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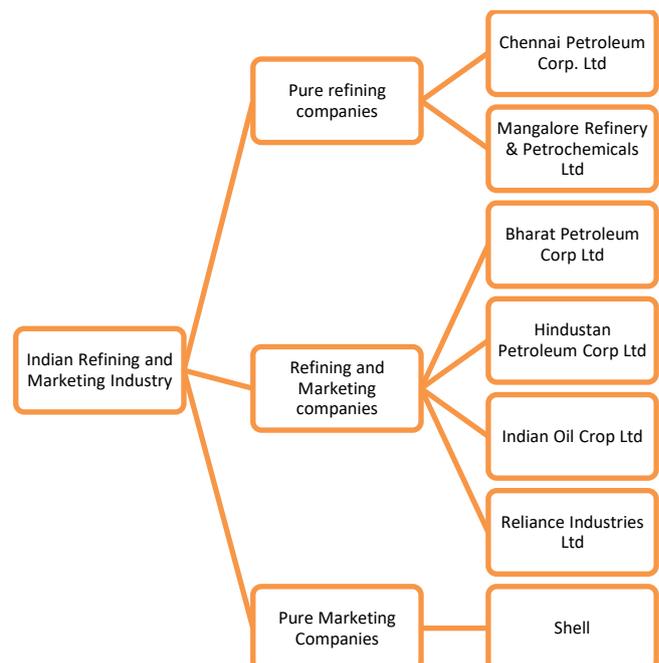
The Indian Refining and Marketing industry which is the downstream segment of the entire oil and gas chain consist of 3 kinds of players namely:

- **Pure Refining** companies consist of those companies which are engaged only in refining. There are very few companies which are only into refining. In India, PSU oil companies have acquired pure play refiners. Eg: Chennai Petroleum Corporation Limited (CPCL) has been acquired by IOCL, Mangalore Refinery and Petrochemicals Ltd. (MRPL) by ONGC and Numaligarh Refineries Ltd. (NRL) by BPCL.

- **Integrated Refining and Marketing** companies are engaged in both refining and marketing of petroleum products in the country. Major integrated companies are PSU oil companies like Indian Oil Corporation Ltd. (IOCL), Bharat Petroleum Corporation Ltd (BPCL), Hindustan Petroleum Corporation Ltd. (HPCL) and private companies like Reliance Industries Ltd. and Nayara Energy Ltd.

- **Pure Marketing** companies are solely into marketing of petroleum products. Shell is the only company in this space in India

Chart 1: Trifurcation of the Indian Refining and Marketing Industry



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Refining

Total Refinery Capacity and Utilization

Chart 2: Capacity of Domestic Refineries (Unit: Million Tonnes)

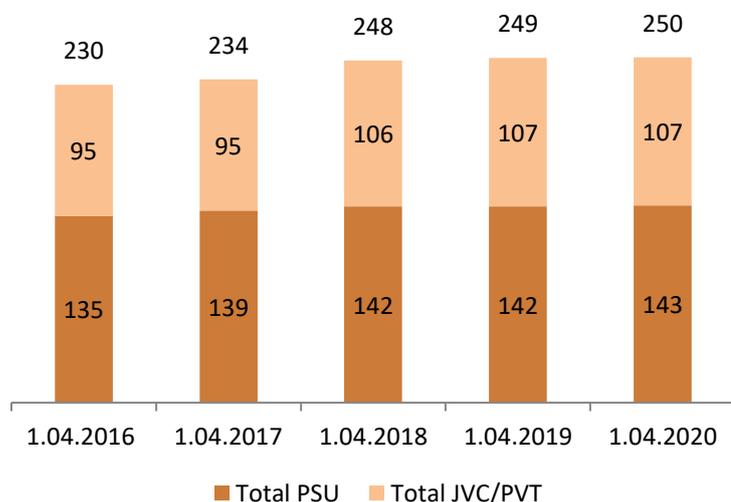
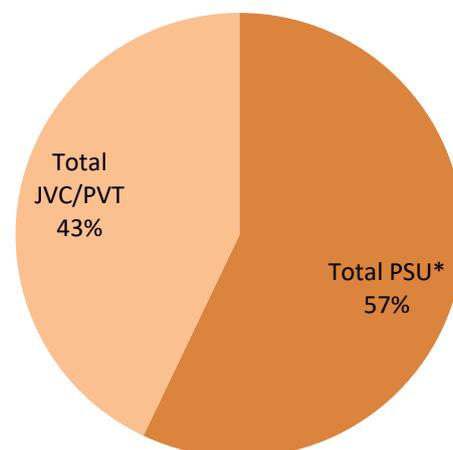


Chart 3: Demarcation of domestic Refinery ownership



Source: PPAC

*includes BPCL as well as it is not divested/privatised yet

Table 1: Demarcation of Refinery Capacity Utilization

	Total PSU	Total JVC/PVT	Total Capacity Utilization
2015-16	94%	111%	101%
2016-17	99%	114%	105%
2017-18	102%	101%	102%
2018-19	106%	99%	103%
2019-20(P)	102%	102%	102%

Source: PPAC, CARE Ratings

Note: JVC refineries are HMEL and BORL-Bina refineries

India ranks 4th in terms of refinery capacity present in the world after the United States, China and Russia and is also home to the world’s largest refinery. Overall addition in capacity of domestic refiners has grown at a CAGR of 2.1% during FY16-20, whilst the addition in capacity of PSU refiners and Joint Venture/Private refiners has grown at a CAGR of 1.4% and 3.1%. Refinery capacity as of 1.08.2020 has been 249.8 MMT (5.02 million barrels/day of crude oil can be processed), which encompasses 18 refineries in the public sector, 2 refineries established under a joint ventures and 3 private sector refineries.

Overall utilization has always been more than the nameplate capacity and refiners have been able to achieve more than 100% capacity utilization in the past 5 years. Refinery throughput has increased at a CAGR of 2.2% during FY16-20.

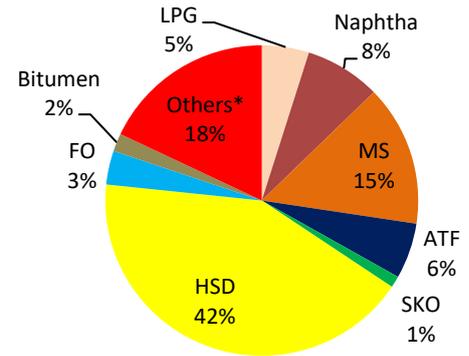
Indian refiners are equipped with the necessary CAPEX to efficiently process high sulphur crude and low sulphur crude and in the last 5 years percentage share of high sulphur crude in total crude oil processing has increased from 71.3% during FY16 to 75.5% during FY20.

Demand-Supply of Refinery/Petro Products

A barrel of crude, when cracked chemically, produces an entire range of fractionates like petrol, diesel, LPG and furnace oil, each having different applications. Indian refineries produce Motor Spirit (MS), High Speed Diesel (HSD), Liquefied Petroleum Gas (LPG), Superior Kerosene Oil (SKO), Air Turbine Fuel (ATF), Light Diesel Oil (LDO), Furnace Oil (FO) and Low Sulphur Heavy Stock (LSHS).

Table 2: List of petro-products manufactured by the Indian Refineries and its end-use application
Chart 4: Percentage share of Petroleum Products manufactured by Indian Refiners during 2019-20

Product	End-use Application
MS	Transport fuel
HSD	Transport fuel & Industrial fuel
LPG	Domestic and Industrial fuel
SKO	Domestic fuel
ATF	Aviation fuel
Petroleum Coke	Fuel for power plants and cement plants
Naphtha	Feedstock for petrochemicals & fertilizers
LDO	Industrial Fuel
Lubes	Lubrication for Automotive and Industrial Application
FO	Industrial Fuel
LSHS	Industrial Fuel
Bitumen	Surfacing of Roads

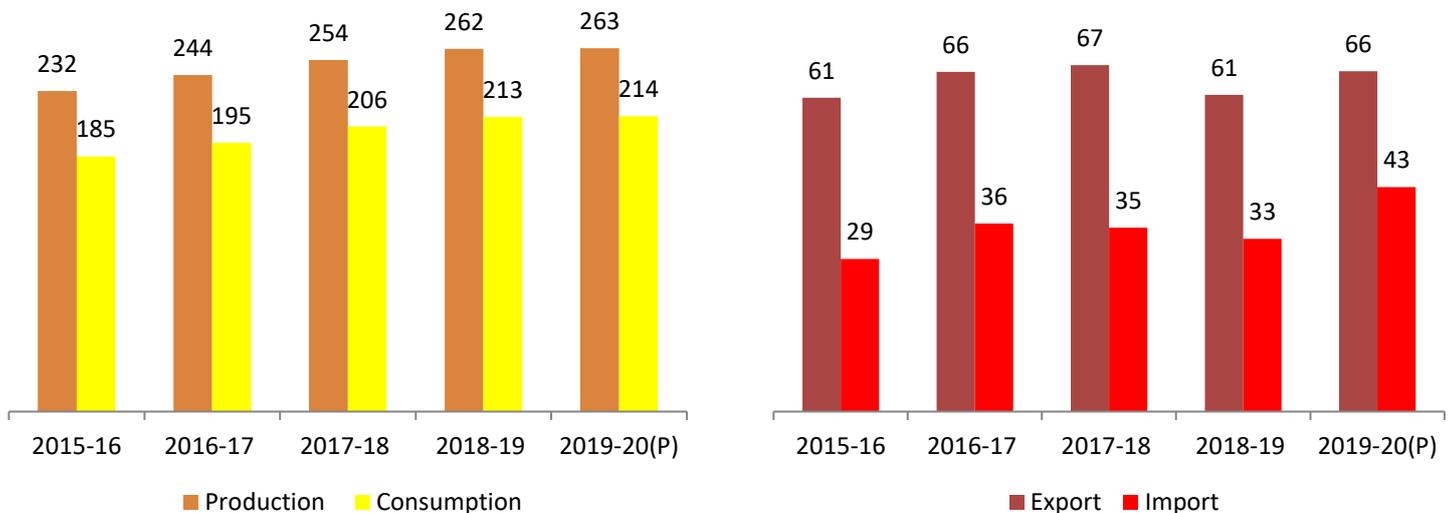


Others (in the pie chart) include products like LDO, LSHS, Lubes and Greases, Propylene, solvents (Hexane, Benzene, Toluene, Xylene and Specialty solvents), Reformate, Mineral Turpentine Oil, Carbon Black Feed Stock, Waxes, Sulphur and petcoke etc

Source: PPAC, CARE Ratings

Transportation fuels (diesel- 42% and petrol- 15%) account for 57% of the total refinery products produced by the Indian refineries followed by Naphtha (8%) which is used as a feedstock in fertilizer and petrochemical industries. ATF is used to fuel airplanes. LPG (5%) is mainly used a cooking fuel in the domestic economy.

Chart 5: Production, Consumption, Exports and Imports of all refinery products (Unit: million tonnes)



Source: PPAC

Production of refinery products has grown at a CAGR of 3.2% during FY16-20 whilst consumption of refinery products has grown at a CAGR of 3.7%. Increase in the refining activities can be attributed to the increase in energy requirements of the domestic economy given the burgeoning population. India has emerged as one of the key global drivers for refined fuels consumption as its economic expansion over the years coupled with rising industrial activity has paved way for infrastructure improvements and better access of energy for commercial and retail consumers.

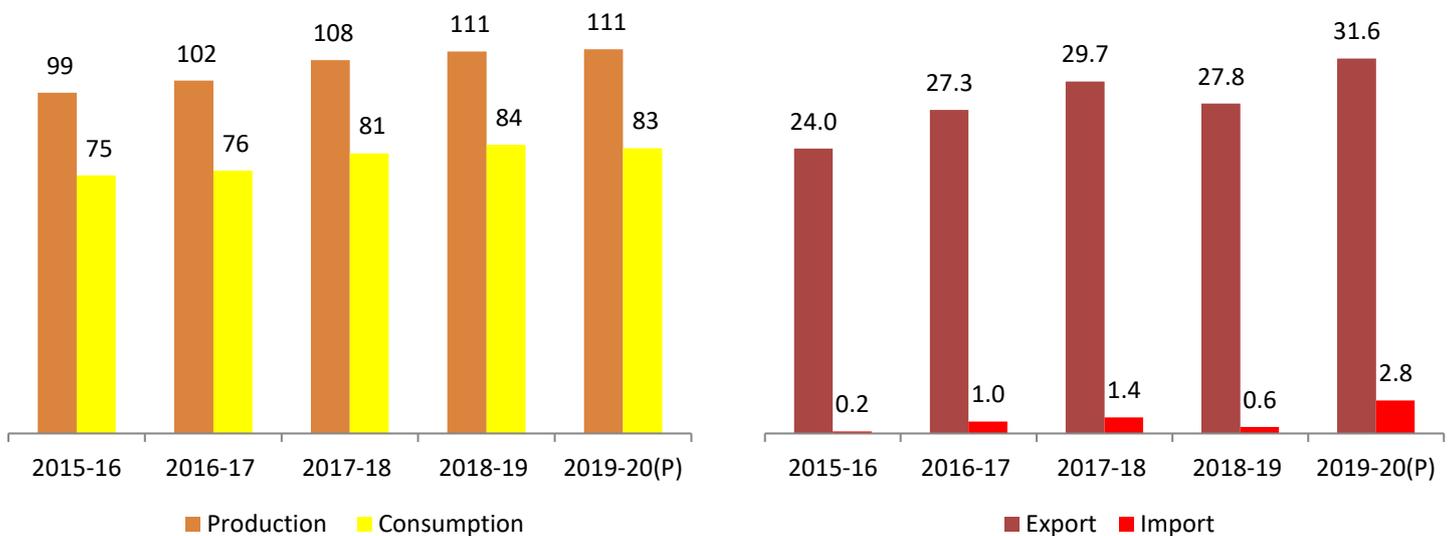
Given the surplus production of certain refined fuels, India is a net exporter of refinery products and our main export destinations are Singapore, United Arab Emirates, Netherland, Malaysia, United States, Israel and Nepal. Exports have grown at a CAGR of 2.1% during FY16-20 while imports have grown at a CAGR of 10.1%. India mainly exports petrol, diesel, naphtha, air turbine fuel and fuel oil. On the other hand we import LPG, bitumen and LOBS/Lube oil.

- **High Speed Diesel (HSD)**

Diesel oil is a complex mixture of hydro carbons. It is a brown coloured oily liquid with pungent smell. HSD is normally used as a fuel in medium and high speed compression ignition engines (operating above 750 rpm) in commercial vehicles, stationary diesel engines, locomotives and pumps etc.

Automotive diesel fuel serves to power trains, buses, trucks, and automobiles, to run construction, petroleum drilling and other off-road equipment and to be the prime mover in a wide range of power generation & pumping applications and is the most widely used petroleum product.

Chart 6: Production, Consumption, Exports and Imports of High Speed Diesel (Unit: million tonnes)



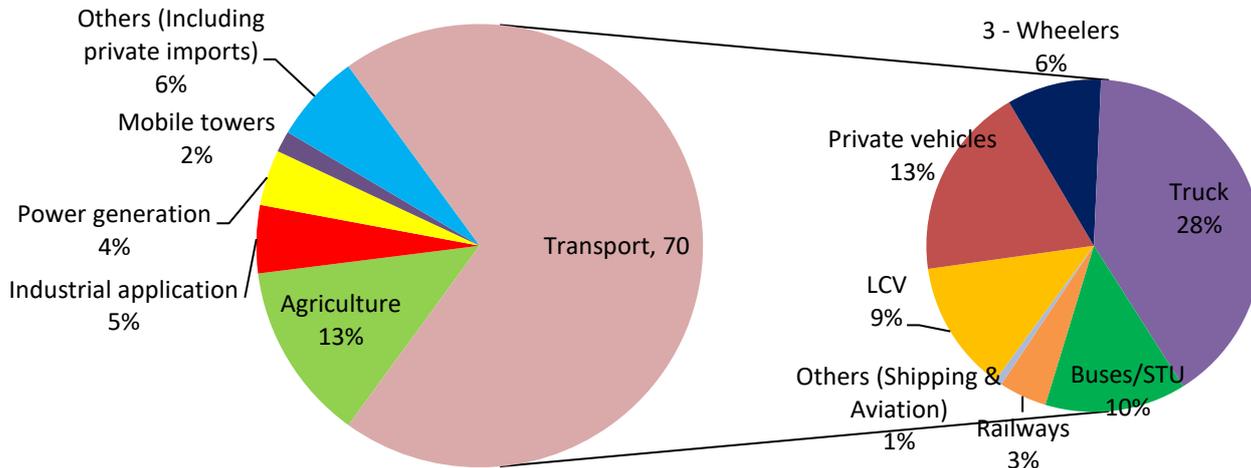
Source: PPAC

Production of diesel has grown at a CAGR of 3% during FY16-20 whilst its consumption has grown at a CAGR of 2.6%. Exports of HSD have grown at a CAGR of 7.1% in the same aforementioned time period. Most of diesel is produced and sold by Indian state refiners while Private refiners too produce diesel, but most of that is exported. India usually imports diesel due to specific product requirements but during FY20, India’s diesel imports increased by 400% as its refineries were gearing up for new emission rules (BS VI fuel) that were to take effect in April 2020 onwards. Most of the imports were of ultralow-sulfur grades that can comply with the Bharat Stage VI standards.

Factors which affect HSD demand

Diesel is mainly used in the road transport, agriculture, industry and power, generation sectors. The transport sector accounts for 70% (both direct and retail sales) consumption of diesel at all India level. **Given the diversity of its usage diesel sales/consumption is often considered as a barometer to judge the economic health of the nation.** Other than refuelling of vehicles several other factors also account for increase or decrease of diesel consumption.

Chart 7: End-use analysis of HSD sales

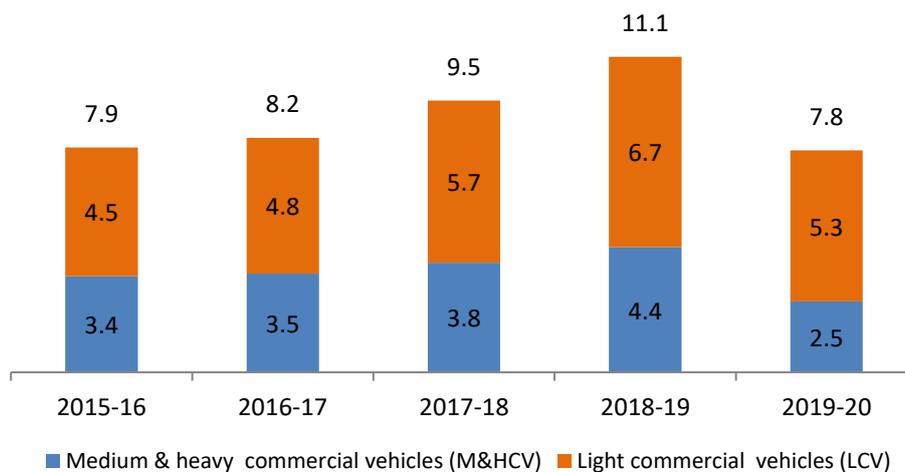


Source: PPAC, CARE Ratings

* Figures include consumption through retail & direct imports

Commercial Vehicle (CV) sales: Commercial vehicles (M&HCV and LCV) account for 3-4% of the overall automobile sales however contribute ~70% of the total transport consumption. Medium and Heavy Commercial vehicles further comprise of trucks and buses whereas Light Commercial Vehicles (LCVs) comprise of Goods carrier and Passenger carriers.

Chart 8: Sales of Commercial Vehicles (Unit: in lakhs/numbers)

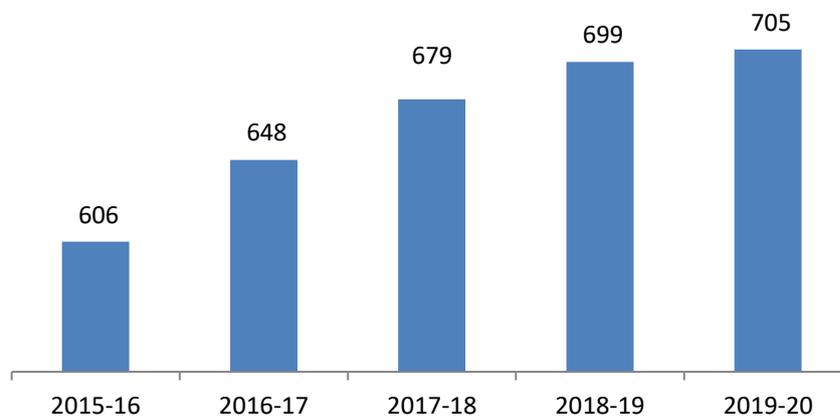


Source: CMIE

Sales of CV had grown at a CAGR of 12% during FY16-19 but fell by 29.7% during FY20. Sales of M&HCV and LCV fell by 43.3% and 20.7% during FY20. Lack of financing options from NBFCs, weak rural economy and slowdown in manufacturing activity has contributed to the sharp fall in the sales. Another reason for low sales has been the increase in axle load norms in July 2018 which increased overall cargo capacities across M&HCVs and saw fleet owners reduce their number of purchases.

Port traffic: According to the Ministry of Shipping, around 95% of India's trading by volume and 70% by value is done through maritime transport. India has 12 major (6 on the Eastern coast and 6 on the Western coast) and 205 notified minor and intermediate ports. POL products (crude, prod., LPG/LNG), coal (thermal and coking coal) and containers mainly account for ~70% of the cargo handled by the major Indian ports. Iron ore (including pellets), fertilizers (F&RM; finished and raw materials) and other cargo account for the remaining ~30%. In the last 5 year period there has been a perceptible shift in an increase in POL and iron ore cargo handled by the major ports from it being 32% and 3% (~35%) of the total cargo handled during FY16 to it 38% and 8% (~46%) of the total cargo handled during FY20. Percentage share of fertilizers, coal and container traffic has relatively remained stable.

Chart 9: Traffic Handled by Major Ports (Unit: Million Tonnes)



Source: IPA, CARE Ratings

The major ports in India have recorded a growth of 3.8% during FY16-20. During FY20, cargo traffic deaccelerated and grew by only a mere 0.8% as compared with the 2.9% growth achieved during FY19. Escalated tensions and weakness in global trade due to the trade/tariff wars between China and the US and the prevailing slowdown in the Indian economy has led to the subdued trade growth. Freight activities have a bearing on diesel demand.

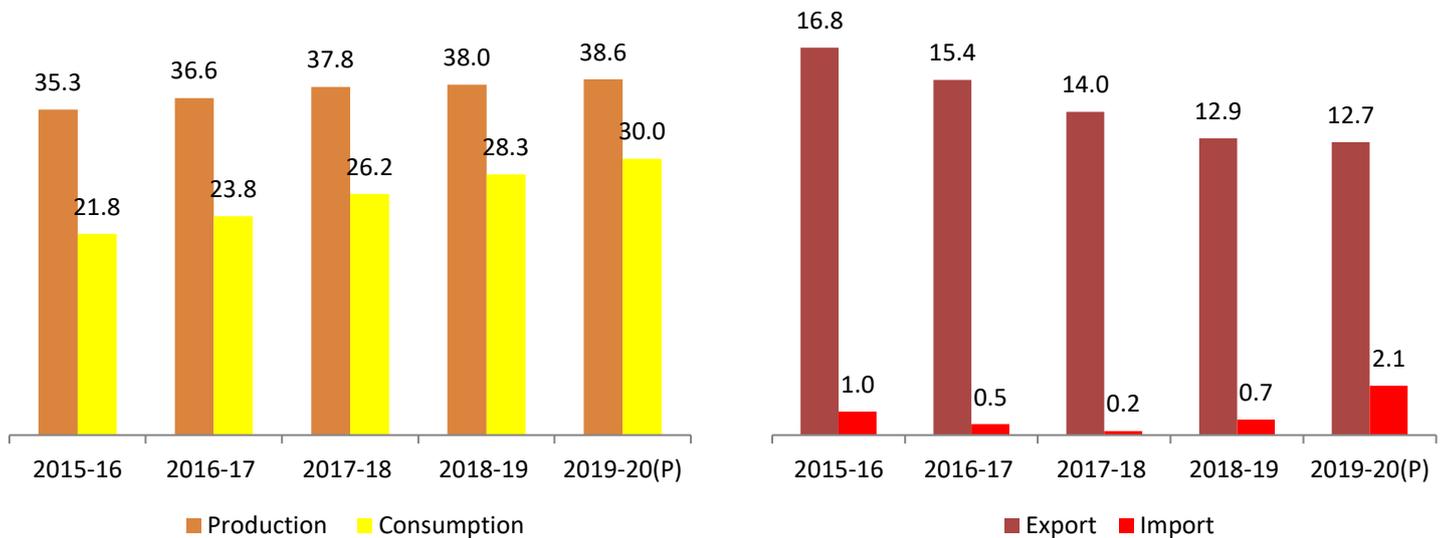
Vibrancy of the Agricultural sector: Timely arrival and progress of monsoon, sowing of key kharif crops and rabi crops have a bearing on diesel demand. Diesel is one of the key inputs for agricultural activities such as tilling, sowing, spraying and harvesting which are highly mechanised and irrigation dependent (most of the irrigation pump operations require diesel). Sales of tractors have grown at a CAGR of 8.1% during FY16-20. From sowing to harvest and irrigation, at each level, agriculture is heavily consuming diesel fuel.

Power situation: Diesel generators are the most commonly used generators and can be used as a backup power supply system for homes, shops, offices etc. in the event of power outages or when connection to the power grid is lost. They can be used to power machinery and power tools at job sites where getting power from the grid is difficult. Diesel generators can even be used as the primary source of power supply in distant regions, where connection to the power grid is not possible. Hence it is important to track any power deficits in order gauge the consumption of diesel.

- **Motor Spirit (MS)**

Motor Spirit also known as Gasoline (American English), or petrol (British English), is a transparent, petroleum-derived liquid that is used primarily as a fuel in internal combustion engines. Petrol is mainly used as a transport fuel for passenger cars, taxis, two & three wheelers.

Chart 10: Production, Consumption, Exports and Imports of MS (Unit: million tonnes)



Source: PPAC

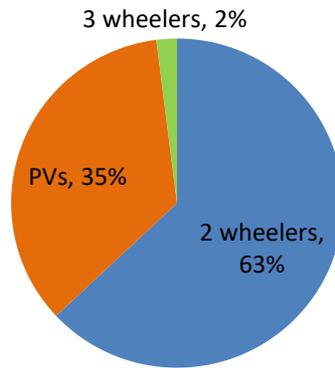
Production of petrol has grown at a CAGR of 2.3% during FY16-20 whilst its consumption has grown at a CAGR of 8.3%. Steady increase in ownership of private vehicles over the years has led to the increase in consumption of petrol coupled with the narrow price difference between petrol and diesel which is leading to consumers preferring petrol powered automobiles (petrol variant cars are cheaper as well).

India is a net exporter of petrol but exports have fallen by 6.8% during FY16-20. Although overall production of petrol is in excess of domestic consumption, due to specific product requirements, some quantity is imported. India’s petrol imports increased by 220.4% during FY20 as its refineries were gearing to produce fuel up for new emission rules (BS VI fuel) that were to take effect April 2020 onwards.

Factors which affect MS demand

All India level the 2-wheelers segment accounts for the highest consumption at 63% while PV use 35% followed by 3-wheelers at 2%. This is because majority of middle-class income population including college students prefer to travel by 2-wheelers, as it is more economical than traveling by car. Other than refuelling of vehicles several other factors also account for increase or decrease in petrol consumption.

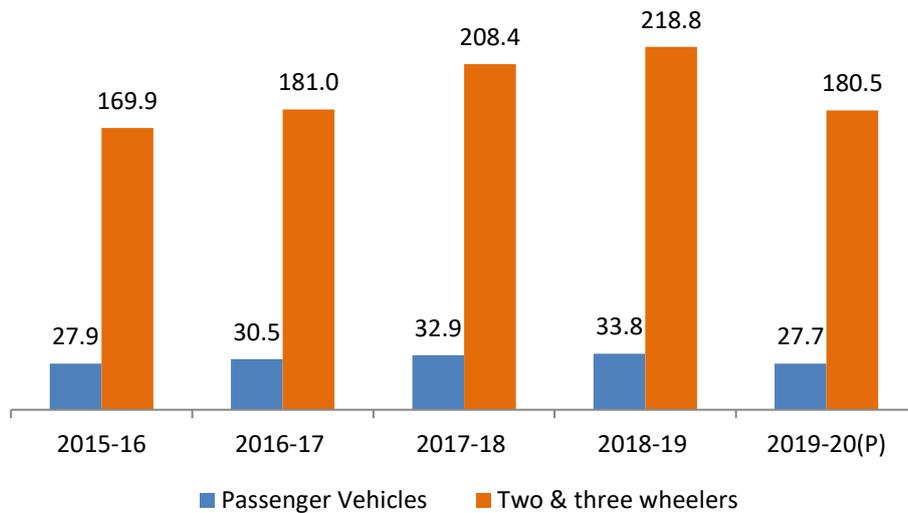
Chart 11: End-use analysis of MS sales



Source: PPAC, CARE Ratings

Sales of Passenger Vehicles (PVs) and 2-3 wheelers: 2-3 wheelers account for 84% of the total automobiles sales in India while passenger vehicles which comprise of passenger cars, vans, MUVs and quadricycles account for almost 13% of the total automobile sales.

Chart 12: Sales of Passenger Vehicles and 2-3 wheelers (Unit: in lakhs/numbers)



Source: CMIE

Sales of PV and 2-3 wheelers had grown at a CAGR of 6.6% and 8.8% during FY16-19 but fell by 17.9% and 17.5% during FY20 respectively. The passenger vehicle sales was negative during FY20 due to delay by consumers in making any discretionary spending, popularity of ride sharing apps, liquidity crunch, high insurance costs, high ownership costs and price hikes due to the onset of the BS-VI emission norms. In case of Two & Three Wheelers, huge hike in insurance, weak customer sentiment, slowdown in rural economy and liquidity crunch due to NBFC crises are some of the factors which have led in the slide of sales. Improving public transport system like BRTS and Metro in certain cities could have also impacted the 2-wheeler sales.

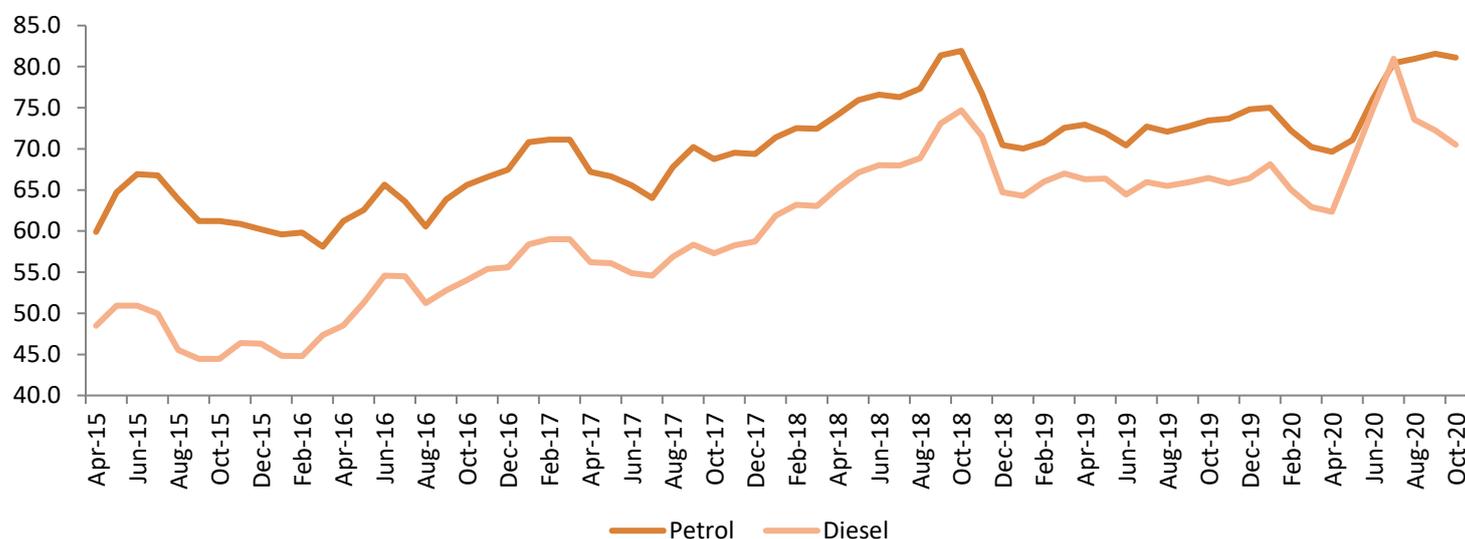
Improvement in road connectivity: The preference for road travel is increasing in comparison to rail and air travel due to improvement in road connectivity given the implementation of many new road projects and widening of roads.

Pricing of Petrol and Diesel

Prices of petrol and diesel have been made market-determined by the Government with effect from 26.06.2010 and 19.10.2014 respectively. Since then, the Public Sector Oil Marketing Companies (OMCs) take appropriate decision on pricing of petrol and diesel in line with their international product prices, exchange rate, tax structure, inland freight and other cost elements.

Oil firms consider the trade parity pricing which is based on the prevailing prices in the international markets. Retail prices of petrol and diesel in India are linked to their prices in the global markets and not crude oil. Prices of petrol and diesel in India are worked out based on the average of the trailing 15 days of benchmarked Arab-Gulf fuel prices which move in tandem with global crude oil prices. The pricing formula involves 80% of import price and 20% export price of the fuel.

Chart 13: Trend in Prices of Petrol and Diesel (Unit: Rs/ltr)



Source: PPAC, CMIE

Prices of petrol and diesel were initially revised on the 1st and 16th of every month but since 16th June 2017 (FY18) refiners have adopted the method of revising the price of these auto fuels on a daily basis. The sharp decline in crude prices, though reflected in the product prices, have not reached the consumers, primarily due to the increased duties and taxes enforced by the Government.

Table 3: Price build-up of Petrol and Diesel at Delhi (Unit: Rs/ltr)

As on 16.10.2020	Petrol	Diesel
Price Charged to Dealers (excluding Excise Duty and VAT)	25.7	25.8
Excise Duty	33.0	31.8
Dealer Commission	3.7	2.6
VAT (includes VAT on dealer commission)	18.7	10.4
Retail Selling Price	81.1	70.5

Source: IOC/PPAC

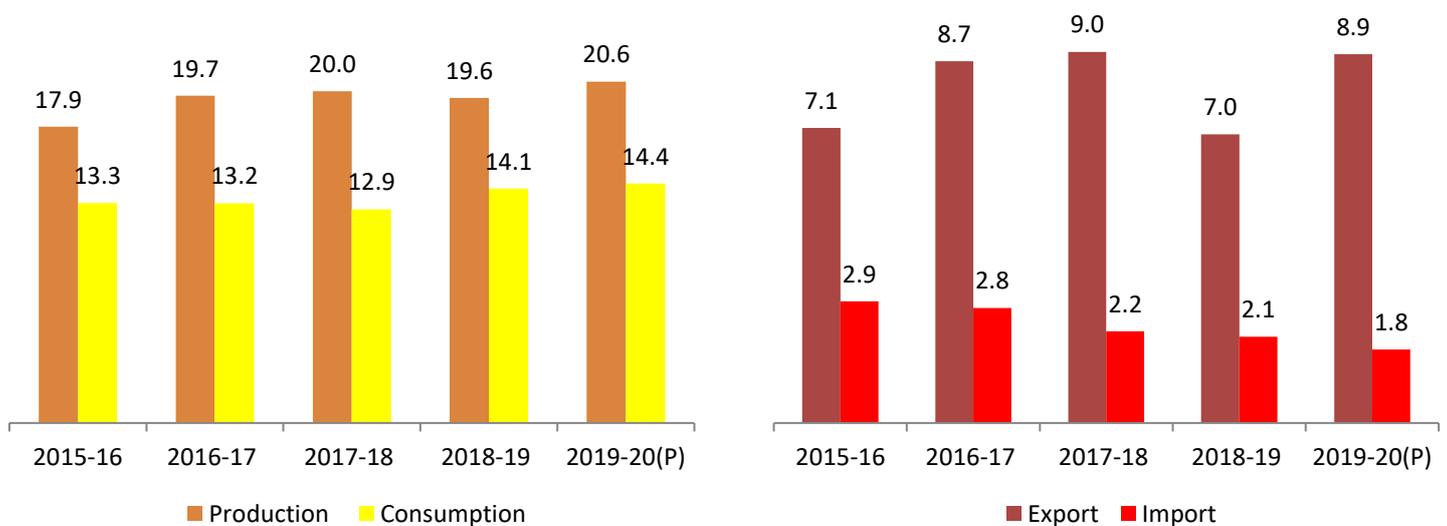
As per the latest available data on price build of petrol and diesel) the government is able to collect around 201% taxes, (Excise Duty and VAT) on the base price of petrol and 164% in the case of diesel (as on 16th October 2020).

Taxes now make up around 64% of the retail price of petrol 60% of the retail price of diesel (as on 16th October 2020).

- **Naphtha**

Naphtha is mainly used as a feedstock in the petrochemical industries but it is also used as feedstock in fertilizer units (urea), gas turbines and in various other applications.

Chart 14: Production, Consumption, Exports and Imports of Naphtha (Unit: million tonnes)



Source: PPAC

Production of naphtha has grown at a CAGR of 3.6% during FY16-20 whilst its consumption has grown at a CAGR of 2.1%. The growth in domestic naphtha consumption has been due to the development of the petrochemical industries which grew by CAGR of 3.9% during FY15-19. Naphtha is also used as feedstock in certain urea units and out of the 31 fertilizer industries present, 3 use naphtha as feedstock. Exports of naphtha have grown at a CAGR of 5.7% during FY16-20 whilst its imports have declined by 11.8%.

Factors which affect Naphtha demand

Petrochemical industries remain the main consumers of naphtha in addition to minor consumers like fertilizer and power plants. Fluctuation in demand by the petrochemical industry (particularly for polymers and plastics) largely drives the pattern of naphtha consumption.

Vibrancy of the petrochemicals industry: India is amongst the fastest growing petrochemicals markets in the world. Petrochemicals, which comprise of plastic and a host of other chemicals, are downstream hydrocarbons derived from crude oil and natural gas. The value additions in the petrochemicals chain offer immense possibilities and cater to the need of textiles and clothing, agriculture, packaging, infrastructure, healthcare, furniture, automobiles, information technology, power, electronics and telecommunication, irrigation, drinking water, construction and a host of other articles of daily and specialized usage amidst other emerging areas. There are 11 cracker complexes in operation in the country with a combined annual Ethylene capacity of 7.27 million MT.

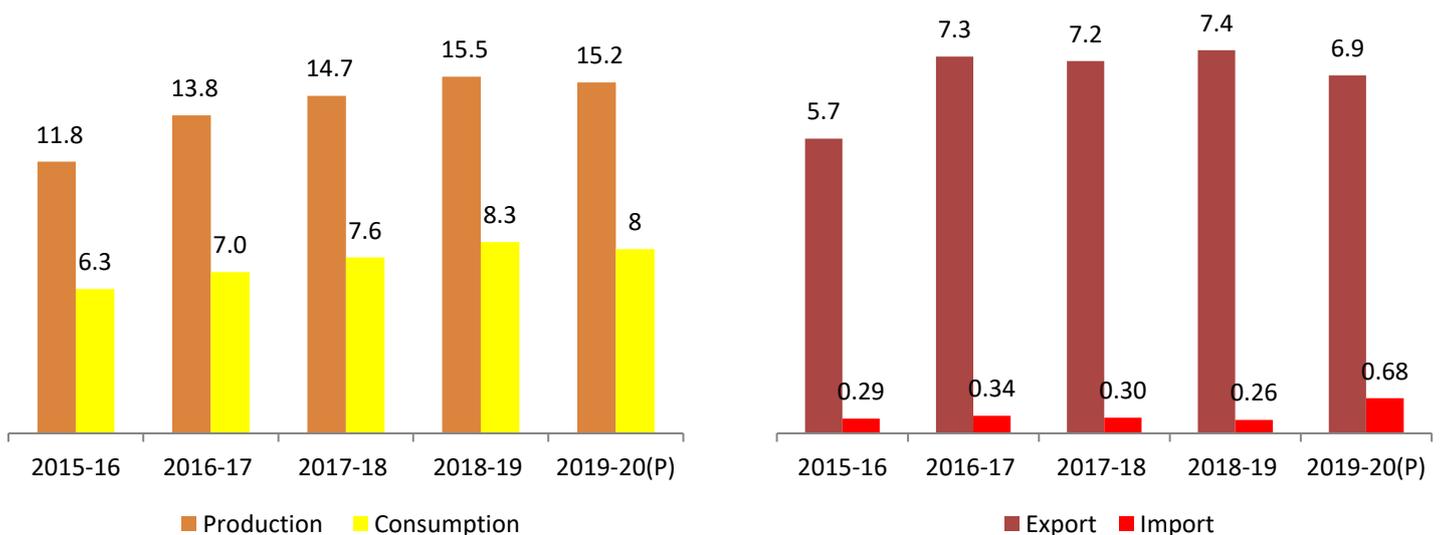
- Pesticides, fungicides and herbicides used for protection of plants and crops are products made from petrochemicals.
- Apparels are made of natural, man-made and blended fibres. The common man-made fibres that are based out of petrochemicals include polyester, nylon, rayon and spandex.
- The petrochemical products provide the benefit of light weight, design flexibility and durability to automotive bodies and components. Various petrochemical products find application in transport and automotive uses.
- Petrochemical based plastics have benefitted the computers and electronics industry as well.
- Plastics which are petrochemical based products have changed the construction industry as durability, flexibility, great strength to weight ratio, cost-effectiveness, rust resistance and low maintenance are the advantages associated with them. They are used in construction that involves seals, windows, doors, pipes, cables, floor coverings and insulation.
- Petrochemicals find their usage in healthcare products.
- Petroleum based plastics finds wide application in packaging. PET plastic is used for plastic bottles that are used for soft drinks, juice, water which provides the advantage of great resistance to many solvents, clear and smooth surfaces.

Urea Production: Urea dominates the total fertilizer production in the country. While India is the world’s 2nd largest consumer of urea, the Government of India is working toward increasing the production of urea so as to end imports by 2022 and achieve self-sufficiency in urea production. Production of urea increased had by 1.3% during FY20 on account of efficiencies of scale achieved by urea manufacturers even with the temporary shutdown of certain manufacturing units during the year. India imports almost 30% of its urea needs which means 70% is procured locally.

- **Air Turbine Fuel (ATF)**

Jet fuel is a colourless, combustible, straight-run petroleum distillate liquid. Its principal use is as a jet engine fuel.

Chart 15: Production, Consumption, Exports and Imports of AFT (Unit: million tonnes)



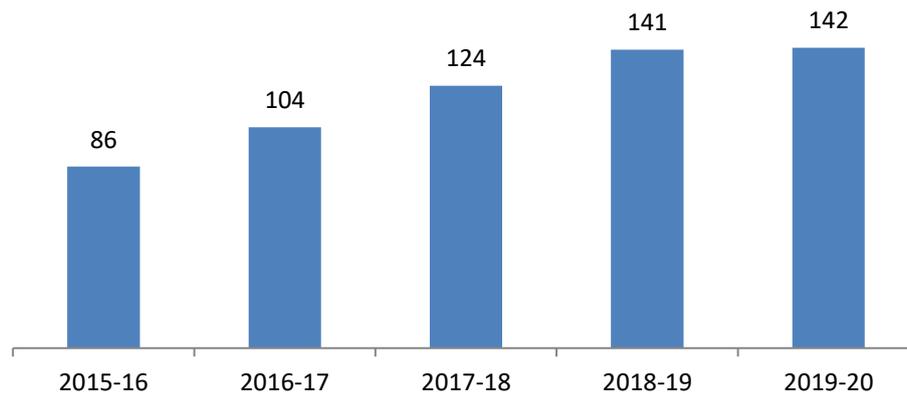
Source: PPAC

Production of ATF has grown at a CAGR of 6.6% during FY16-20 whilst its consumption has grown at a CAGR of 6.3%. With the increase in passenger traffic there has been an increase in air travel which has led to augment the consumption of ATF. Surplus production has led to the country exporting ATF and it has increased by 5% in the aforementioned time period.

Factors which affect ATF demand

Vibrancy of the Airlines sector: Air transport is an important enabler to achieving economic growth and development. Air transport facilitates integration into the global economy and provides vital connectivity on a national, regional, and international scale. It helps generate trade, promote tourism, and create employment opportunities.

Chart 16: Total Domestic Passengers carried by Scheduled Domestic Airlines (Unit: Nos/millions)



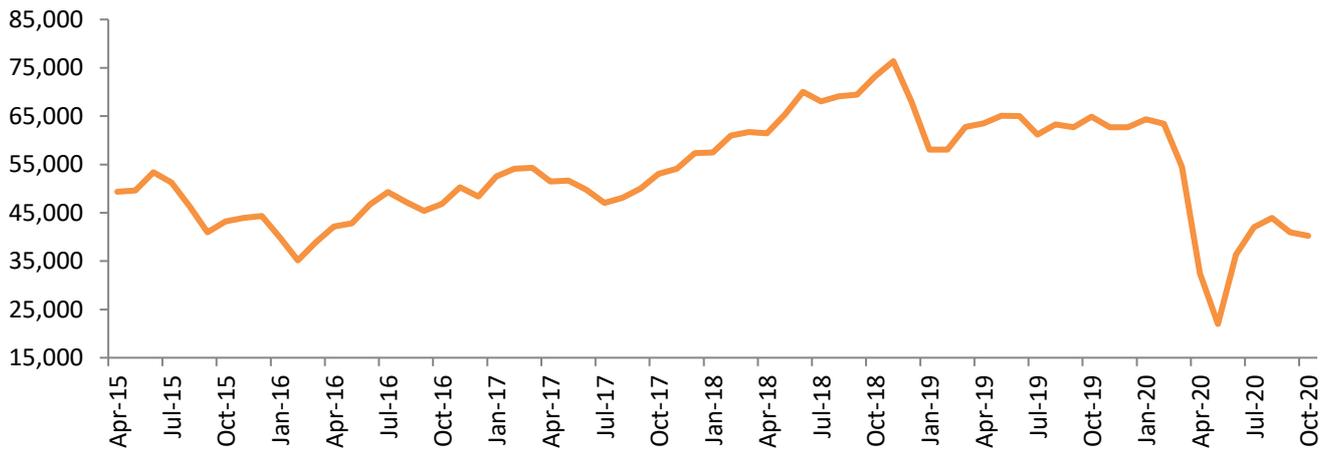
Source: DGCA

The total number of domestic passenger traffic has increased by 13.3% CAGR during FY16-20. With the expansion of the Indian economy, rise in incomes of middle-income households, development of tourism, foray of low-budget-airlines coupled with cheaper airfares due to increase in competition, the macros of air travel look promising as it has gained traction over the years.

Pricing

State-owned fuel retailers revise rates of ATF on the 1st of every month based on average international oil rate and rupee-US dollar exchange rate in the preceding month. Though the price of the fuel is in line with ATF prices in the international markets in the domestic economy the selling price of the fuel varies from city to city depending on local taxes.

Chart 17: Price Aviation turbine fuel in Delhi (Domestic) (Unit: Rs./kl)



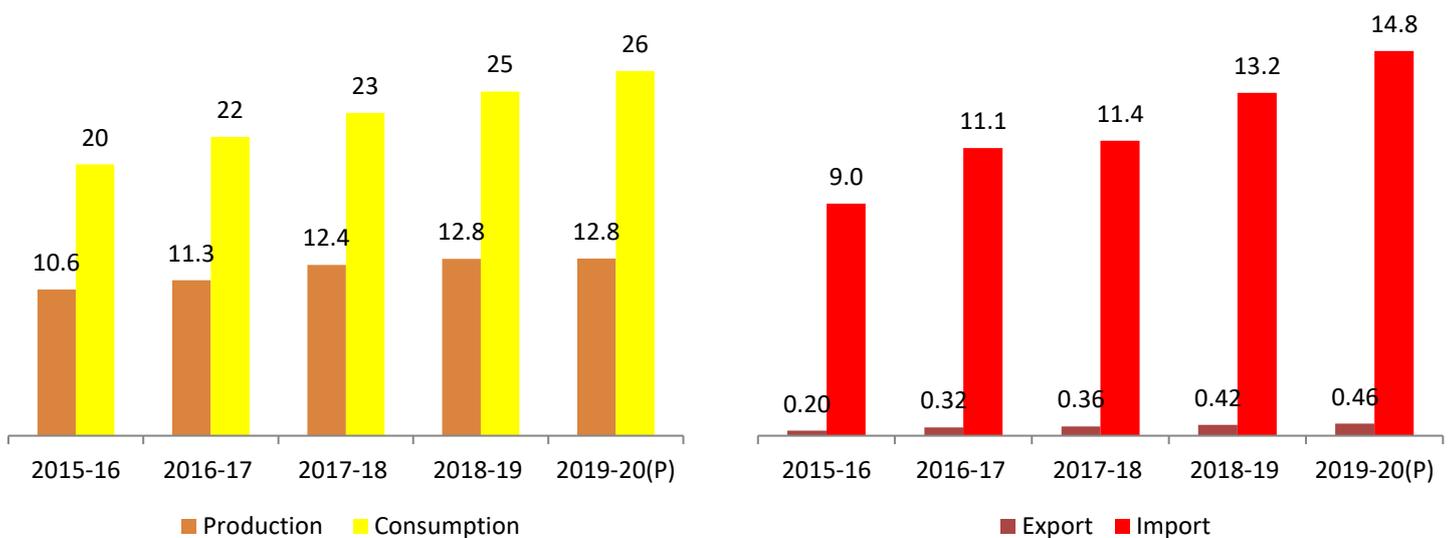
Source: CMIE

• **Liquefied petroleum gas (LPG)**

Liquefied Petroleum Gas (LPG) is a mixture of hydrocarbons, largely Butane and Propane, which are in gaseous state but liquefied under pressure for easy storage, handling and transportation in pressurized vessels. LPG is considered as one of the most eco-friendly and healthy cooking fuels. Besides domestic usage, LPG is also used as an efficient source of energy in various industrial and commercial applications. LPG can also be used in vehicles which in turn helps curb vehicular emissions and pollution as Auto LPG has almost 50% lesser PM emissions than CNG and petrol and 80% lower PM than diesel.

LPG is sold for both domestic and commercial purposes. In order to prevent misuse of domestic LPG for commercial purpose, the two types of cylinders are coloured differently. For easy identification, cylinders used for domestic use are painted with Signal Red colour and cylinders used for commercial use are painted with Oxford Blue colour.

Chart 18: Production, Consumption, Exports and Imports of AFT (Unit: million tonnes)



Source: PPAC

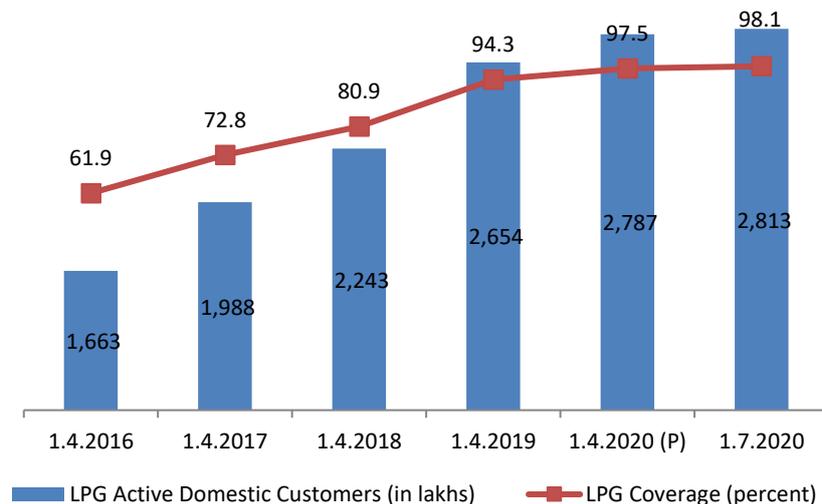
Production of LPG has grown at a CAGR of 5% during FY16-20 whilst its consumption has grown at a CAGR of 7.7%. Rapid increase in population combined with LPG penetration in rural areas has resulted in India becoming the world's 2nd largest LPG consumer. Government initiatives such as the Pradhan Mantri Ujjwala Yojana (PMUY) which was launched with an objective to provide safe cooking gas to BPL families has also resulted in compounding the increase in consumption of the fuel. India is an importer of LPG and increase in consumption has resulted in imports increasing by 13.5% CAGR during FY16-20. Saudi Arabia, UAE, Kuwait and Qatar are the main importers of this cooking fuel to the country.

Factors affecting LPG demand

Refilling of LPG cylinders: Increase in the active domestic customers of LPG coupled with its wide spread coverage is bound to increase the refilling of the cylinder thus augmenting the demand for LPG. As of 1.07.2020 there are 28.13 crore active users of LPG and coverage of LPG is around 98.1%.

Note: LPG coverage has been estimated based on active domestic LPG connections of PSU OMCs divided by households estimated by extrapolating decadal growth of 2001-11 on households in 2011 as per Census 2011 figures.

Chart 19: Active Domestic Customers of LPG (Unit: in lakhs) and its Coverage (%)



Source: PPAC

Active customers of LPG have increased at a CAGR of 13.8% during FY16-20 and incrementally in the first three months of FY21 the number of customers has increased by 0.9% (26 lakh).

Government schemes: LPG is one of the fuels which is still subsidised by the government of India. The government has taken a number of initiatives to promote usage of LPG across the country especially in rural households which otherwise depend on traditional fuels that are hazardous to health and polluting in nature. Under PMUY the government provided free LPG cylinders to 8 crore BPL families. Even in the current financial year, in order to overcome the economic impact of the COVID-19 pandemic, the government had announced a relief package under the Pradhan Mantri Garib Kalyan Yojana (PMGKY) comprising free ration, cooking gas, and cash to certain vulnerable sections. One of the initiatives under PMGKY was to supply three free LPG refills to the 8 crore PMUY beneficiaries during April-June. As the COVID-19 pandemic is still continuing and normal work is taking time to resume to full capacity, the government has extended the period of availing the free LPG benefits until September.

CSR budgets of OMCs: Often a part of the CSR budget of OMCs are directed towards providing a one-time grant of a release of a new LPG connection to BPL families in the rural areas.

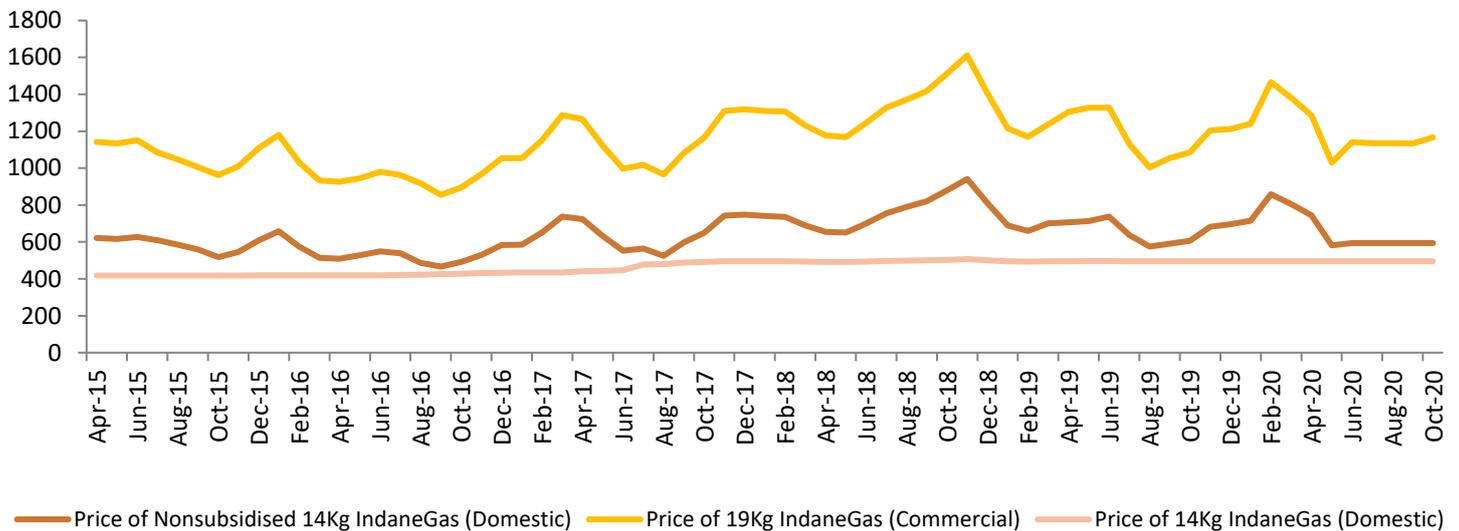
Pricing

Unlike the price petrol and diesel which are revised on a daily basis in line with rates of benchmark fuel in the international market, price of LPG is revised on first of every month which too is in line with the counterpart’s product prices prevalent in the international markets.

The Government continues to modulate the effective price to consumer for Subsidized Domestic LPG and currently subsidises 12 cylinders of 14.2 kilograms each per household every year. The consumer has to make any additional purchases of LPG cylinders at the prevailing market price.

The amount of subsidy provided by the government on the annual quota of 12 refills varies from month to month. The subsidy amount is determined broadly by factors such as crude oil and foreign exchange rates.

Table 20: Price of LPG in Delhi (Unit: Rs/Kg cylinder)



Source: IOCL, CMIE

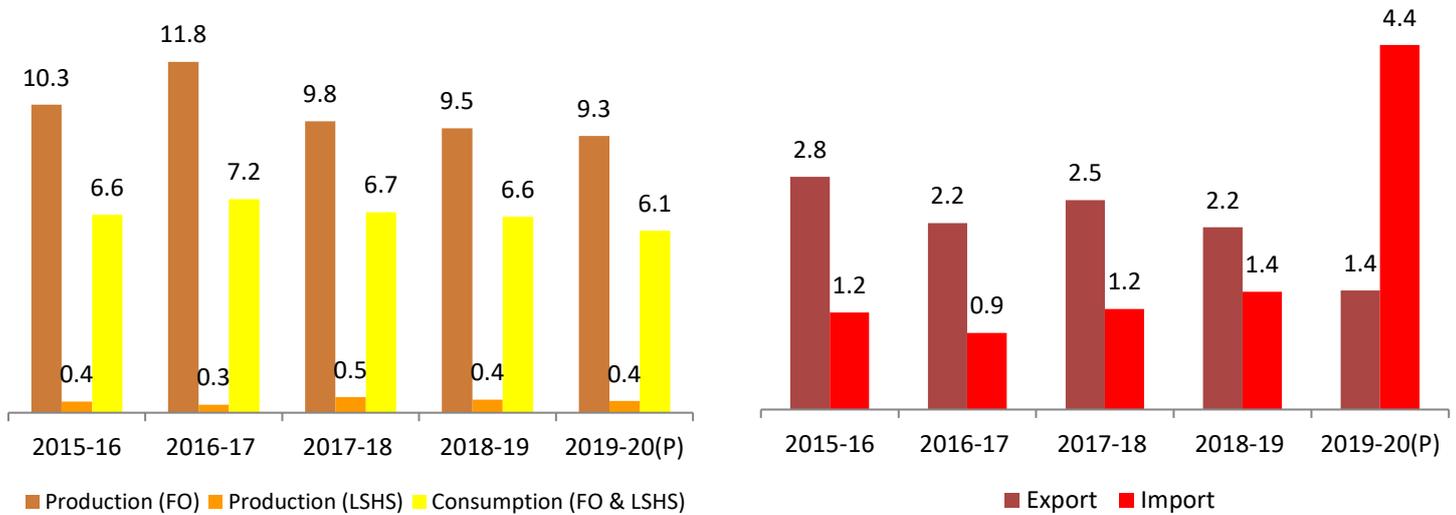
As Government is modulates the retail price of subsidized domestic LPG, the subsidy on these products increase/ decrease with the corresponding increase/ decrease in the prices of these products in international market.

- **Furnace Oil (FO) & Low Sulphur Heavy Stock (LSHS)**

Furnace oil is a fuel oil which is dark and viscous. It is used mainly used as a marine bunker fuel but is also used in different furnaces of the steel plant, in power plant boilers for raising steam and for injection in the blast furnace. It is also sometimes used in air preheaters.

Low sulphur heavy stock (LSHS) is a residual fuel which has a special advantage of having low sulphur content and high calorific value. This fuel is generally used in lieu of FO in the same applications where the FO is suitable.

Chart 21: Production, Consumption, Exports and Imports of FO and LSHS (Unit: million tonnes)



Source: PPAC

Production of FO has fallen by 2.6% during FY16-20 while the production of LSHS has increased by 1.6%. Consumption of FO & LSHS has fallen by 2.1%. Declined in consumption of these fuels is in line with the court's strictures on the use of these polluting fuels in few states which was mandated during mid-FY18. Given the polluting nature of FO its use has been prohibited in Delhi and was also extended to the neighbouring states of Rajasthan, Haryana and Uttar Pradesh. Consumption of LSHS has also reduced due to shift to natural gas by major customers like the fertilizer industry.

Traditionally India has been a net exporter of FO & LSHS but the quantum of exports has been falling on a y-o-y basis and in the previous financial year i.e. FY20, India has become a net importer. As per the new International Maritime Organization (IMO) rules that took effect on January 1st 2020, ships are required to use fuels with sulphur content of no more than 0.5%, down from 3.5%, unless they are equipped with exhaust-cleaning systems known as scrubbers. Indian refineries have started manufacturing very low sulphur fuel oil however, is not available at all Indian ports, thus necessitating the need for imports.

Factors which affect FO & LSHS demand

Consumption of FO/LSHS is largely dependent on general trade sector in addition to shipping, power, fertilizer, petrochemical, iron & steel and others. Going forward, with the implementation of the IMO rules coming into effect, demand for low sulphur fuel oil is bound to increase as it will be the main marine fuel of choice worldwide. Installation of scrubbers in ships will also underpin the consumption of fuel oil with high sulphur levels for the time being as well.

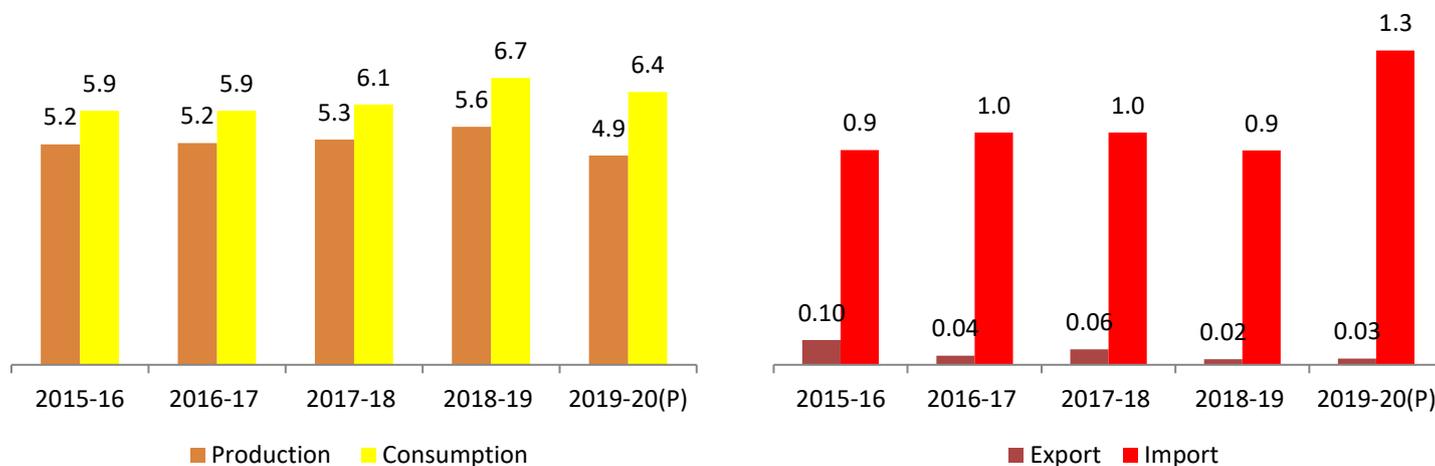
- **Bitumen**

Bitumen is a black or dark brown non-crystalline solid or viscous material having adhesive properties derived from petroleum crude by refinery processes. It is principally obtained as a residual product in petroleum refineries after higher fractions like gas, petrol, kerosene and diesel, etc., are removed. Bitumen is a common binder used in road construction.

Bitumen is also used for water proofing, mastic floorings for factories and godowns, lining of canals to prevent erosion, damp-proof courses for masonry, tank foundation, joint filling material for mason, in battery manufacture as a sealing

compound, in the paint industries for manufacturing black paints and anti-corrosive paints, ceramics, printing inks and electrical capacitors.

Chart 22: Production, Consumption, Exports and Imports of Bitumen (Unit: million tonnes)



Source: PPAC

Bitumen production has fallen by 1.3% during FY16-20 whilst its consumption has grown at a CAGR 1.8%. India imports 15%-20% of its bitumen needs and during FY16-20, imports have increased at a CAGR of 10%. Length of national highways construction has increased at a CAGR of 14% during FY16-20. Pace of construction per day too has increased from it being 16.6km/day during FY16 to 28km/day during FY20.

Factors which affect Bitumen Demand

The Government’s highway construction scheme: Bharatmala Pariyojana is the flagship program introduced by the government of India during FY18, which involved the development of 65,000 km of national highways. It has now been subsumed under the array of projects under the National Infrastructure Pipeline (NIP).

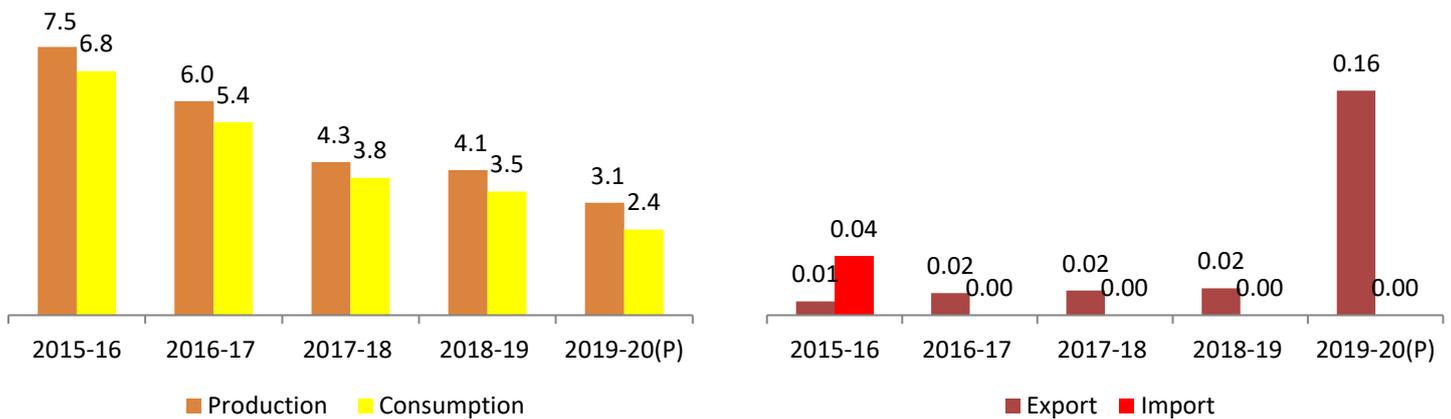
Under Phase-I of Bharatmala Pariyojana, the Ministry has approved implementation of 34,800 km of national highways in 5 years with an outlay of Rs 5.35 lakh crore for development of about 9,000 km length of Economic corridors, about 6,000 km length of Inter-corridor and feeder roads, about 5,000 km length of National Corridors Efficiency improvements, about 2,000 km length of Border and International connectivity roads, about 2,000 km length of Coastal and port connectivity roads, and about 800 km length of Expressways. NHAI has been mandated development of about 27,500 km of national highways under Bharatmal Pariyojna Phase-I. Surfacing of roads will be a major demand driver for the consumption of bitumen.

Resurfacing and maintenance of roads: Roads are usually maintained on a yearly basis whereas resurfacing or replacing of the overlay happens after a longer duration (depending on the wear and tear of the road). Both these methods will use bitumen, thus adding on the demand of the refinery product. India has the 2nd largest road networks in the world, spanning over a total of 5.8 million kms (comprising of National Highways, Expressways, State Highways, Major District Roads, other District Roads and Village Roads).

- **Superior Kerosene Oil (SKO)**

SKO is used in many Industrial applications like heating, cleaning, lighting, cooking, drying, thinner, etc. However, use of SKO as a fuel or fuel additive in motor vehicles is prohibited. Kerosene is mostly consumed by economically weaker section of the society or where there is no penetration of LPG or piped natural gas “PNG”. However, there are rural households in India which still use biomass such as wood, cow dung etc. as a fuel.

Chart 23: Production, Consumption, Exports and Imports of SKO (Unit: million tonnes)



Source: PPAC

Production and consumption of kerosene has fallen sharply by 19.6% and 23% during FY16-20. The overall consumption of SKO has fallen with the increasing use of LPG and with the subsequent electrification of villages. In case of PDS kerosene, the *overall allocation of kerosene by the Centre for the public distribution system has been falling over the years, with the pace of decline getting sharper in the recent years. The advent of PMUY where rural households are given LPG connections has accelerated the fall in consumption of kerosene, along with cash incentives given to the states by the Centre on the reduced kerosene off-take. A total of 9 states/UTs have become kerosene free. In terms of exports of kerosene there hasn't been much of a specific pattern established in the past 5 years whereas imports have been nil FY17 onwards.

* Public Distribution System (PDS) Kerosene is an allocated and subsidized product. It is distributed to the customers through the Public Distribution System (PDS) network (Ration shop) of the State Governments / Union Territories (UT). The quarterly allocation of PDS Kerosene to States / UTs are made by the Ministry of Petroleum and Natural Gas (MOP&NG), Government of India. The quantity of PDS Kerosene allocated per Ration card holder is decided by concerned State Governments / UTs.

Factors which affect SKO demand

A large share of kerosene is still being used for lighting rather than cooking. The draft national energy policy by Niti Aayog has observed that 26% of the rural households show an inclination towards kerosene-based lighting solutions while vis-à-vis kerosene serves as a cooking fuel only for 1% and 6% of the rural and urban households, respectively. With the government claiming to have electrified 100% villages, the need of kerosene for lighting may go down, eventually.

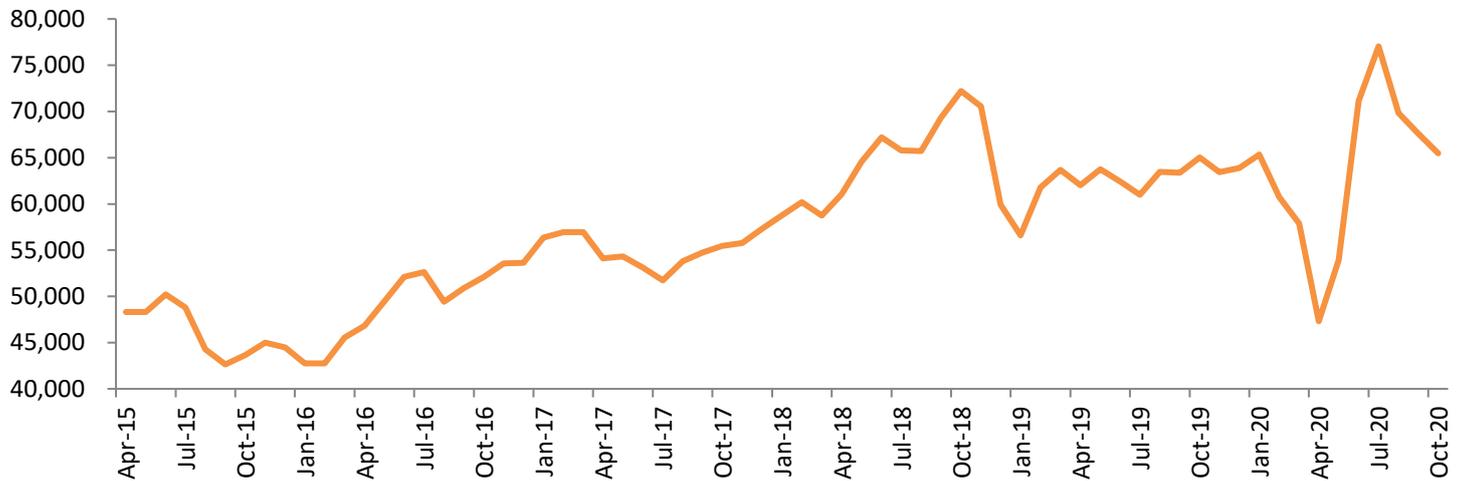
Note: The government assumes a village to be electrified if at least 10% of the households have electricity connections.

Pricing

Like other petrol-products, the price of non-PDS SKO is fixed by state owned refiners in-line with the product prices prevailing in the international markets. In case subsidised SKO, no PDS kerosene is sold in Delhi since July 2016 after LPG

and piped natural gas has covered all of its residents. Elsewhere the price of PDS kerosene, continue to be modulated by the Government in order to insulate the common man from the impact of rise in international oil prices and the domestic inflationary conditions and the consumers continue to get these products at subsidized rates.

Chart 24: Trend in Non-PDS Kerosene prices in Delhi (Unit: Rs/litres)

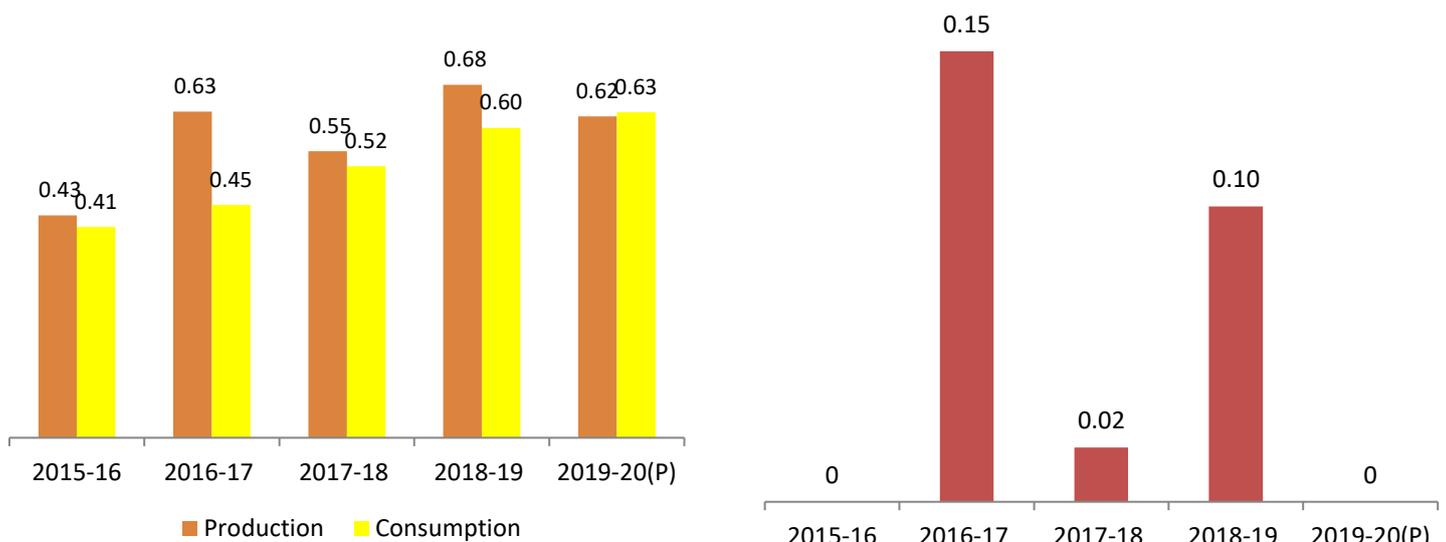


Source: IOCL

- **Light diesel oil (LDO)**

Light diesel oil (LDO) is a non-automotive diesel fuel that is mainly used in engines with RPM less than 750 and equipments. It is widely used in certain types of boilers and furnaces as basic fuel. LDO is also referred to as distillate fuel or marked oil since it is marked with a colouring substance.

Chart 25: Production, Consumption and Exports of LDO (Unit: million tonnes)



Source: PPAC

Production of LDO has grown at a CAGR of 9.7% during FY16-20 whilst its consumption has grown at a CAGR of 11.5%. LDO is used for industrial application and is used to fuel various types of furnaces such as for agricultural pump sets, small industrial units or as start-up fuel for power generation which is one of its major uses. The ban of FO in Delhi, Uttar Pradesh, Rajasthan and Haryana has led to an increase in consumption of LDO.

LDO is used in power generation in the auxiliary boiler in thermal power plants. It is used as the primary fuel in majority of pulverized fuel boilers. Pulverized fuel boilers have pulverized coal as the main fuel which has an ignition temperature of the range ~600°C and to burn coal we need some auxiliary fuel which should have ignition point of lower range. Due to this, LDO is used as the primary fuel which has ignition point in the range ~60°C which is easily achievable and enough to initiate combustion in boiler. India does not import LDO and there has been no specific pattern with respect to LDO exports.

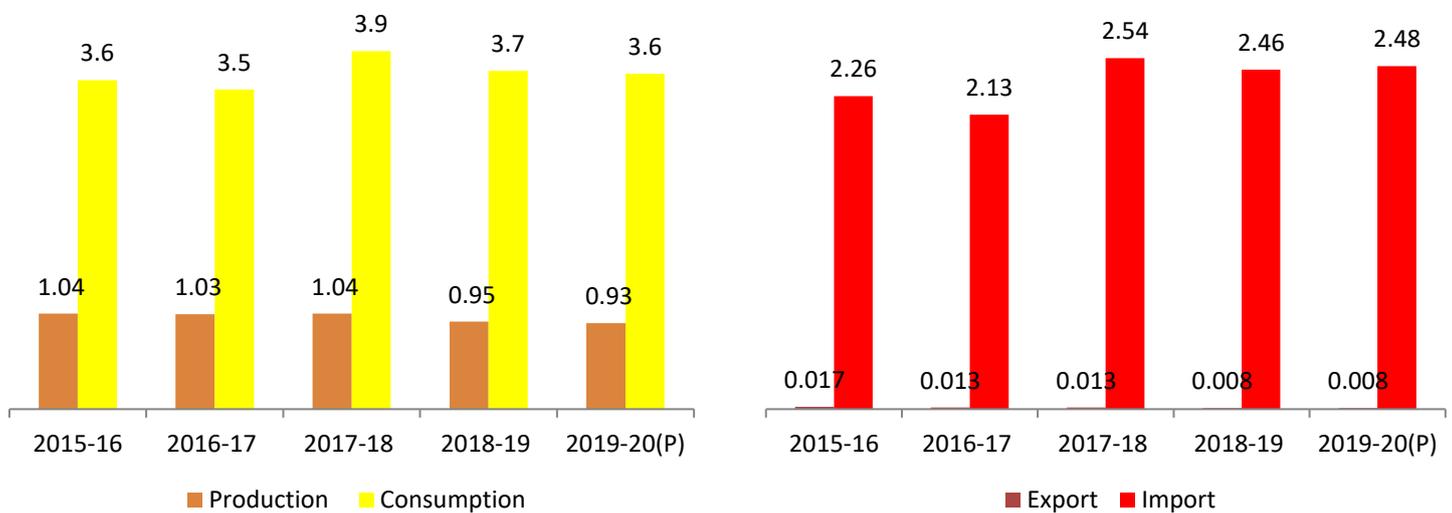
Factors which affect LDO demand

Power Generation: The Government is focused on providing universal access and 24x7 supply of electricity thus supporting the need for LDO. Thermal power generation accounts for 77-80% of the total power generated.

- **Lubes & Greases**

Lubricants and Greases are primarily used to protect to engines from wear and rust. Other applications may include assisting in cleaning of engines, offering a longer oil life and equipment life and better fuel efficiency. Automobiles, industrial, mining and construction, agriculture, fishing, defence and railways are among some of the industries where lubricants find its usage.

Chart 26: Production, Consumption, Exports and Imports of Lubes & Greases (Unit: million tonnes)



Source: PPAC

Production of Lubes and Greases has fallen by of 2.6% during FY16-20 whilst its consumption has grown at a CAGR of 0.5%. India is an importer of lubricants and greases and imports has grown at CAGR of 2.3% in the same aforementioned period.

As per IOCL, automotive lubricants constitute 65% of the total finished lube market. Of this, the commercial vehicle segment accounts for half of the volume while the passenger car segment – the image builder for lubricant brands –

constitutes a mere 7%. The two-wheeler segment, witnessing explosive growth, constitutes about 25%. Agriculture equipments, stationary engines and other miscellaneous applications account for the balance 18% of the market.

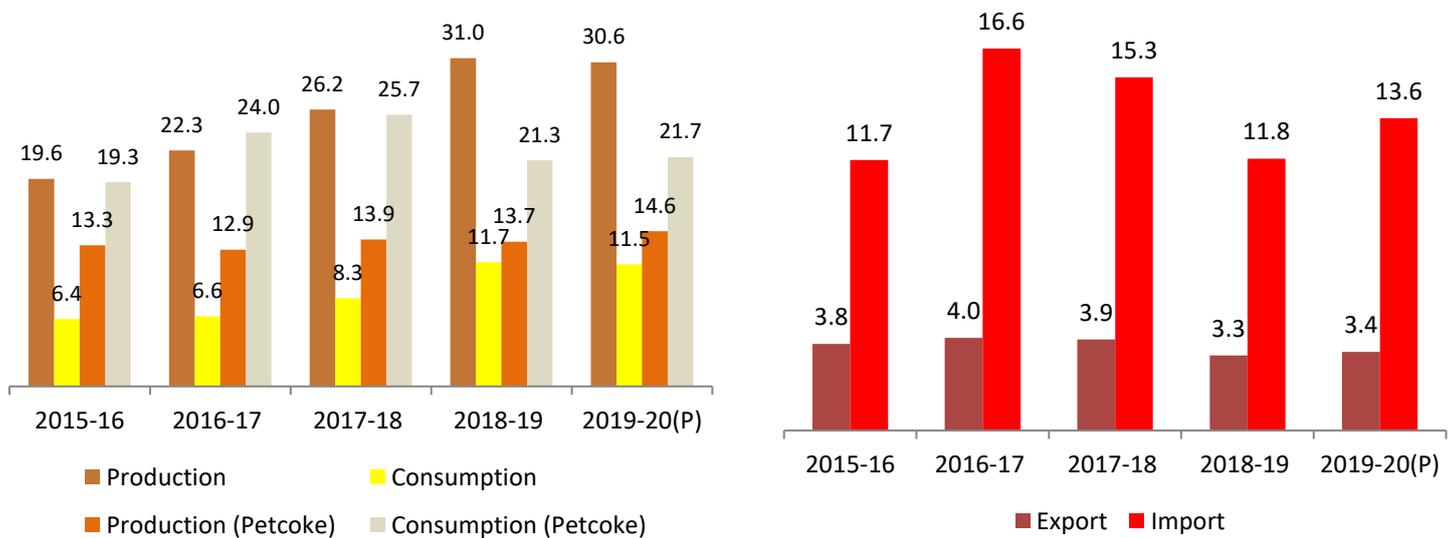
Factors which affect Lubricants and Greases Demand

Ideally if the automobile sector displaying encouraging growth the lubricant market, too is buoyant considering 65% of total consumption is via the automobiles segment. Increase in the Industrial production of country and agricultural activities too impact the demand for Lubricants and Greases.

- **Petcoke and other miscellaneous products**

Petcoke is primarily used as feedstock by Cement companies during the process of manufacturing of Clinker. Pet coke is used in kiln where limestone is ground and burnt till it forms clinker. In this process of calcination, limestone absorbs Sulphur and, therefore, emissions are minimized. Petcoke is also used in lime, Calcium carbide, gasification, Graphite electrode & Aluminum industries.

Chart 27: Production*, Consumption, Exports^ and Imports@ of other miscellaneous refinery products and Petcoke (Unit: million tonnes)



Source: PPAC

* Production include products like Propylene, solvents (Hexane, Benzene, Toluene, Xylene and Specialty solvents), Reformate, Mineral Turpentine Oil, Carbon Black Feed Stock, Waxes, Sulphur etc.

@ Others in import include Petcoke, Paraffin wax, Petroleum Jelly, Aviation Gas, MTBE, Reformate etc.

^ Others in export include Petcoke/CBFS, Benzene, Hexane, MTO, Sulphur etc.

Production* of miscellaneous petroleum products such as Propylene, solvents (Hexane, Benzene, Toluene, Xylene and Specialty solvents), Reformate, Mineral Turpentine Oil, Carbon Black Feed Stock, Waxes, Sulphur etc has grown at a CAGR of 11.8% whilst its consumption has grown at a CAGR of 16.1%.

Production of petcoke has grown at a CAGR of 2.4% whilst its consumption has grown at a CAGR of 2.9%. The consumption of petcoke fluctuates with demand in the cement industry. Domestic cement production has grown at a CAGR of 4.2% during FY16-20. India has been the largest consumer of petcoke in the world.

Exports^ of these petroleum products have fallen by 2.4% during FY16-20. Imports@ (which include the imports of petcoke as well) have increased at a CAGR of 3.7% in the same aforementioned time period. The Directorate General of Foreign Trade (DGFT) under Ministry of Commerce and Industry has banned import of petcoke for use as fuel during FY19, but has allowed its import only for use as feedstock in some select industries such as cement, lime kiln, calcium carbide and gasification industries.

Factors which affect Petcoke demand

Growth in the Cement Industry: The Cement industry is part of the core industrial sector and plays a crucial role in building up the nation's economy. India is the world's 2nd largest cement market, both in terms of production and consumption. The industry has been on a sustained growth path adding capacity, driven largely by the construction sector and the ambitious infrastructural projects announced by the government from time to time. Cement demand is closely linked to the overall economic growth, particularly the housing and infrastructure sector. Increasing demand from affordable housing and construction work for other government infrastructure projects like roads, metros, airports, irrigation etc. should ideally support the demand for cement going forward.

Demand-Supply of Refinery Products during 2020-21

With the outbreak of the COVID-19 pandemic across the world and with the nationwide lockdown imposed in the country, Indian refineries were operating at reduced capacities. The halt and standstill in air and road transportation, temporary shutdown of factories and offices operating on a work from home mode, had resulted in a sharp fall in demand for petroleum products. Many state refineries (MRPL, HPCL and IOC) had also declared force majeure on crude purchases as their crude storage tanks were full to the brim.

Table 4: Production and Consumption of Petroleum Products since the beginning of the new fiscal year

(Unit: Million Tonnes)

	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20
Production	16.0	17.3	18.7	19.4	17.9	18.0
m-o-m	-30.3%	8.3%	8.4%	3.5%	-7.5%	0.4%
y-o-y	-24.2%	-21.3%	-8.9%	-13.9%	-19.1%	-9.5%
Refinery Capacity Utilisation	71%	79%	84%	85%	78%	85%
Consumption	9.4	15.4	16.2	15.6	14.4	15.5
m-o-m	-41.5%	63.5%	5.3%	-3.8%	-7.5%	7.2%
y-o-y	-48.7%	-19.4%	-8.4%	-12.3%	-16.2%	-4.4%

Source: PPAC, CARE Ratings

*prorated on a monthly basis.

Consumption of petroleum products has been increasing as the country is channelling towards the unlock process. Consumption has fallen on an m-o-m basis during July and August as many state governments were announcing state-level lockdowns thus making the unlocking of the economy very sporadic in nature. The monsoon element has played into production during August 2020. But in September 2020 as the country unlocked further and more lockdown restrictions dropped the consumption of petro-products has increased m-o-m basis and is inching towards pre-covid level of consumption.

Cumulative product-wise demand-supply of refinery petroleum products

Table 5: Production and Consumption of Refinery Products during H1-FY21 (Unit: Million Tonnes)

	Production		Change (y-o-y)		Consumption		Change (y-o-y)	
	2019-20	2020-21	2019-20	2020-21	2019-20	2020-21	2019-20	2020-21
LPG	6.1	5.7	-3.2%	-6.4%	12.5	13.3	3.9%	5.9%
Naphtha	9.3	9.0	-5.9%	-2.9%	6.7	6.6	-0.8%	-2.2%
MS	19.2	15.9	0.4%	-17.1%	15.3	12.1	9.1%	-20.8%
ATF	7.4	2.7	-2.9%	-63.7%	4.0	1.2	-3.7%	-69.9%
SKO	1.6	1.3	-23.7%	-20.6%	1.4	0.9	-22.4%	-32.9%
HSD	54.8	45.7	-0.3%	-16.7%	41.4	30.9	1.1%	-25.3%
LDO	0.3	0.3	16.2%	-5.2%	0.3	0.3	15.9%	6.3%
Lubes	0.5	0.5	-8.1%	-4.7%	1.8	1.6	9.7%	-14.4%
FO/LSHS	4.9	4.3	-1.3%	-11.9%	3.1	2.8	-6.6%	-9.0%
Bitumen	2.3	1.6	-6.5%	-30.7%	2.9	2.7	3.0%	-8.2%
Pet Coke	6.8	5.8	-4.7%	-14.5%	10.9	9.1	0.3%	-16.9%
Others	14.9	14.6	-3.2%	-2.0%	5.9	4.9	4.5%	-16.2%
TOTAL	128.1	107.3	-2.0%	-16.3%	106.2	86.4	1.9%	-18.7%

Source: PPAC

*Others include sulphur, propylene, propane, reformat, butane, MTO (Mineral Turpentine oil) etc

Production of petroleum products has fallen by 16.3% during H1-FY21 as compared with the 2% decline in production achieved during H1-FY20.

Crude throughput of refineries processed 4.0 mb/d during H1-FY21 as compared with the 5.0 mb/d of crude processed during H1-FY20. Capacity utilisation was around 80% as compared with the 101% capacity utilization achieved during H1-FY20. Fall in demand has led to refiners trimming their capacity utilisation. A few state-owned refiners have also gone for maintenance shutdown in order to remain afloat and protect margins. Percentage share of HS crude in total crude oil processing was around 72.7% during H1-FY21 as compared with the 74% processed during H1-FY20. Private players are cumulatively operating at 86% capacity while state owned refiners are cumulatively operating at 77% capacity.

mb/d: Million Barrels per Day

Overall Petroleum products consumption fell by 18.7% during H1-FY21 but has recovered to 81.3% of its volume which was prevalent during H1-FY20. Except LPG and LDO cumulatively demand for all POL products has fallen. There has been a sharp recovery in consumption of all petro products (except FO& LSHS and Petcoke) in September 2020 as compared with August 2020, due to improved mobility on roads and further opening of economic activities during the month.

- **MS** consumption fell by 20.8% during H1-FY21 but has recovered to 79.2% of its volumes which was prevalent during H1-FY20. With the further unlocking of the economy, opening up of almost all offices and free movement of both two wheelers and passengers vehicles for leisure as well as official purposes, people are choosing to commute via their own personal vehicles rather than opting for public transport in order to avoid getting infected which has resulted in MS consumption moving towards normalisation.
- **HSD** consumption fell by 25.3% during H1- FY21 but has recovered to 74.7% of its volumes which was prevalent during H1-FY20. With the advent of Unlock 4.0, economic activities are slowly moving towards normalisation and

both manufacturing and services sector are benefitted by increase in demand. Road transport and freight activities such as that of rail and ports are also recovering. Agriculture based economy is still driving the HSD consumption.

- **Naphtha** consumption fell by 2.2% during H1-FY21 but has recovered to 97.8% of its volume as compared with the volume of consumption prevalent during H1-FY20 mainly due to its use in the petrochemicals industry. Robust production of urea too has added on to the recovery of the fuel.
- **ATF** consumption fell by 69.9% during H1-FY21 and has only recovered to only 30.1% of its volumes as compared with the volume of consumption prevalent during H1-FY20. Various measures by local government with respect to air travel are still in place to contain the spread of COVID-19 and international air travel still remains banned except for certain flights engaged in special services and those with established air bubbles. The total domestic passengers carried during H1-FY21 were 111.5 lakh as against 704.4 lakh during H1-FY20.
- **Bitumen** consumption fell by 8.2% during H1-FY21 but has recovered to 91.8% of its volumes as compared with the volume of consumption prevalent during H1-FY20 mainly due to accelerated road work and minor repair work. Road construction has also been carried out in states where the rainfall had been low. MORTH has constructed 3,951 km of National Highways upto September 2020 as compared with 5052 km during September, 2019.
- **LPG** consumption continues to gain traction and increased by 5.9% as the government continues to disburse free LPG refills under PMGKY-Ujjwala. Use of LPG by households has also increased as households under lockdown have ramped up purchases for cooking.
 - o PSU LPG Packed Domestic category recorded a cumulative growth of 13.5% during H1-FY21 as compared with 4.0% growth during H1-FY20. During April - September 2020, around 45.64 lakh new connections and 32.39 lakh DBCs were released. A total of 8.01 crore BPL households have been covered under PMUY till 30.9.2020 since inception of the scheme.
 - o PSU LPG Packed Non-Domestic category recorded a cumulative de-growth of -48.5% during H1-FY21 as compared with the 10.5% growth during H1-FY20.
 - o PSU Bulk LPG category registered a cumulative growth of 2.6% during H1-FY21 as compared with the 16.5% de-growth witnessed during H1-FY20.
 - o PSU Auto LPG category registered a cumulative degrowth of -50.4% during H1-FY21 as compared with the 5.7% de-growth witnessed during H1-FY20.
- **SKO** consumption continues to fall as all UTs except the UT of J&K and Ladakh have been declared kerosene free. The states Andhra Pradesh, Delhi, Haryana and Punjab have been declared kerosene free. States like Gujarat, Bihar, Uttar Pradesh and Maharashtra have also voluntarily surrendered a certain quantity of PDS SKO allocation.
- Increase in **LDO** consumption by 6.3% during H1-FY21 can be ascribed to its usage in various types of furnaces. Power generation, civil engineering and Iron & Steel were the major sectors contributing to the total consumption.
- Consumption of **Petcoke, Lubes & Greases** and **FO/LSHS** fell by 16.9%, 14.4% and 9% but has recovered to 83.1%, 85.6% and 91% of its volumes during H1-FY21 as compared with the volume of consumption during H1-FY20.

Exports of POL products have decreased by 6% during H1-FY21 as compared with the 2.5% growth achieved during H1-FY20. Decrease in POL products exports was mainly due to decrease in exports of ATF, naphtha, LPG, motor spirit, SKO, fuel oil, vacuum gas oil and bitumen. Global fall in demand of petroleum products due to COVID-19 induced lockdowns and social distancing measures adopted has resulted in the overall fall in exports.

POL products imports have increased by 3.6% during H1-FY21 as compared with the 29.8% growth achieved during H1-FY20. Increase in imports was mainly due to increase in imports of fuel oil, LPG, and bitumen.

Marketing

The retail marketing of petroleum products in India is done mainly by the public sector Oil Marketing Companies (OMCs) i.e. Indian Oil Corporation Ltd (IOCL), Hindustan Petroleum Corporation Ltd (HPCL), Bharat Petroleum Corporation Ltd (BPCL), and private companies like Reliance, Nayara & Shell. Important processes in the marketing include storage, distribution and sales of petroleum products. The OMCs perform marketing activities through their vast network of Terminals/Depots, LPG Bottling Plants, Retail Outlets, LPG Distributorships and SKO/LDO Dealers across India.

- **Retail Infrastructure**

Vast marketing infrastructure of OMCs comprise of petrol/diesel stations, Indane (LPG) distributorships, lubricants & greases outlets, consumer pumps which are backed by bulk storage terminals and installations, inland depots, aviation fuel stations, LPG bottling plants and lube blending plants amongst others.

Table 6: Industry marketing infrastructure as on 01.10.2020 (Unit: in Numbers) (Provisional)

Particulars	Total
POL Terminal/ Depots	307
Aviation Fuel Stations	256
Retail Outlets (total)	71,843
[^] out of which Rural ROs	18,923
SKO/LDO agencies	6,521

Source: PPAC

Petroleum, Oils and Lubricants (POL) depot consists of strategic storage of crude oil refinery products in sufficient quantities. The POL depot provides bulk storage facility for various fuels to meet the stocking requirements of various oil companies.

Aviation Fuel stations are situated at airports which can refuel aircrafts Aviation Turbine Fuel (ATF) is dispensed from specially designed re-fuellers, which are driven up to parked airplanes and helicopters. Major airports have hydrant refuelling systems that pump the fuel right up to the filling outlets on the tarmac through underground pipelines for faster refuelling. Essentially, ATF is pumped into an aircraft by two methods: Overwing and Underwing. Overwing fuelling is used on smaller planes, helicopters, and piston-engine aircraft and is similar to automobile fuelling - one or more fuel ports are opened and fuel is pumped in with a conventional pump. Underwing fuelling, also called single-point which is used on larger aircrafts.

Retail Outlets, commonly known as Petrol Pumps are engaged in making available automotive fuels/ lubricants and other value added services for the automobile / private transport sector. The Retail unit is so named, as it involves dispensing fuels of relatively smaller volumes to the vehicle fuel tank. Almost 99% of petrol and 90% of diesel is sold through retail pumps. There are almost 71,843 retail outlets in India and around 26% of these ROs are present in rural regions (as of 1.10.2020). PSU OMCs account for 90% of the retail outlets present in the country.

SKO/LDO agencies as the name suggests market/distribute kerosene and light diesel oil to its customers. In the case of Public Distribution System (PDS) Kerosene which is a subsidized product, it is distributed to the customers through the PDS network (Ration shop) of the State Governments / Union Territories (UT).

- **LPG Marketing**

LPG in India is predominantly marketed by Public Sector Oil Marketing Companies (OMC).

Table 7: Region-wise data on LPG marketing (As on 1.10.2020)

Particulars	North	North-East	East	West	South	Total
LPG Active Domestic Customers (in Lakh)	870	99	552	601	723	2,845
LPG Coverage (Estimated)	113.1%	91.7%	85.1%	89.4%	106.1%	98.8%
PMUY Beneficiaries (in Lakh)	249	42	254	175	81	801
Non-domestic LPG customers (in Lakh)	6.4	0.7	3.3	8.3	14.1	32.9
LPG Distributors (Numbers)	8,125	1,055	4,946	5,280	5,430	24,836
Auto LPG Dispensing Stations (Numbers)	115	0	52	147	343	657
LPG Bottling capacity# (MMTPA)	6.2	0.67	3.1	4.7	5.6	20.3
Bottling Plants* (Numbers)	61	12	28	45	52	198

Source: PPAC

*Includes Numaligarh BP, Duliajan BP and CPCL BP. # Bottling Capacity is based on number of shifts presently in operation at plants.

- PSU OMCs together have 28.45 crore active LPG customers in the domestic category which are being served by 24,836 LPG distributors. The LPG coverage of the country estimated on the basis of active domestic connections and estimated households as on 1st October 2020 are around 98.8%.
 - o Uttar Pradesh has the most number of LPG distributors accounting for 16.6% of the total, followed by Maharashtra and Bihar at 8.8% and 7.8% respectively.
- PSU OMCs have a total of 198 LPG bottling plants all over India with rated bottling capacity of around 20.3 million metric tonnes per annum (MMTPA).
 - o Uttar Pradesh has the most number of LPG bottling plants accounting for 13% of the total, followed by Tamil Nadu and Karnataka at 8.2% and 7.4% respectively.
- PSU OMCs have a total of 657 Auto LPG Dispensing Stations all over India for catering to LPG demand in the automotive sector.
 - o Karnataka has the most number of Auto LPG Dispensing Station accounting for 17% of the overall total followed by Tamil Nadu and Kerala at 13.7% and 10.4% respectively.

• Product Pipelines

The primary transportation of POL products across the country takes place by four transportation modes viz. pipelines, rail, coastal and road. Generally pipeline represents the cheapest mode of POL transportation. Pipelines are the most cost effective, energy efficient, safe and environment friendly mode of transportation of petroleum products. They ease the overburdened rail & road infrastructure and minimise the environmental impacts arising out of rail and road transportation.

Table 8: Major product pipeline network (as on 01.10.2020)

	Oil India	IOCL	BPCL	HPCL	Others*	Total
Length (kms)	654	9,400	2,241	3,775	2,395	18,465
Capacity (MMTPA)	1.7	46	19.5	34.7	9.4	111.3

Source: PPAC

*Others include GAIL and Petronet India. HPCL and BPCL lubes pipeline included in products pipeline data

Pipelines play a significant role in meeting the demand of petroleum products in India by ensuring product availability to consumers and the public at large from the refineries itself. Primarily products which are transported via these product pipelines are ATF, Lubes and LPG.

Government Balances

The government is impacted by fuel prices in two ways.

- First, the government (both centre and states) earns substantial revenue from petro-products through taxation. As the major oil and gas products have been kept out of GST purview (except LPG, Kerosene, Naphtha, Butane / Propane, Bitumen & Asphalt, Furnace Oil, Light Diesel Oil, Low Sulphur Heavy Stock/ HPS & other Res., Lube oil/greases, Petroleum Coke, Petroleum Jelly, Transformer Oil and Waxes all types), states are also able to levy variable taxes as a result of which prices vary across states.
- Second, the government also provides a subsidy for fuel products in order to buffer against prices.

- **Revenue collections**

Taxes levied on petro-products are an important source of revenue to the government. Since the nation-wide rollout of GST; crude oil, petrol, diesel, ATF and natural gas have been kept out of the GST ambit. Products such as LPG, Naphtha, Kerosene, Bitumen etc. are subject to a GST rate.

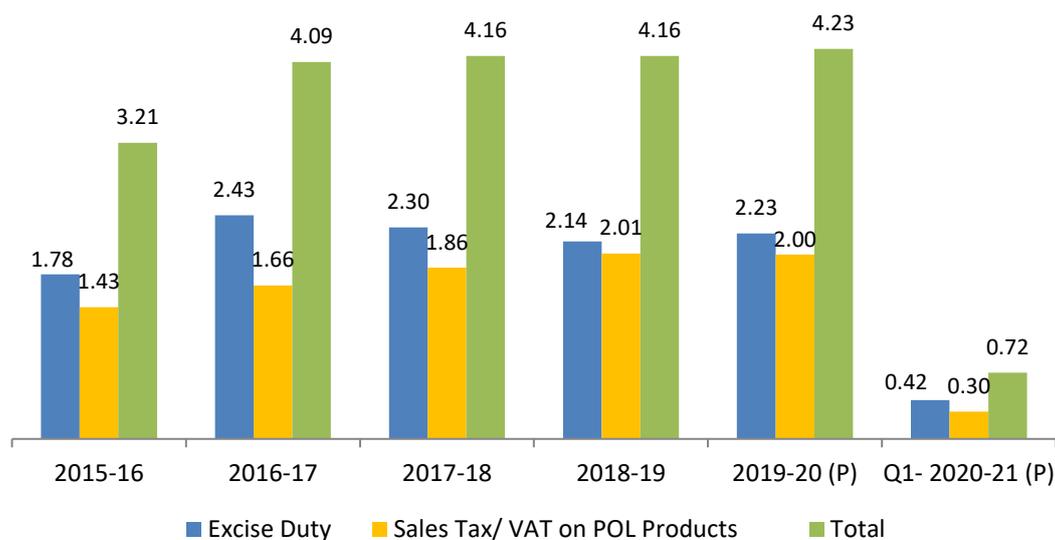
Table 9: Contribution of the Petroleum Sector towards Exchequer during 2019-20 (Unit: Value in Rs. /crore)

Contribution to Central Exchequer		Contribution to State Exchequer	
A. Tax/ Duties on Crude oil & Petroleum products		A. Tax/ Duties on Crude & Petroleum products	
Excise Duty	2,23,057	Sales Tax/ VAT on POL Products	2,00,247
Cess on Crude Oil	14,789	Royalty on Crude Oil / Natural Gas	11,882
Royalty on Crude Oil / Natural Gas	5,602	Octroi, Duties Incl. Electricity Duty	716
Customs Duty	22,927	SGST/UTGST	7,345
IGST	13,099	Entry Tax / Others	405
CGST	6,831		
Service tax	17		
NCCD on Crude Oil	1,130		
Others	88		
Sub Total (A)	2,87,540	Sub Total (A)	2,20,595
B. Dividend to Government/ Income tax etc.		B. Dividend to Government/ Direct tax etc.	
Corporate/ Income Tax	23,134	Dividend Income to State Govt.	215
Dividend income to Central Govt.	12,270		
Dividend distribution tax	5,462		
Profit Petroleum on exploration of Oil/ Gas	5,909		
Sub Total (B)	46,775	Sub Total (B)	215
1.Total Contribution to Central Exchequer A+B	3,34,315	2. Total Contribution to State Exchequer A+B	2,20,810
Total Contribution of Petroleum Sector to Exchequer (1+2)		5,55,125	

Source: PPAC

Tax/ Duties on Crude oil & Petroleum products (from the state and centre) make up almost 90% of the total contribution of the petroleum sector towards the exchequer.

Chart 28: Tax collections on Petro-Products (Unit: Value in Rs/lakh crore)



Source: PPAC

Total tax collection has increased at a CAGR of 7.1% during FY16-20. As can be seen, Rs 4.23 lakh crore was generated by the government through excise duty and VAT collection on petro-products during FY20.

For the centre, during FY20, 78% of the total came from excise duties and the balance from crude oil cess and customs, royalties and CGST. Union excise collections on oil products were Rs 2.23 lakh crore out of the total of Rs 3.34 lakh crore collections under this heading of the central government.

For the state during FY20, 91% of the total came from state VAT levied on POL products and the balance from royalties, crude oil cess, SGST/UTGST, octroi and duties. VAT collections on oil products were Rs 2.00 lakh crore out of the total of Rs 2.2 lakh crore collections under this heading of the state government. Maharashtra is the highest contributor to the total state collections accounting for 13% of the total Sales Tax /VAT on POL collections.

Table 10: Revenue from central excise duty collected on petrol, diesel and ATF (Unit: Value in Rs/lakh crore)

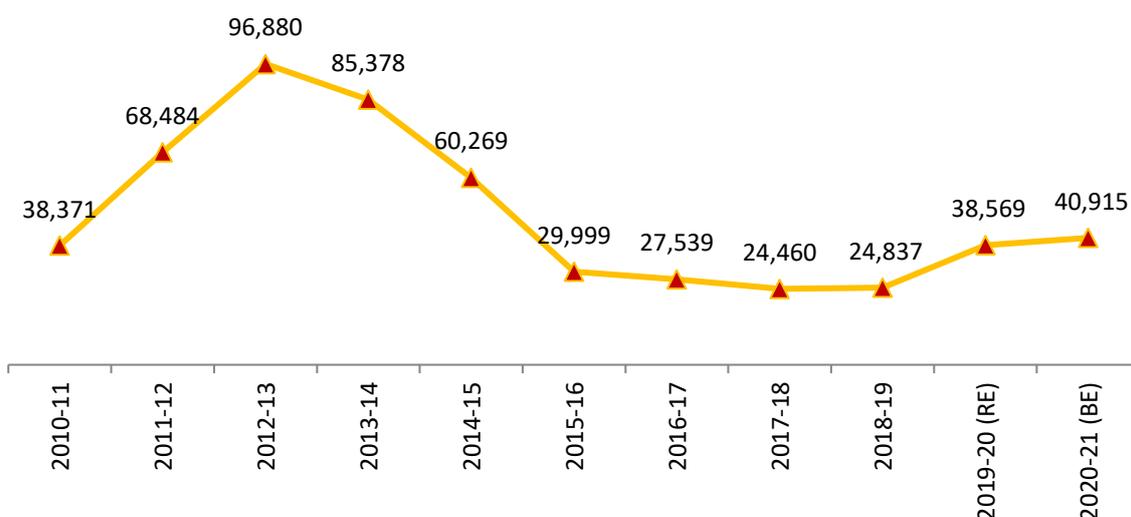
Commodity	2017-18	2018-19	2019-20	2020-21 (Apr-Aug)
Petrol	0.74	0.69	0.83	0.31
High Speed Diesel	1.51	1.44	1.32	0.72
ATF	0.019	0.025	0.02	0.00128

Source: PIB

- Fuel Subsidies**

The government of India provides subsidies and controls the retail selling price of LPG and SKO. Initially the price of petrol and diesel were also controlled by the government and was included in the purview of the fuel subsidy, but those were done away with and deregulated. Price of petrol was made market determined effective June 26, 2010 onwards and the price of diesel has also been completely deregulated effective October 19, 2014. There is no under recovery related subsidy payment for petrol and diesel by the government since then.

Chart 29: Petroleum subsidy provided by the government (Unit: Rs/crore)



Efforts have been made to lower the fuel subsidy by restricting the products that are to be subsidized as well as to target them more effectively.

Table 11: Petroleum subsidy provided by the government post deregulation of Diesel (Unit: Rs/crore)

	2015-16	2016-17	2017-18	2018-19	2019-20 (RE)	2020-21 (BE)
LPG	22,660	18,678	15,656	20,268	34,086	37,256
Kerosene	7,339	8,861	8,804	4,569	4,483	3,659
Total Subsidy	29,999	27,539	24,460	24,837	38,569	40,915

Source: Union Budget

RE: Revised Estimate; BE: Budget Estimates

The revised estimate for FY20 is Rs. 38,569 crore and the fuel subsidy budgeted for the year FY21 is Rs. 40,915 crore. The government has increased the fuel subsidy by 6.1%. Within the subsidy, the allocation towards the LPG subsidy has increased by 9.3% while the subsidy for Kerosene has been reduced by 18.4%. The government is reducing the allocation of PDS SKO ever since it has been trying to increase the coverage of LPG. Many states are also voluntarily surrendering some of the allocation to get cash benefits from the Centre on account of reduced kerosene off-take.

Policies and Initiatives

For Refining

Switch to BS VI Fuel: The government of India had decided to implement BS VI transportation fuel by April 1, 2020. Indian refiners were required to produce BS VI fuel for sale in India by April 2020. In order to meet the stipulated fuel quality for BS-VI fuels, Indian refineries had undergone major upgradation. The switch to BS-VI fuel by skipping BS-V fuel was done in order to combat the pollution levels in the economy. With this India joins the select league of nations using petrol and diesel containing just 10 parts per million of sulphur in an attempt to cut vehicular emissions. It also gives an opportunity to Indian refiners to export gasoline and diesel in the global market, where Euro 6 fuel is accepted.

IMO 2020: By giving an implementation deadline of 1st January 2020, the International Maritime Organisation (IMO) had introduced a new regulation for a 0.5% global sulphur cap for marine fuels (against the previous limit of 3.5%, which has been in effect since 1st January 2012). The change is called IMO 2020. The driver of this change was the need to reduce the air pollution created by the shipping industry by reducing the sulphur content of the fuels that ships use. Indian refineries have been equipping themselves to produce low sulphur marine bunker fuel which is according to changes specified in IMO 2020.

For Marketing

Direct Benefit Transfer for LPG Subsidy (DBTL): Direct Benefit Transfer for LPG Subsidy or PAHAL (Pratyaksh Hanstantrit Labh) is a scheme which provides the LPG subsidy amount applicable on the domestic LPG cylinder directly into the consumer's bank account. At the time of LPG cylinder delivery, consumer will have to pay the full price of the LPG cylinder. It required the consumer to mandatorily have an Aadhaar number for availing LPG Subsidy. Subsequently the government also launched the '#GiveltUp' campaign which is aimed at motivating LPG users who can afford to pay the market price for LPG to voluntarily surrender their LPG subsidy. The objective of this initiative is to enable the Government to utilise the resources thus available to reach out to economically backward classes.

Table 12: Subsidy disbursed under DBTL (Unit: Rs/crore)

	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20 (P)
Total DBTL related subsidies	3,912	3,971	22,011	12,905	20,905	31,539	22,726

Source: PPAC

The DBTL scheme was earlier launched on 1st June 2013 but the government comprehensively reviewed the scheme and after examining the difficulties faced by the consumers, modified it and re-launched it on 15.11.2014 (1st Phase) and on 1.1.2015 in rest of the country.

Direct Benefit Transfer in PDS Kerosene (DBTK) Scheme: With the successful implementation of DBTL, the government launched the Direct Benefit Transfer in PDS Kerosene (DBTK) Scheme. The DBTK Scheme is being implemented with an objective to bring reforms in allocation and distribution of PDS SKO distribution system. Under the DBTK Scheme, as a part of distribution reforms, PDS Kerosene is sold to the identified beneficiaries at non-subsidized rate and the applicable subsidy is directly transferred into the bank account of the beneficiaries. The aim of DBTK was to result in better subsidy management through direct transfer of subsidy into bank accounts of the beneficiaries thus also resulting in reducing the subsidy outgo by means of curbing diversion of subsidized Kerosene.

Table 13: Subsidy disbursed under DBTK (Unit: Rs/crore)

	2016-17	2017-18	2018-19	2019-20 (P)
DBTK subsidy	11	113	117	36

Source: PPAC

As a part of Allocation reforms, States/ UTs have been encouraged to undertake voluntary cut in their PDS SKO allocation by means of providing cash incentive out of the subsidy savings attributable to voluntary cut. Further, States/ UTs are encouraged to become 'Kerosene Free' by bringing all households under LPG.

Pradhan Mantri Ujjwala Yojana (PMUY): Pradhan Mantri Ujjwala Yojana (PMUY) was launched on May 1st, 2016 with an objective to provide safe cooking gas- LPG; to BPL families. As per the scheme, the connection is to be provided in the

name of the adult women of the family with a subsidy of Rs 1,600 per connection. This subsidy is intended to cover the security fee for the cylinder and the fitting charges. The beneficiary has to buy for her own cooking stove and the government will sponsor the first refill as well. However, the cost of all subsequent refills is to be borne by the beneficiary household.

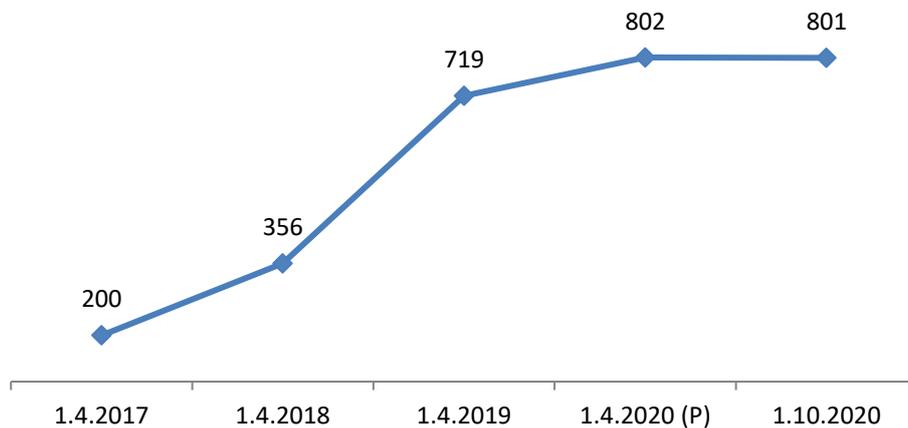
Table 14: Subsidies disbursed under PMUY (Unit: Rs. /crore)

	2016-17	2017-18	2018-19	2019-20 (P)
Total PMUY related subsidy	2,999	2,559	5,523	1,293

Source: PPAC

The aim of PMUY was to safeguard the health of the women & children so that they don't have to compromise their health in smoky kitchens or wander in unsafe areas through the drudgery of collecting firewood. (The smoke from burning such fuels causes alarming household pollution which causes several respiratory diseases/ disorders)

Chart 30: Trend in PMUY beneficiaries (Unit: in lakhs)



Source: PPAC

Initially only 5 crore LPG connections were to be disbursed by March 2019 but the target was later raised to 8 crore connections by 2021. The government also extended the scheme to include all SC/ST households, forest dwellers, most backward classes, inhabitants of islands, nomadic tribes and tea estates households among others.

The initial target of providing 5 crore LPG connections under PMUY was achieved much before the deadline of March 2019 and the revised target of providing 8 crore LPG connections by March 31, 2020 too was achieved by September 2019, 6 months ahead of the target date.

Opening up the Oil retail market: During October 2019, the government opened up setting of a fuel retail market by allowing all companies with a net worth of Rs. 250 crore to set up retail fuel outlets. As per the old rules, companies were required to invest at least Rs. 2,000 crore in the petroleum sector to enter the fuel retail segment. With this even non-energy companies (companies not having prior investment in the oil and gas sector, mainly in exploration and production, refining, pipelines/terminals etc) can sell petrol and diesel to consumers, but only if the following rules are met:

- In addition to conventional fuels, the authorized entities are required to install facilities for marketing at least one new generation alternate fuel, like CNG, LNG, biofuels, electric charging, etc. at their proposed retail outlets within 3 years of operationalization of the said outlet
- The authorised entities are required to set up minimum 5% of the total retail outlets in the notified remote areas within 5 years of grant of authorisation. A robust monitoring mechanism has been set up to monitor this obligation.
- An individual may be allowed to obtain dealership of more than one marketing company in case of open dealerships of PSU OMCs but at different sites.

Change in the erstwhile rules was to encourage more private players, including foreign players to invest in retail fuel marketing which can lead to better competition and better services for consumers. The entities seeking market authorisation for petrol and diesel are allowed to apply for retail and bulk authorisation separately or both and have been given flexibility in setting up a joint venture or subsidiary for market authorisation.

Under-recoveries

Under-recovery is used to denote the notional losses that oil companies incur due to the difference between the subsidized price at which the oil marketing companies sell certain products and the price which they should have received for meeting their cost of production. Refineries charge the trade parity cost or the refinery gate price of petroleum products from the OMCs.

Table 15: Under-recovery (UR) on Petroleum Products (Unit: Rs. / crore)

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20 (P)
UR on Petrol	2,227	-	-	-	-	-	-	-	-	-
UR on Diesel	34,706	81,192	92,061	62,837	10,935	-	-	-	-	-
UR on Domestic LPG	21,772	29,997	39,558	46,458	36,580	18	-	-	-	-
UR on PDS Kerosene	19,484	27,352	29,410	30,574	24,799	11,496	7,595	4,672	5,950	1,833
Total	78,190	1,38,541	1,61,029	1,39,869	72,314	11,515	7,595	4,672	5,950	1,833

Source: PPAC

The lowering of oil prices, coupled with deregulation of petrol prices (w.e.f. June 26, 2010) and diesel prices (w.e.f. October 19, 2014), has contributed in significantly reducing the under-recovery burden on public sector OMCs. Under recovery on LPG too was reduced and has become nil with the launch of the PAHAL scheme. Under recoveries have fallen by 69.2% during FY20 and OMCs are now incurring under recoveries only on the sale of PDS kerosene since FY17.

Gross Refining Margin (GRM)

Gross Refining Margin (GRM) is the difference between the total value of petroleum products coming out of an oil refinery (output) and the price of the raw material, (input) which is crude oil.

It is most useful in assessing the direct effect of market conditions on refinery economics; separate from the effects of operational performance. It is a major indicator of the refinery's operational efficiency. Usually, GRMs are measured in terms of USD per barrel. **Uptrend in GRMs signal increase in the profitability of the refineries.**

The GRMs can be said to be dependent on the following factors:

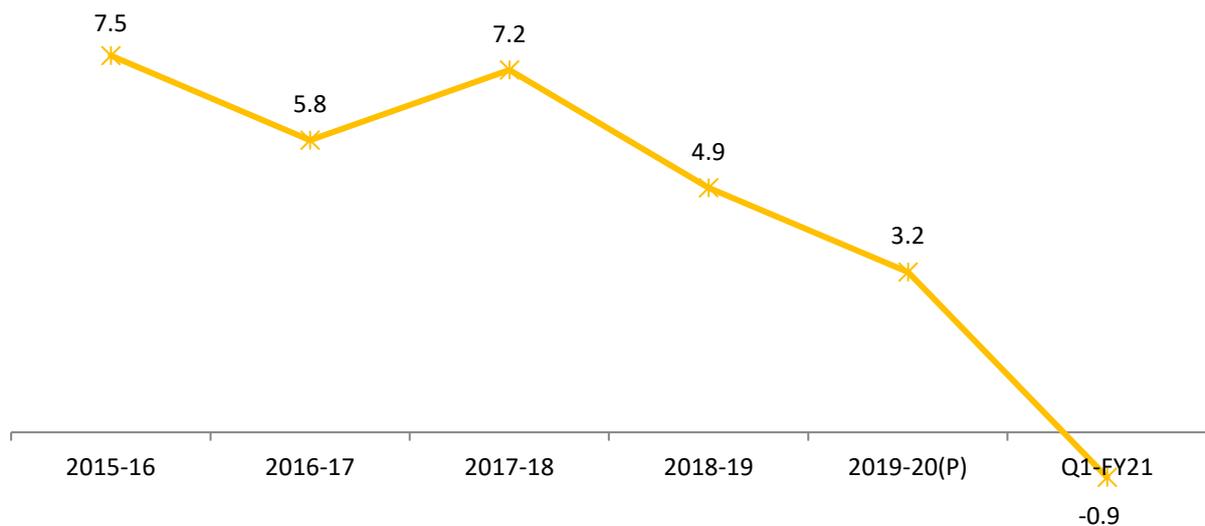
Price of Crude Oil: Crude oil constitutes 95% of the raw material costs. Rising crude oil prices, increases the input costs of refiners. Efficiency in procurement of crude oil can also help in improving GRMs as crude oil prices trading in international markets are very volatile. The type of crude oil that a refinery processes also affects the GRMs.

Product mix: Petroleum products can be classified into heavy, medium and light distillates. Light distillates are high in value and hence trade at a premium to medium and heavy distillates. The price of each of these is different and the GRM for a refinery is higher if it produces more of high-value products such as LPG, petrol and naphtha (light distillates).

Complexity of the refinery: A complex refinery is one which has the ability to process heavy/low quality crude that can be sourced cheaper than light or good quality crude. A refinery's complexity is measured in terms of Nelson Complexity Index (NCI). Refineries with a Nelson complexity of 10 or above are considered complex, which allows them to process crude that is cheaper. Since complexity is a measurement of the capability, if a refinery is able to produce petroleum products that are high in value via inferior and cheap variety of crude oil, it can lead to an increase in the GRMs. Refineries on the other hand which are old and less energy-efficient, can have their performance affected and in turn their GRMs as well.

Location of the refinery: Refineries located on the coast are at an advantage as it is located near the source of crude which brings down the transportation cost and enhances the GRM while those which are land-locked need to transfer crude to different locations from the coast, thus pushing up costs.

Chart 31: Trend in GRM of the Singapore Benchmark (Unit: USD/bbl)



Source: PPAC, Company Filings

The Singapore benchmark is tracked as it is the yardstick of profitability for crude refiners. During FY20 the Singapore benchmark had fallen as refining margins/cracks of diesel and petrol also did not rise in a slowing global economy coupled with a supply glut and fall in demand.

The benchmark GRM was also affected with the rollout of the IMO's new standards applicable out from January onwards. This shift was expected to boost gross refining margins as the demand for cleaner fuels was expected to rise. But the GRMs dropped as the demand for fuel oil fell and demand for low-sulfur fuel didn't compensate that decline, narrowing the margins. U.S. sanctions on two state-owned Chinese crude shipping companies which led to the increase in cost of

importing and exporting oil tightened the supply in the tanker market, leading to a surge in freight rates and thus affecting the margins during FY20.

With the wildfire like spread of COVID-19 pandemic all over the world, the fall in crude oil prices along with the sharp fall in demand have led to the GRMs to turn negative during Q1-FY21. Negative GRMs signify that refiners are incurring losses for refining every barrel of crude.

Financials

Financials of R&M companies are dependent on a number of factors such as economic growth, vibrancy of demand for petroleum products, crude oil prices, refinery throughput, Gross Refining Margins, Refinery Transfer Price, Product Cracks, inventory held, Marketing Margins and foreign exchange loss/gain.

A primer on few concepts

Refinery Gate Price / Refinery Transfer Price (RGP/ RTP): This is the price paid by the OMCs to domestic refineries for the purchase of finished petroleum products at refinery gate. Price of RTP is greatly influenced by the trend in crude oil prices which is instrumental in deciding the international product price.

Inventory Loss/ Gain: An inventory loss is recorded when a company buys raw material at a particular price but by the time it is shipped and processed into fuel, rates have fallen. Since retail prices are benchmarked to prevailing international prices, an inventory loss is recorded. In case of reverse, an inventory gain is booked.

Marketing Margins: Marketing margin is the profit earned from the retailing of motor fuels. It constitutes nearly 40-60% of the total operating profit of OMCs. If crude – raw material – prices fall and retail prices remain the same or increase, then OMCs earn higher gross marketing margin and vice versa.

Crack spreads: A crack, or crack spread, is used to represent the differences between crude oil and wholesale petroleum product prices. It is an industry specific type of GRM. Crack is one primary indicator of oil refining companies' earnings.

Table 16: Financials of 7 Refining and Marketing Companies

	2015-16	2016-17	2017-18	2018-19	2019-20	Q1-FY20	Q1-FY21
Net Sales	11,59,239	12,66,078	14,39,587	17,38,457	16,29,560	4,27,585	2,48,243
Percentage (+/-)	-11.4	9.2	13.7	20.8	-6.3	-0.5	-41.9
Operating Profit	96,450	1,20,523	1,36,979	1,35,055	1,00,871	30,411	27,123
OPM (%)	8.3	9.5	9.5	7.8	6.2	7.1	10.9
Interest	7,813	7,990	10,301	17,000	22,505	5,118	7,119
ICR (times)	12.3	15.1	13.3	7.9	4.5	5.9	3.8
Profit after tax	51,298	69,453	72,429	65,337	32,753	13,785	16,306
NPM (%)	4.4	5.5	5.0	3.8	2.0	3.2	6.6
Brent Crude Oil (USD/bbl)	48.7	50.3	58.3	70.8	61.1	68	33

Source: ACE Equity, CARE Ratings

Total net sales include revenue from operations from refineries, pipelines, retail fuel outlets, budgetary support towards under recovery of sales and subsidies from the sale of LPG and Kerosene. Total net sales have grown at a CAGR of 8.9%

during FY16-20 whilst the increase in demand of refinery products and crude throughput too has grown at CAGR of 3.7% and 2.2%.

In the previous financial year i.e. during FY20, the downstream segment was imperilled with a subdued demand for petroleum products in the start of the year which later recovered H2-FY20 onwards. Refiners were also undertaking upgradation activities to gear up for the production of BS-VI fuels which too had resulted in a lower than usual throughput. High inventory and forex losses led to a fall in profits as well. The impact of COVID-19 pandemic on the physical and financial performance was lesser as the lockdown was announced only in the last week of March 2020. However, sharp fall in crude oil prices in March 2020 did have an impact on the R&M players in the form of sharp inventory losses leading to a fall in margins.

In the current financial year, during Q1-FY21, COVID-19 induced government lockdown had completely stalled any transport air and road (except of essentials) and had also adversely affected several service sectors such as trade, tourism and hospitality which have a bearing on demand of petroleum products leading to a sharp fall in net sales by 41.9%. Refinery throughput was down by 22.9%.

In Q1FY21, due to changes in oil market, crude prices averaged much lower and inventory losses were limited, as crude prices were gaining throughout the quarter. Such a move helped OMCs to sell the crude, purchased at lower prices, at higher rates in the market which limited the losses. While the crude prices were trending lower, retail prices remained the same, which helped the OMCs earned abnormally high gross marketing margins. Post-May 6 as government imposed higher taxes and retail fuel prices remain unchanged, OMCs adjusted this against their earnings. Downstream companies have experienced a sharp fall in gross refining margins but have remained afloat with a steady increase marketing margins given the increase in taxes by the government.

Fall in crude oil prices has also attributed in an increase in the OPM and NPM as compared with the margins during Q1-FY20 due to the sharp fall in the expenses of the industry.

CARE Ratings Views and Opinions: Outlook FY21

Consumption

In the recent months as the economic environment has improved India's fuel demand is on a recovery path after the lows witnessed during April-May 2020 as economic activity is picking up with the subsequent easing of lockdown restrictions. Except schools, colleges and religious establishments most the economy has opened up and is operating at a limited capacity.

The consumption of petroleum products in the country, underscores the high growth potential that the domestic market offers for refined products and India will continue to be a major demand centre over the long-term but since the virus is showing no signs of abating for the time being, demand is to be muted or subdued for the time being atleast till there is a vaccine. **Overall consumption of petroleum products is to fall by 8.6% during by the end of FY21 though a recovery of 1.2% is expected during H2-FY21.**

- Recovery in total consumption during H2-FY21 is to be supported by the increase in demand for auto fuels such as diesel and petrol and industrial fuels such as bitumen and lubes & greases.
- Increase in consumption of LPG and LDO is to remain elevated while there will be a fall in consumption of ATF, SKO, Naphtha, Petcoke and FO&LSHS during H2-FY21.

The consumption of petrol which constitutes around 13%-14% of the overall fuel consumption and diesel which constitutes around 39% of the overall fuel consumption **will register a fall in consumption of 6% and 10.9% by the end of FY21.**

- Recovery in consumption of petrol is expected to be around 9.4% and 3.6% for diesel during H2-FY21.
- Demand for petrol will be more resilient than diesel due to an increased preference for using personal vehicles instead of public transport to follow distancing norms. Pent-up demand and the upcoming festival season may also support fuel sales.
- Vibrancy in the rural markets is to also further demand of diesel on the back of a favourable monsoon seasons and a good kharif cropping season.

The LPG segment is witnessing a major transformation, with a slew of reform measures. Consumption of LPG has remained elevated and has defied a broader demand slump for oil products in India as families spent more time cooking at home amid the lockdown. **Going forward, LPG demand is to increase by 6.3% during FY21.** LPG consumption had increased by 5.9% during FY20 and has increased by 5.9% during H1-FY21 as well.

- LPG consumption is also benefitting as the government is stocking up supplies to ensure regular deliveries across the economy.

Consumption of ATF is to continue to be sub-par as airlines are yet to resume full operations. **Going forward, ATF demand is to fall by 52.8% during FY21.** Opening up of the economy has also led to petrochemical operations normalising and going forward, **consumption of Naphtha is to fall by only 1.5% by the end of FY21.**

Production

Indian refineries usually operate more than their listed nameplate capacity but given the current situation most of them are not operating upto their full capacity in order to contain the level of rising inventories and in order to protect their margins. **Capacity utilisation will probably reach 100% operations November onwards with the onset of the festive season and rebound in fuel demand which even a rapidly spreading virus is cannot derail.** Currently capacity utilisation has been around 80% during H1-FY21 as compared with the consumption prevalent during H2-FY20.

- In terms of refining activities, crude throughput is to fall by 7.3% during FY21. Consumption of crude oil is likely to come down to around 4.73 mb/d during FY21 as compared with the 5.09 mb/d consumed during FY20.

Going forward, refiners are expected to focus on producing less diesel and more petrol in order to respond to changing demand dynamics.

- There has been a structural shift in India's demand for diesel as slowing primarily the country's car fleet are shifting predominantly to petrol, trucks are getting more efficient and solar pumps are displacing diesel-fed units across the countryside. Some auto makers are also rejigging their portfolio by either discontinuing diesel-powered vehicles or those which have low sales volume.
- Use of hydrogen and natural gas in trucks and buses is also leading to a shift which has entangled refiners at crossroads, considering over the years diesel sales have been double of that of petrol.
- The price advantage of once diesel had is also stymied as the fuel now costs almost as much as petrol in some states.

Financials

Benign oil prices due to COVID-19 related demand concerns and recovery in fuel demand in the economy particularly of diesel and petrol is to aid in the financials of the Indian oil refining companies given the increase in auto fuel marketing margins. GRMs are to recover during Q2-FY21 but it will still be lower than what it was during Q2-FY20.

Appendix

Refining Process

Petroleum refining begins with the distillation, or fractionation of crude oils into separate hydrocarbon groups. The resultant products are directly related to the characteristics of the crude processed. Most distillation products are further converted into more usable products by changing the size and structure of the hydrocarbon molecules through cracking, reforming, and other conversion processes.

These converted products are then subjected to various treatment and separation processes such as extraction, hydro treating, and sweetening to remove undesirable constituents and improve product quality. Integrated refineries incorporate fractionation, conversion, treatment, and blending operations and may also include petrochemical processing.

The first step in the refining process is the separation of crude oil into various fractions or straight run cuts by distillation in atmospheric and vacuum towers. The main fractions or cuts obtained have specific boiling-point ranges and can be classified in order of decreasing volatility into gases, light distillates, middle distillates, gas oils & residues.

Next, these distillation cuts are further processed through conversion units to transform them into a more profitable mix of products. A typical refinery has 5-10 different conversion units, such as an FCC or coker. These allow the refinery to produce a mix of petroleum products that is more valuable than the mix that occurs naturally in crude oil. Many of the outputs from one conversion unit are also then fed into another conversion unit

Next, refiners employ treating units such as hydrotreaters to improve stream qualities and to remove contaminants

Finally, refiners blend different streams to create batches of finished refined products meeting the exact quality specifications that the market wants

Table 17: Classification of Refinery Petroleum Products on the basis of distillates

Light	Middle	Heavy
Naphtha	ATF	FO
LPG	SKO	LSHS
MS	HSD	Bitumen
	LOBS	
	LDO	

Source: CARE Ratings

“Middle distillates” is assigned to petroleum products obtained in the “middle” boiling range from about 180°C–360°C during the process of crude oil distillation. They are also called middle distillates because the products are removed at mid-height in the distillation tower during the multi-stage process of thermal separation.

Revenue Collections

Taxes levied by the centre are a fixed amount whereas state governments not only follow a different tax rate regime but also levy taxes on an ad-valorem basis.

Table 18: Break up Central Excise and Customs Tariff Table levied by the Central Government

Particulars	CUSTOMS			CENTRAL EXCISE		
	Basic Customs Duty	Additional Customs Duty (CVD)	Additional Customs Duty	Basic Excise Duty	Special Additional Excise Duty	Additional Excise Duty (Road and infrastructure Cess)
NON GST GOODS						
Crude Petroleum	Rs 1/MT + Rs. 50/MT as NCCD	Rs.1/MT	-	Rs. 1/MT+ Cess @ 20% +Rs.50/ MT as NCCD	-	-
Petrol	2.5%	Rs.2.98/ltr. + Rs.12/ ltr SAD	Rs.18/ltr.	Rs.2.98/ltr	Rs.12/ltr	Rs.18/ltr.
Petrol (branded)	2.5%	Rs.4.16/ltr. + Rs.12/ ltr SAD	Rs.18/ltr.	Rs.4.16/ltr	Rs.12/ltr	Rs.18/ltr.
High Speed Diesel	2.5%	Rs.4.83/ltr+ Rs.9/ ltr	Rs.18/ltr.	Rs.4.83/ltr	Rs.9/ltr	Rs.18/ltr.
High Speed Diesel (branded)	2.5%	Rs.7.19/ltr+ Rs.9/ ltr	Rs.18/ltr.	Rs.7.19/Ltr	Rs.9/ltr	Rs.18/ltr.
Aviation Turbine Fuel	5%	11%	-	11%	-	-

Source: PPAC

Particulars	GST GOODS		
		Customs	
		Basic Customs Duty	CVD (in lieu of IGST)
LPG	Domestic (Note-3)	Nil	5%
	Non - Domestic	5%	18%
Kerosene	PDS	Nil	5%
	Non PDS	5%	18%

Naphtha	Fertilizer	Nil	18%
	Non- Fertilizer	4%	18%
Butane / Propane	Domestic	Nil	5%
	Non-Domestic	2.5%	18%
Bitumen & Asphalt		5%	18%
Furnace Oil	Fertilizer	Nil	18%
	Non- Fertilizer	5 %	18%
Light Diesel Oil		5%	18%
Low Sulphur Heavy Stock/ HPS & other Res.	Fertilizer	Nil	18%
	Non- Fertilizer	5%	18%
Lube oil/greases		5%	18%
Petroleum Coke		10%	18%
Petroleum Jelly		5%	18%
Transformer Oil		5%	18%
Waxes all types		5%	18%

Source: PPAC

Note: 1. In addition to the above, 10% Social Welfare Surcharge (3% in case of petrol and diesel) is also applicable on the total duties of Customs (excluding CVD in lieu of IGST).

2. In case of ATF, Basic Excise Duty /Additional Customs Duty (CVD) is 2% in place of 11%, for supply to schedule commuter airlines (SCA) from the regional connectivity scheme (RCS) airports.

3. Basic Customs duty is Nil for import of domestic LPG sold to household consumers (including NDEC) by PSU OMCs. Basic Customs duty rate is 5% for other importers of domestic LPG.

Table 19: Statement showing the Actual rates of State taxes (posted as on 1.9.2020)

State/UT	Petrol	Diesel	SKO (PDS)	Domestic LPG
States	Sales Tax/VAT		GST	
Andaman & Nicobar Islands	6%	6%	5%	5%
Andhra Pradesh	31% VAT + Rs.4/litre VAT	22.25% VAT + Rs.4/litre VAT		

Arunachal Pradesh	20%	12.5%		
Assam	32.66% or Rs.22.63 per litre whichever is higher as VAT	23.66% or Rs.17.45 per litre whichever is higher as VAT		
Bihar	26% or Rs 16.65/Litre whichever is higher (30% Surcharge on VAT as irrecoverable tax)	19% or Rs 12.33/Litre whichever is higher (30% Surcharge on VAT as irrecoverable tax)		
Chandigarh	Rs.10/KL cess +22.45% or Rs.12.58/Litre whichever is higher	Rs.10/KL cess + 14.02% or Rs.7.63/Litre whichever is higher		
Chhattisgarh	25% VAT + Rs.2/litre VAT	25% VAT + Rs.1/litre VAT		
Dadra and Nagar Haveli and Daman and Diu	20% VAT	20% VAT		
Delhi	30% VAT	Rs.250/KL air ambience charges + 16.75% VAT		
Goa	25% VAT + 0.5% Green cess	22% VAT + 0.5% Green cess		
Gujarat	20.1% VAT+ 4% Cess on Town Rate & VAT	20.2% VAT + 4 % Cess on Town Rate & VAT		
Haryana	25% or Rs.15.2/litre whichever is higher as VAT+5% additional tax on VAT	16.40% VAT or Rs.9.2/litre whichever is higher as VAT+5% additional tax on VAT		
Himachal Pradesh	25% or Rs 15.5/Litre- whichever is higher	14% or Rs 9/Litre- whichever is higher		
Jammu & Kashmir	24% MST+ Rs.5/Litre employment cess, Reduction of Rs.0.50/Litre	16% MST+ Rs.1.5/Litre employment cess		
Jharkhand	22% on the sale price or Rs. 17/ litre , whichever is higher + Cess of Rs 1.00 per Ltr	22% on the sale price or Rs. 12.5/litre , whichever is higher + Cess of Rs 1.00 per Ltr		
Karnataka	35% sales tax	24% sales tax		
Kerala	30.08% sales tax+ Rs.1/litre additional sales tax + 1% cess	22.76% sales tax+ Rs.1/litre additional sales tax + 1% cess		
Ladakh	24% MST+ Rs.5/Litre employment cess, Reduction of Rs.2.5/Litre	16% MST+ Rs.1/Litre employment cess , Reduction of Rs.0.50/Litre		
Lakshadweep	Nil	Nil		
Madhya Pradesh	33 % VAT + Rs.4.5/litre VAT+1%Cess	23% VAT+ Rs.3/litre VAT+1% Cess		
Maharashtra – Mumbai, Thane & Navi Mumbai	26% VAT+ Rs.10.12/Litre additional tax	24% VAT+ Rs.3.00/Litre additional tax		
Maharashtra (Rest of State)	25% VAT+ Rs.10.12/Litre additional tax	21% VAT+ Rs.3.00/Litre additional tax		
Manipur	36.5% VAT	22.5% VAT		

Meghalaya	31% or Rs17.6/litre- whichever is higher (2% surcharge leviable only on advalorem tax)	22.5% or Rs12.5/litre- whichever is higher (2% surcharge leviable only on advalorem tax)		
Mizoram	25% VAT	14.5% VAT		
Nagaland	25.00% VAT +5% surcharge + Rs.2.00/Litre as road maintenance cess +Rs.6.00/Litre as Covid cess	14.50% VAT+ 5% surcharge + Rs.2.00/Litre as road maintenance cess+Rs.5.00/Litre as Covid cess		
Odisha	32% VAT	28% VAT		
Puducherry	28% VAT	19.75% VAT		
Punjab	Rs.2050/KL (cess)+ Rs.0.10 per Litre (Urban Transport Fund) +24.79% VAT+10% additional tax on VAT	Rs.1050/KL (cess) + Rs.0.10 per Litre (Urban Transport Fund) + 15.94% VAT+10% additional tax on VAT		
Rajasthan	38% VAT+Rs 1500/KL road development cess	28% VAT+ Rs.1750/KL road development cess		
Sikkim	25.25% VAT+ Rs.3000/KL cess	14.75% VAT + Rs.2500/KL cess	5%	5%
Tamil Nadu	15% + Rs.13.02 per litre	11% + Rs.9.62 per litre		
Telangana	35.20% VAT	27% VAT		
Tripura	25% VAT+ 3% Tripura Road Development Cess	16.50% VAT+ 3% Tripura Road Development Cess		
Uttar Pradesh	26.80% or Rs 18.74/Litre whichever is higher	17.48% or Rs 10.41/Litre whichever is higher		
Uttarakhand	25% or Rs 19 Per Ltr whichever is greater	17.48% or Rs Rs 10.41 Per Ltr whichever is greater		
West Bengal	25% or Rs.13.12/litre whichever is higher as sales tax+ Rs.1000/KL cess- Rs.17/KL exemption (20% Additional tax on VAT as irrecoverable tax)	17% or Rs.7.7/litre whichever is higher as sales tax + Rs 1000/KL cess – Rs 290/KL sales tax rebate (20% Additional tax on VAT as irrecoverable tax)		

Source: PPAC

Note: For Petrol & Diesel, VAT/Sales Tax at applicable rates is also levied on Dealer's commission in Arunachal Pradesh, Delhi, Gujarat, Haryana, Madhya Pradesh, Punjab, Rajasthan Chandigarh, Puducherry, Andaman & Nicobar, Meghalaya, Dadra Nagar Haveli and Daman & Diu.

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