

E-News Article

“The Engineer’s Energy Toolbox: Practices, Technologies and Management” Dec. 6 -7, 2006 in Galveston, Texas

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Learn how energy management, technologies, and practices can help your plant achieve its lowest long-term manufacturing cost at the **Texas Technology Showcase**, December 6 and 7, 2006 in Galveston, Texas. Optimized energy use will be a key measure of success in chemical manufacturing and petroleum refining in the coming decade.

The two-day conference features four concurrent technical sessions, three plenary addresses, an awards ceremony recognizing top companies' achievement in energy efficiency, an exhibit hall, and opportunities to network with colleagues. There will be a special series highlighting NO_x reduction technologies and implementation case studies. Six Showcase Plants will discuss the benefits achieved through successful energy and environmental projects and programs— Texas Petrochemicals LP, ExxonMobil, The Dow Chemical Company, Chevron Phillips Chemical Company LP Cedar Bayou Plant, Rohm and Haas Texas Inc. Deer Park Plant, and Sterling Chemicals Inc. Texas City Plant.

The conference will open with a panel discussion on “Competition and the New Landscape”. Speakers will address what it is going to take for the process industries in the US to successfully compete in the next decade. In the 4 concurrent technical sessions, more than 40 engineering and technology professionals will discuss their strategies and technologies for optimizing plant energy use, reducing production costs, and reducing NO_x emissions from combustion units. Attendees can also talk to technology providers in the Showcase Exhibit Hall, where there will be more than 30 exhibitors. More information on the Showcase event, and registration and exhibition information, is available at www.ShowcaseTexas.org.

Here are just some of the topics attendees will learn about at the 2006 Showcase:

- Energy Management Process Results in \$2 million Savings at Sterling Chemicals, Inc.
- On-line Laser Based Analyzers Provide Real-Time Measurements in Harsh Environments at The Dow Chemical Company
- Super Boilers Designed for Super Efficiency Top 90%
- WOW Energy’s Final Flue Gas Cleaning System Achieves Up to 99% Reduction in NO_x and SO_x Emissions
- Distillation Column Flooding Predictor Increases Throughput by Up to 5%
- Retrofit Pre-Heater Project at Rohm and Haas Plant Saves \$2 Million per Year in Energy Cost Savings
- Valero Refining Replaces Older Burners with Low NO_x Zeeco Burners

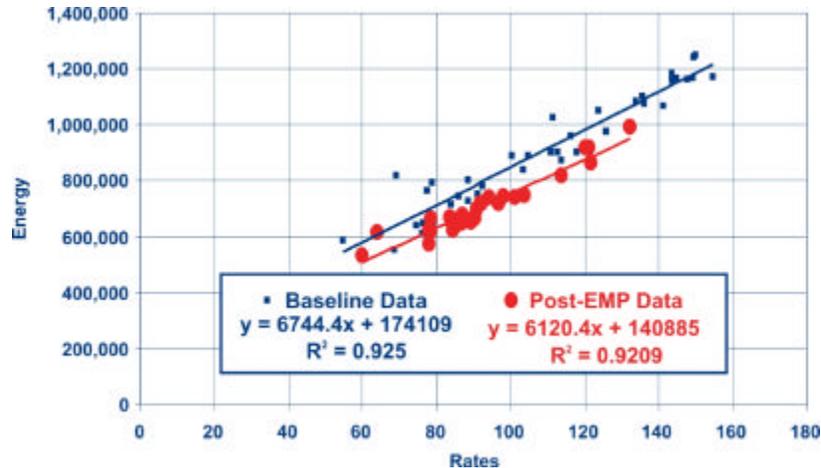
Energy Management Process Results in \$2 Million Savings at Sterling Chemicals, Inc.

Sterling Chemicals Inc., Texas City Plant has joined with the Sinclair Group to implement an energy management process (EMP) aimed at increasing profitability by implementing energy management best practices. Key elements to the success of Sterling's EMP include:

- Management commitment
- Dedicated Energy Management Team
- Accurate energy measurements
- Increased employee awareness and contribution

- Energy management database

Town hall-like meetings and walk-through audits with each operating shift of each unit were important steps in getting employee EMP buy-in. The “low hanging fruit” improvements identified during walk-through audits resulted in savings of \$700,000 per year. Comprehensive energy audits, establishment of an energy management database, and development of a detailed energy model have contributed to annual energy savings of over \$2 million. An additional \$7-\$9 million of potential energy savings opportunities has also been identified. Details on the EMP approach, example projects, and work process metrics will be presented by Sterling Chemicals and Sinclair Group representatives.



Sterling Chemical Energy Use Regression Analysis

On-line Laser Based Analyzers Provide Real-Time Measurements in Harsh Environments at The Dow Chemical Company

Under a program sponsored by the Department of Energy, Dow Chemical and Analytical Specialties, Inc. have developed and implemented a new generation of Laser Based Process Analyzers. These analyzers have the benefit of providing real time measurements under extremely aggressive process conditions (pressure, temperature, corrosive processes) that have not been possible or practical before. As a result of application of these analyzers in waste destruction, combustion control and process control applications, Dow is saving millions of dollars per year in fuel costs and reducing emissions to all time low levels in key processes.

Speakers from The Dow Chemical Company will present information on the commercial application of three in-situ sensors— a furnace, a reactor, and a corrosive product stream. The presentation will include results on energy savings; improvements to safety, quality, and reliability; and reduced emissions.

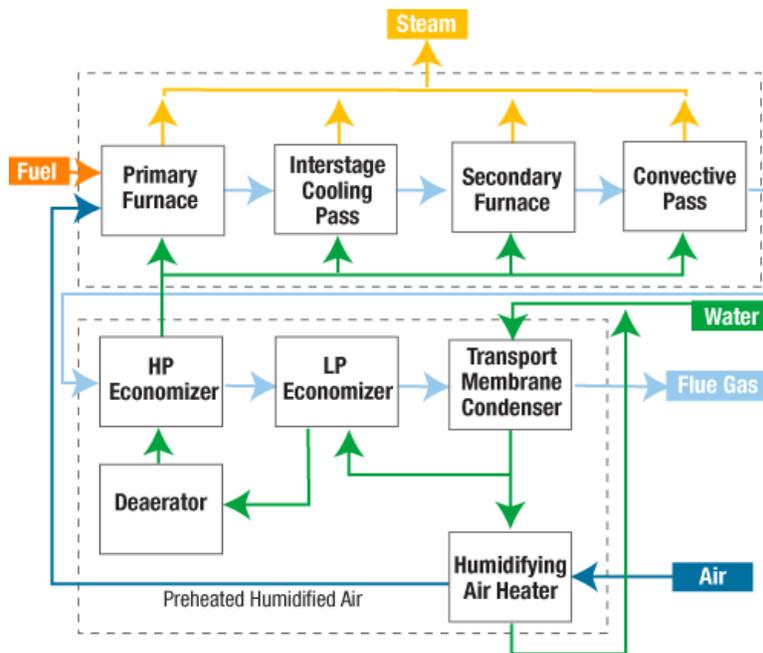
Super Boilers Designed for Super Efficiency Top 90%

Increasing natural gas prices have brought renewed attention to the outdated and inefficient 1960- and 1970-era industrial boilers being used by many large U.S. manufacturing facilities. The first-generation Super Boiler is well on its way to demonstrating steam generation efficiency improvements of up to 25% and NO_x emissions of less than 5 ppmv, with a footprint that is 50%

smaller than conventional boilers. The Super Boiler project combines innovations in combustion, heat transfer and recovery, vessel engineering, and controls in a highly efficient steam-generation system.

The unique boiler design incorporates high-intensity heat transfer using extended surface firetubes. Heat transfer coefficients have been confirmed to be 18 times higher than plain firetubes. Key innovations include a transport membrane condenser and compact humidifying air heater to extract sensible and latent heat from the flue gas for increased energy efficiency, compact convective zones with intensive heat transfer, and a staged/intercooled combustion system for ultra-low emissions.

The scale-up and testing of commercial prototype designs for both single-stage and two-stage boilers will be discussed at the Showcase event. A demonstration test of an 11 MMBtu/hr single-stage gas-fired Super Boiler achieved a fuel-to-steam efficiency of 94%.

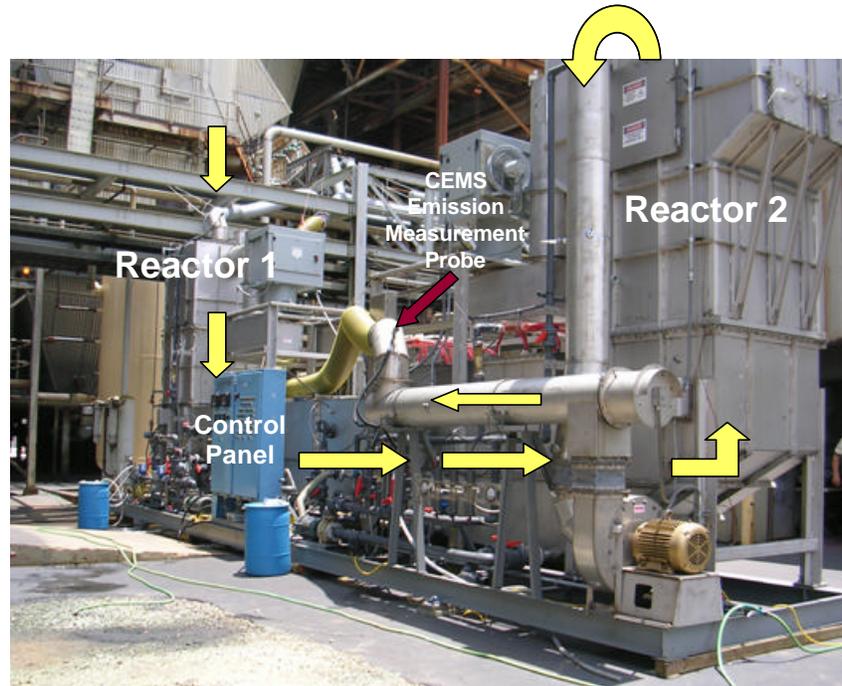


Super Boiler Conceptual Diagram

WOW Energy’s Final Flue Gas Cleaning System Achieves Up to 99% Reduction in NO_x and SO_x Emissions

WOW Energy, Inc. has developed a Final Flue Gas Cleaning (FFGC) system to integrate proven emission reduction techniques into a single multi-pollutant reduction system. The FFGC uses chemical additives in combination with ozone generation and ultraviolet radiation to convert oxidized pollutants to non-polluting compounds. Some of the technologies employed in the FFGC design include scrubbers, wet or dry electrostatic precipitators, and advanced oxidative processes (AOP). The innovative AOP process generates highly reactive oxygen radicals (without the use of metal catalysts) to convert Mercury, SO_x, NO_x, and other pollutants to non-polluting compounds.

A mobile FFGC pilot plant is being tested at a 160-MW petroleum coke power plant in Pasadena, TX—results will be available in December. Preliminary test results demonstrate the capability to achieve 97% to 99% reduction in NO_x and SO_x, and 99.5% reduction in particulate matter. A significant reduction (>60%) in CO has also been observed.



 **Flue Gas Flow**

WOW Energy's FFGC Pilot Plant

Distillation Column Flooding Predictor Increases Throughput by Up to 5%

2ndpoint, Inc. has developed an advanced process control strategy to increase energy efficiency and maximize productivity by identifying and avoiding flooding in distillation columns. Distillation column efficiency and capacity is highest when a column operates in a flow regime approaching flooding, or entrainment, where the vapor-liquid mass transfer rate is highest. By applying a non-intrusive pattern recognition methodology, pre-flood conditions are modeled and coded into the plant's distributed control system. The control system is programmed to "unload" the tower each time the pattern appears.

When potential flood conditions are avoided, column stability increases, which can increase column throughput. A previous commercial application experienced 98% column uptime over a period of four years. Additional benefits include low implementation and maintenance costs and a high level of operator acceptance.

Retrofit Pre-Heater Project at Rohm and Haas Plant Saves \$2 Million per Year in Energy Cost Savings

A recent pre-heater retrofit project at Rohm and Haas Texas Inc.'s, Deer Park plant yielded higher than anticipated energy savings and productivity gains. Preliminary data show a reduction in natural gas use of about 11% and an increase in furnace capacity of about 8%. The combined

energy cost savings (\$2 million/yr) and productivity improvement (\$5 million/yr) resulted in a 2.6-year simple payback for the project.

A pinch analysis of the plant's sulfuric acid recovery process identified structural inefficiencies and pre-heater energy loss largely due to leaks in the heat exchangers. Using the U.S. Department of Energy's Process Heating Assessment and Survey Tool (PHAST) software, plant engineers estimated retrofit energy savings and determined that higher pre-heater capacity could be obtained by increasing the temperature of the preheated air by 25%. These saving estimates validated the decision to replace the unit.

The project included replacing both the pre-heater and the furnace as well as upgrading certain sensors and insulation. Three new analyzers were situated to provide real-time readings of exhaust oxygen levels, and 9-inch insulating refractory was installed. The new exhaust analyzers allow staff to operate the furnace consistently at the lower end of the desired oxygen range, and the new furnace's configuration allows for more efficient burning and faster residue decompositions, so plant personnel were able to lower the furnace temperature by 40°F.



Rohm and Haas Retrofit Pre-heater

Valero Refining Replaces Older Burners with Low NO_x Zeeco Burners

Valero Energy Corporation is working with Zeeco to reduce emissions from fired heaters by replacing existing older process burners with the latest low NO_x burner design. Valero is utilizing Zeeco's patented low NO_x *Freejet* burner design on multiple applications at several Valero refineries. In their Showcase presentation, Zeeco will review many of these applications and share the field results achieved after installation of the *Freejet* burner. The retrofits that will be discussed include a variety of process heaters found throughout a typical refinery operation.