



**Global Supermajor Deploys  
Aspen PIMS-AO™ Globally**





“Overall with Aspen PIMS-AO, we can run more cases and still have more time to analyze the results. We want our engineers using their intelligence and skills to make decisions and analyze data, not setting up cases and waiting for the solution. This allows us to make better decisions and has resulted in more profitable operations.”

Senior Technology Advisor,  
Global Supermajor



## CHALLENGE

Utilize best-in-class technology to improve production planning in global refineries and chemical plants.

## TECHNOLOGY

Aspen PIMS-AO provides a proprietary optimization engine, which improves solution quality and speed compared to existing technology, resulting in better business decisions.

- Quality: Solver is expected to find the best (very good) solution
- Robustness: High likelihood that solver will converge to a solution
- Speed: Faster run time

## BENEFITS

**Higher refining and steam cracker margins from better optimal solutions**

- New insights from deeper analysis of opportunities and decisions
- Increased confidence in results with reduced occurrence of local optima
- Enhanced conversations with traders and better understanding of planning signals

One of the largest globally integrated upstream, downstream and chemical companies uses technology and innovation to help meet the world's growing energy and chemical needs. Since this company is committed to being the world's premier petroleum and petrochemical company, they continuously evaluate new technology to support their goals of superior financial and operating results while simultaneously adhering to high ethical standards.

As part of this ongoing technology evaluation, the company explored opportunities to specifically improve production planning decisions. Being especially thorough, this company evaluated not only AspenTech solutions, but also other suppliers. **After a comprehensive evaluation, the company adopted Aspen PIMS-AO (Advanced Optimization) at more than 15 refining and petrochemical sites around the world, including multi-plant and integrated refinery and chemical plant models.** Aspen PIMS-AO significantly improved refining and steam cracker margins by enabling improved raw material evaluation decisions and better prediction of steam cracker unit yields. It also delivered the ability to run and analyze more cases faster and provide improved run plan signals to operations.

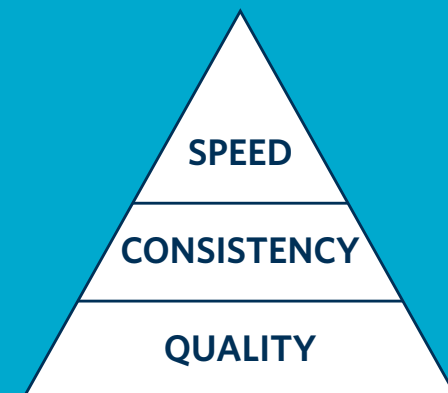
## Evaluation Process

Three main factors needed to be met for the company to consider Aspen PIMS-AO. This included, in priority order, the solver being able to find the best solution (quality), converge almost every time (consistency) and run as fast as possible (speed). As shown at right, the solution quality is the most important factor, illustrated as the foundation of the pyramid.

The company assigned several Ph.D. mathematicians and chemical engineers to conduct early evaluation. They determined that the software's performance was by design both repeatable and demonstrable.

After Aspen PIMS-AO passed the technical evaluation, the next criterion was to generate increased value to justify migration and software cost. To do this, the company engaged actual business users at two of its integrated refining and chemicals sites for pilot evaluations. The planners conducted side-by-side testing of Aspen PIMS™ and Aspen PIMS-AO, with support from the project team, which revealed that Aspen PIMS-AO enabled more profitable business decisions across a range of test models and cases. These tests with pilot users translated PIMS-AO's new technical capabilities into improved business decisions.

**“Project sponsors said, ‘OK, the solutions are better and Aspen PIMS-AO is faster, but can you actually make more money with Aspen PIMS-AO?’ The second phase of our testing proved yes, we can... and we did. Then, once we found out how much more value it created, the project sponsors pushed us to deploy it as fast as possible.”**



**“Aspen PIMS-AO enabled better prediction, which gave different feed selection signals to the cracker. These different signals resulted in significant and measurably higher margins at the cracker.”**

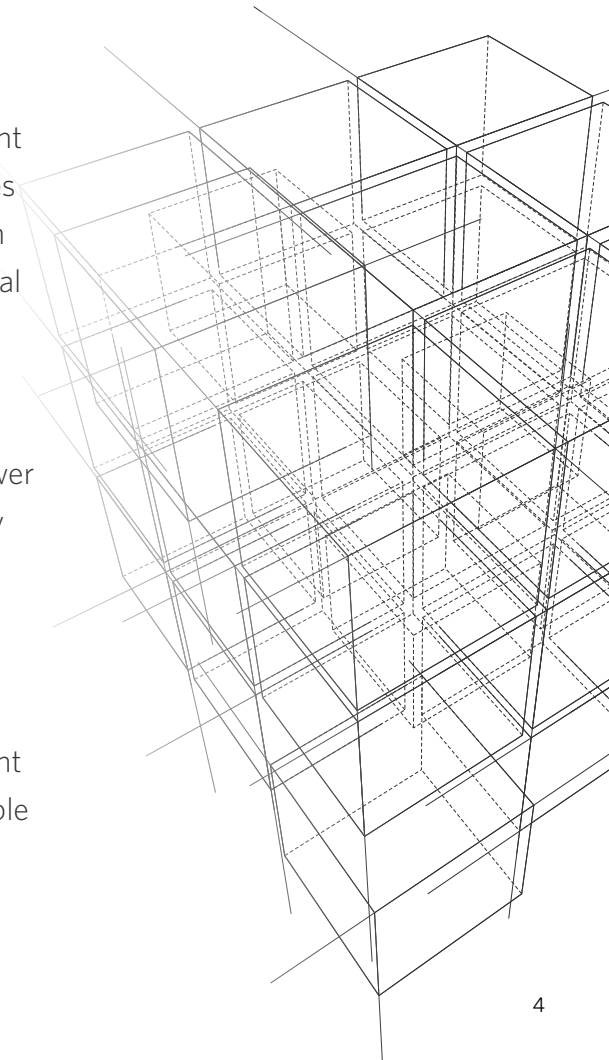
**Senior Technology Advisor, Global Supermajor**

The company improved raw material evaluation decisions by running and analyzing more cases, and improved run plan signals compared to prior practices. For example, Aspen PIMS-AO enables users to discover a different crude selection that's a better fit for current operations, or recommend a different optimum number of furnaces to run on naphtha based on the improved prediction of steam cracker yields. With the lighter cracking slates in the U.S. Gulf Coast and Asia-Pacific regions, these nonlinear yield models were crucial to determine the optimal mix of gas feeds (ethane vs. propane). These pilot tests provided the basis for global deployment of Aspen PIMS-AO.

Aspen PIMS-AO also enabled a number of new capabilities because the results came faster and contained fewer inferior solutions (local optima). For example, planners could focus on the most impactful decisions, especially investigating marginal capacity tiers and marginal grades. Furthermore, the company gained understanding of supply curves and breakpoints for feedstock purchases and product sales. They also evaluated uncertainty in basis items that influence decisions and used integrated site models for run plan decisions.

These capabilities ultimately resulted in higher margins and greater profitability. The company gained important new insights from deeper analysis, as well as increased understanding of and confidence in results, and was able to engage in enhanced conversations with traders.

During evaluation and deployment, the company met regularly with AspenTech's product management, customer support and research and development representatives to provide feedback and address issues.



# Challenges and Solutions

The main challenges the company faced prior to and during the evaluation included proving Aspen PIMS-AO generated increased value, especially through feedstock evaluation and product planning signals to operations. Additionally, there was also a business challenge to increase model solve speed.

Aspen PIMS-AO solved these challenges and demonstrated additional value through:

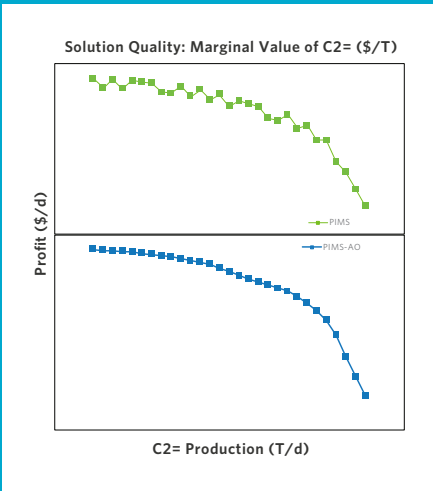
- Proprietary optimization engine: The company stated that the “new math formulation and optimization engine improve solution quality.”
- Parametric analysis: Testing price and availability uncertainty (market changes) enabled by the streamlined case generation and increased solution speed
- Global optimum (proprietary algorithms): Confirmed that Aspen PIMS-AO reduces occurrence of local optima (see chart at left)
- Improved feedstock selection for steam crackers with better predictions of furnace yields

## Project Best Practices

The company also utilized best practices that enabled deployment of Aspen PIMS-AO at more than 15 sites globally. The team used a structured project approach for software and modeling activities. They tested and migrated models to the new platform, utilizing a core team of experienced users to be more efficient. Side-by-side testing between Aspen PIMS and Aspen PIMS-AO was important to identify expected business value. Tiered deployment organized by region allowed the core team to focus their efforts.

## Path Forward

AspenTech continues to work with this customer, especially on testing of new and future versions of the Aspen PIMS Family. AspenTech continues to provide support as they use Aspen PIMS-AO for their models for their downstream, refining, and petrochemicals businesses.



The company studied the results of the solver and observed local optima in their complex models. The jagged line at top represents local optima, whereas the smoother line below shows that all the solutions were continuous and robust.



## About Aspen Technology

Aspen Technology (AspenTech) is a leading software supplier for optimizing asset performance. Our products thrive in complex, industrial environments where it is critical to optimize the asset design, operation and maintenance lifecycle. AspenTech uniquely combines decades of process modeling expertise with machine learning. Our purpose-built software platform automates knowledge work and builds sustainable competitive advantage by delivering high returns over the entire asset lifecycle. As a result, companies in capital-intensive industries can maximize uptime and push the limits of performance, running their assets safer, greener, longer and faster. Visit [AspenTech.com](https://www.aspentech.com) to find out more.

