

Evolving LNG/RLNG Regime in Pakistan and the National Energy Security

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Abstract

With economic growth, the demand for natural gas as a fuel has increased recently, while its supply has seen decrease. The demand is projected to further increase and the country's currently known recoverable indigenous gas reserves are insufficient to meet this demand. Gas shortages have already emerged and shall increase substantially in the following years if indigenous supply is not supplemented through imports. This paper aims to review the regulatory framework of LNG/RLNG for creating enabling environment for import, re-gasification, sale and marketing in Pakistan. The focus of this paper is on the supply side of energy, public and private gas utilities relation with respect to LNG, natural gas market liberalization, and its comparative analysis with other fuel prices. In the short term, without importing LNG to the tune of about 800 – 1.2 MMSCFD, the demand-supply gap of the energy in Pakistan would have been much more than it is today. Irrespective of its price, however, LNG is the only short-term solution in augmenting energy supplies.

Introduction

For the last two decades, Pakistan has been faced with severe energy shortfall. Natural gas plays a key role in Pakistan's energy balance and constitutes around 34% of the country's primary energy supplies.¹ With accelerating economic growth, the demand for gas is projected to increase manifold, whereas the country's currently known recoverable indigenous gas reserves are insufficient to meet this demand.

In order to address the energy shortage, the Government of Pakistan has been reviewing different gas import options since 1990s. TAPI (Turkmenistan-Afghanistan-Pakistan-India) and IPI (Iran-Pakistan-India)² mega projects were initiated for importing gas from countries in the neighborhood through cross-border gas pipelines but physical

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¹ "Present government achievements in oil and gas sector," *Directorate general of liquefied gases*, accessed October 20, 2018, <http://www.mpnr.gov.pk/mpnr/userfiles1/file/Directorat%20General%20Of%20LG's.pdf>.

² Iran-Pakistan-India gas pipeline (IPI) has reduced to Iran-Pakistan gas pipeline (IP) after refusal of India to join the initiative.

progress could not reach appreciable levels on account of different geo-political and economic reasons. With this in view and to keep the wheel of the industry in motion, in 2014, the Government of Pakistan embarked upon import of LNG (Liquefied Natural Gas), re-gasify it to create RLNG and inject it into existing pipeline network of the gas. Necessary measures were taken for installation of facilities for receiving LNG, storage, and re-gasification. Terminals were installed and gas transmission infrastructure was expanded for sale and distribution in the domestic market.

Increasing human population needs more resources of any sort of energy in every location of the world. Natural gas is still leading energy component and drives the wheel of economies in many countries. Apart from this global phenomenon of increased energy requirement, as energy sources are being diversified globally to meet increasing energy requirements, LNG has remained the most rapidly growing petroleum product through 2014-2017.³ In global trade perspective 2017, LNG is one of the most vibrant segments in natural gas value chain, added 35.2 MT to 293.1.⁴

Pakistan has been facing severe shortage of natural gas, both for its electricity generation plants and for general use by domestic, commercial and industrial sectors. The use of natural gas in households, industry and transport is expanding phenomenally and have implications for long-run as well as short-run changes in economic activities.⁵ Currently, domestic gas production of less than 4,000 MMCFD is unable to meet the country's demand and the supply-demand gap stands approximately at 2,000 MMCFD while the unconstrained gap is over 4,000 MMCFD.⁶ This shortage is causing hardships in normal life and inhibiting economic growth of the country. Following the global trend, the Government of Pakistan is pursuing, *inter alia*, import of LNG to minimize the gas shortfall. It has decided to follow an unbundled approach through separate contracts for LNG procurement and re-gasification, rather than an integrated approach to import LNG. Before venturing into the impact of imported LNG for securing energy supply in Pakistan, it is pertinent to underscore the concept of Energy security and its status in Pakistan.

³ *World LNG Report 2018*, Edition 3 27th World Gas Conference, 2018, (International Gas Union), accessed November 3, 2018, https://www.igu.org/sites/default/files/node-document-field_file/IGU_LNG_2018_0.pdf.

⁴ *Ibid.*

⁵ Muhammad Arshad Khan and Usman Ahmed, "Energy Demand in Pakistan: A Disaggregate Analysis," Pakistan Institute of Development Economics, <http://www.pide.org.pk/psde24/pdf/02.pdf>.

⁶ "Liquefied Natural Gas," Directorate General of Liquefied Gases, <http://www.mpnr.gov.pk/mpnr/userfiles1/file/Directorat%20General%20Of%20LG's.pdf>.

Natural gas is a fossil natured resource. In the liquification process, the gas is cooled to a temperature of approximately 260 degrees Fahrenheit at ambient pressure. This condensed liquid form of natural gas takes up about 1/600th of the volume of natural gas at a stove burner tip.⁷ LNG is mostly loaded onto double-hulled ships which are used for both safety and insulating purposes. Once the ship arrives at the receiving port, the LNG is typically off-loaded into well-insulated storage tanks. Further regasified natural gas is transported through pipelines.

Significance of National Energy Security

Energy Security is considered a component of national security and historical empires and modern states have been fighting over energy resources throughout human history. It is alleged that the World Wars I and II too were primarily waged to get a control over the oil supplies through Germany and Japan.⁸ Energy security was considered a permanent component of national policy formation during 1950s and 1960s when the demand of energy in the world spiked twice.⁹ International oil supply became insufficient for western states hence energy security shifted from oil to gas during 1970s and afterwards.¹⁰ Securing energy transit routes became a direct security concern for the countries.¹¹ Over the years, energy security has evolved six dimensions for both energy-producing and consuming states: economic, environmental, social, foreign, technical and security.¹² Establishment of a cartel of oil producing and exporting countries (OPEC) in 1970s was a joint response to the oil crisis of 1970s.¹³ In 1990s, fall of USSR and the

⁷ "Unlocking the supply chain for LNG project success," KPMG Global Energy Institute, <https://assets.kpmg.com/content/dam/kpmg/pdf/2015/03/unlocking-supply-chain-LNG-project-success.pdf>.

⁸ "International Energy Security, common concept for energy producing, consuming and transit countries," Energy Charter Secretariat, <http://www.energycharter.org/what-we-do/trade-and-transit/trade-and-transit-thematic-reports/international-energy-security-common-concept-for-energy-producing-consuming-and-transit-countries-2015/>

⁹ Robin Mills, "Risky routes: Energy Transit in Middle East," Brookings Doha Centre, April, 2016, <https://www.brookings.edu/wp-content/uploads/2016/07/en-energy-transit-security-mills-2.pdf>

¹⁰ Robin Mills, "Risky routes: Energy Transit in Middle East," Brookings Doha Centre, April, 2016, <https://www.brookings.edu/wp-content/uploads/2016/07/en-energy-transit-security-mills-2.pdf>

¹¹ "International Energy Security, common concept for energy producing, consuming and transit countries," Energy Charter Secretariat, <http://www.energycharter.org/what-we-do/trade-and-transit/trade-and-transit-thematic-reports/international-energy-security-common-concept-for-energy-producing-consuming-and-transit-countries-2015/>.

¹² A. F. Alhajji, "What is energy security? Economic, environmental, social, foreign policy, technical and security dimensions," *Oil, Gas & Energy Law Intelligence OGEL*, Volume, 6, Issue 3, <https://www.ogel.org/article.asp?key=2787>.

¹³ "International Energy Security, common concept for energy producing, consuming and transit countries," Energy Charter Secretariat,

Gulf War had obvious energy-related underpinnings. During later years, energy security concerns compelled EU countries to depend more on Russian gas imports and the phenomenon integrated two different regions for mitigating energy security of Europe. From 2000 onwards, energy security became a paramount concern with rise of terrorism and fight against non-state actors. In the post 9/11 world, Afghan war and Arab Spring too created concerns for global energy security and engaged numerous international players for their respective national security concerns. In the recent years (2006, 2009, 2014) the Russian-Ukraine gas crisis initiated a new debate on energy security among EU and neighboring regions.

Contemporary Concepts of Energy Security

There is no consensus on definition of energy security. Scholars and governments have interpreted it in various contexts. One obvious distinction lies in the concepts of energy security among the energy importing and exporting countries which relates to the dynamics of demand and supply. The factor that has contributed to the evolution of the concept of energy security relates to technological developments and climate change. In 1970s, this concept revolved around oil production and its affordability, gas was discovered in the following years, and in 1990s, environmental changes were progressively discussed under this conception. Currently, energy security broadly means the continuous availability of energy in various forms and in sufficient quantities with reasonable price. What constitutes reasonable price has, obviously, remained a continuous debate among importers and exporters.

Under the light of current energy supply-demand, strategic location and Pakistan's significance in the region, energy security in Pakistan's context can be defined as: "Sustainable, sufficient, uninterrupted, strategic, contractually binding, energy supply arrangement backed by sustainable bilateral diplomatic relations between the participating states." Notify this reasonable level of understanding with respect to the concept of energy security allows us to look into the specific dynamics of liquefied natural gas. This article firstly analyses the concept of energy security within global perspective and then narrows it down in the context of Pakistan.

<http://www.energycharter.org/what-we-do/trade-and-transit/trade-and-transit-thematic-reports/international-energy-security-common-concept-for-energy-producing-consuming-and-transit-countries-2015/>.

World Consumption of Natural Gas and LNG

Natural gas is a primary consumption fuel globally and the consumption is projected to be increased to 120 trillion cubic feet (2012 -2040).¹⁴ It remains substantial to power generation and as an industrial fuel, due to its moderate capital cost, attractive pricing and fuel efficiency. Till, 2040, power and industrial sectors will consume 75% of the world natural gas consumption.¹⁵ On the other hand, production of world's natural gas would increase almost 69% from 2012-2040.¹⁶ The largest increase is anticipated to be in Asian countries by 18.7 tcf from 2014-2040. Due to shale resources China's production will increase by 15.0 tcf.¹⁷

Since liquification of natural gas as LNG allows the option of shipment and thus avoids the security and strategic concerns of a transboundary pipeline, the LNG trade will increase from 12 tcf in 2012 to 29 tcf in 2040.¹⁸ Despite the exponential growth in LNG, natural gas through pipeline is still an immaterialized goal for natural gas trade. LNG is mostly traded globally among OECD and non-OECD countries. Russia and United States are the largest producers of natural gas, producing 10.0 tcf and 11.3 tcf, respectively. Russian production has increased due to increased activity in the Arctic and eastern region of the country, while United States has based its growth on shale resources. Till 2040, both USA and the Russia estimate an increase of about 44% of the overall world natural gas production.¹⁹ Transportation, of world natural gas trade through pipeline and shipment is expected to correspondingly increase. LNG trade has increased with the average of 6% a year.²⁰

Countries opted different short- and long-term trading and pricing mechanisms. Qatar, being the leading LNG supplier, has both short and

¹⁴ Chaudhary Mehrunissa, Sumra Latif Mughal & Fareeha Zafar, "Corporate Social Disclosure: A Case Study on Petroleum Industry of Pakistan" *World LNG Report* (World Gas Conference, 2014)

¹⁵ Ibid-p 9

¹⁶ Nadia B. Ahmed, "Turn on the Lights'-Sustainable Energy Investment and Regulatory Policy: Charting the Hydrokinetic Path for Pakistan" *Washington and Lee Journal of Energy, Climate, and the Environment*, (2013), <https://digitalcommons.pace.edu/lawfaculty/965/>.

¹⁷ "Liquefied Natural Gas," Directorate General of Liquefied Gases, <http://www.mpnr.gov.pk/mpnr/userfiles1/file/Directorat%20General%20Of%20LG's.pdf>

This has been further analyzed and discussed by Mr. Muneeb Zia, Legal Consultant of World Bank for projects of Proposed Natural Gas Third Party Access (TPA) Rules 2017 and gas network code, public-stakeholder's consultative sessions across Pakistan.

¹⁸ "Economic survey of Pakistan," (2015-2016): 241 http://www.finance.gov.pk/survey/chapters_16/14_Energy.pdf.

¹⁹ Ibid.

²⁰ "Pakistan Energy Demand Projections" Inter State Gas Systems (Pvt) Ltd, accessed September 02, 2017, <http://www.isgs.pk/pakistan-energydemand-projections.llast>.

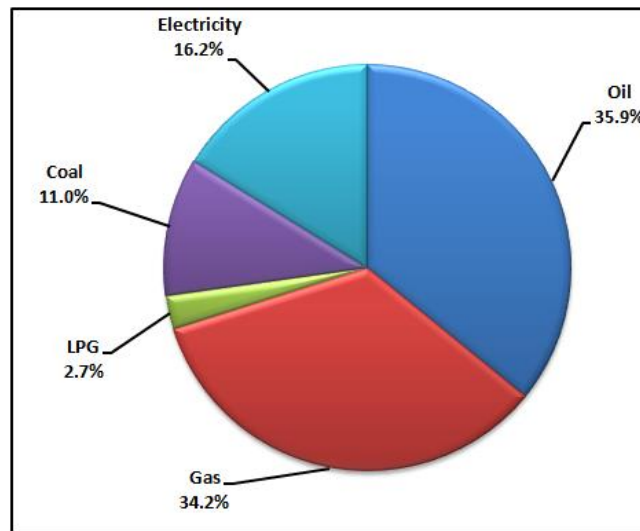
long terms contracts and its export growth is projected to increase by an average of 1.2% per year from 2010 to 2040. Floating re-gasification is a cost effective, flexible and short-term solution to mitigate the natural gas demand. Pakistan, Egypt and Jordan are the latest emerging consumers of LNG.²¹

Pakistan’s Energy Security: An overall picture

There is no dearth of literature highlighting importance of energy security in national contexts. However, the importance of natural gas in Pakistan’s economic development is significant.

Pakistan is heavily dependent on imported energy. Lack of exploration of gas reserves and poor management of existing resources will create further problems for Pakistan in near to medium terms. Pakistan’s overall demand for energy will increase by 350% over the next 20 years. Since Pakistan has so far explored only a third of the total country’s area, there exists a vast potential of exploration of natural gas and possible additional reserves especially in the province of Balochistan. Until these reserves are explored, there is a need to better manage existing resources to optimally meet demand and keep the wheel of economy running. Figure 1 presents the status of Pakistan Primary Energy Supply during FY 2016-17.

Figure 1: Pakistan’s Primary Energy Supply (2016-17)

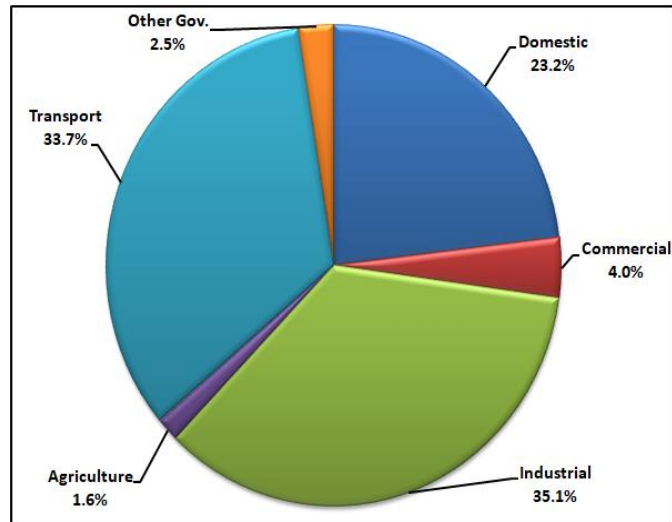


Source: Economic Survey of Pakistan 2015-2016²²

²¹ Chaudhary Mehrunissa, Sumra Latif Mughal & Fareeha Zafar, op. cit
²² *Economic Survey of Pakistan, (2015-2016):* 241,
http://www.finance.gov.pk/survey/chapters_16/14_Energy.pdf.

The following figure gives an idea of energy consumption.

Figure 2: Pakistan's Energy Consumption in FY 2016



Source: Economic Survey of Pakistan 2015-2016²³

Natural gas is environment friendly, safe and an efficient fuel. Pakistan has an extensive gas network of over 11,538 km transmission, 1,14,982 km distribution and 31,058 services gas pipelines to cater the requirement of more than 7.9 million consumers across the country by providing about 4 billion cubic feet per day natural gas.²⁴ A major discovery of natural gas was made at Sui in 1952. Over the next six decades, Sui and other subsequently discovered gas fields played a major role in the economic development of the country. Apart from this huge pipeline network Pakistan is energy starved country and its energy needs are anticipated to grow at an Annual Compound Growth Rate (ACGR) of 4.37 to 6.09 % over the coming 15 years. However, this rate is expected to fall in the range of 116 to 148 Million Tons of Oil Equivalent (MTOE) by the year 2022.²⁵

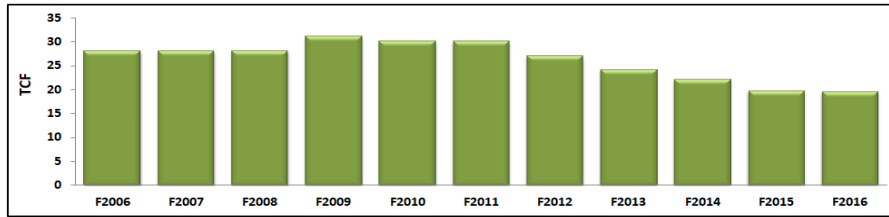
Figures 3 and 4 would help in understanding the share of natural gas in national energy profile.

²³ Ibid.

²⁴ *Economic Survey of Pakistan* (2015-2016): 241, http://www.finance.gov.pk/survey/chapters_16/14_Energy.pdf.

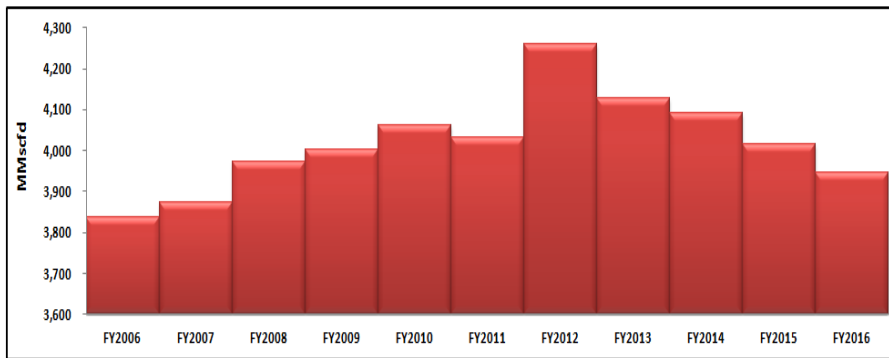
²⁵ "Pakistan Energy Demand Projections", Inter State Gas Systems (Pvt) Ltd. <http://www.isgs.pk/pakistan-energydemand-projections>.

Figure 3: Pakistan’s Gas Reserves and Production (2006-2016)



Source: Economic Survey of Pakistan 2015-2016²⁶

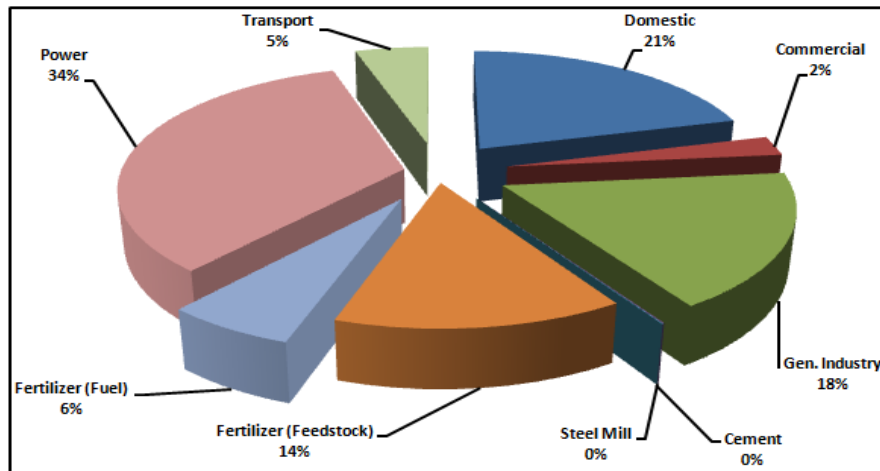
Figure 4: Pakistan’s Total Domestic Gas Supply (2006 – 2016)



Source: Economic Survey of Pakistan 2015-2016²⁷

It will help to have a clear picture of sector-wise consumption of natural gas as well.

Figure 5: Gas Consumption by Sector (2016-17)



Source: Economic Survey of Pakistan 2015-2016²⁸

²⁶ Ibid.

²⁷ Ibid.

²⁸ Ibid.

With the above graphical representation of national energy scenario in view, the Figure 6 gives an idea of current natural gas shortfall in Pakistan.

Figure 6: Current Natural Gas Shortfall in Pakistan.



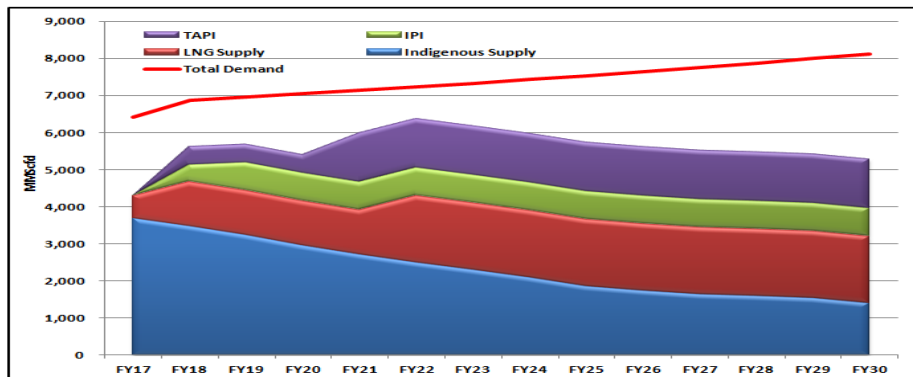
Source: Ministry of Petroleum and Natural Resources, GoP²⁹

The projected scenario for the next few years is depicted in Figure 7, and suggests the significance of simultaneous exploitation of potential options.

²⁹ "Liquefied Natural Gas," Directorate General of Liquefied Gases
<http://www.mpnr.gov.pk/mpnr/userfiles1/file/Direcorat%20General%20Of%20LG's.pdf>.

This has been further analyzed and discussed by Mr. Muneeb Zia legal Consultant of World Bank for projects of Proposed Natural Gas Third Party Access (TPA) Rules 2017 and gas network code, public, stake holder's consultative sessions across the Pakistan. December 2017

Figure 7: Projected Demand-Supply Balance (2017-2030)



Source: Economic Survey of Pakistan 2015-2016³⁰

Above graphics indicate that domestic demand is increasing and indigenous supply is unlikely to fill the shortfall. Supply is based upon depleting domestic gas production while demand is constantly on the rise. If, as a result of additional exploration and new discoveries, domestic production becomes to the rate of its depletion, shortfall is like to be 3,000 MMSCFD during the year 2019 out of which about 1.2 MMSCFD is likely to be met by LNG imports.

As indicated, Pakistan has two options of sourcing natural gas from abroad, which are either through gas pipelines like the TAPI and IPI, or through LNG imports. First option faces a host of challenges and long gestational period, whereas the second option is the quickest way to increase supply in domestic market. Import of LNG will provide adequate supply of gas to public at large and reduce gas shortfall for industry. Extended import of LNG will likely help in mitigating natural gas price volatility, particularly in winters when demand for gas swells largely. Additionally, liquefied gas trade has been a factor of attraction of foreign investments.³¹ Significant capital investment is encouraged when industries are given proper and round the clock gas supply. Over the past decades, advancement in technology has improved methods of liquefaction and efficiency and decrease in LNG prices.³² Moreover, technology has reduced cost of LNG at all levels of supply chain.³³

³⁰ *Economic Survey of Pakistan*, (2015-2016): 241 http://www.finance.gov.pk/survey/chapters_16/14_Energy.pdf.

³¹ Ibid.

³² M. Arif, "Future of LNG in Pakistan", *Oil and Gas and Energy Law Intelligence*. Volume 15, Issue-4, (2017): 4-5

³³ "LNG: understanding the facts", U.S. Department of Energy (DOE) in collaboration with the National Association of Regulatory Utility Commissioners (NARUC), (2013): 6 https://energy.gov/sites/prod/files/2013/04/f0/LNG_primerupd.pdf.

Legal and Policy Regime for LNG/RLNG

In pursuance of Liquefied Natural Gas Policy 2006 and Oil and Gas Regulatory Authority Ordinance 2002, OGRA notified LNG Rules in 2007 in order to bring the anticipated LNG activity under regulatory regime.³⁴ Interestingly, there are two separate legal regimes governing LNG and RLNG in Pakistan. The LNG Rules 2007 fundamentally provide legal, commercial and technical parameters concerning LNG construction, processing, production, testing, licensing as well as the terminal and operational regimes. They encourage prospective project developers to enter into LNG market after fulfillment of requisite legal and code formalities including license from OGRA as per present Policy.

After re-gasification, LNG turns into RLNG and is made available for sale, transmission and distribution. These activities are regulated and governed under the Natural Gas Licensing Rules 2002. As per LNG Policy 2011, the project structures can be (i) integrated in which the terminal developer arranges LNG imports as well as its buyers, and (ii) unbundled in which the terminal developer, LNG importer and LNG buyers are different.

As far as legal aspect of LNG sale and purchase is concerned, its business was initiated to run on *ad hoc* basis. The Federal Government vide S.R.O. No. 405 (I)/2015 dated 07-05-2015 in exercise of the powers under Section 7 of Petroleum Products (Petroleum Levy) Ordinance, 1961, made amendments in the First Schedule and the Second Schedule to the Ordinance, 1961. Resultantly, RLNG and/or any volumes supplied in lieu thereof through a swap arrangement are deemed to be petroleum products for the purposes of determination of price by the Federal Government. The names of both gas distribution companies, i.e. Sui Northern Gas Pipeline Limited (SNGPL) and Sui Southern Gas Limited (SSGL), have also been inserted in the Second Schedule.

LNG/RLNG regime is covered under mid and downstream petroleum industry of Pakistan and the focal legislation on the subject is OGRA Ordinance 2002. Under the Ordinance, the regulator has extensive power to grant, issue, renew or revoke license to domestic LNG purchasers and enforce compliance to license provisions. It also ensures cost effectiveness, safety standards and best prices. License ranges from construction of pipelines, facilities, terminals, storage, transportation and marking gas utilities.³⁵ Though OGRA has been suggesting that entire

³⁴ These legislations and policies pertain to LNG/RLNG sector of Pakistan and available at <http://ogra.org.pk/>

³⁵ OGRA Annual Report (2015-16): 23-24
<https://www.ogra.org.pk/ogra-annual-reports>.

supply chain of LNG/RLNG is to be governed under the same Ordinance, rules and regulations issued by it under delegated legislation power. However, another important legislation is Petroleum Products (Petroleum Levy) Ordinance, 1961 has placed LNG as a petroleum product and determines its price through provisions of the said Ordinance. According to Ministry of Energy the prices of LNG will be in line with other petroleum products on a monthly basis through an amendment in the schedule to declare RLNG a petroleum product.³⁶

For RLNG prices, the regulator has proposed an amendment in OGRA Ordinance so that appropriate measures can be taken to regulate prices. Section 8 of the Ordinance provides for the gas pricing for retail consumers. The Federal Government might include a new provision in Section 8(4) to exclude RLNG from the scope of revenue requirements determined this section.³⁷

Natural Gas (Regulated Third Party Access) Rules, 2012 aim at uniform principles for allowing entities to gain access to natural gas transmission and distribution pipeline networks through development of a competitive gas market. The Government of Pakistan, on the advice of the gas companies, suspended various operative rules to provide interim arrangements to facilitate RLNG transactions. Under this scenario, the GTA was still to be approved by OGRA.

Various stakeholders, including the World Bank and IMF, approached OGRA with respect to certain issues properly addressed in third party access (TPA) Rules. World Bank and IMF pointed out that OGRA TPA Rules 2012 were more LNG-specific and needed to be made generic, particularly for indigenous natural gas shippers.³⁸ Some other issues include applicability of the requirement of furnishing exorbitant amount of performance guarantee to OGRA, BTU equivalence issue and UFG (unaccounted-for gas) loss sharing etc. OGRA hired services of a consultant for review of TPA Rules. The proposed amendments were forwarded to Cabinet Division in May 2016 for approval and notification in the official gazette. Ministry of Energy in the meantime initiated Gas Sector Reforms with prime focus on un-bundling of the two gas utility companies in collaboration with the World Bank. The Ministry formulated working groups for preparation of revised TPA Rules and tariff regime. Several meetings between World Bank, Consultants OGRA's officers and Sui companies' representatives culminated into proposals that asked for

³⁶ Khaleeq Kiani, "OGRA wants LNG regulatory business under one law", *Dawn*, June 22, 2017, <https://www.dawn.com/news/1189634>.

³⁷ Ibid.

³⁸ Ibid.

segregation of TPA rules for distinct functions, non-involvement of OGRA in allocating capacity in the network, *inter alia*.³⁹

The said rules were revised and placed on OGRA's website for comments. Furthermore, comments acquired through consultative sessions in all provincial capitals and Islamabad were compiled and the revised draft was submitted to the Federal Government for approval and subsequent notification in the official gazette. Revised rules take care of aspects like transportation loss and tariff, title and risk management, load and access arrangement.⁴⁰

With regard to policy implementation, first LNG policy was announced in 2006 and revised in 2011. However, not much progress could be made to actualize these policies. The year 2013 is marked important for onset of LNG discussion and policy formulation in Pakistan. On April 2, 2013, the Economic Coordination Committee (ECC) of the Cabinet allowed the Ministry of Petroleum and Natural Resources to start negotiations with Qatar Gas Company Limited for import of LNG. This contract was intended to be Government to Government contract and is designed for import of 500 MMCFD of liquefied gas on ex-ship delivery terms.⁴¹ In the following year i.e. 2014, ECC approved "Fast Track LNG Project".⁴² The Federal Government concluded LNG contract with Qatar and license for construction of LNG terminal was issued to Engro Energy Terminal Private Limited with a construction validity period of two years. From July 2015 to February 2016, 175 MMCFD volume of RLNG was imported.⁴³

The said construction licenses were granted under strict compliance of legislative and regulatory principles.⁴⁴ In addition to state owned buyers (PSO), other prospective companies are under process to get import and distribution of RLNG to end users.⁴⁵ On domestic level, Pakistan is expected to enhance pipeline capacity for outreach of RLNG to far flung areas of the country. Moreover, with the construction of first terminal and for alleviation of energy shortage, 2nd LNG terminal at Port Qasim is expected to add more gas into distribution system.⁴⁶ Interest of several other companies for terminal license has been encouraging.⁴⁷

³⁹ Data collected from gas department of OGRA.

⁴⁰ Ibid.

⁴¹ "Determination of Re-gasified Liquefied Natural Gas", Oil and Gas Regulatory Authority, Case No. OGRA 6(10)-(RLNG) (2015): 1-2, <https://www.ogra.org.pk/rlng-notified-prices>.

⁴² Ibid.

⁴³ *Economic Survey of Pakistan (2015-2016)*, http://www.finance.gov.pk/survey/chapters_16/14_Energy.pdf.

⁴⁴ Data collected from registrar and gas department of OGRA.

⁴⁵ Ibid.

⁴⁶ "LNG only solution to Pakistan energy crisis", *Dawn*, August 27, 2017 <https://www.dawn.com/news/1354284>.

⁴⁷ *Economic Survey of Pakistan (2015-2016)*: 242.

Present LNG import status and future forecast

Since the commissioning of the country's first LNG import terminal in 2015, international suppliers have shown increased interest in delivering the chilled fuel to Pakistan. During next few years, Pakistan could become one of the world's top-five buyers of liquefied natural gas (LNG). At present, one LNG Terminal is in operation and is handling 3 MTPA of LNG which equals 600 MMCFD of RLNG, from February, 2017 onwards. The 2nd LNG terminal, which has been inaugurated but not commissioned, may further add one MTPA i.e. 1200 MMCFD of RLNG. In addition, upon completion of 3rd LNG terminal at Gwadar, currently under consideration, total LNG import volumes are expected to be 1800 MMCFD (13.5 MTPA) by the year 2019. Pakistan's annual imports could surpass 30 million tons by 2022 up from just 4.5 million tons currently.⁴⁸

Table 1: LNG imports from April 2015 to December 2017.

Total No. of LNG Cargos imported as of December 2017	129
Imported LNG in terms of MMBtu	412477054
Imported LNG in terms of Million Metric Tons	7.92
Imported LNG in terms of MMSCFD (Apr-15 to Dec-17)	402.62686

Source: This data has been taken from PLL and tabulated.⁴⁹

Pakistan is also in negotiations with Russia, Indonesia, Malaysia and Oman to secure deals for the supply of up to three LNG cargoes per month to the second LNG import terminal for future projects.⁵⁰

LNG/RLNG Pricing Regime

OGRA has been delegated the powers of RLNG price determination on monthly basis in line with other petroleum products. To implement the said decision of ECC, appropriate amendment has been incorporated in Petroleum Levy Ordinance, 1961. Federal Government's approved pricing components on July 27, 2015 include parameters like LNG DES (delivery ex-ship) price including any take or pay volumes, losses on account of Net Sale Proceeds and relevant adjustments due to exchange rate; FOB (free onboard) price plus freight charges; import costs, importer's margin, terminal charges, cost of distribution, administrative margin, and transmission losses.⁵¹

⁴⁸ "LNG only solution to Pakistan energy crisis", *Dawn*, August 27, 2017, <https://www.dawn.com/news/1354284>

⁴⁹ Pakistan LNG Limited, <http://paklng.com/index.html> accessed September 13, 2017.

⁵⁰ Ibid.

⁵¹ Data collected from gas and finance department of Oil and Gas Regulatory Authority.

Domestic gas production is linked with oil price and most of the gas fields in Pakistan are capped at 36% barrel.⁵² LNG cost is higher than domestically produced natural gas. The imported LNG volumes are expected to be around 2 BCFD in a short term.⁵³ Delivered cost of Imported LNG is variable and presently around cent 7 MMBTU.⁵⁴ If costs of domestic gas and imported LNG are pooled, the end tariff must be raised or revenue deficit issue will arise and a financial deficit is likely to impact the gas utility companies. Table 2 gives a comparison of prices.

Table 2: Price Comparison

Comparison of sale price of Natural Gas vis a vis Alternate Fuels				Price of alternate fuels is higher than gas prices as under	
Natural Gas	Equivalent Price Rs/MMBTU			Natural Gas – Domestic	-75%
Natural Gas – Domestic Maximum	296.83			Natural Gas – Commercial	-30%
Natural Gas-Commercial	819.00			Natural Gas – Industrial	-40%
Natural Gas-Power	468.00			Natural Gas – Power	-60%
Natural Gas-Industrial	702.00			LPG	101%
Alternate Fuel	Unit	Price	Rs./ MMBTU	Kerosene Oil	33%
LPG	Rs/ Cylinder of 11.8 KG	1,253.75	2,351	HIGH Sulphur Furnace Oil (HSFO)	9%
Kerosene Oil	Rs./Liter	53.19	1,561	Motor Spirt	97%
High Sulphur Furnace Oil (HSFO)	Rs./Ton	52,204	1,275	Fire Wood PSB	-17%
Motor Spirt	Rs./Liter	75.99	2,307	Coal Local PSB	-49%
Fire Wood PSB	Rs./Mond	619.40	968	Coal Imported PSB	-46%
Coal Local PSB	Rs./Mond	396.00	592	HSD	96%
Coal Imported PSB	Rs./Liter	421.77	630		
HSD	Rs./Liter	84.59	2,295		
LNG	US \$/MMBTU	11.21	1,172		

⁵² Ibid.

⁵³ Ibid.

⁵⁴ Ibid.

The table shows that RLNG is approximately 50% cheaper than high speed diesel (HSD), motor spirit, and liquid petroleum gas (LPG) and 25% cheaper than kerosene oil.

Conclusion

For the last two decades, LNG trade is getting global attention. As a result of development in gas/LNG trade through bilateral and multilateral agreements, gas prices are becoming competitive on every new transaction. Given the upsurge in production, it is anticipated that gas prices will remain low even though the oil prices rebound. The gas supply can be equalized by an upsurge in demand which will continue because of commitment to environment protection and safety standards.

In comparison to worst energy crises from 2008 to 2014, now LNG has contributed a life injection in supply of uninterrupted supply for Pakistan's economic condition. LNG is more economical and efficient fuel than furnace oil and can reduce the balance of payments issue. LNG is, however, costlier than natural gas, but the scarcity of the natural resource is impeding economic growth in terms of industry, transport and power generation, etc. Therefore, the continuation of economic cycle owing to persistent supply of LNG shall run several industries viz; textile, cement, CNG, power generation and ultimately prosper common citizens in terms of creation of jobs/ resources.

For the last three years RLNG has considerably contributed in the Natural Gas consumption of the country and has reached more than 25% of its share in Natural Gas consumption. Its supply demand is in MMBTU, the current demand of Pakistan is around 4000 MMCFD of which around 1000 MMCFD is contributed through RLNG. Pakistan is currently spending approximately 2 billion dollars annually for the import of LNG. The main supplier is Qatar. For the last three years, Pakistan has imported 311557 BBTU of LNG. Since RLNG is mainly supplied to industries therefore in comparison to other fuels it is cost effective and its uninterrupted supply run the wheel of industry.

Furthermore, it is also argued that Pakistan should focus on its other sectors apart from industries such as railways and must start to switch from diesel-run locomotives to LNG. This would save 40-60% of fuel cost. This practice has already started in India last year. Our obsolete furnace-oil based power plants should be replaced by more energy-efficient LNG-based plants. India has done this earlier and this is expected to reserve \$1.5-2 billion in foreign exchange per annum. With the availability of clean fuel, Pakistan's competitiveness will increase in world trade, resulting in revival of exports and the overall

economy. With the accomplishment of China Pakistan Economic Corridor new investment is anticipated to boost and thereby energy allocation to all sphere of economy is a must.

Along with road transport, the aerospace industry is searching for alternative fuels for aviation fuel supply for environmental, economic and security advantages. In many cases, most of the fuels investigated and experimented were obtained from biomass but unfortunately these fuels could not prove to be more efficient and had limited scope of research. In comparison to other fuels, if entire system of aircraft is considered then LNG can provide competitive advantages. LNG has at least ten times more thermal heat sink potential when compared to other jet fuels. For Pakistan, import of LNG will aid to store more gas pipeline and thereby creating more strategic storage capacity.

Another advantage of using pollution free LNG is mitigation of environmental problems brought by road transport using conventional petroleum products. Pakistan is facing serious threats of climate change due to urbanization and its fast-growing auto industry. However, it is strongly supported that promoting liquefied natural gas vehicle in transport freight is a key to reduce emissions and diversify the direction for road freight development. While compressed natural gas (CNG) is just suitable for light-duty vehicles, LNG can be used in road transport such as heavy-duty trucks and buses. For instance, in China, CNG buses and LNG buses were introduced in 1999 and 2012 respectively and it was proved to be cost effective. So, in sequel, LNG supply chain has augmented the entire energy stream and has been a huge success for Pakistan which should be further encouraged and continued.

Considering the least project completion time of less than 11 months required to install and commission FSRU, LNG was the only solution to mitigate some of the supply-demand gap in natural gas sector. There is an overwhelming interest from the international and national private investors to enter into LNG supply chain. However, considerable difference in domestic gas price as well as imported LNG is acting as a barrier in getting benefit of full LNG potential which is likely to find its own ways in due course of time.

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