



TECH 2022-4: Bisphenol-A

Bisphenol-A is one in a series of reports published as part of NexantECA's 2022 Technoeconomics – Energy & Chemicals (TECH) program.

Overview

Technology for the production of BPA is quite mature, with several well-established developed and/or licensed processes.

Traditionally, BPA has been produced by the acid-catalyzed reaction with phenol and acetone using hydrochloric acid. However, today, most commercial technologies produce BPA through condensation via an ion exchange resin catalyst within single or multiple reactors.

Globally, the BPA industry continues to grow as BPA consumption into polycarbonate production has risen mainly fueled by the Asia Pacific region (mainly China and South Korea).

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

- Who are the main technology holders of BPA? Who licenses and/or owns its technology?
- What are some of the strategic and business considerations surrounding BPA?
- What are some of the recent development trends on the technology for producing BPA? How is polycarbonate waste recycled to BPA?
- How the process economics for IER or HCl catalyst-based BPA processes compare across several different global locations? How they compared to the economics of producing BPA via polycarbonate waste recycling? Which regions in the world provide attractive investment opportunities?

Commercial Technologies

BPA process technology is available for license from several companies, including Badger and Mitsubishi Chemical. Some producers also have their own proprietary technology which they do not license widely (e.g., Covestro, Mitsui Chemicals, and SABIC).

Some licensor-producers have entered into joint ventures (JV) with each other. For instance, Mitsui has a JV company with Sinopec: Shanghai Sinopec Mitsui

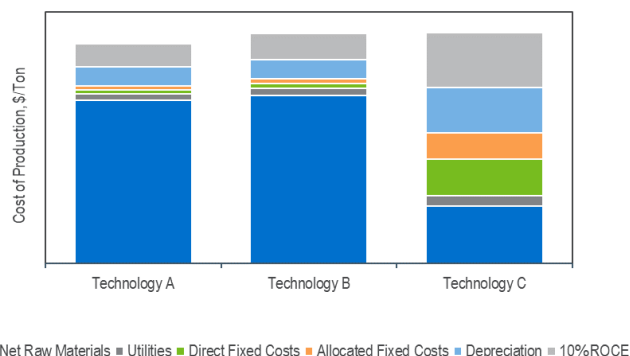
Chemicals (SSMC). Mitsubishi had a JV with Sinopec called Sinopec Mitsubishi Chemical Polycarbonate before it withdrew from it in 2021.

While polycarbonate is fully recyclable, it is a difficult process. Polycarbonate can be depolymerized by reacting it with phenol, in the presence of a catalyst, to produce its BPA monomer.

Process Economics

Detailed cost of production estimates for two different conventional and developing production routes to BPA are presented for USGC, Western Europe, China, and South Korea locations. Estimates are developed for stand-alone IER and HCl catalyzed or integrated (with cumene and phenol units) conventional commercial routes to BPA as well as BPA production from polycarbonate waste. Sensitivity analyses on feed pricing and economy of scale also developed. Additionally, a return on investment and investment attractiveness analysis for BPA production facility is provided for the commercial routes and four regions studied in this report.

Bisphenol-A Production Costs



Commercial Overview

Global BPA demand grew by 6.2 percent in 2021 to 6.6 million tons, a relatively strong year of growth following suppressed markets affected by the COVID-19 pandemic. Capacity growth has been moderate in the last decade, growing at an average annual rate of 3.2 percent since 2010. The most dramatic rates of capacity change have been in China and South Korea.

Supply, demand, and trade of BPA on both a global and regional basis are provided in this TECH report.

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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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