Still green for growth

The downturn has slowed progress on some petrochemical projects, but those based on availability of advantaged feedstocks or strong market growth will still go ahead

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Capacity utilisation rates at petrochemical plants sank to worryingly low levels at the end of last year and the beginning of this year as a result of the global economic downturn. Rates have been picking up over the last few months, but companies planning to start up new production in the next two or three years could struggle to achieve desired profitability levels.

Global cracker utilisation rates started improving in the Spring but are still very low, ranging from between about 75% and 85%, according to Arthur Steinbock, a consultant with McKinsey.

How utilisation rates evolve in the coming year will depend on the timing of the global economic recovery. "But even in the most rosy scenario, we are looking at utilisation rates in the low 80% range in 2010–2011. And in very severe economic scenarios the rates could go down to the mid-70%s and could remain there for a couple of years," he says.

"We are entering a trough that the industry has not seen in a long time," Steinbock continues. "If you are bringing an asset online this year or next year you need to be prepared to live with highly compromised margins."

If the economic recovery is robust and if there is no major wave of new project announcements, cracker capacity utilisation rates could rise to the high 80%s or low 90%s by 2013, he suggests. "But if the global economy takes longer to return to long-term growth rates, we might not even be back to the pre-crisis utilisation rates by 2015."

So far, there have been few cancellations of new petrochemicals projects. But delays are widespread, as a result of tightened credit availability and a heightened scrutiny of project proposals. Saudi Aramco and Dow Chemical, for example, have delayed their project in Ras Tanura, Saudi Arabia, and start-up is not expected until 2014–2015. In China, start-up of the Wuhan-based Sinopec/SK Corp project has been put back to 2012–2013.

Despite the global downturn, new production capacity will continue to be built in regions with competitive feedstock supplies, such as the Middle East, or resilient local demand, such as China and India. However, in regions with less price-advantaged feedstocks, such as western Europe, Japan and South Korea, some existing plants could face closure.

Most of the new petrochemicals capacities due onstream in the next few years will be located in the Middle East, and in Saudi Arabia in particular. There are new signs of engineering

and construction activity in the region, with the award by Saudi Aramco of engineering contracts for a refinery and petrochemicals project at Al-Jubail and a re-launched bidding process for a refinery at Yanbu.

McKinsey estimates that production volumes in the Middle East will grow by about 20%/year between 2007 and 2012, driven by the availability of low-cost gas feedstock. However, the limits of this gas-based growth are already in sight. Middle East governments have allocated most of the ethane gas available up to 2012 to planned projects. Beyond 2012 there is not likely to be sufficient additional ethane to maintain the current growth trajectory, says Steinbock.

Producers of ethylene derivatives based on ethane gas feedstock currently have two key advantages over producers of derivatives based on naphtha. First, ethane is cheaper. Second, their margins are impacted more by the oil price than utilisation rates because the price of ethane is fixed. Naphtha-based production, conversely, is more dependent on utilisation rates and less dependent on the price of oil, because changes in oil price are passed through the chain.

This means that regions such as Asia and western Europe, where naphtha feedstock prevails, are going to be extremely influenced by the utilisation rate.

It could also be argued that investors in new ethane-based projects actually benefit from the economic crisis thanks to the increased availability of engineering and construction capabilities and construction materials. "It is now easier to finish capacity in the Middle East on time and within budget than it was two or three years ago," Steinbock remarks.

It is a different story for Middle East cracker projects based on mixed feeds including naphtha. Cracker projects based on mixed feeds include the Ras Tanura project in Saudi Arabia and the Qatar Petroleum/Honam Petrochemical project in Qatar, both of which face delays.

Although the cost disadvantage of mixed feed projects becomes more pronounced during a recession, when utilisation rates are compromised, such projects could attract support from governments seeking to create employment. Oil extraction and refining, followed by naphtha-based chemical production, represents a relatively labour-intensive domestic use of hydrocarbon reserves.

Naphtha cracking also generates a much broader slate of olefin and aromatic derivatives than gas cracking – providing opportunities for a wider expansion of chemicals manufacture and hence additional job creation.

One of the primary goals of building petrochemical capacity, particularly in Saudi Arabia but also in countries like Kuwait and Iran, is to create employment, says Steinbock. "There could be some level of support, either directly or indirectly, to make naphtha-based chemistry more attractive."

North America, too, benefits from ethane gas availability, and there are new gas sources coming onstream. However, the region has been severely hit by the global economic downturn and there is only one major petrochemicals project under discussion in the region – the Keltic Petrochemicals 1.45m tonne/year complex in Nova Scotia, Canada.

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Arthur Steinbock, consultant, McKinsey

"Even in situations where demand is not as robust, it still looks fairly profitable to operate ethane- or mixed feed crackers in North America," says Steinbock. At the same time, the ethane feedstock availability should help the region avoid any large-scale closures of assets based at least in part on ethane feed, he adds.

China does not have the feedstock advantage of the Middle East or North America – the feedstock is almost all naphtha – but the strong growth in petrochemicals demand should ensure that most projects are built.

Coal-to-chemicals projects in China have attracted a lot of attention, and a wave of new projects has been developed over the last two years as a result of elevated oil prices. Three major coal-to-olefins plants with a combined capacity of more than 1.5m tonnes/year are expected to be operational by mid-2010, according to CMAI. However, the weak energy market has made coal-based investments less attractive, and the Chinese government has tightened controls on coal-to-chemicals projects.

In India, too, petrochemicals investments are being driven by local economic growth. "Even though in the coming trough years they may not earn their cost of capital they will probably be operating cashflow positive, and therefore well positioned once economic activity picks up again to serve what is likely to be fairly strong local demand growth," says Steinbock.

Petrochemicals production in Japan and South Korea is based on naphtha, and faces serious challenges. Local demand has declined significantly in the two countries and the assets are not integrated, which means the petrochemicals producers have to ship naphtha to their plants. "The assets in developed Asia are going to be among the most challenged in the current trough," remarks Steinbock. "There I don't want to exclude the possibility of closures."

Closure of cracker capacity would be more complicated in western Europe because production is generally heavily integrated and there is little cost differentiation between assets. "This means that if one needs to close it's not clear which should bite the bullet," Steinbock observes.

Cutbacks in global production capacity and further delays to new projects will be needed to help spur a recovery. The global petrochemicals industry is in a serious trough that is likely to continue, and cracker utilisation rates may take several years to reach pre-crisis levels. New projects that are not based on competitive feedstock supplies will be the most at risk.