

## China pushes natural gas as transport fuel

The country is developing LNG as a transport fuel, particularly for trucking and shipping, writes Damon Evans



**C**HINA is ready to rapidly develop liquefied natural gas (LNG) as a transport fuel, particularly for trucking and shipping.

With Beijing regulating gas prices, but not the price of crude, an arbitrage opportunity has opened up, which analysts say will make the LNG transport business in China increasingly successful and potentially the world's biggest market for the segment.

Encouraged by government policy to cut emissions and promote energy efficiency, more taxis, buses and heavy-duty trucks are switching to LNG as it is cheaper and cleaner, Liao Na, vice president of consultancy ICIS/C1 Energy, told *Petroleum Economist*.

Given the public outrage over the air pollution that swept across China earlier this year, it seems logical that

Beijing shifts the transport sector's reliance away from oil towards natural gas or electric. While the adoption of electric-powered vehicles is still some way off, LNG looks increasingly attractive as a transport fuel and the number of vehicles using it is rising rapidly. (See Figure 1)

### Reduced emissions

In its favour, gas produces only a small fraction of noxious emissions compared to gasoline and diesel (See Figure 2). It is also cheaper.

Analysis from Bernstein Research shows a spread of up to \$12 per million British thermal units (Btu) can be opened by substituting oil with LNG in China.

LNG can be sold at a discount of 25% to diesel prices. With diesel retailing at \$38/million Btu (based on crude prices of \$110 per barrel), this

A new era for transport: China is poised for a leap forward

means that LNG can be sold at \$28/million Btu.

The cost of LNG supply from domestic gas is about \$16/million Btu. This includes buying the gas, now at \$8/million Btu, but likely to rise to \$11/million Btu with price reforms, plus a further \$5 for liquefaction and distribution, estimates Bernstein Research.

However, it's not just the gap between domestic gas and diesel that is drawing attention. There is also arbitrage within China's own LNG market.

PetroChina imports LNG at \$18/million Btu to supply the domestic market, but for every million Btu it imports and converts to pipeline gas, it loses around \$10/million Btu.

Last year, the national oil company lost 41.9 billion yuan (\$6.8 billion) importing 42.1 billion cubic metres (cm) of pipeline gas and LNG. But if

PetroChina can substitute imported LNG for diesel then it can eliminate the \$10/million Btu loss, giving the firm an enormous incentive to develop the LNG transport fuel market, says Neil Beveridge, a China-focused analyst at Bernstein.

Based on 2011 demand levels, if diesel for trucks and fuel oil for ships were fully converted to LNG, then the total market size would be 125 billion cm. By 2020, Bernstein expects the market for substitution to double to 250 billion cm.

Low conversion fees and big savings offer compelling reasons to switch. Based on Bernstein's analysis, truck drivers would save almost 6,000 yuan, or \$1,000, per month by converting to LNG. Operators could recoup the 123,000 yuan conversion cost in 21 months, compared with 46 months in the US, where the investment is more than three times the price and direct fuel savings are lower.

## Making the change

Heavy-duty trucks, inner-city buses and inner-river shipping vessels are all poised to make the switch. Though the switch for ships is still at an early stage the major gas companies are starting to retrofit refueling ships and build marine gas stations, says Na.

At the end of 2011, there were 179,200 ships operating in China of which 165,800 were plying the inland waterways. Analysts estimate that the ships use 30 million tonnes of fuel oil per year, equivalent to 16 billion cm of LNG.

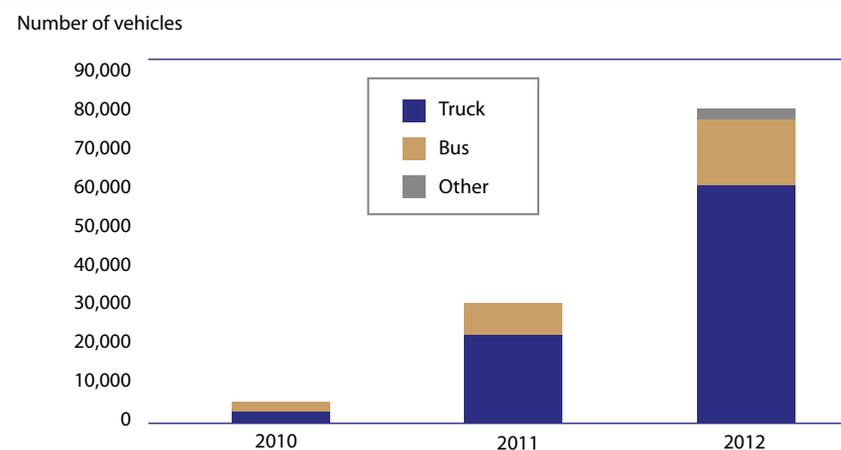
But it's trucking that will drive the use of LNG as a transport fuel. The number of heavy-duty trucks on the road is expected to more than double to 11 million by 2020, up from 5 million now. Bernstein projects the number of trucks running on LNG to hit 247,000 in 2015, up from 51,000 or 77% of the LNG vehicle fleet on the road last year.

Clearly, there is plenty of room for some explosive growth over the coming years. China's small-scale gas liquefaction capacity is already ballooning to cater for potential demand.

By 2015, China's small-scale liquefaction capacity will rise to 120 million cm per day (cm/d), up from 37 million cm/d at the end of 2012.

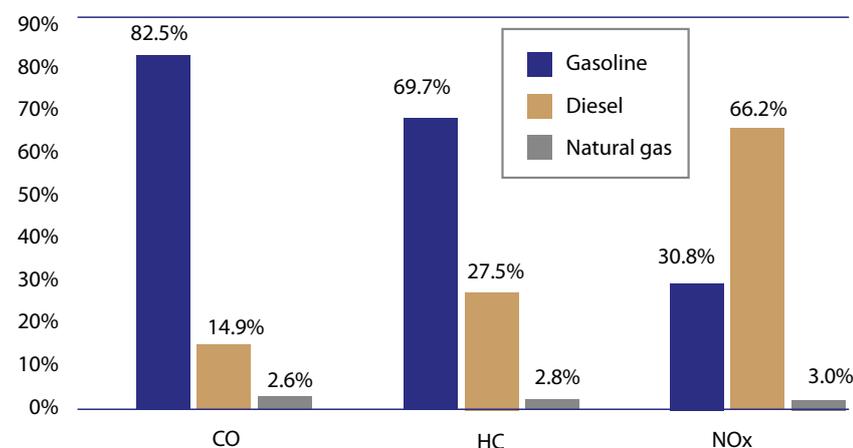
To service the trucks, the number of LNG filling stations is expected to

**Figure 1: LNG vehicles in China**



Source: Kunlun, Bernstein Analysis

**Figure 2: Emissions by fuel type**



Source: China's Ministry of Environmental Protection, Bernstein Analysis

climb from 400 to 3,000 by 2015. Most analysts agree that China is at the apex of a major shift in transportation fuels, with gas set to replace diesel and fuel oil in trucks, ships and trains.

Not only because of its strong price competitiveness relative to oil, but also its much needed environmental credentials too.

But Na offers a word of caution. "It's not clear how long such competitiveness will last as Beijing is mulling natural gas pricing reforms that would align domestic prices much closer to higher international prices."

On 6 May, Chinese Premier Li Keqiang highlighted pricing

liberalisation, including a progressive pricing system for gas supply, as one of the key measures of further economic reform.

Nevertheless, state-backed PetroChina reiterated its view that gas price rises will be slow and steady over several years, rather than a dramatic countrywide jump this year.

Thomas Hilboldt, an Asian gas research specialist at HSBC in Hong Kong, agrees, saying nation-wide implementation could take three to five years.

Still, even with rising gas prices, there is no shortage of interest from investors who are banking on this revolutionary shift to LNG in transport. ●