U.S. LNG Markets In Transition - Again

By Thomas Tunstall

INTRODUCTION

LNG companies in the U.S. have had a rough go of things over the past couple of decades. Before the shale revolution, LNG shippers were spending billions of dollars on import facilities along the Gulf Coast. At the time, the U.S. was running short of natural gas supplies, and forecasts for the future were not promising. In order to augment the expected shortage of supply, import facilities were built to receive LNG shipments from abroad, which would regasify the supercooled, liquid methane, and send natural gas out through pipelines.

Thomas Tunstall is Research Director of the Institute for Economic Development at the University of Texas at San Antonio. He may be reached at thomas.tunstall@utsa.edu

Of course, the billions of dollars spent on import terminals, as we now know, have become sunk costs that will never be recovered. This led the LNG companies to consider options for export, which although entailing a lengthy permitting and construction process, appeared to be an auspicious prospect. Ever resilient, the industry pivoted and began spending billions of new dollars to repurpose the import facilities to instead export liquefied natural gas.

The landscape certainly looked attractive. As recently as 2013, natural gas prices in Japan were as high as $16-17 per thousand cubic feet (mcf), and $11-12 mcf in Europe, while selling for as little as $2 in the U.S. The market for LNG export appeared very promising indeed. However, much as world crude oil markets have been upended by a glut of worldwide production, so now have natural gas markets.

Export terminals in the U.S. - similar to the case of the import terminals - are again unexpectedly facing potential economic peril. While both crude oil and natural gas are sources of energy and serve as the raw materials for a variety of products, there are some important differences that are not always fully appreciated and can shed light on the current situation.

NATURAL GAS VS. CRUDE OIL

This history of natural gas development has tracked differently than that of crude oil for a variety of reasons. Perhaps most importantly, oil became a global market decades ago, with the advent of supertankers. Crude oil, after all, is easier to store and transport by sea. For natural gas, the process is more complex. It must be supercooled to minus 260 degrees Fahrenheit, loaded onto LNG carriers and then regasified at its destination. Due to previous technological limitations, natural gas has remained a comparatively regional market, although that is now changing.

Natural gas is priced in cubic feet/meters or BTUs. Oil and condensates are priced and measured in barrels. The applications are different. Most transport fuels in the U.S. derive from oil, essentially dwarfing natural gas as a vehicle fuel. The reasons are two-fold. One is infrastructure. In the U.S., for example, there are approximately 168,000 public gasoline refueling stations, compared with only about 900 public natural gas refueling stations. The other issue is the premium that drivers must pay for natural gas powered vehicles and, as applicable, home refueling stations. Taken together, this adds as much as $10,000 to the cost of ownership.

So although we don't have global natural gas markets yet, the seeds of change were planted in 1996 when Qatar opened the world's first large LNG export facility. Now twenty years later, while Qatar remains the largest LNG exporter in the world, other countries are also entering the market.

In the U.S., the prospect of LNG export was inconceivable even just a few years ago. U.S. natural gas production was thought to have peaked in 1973, as its decline continued until the late 1980s. The recent resurgence as a result of the shale revolution is due at least in part to the fact that the natural gas industry in the U.S. was finally fully deregulated in 1993. It was at that point that all remaining price regulations associated the Natural Gas Wellhead Decontrol Act of 1989 were finally phased out, which at one time actually included a prohibition on using natural gas to generate electricity. Full deregulation of natural gas production paved the way for the next phase of the industry.

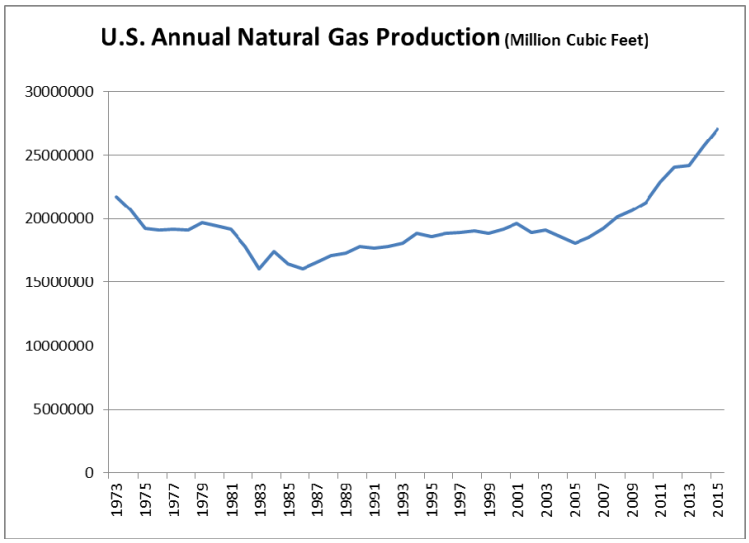
THE RISE OF UNCONVENTIONAL EXTRACTION TECHNIQUES

In 1981, George Mitchell drilled his first well in the Barnett Shale near Fort Worth in an attempt to extract natural gas from shale rock. Halfway into 1997, Mitchell at last used hydraulic fracturing techniques to produce unprecedented amounts of natural gas from shale.

Meanwhile, during the 1993-2005 time period, U.S. natural gas production overall fluctuated between

18-19 trillion cubic feet annually. Following success in the Barnett Shale in the late 1990s, production began apace a few years later in the Haynesville, Marcellus and Eagle Ford shale formations across the U.S.

During the initial phases of the shale revolution, particularly from 2000-2010, natural gas prices remained extremely volatile, which is often typical of markets immediately following deregulation. During that timeframe, natural gas prices ranged from around $2 per mcf to over $10 per mcf.



Source: Energy Information Administration

However, starting in 2006, U.S. natural gas production began a steady increase, finally surpassing 1973 levels in 2011. Production has risen every year since. By 2012, natural gas prices became much less volatile, generally trading between $2-$3 per mcf, where they remain today. U.S. natural gas production continues to set new records and is now in excess of 27 trillion cubic feet annually.

With so much natural gas supply, several companies along the Gulf Coast are in various stages of permitting, constructing or operating LNG export facilities. In February 2016, Cheniere Energy shipped its first cargo of LNG to Brazil. Unfortunately, other traditional LNG export markets no longer look as attractive as they once did. In fact, it is fair to say that export markets for U.S. LNG producers are under siege.

IMPLICATIONS FOR LNG EXPORTERS

Spot prices in Asia - which constitutes 70 percent of global demand - hit $4.24 per thousand cubic feet on April 25, 2016, in large measure because Australia is now reliably shipping large quantities of natural gas to Japan. In Europe, Russia's Gazprom has indicated willingness to lower prices for natural gas buyers in the event of increased import competition from LNG suppliers. This admission makes it very likely that prices in Europe could fall to around $7 per mcf - more or less at the break-even point for U.S. LNG shippers - as a response to competition.

Other countries seeking to capitalize on unconventional shale techniques will also have an impact on world markets. Argentina, for example, is estimated to hold over 800 trillion cubic feet of recoverable natural gas and plans to develop its own shale prospects.

Viable markets for U.S. LNG export are steadily shrinking, which will cause industry players to once again rethink their business models. Several long and short-term realities will impact world natural gas markets in the coming years.

NATURAL GAS PARADIGM SHIFT

The price of natural gas has been traditionally been regulated or linked to the price of oil. However, this is beginning to change. Long-term fixed-price contracts are, in fact, becoming harder to obtain. Natural gas will increasingly be sold on a spot price basis, instead of long-term contracts linked to oil prices. This will occur because of the producer-created excess of supply that in turn makes buyers wary of long-term fixed-price commitments.

Although the fundamentals have been clear for some time, the realization that natural gas will be inexpensive and reliable for decades in the U.S. is still sinking in for many people. Low-cost, stable natural gas prices will also be increasingly the case for the rest of the world. Prices globally will continue to converge.

Even though natural gas is not crude oil, the evolution of global natural gas markets will mimic those of the oil industry. While natural gas is more expensive to store and ship than crude oil, the increased volumes available for sale and the wider use of natural gas-related applications will push down costs for midstream functions over time.

In the U.S., the shale revolution is already encouraging the use of natural gas for a wider range of applications, including electricity generation, manufacturing feedstock and vehicle fuel. Smaller scale liquefaction units will expand the role for LNG, both in the U.S as well as other countries - including developing nations. More natural gas storage capacity will be created worldwide as well.

Crude oil based fuels will be displaced to at least some degree by natural gas. It seems clear that greater numbers of fleet, passenger and big rig vehicles will be produced and driven in the U.S. Diesel demand, in particular, may come under pressure because LNG is well-suited to larger engine applications such as locomotives, ocean-going ferries, and cruise ships that typically run on diesel fuel.

The U.S. will be a reliable, stable supplier of natural gas for decades to come, which will maintain pressure on other worldwide suppliers to become more stable and efficient themselves. Ironically, this will strengthen competitors by forcing operating discipline on countries such as Russia and Australia.

The good news is that LNG companies are actively looking for ways to vertically integrate forward. Investment is either being considered or even now underway in onshore and offshore regasification facilities in other countries, as well as for local manufacturing plants. Floating regasification terminals, for example, are currently operating in Egypt, Jordan and Pakistan. Other opportunities to expand LNG export markets in developing countries with accessible coastlines will likely follow suit.

The unexpected abundance of natural gas supply represents more opportunities to broaden LNG use and applications worldwide, particularly in new niches and markets. This will be critically important for U.S. LNG export entities because the more established markets in Asia and Europe - that had been targeted - now instead have suppliers located closer and thus better able to compete on price than U.S. firms.

References

Gülen, G., Browning, J., Ikonnikova, S., and Tinker, S. (2013). Well economies across ten tiers in low and high Btu (British thermal unit) areas, Barnett Shale, Texas. Energy 60:302-315.

Hinton, D.D. (2012). "The Seventeen-Year Overnight Wonder: George Mitchell and Unlocking the Barnett Shale." *Journal of American History* 99(1): 229-235.

Ikonnikova, S., Gülen, G., Browning, J., and Tinker, S. (2015). Profitability of shale gas drilling: A case study of the Fayetteville shale play. Energy 81: 382-393.

Kinnaman, T. (2011). "The economic impact of shale gas extraction: A review of existing studies." Ecological Economics 70 (7): 1243-1249.

Knudsen, B., Whitson, C., and Foss, B. (2014). Shale-gas scheduling for natural-gas supply in electric power. Energy 78: 165-182.

McGlade, C., Speirs, J., and Sorrell, S. (2013). Unconventional gas – a review of regional and global resource estimates. Energy 55: 571-584.

Tunstall, T. (2015) "Iterative Bass Model Forecasts for Unconventional Oil Production in the Eagle Ford Shale" Energy 93(1): 580-588.

Tunstall, T. (2015) Recent Economic and Community Impact of Unconventional Oil and Gas Exploration and Production on South Texas Counties in the Eagle Ford Shale Area. Journal of Regional Analysis and Policy 45(1): 82-92.

Wang, Z. and Krupnick, A. (2013). "A retrospective review of shale gas development in the United States." Resources for the Future Discussion Paper.