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China's LNG Market: Past, Present and Future

by Wenran Jiang
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LNG SERIES

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China, together with Japan, South Korea and other fast-growing Asian economies, has been the major driver for the growing world market for natural gas and liquefied natural gas (LNG) in recent years. Collectively, they led to the Asian market being responsible for about 75 per cent of global LNG imports, and pushed [Asian LNG import prices to record levels in early 2014](#).

The past five years have witnessed a rapid decline in energy prices, which has brought volatility and uncertainty to the global gas and LNG markets. However, from a medium- to long-term perspective the appetite for more gas and LNG in Asian countries remains strong. The key player is China, which has been very active in pursuing a natural gas and LNG import strategy around the world. [China and Russia signed two historic gas deals in 2014 alone](#), moving the two countries closer in energy co-operation. China has also been aggressively pursuing gas and LNG projects in Central Asia, Australia, the Middle East, Southeast Asia and North America. Increasing tensions in the East China Sea and South China Sea between China and its neighbours are partly due to the fact that both areas are considered rich in oil and natural gas deposits.

This article will focus on China's thirst for LNG in the global and historical context, analyze China's current LNG development and trade strategies, identify the key players and newcomers in both the import and export spectrum, and draw policy implications for Canada in the prospects of China's LNG market in the coming years.

China's thirst for natural gas and LNG

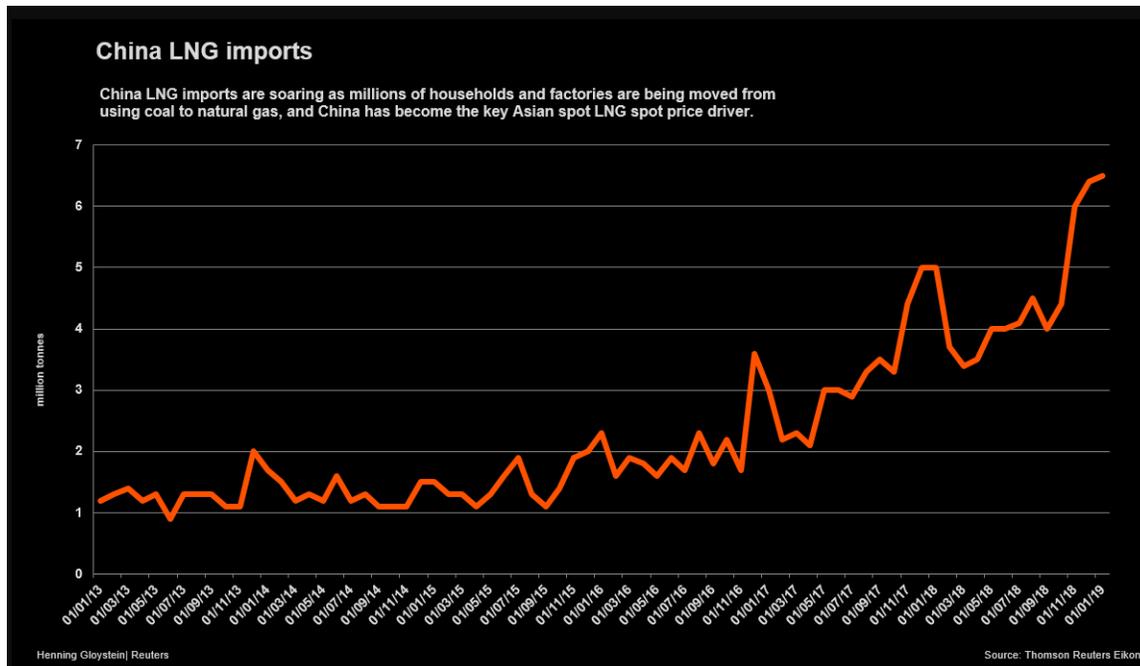
For much of the past decades, China has led the world in economic growth. Japan, South Korea, Taiwan, the Southeast Asian countries and then China have successively gone through rapid industrialization and urbanization. The economic boom and the export-driven development model known as the "East Asian Miracle" have sustained the global demand for energy and resources. Asian economies have become the world's largest LNG importers. In 2017, China overtook South Korea to become the second largest LNG importer. For much of 2018, it imported more LNG than Japan, and is projected to become the largest LNG importer in the early 2020s.

China, although producing a good part of its own fossil fuel consumption, has been steadily increasing the share of its imported oil, gas and LNG since the mid-1990s. Since China became a World Trade Organization (WTO) member in the early 2000s, its economy has gone through another round of robust growth, with GDP growth averaging around 10 per cent. China's demand for energy and other raw materials in this period was dubbed the "commodity super cycle", meaning the demand from China was so strong that prices of oil, gas, coal, major metals and other key resources would sustain their high prices for a prolonged period of time. Even after the 2008 world financial crisis, the Chinese government's stimulus package was so strong that the country underwent a V-shaped recovery, primarily due to infrastructure spending.



Such unprecedented growth put enormous pressure on China's energy supply. The country depends on coal for close to 60 per cent of its total energy consumption, which translates into [China alone using over 50 per cent of the global coal supply](#). It surpassed the United States several years ago as the largest importer of crude oil, with 70 per cent of its oil coming from foreign countries. Despite its efforts to increase production of domestic natural gas, it could not keep up with the double-digit growth it had been experiencing in natural gas consumption, [averaging a 17.3 per cent increase per year between 2002 and 2013](#).

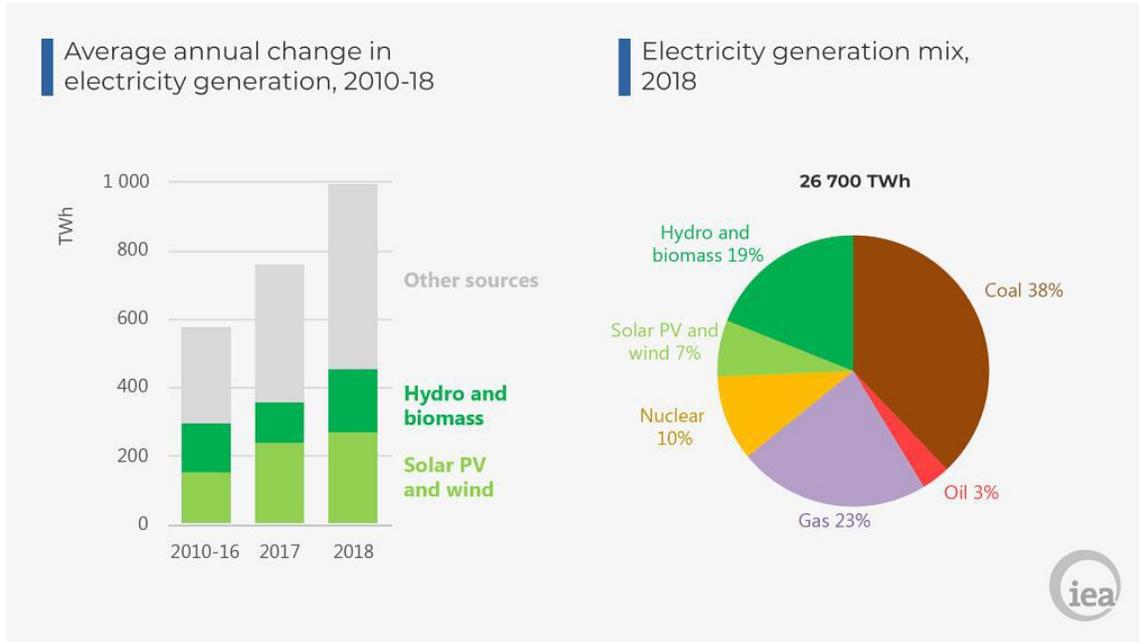
Figure 1. China's LNG imports January 2013 – January 2019



As Figure 1 shows, China's LNG imports picked up speed a couple of years after the global energy price decline and posted a 41-per-cent increase last year. The appetite for more natural gas and LNG is partly due to the government's drive to reduce coal use, not only in combating pollution but also for meeting its Paris climate conference commitments. Natural gas and LNG are regarded as the transitional fuels, or a part of the fuel-switching policy, for the short to medium term in reducing the use of coal in China's energy mix before alternative and renewable energy sources take over. It is projected that [the gas and LNG share in China's energy mix will increase from the current seven per cent to 12 per cent or more by 2040](#).

A recent study by the University of British Columbia's School of Public Policy & Global Affairs, which was submitted to the B.C. government, noted that coal emissions have continued to rise, driven mostly by power generation in Asia. To date, coal emissions are responsible for around one-third of the increase in global temperatures since pre-industrial times and are the single largest source of this growth, as shown in Figure 2. In China and India, where coal currently dominates the energy mix and gas has a relatively small share, there are steady increases in the share of natural gas.

Figure 2: Average annual change in electricity generation, 2010-2018 and the electricity generation mix in 2018



Multiple studies have authoritatively demonstrated that emissions from the combustion of natural gas show clear advantages relative to other fossil fuels. [The combustion of natural gas emits 40- to 55 per cent less carbon dioxide than coal for each unit of energy output, and 20 per cent less carbon dioxide than crude oil.](#) The International Energy Agency (IEA) projects that LNG will be part of the solution to displace more carbon-intensive energy sources and help to address global climate change and air pollution. The market's emergence in the global energy mix has quickly made LNG one of the fastest growing internationally traded commodities. It has the potential to be a bridge fuel for significantly reducing the current consumption of coal in carbon-intensive economies such as China, and helping nations transition to renewable energy.

China's gas and LNG strategies

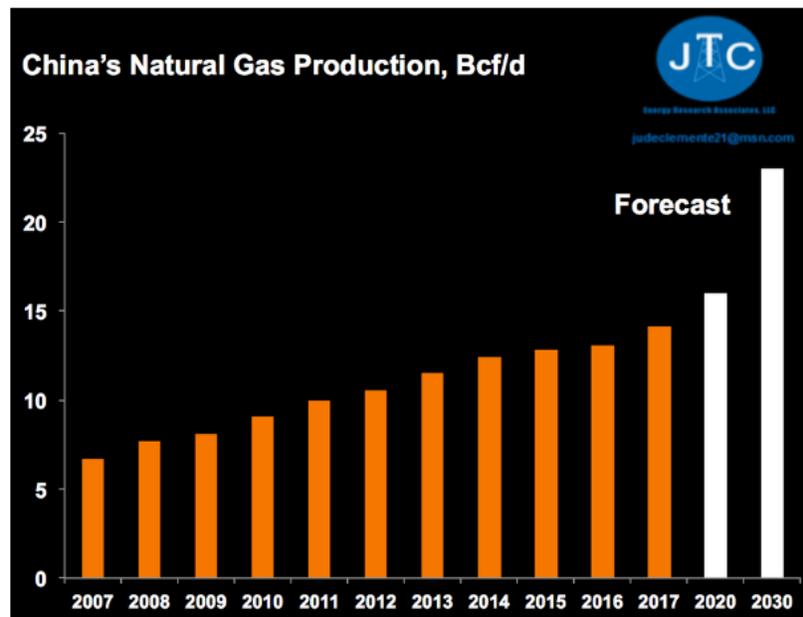
While key importers of gas and LNG in Asia are all actively pursuing stable supply sources, often accompanied by overseas investments by large corporations in the respective countries, China is by far the most strategic and long-term player. China's projected gas demand in the coming years and decades far outpaces all other players.

To meet demand, Beijing has pursued land-based gas pipelines from Central Asia, Russia and Burma while adding more LNG receiving terminals along its eastern ports. This surge in demand has also pushed Chinese energy giants such as CNPC, Sinopec and CNOOC (known as China's "Big Three" national oil companies), to invest in overseas oil and gas assets in countries across Africa and the Middle East in the past two decades, and in Australia, Canada and the United States in recent years. Given China's status as the world's largest comprehensive energy consumer, its

energy security concerns have been heightened in recent years. In order to increase the share of gas in China's energy consumption, Beijing has implemented a number of domestic and international strategies in the past few years.

First, the Chinese leadership calls for more domestic gas exploration and production in order to reduce the vulnerability of import dependence. [According to 2018 BP statistics, China's proven gas reserve has almost quintupled to 195 trillion cubic feet.](#) In both conventional and unconventional areas, domestic production has been prioritized. In the past decade, China's gas production has been growing at nine per cent per year. [It is estimated that nearly 700 new shale production wells will come on stream between 2018 and 2020,](#) but still [shale gas production is only about 15 per cent of China's total gas output in contrast to the 85-per-cent share of shale in U.S. gas production.](#) This is partly due to the very challenging nature of China's shale reserve locations and the complexities involved in development. However, shale exploration in China has accelerated in recent years, which makes China the third largest shale producer after the United States and Canada.

Figure 3. China's natural gas production 2007-2030



China's gas production has been rising, but imports will only become more vital. DATA SOURCE: BP; JTC

Second, China is speeding up construction of infrastructure for gas and LNG transportation. As [Deputy Minister of the National Energy Administration Zhang Yuqing pointed out in late 2015,](#) [by international comparison, China's per capita gas consumption is only 29 per cent of the global average, its gas pipelines are only one-ninth those of the United States and its peak gas storage capacity is only two per cent of total annual consumption, much lower than the world's average of 10 per cent.](#) The Chinese government is eager to change the situation. As set out in the 13th Five-Year Plan (2016-2020), a fourth line will be added to both the existing west-east gas pipeline and the existing Shanxi-Beijing gas pipeline. The China-Russia Easter gas pipeline will be built, along with other gas pipelines from the regions of Xinjiang and Inner Mongolia. China plans to expand LNG terminals along its eastern coast, forming five major regional gas reserve groups designed to



reach a capacity of 20 bcm by 2020. All these measures are in anticipation of China consuming up to 400 bcm of gas per year by the end of the decade. At the same time, [China is planning for 34 coastal LNG receiving terminals, with an annual imported capacity of 247 million tonnes by 2035, triple the current capacity.](#)

Third, the government has launched new policies to encourage more gas consumption. About 70 per cent of China's electricity comes from coal power plants, many of them burning with only limited pollution control. The Chinese government has been trying hard to either shut down the more polluting ones (most of them run by local private operators), or to make them cleaner. China has made remarkable progress in making coal burning more efficient and less polluting. But coal, with the market price very low, is still responsible for well over 70 per cent of China's CO₂ emissions. In an effort to use market incentive to displace coal with gas for electricity generation, the central government released a policy directive at the end of 2014 establishing a gas-electricity price linkage mechanism. [According to the National Development and Reform Commission's document](#), effective Jan. 1, 2015, local governments can provide as much as 0.35 yuan subsidy per kilowatt-hour generated from gas sources over the same amount produced by coal. The latest drive is to replace many coal-burning power plants with gas or LNG.

Fourth, Beijing is pursuing an active go-out strategy for security of the gas and LNG supply. While expanding domestic pipeline and storage infrastructure, China has also enhanced pipeline delivery capacities from Central Asia, Burma and Russia. In terms of LNG import, China has signed long-term contracts with countries such as Australia, Qatar, Malaysia, Indonesia and Russia. China's three largest national oil companies (NOCs), CNPC, Sinopec and CNOOC, were all working on West Coast LNG projects in Canada until a few years ago, but now only CNPC is a partner of the Shell-led LNG Canada project. China had also pursued key projects with the United States in the areas of shale and LNG before the start of the U.S. trade war with China in the middle of 2018. During President Donald Trump's China visit in late 2017, he signed \$250 billion worth of deals. Among those, four energy MOUs alone were worth more than \$160 billion, including a [shale development agreement worth over \\$80 billion](#) and an [Alaska-Sinopec LNG deal worth \\$43 billion](#).

However, China has particularly emphasized its gas and LNG co-operation with Russia in recent years. In May 2014, Chinese President Xi Jinping and Russian President Vladimir Putin signed a \$400-billion agreement, with Russia supplying China 38 bcm a year by 2018. Later that year, the two countries signed another non-binding memorandum that will see top [Russian gas producer Gazprom ship 30 bcm of gas annually to China over 30 years](#). The two gas deals, sealed only six months apart, have profound implications for China's quest for energy security, the volatile global energy market, China-Russia relations and broader geopolitical movements worldwide.

While the world media and expert opinion at the time focused mainly on the significance of these deals for Putin and his confrontation with the West over the Ukrainian crisis, Beijing saw them primarily as a part of its long-term search for energy security and diversification of supply sources. China's attempt to diversify its primary energy sources from its heavy dependence on coal, thanks to Russian gas, clearly responds to a renewed emphasis Beijing has attached to the global climate change agenda. The China-Russia east route gas pipeline of nearly 8,000 kilometres, once complete, will supply China with 38 billion cubic metres of natural gas annually. With China's help, Russia was also able to develop the Yamal LNG project in the Arctic on budget and on time. CNPC has a 20-year off-take agreement in place to buy three million tonnes of Yamal LNG output per year. And only recently, two Chinese NOCs, CNPC and CNOOC, took a combined 20-per-cent share in Novatek's LNG 2 project, which will cover three production trains, each with 6.6 million



tonnes annual capacity. The final investment decision on LNG 2 is expected later this year, and the delivery time is aggressively set for 2023.

Policy implications for North America

While the short-term market for oil and gas is volatile and unpredictable, the medium- to long-term trends for Asia's gas demands are clear. China, Japan, South Korea, India, Taiwan and other emerging Asian economies will remain the dominant global LNG outputs for much of the 21st century. In two decades, China's gas consumption will reach close to the level of all the EU countries combined. The share of oil and gas in China's energy mix will continue to grow, with both having an equal share in China's energy mix by 2025. While Russia, Australia and Qatar are current LNG suppliers, the United States and Canada are catching up in the race to being the lowest cost LNG producers. So far, Shell-led LNG Canada, Woodfibre and FortisBC projects are all showing price competitiveness.

The challenge for global gas and LNG producers, given the optimistic future demand scenario, remains the price range of these commodities in the coming years. China will play a key role in this context, since in past years the high price for LNG in the region pushed the planning and implementation of multiple LNG projects. In the past few years, however, the declining price has affected the strategies of emerging producers. This is, for instance, the case for Canada: unless LNG price driven by Asian demand returns to the \$8-\$12 per MMBtu range, it would be difficult for the few remaining planned LNG projects to be profitable. LNG Canada's projections on cost look competitive, and the recent long-term contract by FortisBC to supply LNG to China, while small in quantity, indicates Canada's competitiveness and potential in the global LNG market.

In normal circumstances, in order to better co-ordinate the supply-and-demand situation of the gas and LNG markets, governments of both gas-producing and consuming states may adjust their policies. While not interfering with private sector investment decisions, Western producers in the United States, Canada and Australia may take a page from the China-Russia gas deals by facilitating medium- to long-term supply agreements with large Asian importers, especially China. While Russia enjoys geographical proximity to and shares geostrategic interests with China, it faces financial and technological challenges in its partnership projects. Western countries, on the other hand, have a much better and more open operational environment, and a clear edge on innovation and technology.

The start of a prolonged U.S.-China trade war in mid-2018 has cast a major shadow on the prospects for U.S. LNG exports to China. Instead of implementing strategies that better promote its market access to China's huge gas and LNG potential, the Trump administration's tariffs on Chinese goods have generated a tit-for-tat Chinese retaliation in every step. One victim was the U.S.'s LNG exports to China being subject to a 10-per-cent tariff beginning in September 2018. This led to the immediate slowdown of U.S. shipments of LNG to China despite the two major long-term supply agreements that U.S. Gulf-based Cheniere Energy Inc. signed with CNPC and Sinopec. Now, with Trump's new tariff hike on Chinese goods in May 2019, Beijing has increased the import levy on U.S. LNG to 25 per cent, effective June 1 of this year.

Canada has experienced its own diplomatic difficulties with China in the past six months with the arrest of Huawei CFO Meng Wanzhou in Vancouver and the U.S.'s request for her extradition. Beijing has since arrested two Canadians on espionage charges, sentenced two Canadians to death for drug trafficking, and limited Canadian exports of canola and pork. Canada perceives these



measures as retaliation for Meng's detention. There is little indication that Canada's potential LNG co-operation with China is in trouble, but with overall bilateral relations deteriorating without signs of a breakthrough in the near future, Canada is not in a position to take advantage of the opportunities provided by the U.S.-China trade war, which has clearly slowed the pace of Chinese interest in the U.S. LNG project.

Given the fact that China is pursuing an aggressive policy of supply diversification, it will likely be in a position to exercise its geopolitical muscle, as it has recently shown. The Canadian government and the private sector should be aware that Beijing is more than willing to use economic leverage in defending its perceived broader national interests, which could potentially leave Canadian producers with limited market options, and a particularly risky future. Therefore, Canadian policy-makers must be proactive in managing Canada's China policy, regardless of which party may form government in the next federal election. Meanwhile, a Canadian LNG export strategy, while realizing the importance of the China market, must include other key Asian importers for reduced risk prospects.

The global reduction of overall CO₂ emission targets set at the Paris climate conference is a more serious long-term setback. As the IEA concludes, when it comes to controlling the rise of global temperature: [“When China changes, everything changes.”](#) [According to studies by LNG Canada](#), for countries that rely heavily on coal to produce electricity, the LNG from the B.C. project alone could reduce global CO₂ emissions by 60 to 90 million tonnes per year, which is more than the total annual emissions of British Columbia and roughly 10 per cent of Canada's total annual emissions. [Another study by Greenpeace shows](#) that if China's planned coal-to-liquid and coal-to-gas conversion facilities (due to the lack of gas as petrochemical feed stocks) all go online by 2020, China would emit about 800 million more tonnes of CO₂ from this sector alone. Even these conversions are designed to avoid lower atmosphere pollution. This amount is more than the entire Canadian national annual CO₂ emission.

Canada should stop fighting internally about the carbon tax. Instead, it should take a leadership position, co-ordinate with the United States, Australia, Qatar, Russia and other LNG-producing countries in an international effort to export large quantities of LNG and gas to China to replace coal use there, thus leading to net global CO₂ emissions reduction worldwide.

► **About the Author**

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