

# Natural Gas Market Update

## National Australia Bank

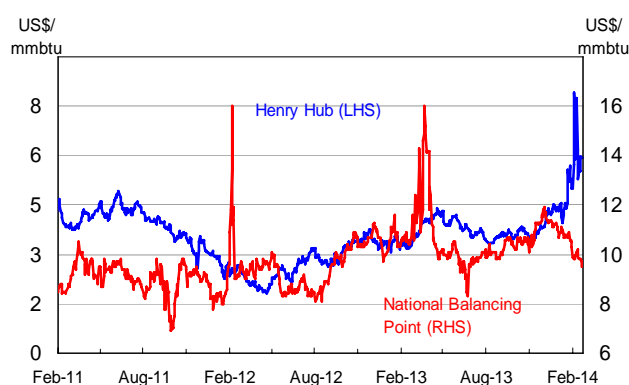
- In the past few months, US natural gas prices have staged some gravity defying movements, fuelled by unusually strong heating demand from the most extreme winter conditions affecting the US in about a quarter of the century.
- In contrast to the punishing cold of US winter, the milder winter conditions experienced by UK and most parts of Western Europe have helped to keep European prices contained.
- The recent crisis in Ukraine has sparked concerns of a widespread natural gas supply disruption in Europe but risks of it happening appear low at the moment. In the event that it does, the current elevated levels of European gas inventories should act as a cushion against any immediate supply shocks.
- LNG prices in Asia Pacific scaled new heights of above US\$20 per mmBtu in February from the lack of spot cargo and strong stockpiling demand ahead of peak summer cooling period.
- The scope for Australian LNG exporters to profit from the current high Asian prices may diminish gradually in the long-run against a landscape of rising global supply competition. In the near-term, Australia still enjoys the privilege of being the main supplier to clients in the Asian region. However, the need for more nimble contracts and looming competition from US exporters are likely to threaten future profitability of Australian exporters.

## Recent Price Movements

In the past two months, US natural gas prices have staged some gravity defying movements, fuelled by unusually strong heating demand from the most extreme winter conditions affecting the US in about a quarter of the century. The Henry Hub index breached the US\$5/mmBtu mark for the first time in more than three years in the last week of January, before spiking to its highest level since late 2008 in the first week of February as a series of arctic blasts sent temperatures falling to unprecedented levels across the country, with numerous low temperature records broken along the way.

The frigid temperatures in January led to record levels of withdrawals from storage, even after taking into account the seasonally high demand for the month. According to Energy Information Agency (EIA), working natural gas storage withdrawals exceeded 200 billion cubic feet (Bcf) for 3 of the 4 weeks in January, and this pattern persisted in the first fortnight of February to culminate in a record fourth consecutive week of 200-Bcf plus draws.

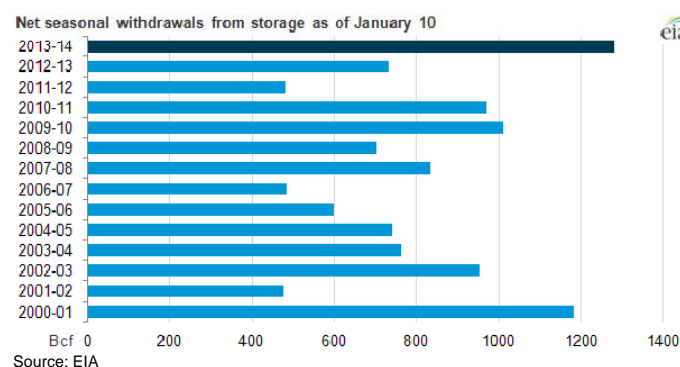
## Henry Hub and National Balancing Point Prices



Sources: NAB; Thomson Reuters

As a result, EIA now forecasts that inventories will end this heating season (till the end of March) at a six-year low of 1,331 Bcf. At the time of writing this report (the last week of February), wintry conditions continue to dominate most of the country, with weather forecasters predicting yet another intense cold snap in early March. It is expected that this cold front will span widely from East to West and into the southern states, inflicting the northern region with sub-zero temperatures. In the money market, cumulative bullish bets on the Henry Hub held by speculators, including hedge funds, set records in the third week of February just before prices reached five-year highs, according to data released by US Commodity Futures Trading Commission.

## Net US Winter Season Gas Withdrawals from Storage



At their current heights of above US\$5/mmBtu, US natural gas prices are highly volatile as they are out-of-line with longer-term fundamentals of continued strong production growth in the US. Any change in weather forecasts by major meteorology agencies would trigger sharp movements in the index in either direction. To illustrate the sheer extent of divergence in natural gas prices in the country during the deep freeze episode during mid-January, prices in Northeast spiked to between \$30 and \$40 higher than the benchmark Henry Hub price. Prices in New York and New England also rose far

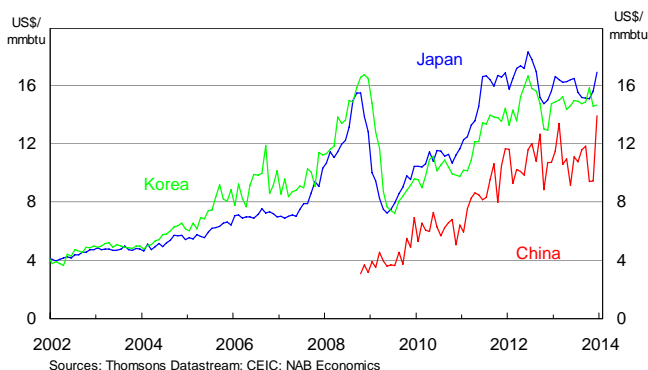
into the double digits, with Transco's Zone 6 delivery point, serving New York City, at \$56.59/MMBtu, and the Algonquin Citygate, serving Boston, at \$34.14/MMBtu.

In contrast to the punishing cold of US winter, the UK and most parts of Western Europe have been experiencing a relatively mild, albeit very wet winter, which reduced demand for heating fuel. In Netherlands, gas prices have fallen to their lowest in two years on supposedly the mildest winter weather conditions since 2008. As such, storage levels at all of the major European hubs except for Austria's Baumgartner were above last year's levels in the order of around 20%. In the UK, Europe's largest gas market, inventory level is around 25% above the same time last year, thereby constraining any upward momentum in the National Balance Point index.

The recent crisis in Ukraine, which resulted in violent clashes between demonstrators and police and the eventual ousting of the then President Victor Yanukovych, has sparked concerns of a widespread natural gas supply disruption in Europe. This could borne out from Russia refusing to supply oil to Ukraine, or a sabotage of the pipeline connecting Russian supplies to the rest of continent by Ukranian sources. To some extent, these concerns are not unwarranted on the basis that it has happened before: in January 2009, prolonged disputes between the two nations caused supply disruptions in many European nations, with eighteen European countries reporting major falls in or complete cut-offs of their gas supplies transported through Ukraine from Russia. However at this stage there is not any indication that Russia might cut off gas supplies, even in the event that it does, the current elevated levels of European gas inventories should act as a cushion against any immediate supply shocks.

In Asia, liquefied natural gas (LNG) prices showed no signs of slowing down as sustained strong demand from Japan and Korea pushed the spot price to its new record high of just above US\$20 per million British thermal units in mid-February. The lack of spot cargoes, exacerbated by competition for these cargoes from Argentina and Mediterranean countries, has added to price pressure. On the supply side, the market has been rendered tighter by a LNG plant shutdown at Angola LNG for maintenance and production issues faced by BG group in Egypt.

**Asian LNG Prices**

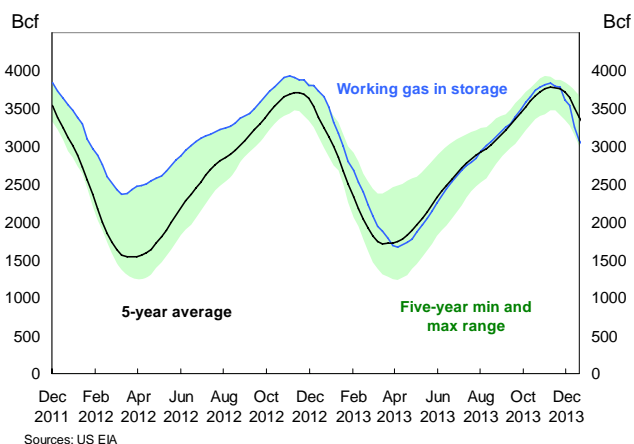


**Market Conditions**

While the staggering growth in US natural gas production has been widely covered in the past, it is the demand conditions that have grabbed headlines in the past couple of months from the historically cold winter conditions.

According to data from EIA, the week ending 10<sup>th</sup> of January posted a record-high net withdrawal of 287 Bcf from US underground storage, the largest for the 20 years for which data were collected by the agency and in a season already characterised by withdrawals much larger than average. This was subsequently followed by four consecutive weeks of withdrawals above 200 Bcf since the second half of January, which is yet another unparalleled feat. Cumulative net withdrawals, as of 10<sup>th</sup> of January, have already exceeded the previous record levels posted during the 2000-2001 heating season.

**Weekly US Working Gas in Storage**



Meanwhile, the cold snaps have wreaked havoc on the supply side of natural gas as well. Some dry gas well freeze-offs have occurred in parts of the Marcellus Shale in north-eastern Pennsylvania and in the Fayetteville Shale in Arkansas in the first week of January, which resulted in natural gas production dropping to the lowest level since September 2012, but production has since recovered modestly. The failure for supply to catch up with demand has seen the Midwest, where around 68% of households use natural gas for heating, particularly affected by a supply constraint when it was hit by extreme temperatures in January. To prevent a gas outage, both ANR Pipeline and NGPL, major interstate pipelines that send natural gas to the Midwest, issued operational flow orders (OFOs), while many other pipelines in the region issued critical notices that limit normal gas-flow in order to maintain balance on their systems.

On the exports front, there has been some acceleration in the pace of approval process for LNG exports projects by the US government under mounting pressure by the oil and gas industry. Earlier this month, the US Department of Energy approved its sixth permit allowing LNG exports to countries not currently having Free Trade Agreements with the US. The current sharp differential between US natural gas prices of around US\$4 to 5 per mmbtu compared to US\$19 to 20 in Japan provides an obvious arbitrage opportunity; however, some experts believe that the window of opportunity may prove to be shorter-lived than many have expected. According to a new report by Kenneth Medlock of the Baker Institute for Public Policy – a renowned expert in the field of US LNG exports, there are a few reasons to expect a gradual convergence of global LNG prices in the medium-term:

1. Longer term commercially successful shale developments in China and Australia will increase supply competition to US exports.

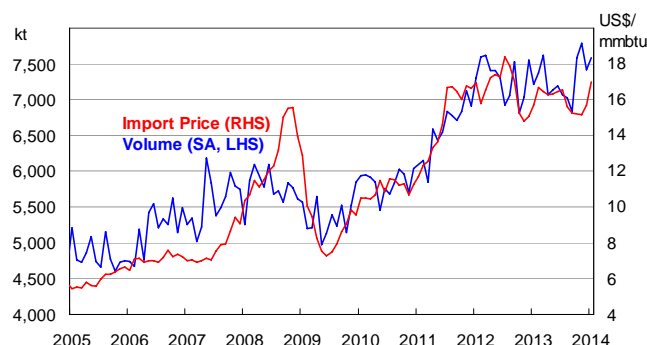
2. The development of pipeline supplies from Russia, Central Asia and South Asia directly to China will replace the need for cargo imports to the country, which means greater supplies available for diversion to Japan.
3. The current imported LNG prices borne by Japan and Korea are fiscally unsustainable in the longer-term and are likely to increase pressure for the restarts of some nuclear reactors as early as this year.

While the above three factors constitute downward forces on Asian LNG prices, there will also be upward price pressures on current levels of Henry Hub index. US natural gas prices in recent years have been too low to afford any meaningful profitability for drillers, reflected in the current low rig count level. Opening up the US market to trade will also irreversibly increase the prices of US domestic natural gas as demand competition rises from external sources. Realistically, the current differentials can only persist if US producers are willing to trade off future LNG export capacity expansion for large rents, or if they are prevented through policy action from doing so.

By inference, the scope for Australian LNG exporters to profit from the current arbitrage opportunity may also diminish gradually in the long-run against a landscape of rising global supply competition. In the near-term, Australia still enjoys the privilege of being the main supplier to clients in the Asian region, further aided by the certainty of long-term contracts. However, the nature of LNG contracts is quickly evolving to reflect the need for more flexibility for both buyers and sellers against an increasingly dynamic global energy market. In the past, the norm was a rigid supply contract specifying fixed volume, destination and price, perhaps with a price index escalator or a pricing band to link it to crude oil movements. More recent contracts tend to include more complex arrangements to protect the interests of buyers, such as price averaging to reduce volatility and fewer restrictions on delivery destination and terms, such as options on additional cargoes. The close shave that Woodside Petroleum came to having one of its contracts valued at \$1.5 billion terminated by its Japan counterpart earlier this year serves to remind us how lumpy and volatile these contracts can be.

So far, intelligence from organisations such as RISC and Citigroup have estimated that Australian LNG export prices will need to attain the US\$14 or 15 mark per mmbtu to make sufficient returns for projects, which are above the projected thresholds for US exports of around US\$11.50 on the assumption of Henry Hub prices of US\$5.50. The project to expand the Panama Canal, which is now expected to be finished later than the original December 2015 completion date due to cost overruns, will further sharpen the cost-competitive edge of US exports at the expense of Australia's by allowing more tanker traffic to Japan.

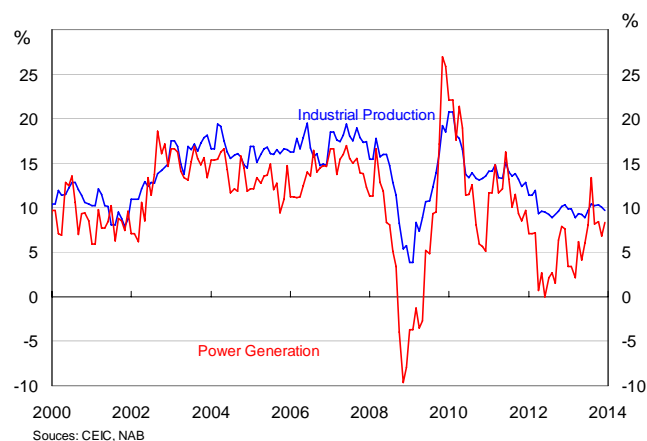
### Japanese Imports and Implied Price



Source: CEIC, NAB Economics

Japanese imports of LNG have reached unprecedented levels this winter season, with the cumulative volume of imports between November and January reaching 23.6 million tonnes, about 4% above the level in the corresponding period in the previous year. Despite an earlier start to winter stockpiling by Japanese importers late last year in October rather than November, a cold winter season and tightness in global supplies have resulted in significant withdrawals from inventories. In the meantime, the continued uncertainty around the restarting prospects of nuclear reactors in Japan is prompting buyers to secure supplies in anticipation of peak summer demand later in the year. Japan's LNG imports in 2013 set another record, driven by a complete shutdown of its nuclear stations for the second time since the Fukushima disaster in 2011 forced utilities to rely predominantly on fossil fuels for energy generation. The corresponding stratospheric rise in LNG import costs has led to Japan incurring a record annual trade deficit of 11.47 trillion yen (approximately AUD\$125 billion) in 2013, up from 6.94 trillion yen in the previous year and a third straight year of deficit.

### Chinese IP and Thermal Power Generation (Y-o-Y growth %)

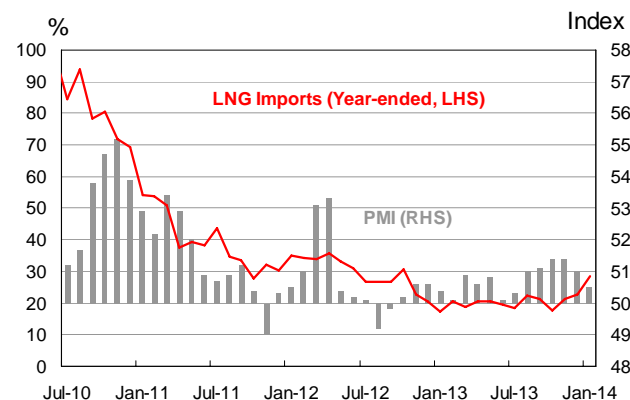


Sources: CEIC, NAB

Meanwhile, recent China's PMI data suggest that its industrial activity has entered a slowing phase since the last quarter of 2013, which subsequently flowed into weaker year-ended growth in thermal power generation. However, the trend in LNG imports was more resilient than industrial activity indicator would suggest. In January, Chinese LNG imports rose to a new record of 2.65 million tonnes, erasing the short-lived record 2.43 million tonnes set only in December. Contributing to the ramping up in imports have been the increased capacity from newly started import terminals and

strong winter heating demand. PetroChina Co. started commercial operations at its Tangshan LNG plant in northern China in December, according to an online statement by its parent company CNPC. Meanwhile, China National Offshore Oil Corp.'s Tianjin floating LNG terminal also received its first cargo in January. The Chinese National Offshore Oil Company (CNOOC), a state-owned oil and gas enterprise is aiming to double its LNG import capacity by 2015 by adding five new terminals, which will lift the current meagre share of natural gas in China's energy mix of 5% to 8%.

**Chinese LNG Imports and PMI**

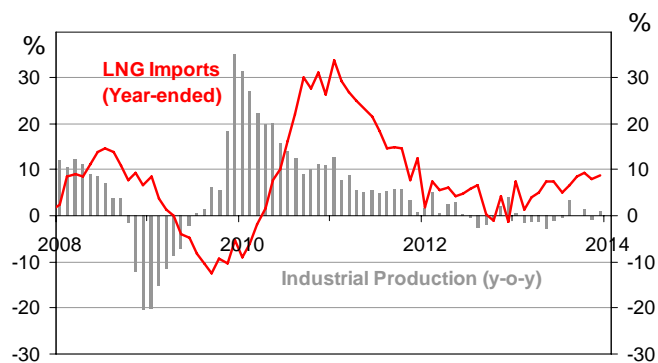


Source: CEIC, Datastream, NAB Economics

In South Korea, the world's second largest LNG importer, LNG imports volume has gained pace over the last year, largely reflecting its diminished nuclear generation capacity from a string of reactor shutdowns over a safety scandal since late 2012. Four of the country's 23 nuclear reactors are currently offline, following the shutdown of the Hanul plant at the end of January. This nevertheless represents a partial recovery of generation capacity from the peak of six reactor closures.

While the country's LNG demand is expected to be robust in the short term, it is the Korean government's priority to lift the share of nuclear generation in its energy mix in the long-term. South Korea currently relies on its 23 reactors for about 26% of the country's power generation but aims to increase it to 29% by 2035. This new target, which was announced in December by the Korean Ministry of Energy, is significantly less ambitious than the 41% target announced in 2008, after accounting for mounting public opposition to nuclear power in the country and a domestic safety scandal. To achieve its target of adding 12 new reactor units by 2024, the government has approved the construction of two new reactors on the country's southeast coast. The construction of five other new units, including the third and fourth reactors at the Shin Kori plant, is currently underway.

**Korean LNG Imports**



Source: CEIC, Datastream, Korean Customs Service, NAB

For other parts of Asia such as Taiwan, LNG import demand growth has been more subdued, reflecting the modest growth in industrial output and export volumes which are barely above year-earlier levels.

**Forecasts**

In the coming months, natural gas prices in the northern hemisphere are likely to experience a seasonal slowdown from milder spring weather. In the US and UK, underlying supply fundamentals remain sound hence a significant price reversal induced by gentler weather conditions is largely on the cards. However, we are unlikely to see prices unwind to the same degree in Asia, with no clear timeframes for the nuclear reactor restarts in Japan but the fiscal pressure from massive trade deficits is getting too powerful to ignore. There is a chance for some reactors to resume operation this year, but the restarts are expected to be gradual hence any price relief is expected to be moderate as well. Meanwhile, the fear of supply tightness by Asian utility companies as global LNG demand competition heats up ahead of wider-scale US exports capabilities is likely to encourage robust imports of LNG in the short-term.

In the longer term, the acceleration in supply growth from a number of sources: US exports, Chinese domestic shale developments and pipeline supplies directly to China etc. are likely to alleviate the global supply shortage currently experienced by major Asian importers. Meanwhile, global demand for LNG will only continue to grow exponentially from their current low shares in most countries, apart from Japan and Korea, as the synchronised push towards cleaner sources of energy gains pace. One thing we can be sure of is that the glaring arbitrage window between American and Asian gas prices is only going to narrow over time, and the opportunity to take advantage of it will be reserved for the first-moving US exporters.

Overall, we have revised our near-term forecasts for LNG and gas upwards to account for the recent spikes in US and Japanese prices but leave those further out in the forward estimates relatively unchanged.

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## Quarterly Price Profile

### Natural Gas Forecasts – Quarterly Average

US\$/mmbtu	Actual	Forecasts							
	Dec-13	Mar 14	Jun 14	Sep 14	Dec 14	Mar 15	Jun 15	Sep 15	Dec 15
Henry Hub	3.85	5.00	4.20	3.70	3.90	3.60	3.80	3.60	3.90
Japan LNG	15.28	16.50	16.00	15.50	15.50	15.30	15.00	14.50	14.35
Brent Oil	108	109	105	103	103	100	100	100	100

Source: Datastream, CEIC, NAB Economics

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