

Middle ground

Middle East increases its influence on chemical feedstock dynamics

Significant new ethylene capacity, oil production rates and major gas projects in the Middle East could impact global chemical feedstock supply and economics. Phil Parker, Shell Chemicals General Manager for New Business Development in the Middle East, looks at the likely impact of these emerging market dynamics.

The current boom in petrochemicals production in The Middle East, based on increased availability of ethane gas feedstock, will undoubtedly have a major impact when this wave of new capacity hits global chemical markets.

So too will the feedstock requirements of these new facilities, which are expected to double consumption of ethane in the region over the next five years (see Fig 1). Because this associated gas comes as a low cost byproduct of oil production - it can offer a significant cost advantage over liquid feeds.

The scale of the new ethylene capacity additions is estimated at around 15 million tonnes - around 10% of the current global market. It is also coming on-stream at a time when the market is least able to absorb it, during a major slump in demand, which will put pressure on liquid naphtha crackers in other parts of the world, especially Asia.

At the same time, however, the feedstock demands of current and planned new projects in the Middle East will exceed the associated gas supply in the region, which is tied to oil production rates. Last year, due to the global slowdown and subsequent collapse in the oil price, OPEC (Organisation of Petroleum Exporting Countries) cut production rates by over 4 billion barrels per day to support prices and further cuts would put further pressure on ethane supply in some parts of the region.

New sources of associated gas, meanwhile, are becoming more scarce as oil production plateaus, and so the region will increasingly



Gas processing associated with Shell's joint venture GTL project under construction in Qatar will result in additional ethane supply for petrochemicals production in the region.

look to alternative feedstocks for future projects. As well as naphtha from refineries, it is likely to turn to other liquid feeds such as LPG (liquefied petroleum gas) from gas production.

A number of new plants coming on-stream already have crackers designed to handle mixed feedstock slates, with LPG becoming a much bigger part of the picture in order to make the ethane stretch further. Plants that process mixed feeds are inevitably more complex and require wider production and

marketing expertise to bring these products to target export markets.

In Saudi Arabia, which relies heavily on associated gas, consumption of LPG in chemicals production is expected to more than double in the next four years.

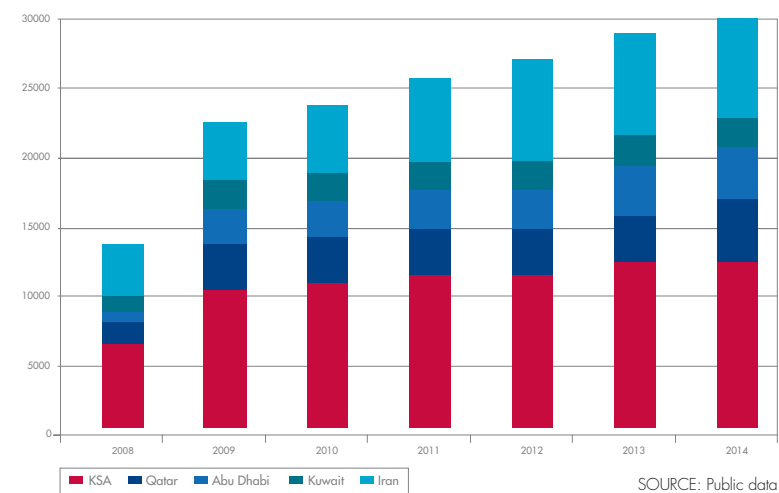
These supply dynamics may help to narrow the imbalance between gas and liquid feeds. At least one major petrochemical facility planned for Abu Dhabi is based wholly on a naphtha cracker, to produce a wider derivative slate.

Petrochemicals offer a vital route to the creation of downstream industries, economic development and employment for the Middle East. Ethane produces only ethylene, which could be a strategic weakness for resource holders looking to develop a diversified chemical industry. Naphtha and (to a lesser extent) LPG yield a broader product slate and more opportunities for creating an integrated complex with a diversified derivatives portfolio.

Supply of naphtha in the region is increasing through refining capacity additions although high engineering and construction costs may lead to delays or cancellation of some planned investments in these and other facilities.

Natural gas production has enormous potential in the region as a source of chemicals feedstock through co-produced ethane, LPG and condensates derived from processing raw gas.

Middle East ethane demand growth 2008-2014



The key to more extensive utilisation of gas liquids, including LPG but especially ethane, as feedstock lies in its local conversion to petrochemicals and plastics.

LPG output in the region is expected to expand significantly over the next 20 years as a result of the massive investments being made in natural gas production, particularly in places such as Qatar.

Unlike ethane, however, LPG has a readily monetisable value - principally as a domestic fuel - and its value would need to drop below naphtha to allow significant uptake. Currently it is largely used as an opportunistic feedstock option during seasonal demand fluctuations.

Saudi Arabia is already investing significantly in its Master Gas system in order to link up gas and oil production and treatment facilities across the country. In Iraq, Shell has signed an initial agreement to form a joint venture with the state-run South Gas Company to capture and process flared associated gas in southern Iraq.

The joint venture would help Iraq meet its domestic energy needs but in future could

export gas not needed for local domestic use, as well as provide associated ethane for local petrochemicals production.

Shell has also pioneered Gas-to-Liquids (GTL) technology for over 30 years and is now involved in developing the world's largest GTL plant in Qatar. Gas processed as part of this venture will

provide around one million tonnes of additional ethane for petrochemicals.

While GTL will certainly help to unlock the potential of the world's gas reserves, primarily for transport fuels, the process also offers routes - via synthesis gas processing - to chemical feedstocks including very high quality naphtha and normal paraffins.

COMPETITIVE PRESSURES

Regional developments are undoubtedly going to start having a greater influence on global chemicals markets although the current turmoil in financial markets and the economic slowdown make it difficult to know exactly how they will play out.

The significant new ethane-based capacity hitting the market over the next few years will lead to a period of oversupply and competitive pressures for other liquid-based producers.

Questions over new sources of feedstock also raise issues for future development in the region itself. As a result, a number of players are already developing new technologies for producing chemicals from natural gas, via a methanol to olefins (MTO) process.

Access to technologies such as GTL and emerging MTO processes, the ability to diversify the derivatives portfolio, and investment in the infrastructure and facilities required to exploit the full potential of natural gas could be key to developing the Middle East chemicals industry over the longer term.

"New sources of associated gas are becoming more scarce as oil production in the region plateaus and mixed feedstock slates are likely to become a bigger part of the picture"

Phil Parker, General Manager for New Business Development in the Middle East.



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