Benzene

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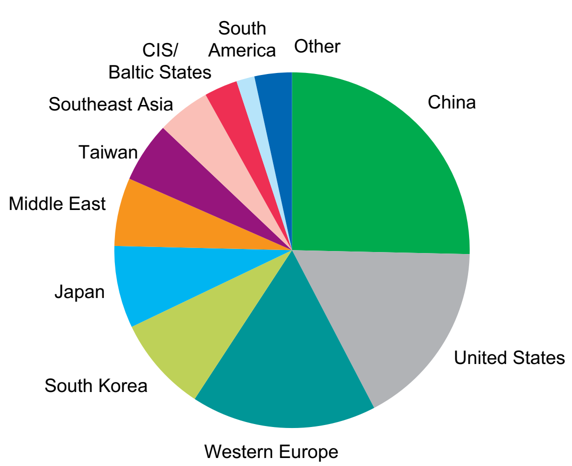
Abstract

Benzene is a large-volume commodity petrochemical that is primarily produced in oil refineries and steam crackers, or as a by-product of p-xylene production. It is normally recovered from aromatic hydrocarbon streams that also contain toluene and mixed xylenes. Benzene is produced primarily as a by-product; thus, its supply is not driven by global benzene demand but rather by demand for other products (gasoline, ethylene, p-xylene).

Benzene finds diverse applications within the chemical industry, serving as a building block for the synthesis of other chemicals. The primary chemicals produced from benzene are ethylbenzene, cumene, cyclohexane, and nitrobenzene; together these four end uses accounted for more than 90% of the global benzene market in 2016. Ultimately, benzene underpins several chemical value chains (e.g., styrenics, nylons, polycarbonate, phenol-formaldehyde resins, and polyurethanes); therefore, its consumption is broadly tied to the general economy. Benzene consumption growth has been increasingly linked to China, where the improvement in living standards is driving increased use of a wide variety of polymers and chemicals in the construction industry, for automotive applications, or for the production of diverse durables and consumables.

The following pie chart shows world consumption of benzene:

World consumption of benzene—2016



Source: IHS Markit

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Over the past five years, despite a gradually slowing economy, China has accounted for virtually all the additional benzene requirements globally; Chinese benzene consumption increased at an average rate of nearly 9% per year during 2011–16.

Contacts

Koon-Ling Ring · Koon-Ling.ring@ihs.com
Maria deGuzman · Maria.deguzman@ihs.com

During the same period, demand declined in all other regions except for North America and the Middle East, which posted modest growth of less than 0.5% per year.

Globally, benzene consumption is dominated by the production of two major derivatives: ethylbenzene and cumene. In 2016, these two markets accounted for nearly 70% of overall benzene consumption. Ultimately, benzene is used in a wide range of economic sectors, with the major ones being construction, electronics and appliances, packaging, transportation, consumer products, and medical.

Over the past decade, consumption has shifted from the West (Western Europe, North America) to the East (Northeast Asia, Middle East, Southeast Asia). China has become an increasingly important influence on the benzene market.

In 2016, Northeast Asia (primarily China) accounted for nearly half of the global production of benzene. In this region, significant refining and ethylene cracker capacity has been added to address rapidly growing car fleet sales (driving gasoline demand), as well as the diverse needs of a growing Chinese middle class. Of particular interest, large-scale p-xylene plants have been commissioned to feed the downstream polyester value chain; polyester fibers are in high demand in China, which has become the global center for textile and clothing manufacturing. Overall, the rate of benzene capacity addition has been very high in Northeast Asia (about 6.5% per year over the past decade), while global consumption growth has gradually slowed, mirroring the deceleration of the Chinese economy. Benzene operating rates have therefore declined, leading to lower margins and pressure on the higher-cost producers.

Over the forecast period, the performance of the Chinese economy will remain a vital driver for benzene consumption; however, slower growth will prevail through 2021. Overall, benzene consumption growth is expected to underperform world GDP growth. Additional benzene capacity is expected to be brought onstream, albeit at a slower pace, as the ongoing development of coal-based olefins units in China will constitute the major source of ethylene supply growth through 2021 but will not coproduce benzene. Despite the expansion of its benzene capacity base through new p-xylene and reforming units, China is still expected to import increasing amounts of benzene through 2021.

Global benzene consumption is forecast to grow at an average annual rate of 2–3% during 2016–21.

Contents

IHS Markit Customer Care

CustomerCare@ihsmarkit.com
Americas: +1 800 IHS CARE (+1 800 447 2273)
Europe, Middle East, and Africa: +44 (0) 1344 328 300
Asia and the Pacific Rim: +604 291 3600

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