

## Australia gears up for shale prime time

The country has all the ingredients to become a major shale-gas producer



**W**ITH geologic and industry conditions similar to those in North America, Australia could well be one of the next countries producing commercially viable shale gas.

As in the US, small independents have led the charge, gathering geological data and probing the high potential basins. The US Energy Information Administration's (EIA) latest report estimates Australia's technically recoverable shale-gas resource at 437 trillion cubic feet (cf) across six basins.

Initial exploration is promising and has drawn the attention of the international oil companies (IOCs), which are entering these plays by forming joint ventures with the smaller players and bringing capital to the table.

Rising gas prices, which in some areas are trending towards liquefied natural gas (LNG) netback parity, make shale-gas a plausible business proposition. Low entry costs, which can be as little as \$400 per acre, compared to US shale acreage that

retails at over \$10,000/acre, also make Australia appealing.

While the domestic market for gas is small, looming supply shortages offer opportunities. Shale could become an alternative feedstock for Australia's fast expanding LNG export industry.

Three separate LNG export ventures are already being developed on the east coast to sell coal-bed methane (CBM) production into Asian markets. But CBM gas reserve bookings are starting to reach a plateau, suggesting the export schemes could be short by more than 10 trillion cf of gas.

So far local companies Santos and Beach Energy have blazed the trail for shale in Australia. In October 2012, Santos brought on stream Australia's only producing shale-gas well, Moomba-191, in the Cooper basin, which flowed at a stabilized rate of 2.7 million cubic feet per day (cf/d).

The pair, as well as Senex and Drillsearch Energy, are busy drilling new vertical and horizontal targets in

the basin, which is widely expected to be the nation's first major source of commercial shale gas.

Australian-focused consultancy EnergyQuest reports that there is 5,544 petajoules (5.2 trillion cf) of best estimate contingent shale resources in the Cooper basin, with Santos making up 54% of the total, Beach Energy on 25% and Senex holding the remaining 21%. This is the discovered gas initially in-place, but that has not been proved commercial yet.

### Good connections

The basin, estimated by the EIA to hold 93 trillion cf of undiscovered technically recoverable shale-gas resources, has established gas-processing facilities and is connected to east coast gas markets. But the lacustrine shales appear to have a high carbon dioxide content, which adds an element of risk to the plays.

Beach is targeting a shale gas play in the Nappamerri Trough, which straddles the states of South Australia

Fracking country: Australia is set to exploit its shale gas potential

and Queensland. The company, which has signed a partnership deal with US major Chevron, is still very much in the exploration phase, but they have de-risked the play, Beach's exploration manager, Mike Dodd, explains.

So far, Beach has drilled 13 wells, two of which are horizontal.

"We have found a fantastic thickness of rock, over one km thick, which translates to a huge volume of gas in-place," Dodd tells *Petroleum Economist*.

Four wells have been flow-tested with initial rates as much as 4.5 million cf/d, which is really encouraging, says Dodd. While it's too early to determine the recovery factor, production declines from these early wells has been steep.

Beach has already booked 1.3 trillion cf of contingent resources.

But the junior could have 600 trillion cf of gas in-place, which based on a 10% recovery factor would equate to 60 trillion cf of potential.

Standalone shale projects are expensive with a horizontal well in the Cooper costing about A\$12 million (\$11 million) and taking around three months to drill. Verticals take about two months.

But efficiencies are improving. As drilling becomes more concentrated significant savings are expected, with wells likely to cost under A\$10 million in future.

Dodd says there is no issue getting fracturing equipment, as there are a number of providers. Halliburton, Schlumberger, as well as Baker Hughes, and a new player, Condor, are present.

If successful, delivering commercial flows could coincide well with the looming east coast Australian market shortage and rising domestic prices.

East coast gas prices are expected to range between A\$6-9 per gigajoule after 2015 – as CBM to LNG export projects start to ramp up – which will likely make Cooper basin shale-gas commercial.

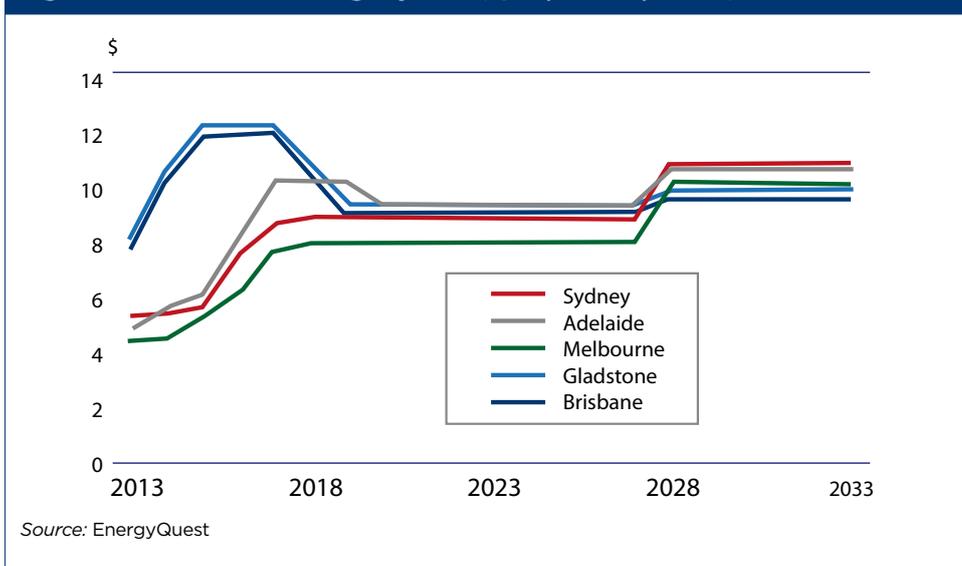
However, the deliverability of wells, as well as the reserves per well, both yet to be determined, will also affect the economics.

Australia's first onshore horizontal shale well – in remote northwest Queensland – to flow gas, has drawn attention to the nation's emerging frontier plays.

The driller, local independent Armour Energy, says the shale should produce commercial flows after tests confirmed the presence of a continuous, gas-rich section of the Lawn shale.

"It typically takes between 30 and

**Figure 1: Annual east coast gas prices (\$/GJ, \$95 oil, 2013\$)**



50 wells to unlock all the codes for a shale play. So it's fair to say more work needs to be done, but results so far have been encouraging," says Robbert de Weijer, Armour's chief executive.

If successful, the play could also help meet the projected supply shortfall on the east coast.

The initial result bodes well for French major Total and Norway's Statoil, as well as Australian gas producer Santos, all of which have recently picked up acreage in the neighboring Northern Territory.

### First step

The IOCs are establishing an early footprint in the Northern Territory with a view to tapping the gas and liquids potential in the shales. Santos, Australia's largest domestic gas supplier, has been talking up the prospect of liquid-rich marine shale plays across the Northern basins.

Armour's permit ATP1087 covering just over 7,000 square kms may be remote, but the gas is far from stranded. The block lies 300 kms north of the Mount Isa industrial hub, which is connected to the east coast gas markets.

So far, the gas recovered is virtually pipeline specification, unlike in the Cooper basin, where gas typically contains considerable carbon dioxide.

Armour's target areas lie between 1,700 and 3,000 metres. Drilling at shallower depths, compared to the Cooper shale plays, which start around 3,500 metres, offers a significant cost advantage.

Shallower wells also mean the

junior explorer can take advantage of the fracking equipment used by the CBM operators in Queensland.

The 100%-owned block holds 40 trillion cf of recoverable resources, which even if only 10-15% is produced from sweet spots would be a significant prize.

Over in Western Australia, US independent Apache Energy has agreed to a A\$30 million-plus entry into the Canning basin fields owned by Buru Energy and Japan's Mitsubishi Corporation.

ConocoPhillips is also exploring the Canning's huge potential with local player New Standard Energy. US independent Hess is present too.

The Canning basin is estimated to hold 235 trillion cf of technically recoverable shale-gas resources, which remain largely unexplored due to its remote location.

But Western Australia's Perth basin holds immediate potential close to existing pipelines and markets, predicted to be gas-short around 2015 until possibly 2020. It could hold up to 59 trillion cf of technically recoverable shale-gas resources.

Other regions where explorers are actively looking for shale include the Beetaloo basin in the Northern Territory, the Georgina basin stretching across the Northern Territory and Queensland, the Galilee basin in Queensland and the Amadeus basin straddling the Northern Territory and Western Australia.

The next two basins on Beach's shale hit list are the onshore Bonaparte and Otway, where the Adelaide-based company is just starting exploration. **DE ●**