

Abstract
Process Economics Program Report 260
ECONOMICS AND PETROCHEMICAL CYCLES
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In any market, pricing structures need to present a return on investment such that companies will be motivated to invest the capital necessary for new capacity. When prices fail to meet such expectations, supply will become tight, and consequently, prices will increase to a level to justify new investment. Petrochemical cycles are likely to continue given that investments are easier to finance during times of high profitability coupled with lead times of three to five years from decision to production.

Traditionally, prices at base of the cycle is determined by the cash cost of the domestic straggler producer. Although the industry as a whole shows signs of restraint in adding capacity and learning to operate, on an ongoing basis, closer to the breakpoint of profitability, the end of the decade will bring the beginning of a decline of utilization rates. This is primarily due to new entrant's additional capacity, not so much by weakness in demand.

As trade become more globalize, the price reinvestment level may only justify regions with access to advantaged feedstock. Nearly half of the announced capacities planned in the Middle East and Africa due to its low cost feedstock for the export market. Additional capacities are also planned in China where supply has been largely met by imports. Continued delays in the Middle East and strong demand in China kept margins strong despite high crude prices.

If excess supply in the Middle East were unable to find a place in Asia either due to lack of demand, the excess will find its way to the Western market undercutting domestic prices, which may change the traditional cycle mechanism at its very base. This is assisted by the emergence of the world economy, and is shown by the influence of ethylene derivative export trade—it has grown from 10% of consumption in 2001 increased to >15% in 2007. Globalization of the petrochemical business now means that supply; demand and prices increasing are set worldwide.

The competitive position of naphtha crackers relative to fixed price ethane will become increasingly dependent on coproduct values (chiefly propylene) to support the economics as crude oil prices are not expected to return to \$20+ per barrel, the price level where the base of economics among region is fairly even. The relevance of this depends particularly on the capacity increments in the Middle East and the amount of new capacity China can absorb.

There remains true uncertainties significant to the industry as drivers for crude oil prices (political/economics), and petrochemical cycles (supply/demand) are independent factors. Of all the announced capacity in the Middle East and Asia planned during 2003-2006, only a third has emerged with the rest either delayed or cancelled. The rapid expansion drove investment cost (EPC, building materials, and logistics) higher than anticipated. In 2007, about 10 or so plants were delayed ranging from six months to more than a year.

Nonetheless, enough capacity will continue to enter the market that the cycle will reach its peak by 2009. Barring unforeseeable events that may severely influence demand, the industry's margin will be under pressure until demand moves operating rates back up again at the 90% level by 2012.

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