GECF

FEATURE ARTICLES 2018

-A Short Term Perspective-

Gas Market Analysis Department

PREAMBLE

Natural gas, as a key fuel for sustainable development, has been sustaining socio-economic developments for decades across the world. This can be attributed to the credentials of natural gas as being abundant, versatile, clean and environmentally-friendly, affordable and flexible. The gas markets have been witnessing many dynamics propelled by energy and environmental policies, technological developments, economy, unconventional gas exploitation, renewable energy growth, price and the evolution of pricing mechanism, amongst others.

The analysts in the Gas Market Analysis Department (GMAD) of the GECF Secretariat led by Mrs. Mahdjouba Belaifa, Head of Gas Market Analysis Department, and under the supervision of HE Secretary General, Dr. Yury Sentyurin, have been thoroughly monitoring these dynamics from a short-term perspective. In this regard, the GECF Secretariat, based on a comprehensive monitoring and understanding of the gas industry, analyzed various aspects of the natural gas market along the value chain with the primary objective of highlighting the opportunities and challenges for GECF Member Countries (MCs).

Such research work is compiled in the form of articles for 2018.

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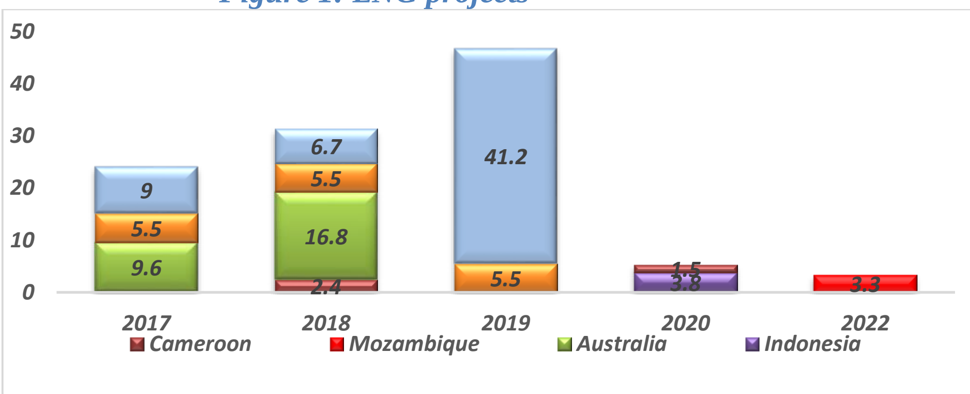
1. The Glut in LNG market: from forecast to reality

Dr. Kamran Niki Oskoui, Market Research Analyst, February 2018

There was a common perspective among market players in 2016 and early 2017 that the global LNG market would face an oversupply and this glut in the market would persist up to 2022. It makes sense when more than 110 million tons (mt) of LNG capacity was expected to come on-stream between 2017-2022; while the demand for LNG struggles to keep up with this incremental supply in the market. Accordingly, there was a variety of forecasts on when this oversupply in the market was expected to end. For instance, International Energy Agency (IEA) and Fact Global Energy (FGE) projected that the glut in the LNG market would persist through the end of 2022 (IEA, medium-term gas outlook, June 2017; FGE LNG outlook). Anadarko forecasted that the LNG market would rebalance around 2023. Meanwhile, Cedigaz sees a longer period for rebalancing of the market and does not expect that glut in the LNG market will end before 2023, or even 2024.

Figure 1: LNG projects



Source: ICIS Heren Egde

However, the critical question is, to what extent these forecasts to become a reality? In reality, reaction of market fundamentals is different from what was already forecasted and there is a need to wait and see how supply and demand balance would take place in the coming years. Development of the LNG market in 2017 can be good example for argument. Despite previously forecasted oversupply for the year 2017, global LNG trade reached 291mt, around 29mt (or 11%) higher compared with the LNG imports in 2016. It means an additional 29 mt LNG was absorbed by the increase in demand. While So, in 2017, averageprice of spot LNG both in North East Asia and South West Europe market increased by 25% and 30% in comparison with 2016 respectively. Even Long-term Japan LNG price averaged around 8 US$/MmBtu, up 20% in comparison 2016.

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Figure 2: Average LNG price

LNG price (US$/MmBtu)	2016	2017	% change
Average North East Asia spot LNG price	5.8	7.23	25%
Average South West Europe spot LNG price	5.0	6.50	30%
Long Term Japan LNG	6.77	8.098	20%

Source: ICIS Heren Egde

In fact, the market balanced both in higher quantity of traded volumes and level of prices. Therefore, in 2017, not only was the glut observed in the LNG market, however we have seen somewhat recovery in the market. Therefore, the assumption of “Glut in the LNG market” was deferred for one year forward. This resulted in some market players talking about the “absence of glut” in the LNG market and revision of the projections of oversupply. For instance, Ben van Beurden, chief executive of Shell, believes that there is not going to be a glut in the market but there would be ample liquefaction for the market to absorb. Other market participants have expressed similar views in recent months, with US exporter Cheniere Energy's director Eric Bensaude having said there was "no evidence" of oversupply in the LNG market. Even some players like Wood Mackenzie revised their projection and spoke about recovery sooner than expected before. From the consumer side, Yuji Kakimi, president of Japanese utility joint venture Jera also announced that global demand will outpace supply after 2020, pushing prices higher.

Some analysts believe that the observed increase in LNG demand and price particularly in the last quarter of 2017, was driven by hike in China’s gas demand, outages in nuclear power generation in Europe; abnormal climate conditions across the globe as well as the competitiveness of LNG prices versus coal in some markets. Although they think that these derivers could be uneven or temporary, we need to take into consideration that such a situation can take place anytime and demand can be affected with different factors. Therefore, any realistic analysis on the subject of glut in LNG market need to take the following aspects into consideration:

First, projection about incremental capacity during next five years is quiet simple as information about LNG plants are available and visible for most of market players. However, forecasting growth of demand is a difficult task and depends on a lot of factors that are not tangible and any underestimation of demand would be reflected in forecasting oversupply in the market. Weather conditions, change in energy policies, economic growth and need for energy are among the factors that can boost LNG demand, however there is no realistic forecast regarding them.

Second, there is difference between capacity, which is supposed to come on stream and supply of LNG cargoes into the market, because of the ramp of the projects and utilization rate. Most of the time, there is time lag between the startup of a project and the time it reaches to nominal capacity. It is even possible that LNG plants

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could decrease their utilization rate because of market condition. Therefore, supply of LNG cargoes can defer to next years or adjust itself with market condition.

Third, oversupply in a market would be reflected in the lower prices and unsold cargoes. If such a situation persist for a long period of time, market fundamentals will react for this excess supply to postpone in investment decisions or lack of FIDs for new projects, shut-in of liquefaction plants and lower plant utilization and. Consequently, after 2023, as it was mentioned in most of the outlooks, the LNG market will be tight and face a deficit.

Considering the above-mentioned factors, we believe that this gives a message that the market should rebalance in any condition and glut cannot persist for five years as previously forecasted, due to the limitation in the storage capacity and high shipping cost. Oversupply in the market can be absorbed by Europe as a sink market, or new markets like China or South East Asia. From the supply side, it makes sense that suppliers defer supplies by one or two years later through under-utilization of plant and shut-in of projects as reaction to the market condition. From the investment perspective, any project that can come on the stream after 2024 would be economical as it is forecasted long market from that point forward. The final word is that the glut in LNG market can take place in the size and length that already was forecasted.

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2. Will the spot LNG market be impacted by the shutdown of the PNG LNG plant?

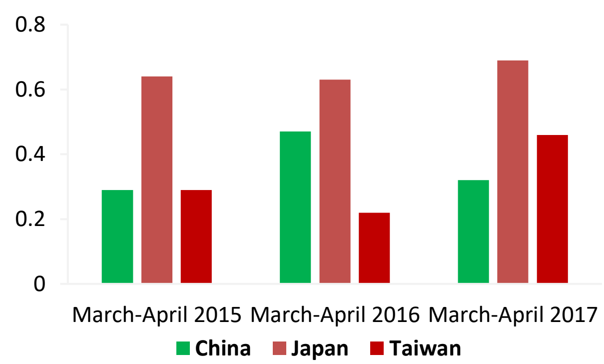
Mr. Adrian Sookhan, Gas Market Analyst, March 2018

The Papua New Guinea (PNG) LNG liquefaction plant, located in the south coast of PNG's central province, has a capacity of 6.9 million tonnes per annum (Mtpa) and began production in May 2014. ExxonMobil, the largest shareholder of the project with a 33.2% interest, is the operator of the facility and has long-term supply contracts with China (Sinopec – 2 Mtpa), Japan (JERA & Osaka – 3.3 Mtpa) and Taiwan (CPC – 1.2 Mtpa).

According to a Reuter's report, on February 26, 2018, a 7.5 magnitude earthquake struck PNG causing equipment and structural damage to the Hides gas processing plant, the Agogo production facility and Moran field which supplies gas to the LNG facility. ExxonMobil has since declared force majeure on LNG exports from the facility and expects the plant will remain shut for eight weeks for repairing works.

In 2017, the LNG plant operated at ~120% of its nameplate capacity. The shut-down of the LNG facility in March and April 2018 is forecasted to reduce long-term supplies to buyers by ~1.34 Mtpa of LNG or ~6% of these markets' LNG demand, based on historical LNG trade (Figure 1).

Figure 1: Long-term LNG trade from PNG (Mtpa)

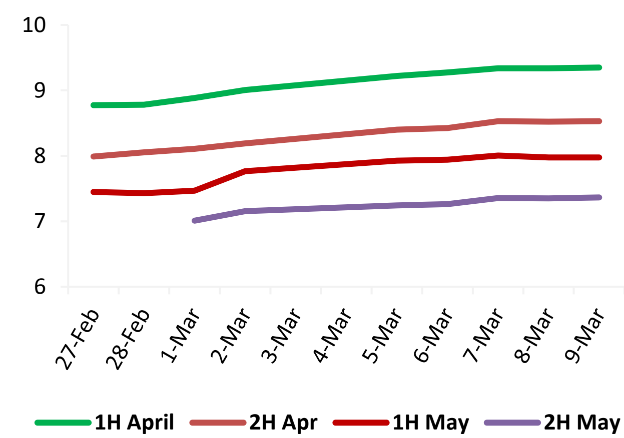


Source: GECF based on ICIS LNG Edge

This share is negligible especially in a market with LNG molecules looking for buyers. Therefore, the impact on prices, considering no other issues, would not be significant except the reaction of the market to speculations.

Indeed, the Northeast Asia (NEA) spot LNG price was supported by the shutdown of the PNG LNG facility (Figure 2) as the spot LNG price for delivery during the shoulder months is usually expected to decline. The NEA spot LNG price for delivery in April increased by 6.6% during the period February 28 to March 09, 2018 while delivery in May increased by 6%. In addition, for the period March 01-09, 2018, the NEA spot LNG price averaged $9.20/MMBtu, representing a decline of 14% from the same period in February, compared to a decline of 21% recorded during the same periods in 2017.

Figure 2: NEA DES spot LNG Price ($/MMBtu)



Source: GECF based on Argus LNG Daily

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Despite a growth in the NEA spot LNG price, the shutdown of the PNG LNG plant did not have an adverse impact on spot LNG demand as expected by some analysts. Following the earthquake, there has not been any firm spot LNG demand from long-term buyers of PNG LNG, as most of them has sufficient LNG supply to cover their demand. It is true that the extended shutdown of the PNG LNG facility could continue to lend strength to the spot LNG prices. However, the expectation of lower gas demand due to higher temperatures in NEA coupled with ample LNG supplies, including reloads from China and Europe and the ramp-up of Cove Point and Wheatstone LNG projects, could weigh on prices.

GECF, which supplied 32% of the LNG imported by these three markets in 2017, has the ability to increase LNG supplies to the concerned markets. Although portfolio players, traders and exporters from Australia and the U.S. could also supply these markets, GECF Member Countries, namely Russia and Qatar, has a competitive advantage in terms of shipping costs and duration.

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3. Gas Supplies from Azerbaijan to Europe through TANAP getting closer

Dr. Aydar Shakirov, Gas Transportation and Storage Analyst, May 2018

The Southern Gas Corridor (SGC) is a major gas pipeline which will enable gas supplies from Azerbaijan to Europe through Turkey. This project is based on the Shah Deniz Phase 2 gas field which is located in the Caspian Sea, 70 kilometres off Azerbaijan's shores. This gas field sits on proven reserves of 1.2 trillion cubic meters.

The SGC is a huge infrastructure project which has required investment amounting to 40 billion dollars. The SGC comprises three parts: 1) South Caucasus Pipeline Expansion (SCPX) project which brings natural gas from Azerbaijan to the Georgian-Turkish border; 2) Trans- Anatolian gas pipeline (TANAP) which stretches from the Georgian-Turkish border to the Turkish-Greek border; 3) Trans Adriatic Pipeline (TAP) which will bring gas from Turkey to Greece, Albania and Italy.

The shareholders agreement for TANAP was signed in March 2015, reflecting the shares of the parties to the agreement as follows: Southern Gas Corridor CJSC (51% state-owned and 49% SOCAR-owned) – 51%, SOCAR Turkey Enerji – 7%, Botas – 30%, BP – 12%.

On May 29, 2018 the President of Azerbaijan Ilham Aliyev attended the official opening ceremony of the Southern Gas Corridor in Sangachal terminal in Azerbaijan, where he made a keynote speech. The GECF Secretary General HE Dr Yury Sentyurin also addressed the ceremony, by highlighting the important role of Azerbaijan as an international gas hub, which will supply gas directly to Europe for the first time in the history.[1]

On June 12, 2018 the Presidents of Turkey, Azerbaijan and Georgia are expected to attend the opening ceremony of TANAP in the Turkish city of Eskishehir. Then, commercial flows will start (the TANAP's testing began in January 2018). For the time being, the part of TANAP that goes to Eskisehir is fully completed, while the part of the pipeline that goes from Eskishehir to the Turkish-Greek border is ready by 83%.

TANAP will stretch from Posof point (Ardahan province) on the Turkish-Georgian border to Ipsala point (Edirne province) on the Turkish-Greek border and will run through 20 Turkish provinces. Its length is 1,850 kilometers, including the 19 km passage running under the Sea of Marmara. The pipe diameter is 56 inches (1422 mm) from the Turkish-Georgian border to Eskisehir and 48 inches (1219 mm) from Eskisehir to the Turkish- Greek border. The undersea passage will have twin pipeline system with the diameter of 36 inch (914 mm).

The project's infrastructure comprises 7 compressor stations, 12 pigging stations, 49 block valve stations, 4 measuring stations and 2 off-take stations to supply gas to Turkey's national natural gas network.

The TANAP's initial capacity will reach 16 bcm, with 6 bcm to be delivered to Turkey starting from 2018 and the remaining volume to be supplied to Europe starting from 2020.

Azerbaijan's supplies to Turkey through TANAP are expected to reach 5.7 mn cm per day in July-December 2018 which will provide 1 bcm of additional supply to Turkey in 2018. Starting from 2019, gas supplies will start increasing gradually to reach 16.4 mn cm per day, or 6 bcm per year, by 2021. TANAP may have a crucial impact on the Turkish gas market. For instance, its commissioning may entail lower LNG imports, first of all spot LNG imports which reached 3 bcm of pipeline equivalent in 2017.

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[1] *From the speech of HE Dr Yury Sentyurin, Secretary General of GECF on 29th May 2018, at the ceremony of launch of the first phase of the project, in Baku, Azerbaijan*

The commissioning of the second phase of TANAP, which will connect Eskisehir with the Turkish-Greek border, should start in January 2019, with first delivery of gas to TAP scheduled for March 2020. By 2026 TANAP's capacity is expected to rise to 31 bcm, with a possibility of new suppliers joining the project. The project's expansion will require the construction of new gas compressor stations.

The bottom line is that Azerbaijan has a great potential of gas resources with an R/P ratio of more than 73 years (based on proven reserves) that are strongly backing its role on the global gas market.

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4. *Canada finally paving the way to become an LNG exporter*

Mrs. Kenna Bravo, Gas Market Analyst, September 2018

After several years of environmental constraints, regulation barriers, and other obstacles, it seems that Canada has finally begun to pave its way to become a liquefied natural gas (LNG) exporter by 2024.

The recent announcement that Shell, Petronas, PetroChina, Mitsubishi, and Kogas reached the final investment decision (FID) on LNG Canada project, made an important milestone not only for Canada, as the only LNG project going ahead for construction but also as a new business model in the LNG industry.

The decision, delayed since 2016, was taken in a landscape of rising oil prices, strong outlook for LNG demand in the Asian market, but also amid growing trade tension between the United States and China.

LNG Canada project, located in Kitimat, British Columbia, seems to start its construction soon. It will represent the largest private investment recorded in Canada's history reaching about US$ 31.2 billion. The project will bring new jobs and opportunities for the country that was quite behind compared with its neighbour, the United States, despite the confirmed huge gas reserves that justify to some extent the ambition of the country to export LNG.

In its first phase, this greenfield LNG project, that already received a 40-year license, will have two liquefaction units with a combined capacity to exports 14 million tons of LNG per annum (mtpa) with a possible future expansion to 26 mtpa.

LNG Canada will have access to plenty of natural gas sources in the British Columbia and will get a geographical advantage due to its proximity to the premium Asian Market (Japan, South Korea, and China). This could give to LNG sales from this plant a competitive advantage in terms of prices and shipping cost, when compared to US LNG exports.

An Argus report on natural gas resources in Canada indicates that Western Canada has about 300 Tcf (8.5 Tcm) of natural gas that could be extracted for less than $3/mmBtu, out of which, Shell has a working interest in more than 9 Tcf of regional supply that would cost about $2/mmBtu. Similarly, in terms of transportation costs, due to the geographic location of the project, Canada LNG could reach premium markets, for example, Japan in half of the time than those facilities located in the U.S. Gulf Coast, which need more time to be delivered and has to transit through Panama Canal.

To get an idea on how competitive could it be, the CEO of the project indicated, last year, that prices could be well below US$ 8/MMBtu. While a recent Argus report indicates that Shell has estimated the cost to supply Asia from Canada LNG to be around US$ 7 MMBtu (feed gas + pipeline transportation costs US$2.5/mmBtu + liquefaction costs US$3.50/ MMBtu + shipping cost about US$1/mmBtu). This price is still competitive compared with the estimated cost for the LNG from US Gulf coast greenfield projects to Asia at $7.50/mmBtu (feed gas cost of about $3/mmBtu + liquefaction cost of about $2.75/mmBtu + shipping cost of about $1.75/mmBtu).

In addition to the above, a significant change observed in this project has been the kind of business model considered. Canada LNG will get funds from its own developers. Traditionally, highly intensive LNG projects received financing from banks when the projects were backrest by signed long-term commitments with their buyers and when those buyers were proven to have high creditworthiness. The greenfield project took its FID without having any signed long-term contract, making it particularly unique in the sense that its financing will rely purely on its shareholders' funds and not from the traditional funding way.

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The joint venture in charge of this project, will be backed up by two of the world largest LNG companies (Shell 40% and Petronas 25%) and by the three of the most significant LNG buyers in Asia (PetroChina 15%, Mitsubishi 10%, and Kogas 5%). Shell spokesman has said that “each joint venture participant will be responsible for providing its own natural gas supply and will individually offtake and market its own LNG".

Canada, which became an LNG importer since 2009 and have received LNG exclusively from GECF producers, would finally see with this project how to monetize its natural gas resources.

As Canada is not facing any dispute with China, Chinese buyers could prefer to buy LNG from Canada rather than from the U.S. even more when the price is competitive.
There are still about 18 projects in Canada pending for approval or to take FID, that underpin Canadian interest in becoming an important LNG player; however, the conditions that LNG Canada project met with its shareholders could be an important challenge to other LNG projects in the country, unless they get support, for example, from Chinese buyers.

Indeed, the strong gas demand in China and the potential increase in other Asian countries will continue to boost new LNG developments with the target to fill the gap that is foreseen in natural gas demand by 2035, by market’s experts.

LNG Canada project, together with the recent announcement of Qatari LNG expansion to 110 mtpa, and potentially other GECF LNG projects (from Nigeria, Russia, Equatorial Guinea, etc) are looking ahead to supply current and potential markets, and although prices could be impacted and competition could be high, the LNG industry undoubtedly is set to grow as coal phase-out in the power generation and environmental concerns call for more gas.

GECF as a leading Forum of gas suppliers to the market, will continue to support its partners and clients through sustainable supplies of gas by pipeline and in LNG form. Also, GECF is welcoming any country producing and exporting natural gas to be part of the GECF family. In this regard, a reference could be made to the recent call of Energy Ministers of Russia and Qatar, made during the Russia Energy Week in Moscow, Russia, urging gas producing countries to join GECF. “*I would like to remind you that Russian President Vladimir Putin once initiated the establishment of the Gas Exporting Countries Forum. We support this organization and support new members’ enlistment, as well as countries which are now Observers to step up their participation and become full- fledged members of the GECF*” said HE Mr Alexander Novak.

This proposal was supported by the Minister of Energy and Industry of the State of Qatar, HE Dr Mohammed Bin Saleh Al-Sada. (Extracted from https://www.gecf.org/events/energy-ministers-of-russia-and-qatar-urged-gas-producing-countries-to-join-GECF).

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Table 1: Proposed Canadian LNG Projects

Project	Export License	Export Volume Million Tons per Annum (Mtpa) -	Cost ($Billion)	Location
LNG Canada	40 Years	14-26 Mtpa	$25-$40	West Coast (British Columbia)
Kitimat LNG	20 Years	10 Mtpa	$15	West Coast (British Columbia)
Cedar LNG Project	25 Years	6.4 Mtpa		West Coast (British Columbia)
WCC LNG	40 Years	30 Mtpa	$15-$25	West Coast (British Columbia)
Orca LNG	25 Years	24 Mtpa		West Coast (British Columbia)
New Times Energy	25 Years	12 Mtpa		West Coast (British Columbia)
Kitsault Energy Project	20 Years	20 Mtpa		West Coast (British Columbia)
Stewart LNG Export Project	25 Years	30 Mtpa		West Coast (British Columbia)
Triton LNG (On Hold)	25 Years	2.3 Mtpa		West Coast (British Columbia)
Woodfibre LNG	25 Years	2.1 Mtpa	$1.60	West Coast (British Columbia)
WesPac LNG Marine Terminal	25 Years	3 Mtpa		West Coast (British Columbia)
Discovery LNG	25 Years	20 Mtpa		West Coast (British Columbia)
Steelhead LNG: Kwispaa LNG	25 Years	30 Mtpa	$30	West Coast (British Columbia)
Goldboro LNG (Nova Scotia)	20 Years	10 Mtpa	$8.30	East Coast
Bear Head LNG (Nova Scotia)	25 Years	12 Mtpa	$2-$8	East Coast
A C LNG (Nova Scotia)	25 Years	15 Mtpa	$3	East Coast
Energie Saguenay(Quebec)	25 Years	11 Mtpa	$7	East Coast
Stolt LNGaz (Quebec)	25 Years	0.5 Mtpa	$0.60	East Coast
TUGLIQ Gaz Naturel Quubec Inc. (Quebec)	Applying	0.8 Mtpa		East Coast
	Total	257 Mtpa		

Source: GECF based on Wood Mac and NEB

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5. The implication of the US-China trade tension on the LNG market

Dr. Kamran Niki Oskoui, Market Research Analyst, October 2018

Uncertainties regarding the consequence of ongoing trade tensions between the United States and China are weighing to some extent on the economic prospects of both countries, and to lesser extent on the global economy. This trade tension has been triggered since January 2018 when the U.S. Administration imposed tariffs on solar panels, washing machines and a range of Chinese products. Subsequent to that, on June 15, the U.S. announced 25% tariffs on $34 billion of imported Chinese goods. China's government in turn responded with similar sized tariffs on U.S. products on 16 June. This was the first round of tariffs that came into effect on 6 July 2018. The second round of tariffs on $16 billion of Chinese imports was announced by the U.S. administration on 7th August 2018 and took effect on August 23, which then led China to impose tariffs on the same value of U.S. products a day after. In the third round, the U.S. administration imposed a 10% tariff on $200 billion of Chinese products on September 2018, which led the Chinese government to enforce a 10% tariff on $60 billion on imported goods from the U.S. into China. As such, the U.S. collectively imposed tariffs on $260 billion worth of Chinese products in three rounds. Meanwhile, China has imposed tariffs on $110 billion on U.S. exports to China including LNG (Table 1).

However, this is not the end of story as the U.S. administration has said that they will increase tariffs to 25% on 1st January 2019, if a trade deal is not reached before then. China's authorities showed their determination on the counter measure by indicating that the tariffs on LNG and many other products could be raised to match the U.S. levels. The U.S. has also planned a fourth round of tariffs as they called it "ready to go" on an additional $267 of imports, which will cover everything imported from China last year. Although, the ongoing trade tension has yet to affect China's economy significantly, as depreciation of the Chinese Yuan to some extent offset the tariffs increase, the impact might be reflected gradually in the coming months. As such, escalating trade tensions if prolonged could affect global trade, investment and business sentiment.

The implication of the trade tension on the energy market is mainly translated through imposing 10% tariffs on U.S. LNG during the third rounds of tariffs by China. Although tariffs on U.S. LNG had a modest effect on LNG market thus far, the potential effects could be reflected in U.S. LNG losing the competitiveness in the Chinese market which could shift the trade flow towards other regional markets. According to Platts, China accounted for 15% of U.S. LNG exports in 2017 and the U.S. accounted for about 5% of China's LNG imports in 2017. This could result in re-arrangement of regional LNG supply-demand balance as well as diminishing flexibility and liquidity of the LNG market. Moreover, there are a number of U.S. LNG export projects which are counting on China's growing LNG demand to go ahead or take FID. However, in the current situation of the LNG market, those projects might face the risk of postponement or cancelation, as it is the case of Magnolia LNG projects, which in October decided to delay its FID to 2019 instead of end of this year due to difficulties in engaging Chinese buyers. While, this could be big a concern for the U.S., China has more options to meet it LNG needs from other LNG suppliers, including GECF exporters.

Table 1: US-China Tariffs

	US tariffs on China's export (Billion US$ per year)	**Announced date**	**China tariffs on US' export** (Billion US$ per year)	**Announced date**	**Effective date**
Round 1	**34**	**15 June 2018**	**34**	**16 June 2018**	**6 July 2018**
Round 2	**16**	**7 August 2018**	**16**	**8 August 2018**	**23 August 2018**
Round 3	**200**	**18 September 2018**	**60**	**18 September 2018**	**24 September 2018**
Total	**260**		**110**		

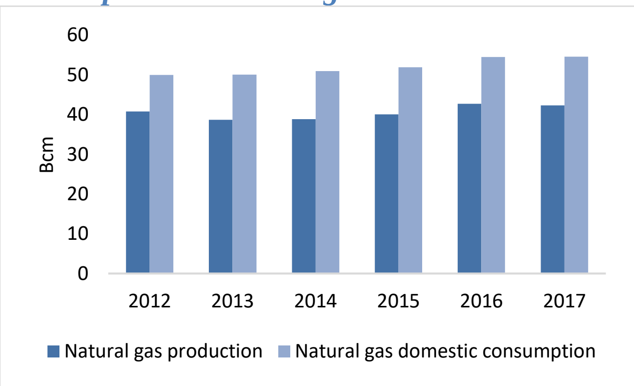
Source: GECF Secretariat

6. *The Shale Gas Production in Argentina: Will the country's export be recovered?*

Dr. Amin Shokri, Energy Analyst, November 2018

Natural gas production in Argentina has been increasing in the recent years, thanks to the development of unconventional plays in Vaca Muerta. While the production decreased from 42.2 Bcm in 2010 to 38.7 Bcm in 2013, the trend has since been reversed and the production level rebounded to its 2010 level in 2017, that is 42.3 Bcm. As a result of decreased domestic natural gas production, the reliance of the country's energy sector on imported pipeline gas and LNG especially from GECF countries such as Bolivia, Qatar and Trinidad & Tobago has increased in the recent years. Argentina's natural gas import increased from 3.6 Bcm in 2010 to 10.8 Bcm in 2017.

Figure 1: Natural gas production and consumption trend in Argentina



Source of Data: GECF, Enerdata 2018 [2]

According to the projections by the government of Argentina, the production level will be doubled in the next five years. YPF as the main player in Vaca Muerta designates a significant portion of its annual spending in the region. The company expects 20% annual production growth only from Vaca Muerta between the years 2019 and 2023. This could turn the country's position from a net importer of natural gas to a net exporter, if the economic conditions are in favour of such developments.

To materialize the above-mentioned production targets, massive investment is required in Vaca Muerta, to build the infrastructure including the pipeline and underground storage facilities. The government of Argentina is looking for potential investors to create required infrastructure through cooperation with other countries. In this regard, the country signed several agreements with the member states of G20 on the side-line of its Summit, which was held on 30th of November in Buenos Aires. For instance, the investment potentials in Vaca Muerta, were discussed with the G20 Member States such as Russia, United States and Saudi Arabia.

However, the development of the significant unconventional natural gas reserves (shale gas reserves of 23 Tcm as reported by Newsbase) of the country, is facing some challenges. The cost of production of the unconventional gas development in Argentina remains higher than the conventional gas. Meanwhile, the required proppant, is delivered from a long distance around 1,400km away from the Vaca Muerta, which imposes extra costs on shale gas producers in the country according to Newsbase. To reduce the trucking costs, the government is preparing a tender to build a railway connecting the proppant delivery points to Vaca Muerta. In this regard, Russia has expressed its interest to cooperate in building and expanding the railway.

Furthermore, the presidential election, which will be held on 27th October 2019, could have a significant impact on the country's shale gas production level in the upcoming years. Whether the current president Mauricio Macri takes the office for his second term or his populist rival wins the election, the investment level could be affected by the energy policies of the new government. Given, the natural gas demand projections of 62 Bcm, according to the GECF Global Gas Outlook, if the country could materialize its target to double natural gas output (based on the government's targets), natural gas surplus will be around 20 Bcm by 2023, which means that Argentina could be a net exporter of natural gas in the upcoming years.

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[2] https://www.enerdata.net/

In conclusion, based on the high potential of Argentina in terms of natural gas resources, the country could be one of the main sources of gas supply growth in South America. However, the competitive advantages of GECF Member Countries as low-cost producers, makes the GECF a reliable source of natural gas supply in the region.

It should be reminded that natural gas production in South and Central America averaged 179 Bcm in 2017, whilst natural gas production of four GECF Member Countries (Venezuela, Trinidad and Tobago, Bolivia and Peru) accounted for 57% of the South and Central American production. Given the increasing level of natural gas trade and high share of GECF Member Countries in natural gas production in the region, we believe that GECF will continue to play an important role in this part of the world, by supplying the region by pipeline and in LNG form.

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7. Sources of Information

- Argus Global LNG
- Argus LNG Daily
- BP Statistical Review
- Enerdata 2018
- Energy Ministers of Russia and Qatar urged gas producing countries to join GECF (https://www.gecf.org/events/energy-ministers-of-russia-and-qatar-urged-gas-producing-countries-to-join-GECF)
- Extracts from the speech of HE Dr Yury Sentyurin, Secretary General of GECF on 29th May 2018, at the ceremony of launch of the first phase of the project, in Baku, Azerbaijan.
- ICIS LNG Edge
- IEA, medium-term gas outlook, June 2017
- National Energy Board (https://www.neb-one.gc.ca)