Natural Gas Market Update

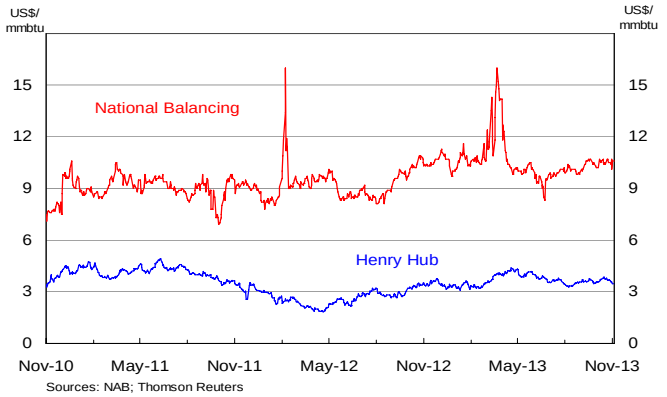
National Australia Bank

- **US natural gas prices showed significant volatility in the lead-up to the US government shutdown, but trended higher in September and October overall in anticipation of winter heating demand.**
- **British natural gas prices also tracked higher in the past two months from the spill-over effects of higher Brent oil prices and supply disruptions from Norway.**
- **Prices in Asia Pacific maintained their historical highs in recent months as governments in these countries have increasingly turned to natural gas as the preferred source of energy.**
- **Henry Hub and National Balancing prices to lift in near term on seasonal heating needs.**
- **Asian LNG prices forecast to maintain momentum into the coming months on weaker prospects to lift nuclear generation from the lack of public support. An uptick in winter heating demand will also benefit prices.**

Recent Price Movements

After falling over April and August from seasonally low demand, the US natural gas spot prices turned the corner and rose gradually over September and October in anticipation of winter heating demand. Nevertheless, there was a significant amount of volatility in the US Henry Hub index in the lead-up to the partial US government shutdown, falling to its lowest point in two months of around $3.50 just before the commencement of the shutdown, but quickly resumed its upward trajectory after that. In mid-October, natural gas futures climbed to their highest level in almost four months in New York on forecasts for below-normal temperatures for the second half of October. Overall, the monthly average of the index grew by 5% and 2% in September and October respectively. In the first couple of trading days of November, the HH Index appeared to have lost some steam on the forecast of mild weather for the first two weeks of November, currently trading below $3.50 per mmBtu.

Henry Hub and National Balancing Point Prices



Sources: NAB; Thomson Reuters

Meanwhile, supply-side factors remain comfortable, with the building of gas inventories maintaining strong momentum throughout summer and autumn months for the underground gas storage levels to maintain slightly above 5-year average levels since early August.

Looking ahead, we anticipate the recent strength in natural gas prices to consolidate going into the US winter. At the moment, winter is forecast to be colder than average for much of the continental US, which is likely to support heating demand, although not to the same extent as the past winter when prolonged chilly conditions were experienced. Also appearing to support prices is the slowing growth in production and inventory accumulation from their trailblazing pace from late 2011 through most of 2012, with actual monthly underground storage levels closely tracking their five-year averages.

In the UK, natural gas prices have tracked consistently higher in the past two months as well, with the National Balancing Point (NBP) price rising in monthly average terms by 4% and 0.5% in September and October respectively. Being a spot price index, the NBP is not linked to long-term oil contracts like those in continental Europe which obtain most of its supplies from Russia. Oil price movements nevertheless still play a part in affecting the NBP via arbitrage opportunities via the Interconnector pipeline linking the UK and continental Europe hubs. Therefore, some of the strength in the NPB can be explained by the strong uptick in the Brent oil index in the third quarter from the escalation of geopolitical risks in the Middle East, more positive economic data from the US and China, as well as the decision by the US Federal Open Market Committee not to initiate the tapering of its asset purchases which maintains loose monetary settings. More recently, unplanned disruptions in supplies from Norway, the largest source of UK gas imports, due to an outage at Troll field which produces around 35% of Norwegian gas, have also helped to prop up prices.

In Asia, LNG prices continued to benefit from the Fukushima crisis in 2011 to trade at near-record levels, rising to a seven-month high towards US $17 per mmBtu in the third week of October according to anecdotal evidence, as Japan, Korea and China vied for November cargoes to bolster their supplies for what is expected to be a chilly winter. In September, the shutdown of the last of Japan's 50 atomic nuclear reactors indefinitely for maintenance and inspection lent a symbolic suggestion that perhaps a return to some form of nuclear energy production by the country will not occur as quickly as most Japanese politicians had hoped, as they continue to face overwhelming objections from the public, as well as new regulatory standards posed by the independent Nuclear Regulation Authority (NRA) on any potential restarts of nuclear plants.

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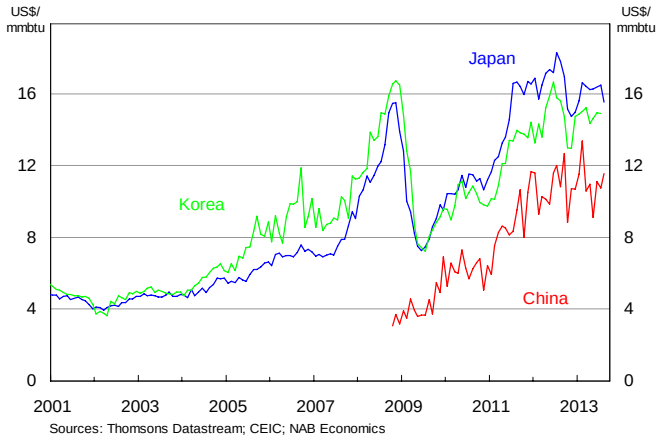
Asian LNG Prices



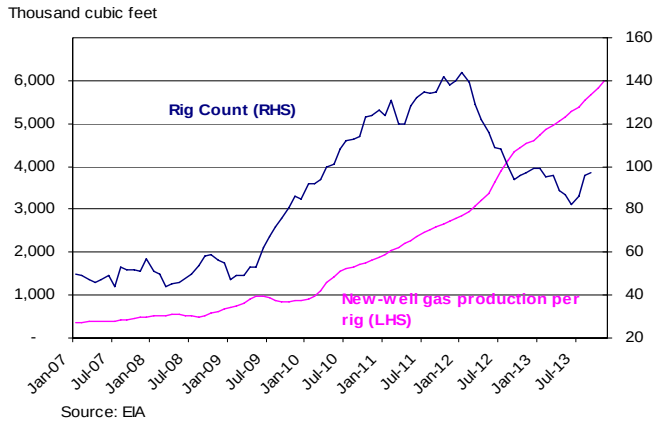
Sources: Thomsons Datastream; CEIC; NAB Economics

Also fuelling upward price pressure on LNG in the month had been the announcement by the Argentinean authorities that they were seeking tenders for 48 LNG cargoes, most to be delivered in 2014 and the rest in 2015. The tender was eventually won by BP Limited which will supply 40 of the 48 cargoes, while the remaining will be supplied by Russian state-owned natural gas giant Gazprom and Norway's Statoil.

Market Conditions

According to the latest data available from the EIA, monthly natural gas production in the US reached a new record in September, despite having the lowest rig count since 1999. This suggests tremendous productivity gains since late 2008, when a period of sustained low natural gas prices triggered a sharp decline in the number of rigs, but production volume completely went against the tide and grew strongly in the opposite direction. According to Baker Hughes, the US natural gas rig count was down to 352 in July, the lowest monthly reading in 18 years.

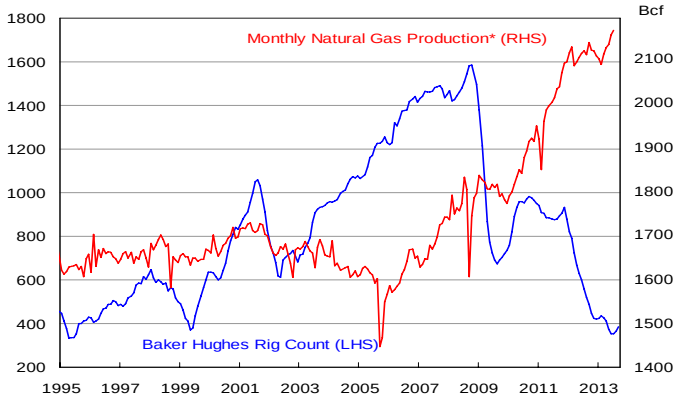
Marcellus Shale Play Rig Count and Gas Production



Source: EIA

The startling improvements in the productivity of rig wells over the last year were explained in more details in the inaugural "Drilling Productivity Report (DPR)" by the EIA covering six major shale plays in the US. According to the report, of all the major shale plays, Marcellus, covering much of Ohio, west Virginia, parts of Pennsylvania and New York state, stands out as having charted the most productive gains since 2012. Although natural gas production increased in 4 of the 6 DPR regions over the past year and the latest month, Marcellus alone accounts for about 75% of natural gas production growth in the 6 regions over both periods. While the number rigs in Marcellus has fallen from its peak of 144 in January 2012 to just 97 in September, total monthly production has more than doubled in the same period to average around 12.6 bfc per day in October. This phenomenon has prompted the EIA to caution against the use of rig count as a predictor of production. To give the scale of production some perspective, if the Marcellus Shale region were a country, its natural gas production would rank eighth in the world, producing more natural gas than Saudi Arabia, the largest OPEC oil producer. Other shale plays which showed improvements over the last year were Eagle Ford, Bakken and to a lesser extent, Permian.

US Production and Rig Count

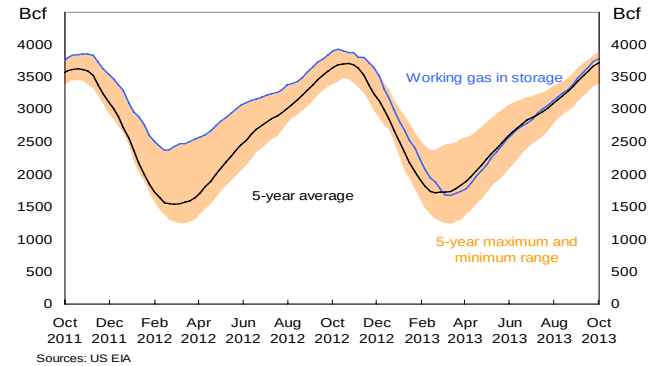


Source: Baker Hughes, EIA, NAB Economics

*Seasonally Adjusted

The strong output gains in some of these major shales were reflected in a pick-up in US total monthly gas production in recent months, which soared to a record high in August (latest available data) at 2198 billion cubic feet. Such rapid increases in production have prompted the EIA to revise their forecasts upwards overtime, now predicting marketing gas growth of 1.2% in 2013 followed by 0.6% growth in 2014, to 70.0 and 70.4 bcf per day respectively. This is in contrast to the EIA projections made in May in their Annual Energy Report, when only 0.4% growth was pencilled in for 2013, followed by a decline of the same magnitude in 2014. At that time, we had also expected gas production to stay relatively stable for the remainder of the year, given the low rig count and increasingly unprofitable propositions offered by gas mining. However, we have clearly underestimated the extent of the productivity gains in some of the shale plays in the US.

Weekly US Working Gas in Storage



Sources: US EIA

The rapid rise in production, coinciding with seasonally low demand during summer and autumn months, saw a consistent

build-up of underground gas storage, which rose and stayed above their five-year averages since August.

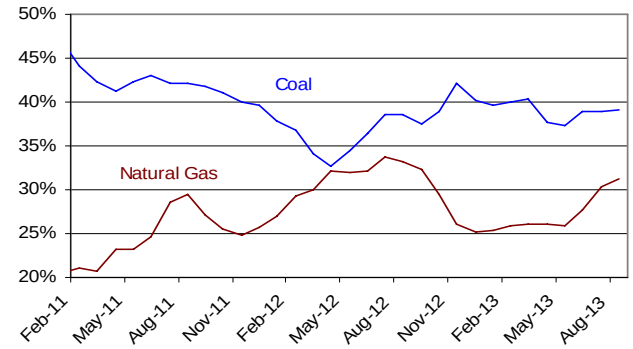
In August (for which the latest consumption data are available), natural gas consumption was down 5% year-on-year. The main driver of the decline was a sharp drop of 11% in the consumption by the electric power sector from lower net generation of electricity this August compared to the same time last year due to warmer weather. During the spring and summer months, electric power was the largest natural gas-consuming sector, accounting for slightly more than half of natural gas delivered to consumers in the US in July and August. Furthermore, natural gas made up a smaller share of total net electricity generation at 31%, which is 2 percentage points lower than in August last year. Since 2009, natural gas has gained more traction in its share of total electricity generation at the expense of coal. In the seven years to 2008, coal's share of total generation ranged from 48% to 51%, but in recent years, its share has been hovering closer to 40%.

About half of US households use natural gas as their primary heating fuel. In the coming months, the EIA expects households heating with natural gas to spend an average of $80 (13%) more this winter than last winter. The increase in natural gas expenditures represents a 14% increase in the average U.S. residential price from last winter, with consumption that is slightly lower than last winter nationally. Overall, consumption for 2013 is forecast by the EIA to rise slightly to match production at 70 bcf per day, before falling slightly to 69.4 bcf per day in 2014. Colder winter temperatures in 2013 and 2014 are expected to increase the amount of natural gas used for residential and commercial space heating.

With the rise of the US as the world's top energy producer, the pressing question that is looming over the industry is how soon will the US emerge as a serious global exporter? A recent study published in September by the US Congressional Research Service, has predicted that the US will be a net exporter by 2020. According to this study, proposed projects to export LNG by tanker ship, cumulatively accounting for about 41.4% of current gross US natural gas production, are currently at varying stages of regulatory approval. However, it is not clear from the report as to when these projects will get approved. While most projects will be allowed to export LNG to free trade countries, so far only the Sabine Pass Liquefaction (only its first application), Freeport LNG Expansion (only its first application), Lake Charles, and Dominion Cove Point projects have received US Department of Energy's approval to export domestically produced natural gas to non-free-trade countries. Of the 33.8 bcf/d of capacity applied for export by companies, 32.4 bcf/d or 96% is seeking or has received approval to export to non-FTA countries. Currently, South Korea is the only major importer of LNG of the countries with which the US has a free trade agreement. In order for LNG export projects to be financially viable, they will likely need the ability to export to non-FTA countries.

The US is currently in negotiations on two multi-nation free trade agreements: the Trans-Pacific Partnership (TPP) and the Transatlantic Trade and Investment Partnership (TTIP), which will provide members with free-trade access to US natural gas exports. Japan, the world's largest LNG importer, was a late participant of the TPP when it became an official member in July, with one of its motivations of joining being the access to US LNG exports.

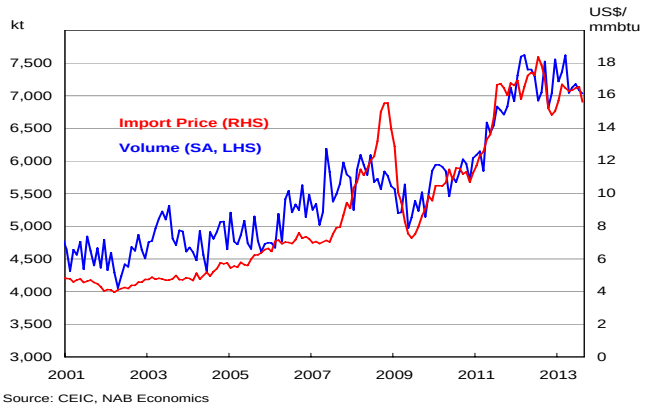
Shares by coal and natural gas of net electricity generation



Source: EIA

Japan continues to battle high LNG imports costs in recent months, as the prospects of restarting any of its nuclear reactors became increasingly diminished following overwhelming resistance from the public, as well as more stringent safety standards imposed by the independent regulatory watchdog Nuclear Regulation Authority. Regarded by many as an omen of Japan's dim nuclear future, the last of Japan's 50 nuclear reactors was shut down in September indefinitely for "maintenance" purposes. Soaring energy import costs, further exacerbated by a weak yen, have resulted in Japan recording a trade deficit in September for the 15th consecutive month, the longest spell since comparable data started in 1979, notwithstanding improvements in exports due to a more competitive currency.

Japanese Imports and Implied Price

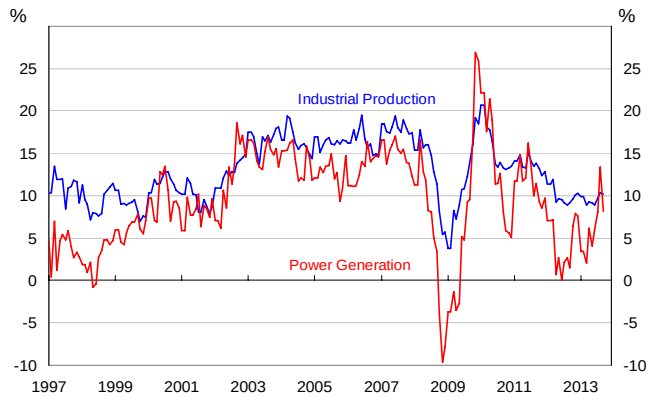


Source: CEIC, NAB Economics

After seasonal adjustment, Japanese imports of LNG have fluctuated around 7300 kilo tonnes per month since early 2012, having picked up by more than 20% since the aftermath of the Fukushima nuclear incident. Import prices during this period have also risen to a corresponding degree. The latest available official data shows that Japanese LNG imports and prices have tracked slightly lower in August due to softer seasonal demand during summer time for electricity for heating purposes, with the level of imports around similar levels as the same time last year.

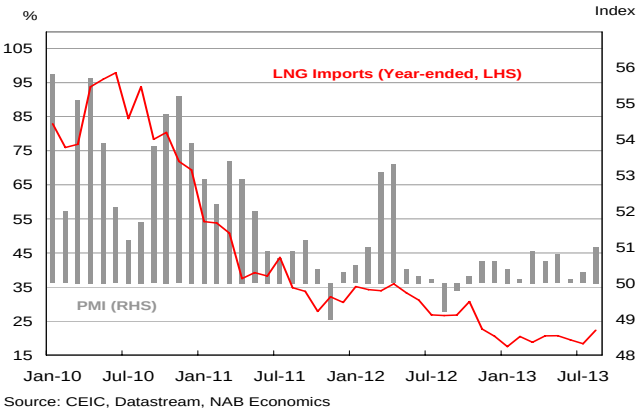
Meanwhile in China, year-ended growth in thermal power generation has picked up pace in the third quarter, consistent with signs of recovery in manufacturing activity, and as indicated by stronger PMI and industrial production data. As a result, Chinese imports of LNG grew by 22% in August (latest available monthly data) compared to a year ago – the highest year-ended growth recorded so far in the calendar year, but still a modest pace compared to the average of 30% y-o-y growth in 2012.

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



The reasonably rapid growth rate, nevertheless, stems from a still relatively low base of LNG usage in the country's energy mix, with natural gas comprising only around 5% of total power generation. Having said that, the Chinese government is aiming to raise the share of natural gas in its energy mix to 8% by 2015 with the intention to reduce pollution (as a result of heavy coal use) and diversify fuel mix in end-use sectors. To support this, China's leading firm in the LNG business, China National Offshore Oil Corp (CNOOC), has announced that it is expected to add five LNG receiving terminals by 2015, doubling its total capacity to 35-40 million tonnes per year (tpy). It has also won the government's approval in building the country's first floating import terminal, which requires a shorter construction period than an onshore terminal and is more adept at realising imported supplies, although its processing capacity is much smaller than an onshore plant.

Chinese LNG Imports and PMI

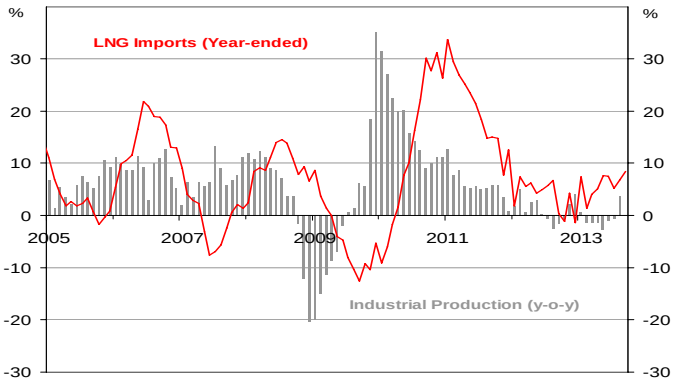


Source: CEIC, Datastream, NAB Economics

For other parts of Asia, 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. This is in turn mainly driven by sluggish growth in world trade and the sharp lift in the export competitiveness of Japan at the expense of its export-reliant neighbours.

In Korea, LNG imports volume has grown at a weaker pace compared to a year ago, but still relatively robust given the weak pace of industrial growth. This reflects the progressive reduction in the nuclear generation capacity of the country since November last year, when a scandal emerged over parts of the reactors being supplied using fake documents, which eventually led to the government ordering a number of shutdowns of nuclear reactors. The scandal has deepened since then, culminating in the indictment of 100 officials from the state-run Korea Hydro & Nuclear Power Co. (KHNP), parts suppliers, and certifiers on charges of forgery and corruption in October, for which court hearings will take place in December. This incident has led to a massive public backlash over the safety of 23 reactors in the country which currently account for around a third of Korea's energy mix, and pressures on the government to reconsider its previous goal to increase it to 41% by 2035. In the near-term, the diminished nuclear energy generation capacity (six reactors are still offline) of the country is likely to sustain the demand for imported LNG.

Korean LNG Imports



Source: CEIC, Datastream, Korean Customs Service, NAB Economics

Forecasts

In the coming months, natural gas prices in the US and UK will continue to be largely driven by heating demand during winter months, with the former likely to receive support from forecasts of a colder winter in general despite some spurts of mild weather, while the latter is also likely to experience some seasonal upward pressure, but with the additional risks of supply shortages due to the unpredictable disruptions of gas flow from the North Sea. In Asia, the synchronised move towards natural gas as the preferred fuel away from coal and nuclear energy is going to keep both prices and demand elevated in coming months. The nuclear dilemma faced by the Japanese and Korean governments is unlikely to be resolved anytime soon, with strong public opposition likely to defer any plans to tilt the countries' energy policies towards nuclear generation.

In the longer term, the likely emergence of the US as an unrestricted global exporter suggests that the currently fragmented global natural gas market is likely to consolidate and prices paid by different regions will begin to converge, although the momentum will only start to build up substantially in 2015 when Sabine Pass, the first export terminal approved in the US starts its operation.

Overall, we have decided to leave our forecasts unchanged from last month as we consider the forecast profile to be adequate in capturing all the aforementioned risks for the time being.

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Quarterly Price Profile

Natural Gas Forecasts – Quarterly Average

	Actual	Forecasts							
US$/mmbtu	Sep-13	*Dec 13*	*Mar 14*	*Jun 14*	*Sep 14*	*Dec 14*	*Mar 15*	*Jun 15*	*Sep 15*
Henry Hub	3.55	3.60	3.90	3.70	3.90	3.60	3.80	3.60	3.90
Japan LNG	16.00*	16.50	16.00	15.50	15.50	15.30	15.00	14.50	14.35
Brent Oil	110	106	104	103	103	100	100	100	100

Source: Datastream, CEIC, NAB Economics

*Estimate only; full quarter data not yet available

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