LNG could rescue the US

Sandy Fielden of energy market specialist Logical Information Machines looks at a potential solution to the US natural gas supply crisis: liquefied natural gas

The depletion of easily accessible market sources of natural gas in the US, combined with lower costs of liquefication due to better technology are making LNG a competitive alternative to pipeline natural gas. The country's growing appetite for gas has brought higher prices, because new sources of supplies have been hard to find. LNG imports created from abundant reserves of gas overseas, are now seen as a major resource to offset the supply crunch.

The US Department of Energy (DoE) says the reasons for higher US natural gas prices in 2002 and 2003 are fivefold:

- higher crude prices due to political instability in the Middle East;
- colder-than-normal temperatures in consuming regions causing increased demand;
- relatively low storage volumes (see figure 1);
- relatively weak domestic gas production; and
- lower-than-usual net imports of pipeline gas from Canada and Mexico as those countries experienced increased demand themselves.

Over the past five years, the average price for prompt-month delivery of the New York Mercantile Exchange (Nymex) Henry Hub natural gas futures nearby contract has been $3.65 per million British thermal units (mmBtu). In the past two years, that average has risen to $3.92. July 2003 prices averaged $5.03/mmBtu. Consensus price projections for 2004 are between $4 and $5/mmBtu.

The higher prices for pipeline gas in the US over the past five years have started to make LNG a very competitively priced alternative (see figure 2) At the same time, the costs of LNG technology have fallen by 30%. In mid-July, Virginia-based energy company Dominion Resources re-opened the Cove Point LNG import facility in Maryland, with plans to expand it to be the biggest facility in the US. Cove Point is economical when natural gas prices rise above $3.60/mmBtu.

In the past decade, natural gas has quickly become the fuel of choice for power plants and many industries in the US. Companies were drawn to gas due to its low cost and environmental friendliness. US Congress pushed the power-generation industry to use gas. The DoE predicts that demand for natural gas in the country will grow by 54% by the year 2025.

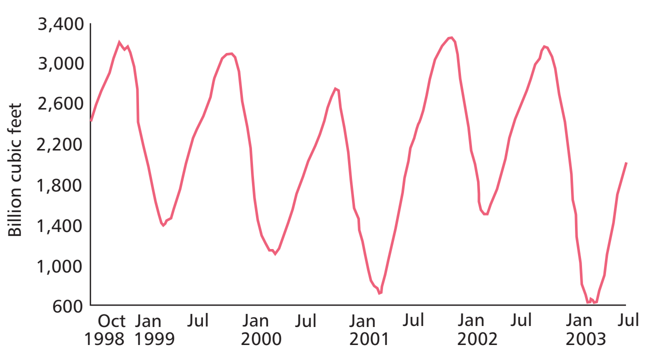
Supply concerns

This growing demand for natural gas is unlikely to be met by significant increases in domestic production. Higher gas prices have prompted increased domestic gas drilling activity, which will lead to an increase in output by the end of 2003 and in 2004 (see figure 3). But major new finds are not on the horizon, except in contentious locations such as the Alaska National Wildlife Refuge, where environmentalists oppose development and the gas is stranded without pipeline infrastructure.

The combination of growing natural gas demand and a stagnant supply situation is causing government concern. The US is not reliant on natural gas merely for power generation and home heating – gas is also an important feedstock for the petrochemicals industry. Rising chemical prices have made US industrial manufacturers less competitive and increased the cost of products such as fertilisers that affect the agricultural sector.

Concerns about the impact on the economy of higher natural gas prices were behind the Federal Reserve chairman's testimony to the US Senate in July. Alan Greenspan said the US should encourage more LNG imports. In addition, US energy secretary Spencer Abraham hosted a summit on LNG developments, also in July.

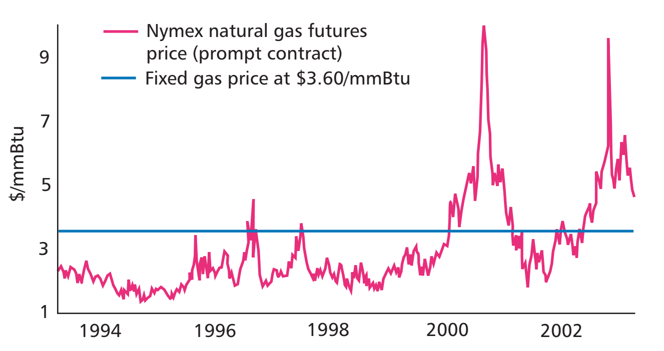
Figure 1: **US working natural gas in storage**



Source: US Department of Energy

The graph shows the total levels of working gas in storage in the US over the past five years. In April of 2003, stocks fell to their lowest level in 10 years after a cold winter increased demand and reductions in output and lower imports from Canada reduced supply.

Figure 2: **US natural gas price v. LNG economic price**



Source: Nymex, Dominion Gas

Natural gas 10-year price history v. economic price for LNG Imports at Cove Point, Maryland. If an LNG importer can make an economic return on its investment at $3.60/mmBtu, the economics of LNG production have looked very good over the past three years.

Not only does LNG offer cost advantages in times of higher natural gas prices, but its flexibility of storage also has potential benefits in terms of keeping gas prices from spiking too high when supplies are short. For storage purposes, LNG – gas that has been cooled to around -260° Fahrenheit (-161.5° Celsius) for shipment and/or storage as a liquid – is more compact than its gaseous equivalent, with a volumetric difference of about 610 to 1. And it can be stored above ground in consuming regions.

Another attraction of LNG is that it allows for the exploitation of so-called 'stranded gas' resources. LNG can be transported in specially built tankers over long distances. Stranded gas is gas produced in remote areas, far from consuming markets, and is often simply flared off or re-injected into oil wells. Lack of demand and the high costs of the technology to liquefy gas made supplies that could be delivered by pipeline more attractive investments in the last quarter of the 20th century.

However, major energy firms are increasing their exploration and production of stranded gas. New sources of crude oil are becoming harder to find and more expensive to develop. Companies are sitting on huge untapped reserves of natural gas in Russia, Norway, Algeria, Egypt and Qatar. Investing in facilities to turn natural gas into LNG and export it to markets where demand is growing is seen as the best way to exploit these dormant gas reserves. Energy companies are investing $28 billion to $30 billion in LNG construction projects worldwide.

Import boom

The result in the US has been an LNG import boom. In addition to the expansion plans at Cove Point and other existing LNG import facilities, more than a dozen proposals for new facilities have been announced since the start of 2001.

Imports for the second quarter of 2003 were 67% higher than the same period in 2002. One facility alone – the Trunkline LNG terminal in Lake Charles, Louisiana – received 30 cargoes totalling 73 bcf, more than double the volume received during the first quarter of last year.

The DoE forecasts that LNG imports will rise to 900 bcf by 2007, supplying 4% of US natural gas demand (see figure 4).

Yet one concern for investors lining up to build LNG facilities is that the volatile US natural gas market might not be a forgiving environment for them. The history of the Cove Point LNG terminal illustrates the point. Cove Point opened in 1978 at the same time as the US gas market was deregulated. As increased exploration for gas and competition in the market brought domestic prices down, the terminal was mothballed two years later and did not re-open until this year.

Pricing

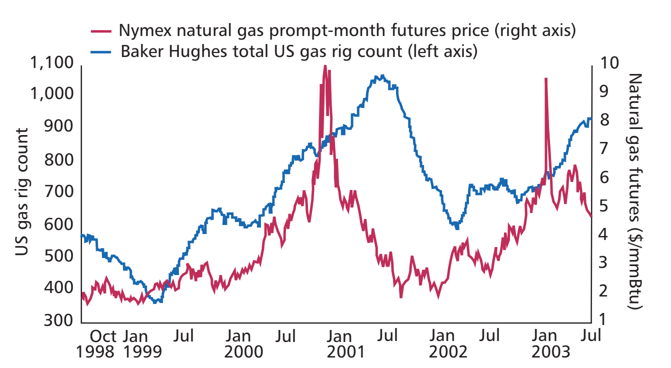
LNG pricing is typically negotiated on a contract basis, over long periods of time. These multi-year deals are designed to protect investors and provide a secure return. Prices outside the US are linked to regional markets. In Japan, deals are linked to crude prices by a formula known as the Japanese Crude Cocktail Index. In Europe, LNG prices are linked to fuel oil and light oils although more recent deals have used electricity pool prices. Buyers are committed to take fixed volumes of gas and pay for it whether they use it or not – under 'take-or-pay' contracts.

In the US market, LNG prices are linked to Henry Hub pipeline gas prices with an adjustment for location. Concepts such as take-or-pay and linking prices to the crude market are considered old fashioned in the deregulated US gas market. It is unclear whether a market mechanism can be constructed to satisfy investors at the same time as being flexible enough to compete with domestic pipeline gas pricing.

Right now, there are a multitude of reasons to develop LNG imports into the US. Natural gas prices are high and supplies of domestic gas are diminishing. LNG technology costs are lower and abundant supplies of stranded gas are available. Should domestic natural gas prices fall back to levels experienced in the 1990s – when the average price of Henry Hub Nymex futures was $2.03/mmBtu – then all the new investment in LNG import infrastructure might turn out to be premature. But if the major energy companies have done their sums correctly, the sector promises to deliver solid profitable sales of resources that were otherwise stranded – both geographically and on their books. EPRM

Sandy Fielden is energy product manager at software vendor Logical Information Machines in Austin, Texas
email: sandy@lim.com

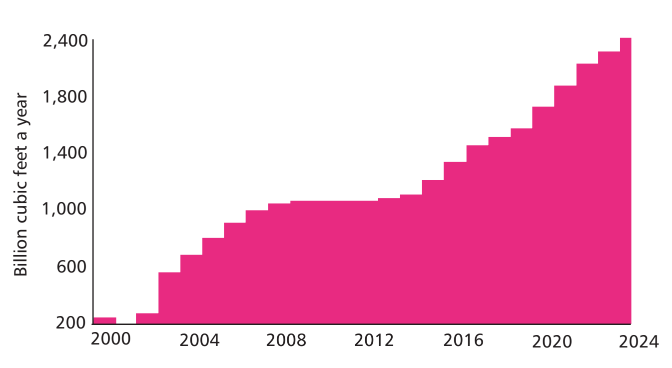
Figure 3: **US natural gas prices and rig counts**



Source: Nymex, Baker Hughes

The number of drilling rigs active in the US gas industry always lags the price of gas, because the industry takes time to respond to higher prices. Drilling activity has increased in 2003 after a big drop in the second half of 2001, but new reserves are getting harder to find.

Figure 4: **Projection of US imports of LNG to 2025**



Source: US Department of Energy

The US Department of Energy has forecast a boom in LNG imports because of the announced plans for investment in new import terminals and facilities and the expectation that gas prices will continue to make LNG imports profitable.