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Supporting middle class growth: refining and shale in Asia

In a recent report, Ernst & Young forecast that the middle classes in Asia will grow from 525 million in 2009 to 3,228 million in 2030, representing a leap from a 28% to a 66% share of the global middle class in just over 20 years. That growth is probably best reflected by the growth in passenger cars sold in the region: according to the Asian Development Bank, private vehicle ownership is doubling every five years in the region, while urban area growth is doubling every two to three years.

One of the key impacts this has had is a growth in the demand for materials to make cars and other consumer goods, stimulating manufacturing and the production of polypropylene and polyethylene - the world's most used plastics – as well as diesel and transport fuels. The Economist Intelligence Unit estimates the Asian chemical industries to be growing at a Compound Annual Growth Rate (CAGR) of 10.5% to 2015, which while positive, puts refiners under strong pressure to keep producing the necessary levels of propylene and ethylene.

Increased capacity

This has meant that countries such as China have been forced to increase imports of foreign crude oil in order to fill the demand gap: the U.S. Energy Information Administration (EIA) notes that imports now outweigh the country's domestic supply. Expanding oil refining capacity to meet the demand for oil products – such as propylene and ethylene – is top of the agenda, and has contributed to huge capacity increases which have occurred across Asia as a whole. Some estimate that China alone will add another 4.4million bbl/d of refining capacity between now and 2020, pushing total capacity to over 17million bbl/d.

As Asian countries have traditionally imported oil from the Middle East and now some parts of Africa, refiners have historically favored naphtha as its feedstock of choice. This has some advantages, namely that cracking naphtha produces approximately 30% yield of ethylene and a 16% yield of propylene which can be then directly used in plastic production.

However, if compared with the yield of ethylene and propylene which can be produced from ethane – 78% and 42% respectively – refiners might begin to reassess their feedstock preference. As the development of the Marcellus and Bakken fields in the U.S. have begun to both push cheap ethane from domestically produced shale gas into the market and thus reduce the price of it for refiners, companies operating there with access to it have naturally gained a significant competitive advantage, both at the feedstock and output end.

The shale rub

This has naturally been a cause of great concern for both European and Asian refiners – the former due to higher labor costs and economic downturn, the latter due to extremely high energy costs and the lack of accessibility. Just as this new found ethane addiction sparked a number of ethylene-specific building projects in the U.S., so China has followed suit: only last June did Sinopec propose building a $3.1bn ethylene plant in southern China and is already involved in joint ethylene ventures with BP and BASF.

The ethane feedstock is still required to fuel such high ethylene production though and ethane itself needs to be liquefied to minus 260° in order to be transported. The process both of freezing it and sending it around the

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world naturally increases costs dramatically though and because of this difficulty, there are wide variations in the price paid for it worldwide, where buyers in Japan and South Korea are said to pay almost double what is paid in Europe and four times that in the United States.

Domestic development

It is no surprise then that the development of domestic shale reserves has increased strongly over recent years. With the EIA's most recent shale reserve report estimate that China´s technically recoverable shale gas reserves are the largest in the world at 1,115 trillion cubic feet, the same zeal seen in the refining sector might be expected with shale development.

However, significant obstacles to that development exist which also apply to India and Indonesia as Asia´s other powerhouses. Firstly, the lack of the necessary skills and technology to bring shale projects to fruition has led Asian companies (predominantly state-owned) to seek partnerships with international producers. Shell has partnered with Sinopec on a number of shale plays, while Sinopec is also working with Chevron and ConocoPhillips in the Qiannan and Sichaun basins in China. ConocoPhillips and Carrizo Oil & Gas have also been in talks with the Indian government over providing technical support for shale drilling in Rajasthan and Assam in India.

The lack of pipeline capacity and infrastructure, in addition to environmental factors, contribute to making shale development in the region difficult. The high volumes of water needed for fracking – each well uses at least 2 million gallons to drill and fracture – means that access to and use of that water is a major concern, especially for countries which are already facing significant water scarcity.

With such obstacles ahead, it seems unlikely that the pace of development seen in the United States and Canada can be replicated by Asia in the short-term. Considering the effort being put into pipeline building, refining capacity and skill development as well as the continued enlargement of an energy- and goods-hungry middle class though, it will be interesting to see just how short that term will be.