

CHEMSYSTEMS PPE PROGRAM

Report Abstract

Petrochemical Market Dynamics Propylene Derivatives

Propylene derivatives, Markets, Supply/Demand, Plant Developments, Global trade patterns.

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Nexant's Petrochemical Market Dynamic, Vinyls report investigates the market and growth profile of EDC, VCM and PVC, and details the expected plant developments and changes in global trade patterns. The reports are published as part of ChemSystems / Petroleum and Petrochemical Economics Programme (PPE). Subscriptions to the programme are available from www.chemsystems.com. For further details or to request a sample copy, please email chemsystems@nexant.com.

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Demand Recovery Brings Supply Side Issues to the Fore

Most propylene derivatives suffered a downturn as a result of the global economic recession during 2008-2009. Asian markets recovered first in 2009, followed by the rest of the world in 2010. All of the derivatives performed strongly in 2010, due to a variety of influences ranging from economic growth to changes in manufacturing trends and agricultural factors. Demand growth in 2011 has benefitted from the on-going gradual economic recovery in Western economies, but has been undermined to some extent by fluctuating demand in Asia.

7000 **2007** thousand tons per year Propylene consumed 6000 **2011** - Min during Recession 5000 4000 3000 2000 1000 0 Acrylonitrile Propylene Oxide Isopropanol Cumene Acrylic Acid

Global Propylene Consumption

Propylene availability has been squeezed from both sides. Rapid consumption growth has coincided with a significant decrease in production capability in North America, resulting from the switch to lighter steam cracker feedstocks. The resulting tightness in the propylene market has increased U.S. propylene values relative to ethylene, and relative to propylene prices in other regions. High prices and physical shortages of propylene have limited the participation of U.S. producers in derivative exports markets, although exports have recovered significantly since the downturn in 2008. High global operating rates and prices for most propylene derivatives allowed significant inter-regional trade in 2010. The increase in U.S. propylene values will become increasingly important over the next business cycle when these export markets themselves become temporarily oversupplied as a result of the major capacity development now underway.

Polypropylene demand improved in 2009, led by a strong recovery in Asia while markets such as North America and Western Europe declined. 2010 was stronger globally however, as all regions increased, despite a slight slowdown in Asia. The global dynamics of the industry are in flux, with a major surge of new capacity in the Middle East now on-stream, but heavy capacity



addition in Asia still underway. While producers in North America traditionally had a competitive advantage conferred by their relatively low propylene price, this situation has now reversed.

The acrylonitrile market grew strongly in 2010. Fibre demand was strong due to record cotton prices, and the robust carbon fibre market resulting from growing usage in mass-produced applications. Demand into HMDA/nylon also benefitted from the cotton effect. Demand for ABS generated very strong demand growth for acrylonitrile in this sector, mainly due to a strong recovery in the automotive and electrical/electronic markets. Other end applications such as polyacrylamide also continue to perform well. Market growth is increasingly focussed in Asia however, while the western markets suffer from lower consumption growth and increasing propylene costs. Global capacity has been largely stable since 2004 as shutdowns in the United States have been offset by small additions in Asia.

Propylene oxide faced a massive impact from the economic crisis as due to its exposure to sectors such as consumer goods, construction and automotive uses. Propylene oxide was however among the first of the products to recover in 2009, and producers struggled to keep pace with growing demand in 2010, partly due to limited availability of propylene feedstock. Recent introduction of HPPO technology by BASF, Dow and Evonik Industries has prompted these producers to invest in the production of propylene oxide in emerging markets.

Like propylene oxide, the phenol market collapsed during 2008-2009, being heavily exposed to the construction, automotive and electronics industries in its principal derivatives. Demand for phenol rebounded again during the economic recovery in 2010. Cumene availability was extremely short, partly due to propylene shortages in the United States, and phenol production globally was restricted as a result. Several BPA and polycarbonate developments in China and other developing markets in Asia have driven phenol demand growth, and accelerated development of phenol capacities in a number of countries. Most capacity development is concentrated in Asia Pacific, where both demand growth and feedstock availability are strongest.

The cumene market usually behaves in tandem with phenol, as cumene production is almost entirely used for phenol production. Most new cumene/phenol production is integrated, and only one of the current slate of phenol projects globally is to be based on purchased cumene. There is a substantial merchant market for cumene in North America, Western Europe and East Asia however, mostly operated through long term supply agreements.

Acrylic acid is one of the propylene derivatives that suffered least during the global economic slowdown as it has a diverse range of applications, which collectively have comparatively little exposure to economic cycles. Acrylic demand into acrylate esters is the most volatile due to its exposure to the construction market while demand into SAP shows steady growth, supported by improvement in standard of living and increasing SAP usage in new applications. Usage in the water treatment sector etc. does not tend to fluctuate. The strong growth profile for acrylic acid production has promoted a rapid development in both developed and developing markets. Capacity is also expected to develop in new markets such as Brazil and India.

Demand for isopropanol fell sharply during 2008-2009 with a small recovery in 2010. Its recovery was subdued by exposure to the construction industry which remains weak in Western



markets, and the on-going replacement of isopropanol and its derivatives with water-based systems which produce less VOC emissions. As isopropanol has a relatively low growth rate compared with other propylene derivatives, minimal capacity development is expected with only one firm capacity addition in China in the near future.

All this and more is analysed in detail in Nexant's recently published *Propylene Derivatives Market Dynamics* report, part of the ChemSystems Petroleum and Petrochemical Economics (PPE) program of reports available for subscription on www.chemsystems.com.





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