

Slow-paced development of resources in Latin America has led to increased dependence on gas imports

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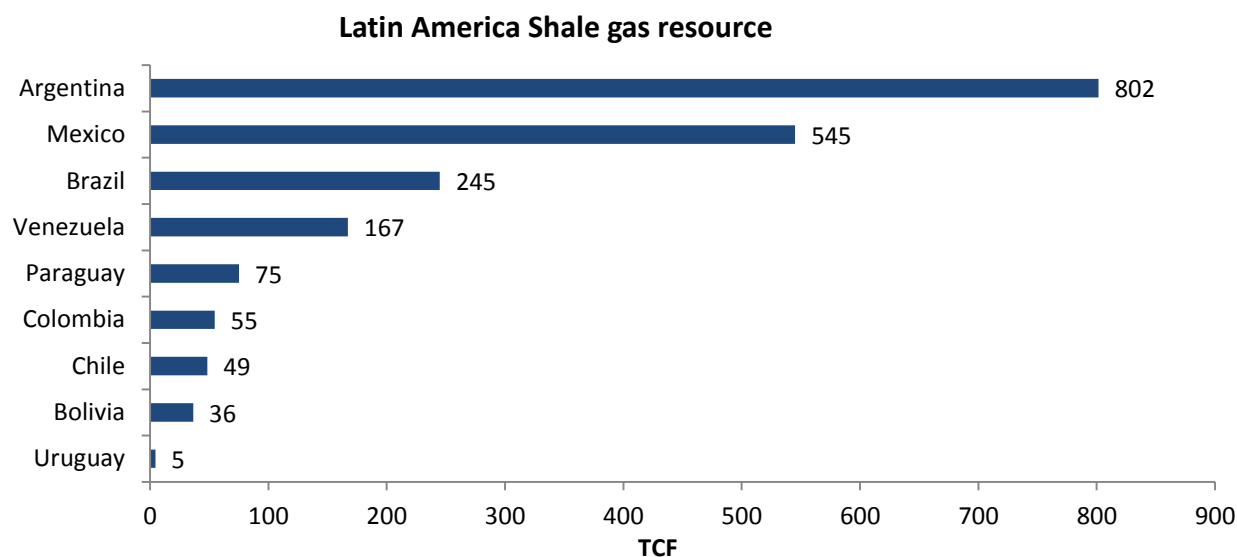
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Slow-paced development of resources in Latin America has led to increased dependence on gas imports

Background

Latin America is well endowed with natural gas resources and has a potential to produce enough gas to fulfil the regions burgeoning demand. According to the US Energy Information Administration (EIA), Latin America holds technically recoverable shale gas resources of around 1,978 trillion cubic feet (TCF). As seen in Figure 1, Argentina, Mexico, and Brazil hold huge amounts of shale gas resources. However, due to lower exploration activity in Latin America, domestic gas production has not been able to reach its full potential. With improved economic and financial support from the government and investors, Latin America is likely to become self-sufficient in terms of its energy requirements by 2030.

Figure 1: Latin America’s technically recoverable shale gas resources constitute 26% of world's total technically recoverable share gas resources



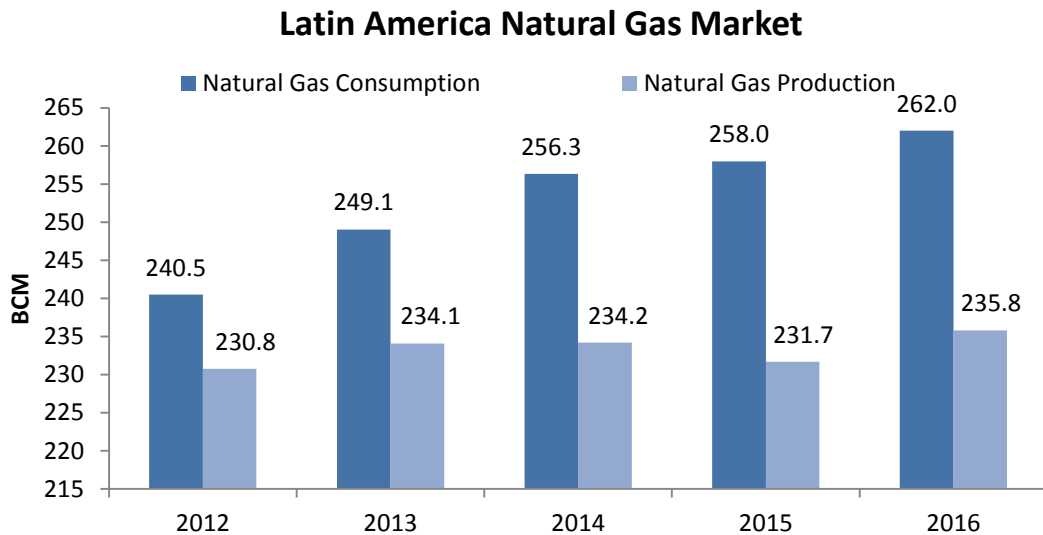
In 2016, the total natural gas production increased by 1.8% to reach 235.8 bcm. Major contributors to this production were Mexico, Argentina, Venezuela, and Trinidad and Tobago. Mexico is the largest natural gas producer followed by Argentina, which has seen a steep decline in production in recent years. Venezuela has the largest proven reserves of natural gas. However, such resources remain mostly unexploited due to the country’s financial crisis.

Although the production has been increasing annually, the growth rate has been low in the region mainly due to lack of investment. Geopolitical uncertainties coupled with geographic and regulatory issues in Latin America have made gas integration a challenging process. Even though some countries such as Argentina and Venezuela have extensive resources, lack of pipelines interconnection has posed obstacle in fulfilling the gas demand in several regions in Latin America.

The energy sector in Latin American countries is highly regulated by the government. The hydrocarbons sector in most of the Latin American countries falls under the purview of National Petroleum Companies that have up to 90% control over their energy industry. However, over a period of time some countries have showed their

receptiveness to private investment in the oil and gas sector. Mexico and Argentina, for instance, are in the midst of revising their policies to encourage private and foreign participation.

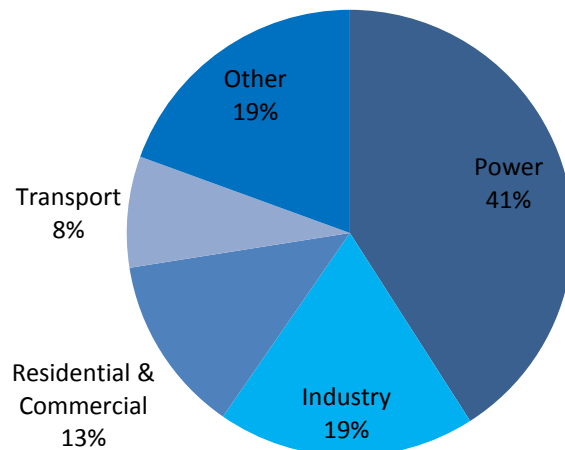
Figure 2: Latin America's technically recoverable shale gas resources constitute 26% of world's total technically recoverable share gas resources



As seen in Figure 2, in 2016, natural gas consumption reached to 262 bcm, a 13.1% increase over the demand in 2011. This has been a result of accelerated economic growth coupled with the need to switch to cleaner fuels. Mexico, Argentina, and Brazil have seen the strongest increase in natural gas consumption and this trend is expected to continue for the next 10-15 years. This robust growth in consumption is backed by high demand of natural gas in the electricity sector. As highlighted in Figure 3, more than 40% of the gas is consumed to generate electricity and in future this trend will be followed by the transport sector.

Figure 3: Gas demand by the power sector has been significantly growing in last few years

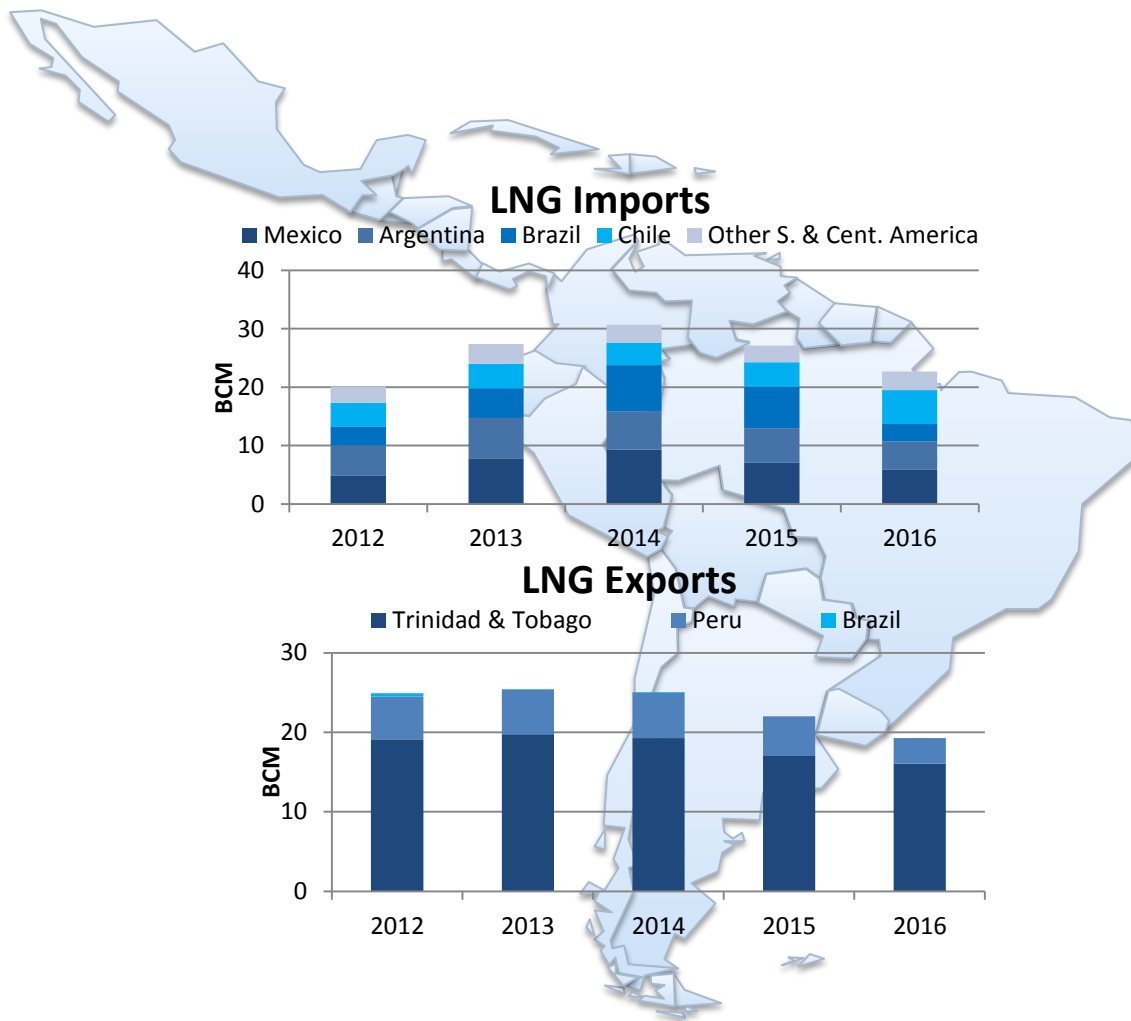
Latin America Natural Gas Demand by Sector, 2015



As seen in Figure 1, the gap between the supply and demand has continuously increased in the last few years. This gap is likely to keep increasing unless the natural gas resources in Latin America are fully developed. So far this excess demand is met by gas imports. In order to maintain the energy security of the region, Latin America sources Liquefied Natural Gas (LNG) and pipeline imports.

Figure 4: LNG imports in Latin America are increasing at a high rate

Latin America LNG Landscape



A boost in gas demand, combined with lower domestic gas production in various Latin American countries, has triggered the increased LNG and piped gas imports. In 2016, about 80.75 bcm of gas was consumed through LNG and piped-gas imports. Of the total gas imported, LNG held 31%. The role of LNG in Latin America has become inevitable. In 2008, Latin America got its first LNG cargo and since then the LNG imports have significantly increased and in 2016, total LNG imports reached 24.65 bcm. In last five years, Latin America has shown greater dependence on LNG to fulfil its growing gas demand. The trend of importing LNG to achieve Latin America's energy security is expected to continue but at a slow rate.

As seen in Figure 4, some countries in Latin America are highly dependent on LNG imports to support their growing energy portfolio such as Mexico, Argentina, Brazil, and Chile. On the other hand, countries that have the capability to export LNG to the international market such as Peru and Trinidad & Tobago are suppliers of LNG in the international market.

Dwindling Domestic Gas Production has Augmented Gas Imports in Mexico

Mexico's natural gas production has been declining since 2012. In 2016, the gas production dropped by 5.1% from 53.2 bcm in 2015. This has been as a result of low investment in exploration activities by Petróleos Mexicanos (PEMEX) which is a state-owned petroleum company.

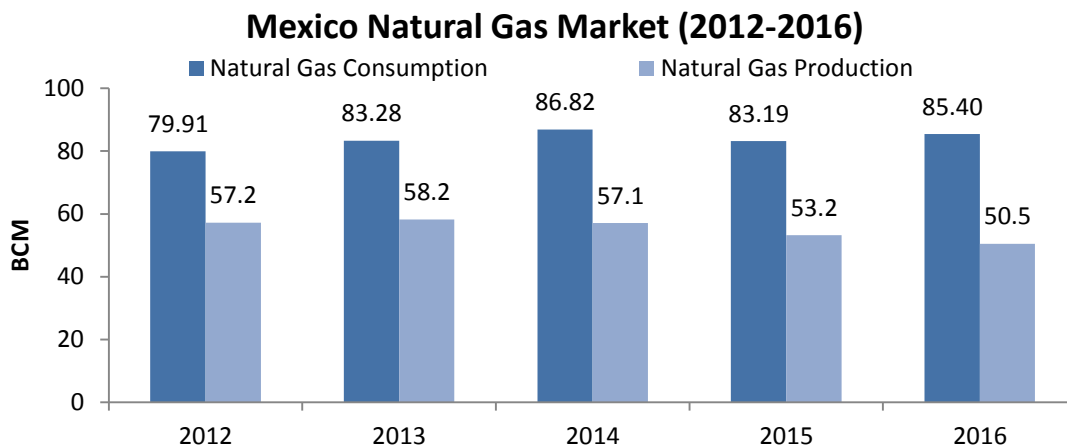
Despite being a robust resource potential, Mexico has not been able to create conducive environment for investments in the oil and gas sector. Unclear policies in conjunction with lack of financial resources have delayed Mexico's shale gas evolution.

According to the EIA, Mexico's technically recoverable shale gas resources amount to 545 tcf. However, the development of these resources has been slow. The geographic complexity along with lack of suitable technology and water resources has been a major challenge in the production of shale gas in Mexico. In addition, the extraction of gas from the shale reserves demands the need of advanced technology, which is accompanied by colossal capital investment.

Stunted domestic gas production in the country has prompted the government to bring changes in the energy policy. It was only in December 2013 that the Mexican government passed the energy reform bill and opened its oil and gas sector after more than 50 years. This step will transform the Mexican economy, as it provides tremendous opportunities to foreign and domestic private companies to invest in the oil and gas sector.

Though the energy reform bill in Mexico highlights flexibility and eases policies in order to capture higher investment, inadequate pipeline connectivity in Mexico has posed several challenges. Hence, in addition to producing shale gas, investments to build a gas supply infrastructure will also be required.

Figure 5: Mexico' natural gas demand is driven by the expansion of the electricity and industrial sectors

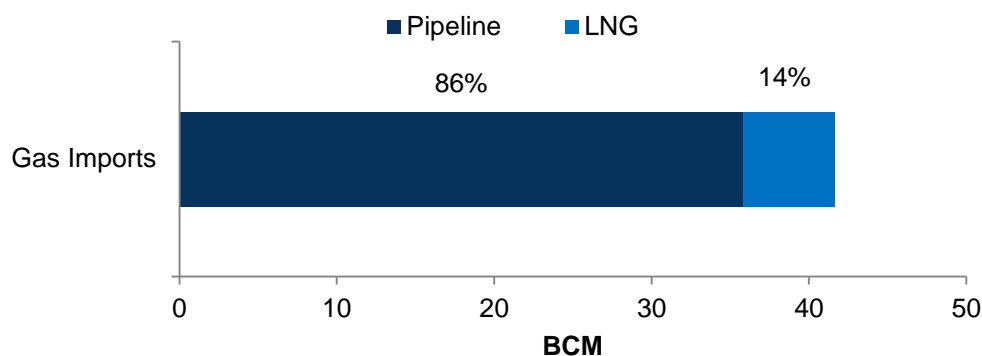


Gas consumption has been rising as a result of high demand from the natural gas-fired power plants. More than 50% of the power plants consume natural gas as a fuel. In addition, Mexico's energy reform initiative has encouraged private investment in the electricity sector. With the objective to use cleaner and more efficient fuels, the push on natural gas to be used as a fuel to generate power is more than ever.

To fulfil the increasing gas demand, Mexico imports huge volumes of gas via pipelines and LNG. As seen in Figure 6, in 2016 Mexico imported a total of 41.6 bcm of gas. Surge in the US natural gas production has made gas accessible to Mexico at low prices, which has triggered an increase in pipeline imports. Mexico's close proximity to the United States gives the country an advantage to leverage low-cost gas from the United States. In 2016, Mexico imported 35.8 bcm of gas from the United States via pipeline which constituted 83% of the total gas imported in Mexico and balance 14% of gas as LNG.

Figure 6: Mexico consumes over 30% of imported gas in the form of LNG and piped gas

Mexico Gas Imports, 2016



Although most of the gas that is imported in Mexico is piped gas, LNG has slowly and steadily become an important source. Customers are not able to get direct access to gas in the Central region via the Manzanillo LNG terminal. Furthermore, with the expansion of Panama Canal the duration to reach Manzanillo terminal from the United States has significantly reduced from 27 days to 10 days. In 2016, Mexico received LNG from the United States for the first time.

Despite the flexibility and viability of LNG imports in Mexico, piped-gas will always have an edge over LNG. LNG imports are gradually being substituted by lower-priced natural gas from the United States. The Los Ramones Phase II South pipeline was completed in 2016 and this pipeline once commissioned in full swing will displace the LNG supply in the Central region. This pipeline runs from Texas to Mexico and will stimulate 50% higher gas pipeline imports. With Mexico's falling gas production, US pipeline exports seem like a feasible option to fulfil the robust gas demand. Mexico has plans to bring in new natural gas fired plants in 2017 with a capacity of 7 GW.

Going forward, Mexico is likely to witness declining domestic gas production and high dependence on piped gas and LNG imports. At present, almost 50% of gas consumption in Mexico is fulfilled by imports and by 2020 it is expected to increase to 70%. Given that the shale gas development is still in the nascent stage and will take at least ten years to start producing, LNG imports are envisaged to grow at a slow pace; however, it will decrease the gap between consumption and production of gas.

With the availability of huge gas reserves, Argentina has the potential to become self-sufficient

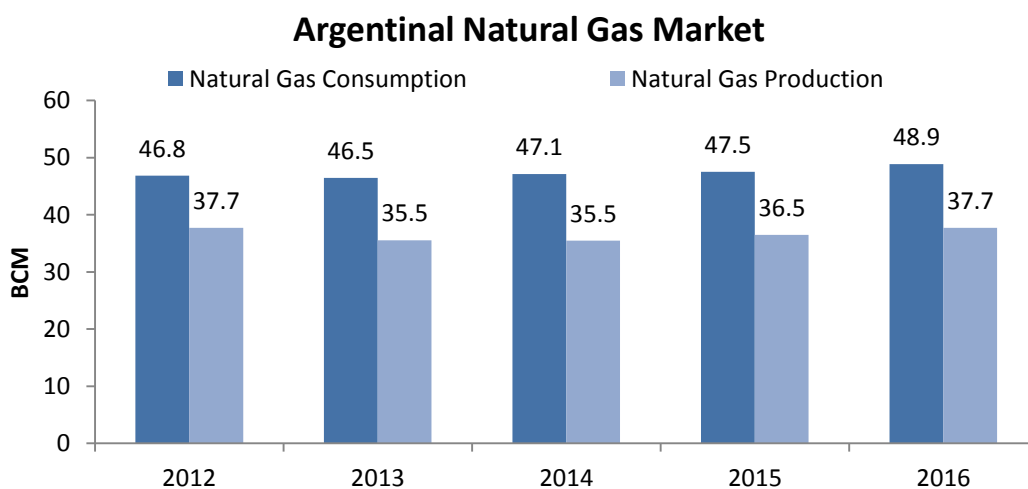
According to the EIA, Argentina ranks third after the United States and China in terms of technically recoverable shale gas at 774 TCF. Argentina's Vaca Muerta shale play is the biggest shale play reserve after that of China. Argentina's lucrative oil and gas reserves have attracted majors from all over the world to explore the hydrocarbons sector of the country— Chevron Corporation, Exxon Mobil Corporation, and Royal Dutch Shell Plc.

Such presence of colossal reserves has the potential to make the country self-sufficient in terms of energy requirements. However, production from these shale plays requires extensive hydraulic fracturing and drilling which is not only expensive but requires exceptional technical expertise. In 2016, the natural gas production

increased by 3.3% to reach 37.7 bcm of gas. The production growth rate has been steadily increasing during last few years. The slow rate of growth is as a result of inadequate capital and advanced technology.

The Argentine government and Yacimientos Petroliferos Fiscales (YPF), a state owned Oil Company together promote and develop the exploration and production of the hydrocarbons sector in Argentina. Argentina’s gas market gives the country an edge over other regions in Latin America. Along with being rich in gas reserves, the development of these reserves is taking place at a steady pace.

Figure 9: Natural gas production is gradually increasing in Argentina making the gas market stronger



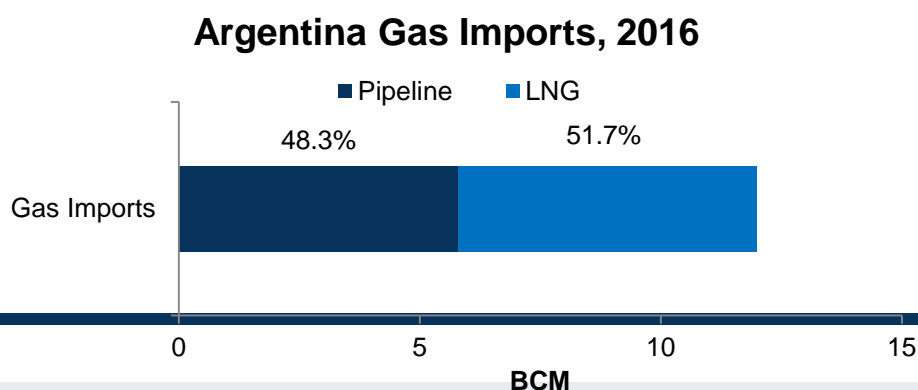
In terms of gas demand, the power sector has the largest share of natural gas consumption with about 40% and this demand is followed by residential and commercial sector that consumes 25% of natural gas. As residential and commercial hold high share, the gas demand is seasonal. In 2016, the natural gas demand stood around 47.5. About 75% of this demand was supplied by domestic production whereas the rest was fulfilled by gas imports.

The government has been making efforts to attract foreign investment to develop the Vaca Muerta shale resources. The country has modified its regulatory regime to enable foreign participation. In 2010, YPF and other major companies started exploring these resources.

Although the Argentine government has been progressive in shaping up its policies, the unstable political environment has failed to attract a lot of foreign and private participation in the country.

Figure 10: Argentina’s dependability on LNG has increased in the last few years

As highlighted in Figure 10, Argentina imported 51.7% of gas in form of LNG. Argentina has two LNG



liquefaction terminals and with the growing natural gas demand, a third terminal is likely to be constructed.

Argentina has three main gas pipelines and imports gas mostly from Bolivia. Argentina plans to bring additional pipeline capacity by 2017, which is expected to meet the projected increase in gas demand.

By 2020, the natural gas demand is likely to increase to 52 bcm also the government has plans to bring in new gas-fired power plants by 2025 of about 5-7GW. This demand will be fulfilled by domestic production which is expected to be around 42 bcm and the balance demand will be supplied by piped-gas from Bolivia and LNG. Although LNG imports from Chile are more expensive than the piped-gas from Bolivia, Argentina relies on LNG as a result of shortages of gas from Bolivia.

By 2030, Argentina may be able to fully tap in to the shale resources which may substitute the gas imports in the country. In order to make this a reality, Argentina will require a lot of investment. Until then, the country's energy sector is expected to be dependent on domestic production and gas imports, majority of which will be LNG.

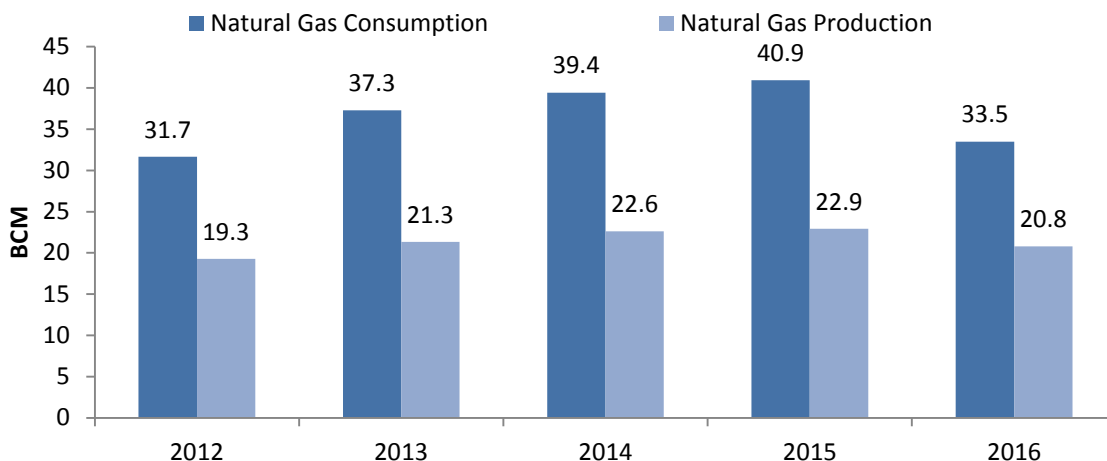
Brazil's dependence on LNG imports is likely to decline significantly

Although the power sector in Brazil relies heavily on hydroelectric plants, the recent shortfall of hydropower has led to high consumption of natural gas in the power sector. As seen in Figure 7, in 2015, the total natural gas supply stood around 40.9 bcm, of which more than 90% of the gas was consumed by the industrial and power sector. This consumption, however, fell drastically by 18% in 2016, owing to slow economic growth in Brazil which led to the decline in prices of commodities. Furthermore, the electricity prices were exceptionally high. As a result Petrobras - an integrated Petroleum corporation in Brazil, delayed investments and future plans.

According to the EIA, Brazil's technically recoverable shale gas resources amount to 245 tcf. As most of these resources are located offshore, developing these resources is complex and challenging.

Figure 7: Brazil's slow economic growth has led to decline in natural gas demand in the country

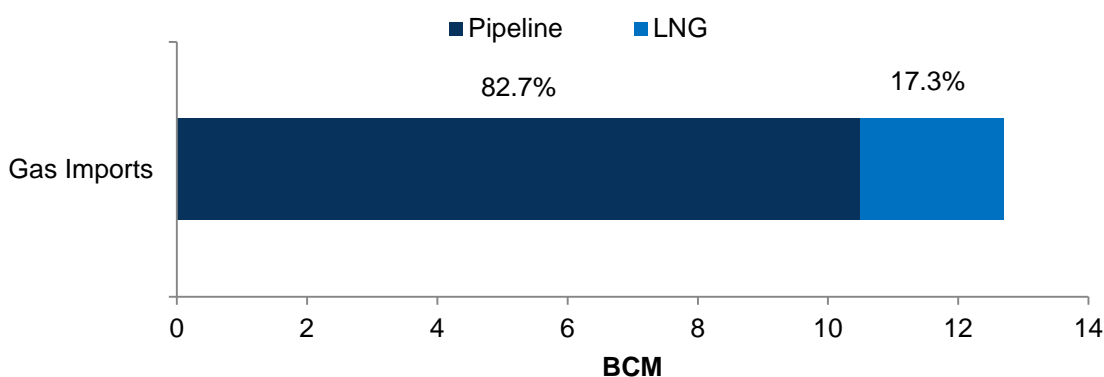
Brazil Natural Gas Market (2012-2016)



The gap between the natural gas supply and demand in Brazil is met by piped-gas and LNG. As seen in Figure 8, more than 80% of the gas imported in Brazil is via pipelines, most of which is from Bolivia. The balance is LNG imports that have been steadily increasing since 2009, when Brazil first started importing LNG in order to secure the country for power shortages. The LNG imports more than doubled from 3.2 bcm in 2012 to 7.14 bcm in 2015.

Figure 8: Brazil relies heavily on pipeline imports from Bolivia

Brazil Gas Imports, 2016



Going forward in short-term, the LNG imports are likely to decline on the back of slow economic growth, increase in hydropower and high volumes of piped-gas imports. In addition, Petronas is planning to terminate few LNG contracts before the expiry timelines.

Conclusion

Overall, Latin America is undergoing some significant developments in terms of building its energy landscape. However, the role of LNG will not be as dominating as some might have thought few years back. With the

United States possessing surplus gas and pipeline connectivity becoming stronger, the chances of LNG to enter are becoming bleak. Furthermore, Latin America is encouraging foreign investments to tap its untouched gas reserves. However, LNG is not likely to be completely wiped off from Latin America; countries such as Brazil, Argentina, Mexico, and Chile will continue to import LNG but at minimal rate.

Even though Latin America has enormous shale gas resources, it is unlikely to enjoy the position of surplus gas production in the near future, owing to slow infrastructure expansion and moderate energy resource development. Latin American countries will need substantial investments for infrastructure development in order to sustain energy security.

Although the government has modified regulations in order to promote investments and develop the resources in Latin America, it will take some time before these countries start producing enough gas to accomplish energy self-sufficiency and supply excess gas to international markets. Hence, a high level of energy dependence on the gas imports is likely to be the scenario throughout the region in the near future. LNG imports will play an important role in meeting the region's objective of energy security.