



Hyundai Oilbank Enhances Profits, Reduces Emissions With Online Simulation Models

\$0.02 per barrel

Gains from
improved operational plans

5%

Expected reduction
in GHG emissions

CHALLENGE

Regular changes to the feed blending ratio required considerable time and effort to calibrate the process simulation models, preventing the refinery from leveraging the full value of their process simulation solutions.

SOLUTION

Engineers deployed online process simulation models, built with Aspen HYSYS®, that would automatically calibrate themselves regularly to gain real-time insights into yields, properties and equipment KPIs across the entire refinery.

VALUE CREATED

- Consistent access to a well-calibrated simulation of process units eliminates the need for frequent model updates.
- The ability to maintain the accuracy of refinery planning models helped **achieve additional gains of \$0.02 per barrel** through enhanced operational plans.
- By leveraging the solution as a real-time advisory system, the refinery expects to **reduce GHG emissions by 5%.**



Challenges

HD Hyundai Oilbank, a major refinery in South Korea, has a refining capacity of 690,000 barrels per day and supplies oil products and services through more than 2,300 gas stations nationwide. The main petroleum products they produce include gasoline, diesel, kerosene, jet oil, LPG and naphtha. The refinery changes its feed blending ratio every two days, requiring engineers to spend considerable time and effort calibrating the process simulation models before each use. This frequent calibration hindered their ability to fully leverage the value of their process simulation solutions.

Insights from a well-calibrated, rigorous process simulation solution are critical for multiple departments across the refinery:

- **Refinery planners** need these insights to quickly and efficiently update their planning models when they identify gaps between plans and actuals, and to better predict the effect of crude blends on throughput.
- **Technical services engineers** require a well-calibrated simulation model that reflects the actual operating conditions of the refinery to conduct “what-if” analyses and monitor equipment and catalyst performance.
- **Process control engineers** depend on updated process simulation models to determine and set the most optimal limits for the controlled variables (CV).





Solution

The engineering team at Hyundai Oilbank addressed this challenge by deploying online process simulation models, built with Aspen HYSYS®, for seven process units across the refinery. These units included the crude distillation unit (CDU), vacuum distillation unit (VDU), fluid catalytic cracking (FCC), mild hydrocracker (MHC), residue desulfurization (RDS), solvent deasphaltene unit (SDA) and propylene recovery process (PRP). Each simulation model was connected to the refinery data historian and set to automatically calibrate every two hours to reflect the actual operating conditions of the plant.

The solution provided real-time insights into yields, properties and equipment KPIs using rigorous online simulation models. It also wrote the calculated real-time KPIs back to the data historian, ensuring the ready availability of historical data for equipment KPIs and more. The results reflected real-time feed blending ratios, with predicted yields for key products within +/- 2-3% of the actuals.

These insights were made available through intuitive visualization dashboards, easily readable by all stakeholders in the refinery. The solution offered visibility into KPIs such as yields and properties of key process streams, performance of pumps and compressors, heat exchanger efficiency, fouling

tendency of heat exchangers, tray efficiencies and more. Key components of the solution, including the various Aspen HYSYS simulation models, were hosted on Amazon Web Services (AWS) cloud servers.

Value Created

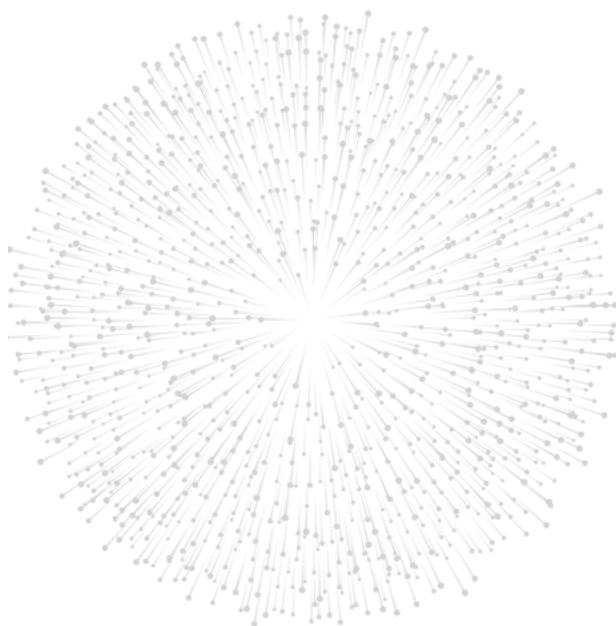
The solution ensured that the refinery team consistently had access to a well-calibrated simulation of their process units, eliminating the need for frequent model updates and saving approximately \$5,000 each time an update would have been required.

For example, process engineers could now perform “what-if” analyses, such as predicting the effect on refinery yields from the introduction of a new crude, at any time. Planners could reduce the time taken to update their planning models from up to eight weeks to just two days. The improved operational plans developed using these updated planning models helped them achieve additional gains of \$0.02 per barrel.

Additionally, by leveraging the solution as a real-time advisory system, the refinery was able to optimize the operation of the process units and expects to reduce greenhouse gas (GHG) emissions by 5% from current levels. Specifically, for the PRP unit, the solution helped control engineers determine new setpoints

for key process variables. This resulted in a 0.1% increase in propylene recovery, improving propylene recovery to 99.8% and reducing steam consumption by the turbine running the propylene compressor by 0.65%.

Furthermore, equipped with additional data from the online simulation models, the team developed a comprehensive offline refinery-wide model in Aspen HYSYS, which they can leverage to accurately predict the effects of new crude feed on refinery yields. Encouraged by the gains achieved with the solution, the refinery also plans to deploy online simulation models for its delayed coker, hydrocracker, platformer and BTX unit.





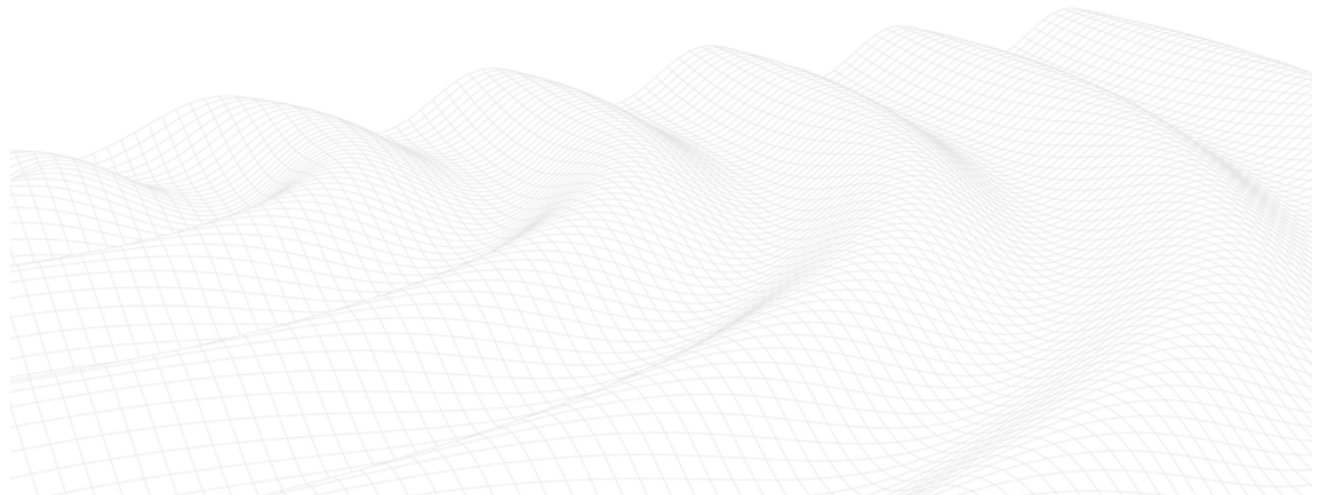
Conclusion

The implementation of online process simulation models at Hyundai Oilbank has significantly enhanced the refinery's operational efficiency and decision-making capabilities. By ensuring consistent access to well-calibrated simulations, the refinery team has eliminated the need for frequent updates and gained ability to perform real-time "what-if" analyses and rapidly update planning models, leading to significant cost savings and a reduction in GHG emissions.

With these results in hand, Hyundai Oilbank plans to expand the deployment of online simulation models to additional process units, further driving operational excellence and sustainability.

If you are interested in learning how you can deploy your Aspen HYSYS simulation models online, please [check out this recording](https://www.aspentech.com/en/resources/on-demand-webinars/deploy-simulation-models-online-easily-gain-unrivalled-process-insights) of AspenTech experts explaining the industry's best practices.

<https://www.aspentech.com/en/resources/on-demand-webinars/deploy-simulation-models-online-easily-gain-unrivalled-process-insights>





About Aspen Technology

Aspen Technology, now part of Emerson, is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance life-cycle. Through our unique combination of deep domain expertise and innovation, customers in asset-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

[aspentech.com](https://www.aspentech.com)

©2025 Aspen Technology, All rights reserved. AT-4186

