

LNG Tipping Points In the GMT+8 Time Zone

Mark Stickells, Director, Energy Initiatives, University of Western Australia, +61 8 6488 4266,
mark.stickells@uwa.edu.au
Andrew Pickford, Adjunct Research Fellow, University of Western Australia, +61 8 6488 4266,
andrew.pickford@uwa.edu.au

Overview

Over the next two decades, countries in, and adjacent to, the GMT+8 time zone will be home to some of the most significant changes in energy sector and specifically the LNG industry. Much of the variance in forecast global LNG demand to 2030 — which can range anywhere from 380-606 million of tonnes per annum — can be attributed to a north-south corridor within a four-hour time zone centred on GMT+8. Home to 60 percent of the world's population, geopolitical flashpoints, mega-cities, emerging economies, technological innovation as well as millions leaving poverty, understanding energy tipping points in this region can shed light on future LNG demand.

Economic literature on future LNG demand often considers economic and population growth; cost competitiveness of gas compared to other fuel sources; and competitiveness between liquefied and piped options. While helpful for creating models and forecasts, alternative approaches may inform the study of LNG demand and energy economics. One such approach involves considering potential “tipping points” in the above mentioned north-south geographical zone. Originally popularised by Malcolm Gladwell, journalist and commentator, tipping points refer to a moment when an idea or trend crosses a threshold, tips, and is rapidly adopted. Applied to energy, these tipping points can be viewed as swift energy transitions or unforeseen shocks which move the system in an unexpected direction or trajectory. Energy transitions may include the energy mix, consumption and production patterns or shift of fuel use.

The implications of hypothesized LNG tipping points may help energy economists consider unforeseen shocks. This could include developments such as the US, unconventional gas revolution or political response from Fukushima. Both developments altered the outlook for LNG and were largely unexpected. By identifying both positive and negative shocks, parameters for a more robust model for economic forecasting can be created.

Methods

- Define the geographical GMT+8 “Zone” and countries to be analysed in this geopolitical region.
- Quantitative data collection: At the national level, collect and assemble data on the LNG production and demand for this defined region.
- Qualitative information gathering: Summarise previous energy transitions and historical LNG “tipping points”.
- Using this quantitative and qualitative data, capture and categorise potential LNG “tipping points” by drawing on McKinsey & Co analysis of the energy sector which includes “extreme scenarios”.
- Consider implications of future LNG tipping points Indo-Pacific for maritime security, markets, energy policy and relevance for energy economists and modellers.

Results

The tipping points identified in this exercise can be broadly categorised under technology, markets-government and the unthinkable.¹

Technological

The adoption of FLNG and the increased miniaturisation of LNG technologies has contributed to its increased use in shipping and transport, as well as smaller scale industrial applications. New and potential LNG applications are

¹ The full list includes: pipeline technologies change economics of the sector; US LNG industry becomes the target of environmentalists; terrorist incident involving LNG plant, terminal or production facility; Papua New Guinea collapses; targeting and sabotage of natural gas pipelines; proliferation of smaller LNG shipping, receipt options, FLNG, greater delivery automation; US-Mexico border dispute shuts down pipeline exports; battery proliferation; US coal renaissance; a security scare or blockage of Malacca, Suez or Panama; change in Qatar; domestic gas reservation policies spread; a LNG tanker becomes involved in international diplomatic incident; and a nuclear device is claimed to be on an LNG tanker holding a city to ransom.

starting to garner significant attention. During any physical breaks in oil supply, these transport and industrial offerings would come into focus. Conversely, battery technology and ever decreasing costs for renewables represent a significant tipping point which would diminish demand for LNG.

Markets-Governments

In the current period of oversupply and excess capacity, the LNG market would be able to respond to most supply shocks without major difficulties. Approaching 2022, when the market is predicted to return to balance, there will be less flexibility and a supply shock could create a larger price movement (and potentially supply shortages) which would quickly lead to economic and geopolitical repercussions. When the US becomes a larger LNG exporter, it may link this trade with geopolitical objectives. Several of the tipping points outlined above would encourage greater levels of US-Japan LNG trade and cooperation. This would make the supply of LNG more of a geopolitical tool akin to oil and may result in closer producer-supplier relations, reversing the trend of substantial LNG market liquidity.

Unthinkable (major disaster)

The South China Sea and access to the Indian Ocean are thus gaining importance as regional flashpoints where energy security, foreign policy interests and competition among major powers are heavily intertwined. Conflict in the South China Sea or blockage of the Straits of Malacca remain a key risk. Unthinkable disasters involving nuclear devices and LNG tankers could have a major impact, but remain a low probability (and speculative risk).

Implications of Tipping Points

Even a continuation of current trends will change the nature of maritime security concerns and make them central to energy security and trade. The reorganisation of the LNG producer-consumer mix is already occurring. As Australia is increasing its LNG production capacity, ASEAN nations are beginning a transition to become net importers of LNG, ending their roles as traditional suppliers. Indonesia's LNG transition, as an established oil supplier, means that it will soon become concerned about naval routes for imported energy in an increasingly contested maritime region.

Conclusions

This exercise produced a series of tipping points which can be categorised as predominantly negative shocks. The qualitative approach, market uncertainty and general industry pessimism may have skewed the results in this direction. More work is needed in this area to capture some of the positive tipping points which could result in an expanded and more vibrant industry. This would require examination of events which could rapidly increase natural gas demand as well as technology and business innovations which make LNG more attractive than alternative energy sources.

References

- Corbeau, A-S. and Ledesma, D. (eds.), *LNG Markets in Transformation: The Great Reconfiguration*, Oxford, Oxford University Press, 2016.
- Dobbs, R., Manyika, J., and Woetzel, J., *No Ordinary Disruption: The Four Global Forces Breaking All the Trends*, New York, PublicAffairs, 2015.
- Gladwell, M., *The Tipping Point: How Little Things Can Make a Big Difference*, Boston, Little Brown, 2000.
- Heiligtag, S., Maurenbrecher, S., and Niemann, N., *From Scenario Planning to Stress Testing: The Next Step for Energy Companies*, McKinsey and Co., February 2017.
- Pratt, J., Melosi, M., and Brosnan K., (eds.), *Energy Capitals: Local Impact, Global Influence*, Pittsburgh, University of Pittsburgh Press, 2014.
- Smil, V., *Energy Transitions: History, Requirements, Prospects*, Santa Barbara, Praeger, 2010.
- Unger, R., (ed), "Energy Transitions in History: Global Cases of Continuity and Change", *RCC Perspectives 2013*, no 2.