MacroPlus
**Comment**

# Towards a global gas price

- *Shale gas has driven US prices down sharply in recent years*
- *But gas prices remain high in Europe, and even more so in Japan*
- *There is considerable scope for these structural price differentials to be eroded*
- *Some analysts suggest that this may take 20 years, or even longer*
- *However, these large price incentives may well mobilise investment more quickly than that*

## All hail the shale

**Shale gas has driven US natural gas prices down sharply**

Hydraulic fracturing and horizontal drilling techniques have led to remarkable growth in US shale gas production, which rose from almost nothing in 2000 to more than 10 billion cubic feet per day in 2010 (≈1.9 million barrels oil equivalent).[1] Rapidly-growing supply drove US natural gas prices down by more than 80%, from $13/MBtu in 2008 to just over $2/MBtu in 2012 (Figure 1). Since then prices have risen modestly, to just under $5/MBtu this year, but remain far below previous levels.

These developments have transformed the U.S. energy market (e.g. terminals intended to handle LNG imports are now being converted for exports), and are having geo-political implications for energy markets and inter-regional energy trade (e.g. the U.S. is on its way to becoming energy self-sufficient by 2035).[2]

**But prices in Europe and Japan remain high**

Equally striking, however, is that natural gas prices in Europe and Japan remain high. In 2012, prices in Europe were over four times those of the US and in Japan they were over six times (Figure 2). In May this year, prices in Europe and Japan were around $10/MBtu and $15/MBtu respectively – both a dollar or two below their winter peaks. US prices however have been below $5/MBtu since March. It seems unlikely that such large differences between regions can persist in the long term.

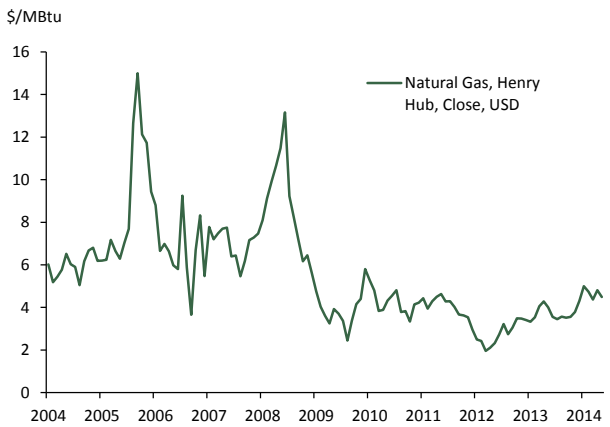
## Casting off structural premiums

**Such price differentials typically become eroded**

Regional gas prices are unlikely completely to converge to one global price, given the costs of transporting gas between regions. However, large structural spreads, particularly between the US and Asia, are likely to be eroded over time as exporters exploit the potential for arbitrage. Natural gas can be converted to Liquid Natural Gas (LNG) and transported by ships to anywhere in the world. The cost of liquefying natural gas, transporting it, and then regasifying is around $5/MBtu, give or take a dollar, with known technology. There is thus considerable potential to erode a substantial portion of present inter-regional price spreads.

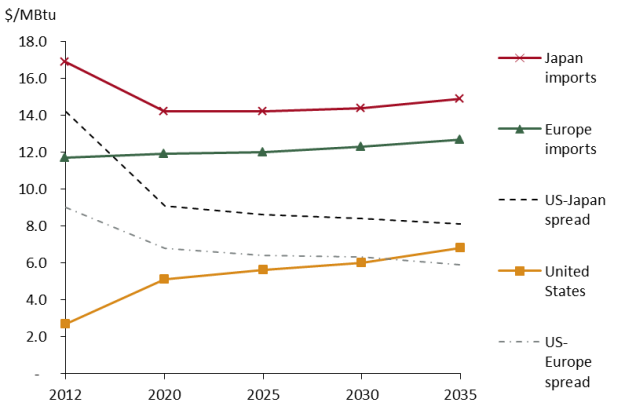
The key question therefore is how long such a narrowing in inter-regional spreads will take. The IEA posits that the spread between the Japan import price and the US price will narrow somewhat by 2020 – as much due to rising US prices (a process already underway) as falling

**Figure 1: US natural gas spot prices, 2004-2014**




*Source: Macrobond*

**Figure 2: IEA regional gas price projections, 2012-2035**




*Source: IEA World Energy Outlook (2013)*
*Notes: 2012 prices. New Policies Scenario.*

Japan prices. Thereafter, however, the IEA expects the spread to stay at $9 through the 2020s, before narrowing marginally to $8 in the 2030s.

## Making both ends meet

**Large price incentives tend to mobilise investment**

We doubt that the convergence process will proceed that slowly. When price incentives are large there is almost no practical limit to the investment that can be mobilised to take advantage of them. Moreover at the moment, with interest rates globally so low, it is even less likely than usual that there could be any serious constraint on financing profitable investment. A parallel is offered by the ramp-up of investment, and production, in North Sea oil and gas in the 1970s. Production grew from almost nothing in 1970 to around 3 million barrels per day by the early-1980s.[3]

**Political support and construction limits are key constraints**

Two other factors are likely to influence the time it will take for spreads to narrow. First, political approval and policy support, particularly from the US to allow increasing gas exports. Second, capacity issues that will determine the speed at which a network of LNG ships, liquefaction plants, and associated port infrastructure can be commissioned and deployed.

**US exports are in train, however, and could increase**

US policy is evolving. The Department of Energy has given conditional approval for a handful of projects to export LNG from the US. Behind these are another 20-odd projects at various stages of the approval process. The initial projects are based on the Henry Hub price, plus a liquefaction fee, and there are no restrictions on destination. LNG exports will therefore be able to seek the most profitable market – currently Asia. Moreover, given the keenness of the US administration to loosen Russia's grip on gas supplies, the political balance is likely to tip in favour of further licensing.

**LNG ships are being built, as are export facilities**

Capacity is increasing. The three big shipbuilding nations are all building LNG carriers. South Korea has built around 100 since 2009, China 20-odd, and Japan around a dozen. This year, 34 new LNG carriers are expected to be launched, increasing the global fleet by 7%.[4] Global LNG exports, however, are likely to more than double between 2010 and 2030, according to Lloyd's Register.[5] Many more ships therefore still need to be built. Shipbuilding capacity for all types is around 37 million compensated growth tonnes (cgt) annually, while new orders are around 42 million cgt.[6] Shipyards may well expand capacity, however. As regards liquefaction, two facilities were added last year; and around a dozen LNG export plants are in development.

**Technology has a tendency to surprise**

While LNG is a known technology, liquefaction and regasification costs stand to reduce further. High prices invariably encourage supply, greater efficiency, and substitution. Technological advances will probably increase the incentive to transport LNG. In addition, the development of the Arctic energy corridor is likely to facilitate the transport of gas (as well of course of other products), and increase demand for LNG ships and facilities. Daewoo won a contract last year to build up to 16 ice-class LNG carriers for the Yamal LNG project in Russia.

## Conclusion

**The gas price differential could be eroded in a decade**

In our judgement it is unlikely that technologies, political priorities, and trade patterns will evolve in such a way as to maintain present price differentials between the US, and Asia (and possibly Europe) over the longer term – all the more so given that China, India, Indonesia, Thailand, Malaysia and Singapore have joined Japan and Korea as LNG importers. More probable is that investors will seek to exploit large price differences and price differentials will be steadily eroded. We would be less surprised to see this happen within one decade than in two.

## 'Watch fors'

Against this background there are four broad developments that would be of significance were they to happen:

- First, a pick-up in the pace of US export licence approvals;
- Second, changes in gas contracting structures e.g. from long-term to spot-price;
- Third, a large increase in the numbers of LNG ships and liquefaction plants being built; and
- Fourth, cost reductions in liquefaction, transportation, and gasification of LNG. ■

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[1] Jaffe et al, 2012. *Geopolitics of natural gas*.
[2] BP, 2014. *BP Energy Outlook 2035*.
[3] Oil and Gas UK.
[4] RS Platou, 2014. *The Platou Report 2014*.
[5] Lloyd's Register, 2013. *Global Marine Trends 2030*.
[6] RS Platou, 2014. *The Platou Report 2014*.