Asia-Pacific's tricky problem

The region has vast potential, but can explorers realise it? Damon Evans reports

ASIDE from some outrageously bullish claims that South Australian shale oil could rival Saudi Arabian conventional oil production, there has been little notable activity in the Asia Pacific's unconventional oil sector. But the region's potential remains a wild card for global oil markets.

The Asia Pacific region is estimated to hold 74 billion barrels of technically recoverable tight oil resources, according to the International Energy Agency's (IEA) *World Energy Outlook 2013*.

China, Australia and perhaps Indonesia, as well as Pakistan, offer potential opportunities. But governments, national oil companies (NOCs), as well as private investors have barely begun exploration. And without it, it is hard to determine what really lies beneath.

As a result "it's very unlikely that unconventional oil will be a major contributor to production in the medium term," says Craig McMahon, an Asian upstream specialist at Wood Mackenzie, a consultancy.

Indeed, it's no secret that most countries will struggle to replicate the North American experience at scale.

In the Asia Pacific region, only China is predicted to have any tight oil production to speak of by 2035.

China

The IEA believes there are many reasons to be optimistic about tight oil production in China over the longer term.

Indeed, the nation is estimated to hold the world's third-largest technically recoverable tight oil resources, with an estimated 32 billion barrels across the Junggar, Tarim and Songliao basins, according to US Energy Information Administration (EIA) figures. And rising oil demand – China is likely to overtake the US as the biggest oil consumer by 2030 – is likely to drive the country to find ways to exploit this resource.

China, perhaps more than any other country outside of the US, has the potential to bring costs down by maximising the use of locally built equipment and through economies of scale, says the IEA. With 1,200 active rigs in the country, its drilling fleet is second only to that of the US.

But while China has neither assessed nor targeted its tight oil resources – less than 20 wells have been drilled so far – it is no stranger to low-permeability reservoirs.

While the rest of the world considers tight prospects unconventional, the Chinese view them as commonplace conventional targets. About one-quarter of Chinese oil production is reported to come from low-permeability fields, needing traditional hydraulic fracturing or horizontal wells.

Almost unnoticed, state-backed PetroChina developed a significant tight gas sector.

"They don't reflect on their success as being unconventional, as they consider it a conventional resource. But to everyone else it's certainly tight," McMahon told *Petroleum Economist*.

Certainly the geology suggests they can replicate this within the tight oil space. But exploration work seems marginal at best.

PetroChina considers the Songliao basin to be prospective for shale exploration and has already flagged commercial tight-oil production there. US independent Hess and PetroChina have jointly carried out a study of the tight oil potential at the giant Daqing oilfield. Anglo-Dutch supermajor Shell and Hess are both separately evaluating oil prospects in Santanghu basin, just east of the larger Junggar basin. The Junggar may have the best shale geology in China, says the EIA.

But while China has considerable shale oil potential, it is geologically less defined. Its shale resources tend to be waxy and are held mostly in lacustrine shales, which may be clay-rich and less favourable for hydraulic stimulation.

While initial drilling has confirmed the resource potential, rapid commercialisation may be tricky based on the typically complex geologic structure, restricted access to data, as well as the high cost and rudimentary state of in-country horizontal drilling and fracturing services, the EIA notes. But some foreign independents operating in China disagree. They claim to have little difficulty accessing equipment for deep tight gas plays, while others have designed bespoke systems to tackle the nation's unique coal-bed methane (CBM) plays.

Still, considerable work is needed to define the geologic sweet spots and develop the service sector's capability. Thus the IEA conservatively estimates that China will produce around 210,000 barrels per day (b/d) by 2035.

However, if China can overcome numerous barriers, including high population density in some areas, water scarcity in others, lack of competition, as well as a relatively high cost structure in most parts of the country, those projections might be bettered.

Small quantities of kerogen oil – otherwise known as oil shale – are being produced and modest amounts of extra-heavy oil, as well as bitumen, exist, but none are expected to contribute significantly to supply over the next 20 years.

Although not strictly speaking coal-to-liquids (liquid hydrocarbons produced from coal), accelerated development of coal-to-chemicals is taking place in China, displacing demand for oil as feedstock.

Australia

Meanwhile, Australia, which holds the world's sixth largest technically recoverable tight oil resources, estimated at 18 billion barrels, spread over the Cooper, Maryborough, Perth, Canning, Georgina and Beetaloo basins, offers investors potential prospects.

Australia's Linc Energy triggered sensational headlines across the globe at the beginning of 2013, when the Singapore-listed company announced its Arckaringa basin assets could hold between 103 billion and 233 billion barrels of oil equivalent (boe) in formations comparable to liquids-rich shale plays in the US.

It neglected to stress that these independent estimates were on an unrisked prospective basis and that 3.5 billion boe were deemed technically recoverable. Essentially it's a theoretical play.

The mainstream media got the wrong end of the stick and declared the South Australian desert town of Coober Pedy the next Saudi Arabia. However, the publicity certainly drew attention to Linc as it seeks investors to help identify targets in the basin.

Linc, which hired Barclays Capital to help it find a partner, expects to start a five-well drilling programme in February 2014.

But as one seasoned oil man says, the red, black and green tape is absolutely crippling in Australia, which hurts project economics.

Even if the geology is right,

Australia's cost structures, which are very high, pose formidable issues for developers. Costs can be several times what US shale developers pay – drilling a shale well in the US costs about $10 million, while in Australia prices are 50% higher at around $15 million.

In addition, Australia has little infrastructure in the very remote locations where most shale exploration is happening.

However, tight oil might just work in Australia's oldest oil producing region, the Cooper basin, which stretches across far south-west Queensland and South Australia. The Cooper, which was the cradle of Australia's conventional upstream sector, hosts a substantial pipeline network, linking it to major population centres. In Western Australia, the Perth basin could also prove attractive because of its proximity to market.

In the Northern Territory, the Georgina basin is thought to offer good unconventional oil prospects. Canadian independent PetroFrontier is working with France's Total and Norway's Statoil in the basin. But some indications suggest it could actually be a gas play with liquids content.

Ultimately, these are really early pure exploration plays in the truest sense of the word, which means the uncertainty of what a play might actually be is really high, says McMahon.

In Australia over $2 billion has been committed to unconventional exploration campaigns – including the established CBM plays in the Surat and Bowen basins. While it's a significant amount, it is not being invested in one play, but rather over a range of basins and targets and it's probably more gas focused.

Australia also has significant near-surface kerogen shales that are thought to hold around 12 billion barrels of technically recoverable oil. But grave environmental concerns will likely bar its development.

Most of the thick Cenozoic lacustrine oil-shale resources of commercial interest lie in a series of narrow and deep extensional basins close to the Queensland coast, near Gladstone and Mackay.

Oil-shale deposits of varying quality also occur in New South Wales, Tasmania, and Western Australia in sedimentary sequences of Permian, Cretaceous and Cenozoic age.

A large-scale project led by Southern Pacific Petroleum had been planned in Queensland's Stuart shale in the 1990s but it was abandoned, largely because of environmental opposition. In 2008, the state government finally banned the industry.

However, in February this year, a ban on oil-shale development was lifted in Queensland, allowing Queensland Energy Resources to develop a pilot plant at Gladstone that was producing about 40 b/d.

The company is now seeking potential investors as it banks on future oil prices averaging over $110/b, making oil shale economically attractive.

Indonesia

Indonesia is estimated to have 7.9 billion barrels of technically recoverable shale oil resources, of which 234 billion barrels is thought to be in-place, according to the EIA.

Some of the best oil source rocks lie in lacustrine deposits and occur throughout Southeast Asia, particularly in the Indonesian province of Sumatra.

Central Sumatra, one of the region's great oil-producing provinces, looks like it will be more gassy than oily, but there will definitely be areas that are mixed, Chris Newton, executive direction of Indonesian-focused independent RISCO Energy told *Petroleum Economist*.

The trouble for Indonesia, which has been a net oil importer since 2004, is that many of its organic-rich shales are non-marine coaly deposits that may not be brittle enough to be hydraulically fractured.

Just because the shales, particularly in Sumatra, have produced oil that has migrated up into decent reservoirs does not necessarily mean it will work on an unconventional basis, noted one industry veteran.

Interestingly, investors are pouring considerable amounts of capital into the sector. But there is a lot of smoke and mirrors, added the executive, referring to the recent hype surrounding the archipelago's unconventional potential. He says the quality of the rocks is questionable. And adds that if there were big opportunities in Sumatra then surely the majors, such as Chevron – which has been active in the region for more than 60 years – would be interested. But they are not.

It's the smaller independents that are very gung-ho. This is probably explained by the fact that tight oil projects are the preferred choice for an operator seeking quick returns on borrowed capital. Production peaks in the first year and then falls off rapidly, so the payback time is short, minimising long-term risks. However, unconventional plays can take hundreds or thousands of wells to develop, not forgetting the explorer has to find the sweet spots in the play before it can see any returns.

Indonesia's maiden licensing round may or may not happen in 2014. But in terms of tight oil nothing is really happening yet with most of the talk focused on shale gas. So far, one shale block has been awarded to Indonesian state company Pertamina, but that sole block is not going to change the face of shale in the country, says McMahon.

Pakistan

Pakistan has never stood out as far as big oil is concerned. But in the EIA's latest 2013 report the oil-short nation was ranked as having the ninth-largest technically recoverable tight oil resources, with the lower Indus basin estimated to hold 9 billion barrels. However, there is a huge difference between technically recoverable and actual reserves.

"There is no denying that we have shale reserves in the country. However, the EIA numbers are exaggerated," Asim Murtaza Khan, managing director of Pakistan Petroleum, said in response to the report.

As Pakistan struggles to meet its energy needs, there is pressure on explorers to find fresh reserves.

But "we need to understand that a discovery should be commercially viable. Otherwise, no one will put money into it," added Khan.

Khan's sobering comments sum up the unconventional oil space in the Asia Pacific. While clearly there is potential, it is far from proven if any of it is commercially viable.

And it seems likely to remain that way for some time as explorers focus on shale gas development. ●