

**OIL AND GAS MIDDLE EAST**

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**Optimising midstream with an integrated simulation environment**

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# Optimising midstream with an integrated simulation environment

With new business slowing, the midstream industry is currently experiencing a shift from greenfield projects to revamps, aimed at minimising CAPEX in a bid to make existing plants more profitable when operational improvements are limited



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In the current energy environment, where prices are low and risk is high, companies need to ensure they can maintain profitability.

Given the rapid development of the GCC countries, the energy demand is expected to increase significantly in the next fifteen years, which will outstrip today's supply.

Better understanding of operations, faster troubleshooting, and more options for improvement projects can enable engineers to enhance the performance of existing gas and LNG plants. The region's energy sector requires a solid development of the midstream segment. With new business slowing, the midstream industry is currently experiencing a shift from greenfield projects to revamps to make existing plants more profitable when operational improvements are limited.

Revamp projects are aimed at increasing capacity and lowering manufacturing costs and for engineering teams, there is a pressing need to consider and minimise



capital expenditures. Additionally, the midstream industry is seeing stricter quality specifications and more complex environmental, health and safety (EH&S) compliance requirements.

A single integrated software platform can provide companies with the tools to manage and mitigate risk, reduce operational costs, enable gas plant optimisation and re-design, while simultaneously meeting safety directives and environmental standards for emissions of flared gas and wastewater. Equipped with the depth of modelling accuracy, engineers can also work more efficiently with integrated workflows and the ability to look at the process as a whole when considering changes to

the feed compositions and flowrates, configuration, or the solvents used.

**Understanding current industry challenges**

In addition to the industry shifts from greenfield projects to revamping existing plants, engineers are facing additional challenges and complexities in the current market

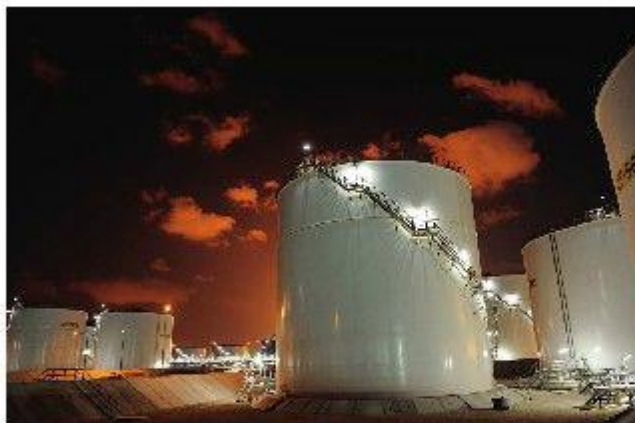
- environment including:
  - Ever-increasing complexity of product specifications. Fungible product specifications for products entering the sale gas pipeline need to be met, which must be evaluated.
  - Manage products to maximise margins. To maximise profits, the value of the products and the cost of recovering the NGLs and removing the additional gas must be considered periodically. For these reasons, accurately predicting the NGL, CO<sub>2</sub>, He, or N<sub>2</sub> content along each step of the processing is essential.
  - New workforce realities. The complexities of a multi-genera-

tional staff mean that employers must embrace a range of tools and technologies to ensure that employees are regularly trained and fully equipped with the appropriate tools. As a wave of experienced engineers retires, a younger generation is being put into more challenging roles. Simulation tools are not only enabling decision making where manual troubleshooting knowhow was once required, but are also creating a bridge between retiring veterans and the new generation of engineers.

- More stringent environmental and safety regulations. Meeting environmental and safety standards is crucial for avoiding fines and penalties and ensuring maximum plant uptime. If high concentrations of H<sub>2</sub>S or CO<sub>2</sub> are present, the product will not meet environmental standards and damage may be incurred.
- Inevitable equipment limitations. Prematurely failing equipment, difficult to operate units and insufficiently sized safety systems can lead to operational issues such as reduced product quality or even shutdowns. Heat exchangers, columns, compressors, pumps, and relief and flare systems must be properly sized for all scenarios to avoid operational risks.

#### The need for simulation

Advanced process simulation tools provide organisations the solutions needed to grow stronger and become more efficient, allowing new heights to be gained and hurdles to be overcome. To address the challenges faced in the design and operation of gas processing facilities, process simulation solutions empower engineers to more deeply understand the process, how the process responds to changes, how to optimise operations,



and prevent and manage potentially damaging scenarios.

In every part of the gas plant, simulation is needed. The gas plant, with its many sections, has many interconnections with downstream dependencies, recycle streams, heat exchanger networks and flare systems. As the feed changes with vary flowrates and compositions, the plant can either handle the new feed or needs to be adjusted within the plant limitations. In order to handle a different range of feeds, it may need to be modified. This is why a full plant model that utilises the most accurate modelling technology for each section is very important. With this type of solution, companies can provide a quick evaluation of where a constraint is violated and how to accommodate the change.

There are currently advanced process simulation tools available today that offer property packages and unit operations specifically designed and tested for difficult-to-model processes such as acid gas removal, sulphur recovery, dehydration, NGL recovery, and liquefaction. To gain these benefits and more, companies have also implemented a fully integrated simulation solution offering seamless workflows to automatically incorporate equipment sizing,

costing, energy networks, and safety systems right in the process model.

As a result, users can make the right decisions when changing feed conditions, compositions, capacities and ageing equipment impact economic objectives. Additionally, companies can model the entire gas process without having to compromise separate simulation tools.

#### The model for future success

Navigating uncertainty is essential in today's market. Those companies who will thrive must be leaner, efficient and able to adapt quickly to market dynamics. As engineers continue to drive improvement in plant operations, it is imperative they have the right simulation tools in place to help make informed decisions and remain competitive. Plant issues arise all too frequently and in order for organisations to ensure the best action is taken, operators need access to an integrated software platform. With the right technology, engineers can make the right decisions for their plants to ensure profits outweigh costs. Additionally, with these solutions, organisations can minimise risk against unplanned events, as they will have the tools to adjust daily activities to find the most effective and efficient way to run the business. ☉