Major Refiner Optimizes Fuel Gas System to Reduce GHG Emissions

AspenTech partner, BluESP, uses Aspen DMCplus® with process inferentials to better manage fuel gas system and emissions for significant energy savings.

The focus on reducing emissions—particularly greenhouse gas (GHG) emissions—poses a challenge for processing industries. A recent McKinsey report says, "The U.S. could reduce greenhouse gas emissions in 2030 by 3 to 4.5 gigatons of CO2e using tested approaches and high-potential emerging technologies." The report further states that the cost of implementing energy efficiency measures (including process control) in fired and steam systems are on the order of $6/ton CO2e, presenting process manufacturers with an opportunity for creative implementation of advanced process control solutions.

Improper management of off-gases can lead to higher emissions and throughput reductions. The changing flow and heat content of gases can also cause instability in unit operations. Improved control of the fuel gas header allows for optimization of boilers and furnaces, potentially reducing GHG emissions.

BluESP, an AspenTech partner in South Africa, employed Aspen DMCplus—an industry-leading model predictive controller—to deliver these capabilities for a major refiner, resulting in significant energy savings.

Customer Profile

Major Refiner
Refining & Marketing

Challenge:

Reduce greenhouse emissions via improved management of the refinery fuel gas system

Solution:

Aspen DMCplus with process inferentials

Benefits:

- Maintain stable pressure and quality
- Operate below all emission limits
- Reduce energy consumption
- Reduce emissions levels and flaring

Numerous Factors to Be Considered

Managing the associated emissions of a typical refinery's fuel gas system presents a challenging control problem:

- Off-gas flows change constantly (particularly during unit startup and shutdown).
- If enrichment gas with a high heating value is added to achieve volume balance, the heating value of the fuel gas increases.
- The controllers on the furnaces will cut back on consumption, upsetting the volume balance and cutting back enrichment gases—ultimately leading to an unstable system.

Improving Control of the Fuel Gas System

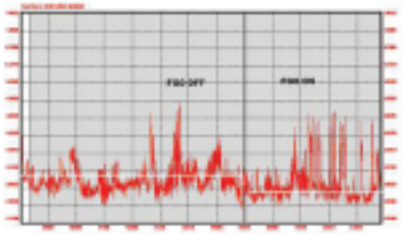
Flaring not only costs money, but is an obvious source of pollution. Improved control of the fuel gas header allows for optimization of boilers and furnaces, potentially reducing GHG emissions. The quantity and quality of the fuel gas and oil provides a good indication of the energy efficiency of the complex. Any reduction in energy usage goes hand in hand with a reduction of emissions.

To address the problems of managing the fuel gas system, BluESP elected to implement Advanced Process Control technology from AspenTech. The solution consists of a model predictive controller implemented with Aspen DMCplus along with a closed-loop optimizer and process inferentials. Nearly all units are producers or consumers of fuel gas, and therefore have to be taken into account as part of the overall solution.

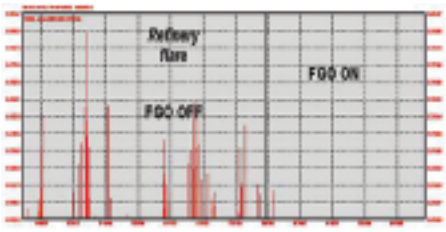
Results and Benefits

Implementation of the control system reduced energy consumption while reducing emission levels and flaring.

Refinery Flaring



Refinery Energy Usage



With Aspen DMCplus in place, the refiner was able to reduce flaring, as well as energy consumption.

By using advanced process control technology BluESP was able to improve operational profitability and make a positive impact on the environment.

About AspenTech

AspenTech is a leading supplier of software that optimizes process manufacturing — including oil and gas, petroleum, chemicals, pharmaceuticals and other industries that manufacture and produce products from a chemical process. With integrated aspenONE solutions, process manufacturers can implement best practices for optimizing their engineering, manufacturing and supply chain operations. As a result, AspenTech customers are better able to increase capacity, improve margins, reduce costs and become more energy efficient. To see how the world's leading process manufacturers rely on AspenTech to achieve their operational excellence goals, visit www.aspentech.com.

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