



LLDPE is one in a series of reports published as part of NexantECA's 2020 Technoeconomics – Energy & Chemicals (TECH) program.

Overview

Linear low density polyethylene (LLDPE) is one of a number of polyolefins that are commodity plastics, which are used globally in a wide range of market segments including packaging, consumer, agriculture, and general industrial. LLDPE is produced from ethylene and a comonomer, typically butene-1, hexene-1, or octene-1.

This TECH report provides an updated overview of the technological, economic, and market aspects for LLDPE, including conventional and second generation resins. The following issues are addressed in this report:

- What are the major technologies for LLDPE production and how do they differ? Which ones can also produce HDPE? Which technologies are available for license?
- What comonomers are used and how does it affect the cost of production? How do the process economics compare across processes and different geographic regions?
- Who are the top 10 producers of LLDPE and how will this change over the next five years?
- What is the current market environment for LLDPE? How does its growth compare with other polyolefins? Where will new capacity be added?

Commercial Technologies

The major commercial routes for the production of LLDPE are gas phase, solution, and slurry/slurry loop. Many are swing processes that can also produce HDPE. The technologies are very mature, with licensors focusing on cost reduction, catalyst development, and product enhancement to differentiate their technologies. The scale of most processes has increased significantly, reducing operating and investment costs. Product enhancement efforts focus on improving the properties of LLDPE by itself and as a substitute for LDPE.

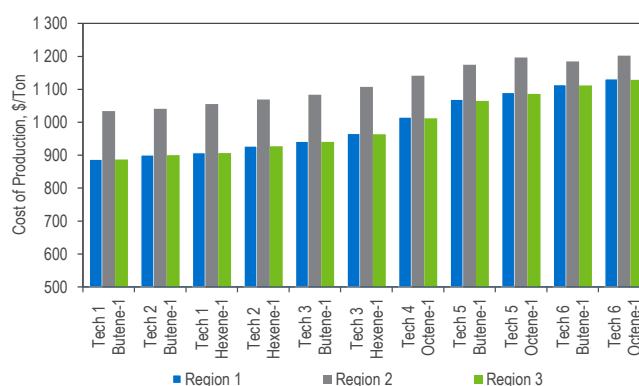
Technologies developed by Borealis (BORCEED and BORSTAR), Chevron Phillips (MarTECH), Dow (DOWLEX), INEOS (INNOVENE G), LyondellBasell (SPHERILENE S), Mitsui (EVOLUE), NOVA (SCLAIRTECH and Advanced SCLAIRTECH), and Univation (UNIPOL) are described and analyzed, with a

focus on recent developments. A list of licensees is included for each technology.

Process Economics

Detailed cost of production estimates for various commercial LLDPE technologies are presented for USGC, coastal China, and Middle East locations using market-priced ethylene. Estimates are developed for conventional, metallocene/single-site, and easy processing film grade resins, depending on the technology. In each region, the comonomer (butene-1, hexene-1, or octene-1) and the technology employed affected the relative cost of production.

Regional Cost of Production Comparison for Conventional LLDPE Resins



Commercial Overview

Global LLDPE consumption was 34.2 million tons in 2019. Film applications are the largest end-use, followed by injection molding, rotomolding, and extrusion. Due to COVID-19, demand is expected to be flat in 2020, slowing strong growth. Demand growth of 2.7 percent per year through 2024 is expected, with growth driven by the Asia Pacific region. An overview of the supply, demand, and trade of LLDPE on a global and regional (North America, Western Europe, and Asia Pacific) basis is provided in this TECH report, including demand by end-use and a capacity list for each region.

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- Chemistry
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- Regional supply and demand balances for product, including capacity tables of plants in each region
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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.

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