

## Mini LNG projects on the rise

Rising demand for gas in Asia-Pacific is expected to pique market interest in small-scale LNG projects in the coming years.

China and Australia are planning several new projects, with some expected to be ready as early as next year. Indonesia and the Philippines are considering using mini LNG facilities to tap gas resources in stranded gas fields. And gas from mini LNG plants can also be viable for countries like Thailand, where the government has been pushing the use of gas in the transport sector and which already has in place significant infrastructure for gas usage, says senior managing consultant at energy consultants Wood Mackenzie, David Bradley.

Small LNG projects are typically built to tap stranded resources or supply remote markets. Unlike many large LNG plants in Asia-Pacific, which cater to major term buyers in Japan, South Korea and Taiwan, mini plants are built to supply gas for transportation purposes or to operate power stations located away from main transmission lines. LNG from smaller plants can be transported in small LNG vessels or by tanker trucks to buyers in remote inland locations (*AGL, May, p15*).

Limitations of scale and high capital costs are keeping the number of mini LNG projects low compared with traditional LNG projects, but demand for such supply exists. Despite typically being delivered at higher prices than large-scale LNG supply, gas from mini plants is "still cheaper than most liquid fuel alternatives such as gasoline, diesel or LPG", says Bradley. Gas from mini plants "will usually fit best as fuel for markets that otherwise would have depended on liquid fuels such as gasoline or diesel for truck fleets, or diesel or LPG for remote power stations", he says.

These facilities are much smaller than traditional 3mn-4mn

t/yr plants and have up to 1mn t/yr capacity — some are built with the possibility to expand capacity to 2mn t/yr. The smaller scale of such projects prevents them from reaping the economies of scale that larger LNG plants enjoy. But one of their benefits is the chance to test new technologies for liquefaction and gasification. Building small-scale plants can benefit the development of traditional LNG projects that face rising development costs.

Because technology successfully tested on small-scale LNG projects can eventually be used for traditional plants, this could help decrease the cost of experimentation for operators, says financial firm AWR Lloyd's senior gas consultant, Tony Taylor.

The smaller scale of investment in mini LNG projects also reduces the margin of risk for firms trying to prove the viability of new technology. Wood Mackenzie estimates that it costs small to mid-size firms \$50mn-200mn to produce about 1mn t/yr with a mini LNG plant. The cost of 3mn-4mn t/yr LNG plants typically run to billions of dollars. But AWR Lloyd's Taylor says the viability of mini LNG plants is yet to be tested, although that does not mean they are not worth pursuing, he adds.

### Project developments

In May, China Gas signed up to operate a 500,000 t/yr project in Xuan Hangxian in Sichuan province. The \$157mn facility will include gas desulphurisation and decarbonisation facilities and liquefaction and storage capacity. The developers could supply it with gas from the Puguang gas field, recently discovered by state-owned Sinopec in Xuan Hangxian, which has identified gas resources of about 370bn m<sup>3</sup>.

Australian firms Arrow Energy and LNG Limited have signed an agreement to build a 1mn t/yr facility in Gladstone, Queensland. The Gladstone LNG plant, to be located within the Gladstone port area, is set for 2010 start-up and will have an expansion option to add a 1mn t/yr train. Arrow intends to tap coal seam-gas resources in the Bowen basin and coastal Queensland to run the plant.

Indonesia's state-run Pertamina and domestic independent Medco Energi signed an agreement in May to develop a \$500mn, 2mn t/yr project in Indonesia's central Sulawesi region. The venture plans to tap into gas reserves from the Senoro field, jointly operated by Pertamina and Medco Energi, and the Donggi Matindok, Maleo-Raja and Minahaki fields in the Matindok block, also operated by Pertamina. Japan's Mitsubishi has signed on to develop the project.

Australian conglomerate Wesfarmers is aiming to develop an LNG project for the domestic market, building a small-scale production plant in Western Australia for the power generation and transport sectors. Wesfarmers will spend A\$138mn (\$103mn) on an LNG plant at Kwinana near Perth, along with distribution infrastructure and two power plants. Construction of the 64,000 t/yr plant started in November last year, with commissioning by the first quarter of 2008. Australian independent Santos will supply 990mn m<sup>3</sup> of natural gas for an initial 10 years from its John Brookes field in the Carnarvon basin offshore Western Australia, with supply piped to Kwinana using the Dampier-Bunbury pipeline.

### LNG as a transportation fuel

LNG has traditionally been used for power generation in Asia-Pacific, especially by utilities in Japan, South Korea and Taiwan. But growing demand for cleaner burning transport fuels means that LNG is increasingly seen as an alternative to liquid fuels such as gasoline or diesel.

Few large-scale LNG import terminals are equipped to produce LNG with the higher methane content required for transport purposes. But small-scale LNG plants can tailor their production to the transport sector. Their lower investment costs compared with large LNG projects reduce the risk for producers keen to venture into producing transport fuels for a sector with significant growth potential.

In California, a number of transit buses, refuse trucks and heavy trucks relying on a central fuelling point run on LNG. Diesel-powered vehicles require modification to their engines and fuel tanks to run on LNG.

LNG as a transport fuel is in its infancy in Asia-Pacific, although there are plans to introduce this in Australia. But vehicles running on compressed natural gas are a common sight in India and Pakistan and are increasing in popularity in many southeast Asian nations, where gas supply is abundant and rising oil prices are becoming prohibitive.