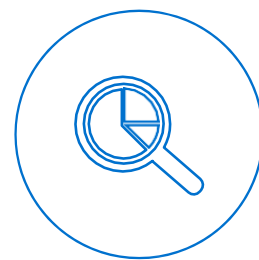


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On-Purpose Propylene in an Era of Uncertainty

Report Overview

The trend of cracking light feedstocks has reduced the supply of propylene from steam crackers and increased the need for on-purpose propylene. As there are a number of routes to propylene, recent plant announcements have included a mix of feedstocks and technologies: coal, natural gas and methanol (via MTP), ethane (via cracking, dimerization and metathesis), and propane (via PDH). Over the next decade, Nexant forecasts that *new on-purpose propylene capacity will exceed new steam cracker and refinery supplies of propylene by over two-to-one*, resulting in a major shift in the global cost curve.

In China, new on-purpose propylene capacity is slated to include a mix of 10 million tons per year of domestic coal-based MTO/MTP units, hybrid MTO/MTP units based on imported methanol, as well as 6 million tons per year of PDH capacity using imported propane. In the Americas, there have been several announcements of new PDH capacity, totaling over 4 million tons per year, plus BASF's announcement of a world-scale methane-to-propylene complex.

With the turmoil in the price of crude oil, the price spread between propylene and propane in the United States has declined by over 30 percent since November 2014. Yet, the economics of PDH (as well as MTO/MTP) are still favorable, so this mix of technologies and feedstocks begs the question:

With the uncertainty surrounding future oil prices, which on-purpose propylene technology is best in a given region in the long-run?

Other Key Questions Addressed:

- Can "hybrid" on-purpose propylene capacity, using U.S. shale gas to produce methanol for export to China for methanol-to-olefins (MTO) units, be successful?
- Which feedstock and value chains will be leaders and laggards regionally and globally after these new on-purpose propylene plants are completed?
- What is the likely impact on these projects of oil price volatility? How does the ranking shift with oil at \$50/bbl, at \$85/bbl, or \$120 per barrel?
- What will the propylene cost curve look like regionally and globally after the new on-purpose propylene plants are completed?
- What are the key issues that a project developer in each region should consider before undertaking an on-purpose propylene project?

Subjects Addressed

Forecast the Supply/Demand Balance and Prices for on-purpose propylene feedstocks using Nexant's World Gas Model and Petrochemical Simulator

The prices and supply of key on-purpose propylene feedstocks (coal, methane, ethane, and propane) and process co-products are forecast for North America, Middle East, and China to 2030 under three oil price scenarios.

Comparative Economics for steam cracking versus on-purpose propylene technologies for North America, Middle East, and China

Report includes the regional cost of production using conventional, on-purpose and hybrid on-purpose propylene technologies. Nexant provides critical sensitivity analyses for feedstocks prices and forecast co-product values using three crude oil price scenarios.

The objective of this special report is to carefully examine, in a volatile crude oil environment, the current and future market dynamics, technology and economics for feedstocks, olefins, and propylene in particular. This report identifies which route to on-purpose propylene is advantaged in various regions of the world and the issues that might impact decision making in an era of uncertainty.

This study uses Nexant's cost of production models, proprietary industry simulators, and best critical thinking to predict which technology will be the low-cost on-purpose propylene process in 2020 and 2030 by region, as well as on a delivered cost basis (for polypropylene) to coastal China.

The report provides a valuable resource for strategists, operators, investors, and customers in deciding how to respond to a major shift in propylene availability and supply.

For information regarding the special report, ***On-Purpose Propylene in an Era of Uncertainty***, please contact STMC@nexant.com.

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