



US chemical producers are playing a risky game with the planned explosion of projects

US boom is a dangerous game

US ethylene producers need to work out where all the new ethylene production is going to be sold before embarking on the planned frenzy of cracker construction

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Something seems wrong with US plans for major ethylene expansion. Producers are currently planning to spend \$110bn (€80bn) in the next few years to exploit their shale gas advantage, according to American Chemistry Council estimates, including a potential 40% expansion to add over 10m tonnes of new production.

Yet as the chart shows, production of ethylene and all its main derivatives has not yet exceeded the peak levels seen before the financial crisis began in 2008:

- Ethylene production peaked at 25.7m tonnes in 2004, and was only 25m tonnes in 2013
- Polyethylene production peaked at 14.3m tonnes in 2007, and was at this level last year
- PVC production peaked at 7.3m tonnes in 2004 and was 6.7m tonnes last year
- Styrene production peaked at 5.5m tonnes in 2004 and was 4.2m tonnes last year
- Ethylene glycol production peaked at 3m tonnes in 2004 and was 1m tonnes in 2013

This raises a critical question. Where will all the planned new capacity be sold?

Neither domestic US demand or US exports seem likely to expand sufficiently to make all the expansions viable. Stephen Pryor, president of ExxonMobil Chemical, well summarised the domestic US position when opening their new Singapore investment in January.

He noted: "The reality is the US from a chemical standpoint is a very mature market. We have some demand growth domestically in the US but it's a percent or two, it's not strong demand growth". And he went on to confirm the same picture for polyethylene, noting that "demand had hardly grown for a decade".

Of course, an increasing number of companies down the value chain are reshoring production to the US from the emerging economies. But this boost to demand is doubtless already factored into ExxonMobil's calculations. And from the viewpoint of ethylene consumption, this is a zero-sum game. Any volume gain in the US will be balanced by a loss elsewhere.

So that leaves us with exports as the key driver for expansion. As the chart shows, based on data from Global Trade Information Services, net US polyethylene exports peaked in 2009 at

2.6m tonnes. Since then they have fallen by 35% to 1.7m tonnes in 2013.

The biggest volume fall has been with China, where they have collapsed by 68% from 1m tonnes to 300,000 tonnes. Sales to southeast Asia (SEA) have fallen 81% over the period to just 69,000 tonnes in 2013. Major expansion has taken place in domestic production, as governments prefer to capture added value from polymer production themselves. This will continue.

In addition, China has developed a strategic corridor with the Middle East, where it exchanges access for polymers and other products to its domestic markets in exchange for energy supplies. Middle East producers remain keen to maintain this relationship, as they are also continuing to expand production.

US exports to Latin America have helped to balance this. Brazil's demand has been the key factor, with US exports having risen 87% to 360,000 tonnes since 2009, as its economy boomed on the back of China's expansion.

But now its GDP is slowing rapidly as China starts to deal with its lending bubble, while the domestic stimulus provided by preparations for the soccer World Cup this year and the Olympics in 2016 is coming to its end.

NEW MARKETS NEEDED

So what else can be done to develop new markets for the planned new production? One seemingly attractive opportunity would be to

negotiate the closure of domestic production in key export markets. Could China, or Europe, be persuaded to cut back their own output, and instead utilise US exports?

Reality, however, suggests this is unlikely to occur on the scale required. Logistics present a major obstacle on their own. No consumer is going to risk being dependent for a large part of their demand on product that needs to travel thousands of miles. Deliveries even to Europe can routinely take double the notional two weeks of shipping time. Vessels to Asia can often be delayed for even longer.

Producers might try to get around this problem by installing large-scale storage in convenient hub locations. But this would raise costs and thus reduce the advantage of their cheap feedstock. It would also not deal with the key issue, namely that governments in Asia and Europe simply cannot afford to allow mass closures of petrochemical complexes to take place.

China long ago realised that its hold on power depended on its ability to keep incomes rising among its population. Its export boom is now over, with exports as a percentage of GDP now close to zero. Ageing Baby Boomers in the West no longer need, or can afford, to continue consuming at the levels seen when they were younger and in their wealth creating years.

Thus China is instead focused on expanding its own production, by adding 5m tonnes of coal-to-ethylene capacity for example, in order

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to create jobs to replace those lost with the export downturn. They are not looking at cost-curves, or other economic arguments. Political survival is understandably a far higher priority.

Europe is also unlikely to prove fertile ground for increased US exports, but for different reasons. Smaller, inefficient crackers are already closing. But there is a limit to the restructuring that can take place, as most ethylene crackers are linked to refineries. And no government worried about energy security is ever going to allow refinery closures on a major scale. As Borealis CEO Mark Garrett has suggested, the main impact of US developments may instead be to initiate another wave of consolidation.

Refineries will therefore continue to roll through refinery margins into petrochemical production when required, in order to keep themselves in business. Europe's preference for diesel rather than gasoline, combined with the decline in US demand for gasoline imports, means there is no obvious alternative for the naphtha volumes involved.

Effectively, therefore, US producers will have to adopt a "scrap and build" policy if they want to go ahead with all their planned expansions. This would mean closing older plants around the world, and would be expensive in terms of up-front closure costs as well as in logistic costs. It might therefore prove a difficult sell to investors expecting an immediate payback.

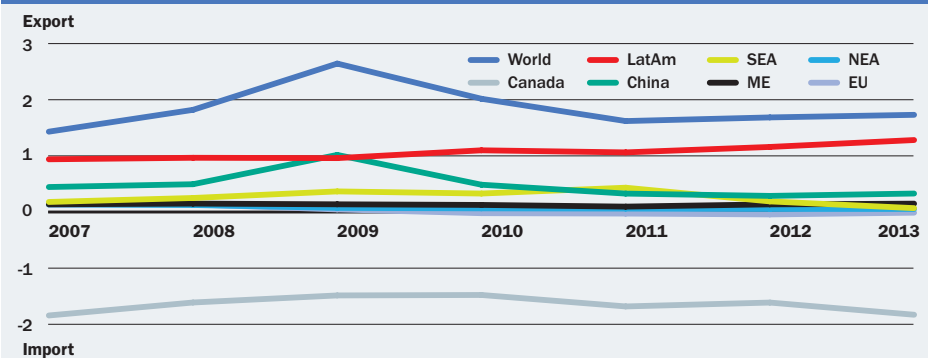
Even this strategy would not address the fact there is little logic for today's disconnection between US natural gas and crude oil prices. Oil has normally traded in line with its relative energy value of around six times gas value. Today's ratio of 25 times may be a new paradigm, but reversion to the mean is normally a more profitable investment concept.

Shale gas thus provides a high-profile example of how today's unprecedented demographic changes are creating major changes in business models. Low-cost supply is no longer a guarantee of future profitability. Any company sanctioning new investment without a firm guarantee of future offtake therefore risks finding itself landed with an expensive white elephant for the future. ■



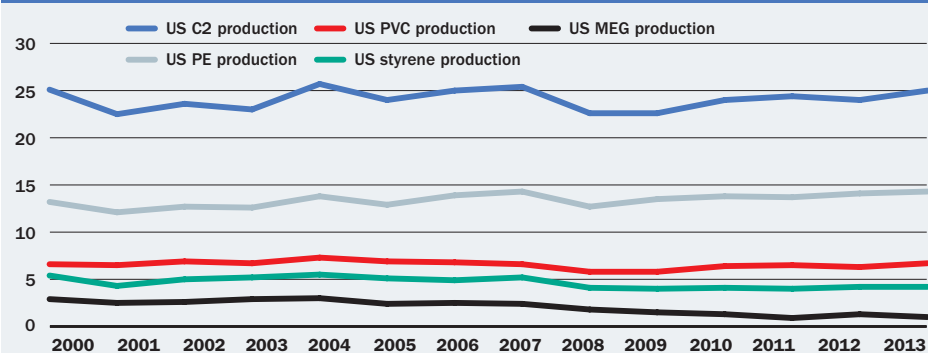
Paul Hodges is chairman of International eChem (IEC), trusted advisers to the chemical industry and its investment community. With John Richardson, he authored 'Boom, Gloom and the New Normal', published by ICIS. Board-level strategy workshops are available to help companies exploit today's new opportunities. Visit www.iec.eu.com/strategy-development

US PE TRADE ('000 TONNES)



SOURCE: IEC Analysis - Data Global Trade Information Services

US ETHYLENE AND DERIVATIVE PRODUCTION (M TONNES)



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