Middle East supply chain under strain

With 52m tonnes/year of new chemical capacity coming on stream by 2015, Middle East ports will be handling unprecedented amounts of material

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Exports of the leading petrochemical commodities produced in the Gulf Cooperation Council (GCC) are set to boom as recent capacity additions come on stream and other major projects in the region move forward.

But will the supply chain assets and architecture moving product from the Middle East to Asia and Europe cope with the increase in demand or will the export boom turn to supply chain bust, with recent infrastructure investments, new business models and new trade routes unable to absorb the growth?

In a new study on Middle East petrochemicals and petrochemical supply chains, commissioned by the Gulf Petrochemicals and Chemicals Association (GPCA), Middle East-focused consultancy Chemical Management Resources forecasts a 52m tonne/year surge in the production capacity of the top 18 petrochemicals, chemicals and fertilizers commodities in the GCC – Saudi Arabia, Kuwait, Bahrain, Qatar, the United Arab Emirates and Oman – by 2015. This would bring GCC capacity to 125m tonnes/year. Iranian capacity would increase this to 172m tonnes/year, although capacity growth in the country is far less certain given the chronic funding difficulties within the petrochemicals sector and the increasingly debilitating effect of international trade sanctions. Overall, the compound annual growth rate for the capacities of the region's top commodity petrochemicals will be 9%. This capacity boost will inexorably fuel an export boom, increasing GCC outflows by 50%, equivalent to 19m tonnes, by 2015.

Abdulwahab al-Sadoun, secretary-general of the GPCA, says: "The supply chain is critically important to the sustainable competitive advantage of the Middle East petrochemicals sector."

The huge growth in exports is underpinned by the cost competitiveness of Middle East production, despite the enforced move to heavier feedstocks and inevitable higher ethane price – possibly tiered depending on its use as a feedstock for commodity or differentiated value chains – in Saudi Arabia from 2012.

Output has jumped this year as six new major »

52m tonnes
Increase in annual production capacity of top 18 petrochemicals, chemicals and fertilizers in the GCC by 2015

386
Number of current and planned plants in the Middle East

$7bn
Cost of the Saudi Landbridge rail project

1.45m TEU
Amount of new Middle Eastern container capacity delivered in 2010

» projects have come on stream – Yansab, Sharq and Kayan, in Saudi Arabia; Ras Laffan Olefins, in Qatar; Borouge II in the United Aeab Emirates (UAE) and Morvarid, in Iran. Export growth of this order is a major challenge to the region's supply chain, which was stretched to capacity in the period leading up to the global economic downturn in the third quarter of 2008. However, despite the crisis, Middle East governments and institutions maintained their commitment to the development of strategically important supply chain infrastructure projects and a new array of supply chain alternatives is opening up for petrochemical exporters.

The study assesses the olefin, methanol, benzene and paraxylene (PX) value chains, plus polyvinyl chloride (PVC) and methyl tertiary butyl ether (MTBE). The capacities and export orientation of all 386 current and planned plants are defined. These are matched against the seaborne and land-based supply chain assets that could be leveraged to satisfy regional, Asian and European customers. Five categories of shipping were considered – liquefied natural gas (LNG), liquefied petroleum gas (LPG), chemical tankers, container ("cellular" ships) and dry bulk – plus a comprehensive review of port developments and comparative costs. Road, rail and intermodal facilties were analyzed.

UAE BIGGEST GAINER

Over the period, Saudi Arabia's share of the total volume exports will by fall nine points to 45%, with the biggest gainer being the UAE, where exports will be driven by the multi-million tonne expansions by Abu Dhabi- and Singapore-headquartered Borouge and investments by ChemaWEyaat, also Abu Dhabi-headquartered, all of which are scheduled to come on stream before 2015.

Investment in major port and terminal upgrades has continued, although these are based on a phased investment approach instead of the previous, more iconic project plans. Major new terminals opened in 2009 in Bahrain (Khalifa bin Salman Port), Jebel Ali in the UAE – the region's largest port, with a capacity of 14m twenty-foot equivalent units (TEU) – and at Jeddah Islamic Port in Saudi Arabia, where the new Red Sea Gateway Terminal increased capacity to 6m TEU.

Unusually, Jeddah Islamic Port stills sits within the ancient city, whereas most new ports have been developed on new, open-access sites where hinterland and infrastructure can easily be developed. However, the notorious congestion in Jeddah is being relieved by a major road construction program. Like most infrastructure projects, it will inevitably get worse before it gets better.

And with many petrochemical offtakers paying for slots on vessels even if they are not used, there will be tensions and costs if congestion prevents containers being loaded, or if shippers, under pressure from tight schedules, skip congested ports where the risk of high demurrage claims caused by long turn-arounds is high.

New larger ports can now accept the larger "mother" ships calling in the Middle East – direct calling reduces the time and cost of having to tranship onto smaller vessels. The major transhipment ports will continue to Jebel Ali, Jeddah Islamic Port and Salalah, in Oman, although a worrying number of other ambitious port investments are predicated on becoming new transhipment hubs.

Some ports may be left isolated by the rises in petrochemical capacity and throughput volumes at locations such as Al-Jubail, in Saudi Arabia. This, and other key production centers such as Ruwais, in Abu Dhabi, will support direct shipments to Asian hubs. While this has been the conventional model for large volume commodity liquid products, export volumes of polymers are reaching a scale where a "polymer pipeline" of dedicated vessels may be a reality. This would improve the schedule integrity of shipping lines, bringing cost and customer service benefits.

In the shipping sector, record losses following the collapse in freight rates from the end of 2008 forced a change in the pricing behavior of owners, with a renewed focus on profitability, rather than volume. Shipping lines have constrained supply by withdrawing surplus capacity, scrapping older ships, temporary lay-ups, delaying investments and slow steaming.

However, most shipping categories will remain oversupplied, with chemical tankers matching demand most closely. For LNG, where the 2007 order book was equal to 88% of the fleet, no further vessels will be required for long-term contracts until 2015. Container carriers have brought back additional capacity in 2010 and have flooded the market in a Pavlovian response to increased trade levels. Vessels with the capacity of 1.45m TEU, equivalent to 11% of the fleet, will have been delivered in 2010.

More critical is the availability and positioning of containers themselves – ironically, these are the least capital-intensive component of the physical supply chain, but may well be its weakest link – at least in the short term.

> **"The supply chain is critically important to the sustainable competitive advantage of Middle East petrochemicals"**
> **ABDULWAHAB AL-SADOUN**
> Secretary-general, GPCA

The increase in GCC exports of the five major dry bulk polymers – polyethylene (PE), polypropylene (PP), polystyrene (PS), polyethylene terephthalate (PET) and PVC – will drive container demand to double demand.

China-based CIMC and Singamas, the two largest container manufacturers in the world, with a capacity of 3.5m TEU/year, will only produce about one-third of capacity this year. This is because of the unexpectedly strong and sudden recovery in demand.

Prices at the end of 2009 of $2,700 (€2,061)/TEU were reportedly at a 20-year high.

The availability of ISO tank containers, used to move hazardous chemicals and high-purity foodstuffs on cellular container ships, has also tightened with the demand high and the vital repositioning legs being impacted by the occasional preference of shippers to carry standard dry freight containers.

The shift to heavier, mixed-feed cracker feedstocks is creating a new portfolio of specialty liquid derivatives. These will require a much larger number of ISO tank containers.

For rail, the $7bn Saudi Landbridge will create a new freight and passenger link between the Red Sea and the Arabian Gulf. The new line will connect Jeddah with Riyadh; the existing line between Riyadh and Dammam will be upgraded and a new rail line will be built between Dammam and Al Jubail.

The Landbridge is part of a 4,000km (2,480 mile) increase in track, with new lines linking the phosphate and bauxite mines in the North at Al-Jalamid and Al-Zabirah with processing facilities on the Arabian Gulf at Ras al-Zour.

The Gulf-wide Union railway is a $25bn railway project, which plans to connect the six member states of the GCC following the Arabian Gulf coastline from Kuwait City to Muscat in Oman, via Saudi Arabia,

STRATEGIC ALTERNATIVE

The Landbridge offers a strategic alternative for shipping carrying polymer cargoes via the politically sensitive Strait of Hormuz, through which one-fifth of the global oil supply passes.

A $3.3bn oil pipeline linking the inner Gulf with Fujairah in the UAE, which has open access to the Indian Ocean, will be completed by the end of 2010. This will enable 1.5m bbl/day of oil to essentially bypass the Strait of Hormuz.

The study forecasts that polymer exports through the Strait will increase to 10m tonnes/year by 2015. But the extent to which the Landbridge creates a new trade lane for dry bulk petrochemicals depends on its cost competitiveness and efficiency compared with shipping.

The project was to have been financed by the private sector on a build-own-operate-transfer basis, with transfer back to the government in 30 years. But private sector investment appetite for the project is muted. As a sweetener, the date for transfer back to the government has been extended to 50 years.

The potential five- to six-day time-saving over seaborne shipping will be more attractive for perishable cargoes than for petrochemicals, where reliability is a more important performance indicator than speed.

Cost competitiveness is vital. Low rail freight rates for the Landbridge, yet to be announced, may be offset by other inefficiencies. The Saudi Arabian Customs authority takes 17 days to process an export container, according to the UK-based Oxford Business Group. This is seven days worse than the OECD average, although the cost of $681/container is half the OECD average.

The study also compares the comparative costs of 80 port activities such as port fees, loading and discharging fees, transhipment charges and berthing charges at the 10 leading ports in the region.

Bandar Abbas in Iran was the lowest cost port in the Gulf, but only in specific circumstances, such as where Iranian-flagged ships were used. Jebel Ali in the UAE was the most efficient transhipment port, and offered the most competitive transhipment rates. ■

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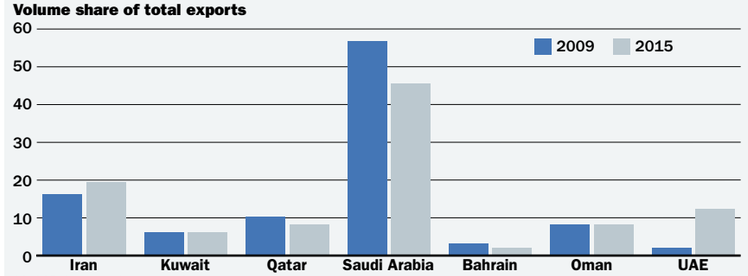
COMPARING THE SHARE OF EXPORTS FOR THE TOP 18 PETROCHEMICALS



SOURCE: Chemical Management Resources

PRINCIPAL PORTS IN THE GCC AND IRAN

SOURCE: Chemical Management Resources

9%
Capacity compound annual growth rate for Middle East petrochemicals until 2015

125m tonnes
Total GCC capacity in 2015. Iranian capacity will increase this to 172m tonnes

50%
Increase in GCC exports by 2015, equivalent to 19m tonnes

172m tonnes
Total 2015 capacity of GCC plus Iran