

Can shale gas change the game in China too?

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When William Hart, a poorly educated American gunsmith, became the first person to drill commercially for natural gas, little could he have imagined that the rush for it in North America almost two centuries later would become like that for gold.

What is more, the form of gas for which there is special zeal now is the same as that Hart drilled from slate-like rocks in the US state of New York in 1821. It is called shale gas, trapped deeper underground than conventional natural gas and in less-permeable rocks. Canada, Australia and Europe are in on the rush.

China and India – both dependent on imported oil and gas – are also eyeing shale gas exploration.

Large-scale commercialisation of natural gas from shale, a grey, fine-grained sedimentary rock, was made possible in recent years after small, independent explorers in the US made a couple of technological breakthroughs.

Shale gas production has already helped drive the price of natural gas in the US down to near 10-year lows, even as the international price of oil has climbed.

Shale gas “is a complete game-changer in the US”, Tony Hayward, BP’s former chief executive, said last

year at the World Economic Forum in Davos, Switzerland. “It probably transforms the US energy outlook for the next 100 years.”

Shale gas is abundant worldwide but is squeezed tightly between densely compressed rocks and is dispersed over large areas deep underground.

The new technology involves injecting water, sand and chemicals into rock formations thousands of metres underground through a well bore, which vastly increases the surface area through which gas can be recovered.

The other breakthrough is horizontal drilling, which was already being used in conventional natural gas extraction. It entails boring multiple wells laterally through oil and gas-bearing rocks at angles from a vertical well bore to maximise the number of gas reservoirs accessed.

The US Energy Information Administration projected in a report in April last year that shale gas output in the US would rise to 169.9 billion cubic metres in 2035 from 35.1 billion in 2008, with its contribution to gas supply forecast to rise to 25 per cent of the US total, from 6 per cent.

This growth is expected to more than offset declines in other sources of gas in the US and fundamentally

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change the country's gas-supply picture. For instance, just five years ago, a few dozen terminals for receiving liquefied natural gas were proposed in the US to import gas to make up for falling domestic conventional gas supply. Now, because of the expected production of shale gas, the industry is looking at changing them into LNG export facilities.

The Marcellus Shale Region, straddling northeastern states including New York, is projected by Wood Mackenzie, a resources consultancy, to see some of the fastest investment growth. It could surge to US\$11 billion in 2013 from US\$3 billion in 2009, it said.

A similar story is unfolding in Canada, which is also developing its shale gas resources to offset a conventional gas output decline. The Kitimat LNG terminal on the west coast has reversed its plan to import gas from the Pacific Basin and now plans to export gas to East Asia.

The technological breakthroughs in the US caught the attention of big international energy companies, which have been snapping up small, independent explorers. Exxon Mobil Corp, the world's largest oil and gas company, raised eyebrows just over a year ago with its US\$41 billion acquisition of Texan-based XTO Energy, an operator of unconventional gas projects. European rival Royal Dutch Shell followed five months later with a US\$4.7 billion purchase of Pennsylvania-based East Resources.

Peter O'Malley, the head of HSBC's resources and energy group for Asia-Pacific, said shale gas projects had had a remarkable reversal of fortune. "Many of today's shale [developers] were sold by some of the majors back in the 1970s and early 1980s," he said. "Given the technological advancements ... these [developers] are now more commercially viable."

China and India are eager to procure the new technology so they can develop their own domestic shale gas resources to enhance energy security and cut pollution.

Both countries have big land masses containing shale gas as well as huge coal reserves that may trap a vast amount of unconventional gas resources, such as methane, the mining of which uses a similar technology to shale gas extraction.

India's Reliance Industries last year bought at least US\$3.3 billion of stakes in US shale gas projects.

China National Offshore Oil Corp paid US\$1 billion for a piece of an onshore shale gas project in Texas and agreed to pour another US\$1 billion into its development, partly to become familiar with the technology.

In another sign that CNOOC wants to break into onshore unconventional gas development, it recently acquired a 50 per cent stake in state-owned China United Coalbed Methane, a pioneer in the mainland's unconventional gas sector.

The central government is aiming for shale gas output of 530 billion to 1.06 trillion cubic feet by 2020, equivalent to 8 to 12 per cent that of conventional gas, according to Zhang Dawei, a deputy director of oil and gas strategy research at the Ministry of Land and Resources. Beijing wants natural gas of all forms to account for 8 per cent of the country's total energy consumption by 2020, double last year's amount.

But people in the industry say it is unclear how easily the technology to extract shale gas can be transferred to the mainland. For a start, the mainland's older, denser geology means that it is trickier to get the gas out. Already, geological challenges have made development of coal-bed methane on the mainland by US and Australian firms less successful than developers had hoped.

Gavin Thompson, a director of China gas research at Wood Mackenzie, said the mainland would need to invest more to address its unique geological conditions.

He also pointed out that limited access to transmission pipelines, mostly owned by giant state-owned rivals, had put independent main-

land developers at a disadvantage. Moreover, right of entry to exploration sites is an issue. Unlike in the US, landowners on the mainland do not get financial benefit from letting gas developers operate on their property because the state controls all mineral rights.

And regulatory regimes in both China and India impose hefty government levies, impeding rapid development of shale gas, according to Peter Cockcroft, the chief executive of European Gas, an unconventional-gas developer.

He told the *South China Morning Post* on the sidelines of the Unconventional Gas Asia Summit in Beijing last month that foreign developers must enter into so-called production-sharing contracts, under which they bear all exploration expenses.

If reserves are found, they have to share a big portion of the output with the government or state-owned companies, and then they have to pay corporate tax on their earnings, effectively giving to the government's coffers twice.

By contrast, in the US, developers only pay a percentage of revenues from the project to the landowner as royalty, and corporate tax on profit.

"Globally, the areas that have been successful in unconventional [gas production] are in the US, Canada and Australia," Cockcroft said. "They all use a royalty tax regime rather than production-sharing contracts."

But the biggest challenge facing the development of shale and other unconventional energy sources in China, he said, was that it took entrepreneurial spirit, and China's energy industry was dominated by huge, stodgy, state-owned firms.

"In this industry, every shale project is different so you can't use a template," he said.

[The development of shale gas] probably transforms the US energy outlook for the next 100 years

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Tony Hayward, BP's former chief executive

"I have worked for a couple of government organisations and a couple of big companies ... it's always a challenge for them to give that authority or autonomy to the technical people to develop their creativity."

Another hurdle is the price of gas. While oil is hovering at about US\$100 a barrel, natural gas prices in the US have decoupled, slumping to near-decade lows of about US\$4.4 per million British thermal units recently from a peak of US\$11.8 per million in July 2008. Besides massive new gas supplies, weak US demand has played a part in the fall.

Roger Kennedy, the head of energy and natural resources at JP Morgan Asia, said he expected oversupply concerns to keep gas prices decoupled from oil. However, he said the market tended to correct itself and low prices meant not all new projects would come online as projected, underpinning gas prices.

Gas prices are key. On the mainland the central government has kept them lower than international levels, discouraging shale gas projects.

But HSBC analysts expect the gas price to rise 20 per cent annually on the mainland until 2015, following a 25 per cent jump last year.

In the US, break-even for shale gas projects ranges from US\$3.70 per million BTU to US\$5.80, according to estimates by Michael Rodgers, a partner and head of Asia for consultant PFC Energy. Meanwhile, to gain expertise, analysts believe China's big oil and gas corporations will buy into more shale gas projects in the US. "We expect a greater number of Asian and global energy companies to take advantage of depressed gas prices to snatch bargain acquisitions in the US shale market," Gordon Kwan, the head of energy research at Mirae Asset Securities, wrote in October.