

Users, Integrators, and Vendors Discuss Sustainability at PMA 2012

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Keywords

Sustainability, Energy Management, Energy Efficiency, Safety, PMA, Automated Startup, Emissions Reduction, Renewable Feedstock

Overview

At PMA 2012, industry leaders demonstrated that important gains in energy and capacity can be sustained profitably. ARC believes it is highly probable that a huge potential of untapped gains is still available to industry.

ARC Advisory Group's annual European forum, the Process Management Academy (PMA), attracted close to 120 participants this year. While most participants were from Europe, several also traveled to snowy Antwerp all the way from Japan. At afternoon workshops on March 5th, participants discussed cyber security, process safety, brand protection, and energy management. The following day, users and providers shared current best practices and emerging practices in automation and manufacturing IT relative to sustainability and safety. All sessions included actual case studies and lively interactive discussions. Individuals who could not make it to Antwerp were able to participate via the Internet thanks to the mechanism provided by ARC Europe's partner, *Process* magazine (<http://www.process-worldwide.com/>).

In this Insight, we report on the energy and production efficiency gains made by leading industrial organizations as reported at PMA 2012. Future Insights will report on safety and security.

Sustainability

Participants in the energy management workshop concluded that, while the "low hanging fruit" has already been largely harvested; by putting the right information in the hands of the right people, employing good process engineering and heat integration practices, and executing energy management initiatives in a strategic manner, industrial plants can still yield year-on-year improvements in energy efficiency.

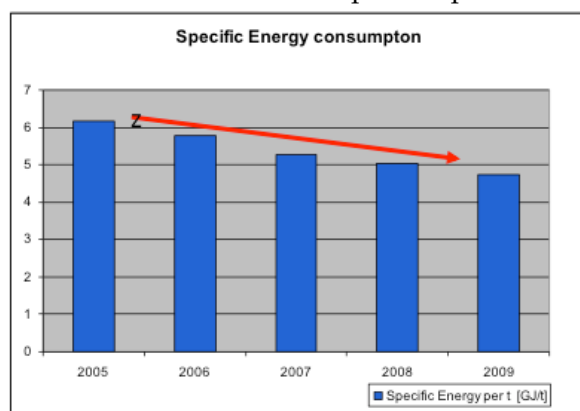


Clariant Reduces Energy Consumption and Carbon Dioxide Emissions

Dr. Herbert Maier of Clariant (a NAMUR board member), kicked off the plenary session by sharing Clariant's approach and methodologies. According to Dr. Maier, Clariant considers all opportunities to improve sustainability in a holistic manner. These range from using non-edible renewable raw materials to produce ethanol for fuel applications; to reducing consumption of raw materials, steam, electricity, compressed air, and energy for chillers.

To maintain the efficiency gains realized during its four-year initiative, Clariant employs a continuous improvement approach. This includes a balanced system that the company calls "e-Watch." Among other savings, e-Watch, which incorporates technical, human and management components saved, helped the company reduce carbon dioxide emissions by 100,000 tons a year.

The technical strategy starts by representing measurements of key variables visually, such as in trend plots that compare actual performance against best-proven performance. Then, focusing on the main energy consumers



Clariant Specific Energy Consumption

and contributors to losses, the company applies process simulation techniques to determine where improvements can be achieved by changing operating conditions or by making simple equipment modifications. The latter can include applying variable speed drives or installing smaller pumps.

On the human side, the company creates awareness through education and provides the training needed to help employees improve behaviors.

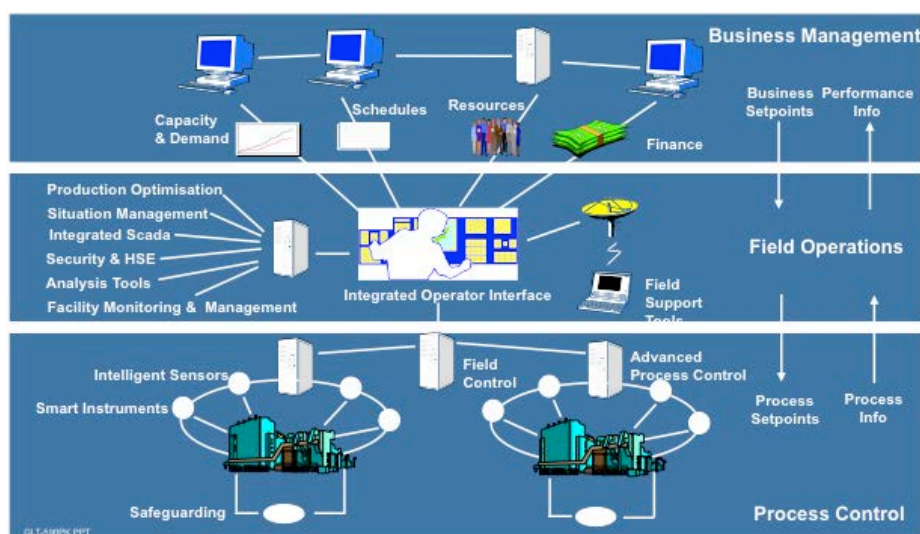
Finally, as a pillar of the company strategy, sustainability is supported by top management at Clariant, which is one key to the success of this type of initiative.

NAM Reduces Energy Consumption by 3 Percent

Wim van Meijeren of NAM, the Shell/ExxonMobil joint venture for production at the Dutch natural gas field, reported on the renovation of the production sites and of the electrical, instrumentation, and automation enhancements. The gas is produced at 29 clustered production sites with 10

production wells at each cluster on average. Each cluster has a low-temperature separation unit to condense larger hydrocarbons that can form slugs and damage compressors and pumps. NAM injects glycol into the gas as part of the treatment process to prevent the formation of hydrates that can plug pipes and equipment.

Declining field pressure (requiring the addition of compressors), plus the need to comply with the latest safety and environmental standards, improve operability, and reduce total cost of ownership provided the rationale for the renovation.



NAM's Vision for Levels 1 to 4 Architecture

NAM installed electrically driven, high-efficiency compressors and drives; replaced manually operated valves with electrical valves; and replaced the legacy pneumatic process controls and SCADA and telemetry with a Yokogawa Centum VP DCS. The new system incorporates 29 autonomous domains with a total of 51,000 I/O interconnected by fiber cable and operated from a central control room. Yokogawa also provided the integrated safety systems, instrumentation, global historian, and asset management system for the entire operation. The cluster design made it possible to gradually reduce engineering hours by 30 percent for the fourth cluster compared to the hours required for the first cluster.

NAM can now start up or shut down clusters remotely within an hour with few or no alarms. The new system made it possible to transition from pressure-controlled gas production to flow-controlled gas production to save energy as mandated by new EU regulations. Overall, this helped re-

duce energy consumption by approximately 3 percent. Startup reliability increased by 10 percent. Integrating production, glycol unit control, and compressor control resulted in either 0.5 percent increased capacity or lower power consumption, depending on production requirements. Improved separator control added an additional 2 percent capacity and non-linear model predictive control (NLMPC) adds another 0.5 percent of capacity by stabilizing the gas outlet temperature. Furthermore, NAM reduced emissions by 25 percent by eliminating gas-actuated valves and employing smart furnace control.

Sasol and BASF Implement New Instrumentation to Save Energy and Improve Safety

Rolf Panzke of Siemens reported on how customized instrumentation and measurements can lead to significant material and energy savings and increased uptime. Examples included leak detection in pipelines and customized interface detection in a high-temperature, high-pressure, three-phase separator at Sasol. He also cited the use of a level radar gauge to replace safety-related inspections in a styrene reactor at BASF.

Evonik Automates Startup in Critical Units

Michael Buesselmann of Yokogawa reported on automating startup of a separation column and a reactor at Evonik Industries using the company's Exapilot package with the DCS. Now, up to 4,000 previously undocumented instructions are sequenced logically and executed optimally, leading to significant reductions in startup-time-to-full-load, emissions, and off-spec material; plus the associated energy savings. In the case of the reactor startup, the mixture composition comes close to an explosive area. The increased consistency of the startup trajectory helped reduce production interruptions caused by automated safety shutdowns.

Last Word

At PMA 2012, industry leaders demonstrated that, with the appropriate technology, processes, and methodologies companies can still gain and sustain improvements in both energy efficiency and production capacity.

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