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Report Abstract

Petrochemical Market Dynamics Feedstocks

Petrochemical feedstocks industry overview, crude oil, natural gas, coal, biological hydrocarbons, olefins, aromatics, methane

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Griffin House, 1st Floor South, 161 Hammersmith Road, London W6 8BS, UK
Tel: +44 20 7950 1600 Fax: +44 20 7950 1550

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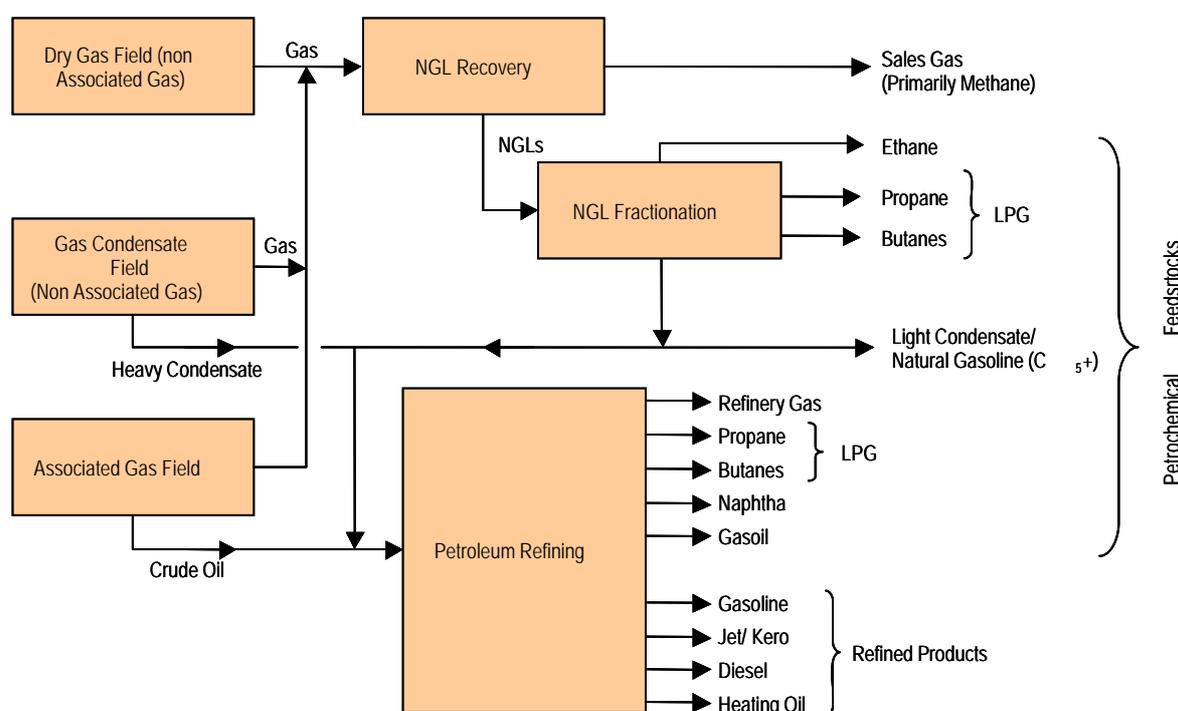
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FEEDSTOCK OPTIONS FOR THE PETROCHEMICAL INDUSTRY

A variety of feedstocks are used for petrochemicals production. Petrochemical feedstocks are generally produced from the refining of crude oil or the processing of natural gas. The figure below illustrates the conventional sources of petrochemical feedstocks. Recently, alternative process routes utilizing coal, biological hydrocarbons and unconventional natural gas, particularly shale gas, have gained more attention as potential feedstock sources. Other emerging sources include unconventional natural gas, predominantly from shale gas, and bio-based commodity feedstocks. This report highlights the global availability of both traditional and emerging chemical feedstocks.

Conventional Petrochemical Feedstock Sources



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The main sources of chemical feedstocks are obtained from crude oil and natural gas, and consist of methane, ethane, LPG, naphtha, and heavier streams such as gas oil and residual fuels. Crude oil and natural gas are extracted from underground reservoirs, while downstream refining of crude oil produces LPG, naphtha and various other fractions such as gasoline, kerosene and diesel. Coal has continued to be a significant alternative feedstock in comparison to liquids and gas feeds, with China leading the world in this respect due to its substantial and widespread coal reserves and production.

Due to growing supplies of unconventional sources, United States natural gas prices have fallen below crude oil equivalent which has resulted in a strong incentive to extract ethane from “cheap” natural gas. Reduced prices have also resulted in improved ethane and propane derived ethylene margins relative to naphtha which has restored some degree of cost advantage to the Gulf Coast region. A few years ago, minimal ethylene capacity additions were expected in North America, particularly in the United States where no new capacity developments were projected. However, with the anticipated amount of NGLs-rich shale gas, a number of chemical companies have announced their desires to take advantage of the new feedstock supply. Many have already switched their steam crackers to crack lighter feedstocks while some are proposing building new ethane-based steam crackers to handle the projected supply. This report examines areas with potential shale gas supply and its prospective impact on future chemicals production.

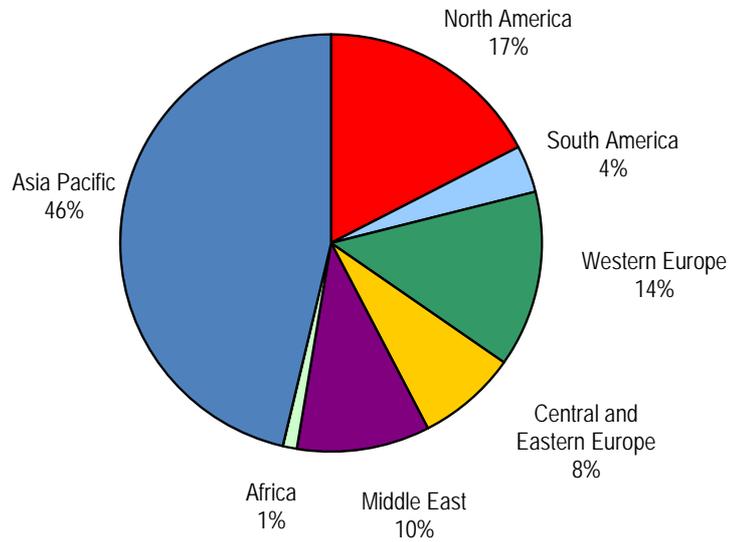
Much research and investment has been focused on bio-based fuels and chemicals, so that many applications are now well-understood for the various bio-feedstocks. Over the past decade, ethanol has been used as transportation fuel, mainly blended with gasoline. Light olefins can however also be commercially produced from ethanol to give ethylene, a major feedstock for other chemicals such as high density polyethylene, ethylene oxide, polystyrene etc. The report explores a variety of important bio-based commodity feedstocks, both primary and derived, for potential use in chemicals production. The ability to use alternative feedstocks is one key factor to achieve the lowest cost of chemicals production especially where feedstock prices have become highly volatile. However, continued large investments, advanced research and government support will be needed to enable commercial “green” chemicals production.

The petrochemical industry continues to be highly cyclical and commoditized, therefore finding ways to optimize production and minimize cost is important for success. The ability to use alternate feedstocks is one of the key elements in achieving the lowest cost of production, especially in an environment where feedstock prices have become highly volatile.

Feedstock Outlook

Naphtha continues to dominate the mix of feedstocks consumed in the production of olefins, aromatics and methane-based petrochemicals, especially in Asia. The refined product represented 51 percent of the estimated 653 million tons of global feedstock consumed in 2010 followed by methane and coal which had 14 percent and 11 percent, respectively. Global feedstock consumption is projected to rise through 2025 with the greatest proportion coming from naphtha and coal, increasing about 100 million tons and 70 million tons by 2025, respectively. Naphtha will remain the main feedstock for petrochemical production since the feed provides the greatest versatility as a feedstock and supply is expected to continue to be available from refineries operated to produce transportation fuels.

Global Feedstock Consumption by Region *Percentage by Region – 2010*



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Nexant's *Feedstock Chain Market Dynamics* report is part of the ChemSystems Petroleum and Petrochemical Economics (PPE) program of reports available for subscription on www.chemsystems.com.



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