

CASE STUDY



Major Korean Chemical Producer Significantly Increases Plant Capacity and Reduces Energy Usage

"The aspenONE® Engineering suite was integral in developing the solutions used to revamp the 1,3 butadiene plant. Using aspenONE expedited the optimization process and led to the quick implementation of improvements."

- Sungchul Yoo, General Manager, LG Chem



LG Chem is the largest chemical enterprise in Korea and holds a substantial market share in the chemical processing industry. It is a major producer of ethylene, xylene, propylene, and 1,3 butadiene.

Recently, LG Chem's Yeosu plant management was challenged to explore reconfigurations to increase 1,3 butadiene production capacity and improve energy performance. Any process revamps were to be achieved without major equipment upgrades or replacements.

LG Chem increases 1,3 butadiene production capacity by 15% and saves energy through heat integration using Aspen Plus®, Aspen Energy Analyzer, and Aspen Exchanger Design and Rating.

CUSTOMER PROFILE - LG Chem, Ltd. - Chemicals

CHALLENGE

Increase production of 1,3 butadiene by improving plant capacity and reducing energy consumption site-wide.

SOLUTION

Aspen Plus provided solutions for debottlenecking equipment, Aspen Exchanger Design and Rating rated equipment capacity, and Aspen Energy Analyzer performed pinch analysis to reduce excessive energy usage.

BENEFITS

- Achieved a 15% increase in plant capacity for 1,3 butadiene production
- Eliminated almost all import of 1,3 butadiene into plant
- Successfully integrated and sequenced process streams to save significant energy costs

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In order to analyze its process and explore optimization of existing resources in the plant, LG Chem turned to Aspen Plus, Aspen Energy Analyzer, and Aspen Exchanger Design and Rating software. Using these products, LG Chem was able to streamline the workflow in performing pinch analysis, column targeting and sequencing analysis, and equipment ratings—helping them to consider a range of optimization scenarios. This, in turn, led to the fast implementation of the true best-case revamp.

ACHIEVING INCREASED PLANT CAPACITY FOR 1,3 BUTADIENE PRODUCTION

LG Chem utilized Aspen Plus to develop detailed simulation models of the 1,3 butadiene plant and employed the integrated Aspen Exchanger Design and Rating models to rate existing process equipment in order to determine available spare capacity. Using the simulation models, methods to debottleneck both the extractive distillation column and fractionator were successfully developed. Upon rerating, it was determined that the debottlenecking led to spare production capacity increases of 13% and 17%, respectively, for the extractive distillation column and the fractionator. Overall, the plant's best target capacity was identified to be 15% greater than it had been before, achievable with only a small additional capital investment. From this increase in capacity, LG Chem's Yesou plant has eliminated most of its import of 1,3 butadiene and now produces most of the chemicals needed in-house.

REDUCING PLANT-WIDE ENERGY USAGE

To reduce energy usage and costs, LG Chem turned to Aspen Energy Analyzer to automate pinch analysis towards producing a detailed heat integration of process streams. The Aspen Plus model constructed of the 1,3 butadiene plant was able to be quickly analyzed in Aspen Energy Analyzer. The heat integration in Aspen Energy Analyzer showed that by rearranging the path of a solvent stream loop, the energy in the loop could be recovered and used for heating purposes elsewhere in the process to reduce the fresh hot utility need. By recycling energy from the solvent loop, the final temperature of the stream before passing through a final cooler was drastically reduced from 70°C to 51°C, which ultimately reduced the required quantity of cold utility in the cooler. Excessive steam venting was also eliminated due to a new usage for steam in the process being identified.

LOOKING AHEAD

The use of the aspenONE Engineering suite proved to be successful in increasing 1,3 butadiene production capacity and reducing energy usage in LG Chem's Yeosu plant. LG Chem continues to utilize AspenTech products to simulate, monitor, and optimize plant performance at Yeosu and other sites, while AspenTech continues to innovate its product offerings to further help the chemical process industry optimize efficiency and maximize profits.

AspenTech is a leading supplier of software that optimizes process manufacturing — for energy, chemicals, engineering and construction, and other industries that manufacture and produce products from a chemical process. With integrated aspenONE® solutions, process manufacturers can implement best practices for optimizing their engineering, manufacturing, and supply chain operations. As a result, AspenTech customers are better able to increase capacity, improve margins, reduce costs, and become more energy efficient. To see how the world's leading process manufacturers rely on AspenTech to achieve their operational excellence goals, visit www.aspentech.com.

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