The background of the slide is a photograph of an industrial refinery. It features several tall, cylindrical distillation columns and a complex network of pipes and metal structures. The scene is captured during the "golden hour" of sunset or sunrise, with a warm, orange glow illuminating the facility. The sky is a pale blue with some light clouds.

REFINERIES

Sector Overview

Nov'19

GLOBAL

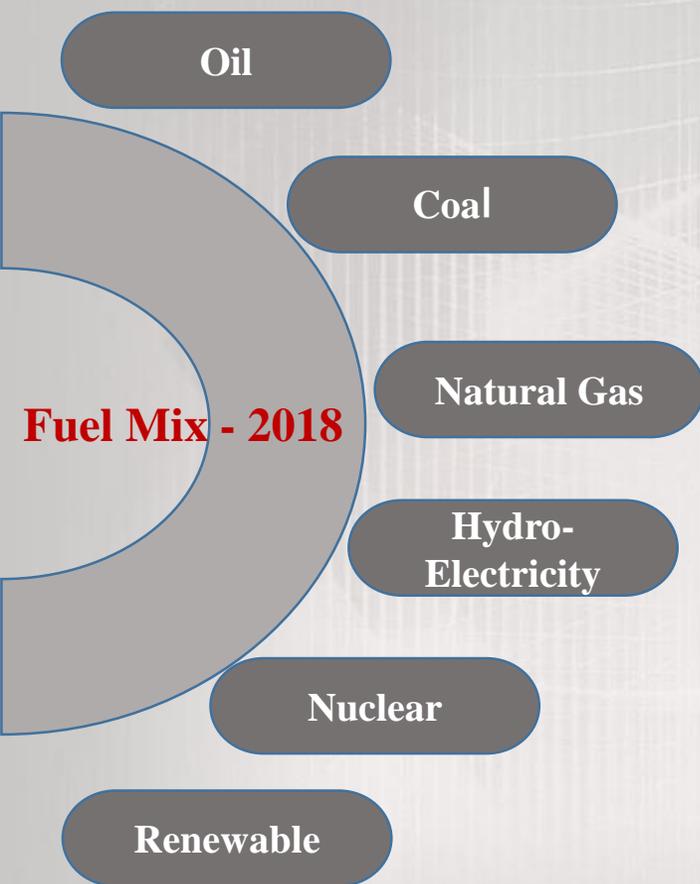
- **Energy Mix**
- **Country Wise Production & Consumption Trend**
- **World Oil Trade – 2018 and 2017**
- **Oil and POL Monthly Prices (FY19)**

PAKISTAN

- **Energy Mix**
- **Petroleum Demand**
- **Product Wise Demand Trend**
- **Share of Local and Import | POL Products Demand**
- **Sectoral Consumption**
- **POL Supply Side**
- **Refineries Market Share | Total and Product Wise**
- **Refineries Product Mix**
- **Refineries Capacities**
- **Outlook**
- **Key Challenges and Opportunities**



ENERGY MIX



Year	Total World Fuel Demand (mln MTs Oil Equivalent)	% Share Fuel Wise					
		Oil	Coal	Natural Gas	Hydro-Electricity	Nuclear Energy	Renewable Energy
2015	13,105	33%	29%	24%	7%	4%	3%
2016	13,276	33%	28%	24%	7%	4%	3%
2017	13,475	34%	28%	23%	7%	4%	4%
2018	13,865	34%	27%	24%	7%	4%	4%



- We are a fossil fuel dependent globe; with oil, coal and natural gas contributing ~85% to the total world demand (2018).
- World fuel demand grows at an annual average rate of ~2%.
- Oil holds the largest share in global fuel demand representing a share of ~4.3bln MTs consumption in 2018.
- Renewable Energy share has grown up slightly from 3% to sustained ~4% in 2017 and 2018.

Oil Production & Consumption | Country Wise Trend

Oil Production Major Countries	2015	2016	2017	2018
	Total World Production Mln MTs			
	4,355	4,377	4,380	4,474
US	13%	12%	13%	15%
Saudi Arabia	13%	13%	13%	13%
Russian Federation	12%	13%	13%	13%
Canada	5%	5%	5%	6%
Iraq	4%	5%	5%	5%
Iran	4%	5%	5%	5%
Others	48%	46%	46%	44%
Total	100%	100%	100%	100%

Oil Consumption Major Countries	2015	2016	2017	2018
	Total World Consumption Mln MTs			
	4,476	4,557	4,607	4,662
US	20%	20%	20%	20%
China	13%	13%	13%	14%
India	4%	5%	5%	5%
Japan	4%	4%	4%	4%
Saudi Arabia	4%	4%	4%	3%
Russian Federation	3%	3%	3%	3%
Canada	2%	2%	2%	2%
Pakistan	1%	1%	1%	1%
Others	48%	48%	48%	48%
Total	100%	100%	100%	100%

- Global Oil Production and consumption grew by ~2% and ~1% respectively in 2018.
- USA tops on the world production and consumption of oil. It also gained ~2% share in world production in 2018.
- 3 OPEC and 3 Non-OPEC countries make up ~54% of the world production.
- US and China are the largest consumers of oil followed by India.
- Country wise Shares in World Production and Consumption have remained largely stable since 2015.

*Oil includes crude oil, shale oil, oil sands, condensates (both lease condensate and gas plant condensate) and NGLs (natural gas liquids – ethane, LPG and naphtha separated from the production of natural gas). Excludes liquid fuels such as biomass and derivatives of coal and natural gas.

Source: BP Statistical Review of World Energy 2019

World Oil Trade

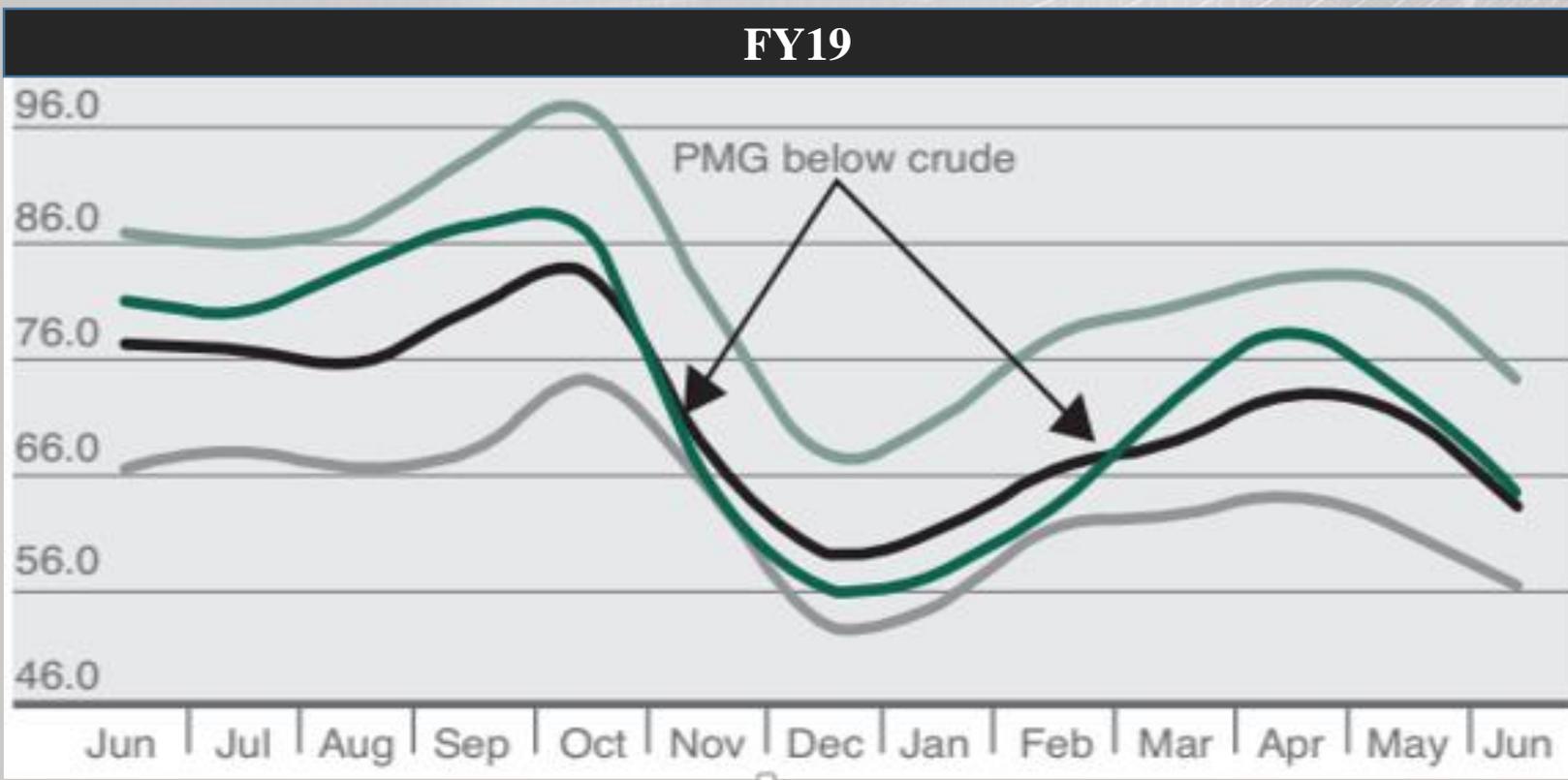
Region/Country Wise Exports	2018			
	Crude	Product*	Total	% in Total
World Exports (Mln tonnes)	2,263	1,239	3,502	
Saudi Arabia	16%	5%	424	12%
Kuwait	5%	2%	127	4%
Iraq	9%	1%	209	6%
UAE	6%	6%	202	6%
Other Middle East	8%	5%	256	7%
Canada	8%	3%	224	6%
West Africa	10%	1%	227	6%
Russia	12%	14%	449	13%
Europe	1%	11%	165	5%
S. & Cent. America	7%	2%	185	5%
North America	4%	20%	345	10%
Rest of the World	14%	31%	688	20%
TOTAL	100%	100%	3,502	100%

Region/Country Wise Imports	2018			
	Crude	Product*	Total	% in Total
World Imports (Mln tonnes)	2,263	1,239	3,502	
Europe	26%	18%	816	23%
North America	17%	8%	490	14%
S. & Centr. America	1%	9%	134	4%
China	21%	7%	546	16%
India	10%	3%	259	7%
Japan	7%	4%	195	6%
Singapore	2%	9%	168	5%
Rest of the World	16%	43%	895	26%
TOTAL	100%	100%	3,502	100%

Region/Country Wise Exports	2017			
	Crude	Product*	Total	% in Total
World Exports (Mln tonnes)	2,196	1,222	3,417	
Saudi Arabia	16%	5%	413	12%
Kuwait	5%	2%	130	4%
Iraq	9%	0%	193	6%
UAE	6%	6%	201	6%
Other Middle East	10%	5%	276	8%
Canada	8%	3%	210	6%
West Africa	10%	1%	228	7%
Russia	12%	14%	440	13%
Europe	1%	11%	163	5%
S. & Cent. America	8%	2%	198	6%
North America	2%	19%	282	8%
Rest of the World	13%	32%	685	20%
TOTAL	100%	100%	3,417	100%

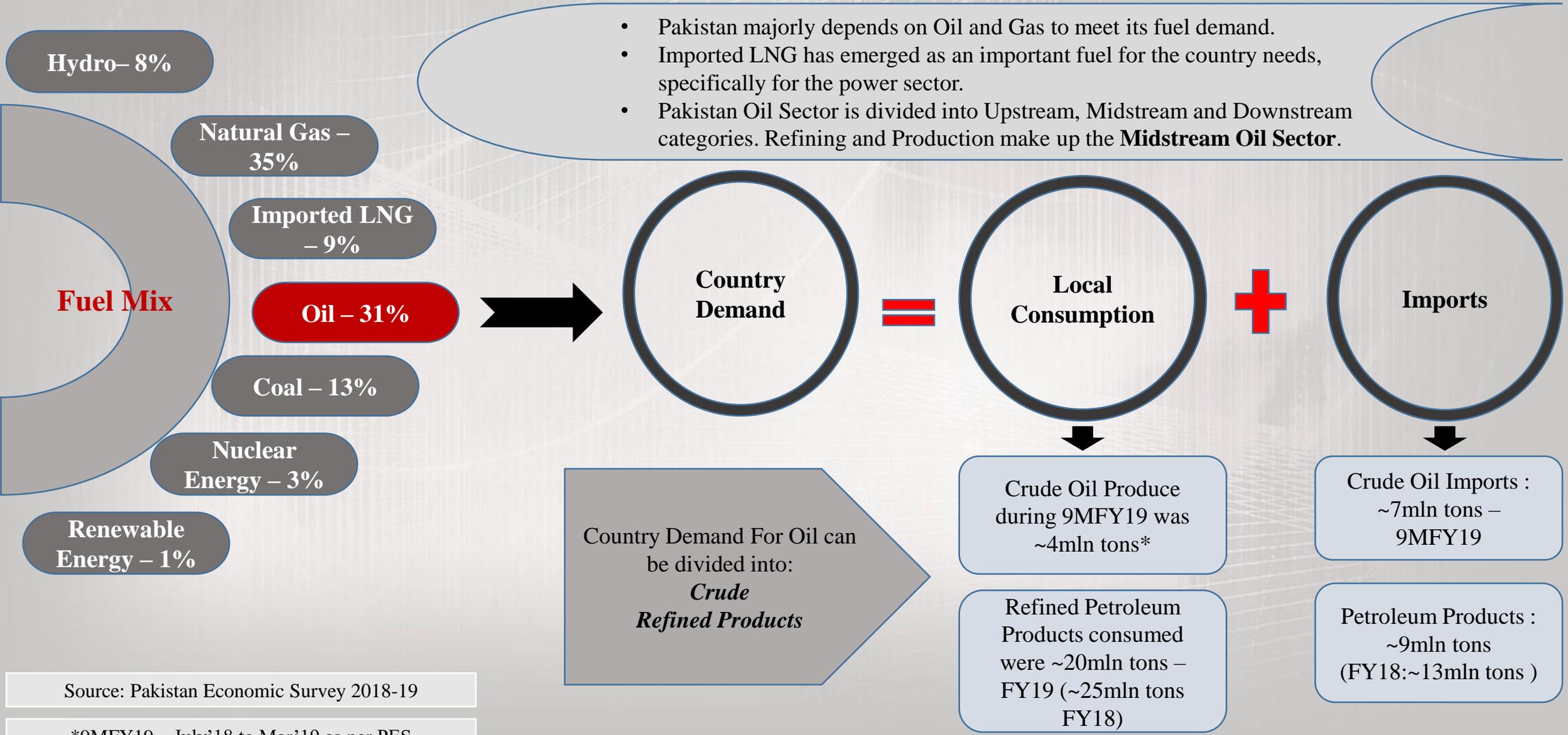
Region/Country Wise Imports	2017			
	Crude	Product*	Total	% in Total
World Imports (Mln tonnes)	2,196	1,222	3,417	
Europe	23%	17%	724	21%
North America	18%	9%	501	15%
S. & Centr. America	1%	8%	127	4%
China	19%	7%	507	15%
India	10%	3%	245	7%
Japan	7%	3%	205	6%
Singapore	2%	11%	187	5%
Rest of the World	19%	42%	923	27%
TOTAL	100%	100%	3,417	100%

Crude Oil and POL Prices – USD/bbl



- International Crude and POL Prices remained Volatile during FY19 with crude price surging to US\$80.9/bbl in Oct'18 and plunging down to US\$58.9/bbl in Dec'18.
- From the Period Nov'18 to Feb'19, PMG/MOGAS traded below crude price, negatively impacting the Refinery Margins. The reason is majorly attributed to seasonal winter slowdown in gasoline consumption as well as substantial product oversupply in Asia.
- In 3QFY19 product prices partially recovered in response to improving product market fundamentals; additionally, unplanned refinery outages in US also led to cut in US product output benefitting the price.
- In 4QFY19, product prices again reversed the rising trend as refineries output grew particularly in US, Europe and China.

ENERGY MIX



- Pakistan majorly depends on Oil and Gas to meet its fuel demand.
- Imported LNG has emerged as an important fuel for the country needs, specifically for the power sector.
- Pakistan Oil Sector is divided into Upstream, Midstream and Downstream categories. Refining and Production make up the **Midstream Oil Sector**.

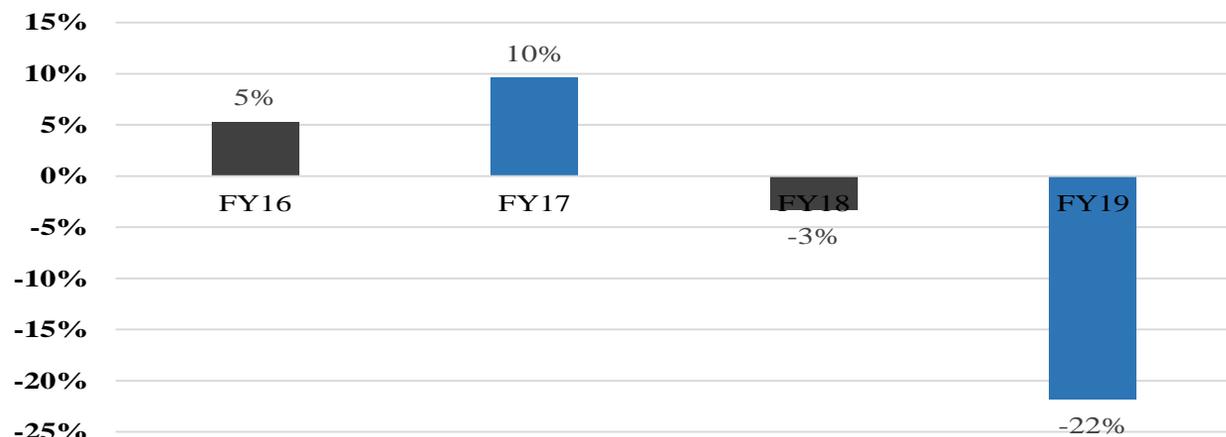
Source: Pakistan Economic Survey 2018-19

*9MFY19 – July'18 to Mar'19 as per PES

Total Consumption | Petroleum Products

Country Demand/Consumption (mln tons)	FY16	FY17	FY18	FY19+
	23.59	25.96	25.15	19.66
Met by				
Domestic Sales	8.65	11.06	12.01	10.86
Import Quantity	14.94	14.90	13.14	8.80
	FY16	FY17	FY18	FY19
POL Demand Trend (%)	5%	10%	-3%	-22%

POL | Demand Trend (%)



- Petroleum products are bifurcated into white oil and black oil products.
- MOGAS, HSD and FO are the major contributors to the petroleum usage in the country (~94%).
- Product Wise Consumption is as follows:

Product Wise Consumption | POL (mln MTs)

White oil	FY16	FY17	FY18	FY19
MOGAS	5.76	6.65	7.39	7.60
HSD	7.75	8.49	9.04	7.36
JP1	0.78	0.83	0.93	0.79
JP8	0.14	0.14	0.18	0.19
SKO	0.14	0.12	0.11	0.10
LDO	0.02	0.02	0.02	0.02
Total	14.59	16.25	17.67	16.06
YoY Change	11%	11%	9%	-9%
Black Oil	FY16	FY17	FY18	FY19
FO	9.00	9.60	7.39	3.54
Lubes	0.00	0.11	0.09	0.07
Total	9.00	9.71	7.48	3.60
YoY Change	-3%	8%	-23%	-52%
Total Consumption	23.59	25.96	25.15	19.66

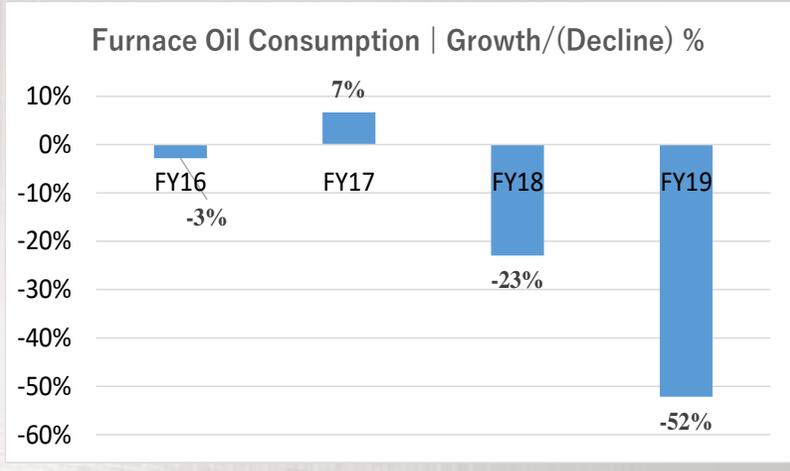
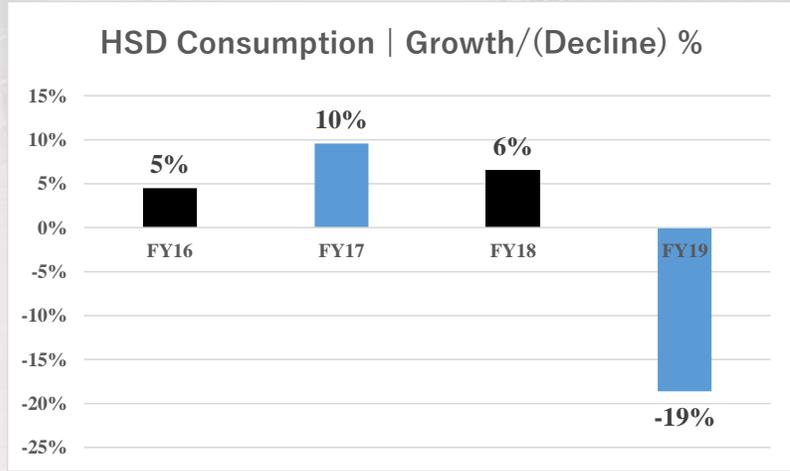
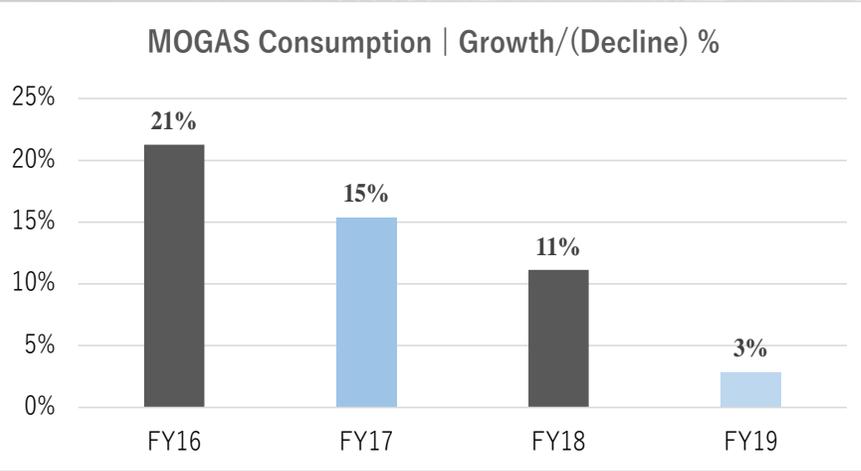
White Oil Trends

Black Oil Trend

MOGAS

High Speed Diesel (HSD)

Furnace Oil

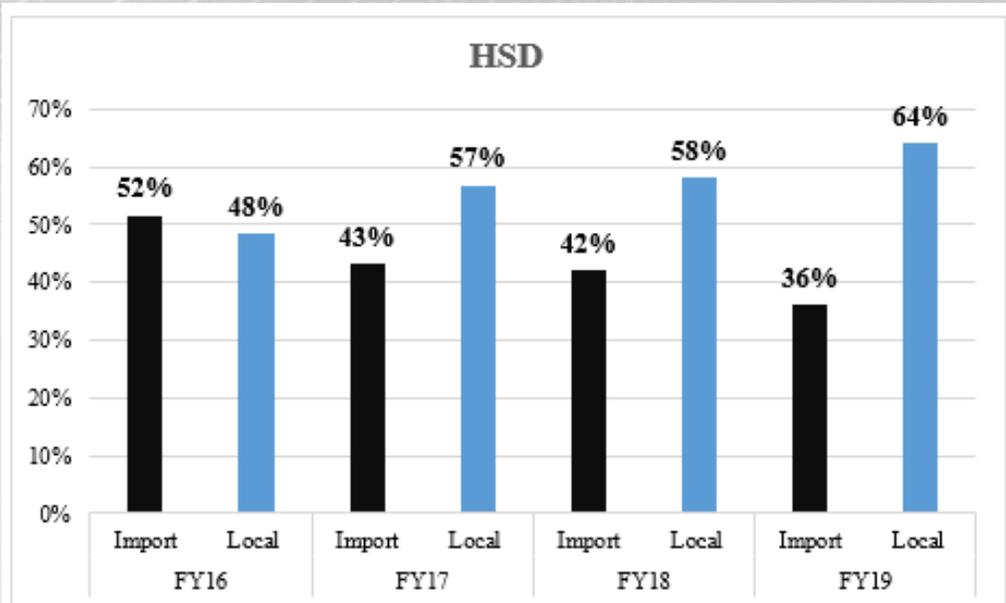
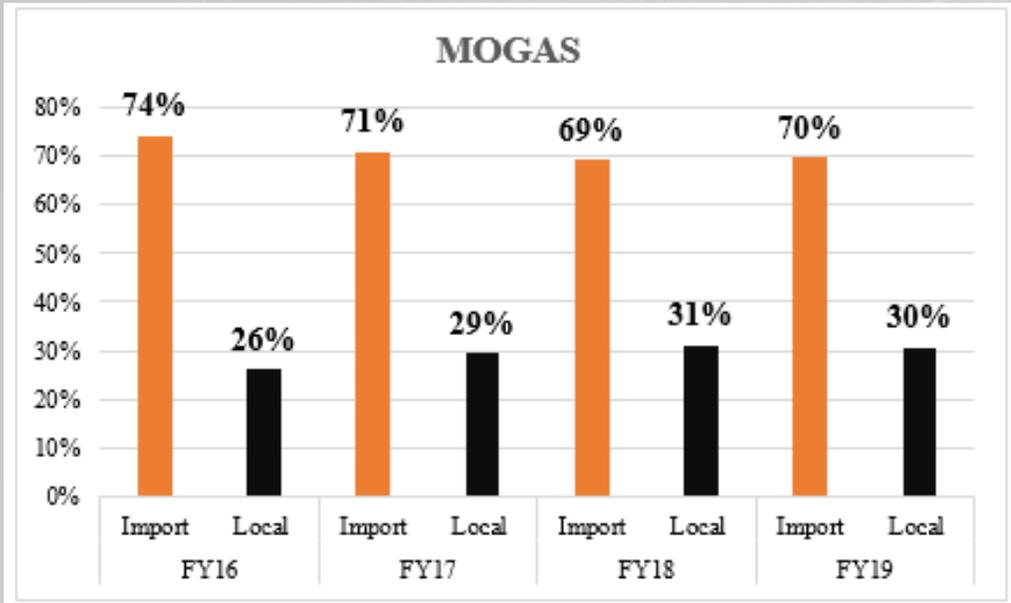


- MOGAS demand in the country is directly related to the transportation sector of the country.
- Growth pattern has historically remained in double digits, touching a high of ~21% in FY16, owing to better motor cars and tractors' offtake.
- Growth, however, plunged to ~3% in FY19 on account of subdued growth in the auto-sector, the lowest growth recorded in last 10 years.

- HSD Demand is correlated to the industrial activity and offtake of heavy commercial vehicles.
- In FY19, as overall industrial activities slowed down, demand for HSD took a significant dip of around ~19%. This accounts for one of the major factors owing to POL demand drop.

- Furnace Oil demand stems from the power sector, unlike MOGAS and HSD.
- Demand for FO is notably declining on account of shift of fuel to imported LNG and coal by the Power Producers. GoP also curtailed the import of FO from time to time which resulted in a significant dip in its offtake.

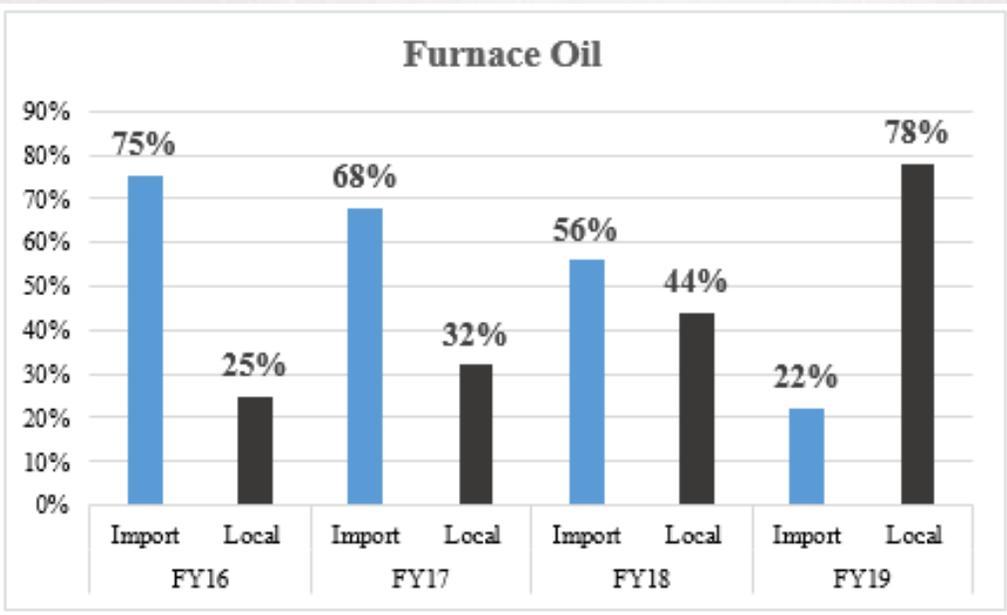
PAKISTAN | POL | Product Wise Import and Local Consumption



HSD Demand is predominantly met through the function of refinery sector in the country catering ~64% to the demand.

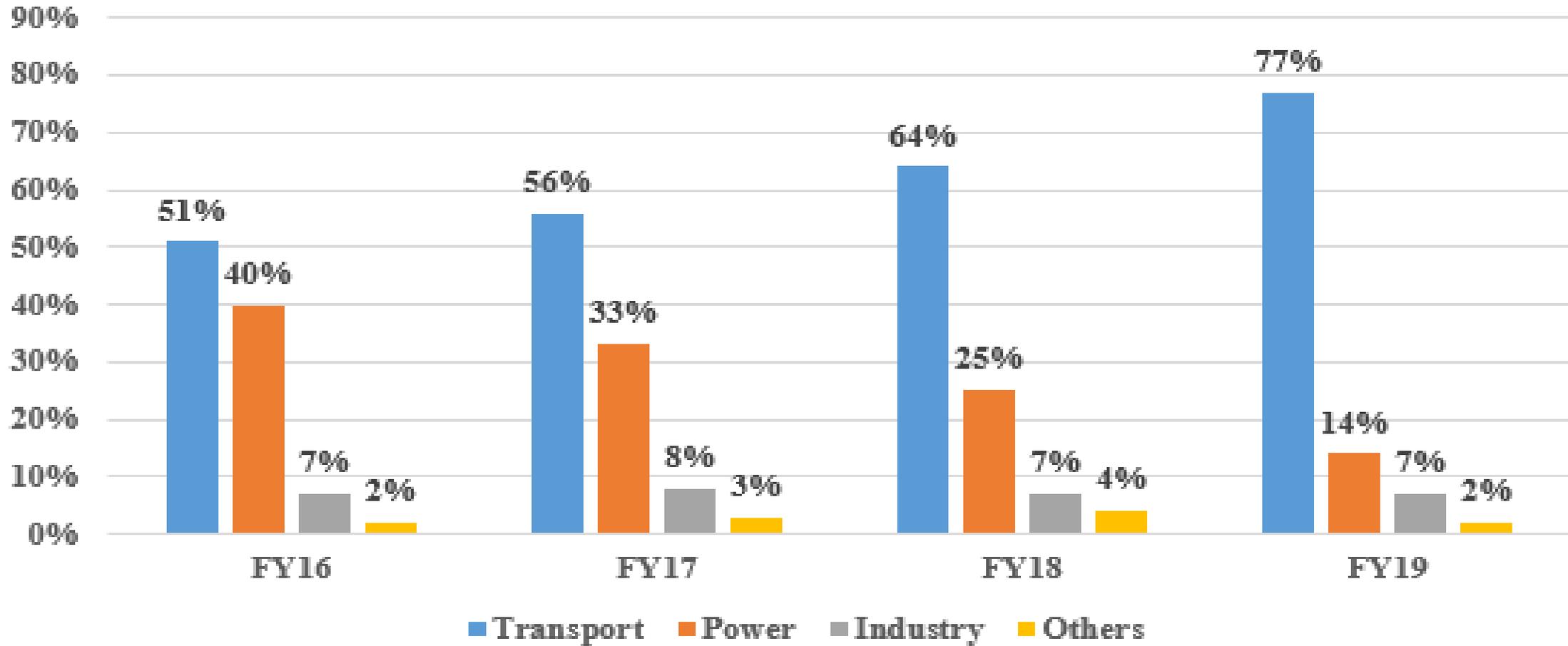


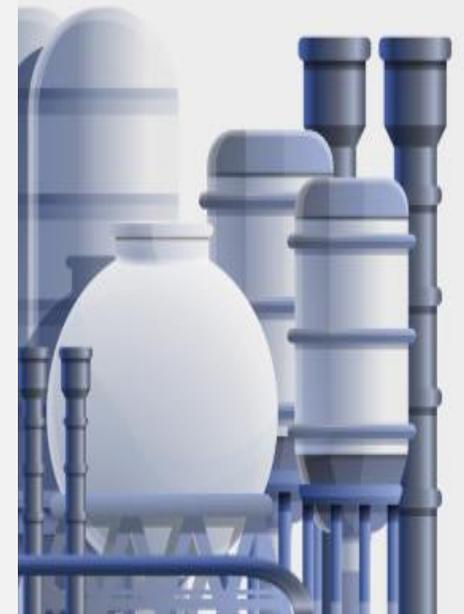
Pakistan Refining Sector contributes only ~30% to the MOGAS consumption of the country (FY19), the rest all demand is imported.



FO demand is witnessing a continual contraction as the power sector is shifting towards other fuels such as LNG and coal. In 3QFY19, however, imports of LNG were kept low to save the country's foreign currency. Thereby, refineries offloaded their piled up FO stocks to cater the power sector demand.

Sectoral Consumption





Crude Oil: Pakistan majorly relies on imports (~64%) to meet its oil demand. Country demand for Crude Oil recorded at ~11mln tons in 9MFY19, of which ~4mln tons were locally produced (**Upstream Oil Sector**) and ~7mln tons was imported.

Petroleum Products: Pakistan's demand for refined petroleum products clocked in at ~19.7mln tons for FY19, of which ~11mln tons was locally refined and the remaining requirement was imported.

Locally, refined products are produced by the following refineries in the country:

- Byco Petroleum
- Pak-Arab (PAPCO)
- National Refinery
- Attock Refinery
- Pakistan Refinery

Byco

- Incorporated in 1995
- Shareholders – Byco Busient Incorporated (BBI) (60%)
Abraaj Mauritius Oil & Gas (40%)

PARCO

- Incorporated in 1974
- Shareholders Government of Pakistan (60%)
Emirates of Abu Dhabi (40%)

National Refinery

- Incorporated in - 1963
- Shareholders – Attock Group(51%)
Attock Refinery Limited (25%)
Pakistan Oilfields Limited (25%)
Attock Petroleum Limited (1%)

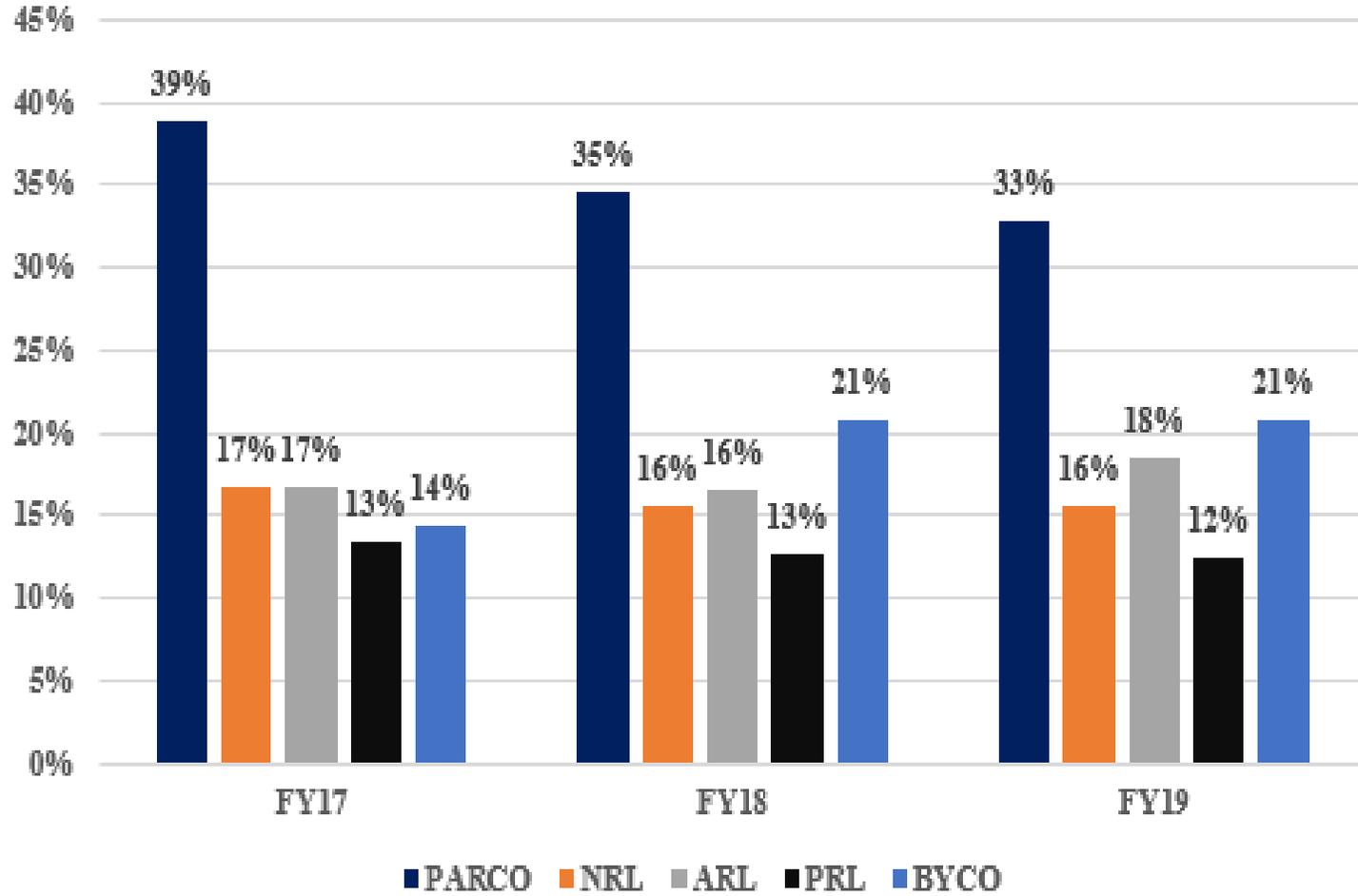
Attock

- Incorporated in 1978
- Shareholders - Attock Group (63%)
Attock Oil Company (61%)
Attock Petroleum Ltd. (2%)

Pakistan Refinery

- Incorporated in May 1960
- Shareholders - Pakistan State Oil (53%)

Market Share | Sales Volume



- Among the 5 refineries, PARCO holds the highest market share of ~33% (FY19). The trend, however, shows that PARCO's share in the market is declining which has dropped from ~39% in FY17 to ~33% in FY19.
- BYCO, on the other hand, following enhancement in its production capacities, has escalated from ~14% system share in FY17 to ~21% in FY18 and sustained the same in FY19.
- The other three refineries have largely remained intact with their volumetric shares having +/- 1% variation.

PAKISTAN | POL | Refineries Product Wise Market Share

Refinery	FY19					
	MOGAS		HSD		FO	
	Local Consumption (mln MTs)	%	Local Consumption (mln MTs)	%	Local Consumption (mln MTs)	%
PARCO	0.81	35%	1.57	33%	0.78	28%
NRL	0.23	10%	0.77	16%	0.37	13%
ARL	0.61	26%	0.69	15%	0.46	17%
PRL	0.22	9%	0.58	12%	0.45	16%
BYCO	0.44	19%	1.11	24%	0.69	25%
	2.31	100%	4.71	100%	2.75	100%

Refinery	FY18					
	MOGAS		HSD		FO	
	Local Consumption (mln MTs)	%	Local Consumption (mln MTs)	%	Local Consumption (mln MTs)	%
PARCO	0.89	38%	1.89	36%	0.88	27%
NRL	0.21	9%	0.90	17%	0.44	14%
ARL	0.64	28%	0.69	13%	0.42	13%
PRL	0.23	10%	0.66	13%	0.52	16%
BYCO	0.35	15%	1.11	21%	0.99	30%
	2.32	100%	5.25	100%	3.26	100%

Refinery	FY17					
	MOGAS		HSD		FO	
	Local Consumption (mln MTs)	%	Local Consumption (mln MTs)	%	Local Consumption (mln MTs)	%
PARCO	0.88	44%	1.90	39%	1.02	33%
NRL	0.17	9%	0.89	18%	0.46	15%
ARL	0.46	23%	0.64	13%	0.52	17%
PRL	0.24	12%	0.62	13%	0.50	16%
BYCO	0.24	12%	0.77	16%	0.58	19%
	1.98	100%	4.82	100%	3.08	100%

- MOGAS and HSD Contribute ~39% and ~37% to the Refined Products Consumption in the Country.
- PARCO holds the largest share in MOGAS, HSD and FO sales (35%, 33% and 28% respectively) – FY19. However, the trend displays that Byco is emerging as a strong player and taking up system share of MOGAS from ~12% (FY17) to ~19%(FY19), HSD from 16% (FY17) to ~24% (FY19) and FO from ~19% (FY17) to ~25% (FY19) respectively.

Refinery	FY17			FY18			FY19		
	Designed Capacity	Utilized Capacity	Utilized Capacity (%)	Designed Capacity	Utilized Capacity	Utilized Capacity (%)	Designed Capacity	Utilized Capacity	Utilized Capacity (%)
	mln tons			mln tons			mln tons		
Byco Petroleum	7.30	1.20	16%	8.08	3.02	37%	8.08	2.63	33%
Pak-Arab Refinery	4.50	4.70	105%	4.50	4.62	103%	4.50	3.95	88%
National Refinery	3.07	2.54	83%	3.07	2.60	85%	3.07	2.36	77%
Attock Refinery	2.67	2.44	92%	2.67	2.51	94%	2.67	2.50	93%
Pakistan Refinery	2.13	1.69	79%	2.13	1.69	79%	2.13	1.63	76%

- In terms of production capacity, Byco claims the highest share in the industry with a design capacity of 155,000 barrels per day.
- FY19 has been a relatively tough year for the petroleum sector, particularly refineries, due to multiple factors including currency devaluation and slower offtake of petroleum products. Refineries, therefore, kept their productions at optimum level.

PARCO			
	FY17	FY18	FY19
MOGAS	21%	21%	23%
HSD	44%	46%	44%
FO	24%	21%	22%
Others	11%	12%	11%
	100%	100%	100%

NRL			
	FY17	FY18	FY19
MOGAS	9%	11%	14%
HSD	48%	48%	45%
FO	25%	24%	22%
Others	18%	17%	19%
	100%	100%	100%

ARL			
	FY17	FY18	FY19
MOGAS	25%	32%	31%
HSD	35%	35%	34%
FO	28%	21%	23%
Others	12%	11%	12%
	100%	100%	100%

PRL			
	FY17	FY18	FY19
MOGAS	16%	15%	16%
HSD	42%	44%	43%
FO	34%	34%	33%
Others	8%	7%	8%
	100%	100%	100%

BYCO			
	FY17	FY18	FY19
MOGAS	15%	14%	20%
HSD	49%	44%	49%
FO	36%	40%	30%
Others	0%	2%	1%

- National Refinery has 2 Lube Refineries too, therefore its mix in the sale volumes of other products is high, which majorly includes Asphalt (Bitumen).

- Except PARCO, all refineries are listed on the Pakistan Stock Exchange.

PARCO Amounts in mln'					
(PKR mln)	FY17	FY18	FY19	Sep-19	Trendline
Revenue	225,792	274,933	316,949	87,558	
Net Income	19,063	18,517	12,335	1,770	
Gross Margin	12.0%	8.6%	4%	3.7%	
Short-Term Borrowings	-	-	8,239	-	
Long-Term Borrowings	1,048	607	-	-	
Equity	78,421	96,477	95,436	97,205	
Rating	AAA/A1+				

NRL Amounts in mln'					
(PKR mln)	FY17	FY18	FY19	Sep-19	Trendline
Revenue	107,447	136,985	160,906	39,268	
Net Income	8,046	1,771	(8,692)	(679)	
Gross Margin	9.1%	2.8%	(2.8)%	(0.5)%	
Short-Term Borrowings	-	1,340	25,008	17,501	
Long-Term Borrowings	766	89	-	171	
Equity	43,339	43,252	33,873	33,195	
Rating	AA+/A1+				

ARL Amounts in mln'					
(PKR mln)	FY17	FY18	FY19	Sep-19	
Revenue	101,412	129,597	176,755	36,173	
Net Income	5,414	579	(5,385)	369	
Gross Margin	4.3%	(0.8)%	(2.3)%	(0.7)%	
Short-Term Borrowings	-	12,643	7,981	7,436	
Long-Term Borrowings	19,872	2,200	2,200	2,200	
Equity	39,381	39,318	33,658	34,028	
Rating	AA/A1+				

PRL Amounts in mln'					
(PKR mln)	FY17	FY18	FY19	Sep-19	
Revenue	69,929	92,229	115,741	35,721	
Net Income	1,060	504	(5,821)	181	
Gross Margin	3.6%	1.1%	(2.7)%	2.8%	
Short-Term Borrowings	5,322	4,619	14,702	7,341	
Long-Term Borrowings	2,234	4,700	4,300	4,100	
Equity	3,101	4,063	3,509	3,691	
Rating	A-/A2				

BYCO Amounts in mln'					
(PKR mln)	FY17	FY18	FY19	Sep-19	Trendline
Revenue	88,420	166,290	197,831	49,071	
Net Income	2,182	5,020	(1,684)	871	
Gross Margin	4.8%	5.5%	1.0%	4.3%	
Short-Term Borrowings	3,372	2,323	15,849	15,440	
Long-Term Borrowings	30,331	26,547	23,743	21,832	
Equity	21,918	29,381	27,361	28,232	

Oil Outlook

- **Global Economic Growth** is forecast at ~3% for 2019 and 3.1% for 2020 respectively, representing a downward revision from OPEC's Monthly Oil Market Report (MOMR) Aug'19. This is triggered by the following factors
 - (i) on-going slowdown in US, Euro-zone and lower than expected growth in India in 1H CY19
 - (ii) continuation of US-China trade dispute.

World Oil Demand:

- Medium-term global oil demand is expected to continue growing at a relatively healthy rate to reach a level of 104.8 million barrels per day by 2024.
- India is projected to see the fastest demand growth for oil in the long term.
- In the long term, the largest incremental oil demand is expected to come from the petrochemicals sector, followed by road transportation and aviation. Electricity generation is the only sector where oil demand is projected to decline.

World Oil Supply

- **Non-OPEC countries** supply is expected to remain mixed due to upward revision in oil productions majorly from Russia, Australia and Canada (2019 and 2020). The same is, however, expected to be off-set by a slower supply expected from the US, which has been a major driver for growth till Aug'19.
- **OPEC supply** is expected to remain steady, while conflicts among Saudi Arabia and Iran may create challenges for the stability of oil market.

Refining Outlook

- The medium-term outlook projects refinery capacity additions of 7.95 million bpd between 2019 and 2024, with over 70% of the additions in the Asia-Pacific and the Middle East.
- The potential for incremental crude runs is almost 4 million bpd higher relative to incremental refinery product demand, highlighting a significant build-up of excess capacity, which may impact the refining margins, going forward.
- The largest capacity surplus is expected for the Middle East, followed by the US & Canada, China and Europe. While refineries in the Middle East and the US & Canada are likely to increase product exports, refineries in Europe could come under pressure in the medium-term.
- Given the long-term slowdown in required refining capacity, it will become increasingly difficult to justify building large new refineries in the long run.

Key Challenges

Exchange Rate Volatility – No Hedging Allowed

Pricing Mechanism

Slow Demand of POL Products

Diminishing Demand For Furnace Oil in the Country

Grey Market

Continuation of Deemed Duty on Diesel

Opportunities:

Expected Stability of PKR against USD Following FY19

Expected Revival of Demand of HSD and MOGAS

Alternate Use of Furnace Oil through Installation of Hydro-Cracker Plants.

Refinery Upgradation/Expansion Projects in Pipeline.

International Interest in the Local Refining Industry

Bibliography



- BP Statistical Review of World Energy 2019
- Pakistan Economic Survey
- OPEC World Oil Outlook and Monthly Reports
- Oil Companies Advisory Council (OCAC) – Reports
- Annual Reports – Market Players

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