CASE STUDY

KBC
A Yokogawa Company

European Refinery Optimizes Production

Digital Twin provides a single source of truth, driving alignment decisions and actions across the value chain

Key Benefits

- Single source of truth
- Automated data collection and processing
- Simplified workflow

Background

- European refinery
- Looking to increase productivity
- Digitalization journey

KBC Solution and Results

- Petro-SIM digital twin
- Customized displays
- Improved efficiency and productivity

Client Challenge

A global energy company in Europe has upstream facilities with a net production of more than 700,000 barrels of oil equivalent per day. This includes several industrial facilities and a refining capacity of more than 1 million barrels per day.

Their production optimization department uses complex linear program models. These LP models represent the refinery units through LP vectors. They wanted a way to generate the LP vector to improve accuracy and frequency of updates for better planning to optimize production.

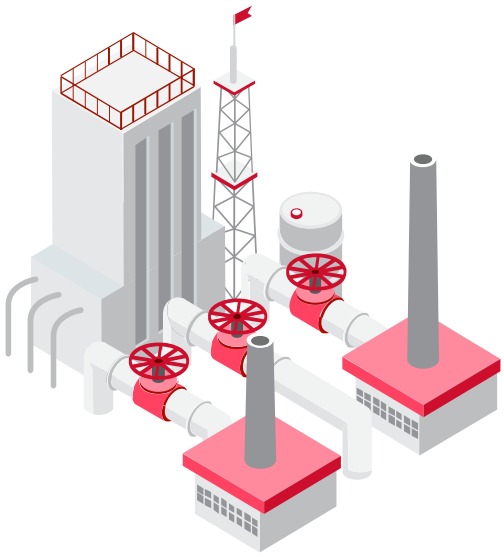
They strive to operate in a safe, competitive, and sustainable way. As part of their goals, the company is committed to reducing CO_2. Their path to decarbonization is only possible with tools that support digitalization.

The Solution

They wanted more than just a traditional simulation built on an ad-hoc basis which only provides an accurate representation for a particular operating case in a snapshot of time.

The solution needed to provide insight to multiple issues that a business needs to answer. They wanted a centralized model that offered a single version of the truth for everyone to use. It had to be a tool that could capture the full history and the future of the asset. They wanted a digital twin.

KBC
A Yokogawa Company



They chose the Petro-SIM® simulation software which uses first-principles for their solution architecture. It would provide them with a digital twin with the same accurate representation for their full operation range. The Petro-SIM simulation software was able to read and write to their PI historian. In addition, it was possible to create customized displays to help users follow their workflow.

The Petro-SIM digital twin generated a lot of information that different stakeholders could use in different ways. The customized displays ensured a consistent process. The digital twin provides indicators that monitors the LP vectors and simulation model in relation to reality. The system generates alerts when deviations in data quality occur. So, with only one model in different dashboards, different people from around the organization can see data relevant to their area.

The model is sensitive to changes in feed operating conditions, catalyst, and fractionation. Calibration to align with reality is easy. There are indicators to monitor input, data quality, reality, and model results. The model is able to run automatically on a regular basis or daily, weekly. The operator runs the model on a weekly basis after they receive all the lab data.

Once they have the results, they check their data quality parameters and evaluate. If the data is good, they validate. If not, they investigate and dismiss the results. After validation, they check the KPIs. If they are a good match with the LP, they validate the LP model. They then wait for the next week to run again. If a poor match with the LP reoccurs, it may be time to update the LP model. If the poor match is about the simulation, they recalibrate. In both situations they can update the LP, update the model calibration, and re-execute the historical data.

Results

They now have a digital twin using Petro-SIM first principles with customized displays. It is easy for them to monitor the LP vector and simulation model and update the LP vectors in an agile way.

Most of their decision-making activities geared to improving plant profitability rely on a process model. The Petro-SIM digital twin model accelerates their decisions. It is now easier to identify and resolve issues, thus improving productivity.

The digital twin provides a dashboard which different people can access and see results related to their area. The Petro-SIM digital twin provides a single source of truth driving alignment decisions and actions across the value chain.

Changes in digitalization, computing, and optimization opens up countless opportunities for improvement from a simulation optimization point of view. The change from a pure traditional simulation to include a digital twin solution assured the best decision over time.

Houston Regional HQ
15021 Katy Freeway, Suite 600, Houston, TX 77094 USA
T +1 281 293 8200
T +1 800 726 5914

0149-PetroSIM.DTRs-CAS-US-072021

All about EXCELLENCE