Global Natural Gas Pivot to Asia:

The New Geopolitics of Pipeline Gas and LNG

American Security Project

Perspective

-

Hidetoshi Azuma

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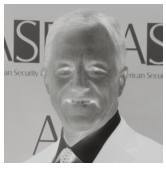

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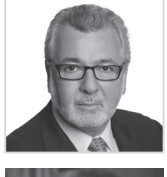

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Energy Security

In this Report:

Global natural gas revolution is increasingly driving today's Asian geopolitics. As global energy suppliers pivot to Asia to capitalize on its growing gas consumption, pipeline gas and LNG play divergent geostrategic roles with significant implications for Asian energy security.

This report analyzes the demand and supply of Asian natural gas market, geostrategies of major suppliers, including Russia, and the prospects for the U.S. natural gas exports to Asia. It then concludes that the U.S. could leverage its domestic gas boom to reduce various geopolitical risks associated with pipeline gas by introducing supply and demand logic to the natural gas market.

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IN BRIEF

- Global natural gas suppliers are pivoting to Asia to capitalize on its growing consumption.
- Pipelines and LNG play a geostrategic role in providing access to the Asian market.
- There are four major global gas suppliers vying to seize the emerging opportunities in Asia: Russia, Central Asia, the U.S., and Australia.
- The U.S. is in a strong position to prevail in the burgeoning Asian gas market with its ongoing shale gas revolution while leading the liberalization of trade rules.

About the Author

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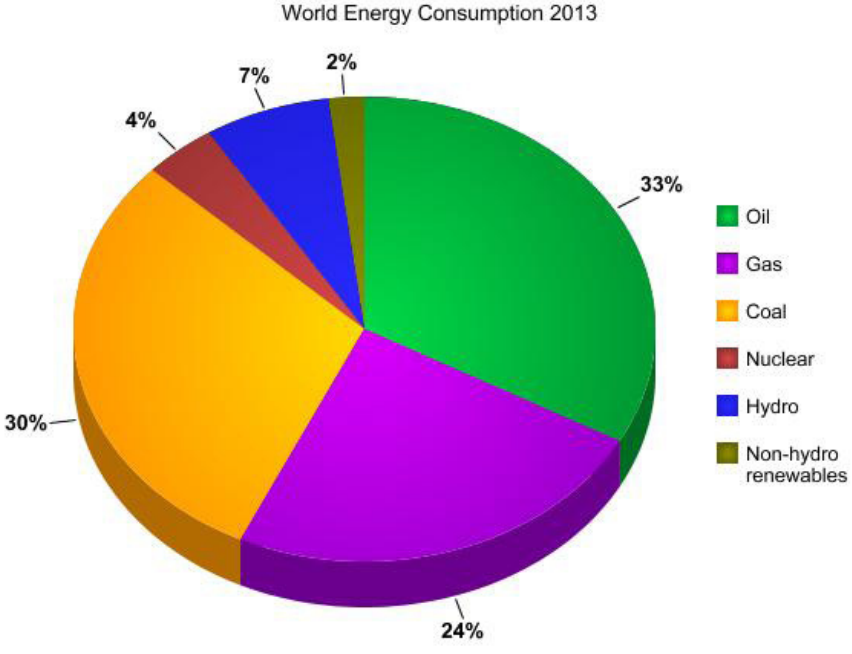
Natural Gas Revolution in Asia

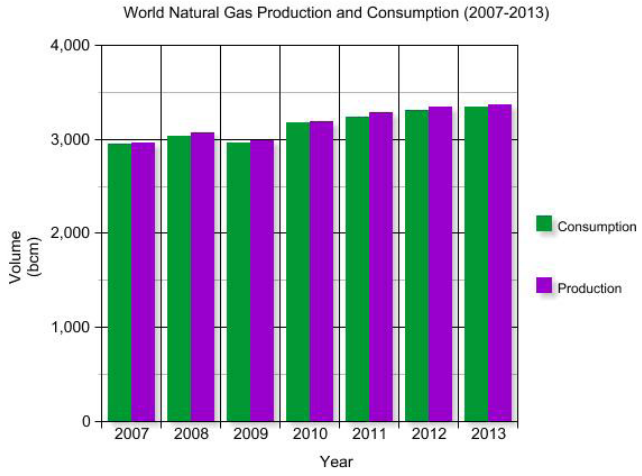
Natural gas is becoming a preeminent form of hydrocarbon energy. This is a direct result of the ongoing natural gas revolution. The natural gas revolution is a product of the following factors: the recent surge in available current supply, the decline in natural gas prices, and greater estimates of world proven reserves.[1] The advent of new technologies, including hydraulic fracturing and horizontal drilling, has particularly contributed to these factors. In 2013, natural gas comprised 24% of global energy consumption while the two other conventional sources, oil and coal, accounted for 33% and 30%, respectively.[2]



BP Statistical Review of World Energy 2014

Although still secondary to oil, natural gas has gained importance at an extraordinary rate. This new reality has become increasingly evident, especially since 2007 when shale gas began accelerating the natural gas revolution. Between 2007 and 2013, U.S. natural gas production rose by 26%, with its shale gas production skyrocketing by almost 800%.[3] During the same period, global natural gas production rose by almost 14% from 2962.7 bcm to 3369.9 bcm while consumption surged by 16% from 2954.4 bcm to 3347.6 bcm.[4] According to the International Energy Agency (IEA), this growth trend is projected to continue, ultimately surpassing coal in global energy consumption by 2040.[5]

Asia is headed to be the world's largest consumer of the emerging global natural gas abundance. Between 1990 and 2012, Asia's natural gas production almost quadrupled from 168 bcm to 651 bcm. While the Middle East has led in gas consumption growth in the last two decades, Asia is estimated to surpass the region by 2020 with its demand virtually doubling in just eight years.[6] Asia's surging gas demand is largely shaped by the voracious appetite of China and Japan in particular.



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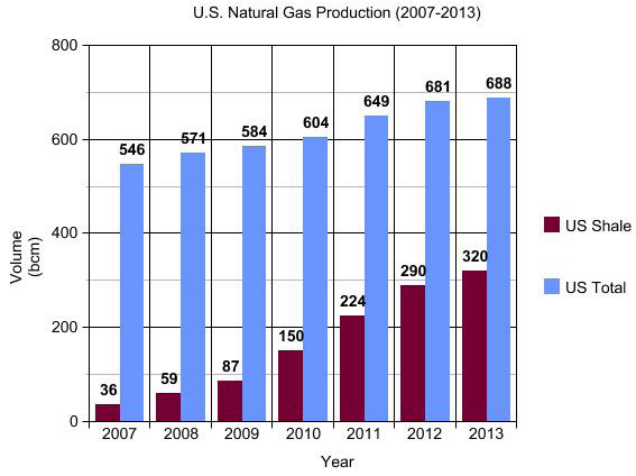
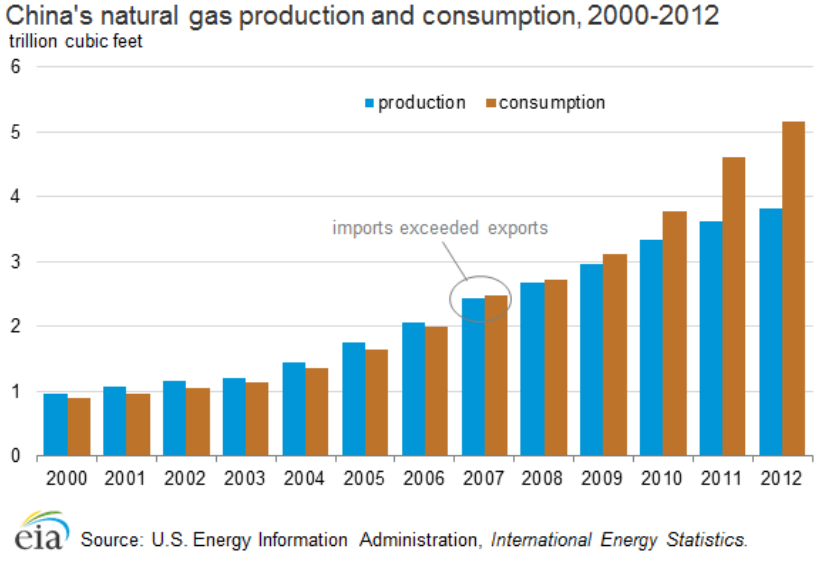


BP Statistical Review of World Energy 2014, EIA

Gasping for Gas: China's Emerging Energy Demand

China's rising economy has generated an enormous demand for all sorts of energy- especially natural gas- in recent years. In fact, China is one of the major producers of natural gas. The country possesses Asia's largest proven natural gas reserves of 4.34 tcm[7] and is also estimated to contain the world's largest technically recoverable shale gas reserves of 31.22 tcm.[8] China produced over 112 bcm of natural gas in 2013, but its production from shale gas was only 213 MMcm.[9] While China's shale gas potential still remains marginal, future technological developments could lead to a greater extraction capacity.

Nevertheless, China's growing gas consumption has outpaced its production, leading the country to become a net importer in 2007. China's natural gas consumption soared by 11% between 2011 and 2012, causing the country to import 42 bcm of LNG to meet the surging demand.[10] As a result, natural gas imports made up almost 30% of China's demand in 2012,[11] and this emerging import-dependency will shape the country's energy portfolio.



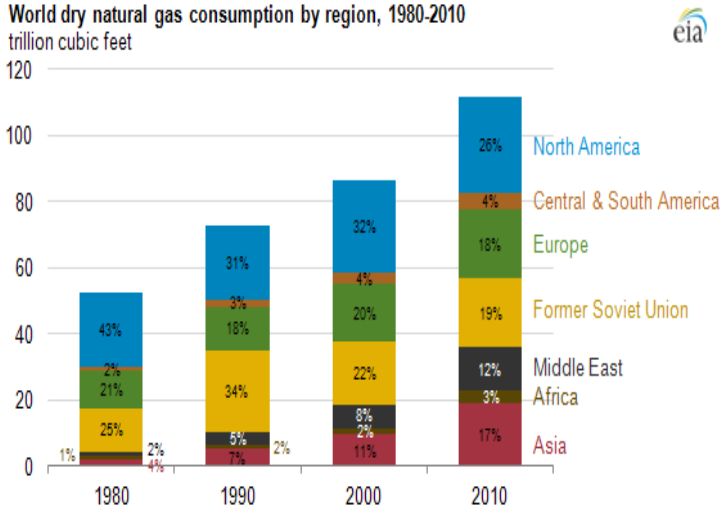
Other factors are also driving China's growing interest in natural gas. Coal still dominates China's energy consumption, accounting for 70% of its energy mix in 2011.[12] Coal is largely responsible for China's severe climate and pollution problems that often affect its neighboring countries.[13]

The 12th Five-Year Plan (FYP) (2011 - 2015) addressed climate issues for the first time in China's history and pledged to boost the use of cleaner energy sources, including natural gas.[14] China also pledged during APEC 2014 to peak its carbon dioxide emissions by 2030, and natural gas will likely be to play the most important role over the medium term.[15]

Against this backdrop, China aims to increase its natural gas consumption to 8% of the total by 2015 and 10% by 2020. The US Energy Information Administration (EIA) estimates an average annual growth rate of 4% for China's gas demand, leading the country to seek additional supplies overseas in the form of LNG and pipeline gas.[16] Therefore, China is rapidly expanding natural gas' share in its energy mix.

LNG for Nuclear: Post-Fukushima Japan's Quest for Energy Security

Japan is in a dire need of energy to generate natural gas. The 2011 Fukushima nuclear accident has virtually eliminated Japan's nuclear power generation, which accounted for 26% of its electricity generation. This posed a major threat to a country almost completely lacking indigenous natural resources. High oil prices before the Ukrainian Crisis contributed to severe trade deficits and the weakening of yen,[17] compelling Japan to seek more affordable energy sources. Natural gas has thus emerged as a solution to Japan's desperate quest for energy security, even at great cost.



Source: EIA, U.S. Energy Information Administration

Against this backdrop, Japan's gas consumption soared by 22% between 2010 and 2012. For the island nation, almost all of its natural gas is delivered in the form of LNG. Cheaper than oil on an energy-equivalent basis, LNG has emerged as an attractive alternative to address Japan's energy crisis. Indeed, LNG rose by 14% in Japan's electricity generation mix between 2010 and 2013 while oil and other fuel gas did so only by 7%.[18] As a result, Japan consumed 37% of the world's total supply of LNG in 2012 and is already its world's largest importer.

Race to Asia: Who Will Dominate?

Anchored by two of the world's three largest economies, Asia thus offers tremendous long-term opportunities for global natural gas suppliers. There are two major systems of delivery of natural gas, namely pipeline gas and LNG. These two delivery methods have serious implications for suppliers in Asia's energy geopolitics. As of 2014, Russia, Central Asia, the U.S. and Australia are major suppliers vying for greater access to Asian gas markets leveraging pipeline gas and LNG for their own advantages.

The Sick Man of Eurasia: Russia's Asian Pipe Dream

Russia possesses the world's largest proven natural gas reserves of 48 tcm.[19] In 2013, it exported 195 bcm of gas[20] and generated $73 billion, accounting for 14% of the country's total export revenues.[21] Hydrocarbons make up 30% of Russia's GDP and 50% of its GDP growth since 2000. It can be argued, therefore, that Russian natural gas pipelines are the arteries providing crucial cash flows.

Russia has recently been shifting its energy focus to Asia. The Russian president Vladimir Putin inked two major natural gas deals with China in 2014. In May 2014, Gazprom and China National Petroleum Corporation (CNPC) signed a $400 billion deal that promised to deliver 38 bcm of Russian gas via the Power of Siberia pipeline for 30 years, beginning in 2018.[22] The two nations struck their second gas deal at $284 billion during APEC and would send China an additional 30 bcm of gas each year through the Altai Gas Pipeline.[23] Unlike the Power of Siberia, this pipeline will link into the Russian gas grid structure all the way to Europe, making Gazprom a swing supplier. These two deals would provide China with 68 bcm of gas annually, making the country the largest importer of Russian natural gas, surpassing Germany. Moreover, Russian natural gas is also estimated to account for 17% of China's gas consumption by 2020.

However, despite the scale of the deals, Russia's pipeline-centric gas strategy in Asia casts various questions surrounding its long-term prospects. For example, the two pipelines for China will require considerable investment in capital, labor, and time long before any gas flows. Total investments required to develop the two pipelines will be as much as $100 billion, almost one twentieth of Russia's 2014 GDP. The two deals' profitability is also questionable. China is demanding a remarkably low pricing at $350 per 1,000 cubic meters of gas, $30 less than what the Europeans currently pay.[24] If the Chinese demand is accepted, Russia's gas revenues from Asia will be severely constrained.

Other emerging factors could also minimize Russia's ability to dominate the Asian gas market. Sanctions, low oil prices, and a currency crisis have conspired to cripple the Russian economy. In December 2014, the Russian GDP shrank below that of Texas.[25] Due to its declining economy, Russia's gas pipeline strategy has already gone awry, culminating in the cancellation of the $50 billion South Stream in southeastern Europe. Although South Stream has been replaced by the Turk Stream for now, this is unlikely to compensate for the expected revenues from Europe; further eroding the country's collapsing economy. The demise of South Stream also bodes ill for Russia's fledgling pipeline projects in Asia.

Russia is increasingly flailing due to its own pipeline dilemma. Pipelines are very expensive to build, but pipeline gas remains Russia's major source of income. To break this impasse, Russia believes it has an ultimate ace up its sleeve: North Korea. Russia has long been eying pipeline projects connecting South Korea and ultimately Japan to capitalize on Asia's two largest economies. In 2011, Russia and South Korea agreed on a specific roadmap for the construction of a trans-peninsula gas pipeline.[26] Yet, North Korea's geopolitical risk factors have frustrated the implementation of the plan.

Nevertheless, North Korea is now pivoting to Russia as its relationship with China sours. North Korea has recently demonstrated defiance toward China by staging such incidents as the 2013 nuclear test and the execution of Kim Jong-un's pro-Chinese uncle, Jang Song-Thaek. Russia has been increasingly eclipsing

China as North Korea's patron. Indeed, Russia recently agreed to write off North Korea's $10 billion debts as well as supporting its economic liberalization initiatives. Moreover, Putin has officially invited Kim Jong-un to Russia on Victory Day in 2015. These developments could lay the foundation for a potential pipeline deal. Nevertheless, inherent geopolitical uncertainties surrounding North Korea cast a bleak outlook for the emerging gas project.

Pipelines are largely responsible for Russia's floundering energy strategy in Asia due to their inherent inefficiency. To be sure, pipeline gas is cheaper than LNG. However, pipelines are costly to build and require years of construction and maintenance, potentially incurring cost overruns. Moreover, pipeline gas deals are often unequal because the supplier exercises monopoly over the flow of gas. This directly translates into various geopolitical risks that often bind the purchasing country's fate to the Kremlin's will.

The harrowing prospect for supply terminations as frequently experienced by Ukraine is especially concerning for most Asian countries seeking to achieve sustainable economic growth. Indeed, China has been aggressively seeking alternative gas suppliers as will be examined in the following section. Therefore, fears of geopolitical risks will constrain Russia's ability to wield monopolistic energy influence in Asia.

Paving the "Pipeline Silk Road": Turkmenistan and China

The Silk Road is reemerging to shape China's relationship with Central Asia in the 21st century. This time, however, the ancient trade routes are traversed not by exotic caravans, but by nondescript pipelines. While China long maintained a passive policy for Central Asia after the Cold War, the country's growing appetite for natural gas has recently intensified its regional engagement to pave a western energy corridor. Turkmenistan's rich gas reserves have become China's ultimate prize.

Turkmenistan has long been a victim of its own landlocked geography. It boasts the largest regional proven reserves of 24,319 bcm of natural gas. Nevertheless, due to Russia's overwhelming influence and the long history of Soviet-era infrastructure, the landlocked country has had its energy potential dictated by the Kremlin's will since its independence in 1991. For example, all Soviet-era gas pipelines from Turkmenistan are routed to Russia, barring direct Turkmen exports to the global gas markets. Even after the Cold War, Russia continued to check Turkmenistan's quest for independent energy policy by purchasing cheap natural gas through these legacy pipelines. Turkmenistan made its first foray into non-Russian markets when it struck a loan-for-gas deal with Iran in 1997.[27]

Source: EIA, U.S. Energy Information Adminstration

China has helped Turkmenistan break out of its enduring geopolitical predicament. China turned to Central Asian pipelines in response to its growing domestic consumption and aversion to seaborne supplies. Completed in less than three years, the Central Asia-China Pipeline (CAGP) runs for 1,800 km from Turkmenistan to China's Xinjiang region via Kazakhstan and Uzbekistan. When connected to China's domestic pipeline network, CAGP spans 7,000 km, the longest in the world. The CAGP deal promises to deliver 30 bcm of Turkmen natural gas to China for 30 years. This delivery capacity will raise Turkmen gas exports by 50%, ultimately leading the country to deliver 70% of its gas to China.[28] Indeed, Turkmen gas makes up half of China's imports.[29] Moreover, the two countries have recently agreed to raise the annual delivery to 65 bcm.

Despite this promising outlook, Central Asia's "Pipeline Silk Road" is unlikely to become a multinational natural gas network over the long term. First, China is only eclipsing Russia as an energy hegemon in Central Asia. China offered a loan-for-gas deal for the development of the South Yolotan-Osman gas fields and the construction of the pipeline. In doing so, China also expanded its political influence by packaging diplomatic assistance with transit issues with Uzbekistan and Kazakhstan.[30] Given Turkmenistan's growing dependency on its gas exports to China, the CAGP deal is a far cry from the realization of the country's export diversification policy. Moreover, China only pays half the price demanded by Turkmenistan, confirming the Central Asian country's subordinate position.[31]

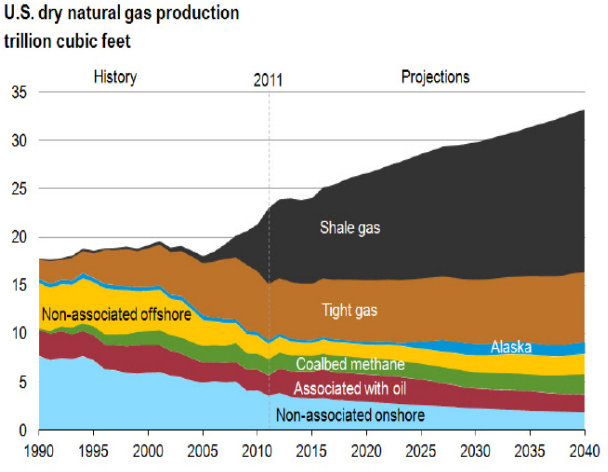
Second, geopolitical constraints cast a grim outlook for future investments in Turkmen gas projects. Turkmenistan's fate is inherently bound to its landlocked geography. This inevitably incurs transit fees if Turkmen gas were to be delivered to major consumers, like China, further raising costs. Turkmenistan has several proposed gas pipelines, including the Trans-Caspian Gas Pipeline and Trans-Afghan Pipeline. However, Turkmenistan's relative weakness vis-a-vis other regional players, including Azerbaijan, remains a major impediment to any progress. Afghanistan's enduring struggle with radical Islam also augers ill for Turkmenistan's ambitions.

Moreover, China's potential extraction of its own shale gas could reduce, if not negate, its need for Turkmen gas. China currently struggles to tap its unconventional gas due to technical and geological obstacles. However, if successfully extracted, Chinese shale gas will undeniably become the country's largest source of gas. However, given Turkmenistan's growing reliance on China for revenues, the Chinese shale gas potential remains a major threat to the country's energy ambitions.

Turkmenistan's experience reveals another weakness of pipeline gas. Absent the demand-supply logic, geopolitical power drives natural gas deals. Turkmenistan is a supplier, but has little bargaining leverage over China due to various politico-economic asymmetries. The emerging "Pipeline Silk Road" is essentially China's geopolitical expedient designed to exploit Turkmenistan's energy abundance and poor economy to fill its voracious appetite. In short, Turkmenistan is merely a pawn serving China's energy diversification strategy. The upshot is the repetition of Turkmenistan's age-old resource curse.

Neptune's LNG Trident: The U.S., Australia, and Japan

While not a 21st-century invention, LNG is the rising star of the current natural gas revolution. Natural gas is reduced to a factor of 600 when converted to LNG, allowing for seaborne delivery. Yet, this liquefaction process and shipping have combined to add additional costs, making LNG traditionally costlier than pipeline gas. Moreover, natural gas prices are indexed to oil prices that are usually much more expensive than spot prices. However, the recent surge in natural gas supply projects LNG prices to approach spot prices while new technologies could also bring down other technical costs. The U.S., Australia, and Japan are poised to leverage this emerging trend with significant geopolitical implications.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2013 Early Release*

The U.S. is one of the leading countries in the natural gas revolution. U.S. natural gas production has skyrocketed by more than 30% since 2005, reaching 707.5 bcm in 2013.[32] U.S. natural gas prices hit a low of $2.04 per thousand cubic feet in 2012 before stabilizing around $4.00 in 2013. Enabled by hydraulic fracturing, the surge of U.S. unconventional gas production is responsible for this dramatic shift in U.S. energy picture. EIA forecasts unconventional gas to make up 75% of U.S. production by 2035.[33] Indeed, U.S. shale gas production surged by more than twelvefold in just a single decade, going from 11 bcm in 2000 to 137.8 bcm in 2010. Thanks to these developments, the U.S. became the world's largest natural gas producer in 2009, surpassing the global energy stalwart Russia.

Australia is another major beneficiary of the natural gas revolution. Australia has proven reserves of 1.3 tcm of natural gas[34] and is already a major exporter catering chiefly to Asian consumers, especially Japan. Australia also boasts technically recoverable reserves of 13.11 tcm of shale gas as of 2012.[35] Australia currently operates three LNG export facilities with an annual total capacity of 34 bcm. EIA estimates that with additional LNG projects currently under construction, Australia is set to surpass Qatar as the world's largest LNG exporter.[36]

These two countries' natural gas potential is attractive to energy-hungry Asian countries, particularly Japan. In fact, as the world's largest LNG importer, Japan already has a solid strategy for leveraging U.S. and Australian natural gas abundance for its own energy security. The Ministry of Economy, Trade, and Industry (METI) estimates 70% of its LNG to be sourced from North America and Australia by 2020.[37] By contrast, Japan plans to reduce its reliance on its second largest LNG supplier, Qatar, due to the high cost of shipping and long-term geopolitical uncertainties.[38]

Moreover, according to METI's 4th Strategic Energy Plan (SEP), Japan will maximize the U.S. LNG potential for improving the country's energy security with its reliable supply route and low pricing.[39] Indeed, North American LNG is estimated to be $12 and is 30% lower than Japan's current per-unit price of $16.[40] This is particularly good news for Japan as high LNG costs are a crucial factor behind its trade deficit. As a result, Japanese companies already have major stakes in key U.S. LNG projects, such as the Freeport Project.

Growth of regional natural gas production
percent change from 1980 to 2010

World	110%
North America	24%
Central & South America	335%
Europe	18%
Former Soviet Union	71%
Middle East	1068%
Africa	975%
Asia	617%
Oceania	434%

Share of world natural gas production
percent of total world production, 1980 and 2010

	1980	2010
North America	43%	26%
Central & South America	2%	5%
Europe	17%	10%
Former Soviet Union	29%	23%
Middle East	3%	15%
Africa	1%	7%
Asia	4%	13%
Oceania	1%	2%

Source: EIA, U.S. Energy Information Adminstration

Ultimately, Japan seeks to utilize U.S. and Australian LNG to become an Asian LNG hub where Japan can resell imported gas to other regional importers. In September 2014, the country made its initial inroads into this strategic vision by creating its own benchmark called Japan OTC Exchange (JOE).[41] While the putative objective of creating such a hub is to stabilize Asia's demand-supply structure of natural gas, it could also lead to greater regional influence for Japan. This would be especially important given Japan's perpetual concerns over its sea lane security, which it considers threatened by China's growing maritime influence.

Nevertheless, various obstacles must be overcome before LNG can transform the regional geopolitics. There are serious environmental concerns associated with the hydraulic fracturing technique. This technique is vital to tapping unconventional gas, but could cause water contamination, earthquakes, and droughts.[42] Indeed, New York State has recently banned hydraulic fracturing citing health risks for local residents.[43] Moreover, the U.S. Natural Gas Act of 1938 requires export approval from the Secretary of Energy. Critics point to the potential negative impact on the domestic economy due to rising gas prices as a result of LNG exports.[44]

Despite these challenges, the U.S.-Australia-Japan natural gas triad is a major geopolitical trend enabled by the natural gas revolution. The key strength of LNG lies in seaborne shipping that faces far less geopolitical risks compared to land-based pipelines. Moreover, as U.S. and Australian LNG flood the Asian market, natural gas can be expected to gain demand-supply logic, further minimizing the political risks inherent in pipeline gas.

The U.S., Australia, and Japan are Asia's major maritime powers sharing kindred politico-economic systems and values. They are in a prime position to capitalize on the natural gas revolution to make the region more secure from the risks of pipeline gas once again.

Conclusion

Natural gas is emerging as a key driver of Asian geopolitics. Asian countries vary in geography, ranging from landlocked Turkmenistan to maritime Japan. Basic geographic features constrain the way in which they can capitalize on the natural gas revolution in Asia. Pipeline gas and LNG are the main instruments for those vying for the prize of the revolution. As a result, three major geopolitical trends have emerged in Asia: Russian natural gas pivot to Asia, the China-Central Asia "Pipeline Silk Road", and the U.S.-Australia-Japan LNG triad.

These competing geopolitical trends evoke the classic geopolitical struggle in Asia between continental powers and maritime powers. In the 19th century, Russia and Britain waged a fierce battle for access to the Asian market with the Trans-Siberian Railway and global sea lanes, respectively. The Trans-Siberian Railway was essentially the Tsar's tool for expansionism and caused frequent geopolitical clashes, including the Russo-Japanese War. By contrast, the global sea lanes protected by the Royal Navy were open to all involved in international commerce. Indeed, the main Asian beneficiary was Imperial Japan, which relied on these sea lanes for economic growth.

Likewise, the current geopolitical contest between pipeline gas and LNG is guided by the same logic. Pipelines are inherently political and carry other geopolitical risks, such as political instability of transit countries. By contrast, LNG is more suited to economic logic and is increasingly transforming such conventional practices as oil-price indexation.

The Ukrainian crisis in 2014-5 has heightened the geopolitical risks associated with pipeline gas as demonstrated by Gazprom's subsequent termination of their gas supply to Kiev. Geopolitics is often beyond the control of responsible national leaders. As pipelines themselves become a risk factor, natural gas-purchasing countries in Asia would have to look to more stable LNG supplies.

The U.S. would be in a particularly favorable position to leverage such a shift with its natural gas exports to the region. An unfettered flow of U.S. LNG into Asia could liberalize its natural gas market by extricating the region's consumers from the yoke of oil-price indexation.

Endnotes

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Gone are the days when a nation's security could be measured by bombers and battleships. Security in this new era requires harnessing all of America's strengths: the force of our diplomacy; the might of our military; the vigor and competitiveness of our economy; and the power of our ideals.

We believe that America must lead in the pursuit of our common goals and shared security. We must confront international challenges with our partners and with all the tools at our disposal and address emerging problems before they become security crises. And to do this we must forge a bipartisan consensus here at home.

ASP brings together prominent American business leaders, former members of Congress, retired military flag officers, and prominent former government officials. ASP conducts research on a broad range of issues and engages and empowers the American public by taking its findings directly to them via events, traditional & new media, meetings, and publications.

We live in a time when the threats to our security are as complex and diverse as terrorism, nuclear proliferation, climate change, energy challenges, and our economic wellbeing. Partisan bickering and age old solutions simply won't solve our problems. America – and the world - needs an honest dialogue about security that is as robust as it is realistic.

ASP exists to promote that dialogue, to forge that consensus, and to spur constructive action so that America meets the challenges to its security while seizing the opportunities that abound.

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