

Executive Director IEA Nobuo Tanaka. Photo: David Briabyn/Corbis

The latest review of natural gas markets from the International Energy Agency (IEA) paints a picture of growing demand in the face of rising prices, a strengthening link between gas and electricity markets, and a globalising influence from increasingly flexible LNG supplies. But there are growing signs that security of supply is under threat from underinvestment, delays and cost escalation.

Gas supply under pressure

| by Alex Forbes

You would think that with spot liquefied natural gas (LNG) cargoes fetching up to \$20 per MMBtu in Japan – a nation entirely dependent on LNG for its natural gas supply – users would be cutting back on consumption. Yet in 2007, Japanese gas consumption grew by 11% to 96 billion cubic metres (bcm), and during the first half of 2008, it grew even faster.

Part of the reason is that Japan has had big problems with its nuclear industry. But it is far from being the only major gas-consuming nation to be experiencing consumption growth on such a scale. South Korea, another nation totally dependent on LNG, has seen similar rates of growth, and Spain's gas consumption is increasing even more rapidly, at around 18-20% per year. Again, LNG plays a dominant role in Spain's gas mix.

These are just some of the surprising developments to emerge in September's

gas market review from the IEA. It reports robust demand for natural gas, particularly for electricity generation, in both OECD and non-OECD countries – despite rising prices. Gas demand in OECD countries rose by 4.5% in 2007, which compares with overall energy supply growth of 1%, and strong growth has continued into 2008, especially in non-OECD countries. Prices in all regional gas markets continued to rise in 2007 and the first half of 2008 because of higher oil prices, unseasonal weather conditions, and supply and demand imbalances. Gas prices in the US were around \$7 per MMBtu (million British thermal units, 1 MMBtu = 28 m³) in 2007, in the UK they have risen to well above \$10 and in the Pacific spot prices of \$15 per MMBtu are paid for LNG cargoes.

Rollercoaster |

So why is demand proving to be so resilient in the face of historically high prices?

A large part of the answer is that while gas prices look high, so do the prices of competing fuels. Oil prices have been on a rollercoaster this year, reaching \$147 per barrel in July and now dipping below \$90 per barrel. However, as Ian Cronshaw – head of the IEA's energy diversification division – points out in an interview with EER: 'Even at \$90 a barrel, the oil price is still equivalent to \$16 per MMBtu. That alone suggests that even at \$10 per MMBtu, gas is going to have significant buying support. So pressure on gas prices is still strong, notwithstanding what's happened in oil markets.'

The same applies to natural gas's main competitor in the markets for electricity generation fuels – coal. 'I've never seen coal markets behave as they have over the past year,' says Cronshaw. 'Until October last year, European prices were in the \$70 per ton range. In August they were up to \$200

per ton. That's very dramatic. American coal prices went from \$50 to \$140.

'What happened is that because America is a coal exporter, when the high prices in Europe appeared, a lot of American producers moved back into the export market.' The key factor in this price jump, adds Cronshaw, has been demand in China, the world's biggest coal user, where the economy continues to grow at around 10% per year.

The implications for the electricity generation fuels markets are significant. '\$150 per tonne coal is \$6 per MMBtu,' says Cronshaw. 'You can say that's still cheaper than gas – but is it? If you correct for efficiency and have to pay a carbon penalty – and coal pays a higher carbon penalty than gas – suddenly \$150 coal is not that cheap.'

Exceptional case |

Interestingly, the US market has bucked the gas price trend. Until relatively recently, it was widely assumed that US gas production would remain flat at best. Instead, production has begun growing rapidly, largely because high prices and advances in technology are making unconventional gas sources – such as 'tight gas', coal-bed methane, and deep-water gas in the Gulf of Mexico – commercially viable.

'The US market is an exceptional case,' says Cronshaw. 'The production response

to high prices has been dramatic. Not only has that put downward pressure on US prices, but even with the recent hurricanes the market's been incredibly relaxed. If the US had discovered an oil field nine months

Moreover, the IEA's projections suggest this trend will continue. Natural gas remains the dominant fuel not just in plants due to come on stream by 2012, but also for planned projects until 2017. Gas-

'Where you are using gas, look to multiply your supply sources'

ago and brought it to the market at a million barrels a day, everyone would be jumping up saying "that's impressive". But that's what they've done in gas. They have basically found the annual equivalent of 50 bcm per year of gas.'

'What that means', says Cronshaw, 'is that the US is now a virtual exporter of LNG to Japan, South Korea and Spain – places that have seen demand go up. In 2007, the US imported 22 bcm of LNG. This year it won't do half that. So a lot of gas has been available because the market has liquidity, the ability to move gas around. The US, depending on the supply-side response, is probably going to remain quite a small LNG importer. There just seems to be tremendous latent demand out there in places like China and India, the Middle East and even South America. There are plenty of people who want gas.'

fired power in the US increased by 10% last year, and all the larger OECD countries foresee further increases in gas demand for power.

A big factor, says the IEA review, is that 'policy uncertainty, especially with respect to climate change, favours gas as the short-term default option for new investment.' Cronshaw adds: 'It's clear that gas has become the fuel of choice for power generation in the OECD. Nuclear plants are just not happening, and while everyone's talking about coal-fired plants, they're not happening either.

'[Gas] does have its advantages: it means the power sector can respond quickly, in short lead times, and gas can deliver significant environmental benefits. But having said that, it raises issues of supply security, and it links the gas and power sectors in a way that we haven't seen before. It means that if gas prices go up, so do power prices, because gas is the marginal fuel in the mix.'

The wide differential emerging in recent years between oil and gas prices has been particularly significant in Japan, where the contract prices for LNG are much lower than for oil, despite its recent price drop. 'Up until 2004/5, LNG and oil were pretty much the same price, so a lot of people in Japan couldn't see the point of changing,' says Cronshaw. 'Well, now they see the point.'

Fuel of choice |

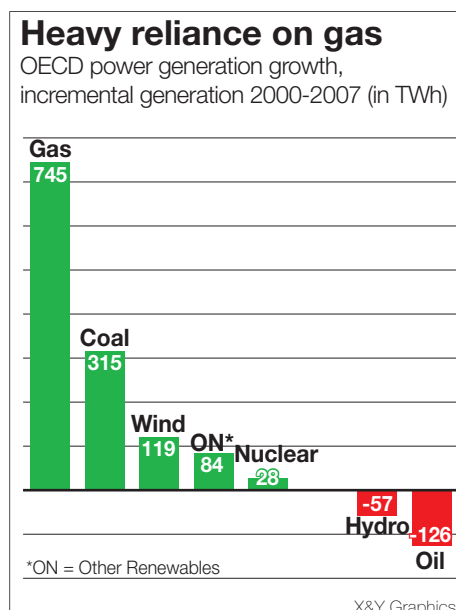
The main driver for growing gas demand is its increasing popularity as a power generation fuel. Incremental power generation over the period 2000-2007 in OECD countries has been dominated by natural gas, which accounted for 745 TWh out of a total of 1,108 TWh – a share of 67%. Coal, with the next-largest share, managed only 28%.

Worries about security of supply are growing along with the structural rise in demand.

Nobuo Tanaka, executive director of the IEA, warns, 'Investment uncertainties, cost increases and delays continue to be a major problem in most gas markets and are continuing to constitute a threat to long-term security of supply.'

The issues are particularly acute for LNG, with incremental supply beyond 2012 hit by a lag in investment since the start of 2006. But there are also concerns about pipeline supplies, over both upstream development and transportation infrastructure.

European Energy Review has already reported on the looming LNG supply crunch that now looks inevitable around



2011-12, when the large chunk of capacity currently under construction has been completed. Since the start of 2006, there have been only five final investment decisions for new liquefaction plants, representing just 19 million tonnes per year (mt/y) of new supply.

What the IEA projections imply, is that this supply crunch could last until 2015, with only another 20-25 mt/y of supply coming on stream between 2012-2015.

‘Since 2005 we’ve seen a reluctance to commit to new LNG projects,’ says Cronshaw. ‘Instead of the four or five final investment decisions per annum that we were getting up to 2005, we’ve seen one to one-and-a-half per annum.’

The IEA’s latest projection for LNG supply until 2015 is a massive downward revision – one-third – from its projection last year, which in turn was a significant downward revision of its 2006 projection.

Increased costs |

Of the various factors behind the recent reluctance to invest in gas liquefaction – which include access to gas reserves, resource constraints and the availability of contractors and other skilled staff – a key one has been cost escalation.

‘Back in 2005 we saw plants being completed in places like Egypt for \$200 per tonne per year of capacity,’ says Cronshaw. ‘No one’s going to finish a plant in the 2009-10 timescale at that kind of number. The projects that are going to be completed around 2010 are more likely to come in at around \$800 per tonne. At \$800 you’re talking about \$4 per MMBtu just to service the capital, compared to a dollar or a dollar fifty. What that means is that LNG is not going to be cheap to produce. If the capital cost is \$4 per MMBtu, by the time you add in feedstock, operating costs and shipping, \$10 per MMBtu looks awfully close.’

Ironically, there has been little reluctance to invest in regasification plants – partly a sign of how much latent demand exists, at the right price. This inevitably means that many of the projects being constructed are bound to be under-utilised. On the plus side, this glut of reception infrastructure will increase the flexibility of the LNG

market, making it more resilient and able to cope when things go wrong.

Russia |

Looking ahead, the LNG supply crunch that is looming post-2011 is putting the onus on pipeline supplies, particularly in Europe. A key concern for the European Union is whether Russia will invest sufficiently, not just to replace lost production at declining fields, but also to increase its production to meet incremental demand growth. Concerns decreased as Russia committed larger sums of money in recent years, but whether they will be enough to cover the escalation in costs the industry has seen is a moot point.

The IEA estimated in its 2007 World Energy Outlook that Russia needed to invest around \$18 billion per year (in 2006 US dollars) to ensure that sufficient gas is produced between now and 2030 for the domestic and export markets, most of it in upstream production development and pipelines.

In 2008, Gazprom’s investment budget more than met this requirement for the first time – ‘a reassuring sign that Gazprom may adequately invest on upstream development over 2008 in the face of a number of major project start-ups in new, more-difficult-to-develop regions’, says Cronshaw.

So how worried should customers be? And what can they do to adapt to this new gas supply environment? ‘The first issue is

and market actors need to use energy efficiently, because it’s expensive – gas-based or power based. If you’re a big user – such as a power sector operator – you need to be doing what you can to diversify your operations, particularly low-carbon operations. That means keeping nuclear in the fleet as in the case of Germany, and improving the units you’ve got in place. It’s interesting to note that the US has managed to increase its nuclear power output, not through building any new power stations, but by improving capacity factors and re-furbishing steam generators. Capacity factors in the US of 92% compare with 50% in Japan. Third, as in any risk management strategy, diversity is good. Where you are using gas, look to multiply your supply sources. Look to LNG – build the terminals. In the UK and Spain this has already happened, but not in places like Italy. Fourth, make markets work for you, particularly in Europe, where markets do not work in any text-book sense.’

Cronshaw argues that markets will increasingly need to move gas around flexibly if there is a supply-side, or indeed demand-side, problem. He cites Spain, where gas use has gone up 20% in the last nine months. ‘The winter was dry and there wasn’t much wind either. So because hydro and wind weren’t available, gas had to come into the mix. And because they have the terminals, they were able to get the LNG they needed out of the Atlantic Basin because the US wasn’t there. Diverse

‘In Europe markets do not work in any textbook-sense’

that in many markets – such as Europe – gas price rises and power price rises have yet to come through to the small consumer,’ says Cronshaw. ‘In the US, where prices come through very quickly, already we are starting to hear anecdotal reports of utilities saying “yes, we can drop our power prices, yes we can drop our gas prices.” But in Europe, that’s still at least some months away – at best.

‘The second issue is that governments

sources of supply such as LNG are a really important part of how you’re going to cope with a difficult and uncertain future.’

What we have yet to see is how the worldwide financial turmoil will affect economic growth, and consequently, demand for energy and the availability of finance for large capital-intensive projects. Until the turmoil subsides and the dust starts to settle, no one can say for sure. ■