Approaching Tides: Convergence in World Natural Gas Prices

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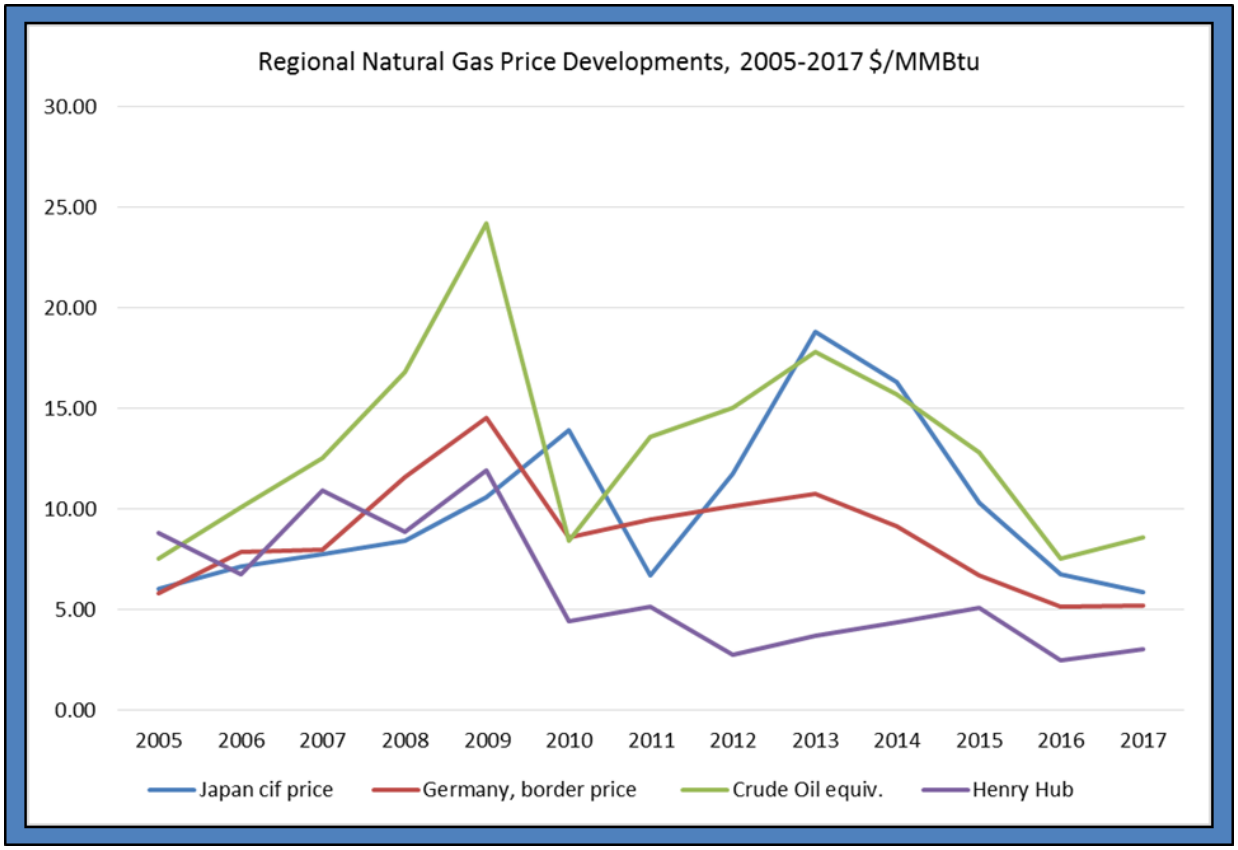
Introduction

In the past three years the global liquefied natural gas (LNG) market has seen an upward shift in supply at a time when demand has stagnated in some markets and risen less rapidly in others. Furthermore, this supply-demand imbalance has impacted different regional markets unevenly, driving the relative price of Asian LNG down in relation to levels in both Europe and the U.S., as charted on the next page in Figure 1. In addition, non-market forces may have exacerbated these price movements, as changing market structure, contractual practices, as well as environmental and geopolitical considerations have also played a role in reshaping the contours of the world natural gas market.

Following a brief overview of the current global supply and demand situation for LNG, this article examines to what degree these latter non-market forces have contributed to this narrowing of inter-regional price differentials. Against an overlay of rapid technological change that has facilitated new sources of supply, the situation in North America is contrasted with the very different forces impacting LNG prices in Europe, with its different priorities, supply options and commitment to alternative energy sources.

Finally, the article surveys the largest and most rapidly changing global market, Asia, briefly evaluating each of the most important non-supply-demand factors to have reshaped LNG trade in recent years and their impact on price movement.

Figure 1



Sources: German Federal Office of Economics and Export Control (BAFA); ICIS Heren Energy Ltd; Energy Intelligence Group, *Natural Gas Week*.

Abbreviations: Btu = British thermal units; cif = cost +insurance +freight (average prices).

The Global Liquefied Natural Gas Market

Total global trade in natural gas reached a record level of 258 million tons in 2016, including 18 countries involved in LNG exports (led by Qatar, Australia and Malaysia) and over 40 importer nations, up from

only 15 buyers of foreign LNG in 2005. Asia accounted for 72.4 percent of the total world trade (IGU, 2017). Declining Japanese imports and stagnant purchases from South Korea were more than made up for by increases in Chinese imports, up 6.9 percent, and new Indian buying, up 4.5 percent. In contrast, China, which has increasingly established itself as the key driver of global demand growth, mostly entered into the spot market for shipped LNG, focusing on pipeline-sourced rather than ocean-bound LNG supply.

At the beginning of this decade, the market consensus was that the foreseen rise in natural gas supplies from traditional as well as new, non-traditional sources would more than offset likely increases in demand, which would keep prices competitive. Supply increases from established producers and exports by emerging sellers in Asia and Africa, as well as from the U.S., would keep the market in balance, despite the secular trend of substitution away from oil and coal in favor of gas, in response to environmental factors, but increasingly also driven by cost considerations.

These forecasts were soon found to be overoptimistic, following sharp price declines in 2014-15. Supply is now forecast to increase from 450 million tons per annum (MTPA) to 677 MTPA by 2020, bolstered by a further 30 new liquefaction trains with 110 MTPA of capacity coming on stream in the next five years (Taylor, 2017). However, the advent of new emerging buyers is set to keep demand apace with supply and global natural gas prices now appearing to be bottoming, particularly in the two traditionally cheaper regions, Europe and the U.S. Recent industry estimates now envisage a new trend of moderate price increases over the period through 2021. From 2022-23 onwards however, there is a fall-off in scheduled new capacity becoming available, offering an opportunity for emerging sellers and potentially heralding a more volatile phase with higher prices globally (Bretz, 2017).

Two further factors have impacted pricing patterns over the past five years. First, the tradability of LNG internationally has improved, as buyers have multiplied and sellers have moved to a new LNG trading model offering greater flexibility in sales and delivery arrangements. Second, the entry of the U.S. into the global market, leveraging its huge shale gas reserves for export, has overturned previous LNG trade channels and boosted supply internationally.

Historically, LNG sales to North Asian buyers were based on relatively rigid, long-term offtake contracts. The latter are now becoming less common as LNG supply continues to exceed demand. Changes in contractual norms allow destination flexibility, where cargos can be diverted to buyers other than the originally contracted off-takers. This is examined in more detail later in this digest article. The newly emerging LNG exporters (mainly the U.S. and Australia) are rapidly expanding their capacities to export to Asia and elsewhere. This is a long-term supply phenomenon that is likely to keep future inter-regional price spreads far below their 2011-2014 levels when Japanese import prices ranged from $8-13 MMBtu over U.S. Henry Hub.

Technological Developments

The advent of fracking[1] technology helped make gas extraordinarily cheap in the U.S., reinforcing the status of the U.S. among lowest cost major producers worldwide. Because of the large premiums paid

by foreign LNG importers, even allowing for the significant costs of liquefying and shipping gas globally, for several years there were therefore healthy profits to be made from such wide inter-regional spreads.

The process of extraction and transformation, shipping and regasification for consumption by an overseas buyer is more complex than the extraction and marketing of crude oil. Large investments of time and money are required for the specialized liquefaction trains to achieve the conversion of gas to liquid. Specialized ships with gas auto-refrigeration are also needed for oceangoing LNG transportation; and lastly at the receiving end, LNG processing terminals are required for the retransformation of the product for consumption by the end-user.

Although further advances in liquefaction, in-transit refrigeration as well as optimizing tanker configuration may reduce the unit variable cost of gas shipped internationally, technological advances alone are unlikely to be a significant driving force in the reduction of future inter-regional price spreads (Schmidt, 2017).

Industry sources estimate that shipping and related logistical costs account for no more than 25 percent of the price differential between regions. Much of the difference is accounted for by other factors, several of which are currently in a state of flux. The following sections of this article will consider the impact of changes that have occurred or are currently underway in the political, legal, contractual and institutional arenas and the extent to which they are drivers of inter-regional LNG prices convergence.

Gas Politics and Geopolitics: Common Interests, Differing Approaches

The evolution in the growth of natural gas industries in North America and Europe over the past decade not only reflects the different domestic needs and opportunities present in the industry across the two continents. It also reflects varying priorities as to security of supply, and policy affecting who benefits and who loses from the expansion of both on and offshore gas reserve exploitation. As the U.S. has enjoyed a surge in production at lower prices, major European suppliers have begun to produce less while developing alternatives more rapidly. At the same time as Europe has found an ally with new resources to help reduce dependence on Russian supplies, prices have moderated gradually against slackening demand, but at a slower pace than in Asia.

An important clash of views across the Atlantic concerns what constitutes valid progress towards reducing carbon emissions and what is viewed as environmentally unsustainable. To the greenest of the European environmentalist parties, all fossil fuels, including natural gas, are targets for restriction and eventual elimination. By contrast, in the U.S., the switch from heavy-polluter fuels to cleaner burning natural gas helps industry achieve its carbon emissions targets via coal-to-gas switching in, for example, the U.S. power sector.

While the political climate in the U.S. has been broadly pro-gas industry, ferocious political opposition often confronts would-be gas fracking operations in Western Europe. In the latter, the perception among many activist groups as well as mainstream political parties is of an unacceptable cost to the many and a risk to the common environment – with a benefit only to the few already-wealthy energy companies.

In contrast to the U.S., rather than a cleaner alternative to polluting energy sources such as coal and oil, in Europe natural gas is now increasingly tarred with the same 'fossil fuel' brush as those legacy hydrocarbon sources – and with additional negative stigma attached to fracking as the means of its extraction.

In terms of international trade, U.S. policy towards energy exports was for a long period dominated by self-sufficiency priorities, historically influenced by the OPEC oil embargo of the 1970s. But more recently, with increasingly balanced or indeed oversupplied global markets, a continued export ban made less sense.

Indeed, the main impact of the four-decade-old export ban, which barred oil and gas shipments to countries other than Canada, was to help U.S. refiners buy cheap domestic U.S. crude oil, while selling gasoline at the global price. Till and Eagleeye (2017) cover a futures trading strategy that had benefited from the extraordinary refinery margins that resulted from this state of affairs. But finally, in December 2015, Congress passed, and President Barack Obama signed, new legislation repealing the energy export ban.

Re-gasification equipment at former LNG Gulf Coast import terminals was converted to LNG liquefaction plants, and in February 2016 Cheniere became the first company to export gas from its Sabine Pass facility, with a LNG cargo bound for Brazil. Since then, the growth in LNG export capacity from the U.S. has been exponential with Sabine Pass exports reaching a record 1.96 billion cubic feet (bcf) per day in May 2017. Another four export terminals are expected to be completed by 2021, pushing U.S. export capacity to 9.2 bcf per day (EIA, 2017).

Diverging Policies, Converging Prices

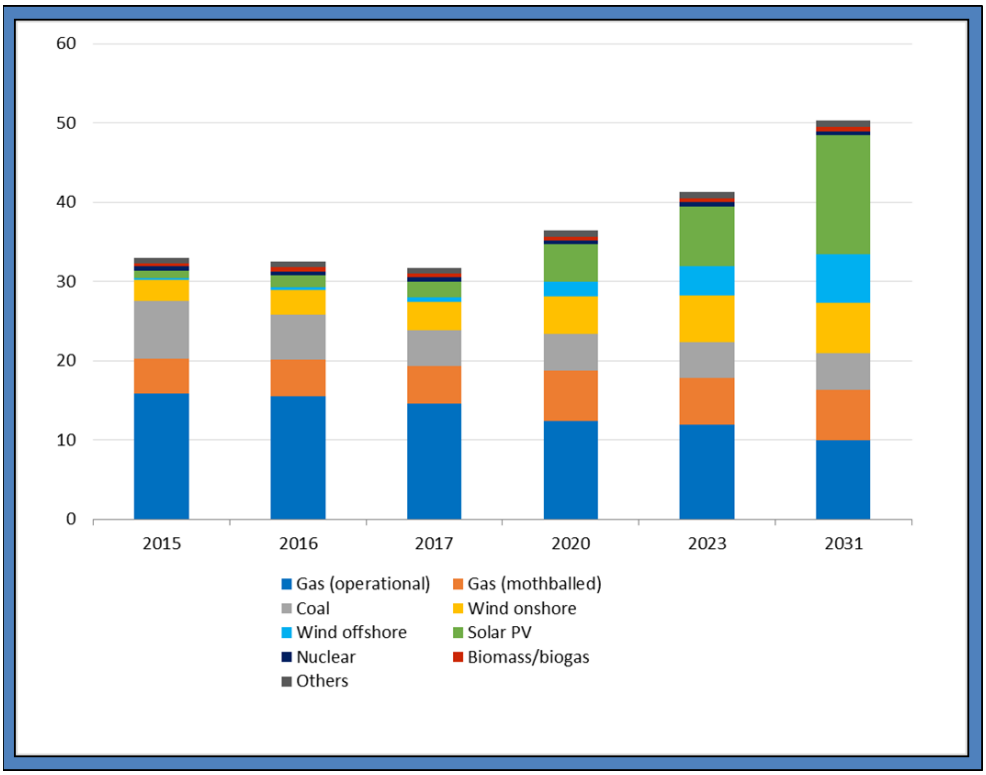
Until recently it could be said that official European policy was evenly divided between pro-and anti-natural resource exploitation camps, with the U.K., Norway and the other northern producer economies not surprisingly able to rely on mostly supportive domestic electorates. But opinion has shifted in response to events both global and domestic, forcing both governments and industry to respond.

For example, a year before he was re-elected as the U.K.'s Prime Minister, Conservative David Cameron declared in 2014 that he was 'going all out for shale' while opposing E.U. measures to limit fracking (Carrington, 2014). Today, however, the U.K.'s opposition Labour party, which is now riding high in opinion polls, has committed itself to anti-fracking legislation if elected.

Moreover, in France the government has imposed a complete ban on fracking and French industry, its consumers and financiers have been under increasing pressure to follow suit. In October 2017, BNP Paribas announced a halt to all financing for clients with businesses focusing on shale oil and gas exploitation. This is a substantial shift for the French lender, already under pressure for alleged illegal and unethical dealings in Africa, and whose business with the energy sector totaled $1.94 billion last year, down from $3.74 billion in 2014, ranking it 17th among international banks (Valentini, 2017).

Of great significance as a barometer of European sentiment is the case of the Netherlands, a major producer where opinion has spun spectacularly from supportive to restrictive in the space of a few short years. For decades the Netherlands was the E.U.'s largest gas producer and supplier to 98% of Dutch homes as well as much of northern France, Germany and Belgium. However, because of a seismic event in 2012 close to the huge Groningen field, production curbs have been put in place by the Dutch government for fear of further earthquake risk to the nearby population.

Figure 2
Netherlands Power Generating Capacity by Fuel Source 2015-2031 (in Gigawatts)



Source: *Tennet Rapport Monitoring Leveringszekerheid*, Tennet TSO B.V., 2016.

In consequence, national production has fallen from 81.5 billion cubic meters (bcm) in 2013 to 47.4 bcm in 2016. Production from the flagship Groningen field, for many decades at the heart of the Netherlands energy economy as well as a huge export earner, is now subject to a lower government-imposed cap following further recent seismic activity in the region. Extraction ramp-ups ahead of the heavy usage winter months are banned, which will force consumers to increase winter fuel imports from Russia or the Mediterranean producers, with a knock-on effect on other European buyers for whom the Netherlands was formerly a reliable supplier, rather than competitor for gas supplies.

The Netherlands is now undergoing a transformation to an economy committed to achieving majority sustainable energy supplies by the 2030s, as diagrammed in Figure 2. By that year, a combination of wind power and solar energy is expected to constitute most of the country's energy supply, according to current national strategy (Honoré, 2017).

Asian LNG Prices: Between Revolution and Reform

Asia is the fastest growing, most heterogeneous, and most expensive of the three regional LNG markets under consideration. In examining the relationships in natural gas price movement and price convergence respectively, it soon becomes clear that causal relationships that are present in North America and Europe are not present in Asia.

Although other regions offer consumers economically feasible opportunities to substitute between energy sources, in Asia coal is dominant. While switching to gas has environmental benefits, the abundance of cheap Asian coal presents significant challenges for increased gas consumption as an energy source and is likely to remain so despite other changes in the market.

China, the largest regional consumer, and India have shown a commitment to gas, and they have displayed a preference for transcontinental pipeline arrangements.[2] Their impact on the future of traded LNG markets therefore remains difficult to evaluate.

The Asian LNG market structure has recently been in flux with the confluence of several factors:

a) The trend to using alternative gas-based benchmarks instead of crude oil price indexing – by 2016 less than 35 percent of LNG was being traded in oil-linked contracts in the region compared to 90 percent in 2011. In times of higher oil prices, the oil-indexing mandate artificially supported LNG prices.

b) Japan's resumption of nuclear power generation following the post-Fukushima shutdown; the overall drop in LNG demand in Asia in 2014-15 led to buyers becoming more demanding as well as more fragmented (there will now be a projected 55 buyers in the region in 2020 versus a total of 33 in 2014).

c) Sellers have been responding with more flexible contracts. Whereas an LNG tanker used to set sail for Asia with its cargo destined for a specific buyer, today cargos may be traded and re-traded en route to their ultimate end user in the region. BP now purchases no less than 60% of its global LNG requirements on a short-to-medium-term contract basis from third-party sources (Milongo, 2017).

d) The recent rapid growth of Asian LNG futures trading. The East Asian spot LNG index Japan-Korea Marker (JKM), traded on the Intercontinental Commodity Exchange, recorded its single largest monthly volume in August of this year – the equivalent of over 21 LNG cargos – establishing the contract as a major global energy trading instrument (Terazono, 2017).

e) New producers in the Middle East, South Asia, and Africa, often with competitive production costs but in need of funding for national LNG infrastructure development. This new breed of LNG producers (e.g. Tanzania, Mozambique, and Senegal/Mauritania) often with no prior experience of selling to Asian buyers is now strongly motivated to compete for a share in Asia's growing LNG market.

These factors have all contributed directly to or facilitated the downward pressure on delivered Asian LNG prices, resulting in a situation where prices in Europe and Asia have recently been moving almost in parallel, with an inter-regional differential of under $2 MMBtu. Although some of the above changes, such as the move away from oil-indexing have only a one-time impact, other factors have more radically reshaped Asia's LNG market. In most cases, changes have improved liquidity and options for enhanced price discovery by both buyers and sellers. To that extent they have facilitated downward price movement already underway due to supply and demand shifts at a global rather than regional level.

Conclusion

The evidence suggests that changes in trade practices and new markets as well as the emergence of new sources of supply have contributed to trends underway, rather than being the primary cause of those trends themselves. Where Asian buyers have been able to exert greater market power versus sellers, they have been more willing to dictate their terms than in the past.

Undoubtedly, the LNG market has become more global and converging inter-regional price levels clearly underline that reality. In the future, when supply-demand conditions tighten, further evidence of the impact of structural changes will become available. In the meantime, a better understanding of the impact of non-market forces may assist practitioners in assessing future price trends, in conjunction with analysis based on traditional supply and demand forecasting.

Endnotes

1 The energy industry practice commonly referred to as "fracking" is a drilling technology that uses a mix of water and chemicals to dislodge natural gas from deep shale or coalbed methane (CBM) deposits. Saundry (2009) defines fracking as "the high-pressure underground injection of large amounts of water and other fluids (including chemicals) into gas bearing rock to form fractures that are propped open with sand. Once the formation is fractured, the natural gas can flow to the well where it is pumped out of the ground."

2 The largest such pipeline supplying China is from Turkmenistan, projected to provide 40 billion cubic meters per annum (bcma) with the Myanmar pipeline adding some 12bcma in the near term. Longer term potential overland suppliers under consideration could include Russia and Kazakhstan.

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Currently involved in research and investment assignments in the financial services sector in sub-Saharan Africa, Mr. Waugh was a partner in the New York firm of Galtere Ltd, a $2.5bn commodity – global macro fund, until 2008 when he joined Lombard Street Research as an Associate Director for commodities research. Mr. Waugh has also worked on the use of digital technologies to achieve wider financial inclusion in developing economies. A recent member of the Advisory Board of Columbia University's Institute of African Studies in New York and associate fellow of Chatham House in London, Mr. Waugh holds an MSc (Econ) degree from the London School of Economics, a Certificate in Financial Technology from the Massachusetts Institute of Technology, and speaks French and Portuguese. In addition to financial research and publications, he has published two non-fiction books on Africa: Paul Kagame and Rwanda (2004) and Charles Taylor and Liberia (2011). Mr. Waugh also contributed the chapter, "Collision: Investing for the New World Commodity Order," in the book, Intelligent Commodity Investing (2007).