

Can gas see off coal?

Without a price on carbon, gas is generally seen as an expensive alternative to cheap coal. But the increasingly fungible nature of liquefied natural gas (LNG) and potential market innovations could see gas overtake coal as Asia's fuel of choice. Damon Evans reports

AT THE launch of its latest *Medium-Term Gas Market Report*, the International Energy Agency (IEA) offered developers and policy makers a timely reminder – that coal poses a real threat to expanding natural gas' market share in Asia, the world's fastest growing energy market.

On a head-to-head basis, coal remains competitive in the Asia-Pacific market place, as it does elsewhere in the world.

Compared with oil and gas, coal is the most cost-competitive per calorific value – the amount of heat produced when a fuel is burnt. This is especially true in Asia, where because of the absence of gas-on-gas competition (as there is in the US, for example), the prices of gas imports are generally indexed to crude.

Shoichi Itoh, a senior analyst at the Institute of Energy Economics in Japan, says aggressive use of coal, therefore, could cut capital outflows, especially from economies with low hydrocarbon self-sufficiency. Following the nuclear shutdown prompted by the 2011 Fukushima Daiichi disaster, Japan opted to import liquefied natural gas (LNG) for power generation. This, however, saw LNG prices soar. Japanese utilities are now increasingly opting for cheaper coal – a decision which has seen the country's carbon dioxide emissions rise.

The IEA estimates coal will make up one-quarter of the world's primary energy demand in 2035. Its use will be all the more persistent in Asia, where it is forecast to make up 45% of the energy mix and more than 60% of the power mix in non-OECD Asia by 2035, partly because the self-sufficiency rate of coal is reasonably high in Asia. China, India, and Australia are the world's first-, third- and fourth-largest coal producers, respectively.

The IEA has even predicted that, barring policy changes, coal may rival oil in importance by 2017 on a global basis.

As nations become wealthier they tend to look for alternatives – China is hastily trying to curb its rising



consumption. But others, such as India and Africa, are primed to take up the slack.

Cheap fuel

Indeed, just as this coal powered the industrial revolution in the 19th Century, today it offers the best chance for poor countries wanting to get rich. But it is devastatingly dirty – coal contributes 39% of the man-made carbon dioxide emitted into the atmosphere.

And as long as consumers do not pay for coal's side effects, the fuel will remain irresistibly cheap. It costs as little as \$2-4 per million British thermal units (Btu) to mine coal in China. On the other hand, imported LNG costs roughly between \$14 and \$20/million Btu in Asia and domestic gas production in China – while in

the \$10 or more per million Btu range – is husbanded for industry, not electricity.

Coal is making significant inroads in developing Asia and is making a comeback in many OECD Asia Oceania nations. Of the new power plants on order over the next seven years in developing Asia, 70% are coal-fired, with the remainder fuelled by gas or other sources. The IEA's chief economist Fatih Birol says that to produce 1 kilowatt-hour of electricity, on average a new gas-fired power plant is more than twice as expensive as its new coal-fired equivalent.

And it is the economics that makes it difficult for natural gas to expand its market share, especially in Asia's ballooning power sector. As Rob Franklin, president of ExxonMobil

Powering Asia: Has coal had its day?

gas and power marketing, said “gas cannot compete with coal on a like-for-like basis unless there is a price on carbon”.

High LNG prices are threatening to crimp demand as many countries are increasingly unwilling, – or unable – to afford these supplies. And that could open the door to coal, particularly in Asia, warned Maria van der Hoeven, the executive director of the IEA, at the launch of the gas market report.

Significantly, more LNG will be needed towards the end of the decade to prevent prices from trending even higher. But given the five-year construction period that any greenfield projects usually need, decisions must be taken now for supplies to arrive in the markets by 2020, the IEA said. Although many LNG projects are at the planning stage, actually very few final investment decisions have been taken since mid-2012.

Van der Hoeven added that, looking ahead, unless there is timely development in new production and the reversal of the recent cost inflation of LNG, only a very strong climate policy commitment could redirect Asia’s coal investment wave to gas.

Lack of regulation

Gas, which emits up to 50% less carbon dioxide than coal when burned for power generation, is the least carbon-intensive fossil fuel. Still, carbon capture and storage (CCS) technology – which remains largely experimental – could make it cleaner. But there is a lack of local standards regulating emissions and pollution in the Asia region.

It should not be taken for granted, therefore, that gas will become a major market player, as, unless gas prices retreat or coal is subjected to stringent environmental regulations, coal usually proves to be the most economic fuel option, Birol told *Petroleum Economist*.

But developing nations around Asia are evolving and becoming far more sensitive about emissions, and China is a case in point. China’s campaign to clean its smog-filled skies will

usher a new “golden age of gas” for the country as demand doubles over the next five years, the IEA says.

But clearly innovations are desperately needed to produce gas in a way that is profitable for investors, as well as price competitive for consumers, to build a sustainable supply chain.

On the market side, there is plenty of potential for gas usage to expand.

“People are not yet really opening their mind up to all the alternative uses that gas has,” Peter Coleman, chief executive of Australian LNG developer Woodside Petroleum told *Petroleum Economist*.

Coal use is limited. It can simply convert water to steam and steam to electricity. But gas can be used in many different forms, which are yet to be fully exploited.

Gas can be used not just in power generation and transportation, but also directly in commercial use, to fire industrial boilers and burners. Significantly, coal cannot be reticulated like gas.

If more supply comes into the market and gas becomes more abundant people are going to find more things to do with it.

“The current forecasts are very linear, they’re really just talking about head-to-head power competition between coal and gas, as well as the elasticity of price around that,” says Coleman.

French major Total estimates Asian LNG demand will be around 300 million tonnes by 2024 with one-quarter of that demand yet to be contracted.

From an environmental perspective, the most effective way to slow carbon emissions is to help the developing world with infrastructure development – and to help them develop alternatives to coal-fired power.

To do that requires efficiency and innovation, not just on the supply side, but also on the market side says Coleman, whose company is embracing novel floating LNG (FLNG) technology and beefing up its trading arm to help cut supply costs.

Coleman believes making access to technology cheaper, while breaking down intellectual property barriers

around research and development would be very cost effective for developing economies.

Nevertheless, demand for LNG in Asia is constrained by a lack of certainty in government policy and reliance on inefficient heating and power systems for the time being.

But, positively, with the rise of LNG, gas is becoming more fungible and commoditisation will provide more countries with greater access to the fuel, particularly in Southeast Asia. However, as the IEA noted, demand for gas will be price sensitive, meaning buyers and suppliers need to work together to cut costs.

Crystal ball

Still, market disturbances are expected over the medium term. But these are hard to predict, just as the rapid expansion in the use of the mobile phone was. Likewise, neither was the surge in US shale-gas production foreseen, and while technology enabled that shift, it was not the catalyst for it. Part of the impetus was relatively high gas prices, which initially allowed savvy investors to exploit the potential of shale.

Similarly, it will be difficult to gauge how quickly gas consumption will evolve – at present, most people can only access it from a stove. What will be the signals that allow gas to bloom? Will it be a price signal? A breakthrough in the technology of storage and distribution of the fuel? Or maybe it will be something different like an emissions or environmental push. It could be anyone of these, but it might take all three before there is a huge expansion in gas use, says Coleman.

Nevertheless, coal’s renaissance is a strong reminder that the important role for gas in tomorrow’s world cannot be taken for granted. For the gas industry, there’s an opportunity – and a duty – to steer things in the right direction. Industry needs to make a stronger case for gas and to continue to innovate. As Martin Weteselaar, executive vice president of integrated gas at Shell, told delegates to the Gastech conference in Seoul earlier in 2014, only then, gas might get the role it deserves. ●