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Report Abstract

Petrochemical Market Dynamics Aromatics

Aromatics industry overview, Markets, Supply/Demand, Plant Developments, Global trade patterns

May 2010

Nexant

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Report Abstract

Petrochemical Market Dynamics
Aromatics

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www.chemsystems.com

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

RECOVERY IN AROMATICS MARKETS REMAINS DIFFICULT

The polyester chain continues to drive the fortunes of the aromatics business as further investment in Asia and the Middle East expands the value chain in both regions. Aromatics supply meanwhile has been buffeted by the preference for light feedstocks at steam crackers, and weak gasoline demand reducing reformer production, which could be further constrained by increased ethanol mandates.

Extreme volatility in price and profitability of aromatics has been seen in the past two years. After a historic peak in the third quarter of 2008, average benzene prices plunged below naphtha feedstock prices in the first quarter of 2009, while *para*-xylene prices showed rapid recovery from a low point at the end 2008. Noticeable recovery in benzene demand led by Asia Pacific and China, subsequently supported price rises to a more reasonable level. Nevertheless, aromatics profitability has remained highly volatile, depending on relative naphtha and gasoline markets, while toluene conversion units faced difficulty due to minimal spread between benzene and toluene values.

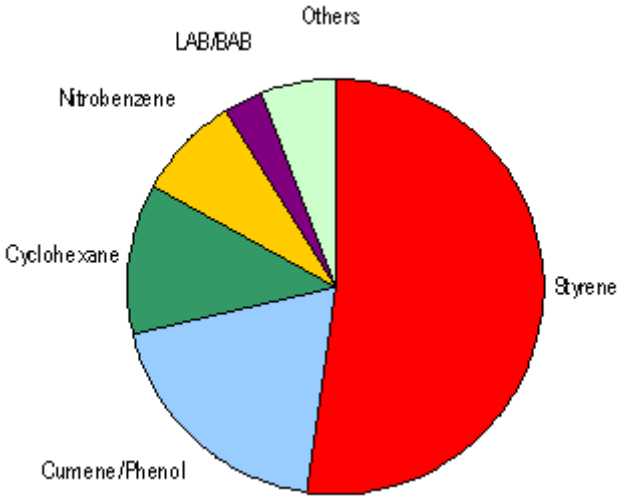
Relative stable growth of post consumer PET resin has given respite and some room for virgin PET and thus PTA and *para*-xylene demand to grow. Major PTA capacity additions in China have outweighed the impact of shut downs in the United States and Western Europe. However, despite decent growth in *para*-xylene demand, new capacity addition both in the Middle East and Asia Pacific continues to overhang the market. These new world-scale units are planned to run at higher rates in 2010, with several further new units are under construction. A flood of para-xylene supply seems inevitable in the next few years, placing pressure on producers with less competitive plants.

In the outlook, benzene demand will continue to track GDP growth rates, (a relationship that was disrupted in 2008), at around three percent. *para*-Xylene consumption is expected to rise faster than benzene but at less than historic rates, due to maturity in PET bottle markets. Despite the recovery seen for both aromatics, the current slate of new capacities is likely to delay full recovery to 2015.

Aromatics Demand

Global benzene consumption continued to decline in 2009. Major rationalisations of downstream units, particularly in the West, were driven by poor benzene-derived polymer demand from automotive and construction sectors. In the United States and Western Europe, more than two million tons of styrene capacity has been permanently shut down over 2007-2009, while significant production capacity of nitrobenzene and cyclohexane was also shut down or mothballed. In the outlook, nitrobenzene with robust MDI demand will be a major driver of benzene demand, albeit from a small base. Expandable polystyrene (EPS) will be the key drive of styrene consumption. Meanwhile, the slowing of PC penetration into new applications will decelerate the growth of cumene/phenol.

Global Benzene Demand, 2009



Global demand growth of *para*-xylene stalled in 2008, hit by the global financial crisis, soaring post consumer recycle of PET bottle and destocking along the value chain. 2009 saw global *para*-xylene demand recover, helped by lower crude oil prices, economic recovery and government stimulus packages around the world. Demand growth has again grown stronger than GDP, in line with the historic trend. The trend in growing recycle rates and the maturity of PET bottle market is expected to slow growth in the forecast.

Aromatics Supply

Benzene supply growth from pygas is concentrated in Asia Pacific, specifically China, Southeast Asia and India. The benzene yielded is often considered as by-product, and throughput will be varied based on ethylene economics. Feedstock and severity is a major influence in pygas availability, and has been restricted by the current trend to lighter feedstocks at flexible crackers.

Supply from refinery sources usually come as by-product of *para*-xylene production. New benzene capacity in China has been sourced this way, exceeding the contribution from pygas. The imbalance between *para*-xylene and benzene has been well-perceived for many years. *Para*-xylene enjoyed skyrocketing growth of almost seven percent over 2000-2007, driven by PET bottle demand, while benzene has suffered from slow growth, particularly for polystyrene during the same period. Despite the maturing of the PET bottle market and an increase in PET recycling in the forecast period, this growth discrepancy between the two products will remain. As a result, the industry has seen an increasing trend in minimising benzene yield from aromatics complex.

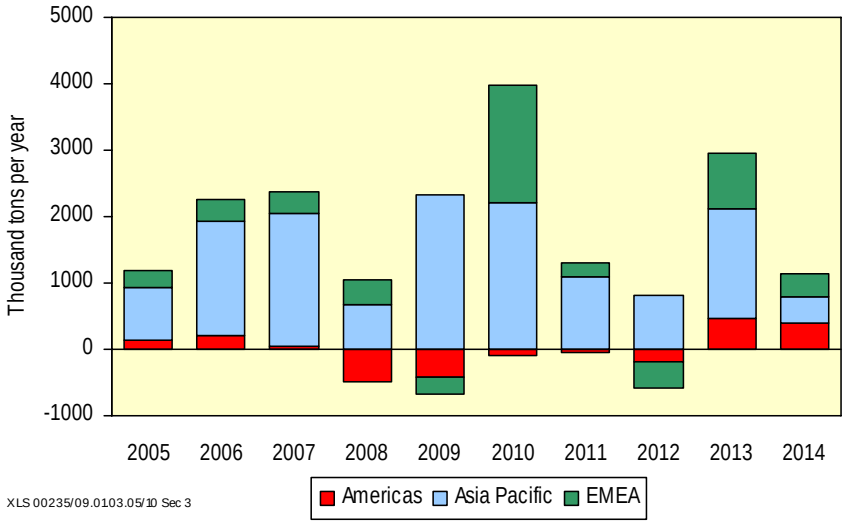
Benzene supply from coal has meanwhile seen dramatic increases in China. Demand here is for the production of maleic anhydride (MAN) via a process which can consume low grade benzene, a route absent elsewhere.

New MSAT II gasoline regulations in the United States stipulate a maximum benzene content in gasoline of 0.62 percent by volume, down from the current level of one percent. Some refiners may increase benzene extraction in order to meet the new targets. Various factors are however likely to limit the scale of the supply increase. The development of bioethanol has continued to displace traditional blendstocks, decreasing the overall requirement for gasoline from refineries. The United States is the second largest producer of bio-ethanol globally, and its government has proposed to increase the quantity of ethanol blended with gasoline. Some refineries have meanwhile already met the new benzene limit issued by MSAT II, and can opt to remove benzene precursors from the naphtha fed into the reformers, and thereby minimize benzene production.

In geographical terms, almost all new benzene supply is expected to come from Asia Pacific and the Middle East. China, South Korea, Singapore, Thailand and India are currently building ethylene crackers and aromatic complexes which include an additional 4.5 million tons of benzene capacity by 2015. Benzene capacity share of Asia Pacific in the world will increase from 46 percent in 2009 to 51 percent in 2015. The second most active region is the Middle East where one million tons per year of benzene capacity were added in the past three years, and another 1.2 million tons per year are planned or under construction for start-up by 2015. Around three quarters of total benzene capacity addition in the region will be derived from refineries.

The expansion of benzene capacity in North America and Western Europe has been limited by the lack of growth of ethylene and *para*-xylene demand in both regions, although some debottlenecks are expected in the long term. In Central and Eastern Europe, capacity addition is limited as both regions currently have surplus benzene.

Global *para*-Xylene Capacity Additions/Closures (Firm and Speculative)



Aromatics Trade

Despite the recent severe decline in benzene demand, the United States remains the largest consuming country, playing an important role in absorbing benzene surplus from new capacities in Asia Pacific. Benzene surplus in Asia is lengthening greatly despite strong demand growth. China became a net exporter of benzene in the second half of 2009. Singapore trade position will shift to a net surplus if JAC project materialises, while Indonesia has become a net exporter of benzene since the restart of TPPI benzene facility.

Economics are generally supportive of the shipment of *para*-xylene (as a bulk liquid) rather than PTA or DMT, both of which are normally shipped as containerised solids. As such, *para*-xylene is produced at locations with feedstock advantage and shipped to the consumer. As a result, *para*-xylene trade has been increasing with most cargoes shipped to Asia, where most of the world's polyester fibre manufacturing is located. The Middle East has replaced the United States as the leading supplier of exports, serving both Asia and Western Europe. Western Europe is expected to develop an import requirement for *para*-xylene, as new production is limited by the lack of demand for additional reformate, while demand will continue to grow with the expansion of PTA capacity and the PET resin market.

The latest aromatics report examines the current market situation for the aromatics chain, and details the expected plant developments and changes in global trade patterns. Nexant's ***Aromatics 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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