

Integrated Refinery and Petrochemical Complex Finds USD 200 Million/Yr in Savings

Open communication paves the way to reduce capex and opex

Key Benefits

- Reduced CapEx by USD 200 million/year
- Identified improvement opportunities worth USD 200 million/year

Background

- Integrated refinery and petrochemical complex in Asia
- Wanted to maximize high value products

KBC Solution and Results

- Planned and executed a design review study
- Maximize high value products
- Develop flexible design which can handle different sensitivities
- Best-in-class energy efficient design
- Optimized integrated complex product slate

Client Challenge

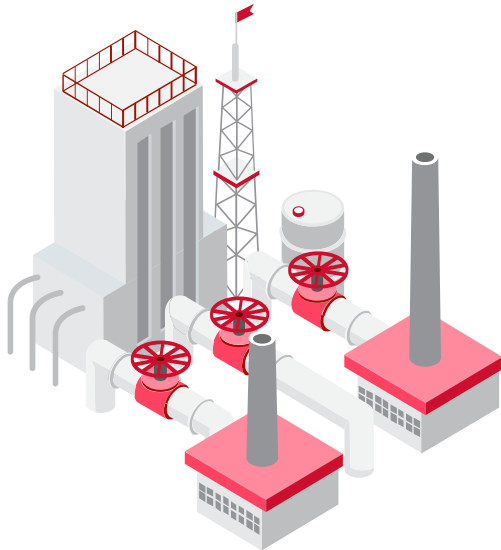
An operator in Asia was in the process of integrating their refinery with a petrochemical complex that would produce a range of products, including fuels that meet BS-VI standards. They wanted to increase profits by maximizing the petrochemical high value products. In addition, the key objective was to get to a net 'zero bottom', energy efficient, and environmentally friendly, integrated complex.

To help them meet this goal, the owner engaged KBC as their technical advisor to optimize the overall complex. The operator's expectation for this role was to get advice in planning the optimal configuration and creating the best-in-class design in terms of operability and flexibility. The objective was to ensure that client could develop and realize the project in a smooth, professional, and technically acceptable manner with a reduced work recycle at a later stage to minimize cost.

The Solution

The KBC team kept the objectives and goals of the project as the focal point. Since communication is critical for any successful project, the KBC team put together several ideas to maintain open communication channels.

KBC developed an effective communication protocol with weekly reports and engaged with all key stakeholders. Managing the



schedule for multiple parties was a big challenge. The team was able to maintain some buffer by floating resources to accommodate the multiple meetings. They also suggested the client designate a representative for each work stream to facilitate open channels and manage expectations.

KBC used the concept of a KBC/Client one-team approach to manage the licensor/project management consultant (PMC). They created custom reports per client requirement for licensor evaluation. Based on interactions with the individual process licensor and the PMC, the team identified many improvement opportunities.

KBC did the economic evaluation of all opportunities using the LP model which was updated based on the final basic engineering design package for all the process units. The team ran various economic scenarios to optimize the refinery product slate and maximize petrochemical products.

KBC's approach for identifying these opportunities included optimization of yield and energy and proposed design improvements which can improve complex flexibilities, and use of over design margins of process units.

The opportunities proposed ranged from design changes for optimization, capital expenditure (CapEx) reduction, operating expense (OpEx) reduction, and yield optimization to ideas for potential minor/moderate capital upgrades to improve the complex profitability. The methodology used was a combination of LP and simulation modeling. This depicted the complete representation of the whole integrated complex from which opportunities were evaluated to determine technical feasibility and economic benefits.

The team facilitated implementation by bridging the goals and objectives between the various groups into an efficient and streamlined process. KBC minimized recycle and rework to minimize costs and improve the schedule as the project progressed.

Results

KBC used its people, tools, and methodologies to provide the operator with critical insights across unit and system boundaries to ensure operability was part of the focus. KBC's evaluation methodology ensured that the systems, when integrated, would operate with the intention and objectives as per the design basis and goals of the operator.

The KBC team identified economic improvement opportunities worth USD 200 million/year. The opportunities included crude selection, optimized stream routing, especially those integrated with the steam cracker complex, turnaround planning optimization, and energy improvement schemes. KBC also reviewed gasoline pool feasibility and suggested mitigations to achieve the same.

KBC also identified reduction ideas worth USD 200 million among different units, utility, and off sites system by optimizing the overall complex. This included re-designing of the complex power system to improve reliability and reduce OpEx of the complex.



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