# US unconventional output redraws the global energy map

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In 2012, we at the International Energy Agency wrote that North American oil and gas developments were redrawing the global energy map – and many of those changes have accelerated since. Technology and high prices are unlocking new supplies of oil and gas that were previously thought to be out of reach. Yet the impacts of that phenomenon on prices vary in different regional markets, and that has made energy prices a live issue in political debate – especially in terms of affecting competitiveness.

Natural gas is a prime example. While unconventional production of natural gas may herald a golden age of gas, with major impacts on $CO_2$ where it displaces coal, its concentration in North America for the coming years means that the effects on natural gas prices globally are mixed. The most immediate impact is to exacerbate structural gas and electricity price differentials among the major consuming regions of North America, Europe, and Asia. Gas prices in Europe are currently about three times those in the US, and in Japan they are still around four times the US level.[1] That has implications for industrial competitiveness, particularly in energy-intensive industries.

There is more to those differentials than the availability of relatively cheap, abundant natural gas supplies in North America, however. They are also a function of the way natural gas is priced in Europe and Asia, where long-term import contracts are still all too often indexed to oil prices – a legacy pricing method still commonly used with Russia but also with Australia and the Middle East. The use of oil indexation in long-term contracts is rooted in the idea that oil and natural gas are interchangeable and can easily be substituted for each other as boiler fuels for power generation or industrial use. That was long the case, but the power sector has moved on, and oil and gas are no longer the competing fuels they once were. And while long-term contracts can provide demand security for very expensive projects, they also make for less liquid, less flexible, and less integrated gas markets.

The issue of gas pricing is hotly debated, but the way in which gas markets are developing is strengthening the arguments for moving beyond oil indexation. The historical argument for the practice revolved around the scope for physical substitution between the two fuels. This has all but disappeared in Europe and the US, while in Asia there is still meaningful oil-fired generation. However, high prices are driving oil out of the power sector and concentrating it in the transport sector, where oil is almost totally dominant. As a result, gas and oil demand are increasingly decoupling in Asia, undermining that particular rationale for oil indexation. It is not just pricing mechanisms that make contracts inflexible, but many traditional contracts also contain destination clauses that prohibit resale. These restrictions made sense when market actors were limited and the possibility of losing sales to an individual market posed a major investment risk. Yet the LNG industry is maturing, with more large players as oil majors give gas an increasing role in their upstream portfolios.

LNG exports from North America's gas bonanza can play an important role in that market development process – because while the bulk of new LNG supplies will follow the same long-term, oil-indexed model, an important and growing amount will not. North American spot contracts, together with secondary re-exports from Europe and elsewhere, will significantly increase flexible global supply. In the case of Asia, these flexible supplies can help provide liquidity to a developing Asian gas hub.[2] The impact of American LNG exports will be to provide a competitive (often spot-priced) alternative to oil-indexed contracts. While volumes will in no way be enough to replace those contracts, they will provide leverage to push the negotiated prices lower. In fact, many would argue that just the prospect of US exports is already having such an impact. And when considering the costs of allowing those exports to go forward, it should be noted that the upward impact of LNG exports on North American gas prices is likely to be negligible.

When it comes to oil, light tight oil (LTO) output has grown from almost nothing in 2005 to about 2.3 million barrels a day today, and our scenarios indicate that fracking will help push the US to become the largest oil producer (if still not the one with the greatest production capacity). Together with oil sands, conventional deep-water offshore resources from Brazil, and increased natural gas liquids, LTO will help to reduce OPEC's aggregate share of supply over the next decade. At the margin, then, unconventional oil eases pressure on tight global supply, helping to minimise upward price pressures from production shortfalls elsewhere.

But our central *World Energy Outlook* scenario

sees global LTO production peaking by around 2030. In any case, LTO is relatively costly and requires a significant price floor to remain viable. So, we should not exaggerate the role of LTO relative to conventional production, or proclaim oil abundance. Supply and prices over the medium to long term will depend heavily on sufficient investment into conventional production, often by traditional suppliers.

Still, all new sources of oil will be crucial to meeting a 14 per cent increase in global demand to 2035 – particularly since the vast majority of investment will need to go to replacing declining production from mature fields. Meeting global demand growth will be an investment requirement over and above maintaining current output.

## Demand unevenly spread

Meanwhile, that demand growth will be like energy demand growth generally – geographically uneven. While it is barely changing or even falling among OECD countries, growth is moving ever more to Asia. This trend is not new, but within Asia, the balance shifts. In the 2020s, India and Southeast Asia will take the lead from China in driving up consumption. The Middle East is also taking on a role as one of the major consuming regions.

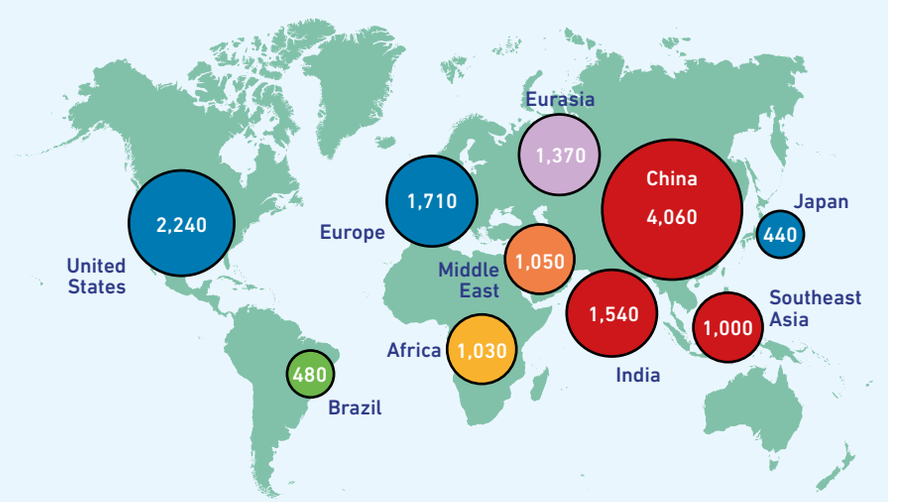
One of the consequences of those changes is a transformed global product supply chain. New, non-OECD mega-refineries are challenging OECD refining economics, at least outside the US. Their expanding reach is accelerating the globalisation of the product market, particularly in the case of refineries geared toward export. With this shift come not only the benefit of greater market flexibility in the dispatch of product supply, but also longer supply chains, higher reliance on stocks to meet demand, diminished visibility in inventory levels, increased disruption risks, reduced market transparency and, possibly, greater price variation between key markets and also between seasonal peak and troughs in demand.

While unconventional oil and gas production in North America is on the rise, and certainly dominates headlines, the prospect of "energy independence" should not be misunderstood. Even with these developments, the US will remain deeply tied into the world energy economy, and the economic and political impacts of unconventional oil and gas will be no less than global. The ramifications of North American production will be less potent as direct political tools or cause for political disengagement, and more so in terms of their impact on market structures. That is the case for gas exports, which even in small volumes can affect long-term contract negotiations in Europe and Asia. It is also the case for LTO, which may not usher in an era of oil abundance or diminish OPEC, but which together with demand shifts can contribute to an entirely new map of crude and oil product trade. ■

*1. We do not see North American gas prices as 'set in stone.' We expect them to continue a general rise from their 2012 lows, as well as to fluctuate. Due to structural factors, however, we still expect them to remain well below European and Asian contracted prices.*

*2. In February 2013, the IEA released a report showing how that process can play out: IEA (2013), Developing a Natural Gas Trading Hub in Asia, Paris.*

New Policies Scenario: Primary energy demand in 2035 (Mtoe)




*Source: World Energy Outlook 2013 (OECD/IEA)*