



Polyolefins Technology Report - 2022

Polyolefins Technology Report - 2022 is one in a series of reports published as part of Nexant's Sector Technology Analysis program.

Overview

Polyethylene and polypropylene are the most common polyolefins that are commodity and specialty plastics, which are used globally in a wide range of market segments, including packaging, consumer products, agriculture, pipe and conduit, storage containers, building and construction, and automotive.

Three primary forces drive technology development: product performance (improved properties, new applications), process technology (increased plant scale, simplified design), and process chemistry (new catalysts, increased yield). This report provides an updated overview of the technological and economic aspects of the technologies used to produce low density polyethylene (LDPE), linear low density polyethylene (LLDPE), high density polyethylene (HDPE) and polypropylene (PP), covering more than 30 technologies.

Commercial Technologies

The report covers all major licensed technologies as well as technologies that are not licensed but are important to the polyolefins industry. Profiles, covering recent developments, background (including lists of plants employing the technology), and process description, are presented for technologies developed by:

- LDPE – Tubular: ExxonMobil, LyondellBasell, SABIC, Versalis
- LDPE – Autoclave: ExxonMobil, ECI Group/Repsol, LyondellBasell, Versalis
- LLDPE (Dedicated and Swing) – Gas Phase: INEOS, LyondellBasell, Mitsui, Univation
- LLDPE (Dedicated and Swing) – Solution: Borealis, Dow, NOVA
- HDPE (Dedicated) – Ziegler Slurry: LyondellBasell, Mitsui
- HDPE (Dedicated and Swing) – Slurry Loop: Borealis, Chevron Phillips, INEOS
- HDPE (Dedicated and Swing) – Gas Phase: LyondellBasell, Univation
- Polypropylene – Gas Phase: INEOS, Japan Polypropylene, Lummus Novolen Technology, LyondellBasell, Sumitomo, W. R. Grace
- Polypropylene – Bulk: Borealis, ExxonMobil, LyondellBasell, Mitsui

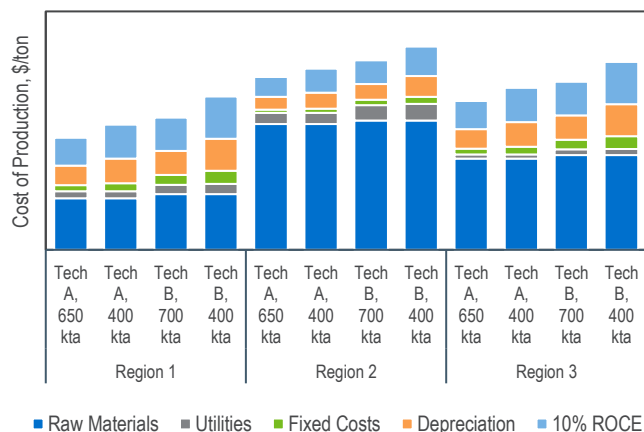
Process Economics

Detailed cost of production estimates are developed on a 1Q22 basis for plants located in the United States Gulf Coast (USGC), coastal China, and the Middle East for various technologies for the following resin types:

- LDPE: homopolymer LDPE, EVA (18% VA), EVA (28% VA)
- LLDPE: conventional LLDPE film (butene-1, hexene-1, octene-1), second generation (metallocene/single site and easy processing) LLDPE film (butene-1, hexene-1, octene-1)
- HDPE: homopolymer injection molding grade, copolymer bimodal film grade, copolymer bimodal pipe grade
- Polypropylene: homopolymer injection molding grade, impact copolymer automotive grade

Estimates reflect the current capital cost environment and state-of-the-art plant scale. Larger scale plants offer a cost advantage over smaller scale plants.

Effect of Plant Capacity on Cost of Production





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Technology and Costs Programs

NexantECA's Technology and Costs Programs examine the impact of new, emerging and improved industrial technologies on the comparative economics of different process routes in various geographic regions, as well as the cost competitiveness of individual production plants.

These include:

- Technoeconomics – Energy & Chemicals (TECH)
- Biorenewable Insights
- Cost Curves
- Sector Technology Analysis

Sector Technology Analysis

As part of the Technology and Costs Programs, NexantECA issues regularly a series of reports focusing on the technology developments and comparative economics within a particular industry sector.

The Polyolefins Technology Report, formerly known as the POPS Technology Report, is published on a biennial schedule and provides technology analysis for all polyethylene resins (LDPE, LLDPE and HDPE) and polypropylene in a single study. The report includes comparative process economics for all major licensed technologies, as well as technologies not licensed but important to the polyolefins industry. Factors within the industry and the external market that shape technology development and competitive positioning are also examined.

For more information, please contact
Technology@NexantECA.com or www.NexantECA.com



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Technology and Costs comprises the Technoeconomics – Energy & Chemicals (TECH) program, the Biorenewable Insights program (BI), and the new Cost Curve Analysis. These programs provide comparative economics of different process routes and technologies in various geographic regions.

NexantECA serves its clients from over 10 offices located throughout the Americas, Europe, the Middle East, Africa, and Asia.

Americas

Tel: +1 914 609 0300
44 S Broadway,
5th Floor White Plains
NY 10601-4425
USA

Europe, Middle East & Africa

Tel: +44 20 7950 1600
110 Cannon Street
London EC4N 6EU
United Kingdom

Asia Pacific

Tel: +662 793 4600
22nd Floor, Rasa Tower I
555 Phahonyothin Road
Kwaeng Chatuchak
Khet Chatuchak
Bangkok 10900
Thailand

For more information. please contact
Technology@NexantECA.com or www.NexantECA.com