



## TECH Report 2018-2: High Density Polyethylene (HDPE)

High Density Polyethylene (HDPE) is one in a series of reports published as part of Nexant's 2018 Technoeconomics – Energy & Chemicals (TECH) program.

### Overview

High density polyethylene (HDPE) is one of a number of polyolefins that are commodity plastics, which are used globally in a wide range of market segments, including flexible packaging, pipe and conduit, storage containers, and automotive parts.

This TECH report provides an updated overview of the technological, economic, and market aspects of HDPE. The following issues are addressed in this report:

- What are the major technologies for HDPE production? How do the technologies differ? Which technologies are available for license?
- How do the process economics compare across processes and different geographic regions?
- Who are the top 10 producers of HDPE? How will this change over the next five years?
- What is the current market environment for HDPE? How does growth compare with other polyolefins? Where will new capacity be added?

### Commercial Technologies

Multiple processes are used for the production of HDPE. Ziegler slurry technologies employ dual reactors to produce a bimodal product with careful control of comonomer distribution to produce resins with excellent environmental stress crack resistance. The loop slurry processes were developed to focus on the production of medium density and HDPE resins producing quality broad MWD resins for blow molding and pipe applications. Gas phase processes were the first to produce linear low density polyethylene (LLDPE), but can swing to produce HDPE. With the development of a dual-site catalyst, bimodal resins can be made in a single gas phase reactor. Although typically focused on LLDPE film, solution processes are also used to produce HDPE resins.

Technologies developed by Borealis, Chevron Phillips, Dow, INEOS, LyondellBasell, Mitsui, NOVA, and Univation are described and analyzed, with a focus on recent developments.

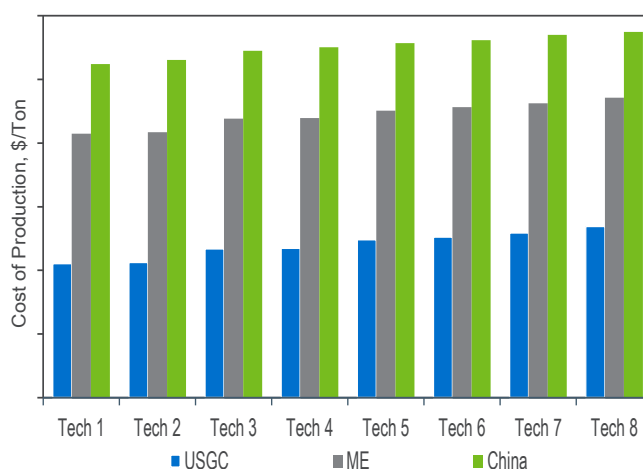
### Process Economics

Detailed cost of production estimates for various technologies are presented for USGC, coastal China, and Middle East locations. Estimates are developed for homopolymer injection molding, copolymer bimodal film, and copolymer bimodal pipe resins.

### Commercial Overview

Global HDPE consumption was more than 42 million tons in 2017 with blow molding and film applications the major end uses, followed by injection molding and pipe and conduit. A key driver for HDPE demand is substitution of materials such as glass, metal, and wood. With new global capacity, demand growth of 4.1 percent per year through 2022 is expected. An overview of the supply, demand, and trade of HDPE on a global and regional (North America, Western Europe, and Asia Pacific) basis is provided in this TECH report.

Regional Cost of Production Comparison for HDPE Injection Molding Resins





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