Asia's energy conundrum

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IT IS no secret that Asia's energy demand will increase significantly over the coming decades. As the region's population and economies grow, primary energy demand is set to rise by an estimated 37% by 2025.

To meet this growth, Asia's energy imports will increase by 53%, or 1.9 billion tonnes of oil equivalent. Yet it is not clear how this demand will be met or if Asia can harmonise its energy connectivity to build a 21st century energy system that will power its drive to achieve its economic potential.

But it is clear that in the next decade at least, coal, which is both cheap and abundant, will dominate the region's energy mix, even as alternative fuels expand their market share.

Coal is likely to account for around 60% of Asia's primary energy production by 2025. While coal is a cheap power-generation fuel, its dominance as an electricity feedstock is likely to exacerbate Asia's pollution problems and carbon emissions.

Singapore International Energy Week (SIEW) this year focused on energy connections – a timely reminder that the solutions to the region's energy conundrum cannot be developed in isolation.

For years policymakers and analysts have talked up the prospects of collaboration between Asian nations as a way of both increasing energy security and driving down energy costs. Proposals included a trans-Asean power grid, as well as a regional gas pipeline network. Yet little has materialised.

Yasuo Ryoki, head of Osaka Gas' commercial and industrial energy business, told delegates to SIEW 2014 that developing a more fluid market for liquefied natural gas (LNG) trading in the region was probably the most realistic way to connect Asia's gas markets.

Rising capacity

Many Asian nations have recently built or are developing LNG import capacity. Japan and South Korea are the world's two biggest importers of LNG, while China is on course to overtake South Korea as the world's second-largest LNG importer by 2020.

Asia as a whole will make up two-thirds of all global energy demand growth by 2025. This, analysts say, makes the need for a coherent regional strategy crucial. However, such a move requires sound regional policy and regulations, as well as fully liberalised markets.

In a keynote speech at SIEW 2014, Maria van der Hoeven, executive director of the International Energy Agency (IEA), warned Asia not to count on cheap, abundant gas from North America.

She said: "Waiting for North American LNG is no substitute to running a good energy system … [US shale-gas imports] will not be enough to supply the entire region and [they] will be pricey."

The IEA expects Asia will be responsible for half of all new gas consumption this decade. By 2035, the region will burn an extra 750 billion cubic metres of gas – slightly more than total US gas production today.

Van der Hoeven said the region had two options to reduce its gas import bill – and its dependence on imports. "Use less [gas] and find more [gas]," she told delegates. "The good news is that both of these solutions can be met in the region."

However, encouraging new gas production requires government moves to create efficient gas and electricity markets region-wide, van der Hoeven said.

The first step is to encourage investment in new production – and that means changes to regulations, licensing processes, royalties and taxation, as well as an overhaul of gas subsidy regimes.

Van der Hoeven stressed that gas' future role in Asia will depend, in large part, on pricing. While the IEA sees no credible prospect of cheap gas in Asia, government policy can be used to foster a secure and abundant supply – by actively encouraging greater competition. Asia's emerging economies can also avoid the mistakes made in developed economies by encouraging efficiency at an early stage, thus avoiding the need to reform systems when they are already well established. The gap between low- and high-energy efficiency potential growth is substantial.

But perhaps more crucial to Asia's problems is that the markets are moving fast and governments are struggling to keep up.

"There is a lot of talk, but a vast analysis gap," Sarah Fairhurst, director of the Hong Kong-based Lantau Group, a specialist economic energy consultancy, told *Petroleum Economist*.

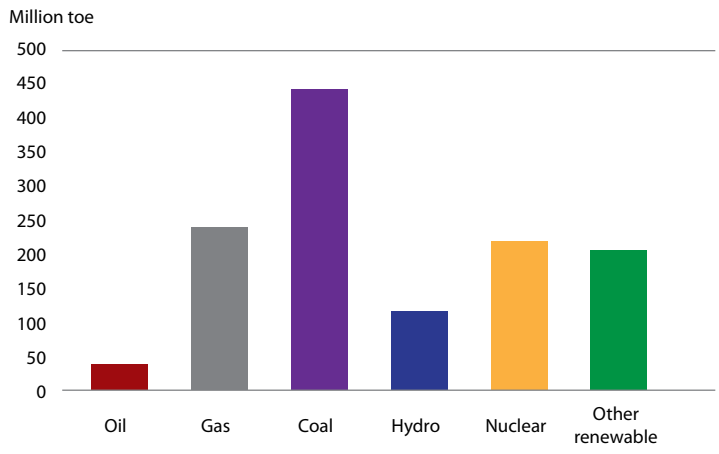
Fairhurst put a question to a panel – largely made up of regional policy-makers tasked with shaping Asia's energy connections – that appeared to leave most of them stumped.

She asked whether the proposed Asean power grid, a topic the panel discussed, remained relevant given the rise of renewables and the region's expanding LNG infrastructure.

When plans for the Asean grid were first developed, all the member countries had their own electricity systems, fuelled by domestic resources.

Via the Asean grid, cheap hydro-power from Laos, Cambodia and Vietnam, for example, could be moved

Figure 1: Total Asia energy production change 2013 versus 2015e



Source: BP, Macquarie research

swiftly to countries relying on higher-cost oil-fired power. However, as more LNG import terminals are built across the region, the marginal fuel cost – the last megawatt hour to be generated – is starting to resemble the cost of LNG.

"If all you are doing is moving electricity around that costs the same everywhere, why bother? Or, why build lines to move power if there are no cost savings in doing so," said Fairhurst, adding that the growth of LNG removes one of the biggest underlying reasons to create a cross-national electricity grid.

On an economic basis, LNG is a good marginal cost solution for the last plant in the system. Still it cannot compete with coal for base load power nor can it be procured as flexibly as coal.

LNG is a good fuel for mid-merit and peaking projects – its high fuel cost is offset by low capital costs, meaning that for plant that are not used too often, it is a sensible addition to the grid.

Coal, on the other hand, has low (albeit variable) fuel costs but high fixed costs, making it good for base load generation.

Unless LNG prices fall substantially – roughly to about half of current levels – this is not going to change the relative economic merits of coal and LNG, Fairhurst said.

LNG is still sold quite inflexibly, except for a small, albeit expanding, spot market. Coal, on the other hand, is much more mature with a mix of long-term, medium-term and spot markets all operating, plus a wide variety of suppliers and transportation options.

"It's in that flexibility that LNG has not caught up with coal yet – and this is purely commercial choice – there is nothing fundamentally stopping a move towards more flexible arrangements and if LNG wants to secure its niche in Asia, it needs to happen," she added.

Cheaper technology

Meanwhile, as the cost of renewable power technologies continues to fall, there is also a point – called the disconnection point – when a mixture of distributed technologies, usually solar generation supplemented by batteries, offers the end-consumer power at the same price as power from a central grid.

The head of one Australian utility remarked that this disconnection point could be a reality in as little as five years. Certainly, if, as expected, the cost of distributed technologies and batteries continues to fall, then the disconnection point could be a real prospect in the medium term.

Regionally, installing decentralised technologies in countries with constrained generation capacity and growing demand – Myanmar and Bangladesh, for example – looks increasingly economic.

Fairhurst said: "Myanmar is a beautiful case in point. The costs are low enough [so that] decentralised power is probably cheaper than building a big centralised system."

Regardless, policy-makers still face challenges. They need to adapt to fast-changing markets, to build smarter energy systems, smarter supply chains and smarter partnerships across the globe.

This, former IEA head Nobuo Tanaka, now global associate for energy security and sustainability at Japan's Institute of Energy Economics, could be the biggest problem Asia faces. He told *Petroleum Economist*: "Thinking collectively and not one by one is the big challenge in Asia."

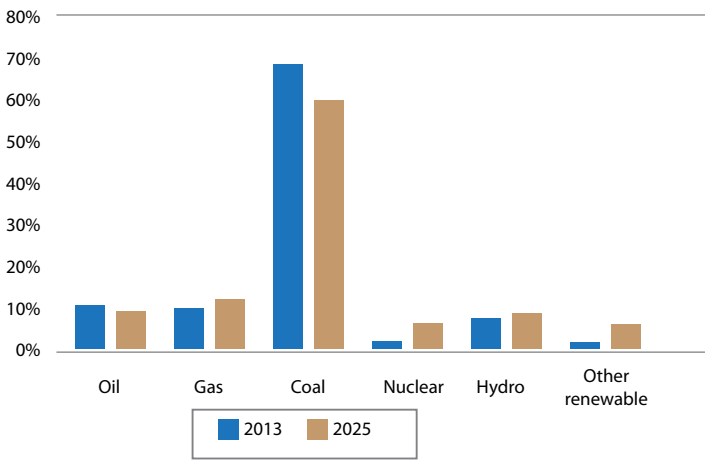
Van der Hoeven echoed his concerns, saying Asia's energy status quo is inefficient, expensive and potentially unsustainable.

Liberalising markets would channel new supplies where they are needed, while efficiency standards in the building, industrial and transportation sectors could slow demand growth.

She added that IEA member countries know from hard-learned experience that economic expansion is only as secure as the energy supply that underpins it.

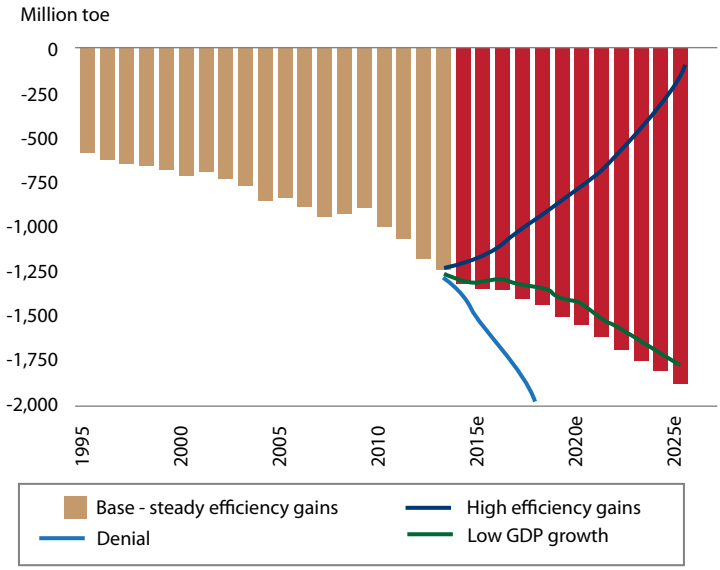
"It's a lesson Asia should learn the easy way," van der Hoeven said. ●

Figure 2: Change in Asia primary energy production mix



Source: BP, Macquarie research

Figure 3: Total Asia energy net imports/exports, base case



Source: BP, Macquarie research