts your operation. In short, keeping steam in the pipes is easier said than done.

Nevertheless, you must maintain something approaching stability in the powerhouse. Meanwhile, environmental constraints are becoming tighter and rising energy costs threaten your budget.

The success of your plant hangs in the balance. You need to produce utilities more intelligently and cost-effectively—and you need to do it fast.

What's keeping you from delivering steam reliability while reducing energy costs and emissions?

DEMAND SWINGS INHIBIT STABILITY AND RELIABILITY

The unpredictable demands placed on your powerhouse are matched only by the potential for mechanical process disruptions in the operation, and human error just makes things worse. You know there are inefficiencies in your operation, but with your present equipment, control technology, and operating methods, performance is managed as best as possible. You've tried to make improvements, but often this seems to make your team's job more difficult rather than easier.

ENERGY COSTS ARE HIGH, AND THEY'RE RISING

Rising energy costs impact not only the power and utility operation, but the bottom line of your entire business. Ideally, increasing the use of low-cost waste and alternate fuels should lower costs, but variations in the Btu content and supply of these fuels makes steady operation difficult and savings hard to come by. What's more, operators feel like they have better control over utility processes when they run in manual, varying your cost performance between operating shifts.

INSTABILITY LEADS TO EMISSIONS EXCURSIONS

Current environmental permits are tight and are becoming more restrictive over time, making it more important than ever to operate with precise control over emissions. Swings in demand and other operating issues lead to seemingly unavoidable emissions. Running in manual control also contributes to excursions by preventing real-time compensation for changing conditions.

EMERSON™
Process Management

Achieve power and utility performance leadership

The objective, then, should be achieving and maintaining powerhouse performance leadership that gives you the ability to deliver utilities reliably while reducing your costs and emissions. This may seem a lofty goal, but it is absolutely attainable.

That's where Emerson comes in. With our unique, holistic approach and industry-leading expertise and technologies, you can move the performance of the powerhouse to an entirely new level.

ENSURE RELIABLE AND RESPONSIVE STEAM, ELECTRIC, AND OTHER UTILITY PRODUCTION

With improvements in automation, combustion control, and process equipment diagnostics, you can put your best operating scenarios into automatic and replicate your most experienced operator's performance every minute of every day. In doing so, you'll be able to:

- provide your operating team with tools that make it easier to stay on control.
- optimize overall powerhouse performance in real time.
- identify equipment problems before trips or failures.
- eliminate production disruptions caused by the powerhouse.

You'll stabilize power and utility operations and give your operating team access to real-time performance intelligence, turning them into true process managers.

DECREASE ENERGY CONSUMPTION AND MINIMIZE FUEL COSTS

You need to run leaner and smarter, especially when responding to utility demand variations. With Emerson's end-to-end solutions, you can permanently reach optimal combustion and maximize use of your lowest-cost fuels. Backed by Emerson's technology and expertise you will:

- stabilize boiler performance;
- adjust automatically and in real time to fuel supply and quality variations;
- incorporate emissions and process mechanical constraints into automatic controls;
- reduce operating cushions that increase cost;

all without sacrificing reliability or responsiveness.

SAFELY AND AUTOMATICALLY MANAGE OPERATIONS WITHIN EMISSION CONSTRAINTS

In order to consistently meet your emissions constraints now and in the future, you need to significantly improve your combustion performance and begin to operate at a level manual control cannot deliver. With support from Emerson, you can implement technologies to automatically stabilize combustion such that emissions are managed at all times, even when loads are changing and fuels are varying.

One large steam producer was using a mix of biomass, coal, and natural gas to produce steam, but powerhouse instability was forcing continual manual intervention and necessitating a greater dependency on coal use. That, in turn, raised costs and emissions from the powerhouse, resulting in a higher cost of goods produced.

By implementing Emerson's SmartProcess, the company virtually eliminated manual intervention, increased their use of less expensive biomass by 50% on one boiler and 20% in a second. All told, the producer saved about $2.3 million annually in energy costs.

A proven way to achieve full automatic control and optimized unit performance

Emerson's holistic approach is the key to moving your powerhouse to fully automatic operation with significant fuel cost savings and improved emission performance. It is a step-by-step methodology that begins with a performance audit, delivers a customized improvement solution, and achieves sustained automatic control 95 percent of the time. It's a tried and true methodology that can turn your powerhouse into a strategic business advantage.

HOLISTIC UNIT IMPROVEMENT APPROACH—BOILER EXAMPLE

PERFORMANCE AUDIT

Emerson performs mechanical, process, field device, and control system surveys and analyzes recent operating data to fully understand process performance.

PROCESS TESTING

Operating tests are conducted to determine process constraints and to evaluate alternative operating methods.

PROCESS EQUIPMENT MODIFICATIONS

Working within business ROI parameters, Emerson recommends upgrades to process and mechanical equipment, such as the fuel handling and air-systems, in order to resolve identified limitations.

FIELD DEVICE IMPROVEMENT

From the survey and audit efforts, required measurement and actuation changes are recommended in order to support fully automatic and optimized control.

CONTROL STRATEGY UPGRADE

Tailored to specific site needs, Emerson develops control strategies for full automatic optimized control.

INSTALLATION

New equipment, devices, and solutions are installed.

COMMISSIONING AND START-UP

With new equipment and strategies in place, Emerson completes field-check, commissioning, and start-up tasks for the new equipment and controls.

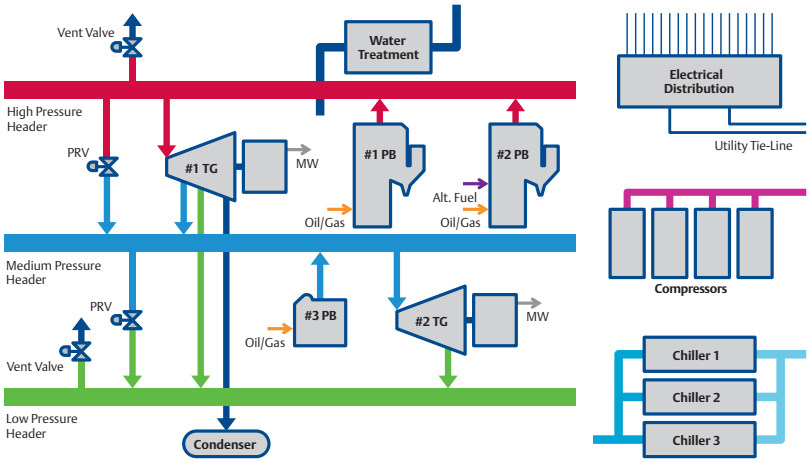
SOP MODIFICATION

Operators and maintenance personnel are trained to run processes with the new tools and technology.

Bottom to top improvement in power and utility performance

Emerson's holistic method to optimize power and utility operations has proven time and again to produce real, measurable, and lasting results. And because our solutions are scalable, you can choose to address most pressing needs before expanding into other areas.

No matter if you choose to optimize just one section of your process or your entire powerhouse, you'll realize a number of benefits from working with Emerson. A sample of the results you can achieve with Emerson's approach to industrial energy can be found below.



BURNER MANAGEMENT SYSTEM	OVERALL POWERHOUSE ENERGY MANAGEMENT SOLUTION
• Eliminate nuisance trips and simplify boiler start-up with clear indication of malfunction cause • SIL rated implementation per applicable codes	• Coordinate and manage overall utilities in real-time to decrease total cost 1-3% • Accurately determine electric buy/make criteria in real-time
ENERGY MANAGEMENT INFORMATION SYSTEM	**STEAM CONTROL AND OPTIMIZATION**
• Precisely track energy usage in real-time and immediately identify unusual waste • Condition and production specific analysis to provide information rather than simple data	• Governor and exciter control with machinery health prediction and protection • Flexible modes of operation to integrate with powerhouse
MULTI-FUEL BOILER CONTROL AND OPTIMIZATION	**STEAM HEADER CONTROL AND COORDINATION**
• 1-3% thermal efficiency improvement • 10-15% increased steam from waste/biomass fuel	• Prevent cascade trips leading to total outages • Increase on-site electrical generation by 10-20%

EmersonProcess.com/ SmartCombustion

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