



Distribution | Gas Sector Study



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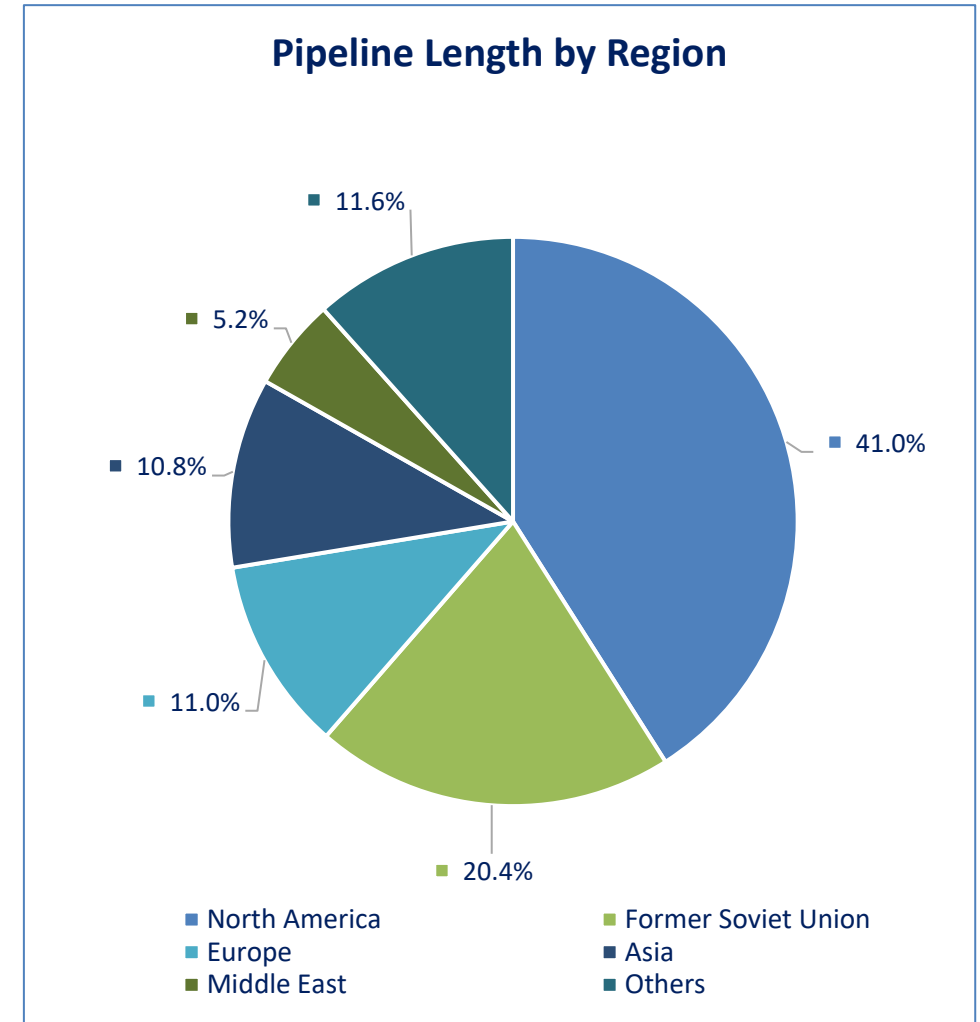
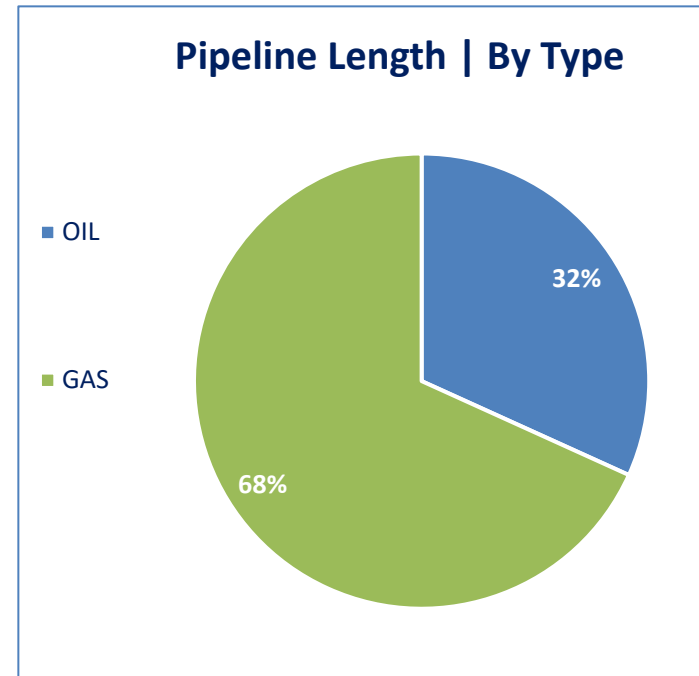
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Distribution | Gas

Global Overview

- Global pipeline distribution network can be divided into oil pipelines and gas pipelines. Combined revenue of both segments was recorded at USD~12bln in CY19.
- Demand for oil is expected to rise by around ~1mln barrels per day (bpd) on average every year till CY25, from ~97mln bpd in CY18. In a bid to meet the rising consumption of oil and gas, the pipeline capacities are being expanded, and new pipeline projects are being commissioned.
- However, the global shift towards renewable sources for electricity generation to transport poses a huge threat to the demand for oil and gas, which is likely to be a major challenge for the growth of onshore oil and gas pipeline installation in the coming years.
- The total length of global gas distribution pipeline network is ~4,322,388km.





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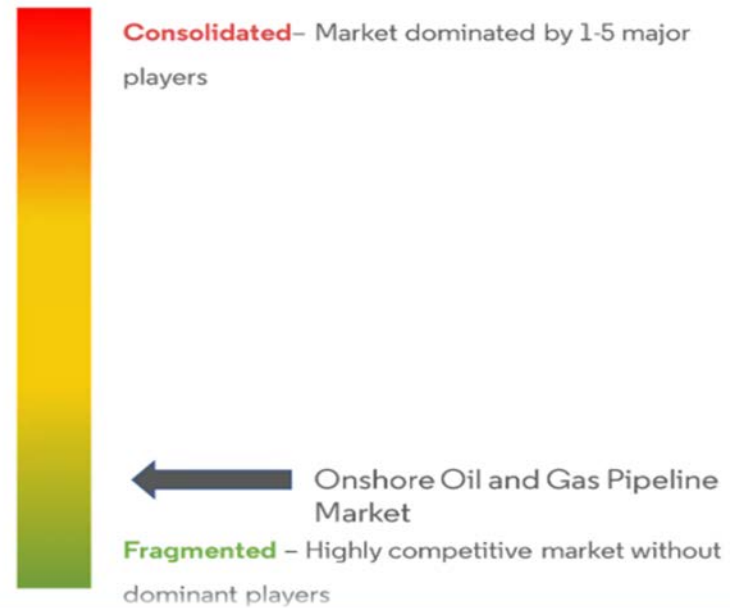
Global Overview | Market Growth

- Asia Pacific is expected to be the fastest growing region in the world for the period CY21 to CY26 in terms of growth in pipeline network.
- Global pipeline market is fragmented in nature with a large number of companies operating in the industry. As of Sep-19, the active and suspended number of pipelines were ~3,807 with the number set to grow further as ~507 planned and announced pipelines are expected to start operations by CY23 with a length of ~155,340kms.

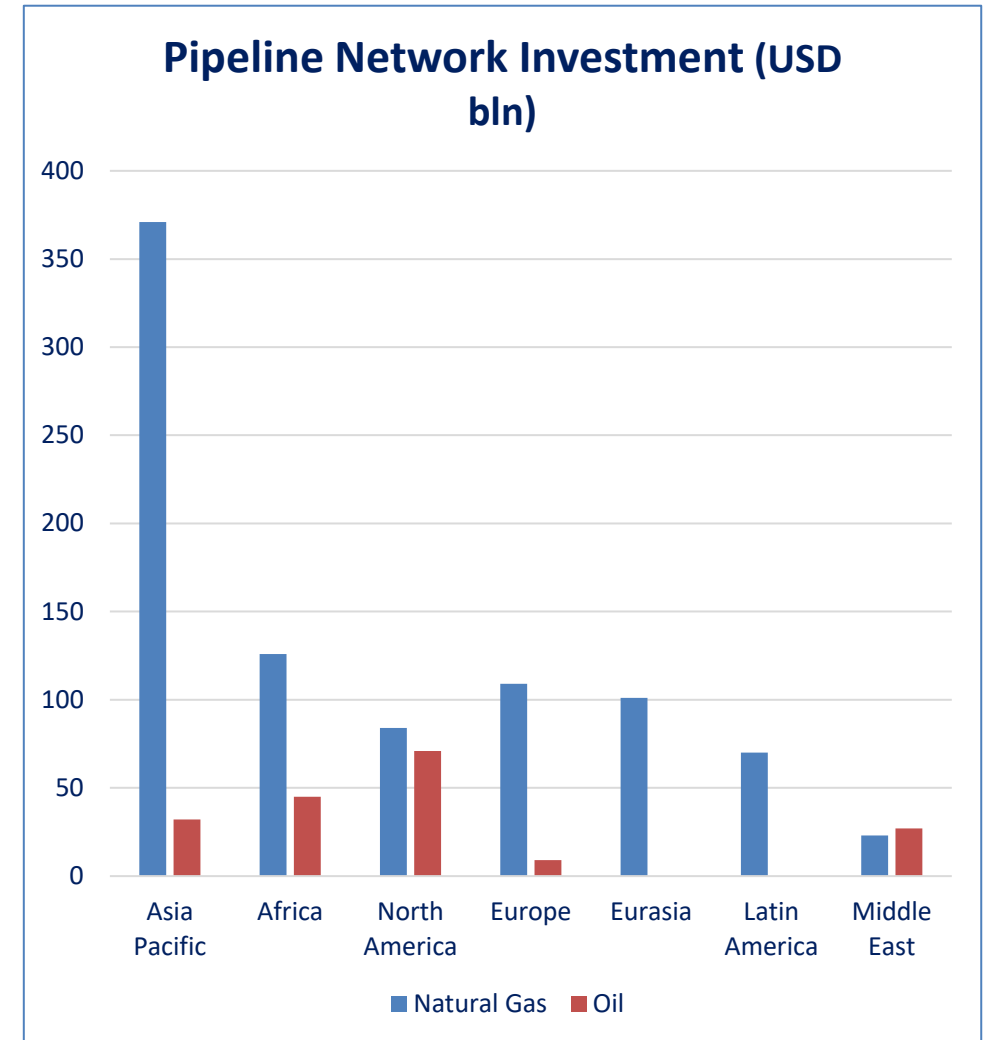
Growth Regions:



Market Concentration:



- The availability of abundant natural gas reserves and its lower cost compared to other fossil fuel types has supplemented the demand for natural gas from multiple end-use sectors, including power generation. The trend is expected to continue in the coming years. This, in turn, will boost the onshore gas pipeline market.
- On regional scale, the highest investments in pipeline networks are incurring in Asia-Pacific followed by Africa. Growing oil and gas demand in Asia-Pacific holds immense potential for onshore oil & gas pipeline market and is the fastest-growing market. China and India have been the largest consumers of oil & gas in the Asia-Pacific region and the gas consumption is growing at a significant pace in these countries.
- The energy consumption in Asia-Pacific is expected to grow by ~48% over the next three decades. This makes it the fastest-growing market amongst other regions. Focusing on cleaner way to transport fuel, technology developments and cost-efficient methods have been among the driving factors in the demand for the onshore pipeline infrastructure. On the other hand, renewables sources are the biggest and rising threat to the oil & gas demand, but due to their unreliability, fossil fuels still continue to have the largest share in energy production.





Distribution | Gas

Industry Snapshot | Local

- Natural Gas is a clean, safe, efficient and environment friendly fuel. Its indigenous supplies contribute about ~35% in the primary energy supply mix of the country.
- Pakistan has an extensive gas network of over ~13,315km transmission ~149,715km Distribution and ~39,612km services gas pipelines to cater for the requirement of more than ~10.3mln connections across the country.
- Production of natural gas from indigenous resources is decreasing. Thus, to bridge supply demand gap, Pakistan’s reliance on imported Re-gasified Liquefied Natural Gas (RLNG) has been increased in recent years. At present, the capacity of two Floating Regasification Storage Units (FRSU) for RLNG is more than 1,200MMCFD
- The average natural gas consumption during 9MFY21 was about ~3,723MMCFD including ~950MMCFD volume of RLNG. During FY21, the two gas utility companies (SNGPL & SSGCL) have laid 143Km gas transmission network, ~2,616Km distribution and ~886Km services lines.

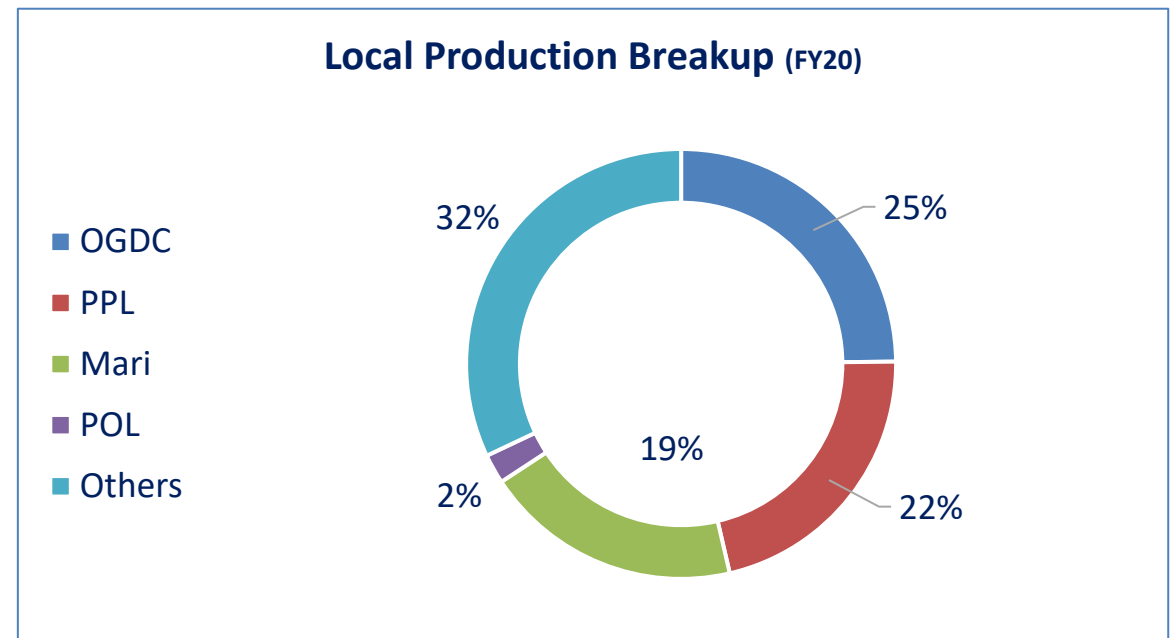
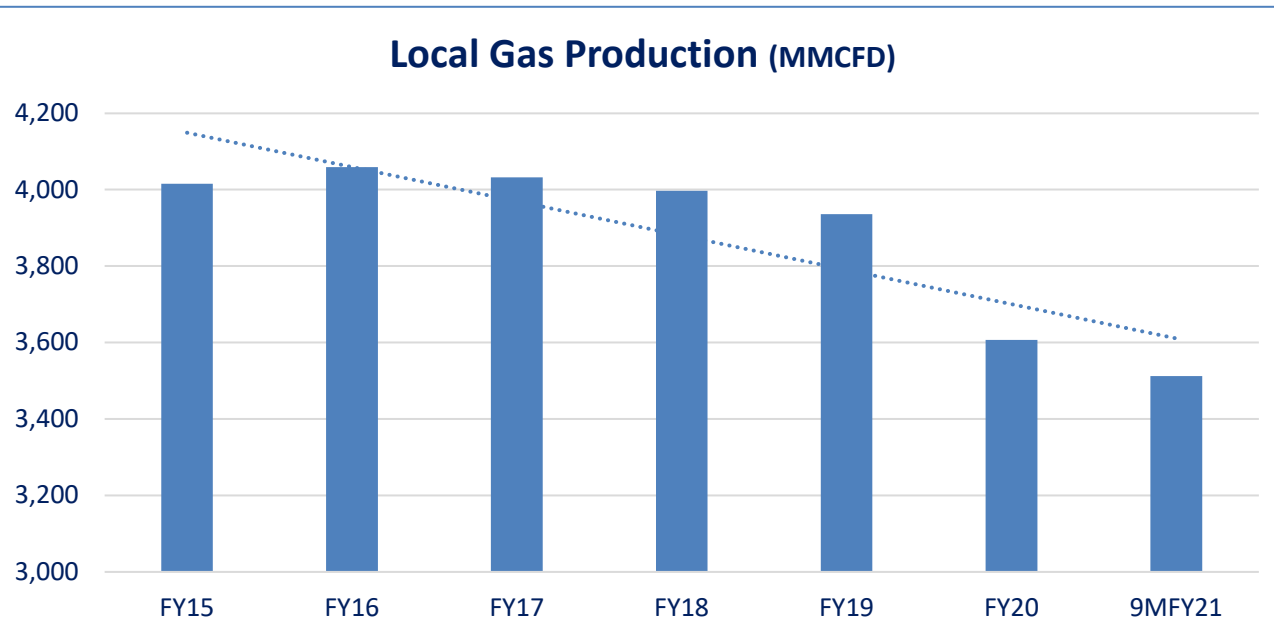
Particulars	FY20	9MFY21*
Consumption Gas (MMCFD)	3,667	3,723
Local Production (MMCFD)	3,607	3,525
RLNG Imported (MMCFD)	919	950
Structure	Regulated & Oligopolistic	
Length of Transmission Lines (km)	13,172	13,315
Length of Distribution Lines (km)	147,099	149,715
Total Number of Connections (mln)	9.9	10.3

Note: FY21 numbers are prorated based on 9MFY21 actual numbers.

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Supply Side | Local Production

- In the absence of big gas discoveries, the natural gas reserves of Pakistan are declining and estimated at ~19,000BCF. Local natural gas production is also declining. During FY20, local natural gas production was recorded at ~3,607MMCFD (FY19: ~3,935MMCFD) with YoY decline of ~8%. Moreover, the production during 9MFY21 was recorded at ~3,512MMCFD (9MFY20:~3,697MMCFD).
- Oil and Gas Development Company (OGDC) is the largest gas producer in the country with a share in total gas production of ~25% followed by Pakistan Petroleum Limited (PPL) and Mari Petroleum (Mari) having ~22% and ~19% shares respectively. Others include United Energy Pakistan Limited (UEP) and ENI Pakistan having the highest shares.



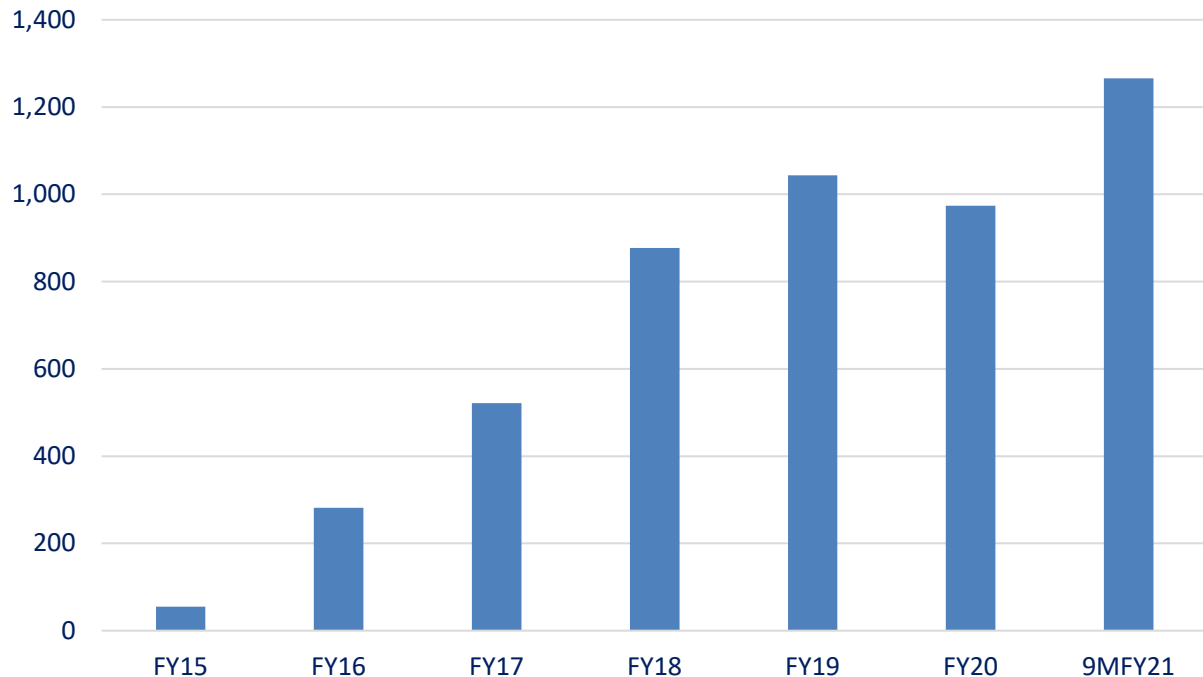


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Supply Side | Import

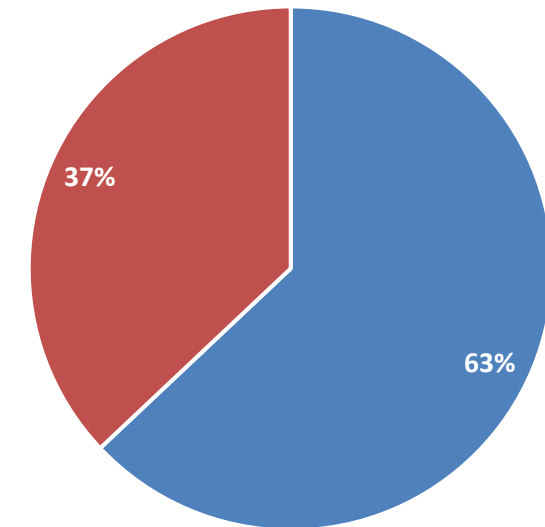
- Amid rising energy demand and low local production, Pakistan started RLNG import in 2015 to bridge the rising supply and demand gap.
- RLNG import increased from ~55MMCFD in 2015 to ~950MMCFD in 9MFY21. The import of RLNG is playing an crucial role Pakistan’s energy sector. The demand is expected to increase further on the back of ever increasing demand of energy in the country.

RLNG Imports (MMCFD)



RLNG Importers (FY20)

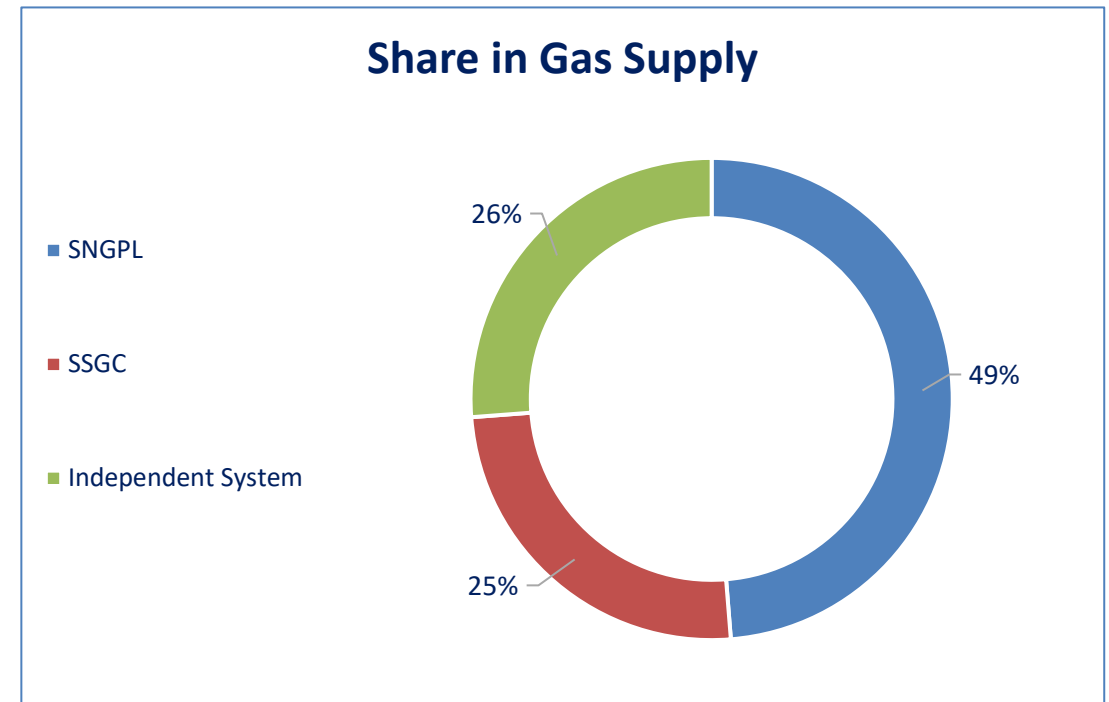
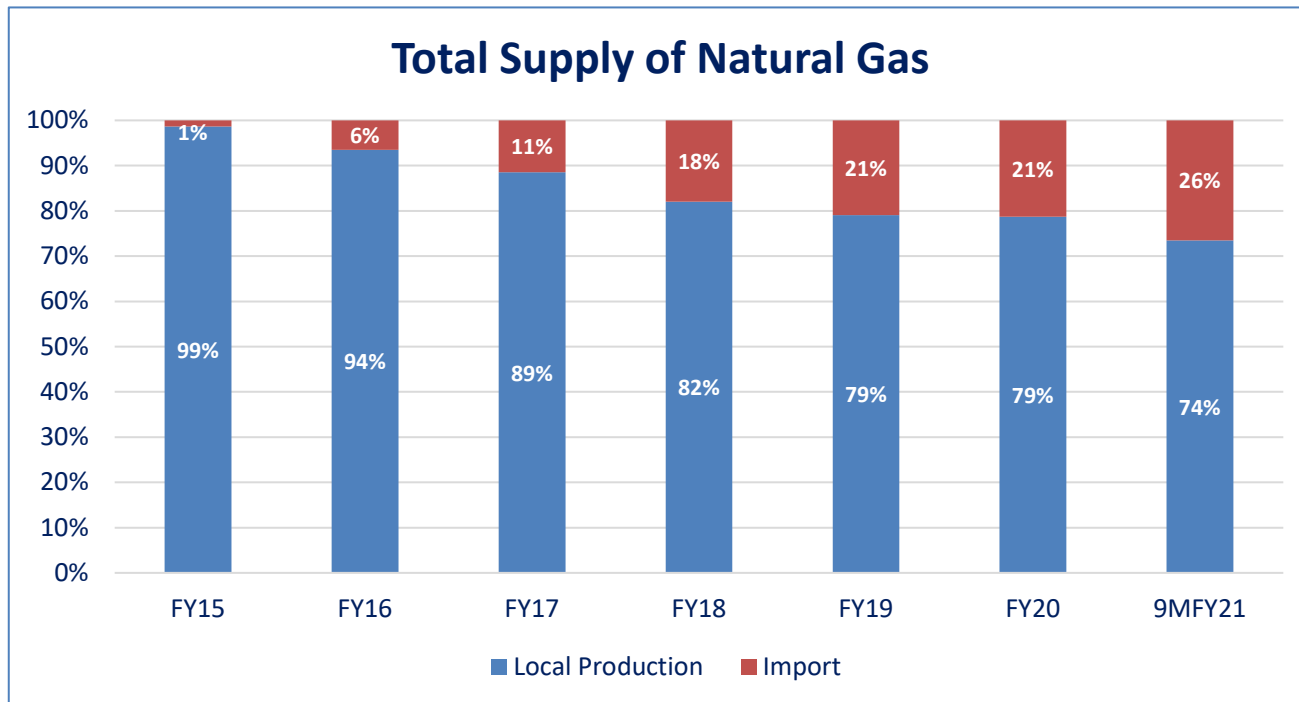
- Pakistan State Oil Company Limited
- Pakistan LNG Limited



Distribution | Gas

Supply to End Consumers

- The two Government owned gas utilities, SNGPL and SSGC, have a significant share of ~75% in total gas supply to consumers in the country. Meanwhile, Independent system comprises consumers having direct arrangements with gas producing companies since they receive natural gas through dedicated pipelines or through virtual networks including containers.
- Overall share of imported gas in the country’s total gas supply is on a rising trajectory. With depleting gas reserves and rising demand, the share of imported gas is expected to go up, in the absence of any major reserve discovery.



Supply Side | LNG Operators

- According to LNG Policy 2011, the license for LNG related activities can be classified into the following categories:
Integrated Project Structure: in which the terminal developer arranges LNG imports as well as arranges its own buyers.
Unbundled Project Structure: in which the terminal developer, LNG importer and LNG buyers are different.
- As of May 2021, the detail of licenses issues by OGRA for LNG related activities are as follows;

Name of Developer	Type of License Issued	License Issuance Date
Engro Elengy Terminal Limited (EETL)	Unbundled Project Structure Operation License of LNG Receiving Terminal at Port Qasim, Karachi. Regasification Capacity: 600-690 MMCFD	March 18, 2016
PGP Consortium Limited (PGPCL)	Unbundled Project Structure Operation License of LNG Receiving Terminal at Port Qasim, Karachi. Regasification Capacity: 600-690 MMCFD	Apr 03, 2018
Global Energy Infrastructure Pakistan Limited & Global Energy Infrastructure Limited (GEIP/GEIL)	Integrated Project Structure	(Construction license till) March 29, 2022
Tabeer Energy (Private) Limited (TEPL)	Integrated Project Structure	April 28, 2021
Energas Terminal (Pvt.) Limited (ETPL)	Integrated Project Structure	April 28, 2021
Daewoo Gas Private Limited (DGPL)	Integrated Project Structure (Virtual Pipeline project)	Jan 13, 2021
LNG Easy Private Limited (LNGe)	Integrated Project Structure (Virtual Pipeline project)	Jan 08, 2021

Supply Side | Upcoming Projects

- To bridge the demand supply gap, the government is working on a number of projects to facilitate import of natural gas. Some major projects are as follows:

Turkmenistan-Afghanistan- Pakistan-India (TAPI):

- The gas pipeline project aims to bring natural gas from the Gylkynish and adjacent gas fields in Turkmenistan to Afghanistan, Pakistan and India. The Asian Development Bank (ADB) is acting as the facilitator and coordinator for the project. The feasibility study, proposed to lay a 56-inch diameter ~1,680 KM pipeline with design capacity of ~3.2 billion cubic feet of natural gas per day (BCFD) from Turkmenistan through Afghanistan and Pakistan up to Pak-India border. Once completed, Pakistan would receive ~1,325MMCFD gas from the pipeline. Expected completion date is not being announced by the government yet.

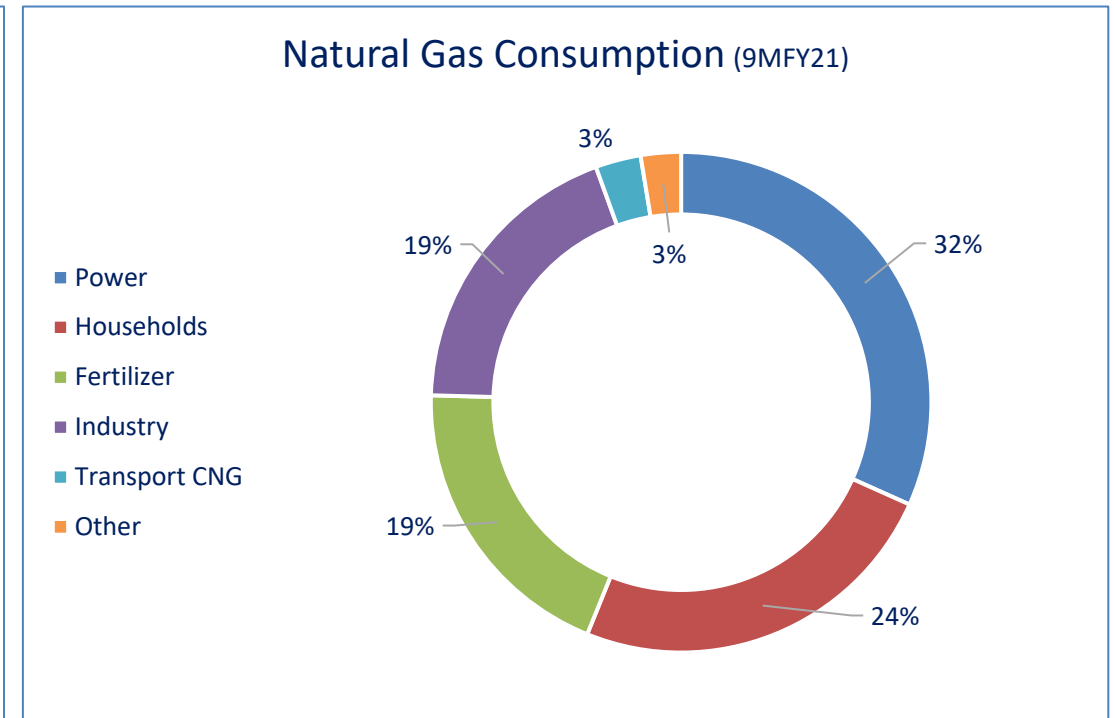
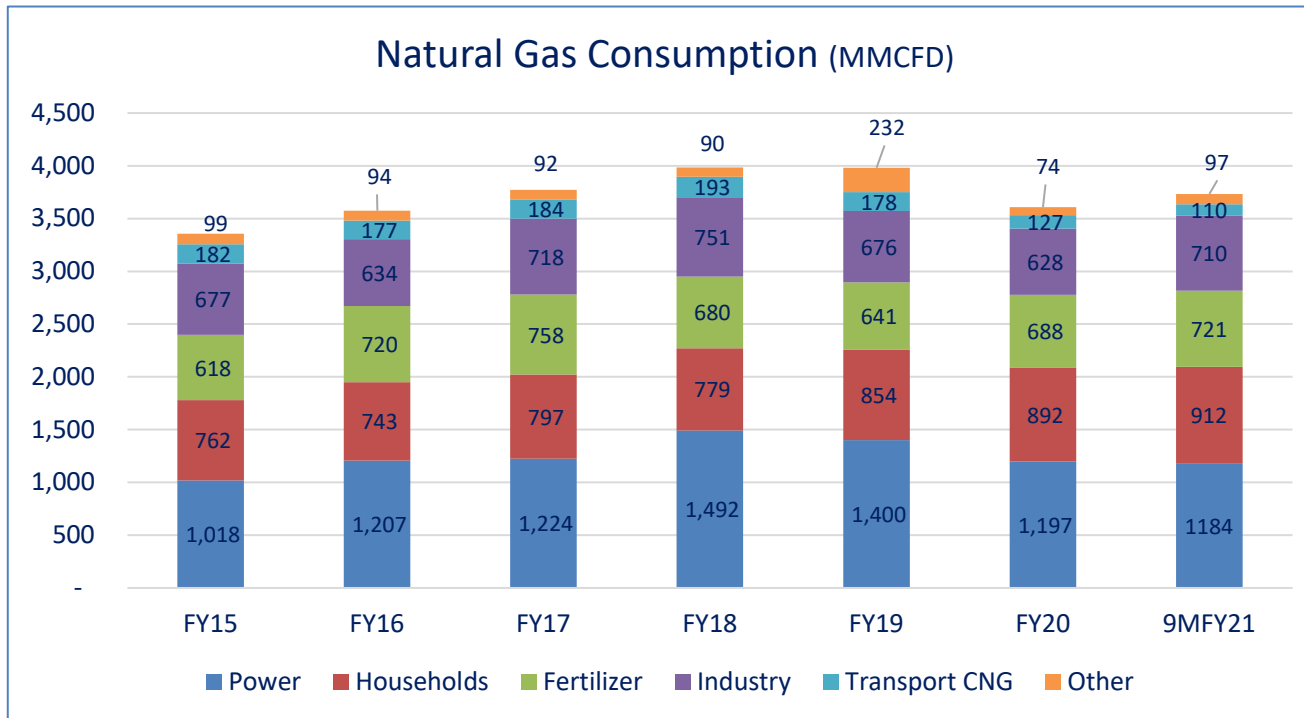
Pakistan Stream Gas Pipeline (formerly “North-South Gas Pipeline”):

- Pipeline with the length of ~1,122km connecting Port Qasim (Karachi) to Kasur (Punjab) would be built under the Inter Governmental Agreement for North South Gas Pipeline (NSGPP) between Russian Federation and Pakistan. The project once completed will increase the country capacity to transfer imported RLNG by ~1,200-1,500MMCFD. The proposed pipeline would be the country’s first RLNG pipeline.

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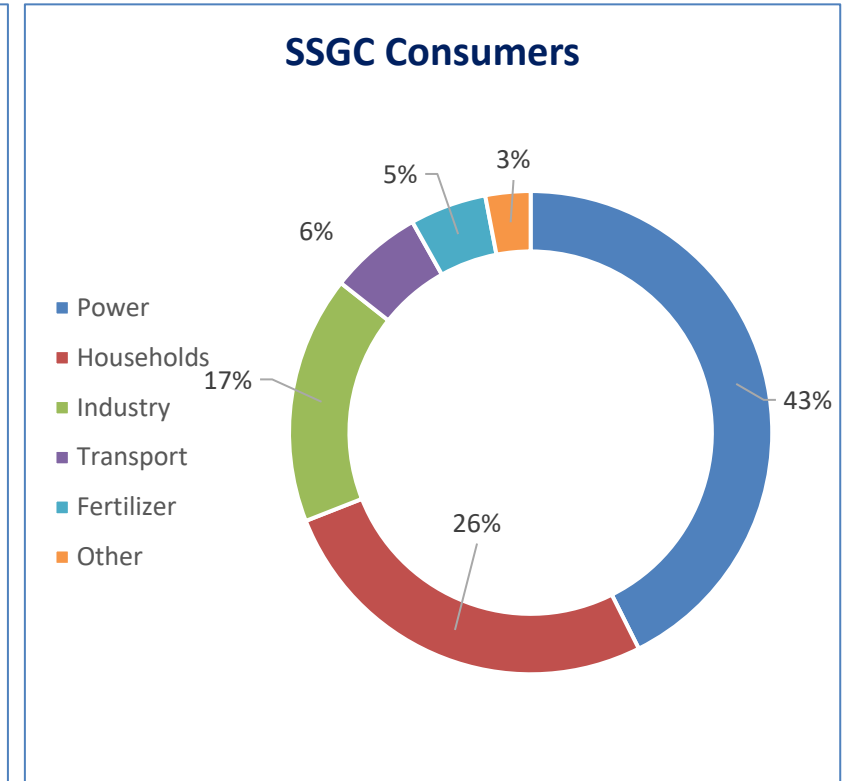
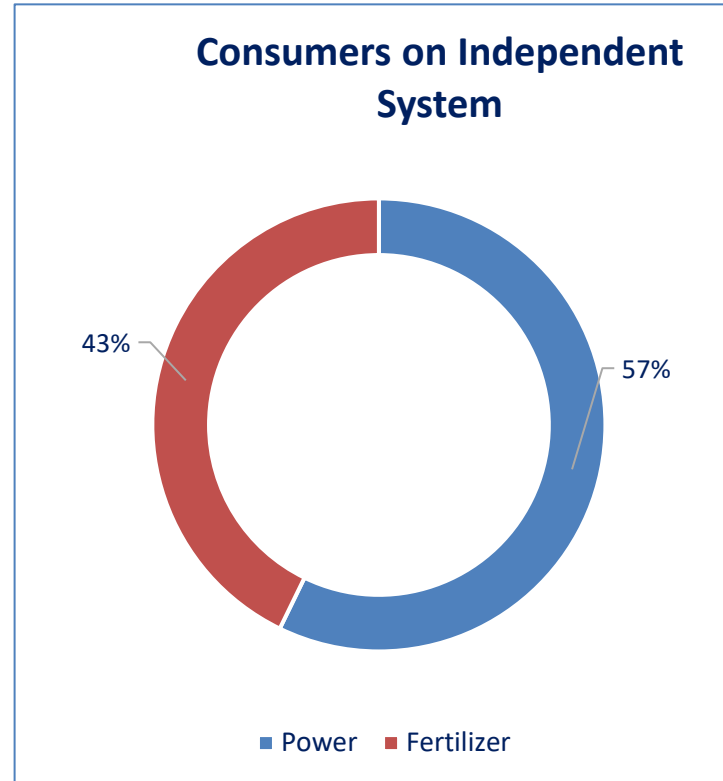
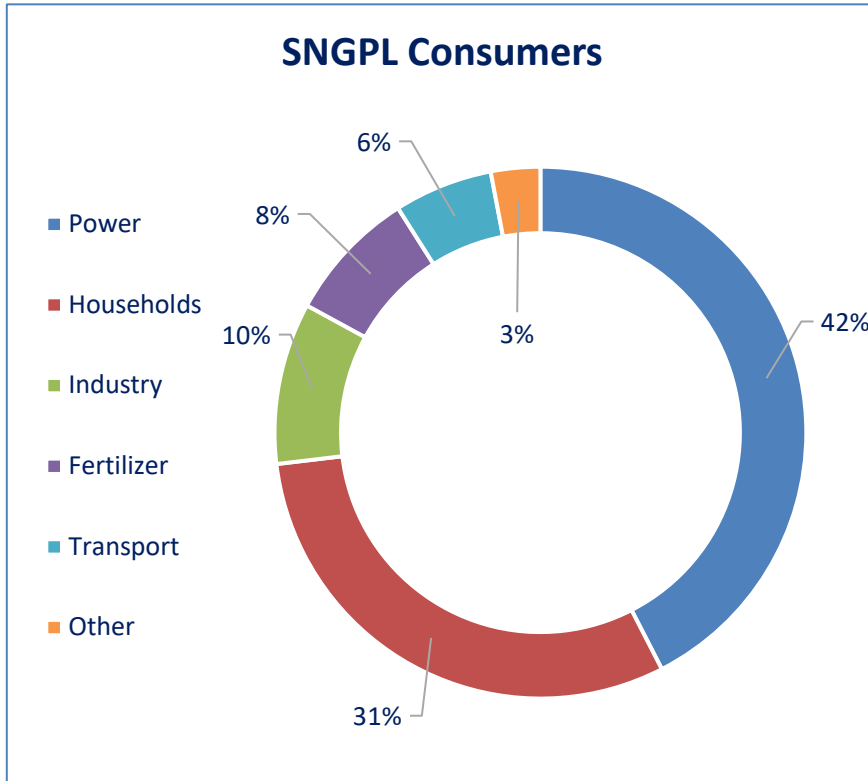
Demand Side | Consumption

- Electricity producers are the major consumers of natural gas. Power sector's share in total natural gas consumption clocked in at ~32% followed by fertilizers and households consumers each having ~19% share in 9MFY21.
- Households consumers use expensive LPG during curtailed gas supplies by gas utilities to fulfil their energy needs. Fertilizer sector's dependence on natural gas is significantly high as it consumes most portion of the gas as feedstock making it difficult to switch to other form of energy.



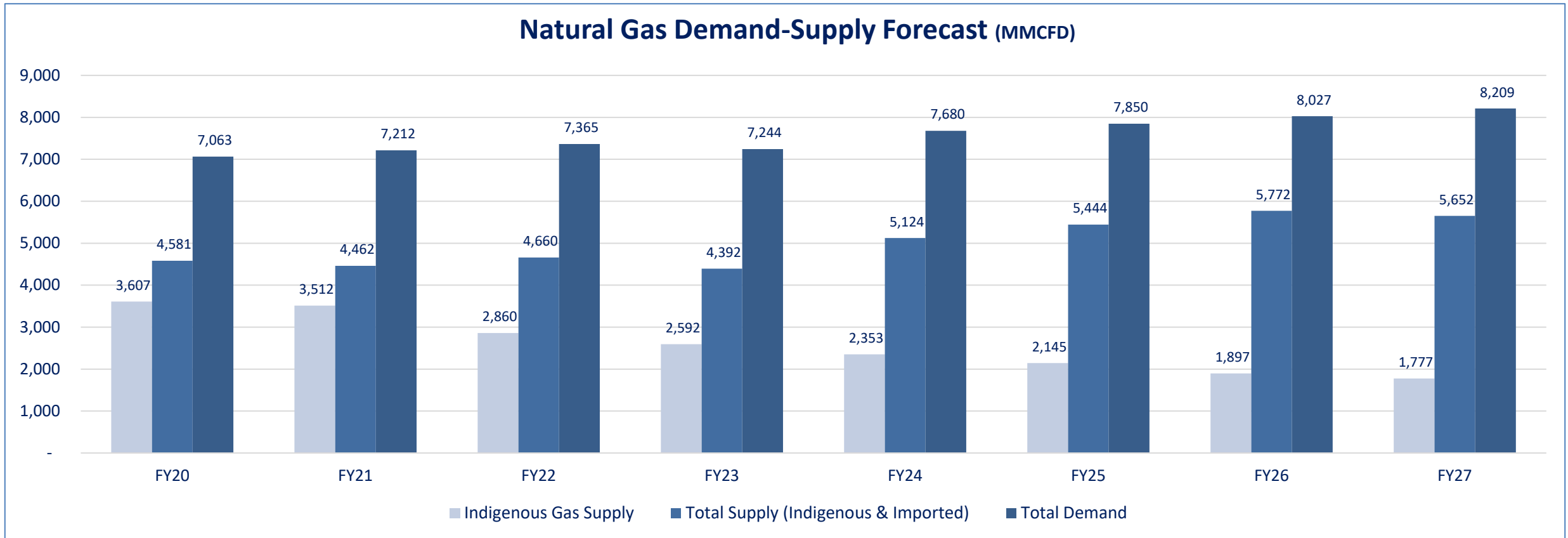
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Demand Side | Consumption



Demand | Supply Forecast

- As domestic natural gas production continues to decline, Pakistan's domestic gas supply gap continues to increase. Therefore, Pakistan needs to accelerate domestic E&P activities and/or increase the imported gas to meet its gas demand.
- Once completed, Pakistan Stream Gas Pipeline project can provide support to contribute towards reducing reliance on gas import.



Business Risk | Pricing

- Based on the Revenue Requirement of the Gas Companies, OGRA determines the prescribed price (i.e. price to be retained by the companies) for each category of consumers.
- The Government fixes consumer gas prices and as a matter of policy, maintains them at a uniform level throughout the country. Therefore, the cost of supplying gas to customers at various locations is not accounted for and, regardless of the difference in cost due to location, all consumers within the same category pay a uniform price.
- The consumer price of natural gas in Pakistan comprises:
 - (a) the prescribed price for the gas companies and
 - (b) Gas Development Surcharge (GDS). OGRA fixes the 'prescribed price' for the gas utilities after conducting public hearings where stakeholders express their views. Also, a thorough analysis is carried out in terms of prudence and rationale for revenue and capital expenditures.
- The prescribed price includes the following elements:
 - Producer gas prices, which are linked with international prices of crude oil and HSFO
 - Transmission and distribution costs
 - Depreciation
 - Return to SNGPL and SSGCL (~17% on net operating fixed assets)
 - Allowed UFG losses



Consumer (w.e.f 01-09-2020)	PKR/MMBTU
Households	
Up to 0.5MMCFD per month	121
Up to 1MMCFD per month	300
Up to 2MMCFD per month	553
Up to 3MMCFD per month	738
Up to 4MMCFD per month	1,107
Above 4MMCFD per month	1,460
Fertilizer Feed Stock	302
Fertilizer Fuel Stock	1,023
Power	857
General Industries	1,054
Export Oriented Industries	819
Transport CNG	1,361

- The determination of annual revenue requirement takes into account the determination of Unaccounted For Gas (UFG) allowance and disallowance to the state owned gas utilities companies. UFG is a phenomenon of gas loss which is contingent upon occurrence of various technical factors when gas flows from fields to end consumers. It is calculated as the difference between metered gas volume injected into the transmission and distribution network (Point of Dispatch/Delivery) and the metered gas delivered to the end consumers (Consumer Meter Station) during a financial year.
- The determination of annual revenue requirement takes into account the determination of Unaccounted For Gas (UFG) allowance and disallowance to the gas companies.
- A two-component formula for calculating UFG allowance being used is as under:

$$\text{UFG Allowance} = \text{Gas Received} \times (\text{Rate1} + \text{Rate2} \times \beta)$$

- Rate1= Technical Component (Inherent gas loss in the system): is the benchmark fixed rate based on prevalent conditions / infrastructure in the areas of the operation of the Sui companies and same is fixed at 5% for the next five years.
- Rate 2= Local Challenging conditions component (Pakistan specific): is the allowance for local challenging conditions as compared to the world at large. Allowance for these challenging conditions is fixed at a maximum of 2.6%.
- β =Performance factor (Key Monitoring Indicators - KMIs): in order to ensure appropriate and serious efforts are directed towards reducing UFG over the agreed term of five (5) years, the local challenging conditions component has been linked to the achievement of KMIs by each gas utility company.

Financial Risk | Gas Circular Debt

- Gas circular debt is rising at an alarming pace and holds the potential to cause serious problems for an already fragile distribution gas sector. Initially, a major portion of debt was stemming from natural gas, however, lately the share of RLNG is building up as well. As of June-2020, the gas circular debt was estimated at PKR~600bln. In turn, as of March-2021 the receivables of OGDC and PPL from the two gas utility companies were registered at PKR~513bln – hindering prospective exploration of gas and oil.
- The gas differential margin in both the Sui companies is the tariff adjustment recoverable – primarily the difference between the tariffs prescribed by OGRA (based on tariff review petition) and the tariffs approved by the Government. This is similar to the difference between the base tariffs prescribed by NEPRA and what government approves in the power sector.
- In the yesteryears, the gas differential margin was insignificant. The gas supply to domestic consumer (households) is at discount to the cost and the remaining customers (mainly industry, commercial etc.) cross subsidize these to recover the gap. The indigenous gas supply has been fast declining, while the domestic consumer base is growing. The share of domestic is growing and there is not enough recovery from the shrinking share of others to cross subsidize – the gap is building up as recoverable from government. This is how the circular debt is building.
- Rising circular debt will cause cash flow problems for gas utilities which will hamper their abilities to further improve their transmission and distribution network.

Outstanding Payable on account of SNGP & SSGC (March-2021)			
Company (PKR bln)	OGDC	PPL	Total
SNGP	141	152	293
SSGC	112	108	220
Total	253	260	513

Cost & Sales Price Comparison			
	Indigenous Gas	RLNG Imported	Avg. Selling Price to Households
Est. Cost (PKR/Mmbtu)	700	1,400	300



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Taxes

- Sales tax on RLNG/LNG increased from ~12% to ~17% in the **Budget FY22**.
- Indigenous gas is subject to sales tax of ~14%.

	Category	FY21	FY22
RLNG	Custom Duty	11%	11%
	Sales Tax	12%	17%
	Federal Excise Duty	PKR 10,000/MT	PKR 10,000/MT
	Income Tax	11%	11%
	Additional Custom Duty	2%	2%

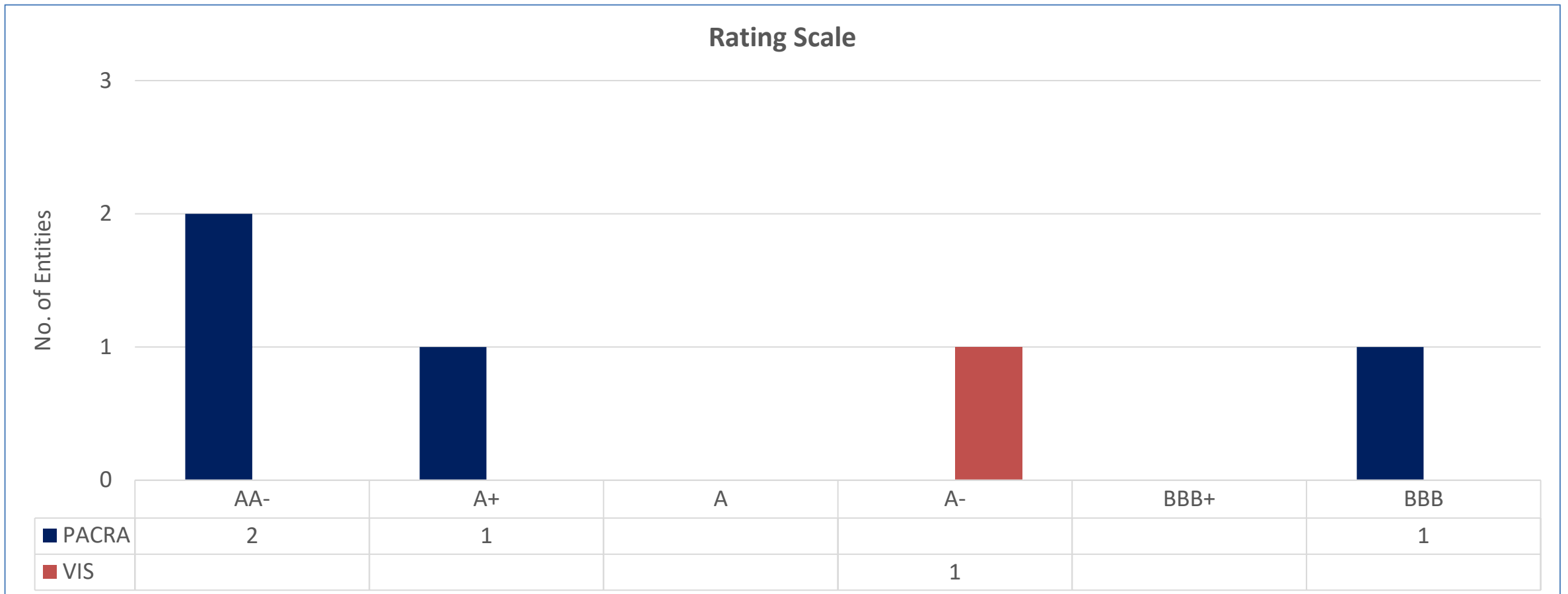


Regulatory Framework

- The regulatory functions of natural gas sector were transferred to OGRA on March 28, 2002 with the objective to break the public sector monopoly and open natural gas transmission and distribution to private sector to promote and enhance competition in the midstream and downstream oil and gas sectors. OGRA has been performing the following functions pertaining to the Natural Gas Sector: -
 - Grant of licenses for the regulated gas sector.
 - Formulation of rules, regulations and procedures for the conduct of licensees.
 - Determination of Revenue Requirement Petitions of SNGPL & SSGCL.
 - Monitoring and enforcement of rules, regulations and applicable license conditions.
 - Pipeline capacity allocation.
 - Licensing of low pressure (flare) gas.
 - Licensing for transmission, distribution and sale of RLNG.
 - Approval of Gas Sale Agreements (GSAs) for supply of gas between the Gas Producers and Gas Companies/
Consumers.

Rating Scale

- PACRA rates four players in the gas distribution sector while VIS rates one player.





SWOT Analysis

- Natural Gas is a clean, safe, efficient and environmentally friendly fuel
- There are few players operating in the sector
- Demand for gas is continually rising
- Capital intensive sector – Low entry barriers
- Stringent regulatory approvals required to enter the market
- Indigenous production – low cost

- Rising circular debt
- Increased exposure to exchange rate risk due to rising reliance on imports
- Increase in gas theft, transmission and distribution losses
- Declining local natural gas reserves



- Structural reforms requiring huge investments
- Greater reliance on imports
- Rising demand supply gap
- Limited regassification capacity at import stage

- Upcoming supply side projects to facilitate imports and reduce demand supply gap
- Rising demand
- Long term import contracts at favourable rates
- Increase in exploration activities

- Natural gas, being cheap and environment friendly energy source, has always been the first priority of both households and other consumers. In line with the rising population and increasing economic activity the demand of natural gas is also increasing, whereas the local production is not enough to cater the demand. To bridge demand-supply gap, Pakistan started import of RLNG in 2015 and the share of import in total gas consumption is increasing since then.
- OGDC, PPL, MARI and UEP are the largest producers of natural gas in the country. Amid absence of any big discoveries in recent periods the overall gas reserves of the country are declining. PSO and Pakistan LNG Limited are the only importers of natural gas in the country wherein combined regassification capacity of the both regassification units of the country is ~1200-1380MMCFD. It is strategically important to increase the overall regassification capacity of the country to cope up with rising imports of RLNG.
- The work on PSGP is also expected to start soon, which will significantly increase the country's capacity to transport imported RLNG upstream to areas of Punjab and KPK. Moreover, TAPI and Iran-Pakistan gas pipeline projects have the potential to significantly improve the country's gas supply situation.
- The need to manage the structural issues of gas distribution sector is also increasing and these issues if not addressed have the potential to significantly dent the sector's ability to deliver to its consumer which in turn will have a serious implications for the overall economic growth of the country.



Bibliography

- PACRA Internal Database
- Oil and Gas Regulatory Authority
- Pakistan Bureau of Statistics
- Ministry of Energy (Petroleum Division)
- Ministry of Finance
- Pakistan Petroleum Information Service
- Companies Financial Statements
- National Electric Power Regulatory Authority

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