



# Pipeline Network Sector Study



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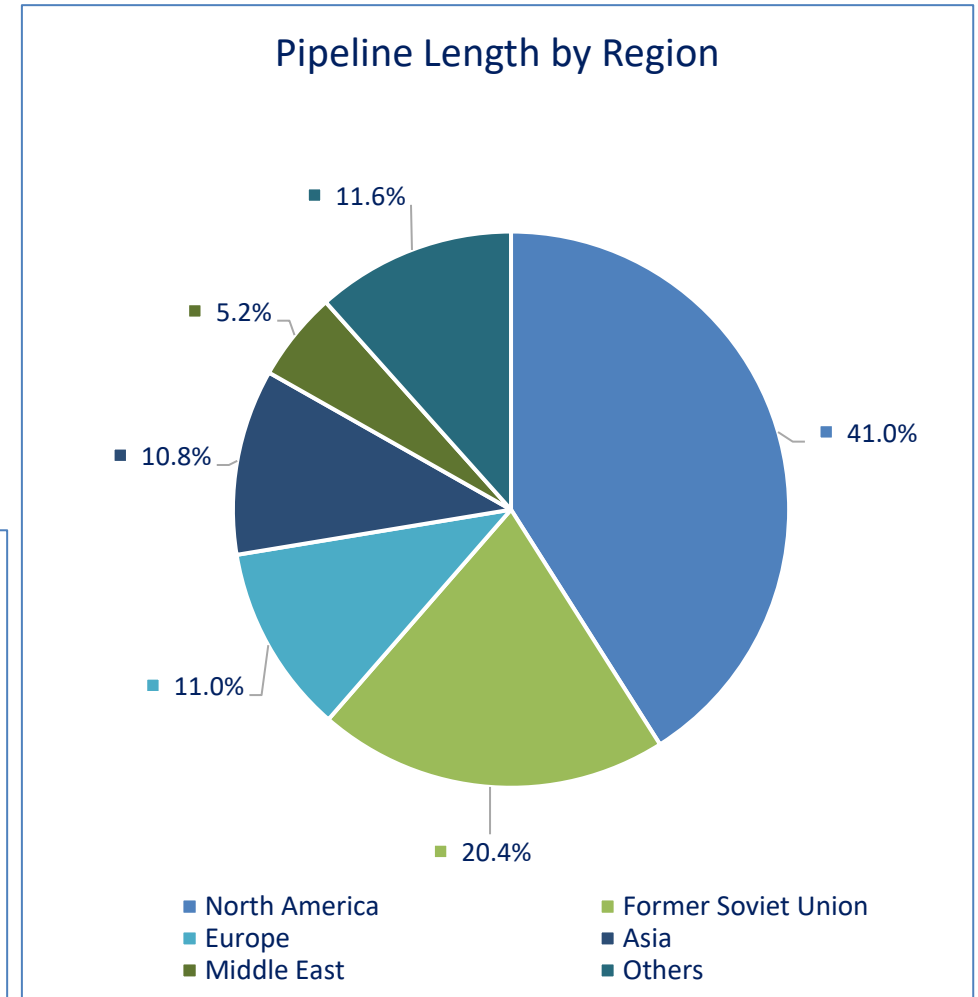
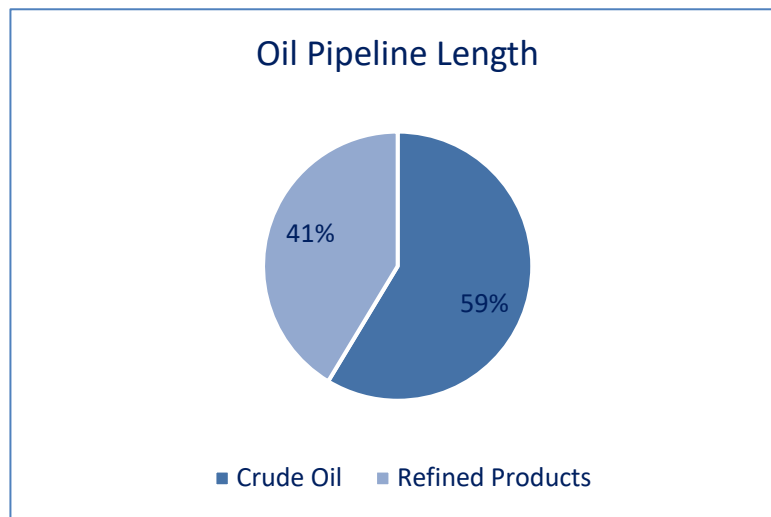
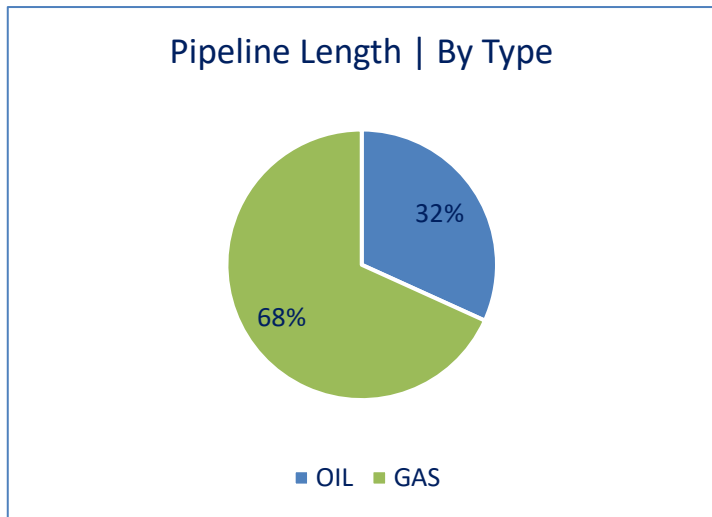
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# Pipeline Network

## Global Overview

- Global Pipeline 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 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 pipeline network is ~2,034,065km breakup of which is illustrated below:





# Pipeline Network

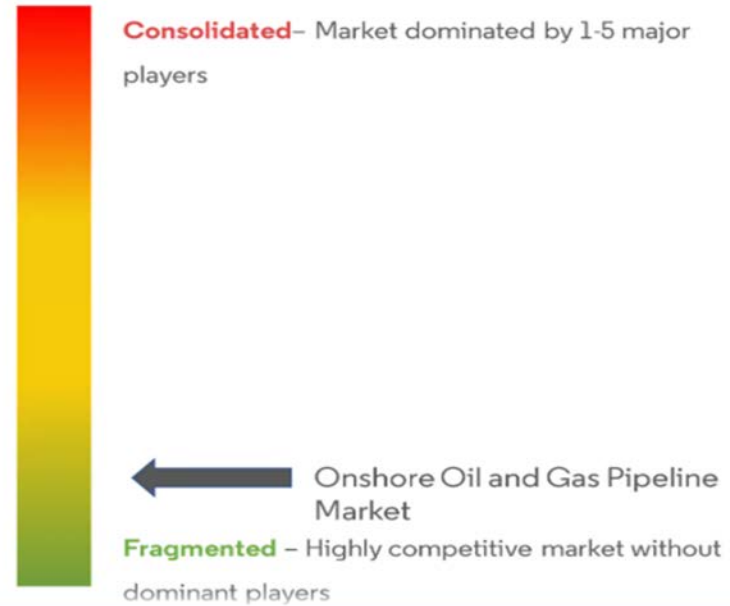
## Global Overview | Market Growth

- Asia Pacific is expected to be the fastest growing region in the world for the period CY21 to CY26. As of CY20, North America has the largest oil and gas pipeline network of ~833,967km.
- 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:

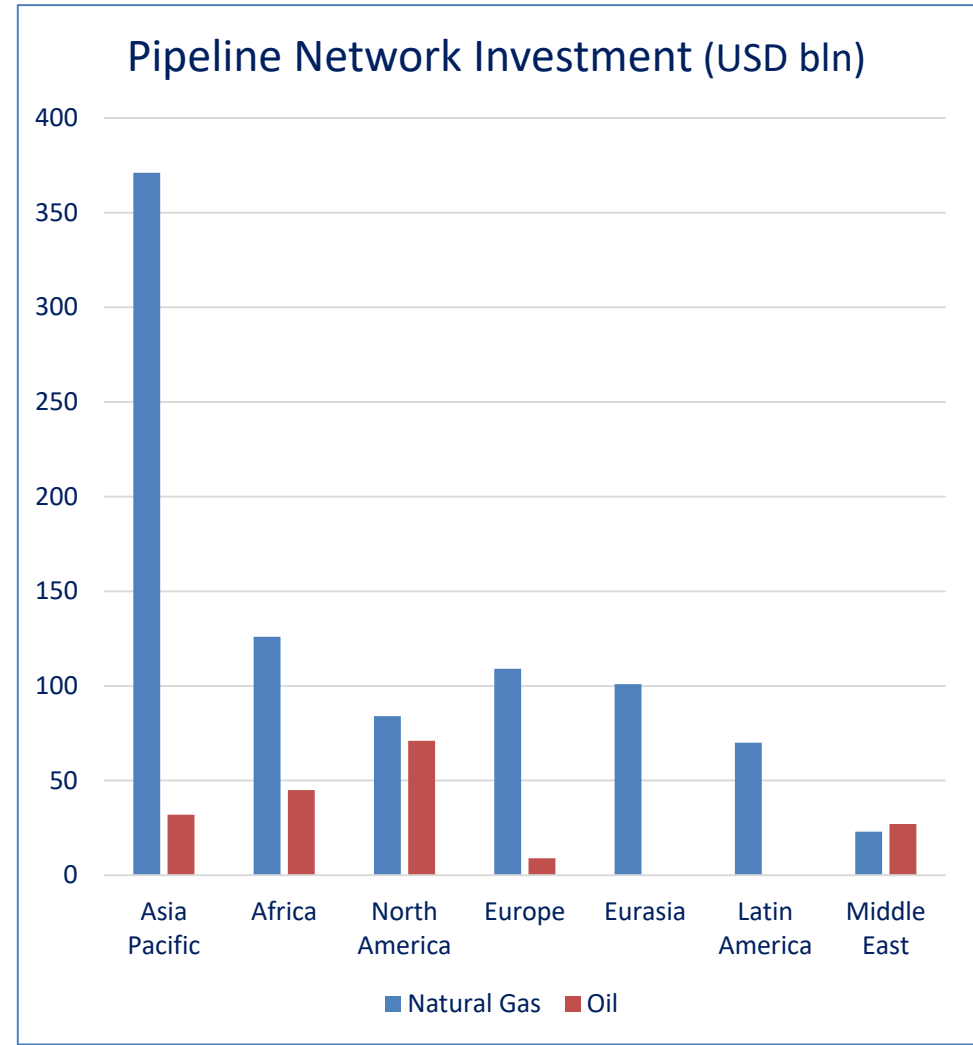




# Pipeline Network

## Global Overview | Investments

- The availability of abundant natural gas reserves and its lower cost compared to other fossil fuel types, is expected to supplement the demand for natural gas from multiple end-use sectors, including power generation in the coming years. This, in turn, is expected to boost the onshore gas pipeline market.
- Russia and Pakistan have agreed to build a new gas carrying pipeline worth USD~2bln. Further, India and Russia have also signed a deal worth USD~40bln on natural gas exports to India.
- Growing oil and gas demand in Asia–Pacific holds immense potential for the 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 pipeline network 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 has led the onshore oil & gas pipeline market to be the fastest-growing 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. Renewables sources are the biggest and rising threat to the pipeline network investment, but due to their unreliability, fossil fuels still continue to have the largest share in energy production.

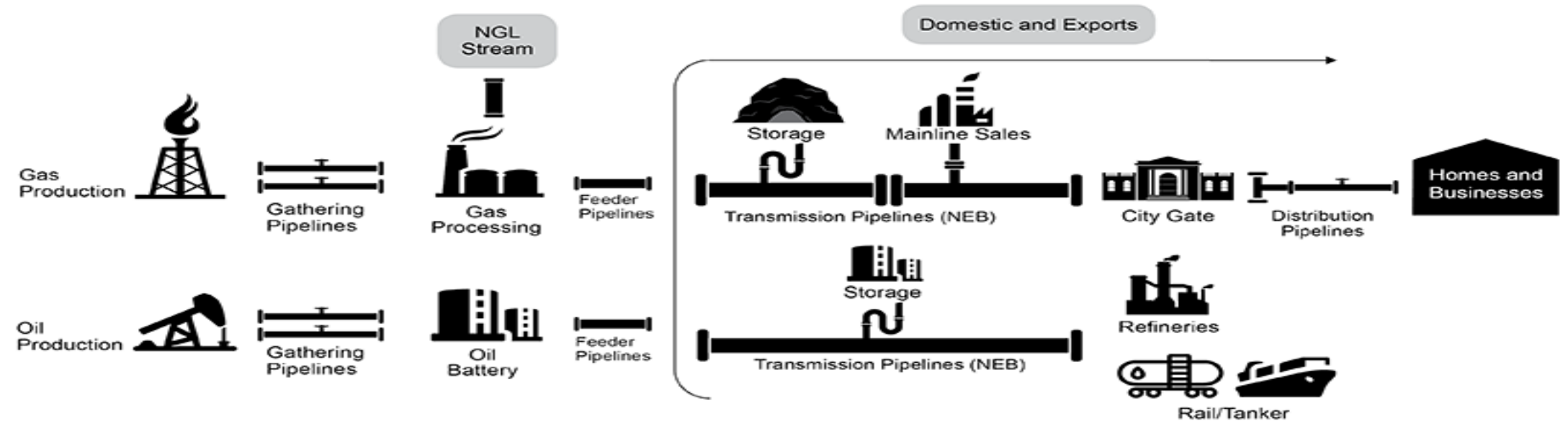




# Pipeline Network

## Supply Chain

- There are two types of oil pipelines: crude oil pipeline and product pipeline. While the former carries crude oil to refineries, the latter transports refined products such as gasoline, kerosene, jet fuel, and heating oil through imports or from refineries to the market. After extraction, pipelines carry gas or oil to processing or storage areas where they are stored and further fed into feeder pipelines connecting to major or nationwide pipeline in use.
- Refineries, after receiving oil from nationwide pipelines refine it and further pump refined petroleum products in the pipeline. Petroleum products are delivered to storage areas where they are transported via oil tankers to fuel pumps or ports for export. Supply chain of petroleum products, either refined or unrefined, is a mix of oil tankers and pipelines.





# Pipeline Network

## Industry Snapshot | Local

- In Pakistan, major portion of oil products are transported through roads. In FY21, ~69% of total oil products moved by roads followed by pipeline ~29% and ~2% by railways. Moreover, with the start of MOGAS transport through pipeline during FY21, overall throughput of the sector has been improved.
- Total length of the pipeline network in Pakistan is more than ~12,500km majority of which, almost ~80% pertained to gas pipelines. Total length of oil pipeline operating network is over ~2,000km, previously transporting only High Speed Diesel (HSD) and crude oil. Upgradation of one the major pipeline in the country, owned by Pak Arab Pipeline Company (PAPCO), has enabled the company to transport both MOGAS and HSD through its pipeline spanning from Karachi to Mahmoodkot with total length of ~786km.
- Currently, two companies, Pak Arab Refinery Limited (PARCO) and PAPCO, own all the four major oil pipelines present in the country. Two of them are situated at heart of the industry, Karachi to Mehmoodkot.
- Pipeline is the cheapest and safest mode of transportation for petroleum products. White Oil Pipeline has reduced the movement of ~4,000 trucks operating out of Keamari to Mahmoodkot and back.

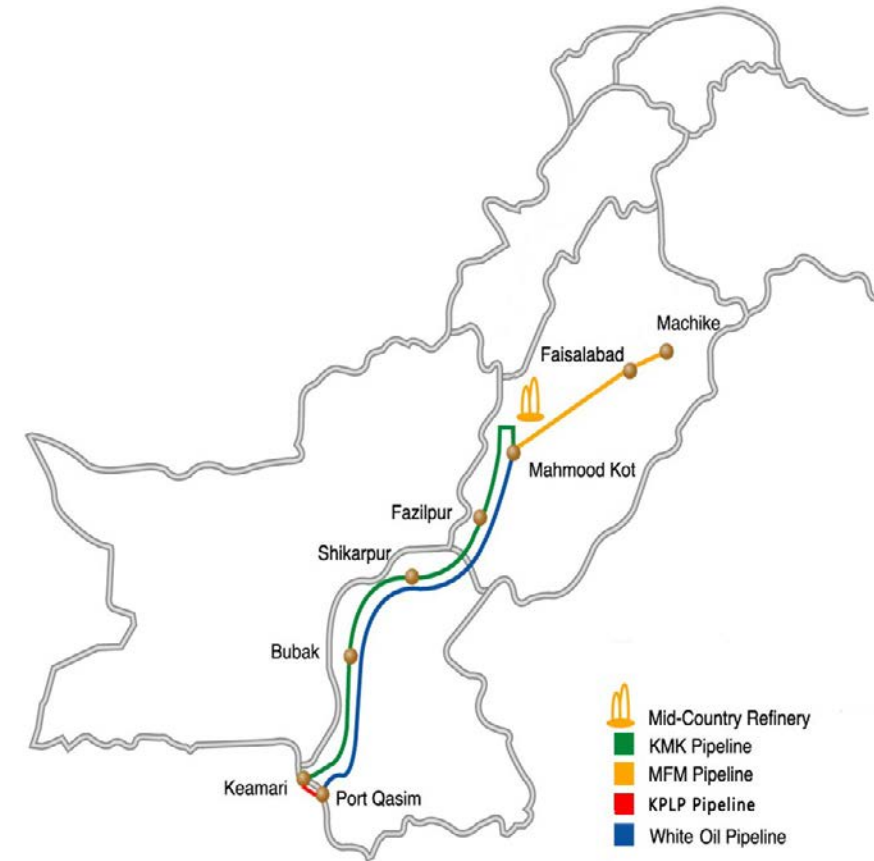
Particulars	FY19	FY20	FY21*
Gross Revenue (PKR mln)	6,303	6,709	6,104
Major Oil Pipelines	4	4	4
Structure	Regulated & Unlisted		
Oil Movement (Pipeline)*	18%	19%	29%
Regulator	Oil & Gas Regulatory Authority		
Association	Oil Companies Advisory Council		
Key Industry Players	PARCO & PAPCO		
Product	Crude Oil, High Speed Diesel and Motor Gasoline		

*Note: Calculations are based on PAPCO numbers having market share of more than ~50%. This report only includes oil pipelines. Gas pipelines are covered in PACRA Gas distribution report.*

# Pipeline Network

## Pakistan | Pipeline Network

Pipeline	Year Commisioned	Operated by	Length (km)	Route	Oil Type
Karachi-Mahmoodkot (KMK)	1981	PARCO	870	Keamari, Bubak, Shikarpur, Fazilpur, Mahmoodkot	Crude Oil
Mahmoodkot-Faisalabad-Machhike (MFM)	1997	PARCO	362	Mahmoodkot, Faisalabad, Machhike	HSD
White Oil Pipeline (WOP)	2005	PAPCO	786	Port Qasim, Shikarpur, Mahmoodkot	HSD, MOGAS
Korangi-Port Qasim link	2006	PARCO	22	Port Qasim, Keamari	Multi Purpose





# Pipeline Network

## Upgradation & Expansion

- Considering increasing demand of oil products and substantial cost benefit of transporting oil products through pipeline, local companies are upgrading their existing pipeline network.
- Recently, PAPCO has completed the upgradation of its White Oil Pipeline (WOP). The upgradation has enabled the pipeline to transport both MOGAS and HSD. Previously it was only capable of transporting HSD. More upgradation and expansion are as follows:
- **Expansion of Pipeline Network by PAPCO:** PAPCO is expanding its pipeline network from Machhike (Sheikhupura) to TaruJabba (Peshawar). The pipeline is expected to be dual purposed (MOGAS and HSD) and the contract for construction has already been initiated. It is expected to be completed in FY23. The ~427km long pipeline is divided into three section, aimed at ensuring a smooth supply chain of petroleum products from Karachi to Peshawar.
  - Machhike-Chak Pirana (~135km)
  - Chak Pirana-Rawat (~117km)
  - Rawat-TaruJabba (~175km)
- **Upgradation of MFM pipelines:** MFM pipeline is also being upgraded for dual transportation of HSD and MOGAS. Physical works have been completed and commencing of the project is expected as soon as tariff is determined by OGRA. The total cost of upgrading WOP and MFM pipeline stood at USD~194mln.
- These upgrades will reduce traffic congestion, environmental pollution and transportation cost. However, onward distribution from OMCs' oil depots to petrol pumps would remain intact through tankers.

# Pipeline Network

## Pricing

- Tariff for transporting petroleum products through pipelines is determined by Oil and Gas Regulatory Authority (OGRA). The current tariff for KMK and MFM pipelines is linked with railways tariff and was last notified by the Federal Government effective from Apr-2000 and May-2002, respectively. The tariff rates for White Oil Pipeline were determined by OGRA for the next ~25 years from start of commercial operations with intervals of 5 years each.
- The tariff for transportation of HSD through MFM was approved in 1994 by the Cabinet Committee on Energy (CCOE) in line with the basis of ~85% of the prevalent railway tariff, as provided in the Memorandum of understanding (MoU) between the two Governments, Pakistan and Abu Dhabi.
- Current railway tariff for Mahmoodkot-Faisalabad is PKR~2,155 per ton and Mahmoodkot-Machhike is PKR~2,620 per ton.

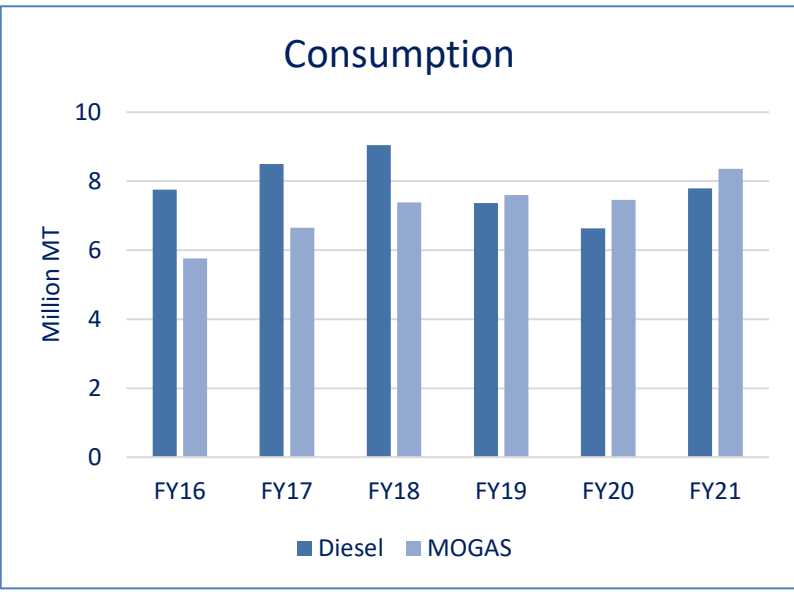
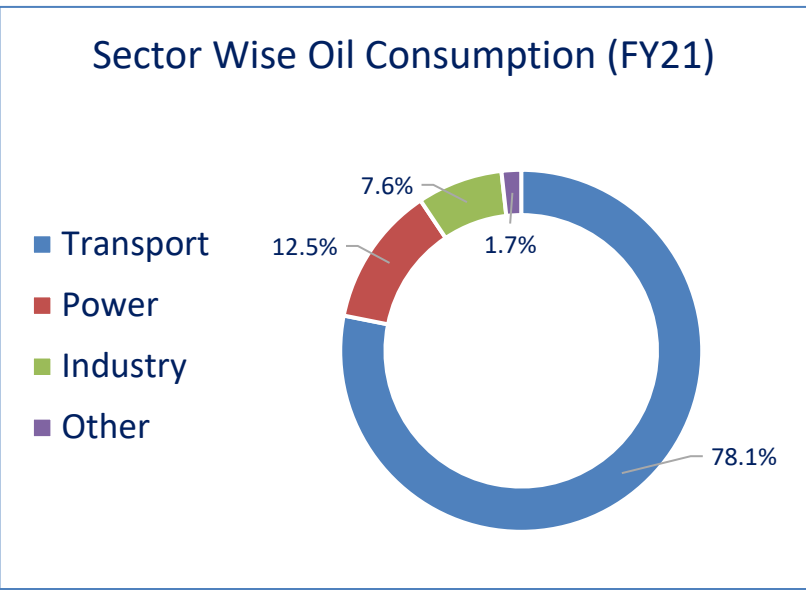
White Oil Pipeline Tariff Structure		
High Speed Diesel	Karachi-Mahmoodkot	Karachi-Shikarpur
	\$US/Ton	\$US/Ton
1st Five years	15.889	10.068
2nd Five years	15.342	9.770
3rd Five years	13.252	8.476
4th Five years	10.416	6.884
5th Five years	9.670	6.387

White Oil Pipeline Tariff Structure	
Motor Gasoline	\$US/Ton
Karachi-Mahmoodkot	11.27
Karachi-Shikarpur	6.43

# Pipeline Network

## Demand

- The demand for Petroleum products is highly correlated with the economic activity in the country. With the uptick in economic activity, Large scale Manufacturing (LSM) Index witnessed positive growth of ~14.9% during FY21 (FY20: (10.2%)). Transportation sector, which makes up ~78% of the total oil consumption in the country has also showed positive growth on the back of decreased COVID-19 restrictions.
- The economy is projected to grow by ~4.2% in FY22 (FY21: 3.9%). Petroleum product consumption has increased significantly in FY21 by ~8.9% . With pipelines being the cheapest form of transportation for oil, the sector is expected to receive surge in demand. Although a major portion of the petroleum products will still be transported via oil containers, but with MOGAS pipeline upgrades, the sector is expected is receive a boost. For FY21, the sector's utilization levels were recorded at above ~50%.

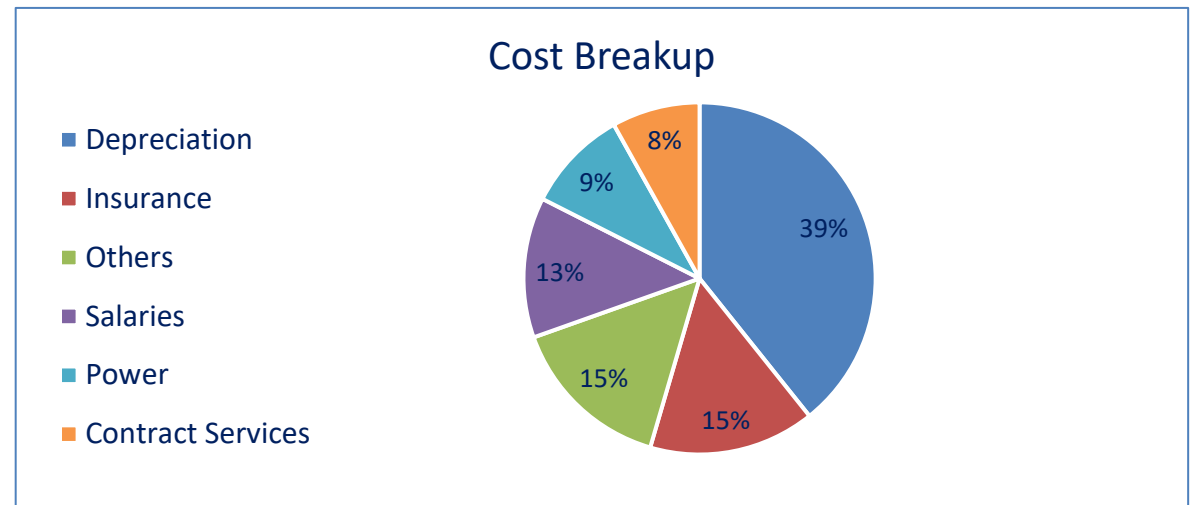
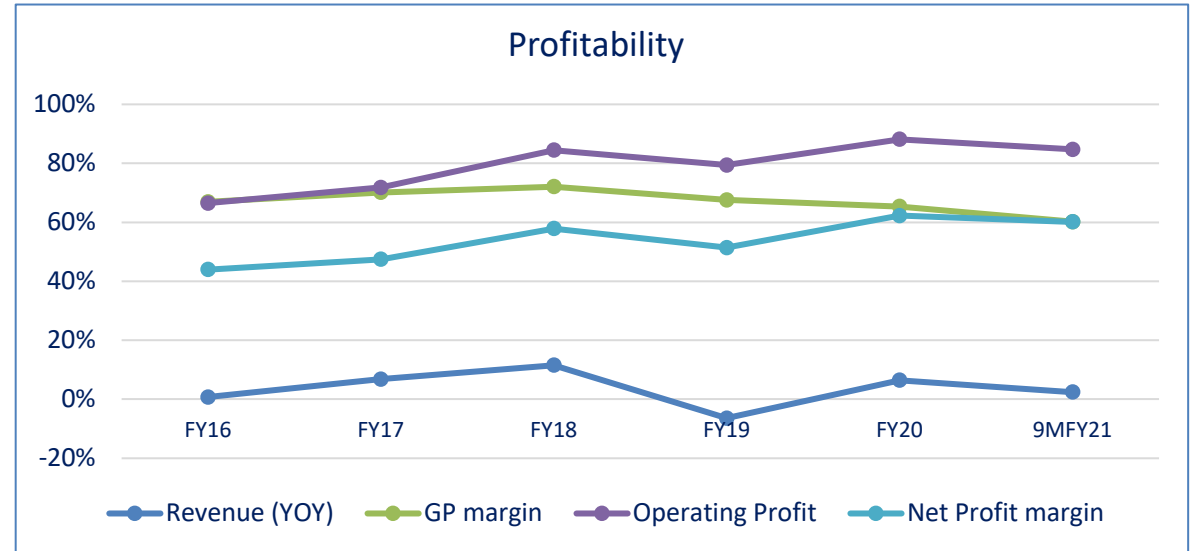




# Pipeline Network

## Business Risk

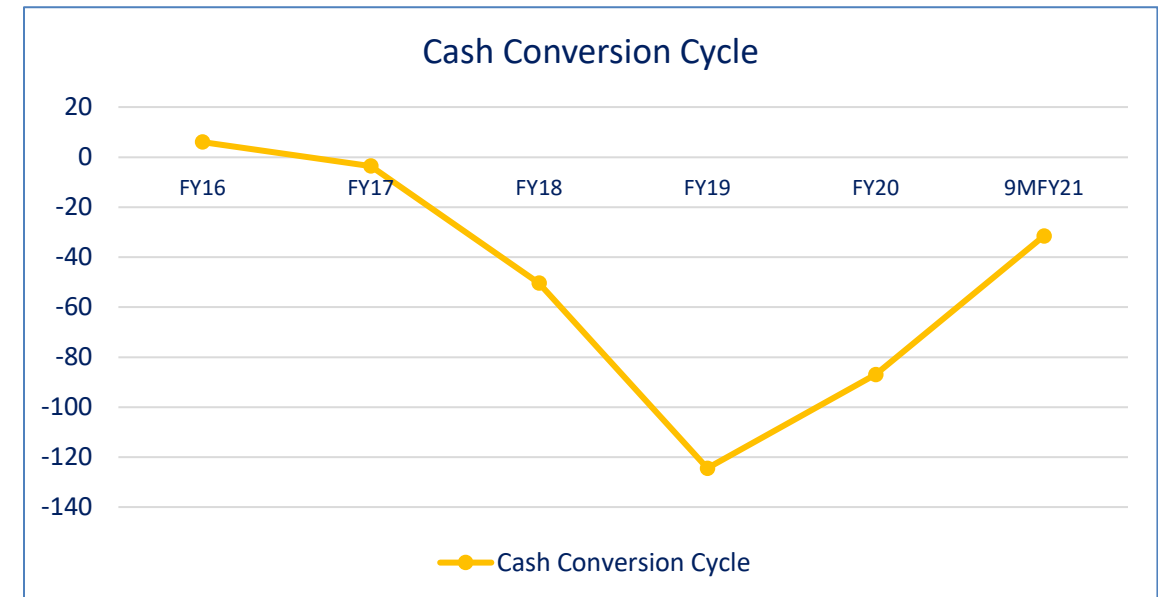
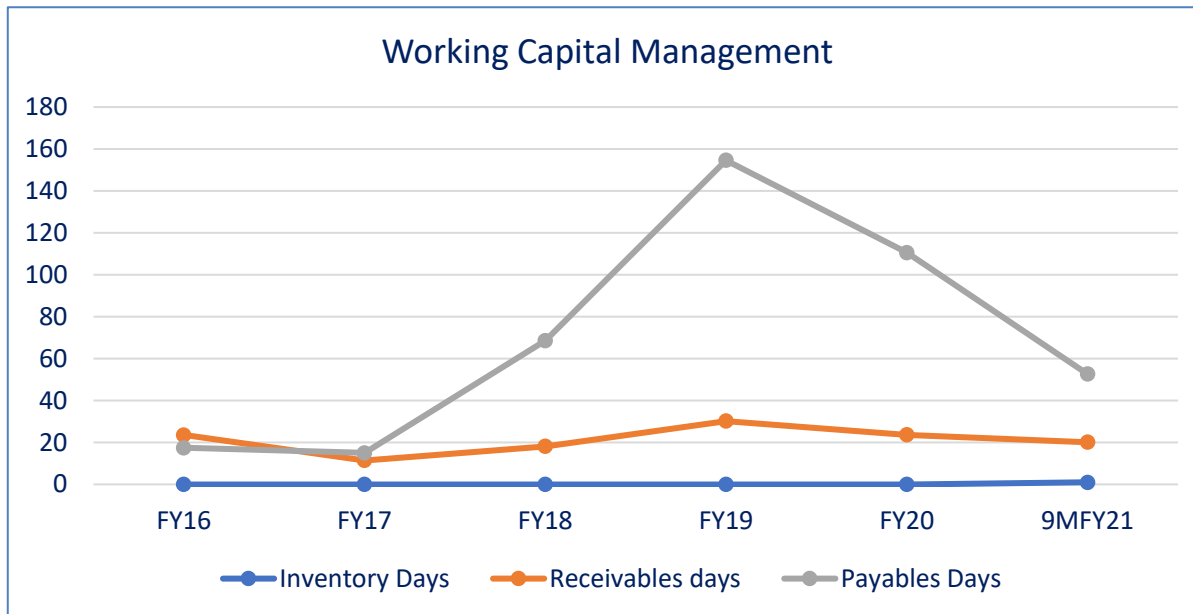
- OGRA regulates and determines the pipeline tariffs. The sector's revenue ceiling is two fold, the fixed tariff, as stated and the quantity of oil transported via pipelines limited by pumping and storage capacity. However, the capacity still remains under utilized. Moreover, the sector's topline is USD linked so it provides a natural hedge against adverse exchange rate movements.
- Depreciation of pipelines and pumping stations remains the highest portion of operational cost and is expected to remain so. Depreciation accounts for ~39% of the total cost while insurance at second place accounts for ~15%.
- Due to fixed nature of revenue (tariff), the effect of revenue is kindred to profit. Revenue growth and margins move analogously. The effect of revenue growth can be seen in gross margin, operating margin and net profit margin likely. Fixed nature of revenue per ton makes this behavior similar across all margins assuming fixed cost structure. Leakages and damage to pipeline are the major risks. However, higher demand for oil pipelines is driving the expansion forward.



# Pipeline Network

## Financial Risk | Working Capital

- The sector's working capital is largely a function of payables and receivables. The sector holds no or minimal inventory, however uses storage facilities at its pumping locations to smoothen the oil flow in the pipelines.
- The sector went through expansion in FY18 for upgrading pipelines for dual transportation of HSD and MOGAS. Payables make up largest portion of the working capital management and witnessed the largest growth after FY17.
- Cash Conversion Cycle stood at negative ~31 days for 9MFY21. Negative working capital days depicts low need of financing for management of routine operations.

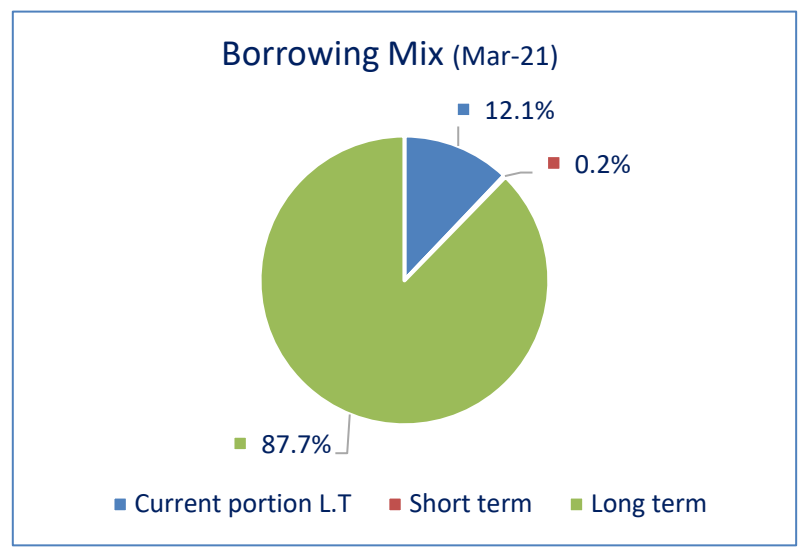
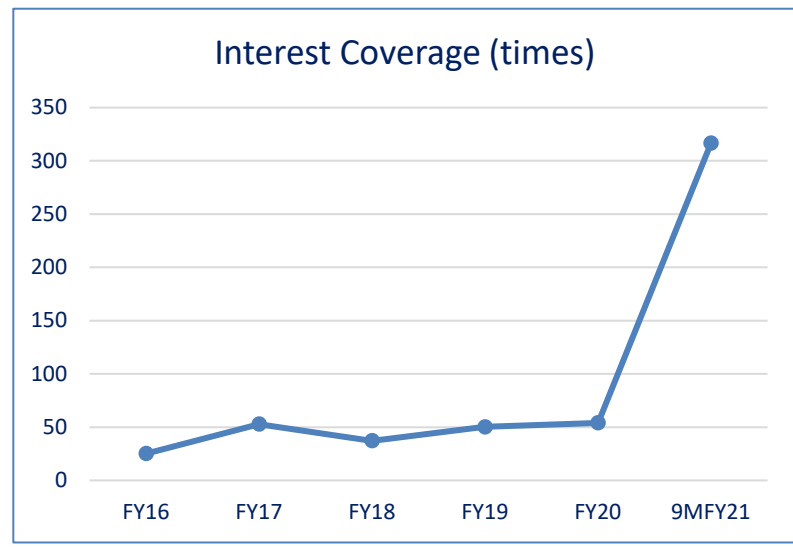
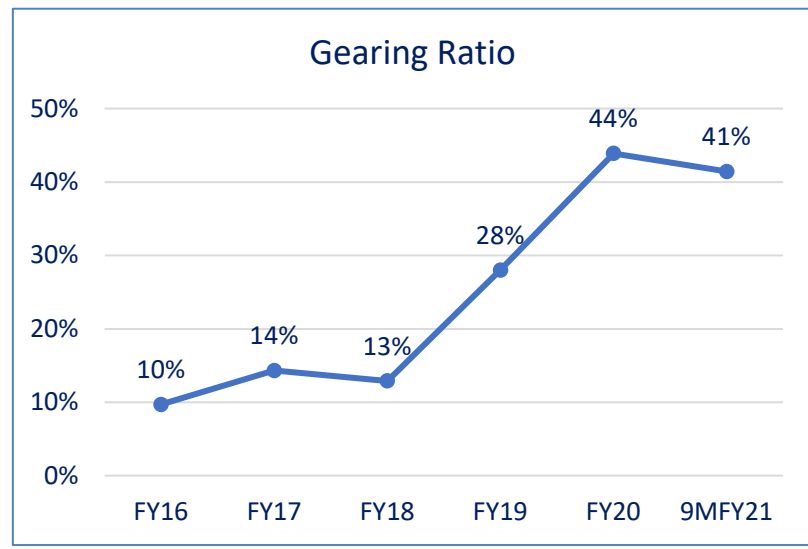


Note: Calculation are based on PAPCO numbers having market share of more than~50%.

# Pipeline Network

## Financial Risk | Borrowing

- Total debt of the sector largely comprises long term borrowings (~88%). As the working capital cycle of the sector is cash positive (due to higher payables) the need for short term borrowings only arises to bridge some financing gaps. Long term borrowing are raised to finance expansion and upgradation projects.
- Gearing ratio ranged between ~10%~13% from FY16 to FY18. Borrowing increased on the back of higher debt for expansion and upgradation of the pipeline network. As of 9MFY21, gearing ratio stood at ~41% and is expected to increase further as expansion of pipeline network to TaruJabba (Peshawar) is planned in the coming years. Interest rate coverage fluctuated between ~37 to ~54 between FY17 and FY20. The sector's gearing and financial risk is moderate.
- Considering low gearing and high interest coverage the financial risk of the sector is considered low.



Note: Calculation are based on PAPCO numbers having market share of more than~50%.





# Pipeline Network

## Taxes

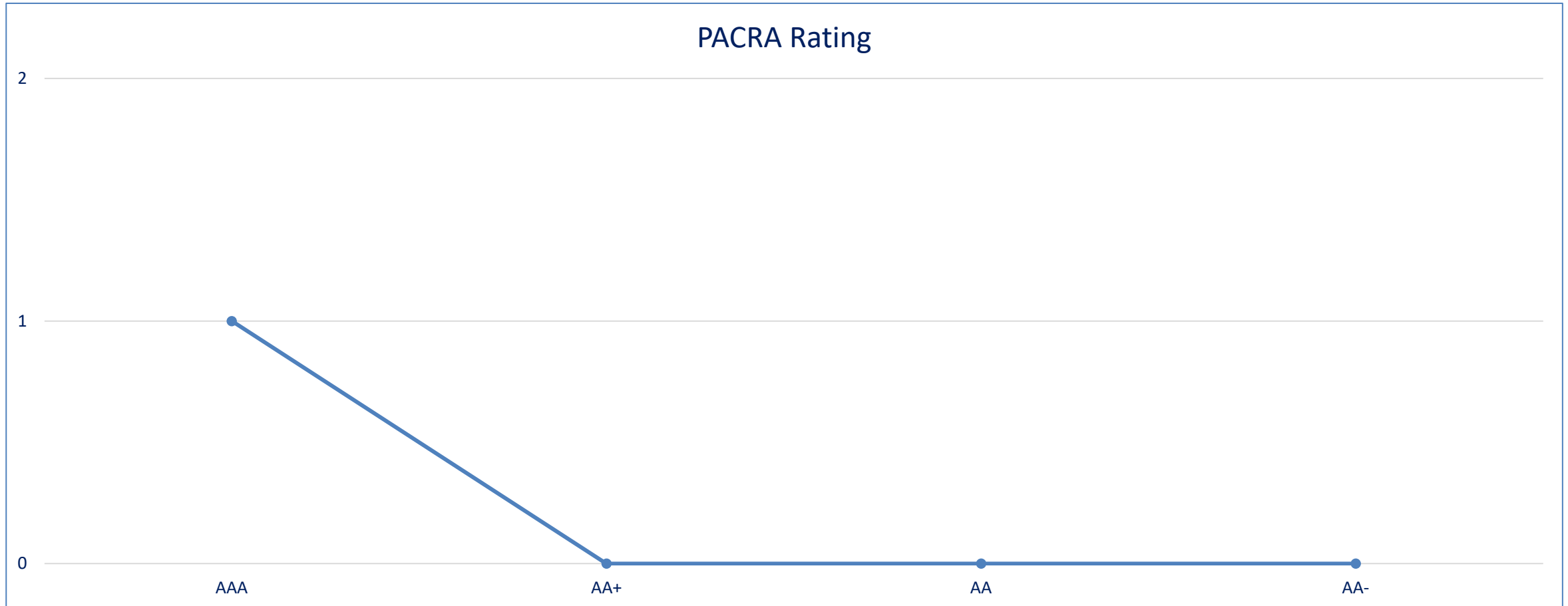
- Sales Tax applicable on the pipeline sector is ~16%. No change was observed in sales tax for FY21.
- Withholding Tax is applicable on the rate of 3%. No change was observed in FY21

Category	FY22	FY21
Sales Tax	16%	16%
Withholding Tax	3%	3%



## Rating Curve

- PACRA rates one player in the sector.





# Pipeline Network

## Porters 5 Forces Model

### POTENTIAL NEW ENTRY



- Very low due to capital intensive nature of the sector and stringent regulatory approvals required.

### BUYERS



- Low bargaining power.
- Fixed tariff determination by OGRA role out any negotiations
- Non-availability of alternative pipeline on same routes.

### SUBSTITUTES

- Main Substitutes are oil tankers.
- Currently, Oil tanker has major share in oil transportation.

### SUPPLIERS



- Medium Power
- Non utilization of full production capacity

### COMPETITIVE RIVALRY



- Very low
- There are not many players in the sector.



# Pipeline Network

## SWOT Analysis

- Few players in the industry
- Growing Demand for pipeline due to cost effectiveness
- No inventory management
- No environmental impact or road accidents
- Unaffected by oil prices
- Tariff based in US dollar (Exchange rate exposure)

- Capital Intensive
- Tariff controlled by OGRA
- High Maintenance and depreciation
- Longer regulatory approval process



- Natural Disasters
- Pipeline Leakages or damage inflicted
- Abolishment of fix tariff regime or conversion to PKR based return

- Pipeline network is extendable
- Growing opportunity for MOGAS transportation
- Pipelines can be upgraded for dual purposes (MOGAS and HSD)
- Increasing demand for petroleum products in the country

# Pipeline Network

## Outlook - Stable

- Pipeline is considered as a cheap and environment friendly mode of oil product movement. This mode of transportation does not only provide efficiency to goods transport within the country but is also used for cross borders movement of oil and gas. It is a strategically important sector considering its importance in the country's energy system.
- Currently, the portion of oil products movement through pipeline is low, as the pipeline accounts for only ~29% of the total oil products moved within the country. However, the long term prospects of the sector are positive, considering its safety and environment friendly nature, in contrast to movement of oil and hazardous liquids through oil tankers. The sector's system share is also expected to improve with the upgradation of existing pipelines and further expansion of pipeline networks.
- PAPCO, the sole commercial operator of White Oil Pipeline, has lately completed its upgradation and commenced the movement of both MOGAS and HSD through its White oil pipeline during FY21. Further, expansion which is expected to come online by 2023 will connect Karachi ports with Peshawar and will play a critical role in improvement of the overall energy system of the country to the upper parts of the country as well.
- Fixed tariffs and USD indexation keeps the sector's revenue volatility risk low. A natural hedge against exchange rate fluctuations and negligible price sensitivity foster the sector's margins to a great extent. Volumes remain the key driving factor for growth.
- Almost all debt of the sector is long term in nature and short term borrowing is very low. Considering nature of borrowing and strong interest cover, the financial risk of the sector is reasonably very low.



# Pipeline Network

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<b>Research Analyst</b>	<b>Saniya Tauseef</b> <b>Assistant Manager</b> <i>saniya.tauseef@pacra.com</i>	<b>Muhammad Nadeem Sheikh</b> <b>CFA, ACCA</b> <b>Supervising Senior</b> <i>nadeem.sheikh@pacra.com</i>
<b>Contact Number: +92 42 35869504</b>		

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