Abstract

Propylene is one of the largest volume petrochemicals, with a current worldwide production capacity of around 120 million metric tons for polymer and chemical grades. The industry is somewhat unique considering that most propylene is manufactured as a by-product from either steam cracking or refining operations. Propylene was produced almost exclusively as a by-product until 10–15 years ago. The supply landscape has changed considerably since then, with on-purpose propylene production technologies now responsible for roughly 20% of global supply. The rapid build in on-purpose propylene capacity has largely been driven by slower growth in supply from steam cracking coupled with continued strong demand.

This process summary reviews the key technology features and presents detailed process economics for the principal routes to produce propylene, including both by-product and on-purpose technologies. The following propylene technologies are included:

- Propylene from wide-range naphtha, max. propylene, front-end depropanizer with gas turbine driver
- Propylene, polymer-grade from refinery-grade propylene
- Propylene from propane by the CB&I/Lummus CATOFIN® process
- Propylene from propane by the UOP Oleflex™ process
- Propylene from propane by the Uhde STAR® process
- Coal-to-propylene process by Siemens gasifier
- Lignite-to-propylene process by Shell gasifier
- Methanol-to-propylene by the Lurgi MTP™ process
- Propylene production by the JGC/MCC DTP™ process
- Propylene from ethylene via dimerization and CB&I/Lummus Olefins Conversion Technology (OCT)
- Propylene from the KBR Superflex™ process

Given that feedstock prices can fluctuate greatly over time, a traditional process economics snapshot comparison for a particular time and region can often be misleading if applied to investment decisions. For investment purposes, using historical process economic comparisons over a long period of time provides a better basis. To address the impact of feedstock price fluctuations, this process summary is accompanied by an iPEPSpectra™ interactive data module that allows for quickly comparing historical process economics of competing technologies in several major regions. The iPEPSpectra™ module uses Microsoft Excel pivot tables and is a powerful interactive tool for comparing process economics at various levels, such as variable costs, plant gate costs, full production costs, and capital costs. An iPEPSpectra™ historical economic comparison provides a more comprehensive assessment of competing technologies and enhances investment decisions.
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