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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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Nexant

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FEEDSTOCK OPTIONS THAT WILL SHAPE THE INDUSTRY

As the world becomes more technologically advanced, the demand of for chemicals has increased dramatically. These chemicals can be produced from a wide of feedstock materials including crude oil, natural gas, coal and biological hydrocarbon. Nexant has just released new ChemSystems analysis which addresses the feedstock requirements for basic chemical production, and addresses which feedstocks will be important to the industry going forwards.

The oil and gas industry produces hydrocarbons which are consumed in a wide range of varied applications. The major portion of hydrocarbon products is used as fuel for power, heating, and transportation with petrochemical feedstocks accounting for a relatively small proportion of the total. Chemical feedstocks obtained from crude oil and other hydrocarbons include naphtha, natural gas and liquefied petroleum gas (LPG). Crude oil and natural gas are extracted from underground "wells", while downstream refining of crude oil gives rise to LPG, naphtha and various other fractions such as diesel, gasoline and kerosene.

Over the past decade, coal has resumed its status as a significant alternative feedstock, after many decades where liquid and gas feeds have been preferred. With the significant and widespread coal reserves and a high growth rate of energy, steel and chemical consumption, China has been taking advantage of coal as a feedstock to reduce import requirements.

An increasing awareness of the impact of fossil fuel and coal use on the environment has resulted in a continual search for less polluting feedstocks. Demand for biological hydrocarbon such as ethanol has surged as it can be derived from sugar cane and other sources which are considered to be renewable. For the energy industry, biofuels involve dynamics that have not been seen before, such as demand driven by social and political issues rather than customers or economics. Biological hydrocarbon becomes more attractive under a high oil price although continued huge investments, advanced researches, new technologies, and government support will be required to enable commercial production.

Business Situation

The economic downturn which started in 2008 has affected the petrochemical industry dramatically. The collapse in petrochemical demand and a loss of business confidence also triggered industry wide de-stocking, and drastic cutbacks in petrochemical production. Signs of economic recovery started appearing in the second half of 2009, albeit slowly; with Chinese economic growth a key driver that acts as an accelerator or decelerator to the global economy.

The olefins industry nonetheless faces a massive capacity increase, coming to market just as consumption is considerably below expected levels. The bulk of the new investments are massive and highly advantaged plants in the Middle East. Most of the remainder are large and highly integrated plants in China, which benefit from optimised refinery/feedstock integration, low labour costs, and proximity to market. While almost all of these projects are going ahead without delay, some other less advantaged investments are being postponed or cancelled, and

large volumes of olefin and derivatives capacity are being shut down in mature, high cost regions such as Japan, Western Europe and the United States.

The aromatics industry is expected to slowly recovery from the current downturn. Aromatics demand growth in 2009 has partly been due to restocking, and partly due to economic growth in regions, such as China. The rebuilding of inventory in the value chain though is likely to be very slow. Styrene will continue to be the dominant end-use of benzene, accounting for about half of global benzene consumption.

In terms of C_1 chemistry, the methanol market suffered dramatic changes during 2008 and 2009. The continued weakness of the construction and automotive sectors in North America and Western Europe had a big impact on methanol consumption resulting in reduced demand for chemical uses. Technologically, there was some mitigation provided by "new uses" of methanol, in particular, DME in China for heating during the winter months and gasoline blending. Methanol is predominantly produced using natural gas and coal as feedstocks. This is typically steam reformed to provide syngas which is then converted to methanol.

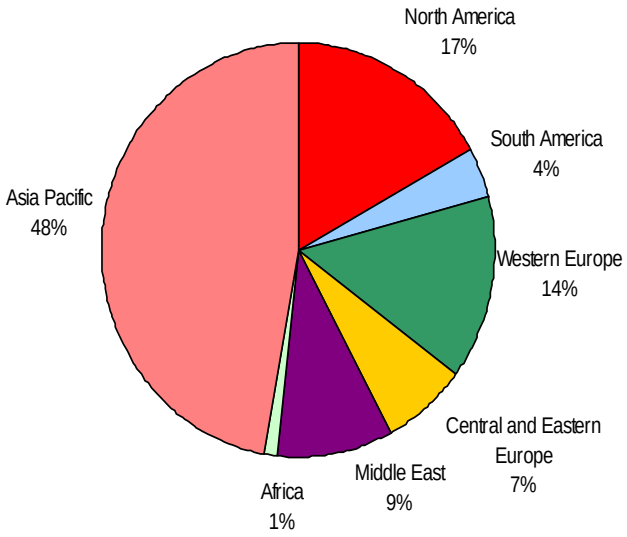
Like methanol, ammonia is produced from natural gas and coal via syngas. The ammonia industry has not escaped the turmoil seen in the world-wide chemical industry as a direct result of the worst global economic downturn. Fertilizer market conditions deteriorated rapidly through the second half of 2008, as a slowdown in sales, amid rising inventories, saw farmers delaying purchases in the expectation of further price reductions, volatility in commodity markets, and tightening financial conditions. Overall global ammonia production will steadily increase from new capacity addition coming on-stream with China alone contributing over half of this new capacity in the form of coal-based syngas units.

The petrochemical industry through all these changes continues to be highly cyclical and commoditised, and finding ways to optimize production and minimize cost is key to success. The ability to use alternate feedstock is one of the key criteria in achieving lowest cost production especially in an environment where feedstock prices have become highly volatile.

Feedstock Outlook

The world consumed over 600 million tons of feedstocks in 2009 in the production of these basic petrochemicals. Naphtha dominates the mix and represents half of total feedstock consumption followed by methane and coal, which together account for just over one quarter of feedstock consumption. Total global feedstock consumption is projected to reach 1 billion by 2025.

Global Feedstock Consumption by Region
(Percentage by Region – 2009)



Around 300 million tons of feedstock was consumed globally in 2009 in the production of ethylene, with naphtha by far the largest at almost two thirds total feedstock, followed by ethane 42 million tons and gas oil 38 million tons which together account for one quarter of total feedstock consumed. It is forecast that feedstock demand for ethylene alone will increase to exceed one half billion tons by 2025.

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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