Lubricant Market and its Scenario in Bangladesh

HYDROCARBON UNIT
Energy and Mineral Resources Division

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Preface

Report on Lubricant Market and its Scenario in Bangladesh is prepared and published by Hydrocarbon Unit for the first time in March 2022. This report reflects the lubricating oil & Grease at a glance, lubricating oil market scenario, competitor's market share and activities at a glance in Bangladesh. This report also contains Global lubricating oil perspective and market volume along with the graphical presentation have been depicted.

This report has been prepared based on the data available from the lubricating oil operator's data bank and their annual report, newspaper, Internet etc.

It is expected that the report will be helpful as reference book and elements of interest for the concerned.

The report is also be available at HCU's website: www.hcu.org.bd.

Date: 7 March, 2022

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List of Acronyms

- ✓ Lube/Lubricating oil — Lubricant or Lubricating Oil
- ✓ VG — Viscosity Grade
- ✓ VI — Viscosity Index
- ✓ VII — Viscosity Index Improver
- ✓ PTFE — Polytetrafluoroethylene
- ✓ PAO — Polyalpha-olefin
- ✓ PAG — Polyalkylene glycols
- ✓ PFPE — Perfluoropolyether
- ✓ AN — Alkylated naphthalenes
- ✓ MAC — Multiply alkylated cyclopentanes
- ✓ ISO — International Organization for Standardization
- ✓ SAE — Society of Automotive Engineers
- ✓ API — American Petroleum Institute
- ✓ STLE — Society of Tribologists and Lubrication Engineers
- ✓ NLGI — National Lubricating Grease Institute
- ✓ ILMA — Independent Lubricant Manufacturer Association
- ✓ ACEA — European Automobile Manufacturers Association
- ✓ JASO — Japanese Automotive Standards Organization
- ✓ PPC — Petroleum Packaging Council
- ✓ MPL — Meghna Petroleum Ltd.
- ✓ POCL — Padma Oil Company Ltd.
- ✓ MJLBL — MJL Bangladesh Ltd.

1.0 Introduction:

A Lubricant is a substance (such as lubricating oil or grease) which is capable of reducing friction, heat, and wear when introduced as a film between solid surfaces. It is a mixture of base oil and additives, used to lubricate engine/machine parts, reduce friction, clean, cool, and protect machineries. It may also have the function of transmitting forces, transporting foreign particles, or heating or cooling the surfaces. The property of reducing friction is known as lubricity.

Figure 1: Machinery Lubrication

1.1 Background:

Lubricants have been in some use for thousands of years. Calcium soaps have been identified on the axles of chariots dated to 1400 BC. Building stones were slid on oil-impregnated lumber in the time of the pyramids. In the Roman era, lubricants were based on olive oil and rapeseed oil, as well as animal fats. The growth of lubrication accelerated in the Industrial Revolution with the accompanying use of metal-based machinery. Relying initially on natural oils, needs for such machinery shifted toward petroleum-based materials early in the 1900s. A breakthrough came with the development of vacuum distillation of petroleum, as described by the Vacuum Oil Company. This technology allowed the purification of very nonvolatile substances, which are common in many lubricants. [1]

2.0 What is Lubricating oil?

Lubricating oil is the substance that is capable of facilitating the following five features in short:

- Reduction of friction
- Cooling
- Cleaning
- Corrosion protection
- Sealing

2.1 Formulation-Lubricating oil

2.1.1 Base Oil

Typically, lubricants contain 90% base oil (most often petroleum fractions, called mineral oils) and less than 10% additives. Vegetable oils or synthetic liquids such as hydrogenated polyolefins, esters, silicones, fluorocarbons and many others are sometimes used as base oils. Additives deliver reduced friction and wear, increased viscosity, improved viscosity index, resistance to corrosion and oxidation, aging or contamination, etc.

Non-liquid lubricants include powders (dry graphite, PTFE, molybdenum disulphide, tungsten disulphide, etc.), PTFE tape used in plumbing, air cushion and others. Dry lubricants such as graphite, molybdenum disulphide and tungsten disulphide also offer lubrication at temperatures (up to 350 °C) higher than liquid and oil-based lubricants are able to operate. Limited interest has been shown in low friction properties of compacted oxide glaze layers formed at several hundred degrees Celsius in metallic sliding systems, however, practical use is still many years away due to their physically unstable nature.

2.1.2 Additives

A large number of additives are used to impart performance characteristics to the lubricants. Modern automotive lubricants contain as many as ten additives, comprising up to 20% of the lubricant, the main families of additives are:

- ✓ *Pour point depressants* are compounds that prevent crystallization of waxes. Long chain alkylbenzenes adhere to small crystallites of wax, preventing crystal growth.

- ✓ *Anti-foaming agents* are typically silicone compounds which increase surface tension in order to discourage foam formation.
- ✓ *Viscosity index improvers (VIIs)* are compounds that allow lubricants to remain viscous at higher temperatures. Typical VIIs are polyacrylates and butadiene.
- ✓ *Antioxidants* suppress the rate of oxidative degradation of the hydrocarbon molecules within the lubricant. At low temperatures, free radical inhibitors such as hindered phenols are used, e.g. butylated hydroxytoluene. At temperatures >90 °C, where the metals catalyze the oxidation process, dithiophosphates are more useful. In the latter application the additives are called metal deactivators.
- ✓ *Detergents* ensure the cleanliness of engine components by preventing the formation of deposits on contact surfaces at high temperatures.
- ✓ *Corrosion inhibitors* (rust inhibitors) are usually alkaline materials, such as alkylsulfonate salts, that absorb acids that would corrode metal parts.
- ✓ *Anti-wear* additives form protective 'tribofilms' on metal parts, suppressing wear. They come in two classes depending on the strength with which they bind to the surface. Popular examples include phosphate esters and zinc dithiophosphates. [2]
- ✓ *Extreme pressure (anti-scuffing)* additives form protective films on sliding metal parts. These agents are often sulfur compounds, such as dithiophosphates.
- ✓ *Friction modifiers* reduce friction and wear, particularly in the boundary lubrication regime where surfaces come into direct contact. [3]

2.2 Lubricating oil vs. Grease:

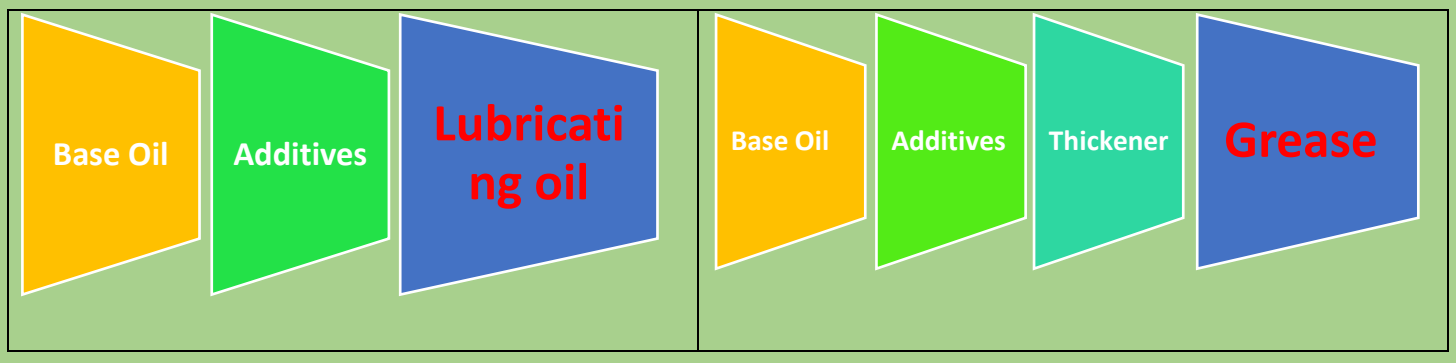


Figure 2: Lubricating oil vs. Grease

Table 1: Comparison of lubricating oil vs. Grease-

Description	Lubricating oil	Grease
Acting as a Seal against foreign particles (Dirt & Dust)	No	Yes
Expensive	More	Less
Retention time & Stickiness	Less	More
Saponification Reaction	Does not Take Place	Key Factor
Operating over wider temperature	Less	Yes
Lubrication without corrosion in the presence of water	No	Yes

3.0 Types of lubricants:

Automotive applications dominate, including electric vehicles but other industrial, marine, and metal working applications are also big consumers of lubricants. Although air and other gas-based lubricants are known (e.g., in fluid bearings), liquid lubricants dominate the market, followed by solid lubricants. Naturally, there are different types of lubricants whose are described below:

3.1 Mineral oil

The term "mineral oil" is used to refer to lubricating base oils derived from crude oil. The American Petroleum Institute (API) designates several types of lubricant base oil:

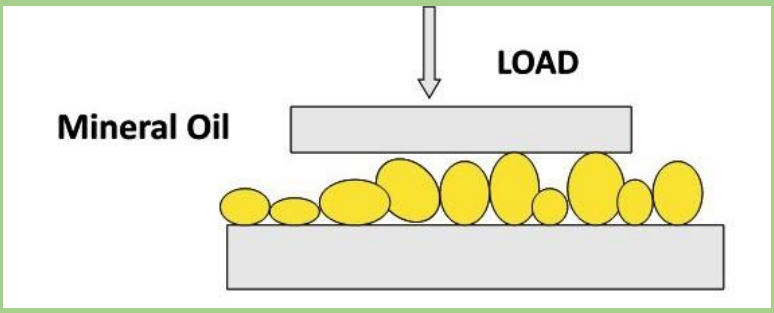


Figure 3: Molecular Distribution of Mineral Oil

- ✓ **Group I** – Saturates < 90% and/or sulfur > 0.03%, and Society of Automotive Engineers (SAE) viscosity index (VI) of 80 to 120

  Manufactured by solvent extraction, solvent or catalytic dewaxing, and hydro-finishing processes. Common Group I base oil are 150SN (solvent neutral), 500SN, and 150BS (brightstock)

- ✓ **Group II** – Saturates > 90% and sulfur < 0.03%, and SAE viscosity index of 80 to 120

  Manufactured by hydrocracking and solvent or catalytic dewaxing processes. Group II base oil has superior anti-oxidation properties since virtually all hydrocarbon molecules are saturated. It has water-white color.

- ✓ **Group III** – Saturates > 90%, sulfur < 0.03%, and SAE viscosity index over 120

  Manufactured by special processes such as isohydromerization. Can be manufactured from base oil or slax wax from dewaxing process.

- ✓ **Group IV** – Polyalphaolefins (PAO)

- ✓ **Group V** – All others not included above, such as naphthenics, polyalkylene glycols (PAG), and polyesters. [4]

The lubricant industry commonly extends this group terminology to include:

- ✓ Group I+ with a viscosity index of 103–108
- ✓ Group II+ with a viscosity index of 113–119
- ✓ Group III+ with a viscosity index of at least 140

Can also be classified into three categories depending on the prevailing compositions:

- ✓ Paraffinic
- ✓ Naphthenic
- ✓ Aromatic

3.2 Synthetic oils

Petroleum-derived lubricant can also be produced using synthetic hydrocarbons (derived ultimately from petroleum), "synthetic oils".

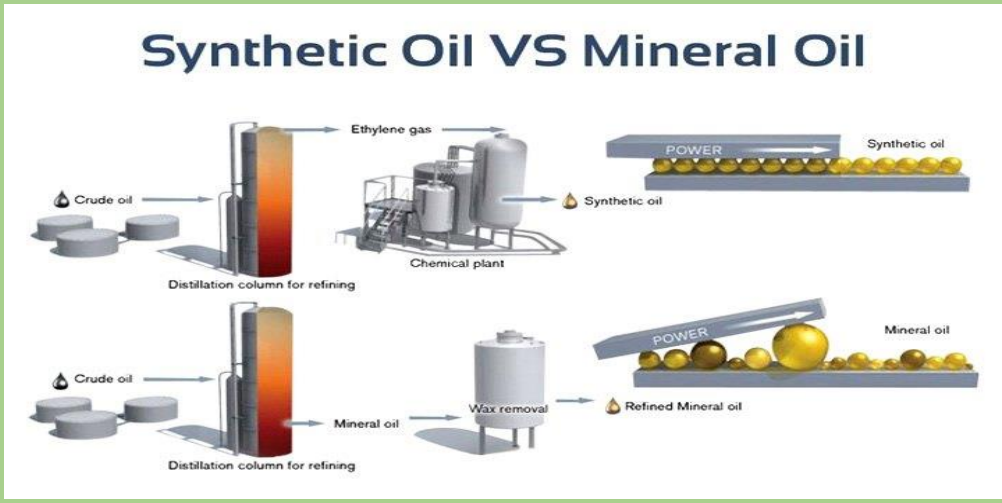


Figure 4: Molecular Distribution of Synthetic Oil

These include:

- ✓ Polyalpha-olefin (PAO)
- ✓ Synthetic esters
- ✓ Polyalkylene glycols (PAG)
- ✓ Phosphate esters
- ✓ Perfluoropolyether (PFPE)
- ✓ Alkylated naphthalenes (AN)
- ✓ Silicate esters
- ✓ Ionic fluids
- ✓ Multiply alkylated cyclopentanes (MAC)

3.3 Solid lubricants

PTFE: Polytetrafluoroethylene (PTFE) is typically used as a coating layer on, for example, cooking utensils to provide a non-stick surface. Its usable temperature range up to 350 °C and

chemical inertness make it a useful additive in special greases, where it can function both as a thickener and a lubricant. Under extreme pressures, PTFE powder or solids is of little value as it is soft and flows away from the area of contact. Ceramic or metal or alloy lubricants must be used then. [5]

Inorganic solids: Graphite, hexagonal boron nitride, molybdenum disulfide and tungsten disulfide are examples of solid lubricants. Some retain their lubricity to very high temperatures. The use of some such materials is sometimes restricted by their poor resistance to oxidation (e.g., molybdenum disulfide degrades above 350 °C in air, but 1100 °C in reducing environments.

Metal/alloy: Metal alloys, composites and pure metals can be used as grease additives or the sole constituents of sliding surfaces and bearings. Cadmium and gold are used for plating surfaces which gives them good corrosion resistance and sliding properties, Lead, tin, zinc alloys and various bronze alloys are used as sliding bearings, or their powder can be used to lubricate sliding surfaces alone.

3.4 Aqueous lubrication

Aqueous lubrication is of interest in a number of technological applications. Strongly hydrated brush polymers such as PEG can serve as lubricants at liquid solid interfaces. By continuous rapid exchange of bound water with other free water molecules, these polymer films keep the surfaces separated while maintaining a high fluidity at the brush–brush interface at high compressions, thus leading to a very low coefficient of friction. [6]

3.5 Biolubricant

Biolubricants are derived from vegetable oils and other renewable sources. They usually are triglyceride esters (fats obtained from plants and animals). For lubricant base oil use, the vegetable derived materials are preferred. Common ones include high oleic canola oil, castor oil, palm oil, sunflower seed oil and rapeseed oil from vegetable, and tall oil from tree sources. Many vegetable oils are often hydrolyzed to yield the acids which are subsequently combined selectively to form specialist synthetic esters. Other naturally derived lubricants include lanolin (wool grease, a natural water repellent). Whale oil was a historically important lubricant, with some uses up to the latter part of the 20th century as a friction modifier additive for automatic transmission fluid. In 2008,

the biolubricant market was around 1% of UK lubricant sales in a total lubricant market of 840,000 tonnes/year. [7]

As of 2020, researchers at Australia's CSIRO have been studying safflower oil as an engine lubricant, finding superior performance and lower emissions than petroleum-based lubricants in applications such as engine-driven lawn mowers, chainsaws and other agricultural equipment. Grain-growers trialing the product have welcomed the innovation, with one describing it as needing very little refining, biodegradable, a bioenergy and biofuel. The scientists have reengineered the plant using gene silencing, creating a variety that produces up to 93% of oil, the highest currently available from any plant. Researchers at Montana State University's Advanced Fuel Centre in the US studying the oil's performance in a large diesel engine, comparing it with conventional oil, have described the results as a "game-changer".

4.0 Categories, Characteristics and Functions of Lubricating oil:

4.1 Categories of Lubricating oil

4.1.1 Automotive Lubricating oil

- Engine oils
  - ✓ Petrol (Gasolines) engine oils
  - ✓ Diesel engine oils
- Automatic transmission fluid
- Gearbox fluids
- Brake fluids
- Hydraulic fluids
- Air conditioning compressor oils
- Tractor (one lubricant for all systems)
- Universal Tractor Transmission Oil – UTTO
- Super Tractor Oil Universal – STOU – includes engine
- Other motors
- 2-stroke engine oils

4.1.2 Industrial Lubricating oil

- Hydraulic oils
- Air compressor oils
- Food Grade lubricants
- Gas Compressor oils
- Gear oils
- Bearing and circulating system oils
- Refrigerator compressor oils
- Steam and gas turbine oils

4.1.3 Aviation Lubricating oil

- Gas turbine engine oils
- Piston engine oils

4.1.4 Marine Lubricating oil

- Crosshead cylinder oils
- Crosshead Crankcase oils
- Trunk piston engine oils
- Stern tube lubricants

4.2 Naturally A good lubricant generally possesses the following characteristics:

- ✓ A high boiling point and low freezing point (in order to stay liquid within a wide range of temperature)
- ✓ A high viscosity index
- ✓ Thermal stability
- ✓ Hydraulic stability
- ✓ Demulsibility
- ✓ Corrosion prevention
- ✓ A high resistance to oxidation

4.3 Basic functions of lubricating oil:

One of the largest applications for lubricants, in the form of motor oil, is protecting the internal combustion engines in motor vehicles and powered equipment.

4.3.1 Lubricant vs. anti-tack coating

Anti-tack or anti-stick coatings are designed to reduce the adhesive condition (stickiness) of a given material. The rubber, hose, and wire and cable industries are the largest consumers of anti-tack products but virtually every industry uses some form of anti-sticking agent. Anti-sticking agents differ from lubricants in that they are designed to reduce the inherently adhesive qualities of a given compound while lubricants are designed to reduce friction between any two surfaces.

4.3.2 Keep moving parts apart

Lubricants are typically used to separate moving parts in a system. This separation has the benefit of reducing friction, wear and surface fatigue, together with reduced heat generation, operating noise and vibrations. Lubricants achieve this in several ways. The most common is by forming a physical barrier i.e., a thin layer of lubricant separates the moving parts. This is analogous to hydroplaning, the loss of friction observed when a car tire is separated from the road surface by moving through standing water. This is termed hydrodynamic lubrication. In cases of high surface pressures or temperatures, the fluid film is much thinner and some of the forces are transmitted between the surfaces through the lubricant.

4.3.3 Reduce friction

Typically the lubricant-to-surface friction is much less than surface-to-surface friction in a system without any lubrication. Thus use of a lubricant reduces the overall system friction. Reduced friction has the benefit of reducing heat generation and reduced formation of wear particles as well as improved efficiency. Lubricants may contain polar additives known as friction modifiers that chemically bind to metal surfaces to reduce surface friction even when there is insufficient bulk lubricant present for hydrodynamic lubrication, e.g. protecting the valve train in a car engine at startup. The base oil itself might also be polar in nature and as a result inherently able to bind to metal surfaces, as with polyolester oils.

4.3.4 Transfer heat

Both gas and liquid lubricants can transfer heat. However, liquid lubricants are much more effective on account of their high specific heat capacity. Typically the liquid lubricant is constantly circulated to and from a cooler part of the system, although lubricants may be used to warm as well as to cool when a regulated temperature is required. This circulating flow also determines the amount of heat that is carried away in any given unit of time. High flow systems can carry away a lot of heat and have the additional benefit of reducing the thermal stress on the lubricant. Thus lower cost liquid lubricants may be used. The primary drawback is that high flows typically require larger sumps and bigger cooling units. A secondary drawback is that a high flow system that relies on the flow rate to protect the lubricant from thermal stress is susceptible to catastrophic failure during sudden system shut downs. An automotive oil-cooled turbocharger is a typical example. Turbochargers get red hot during operation and the oil that is cooling them only survives as its residence time in the system is very short (i.e. high flow rate). If the system is shut down suddenly (pulling into a service area after a high-speed drive and stopping the engine) the oil that is in the turbo charger immediately oxidizes and will clog the oil ways with deposits. Over time these deposits can completely block the oil ways, reducing the cooling with the result that the turbo charger experiences total failure, typically with seized bearings. Non-flowing lubricants such as greases and pastes are not effective at heat transfer although they do contribute by reducing the generation of heat in the first place.

4.3.5 Carry away contaminants and debris

Lubricant circulation systems have the benefit of carrying away internally generated debris and external contaminants that get introduced into the system to a filter where they can be removed. Lubricants for machines that regularly generate debris or contaminants such as automotive engines typically contain detergent and dispersant additives to assist in debris and contaminant transport to the filter and removal. Over time the filter will get clogged and require cleaning or replacement, hence the recommendation to change a car's oil filter at the same time as changing the oil. In closed systems such as gear boxes the filter may be supplemented by a magnet to attract any iron fines that get created.

It is apparent that in a circulatory system the oil will only be as clean as the filter can make it, thus it is unfortunate that there are no industry standards by which consumers can readily assess the

filtering ability of various automotive filters. Poor automotive filters significantly reduces the life of the machine (engine) as well as making the system inefficient.

4.3.6 Transmit power

Lubricants known as hydraulic fluid are used as the working fluid in hydrostatic power transmission. Hydraulic fluids comprise a large portion of all lubricants produced in the world. The automatic transmission's torque converter is another important application for power transmission with lubricants.

4.3.7 Protect against wear

Lubricants prevent wear by keeping the moving parts apart. Lubricants may also contain anti-wear or extreme pressure additives to boost their performance against wear and fatigue.

4.3.8 Prevent corrosion

Many lubricants are formulated with additives that form chemical bonds with surfaces or that exclude moisture, to prevent corrosion and rust. It reduces corrosion between two metallic surface and avoids contact between these surfaces to avoid immersed corrosion.

4.3.9 Seal for gases

Lubricants will occupy the clearance between moving parts through the capillary force, thus sealing the clearance. This effect can be used to seal pistons and shafts.

5.0 Lubricating oil Manufacturing Process:

Lubricating oil is extracted from crude oil, which undergoes a preliminary purification process (sedimentation) before it is pumped into fractionating towers. A typical high-efficiency fractionating tower, 25 to 35 feet (7.6 to 10.6 meters) in diameter and up to 400 feet (122 meters) tall, is constructed of high grade steels to resist the corrosive compounds present in crude oils; inside, it is fitted with an ascending series of condensate collecting trays. [8]

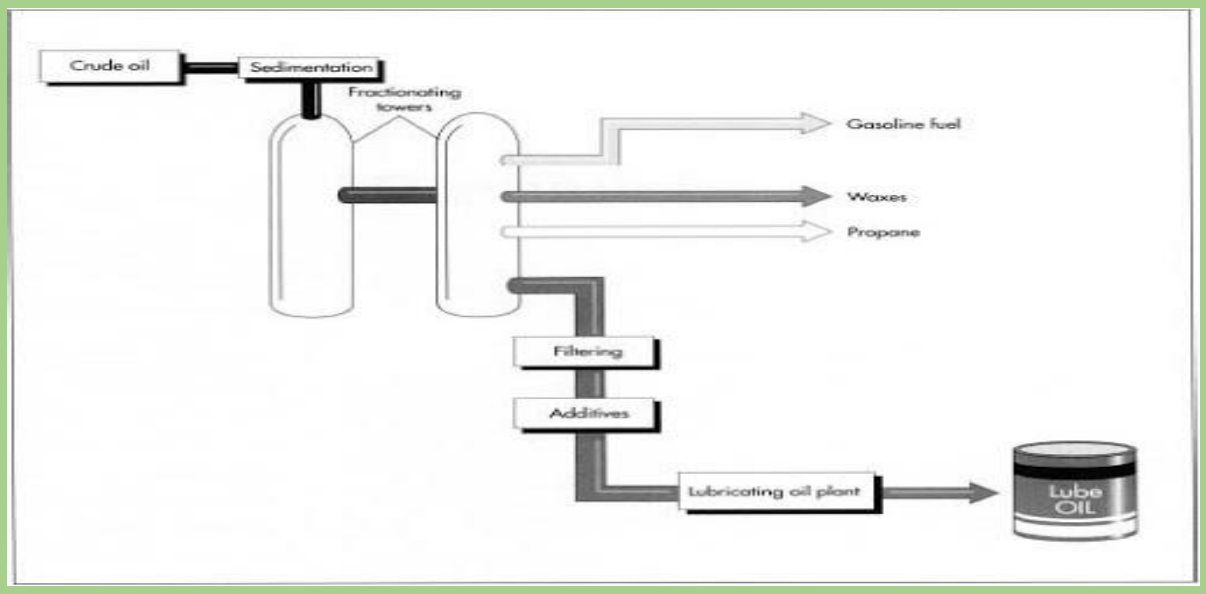


Figure 5: Lubricating oil Manufacturing Process

Within a tower, the thousands of hydrocarbons in crude oil are separated from each other by a process called fractional distillation. As the vapors rise up through the tower, the various fractions cool, condense, and return to liquid form at different rates determined by their respective boiling points (the lower the boiling point of the fraction, the higher it rises before condensing). Natural gas reaches its boiling point first, followed by gasoline, kerosene, fuel oil, lubricants, and tars.

5.1 Sedimentation

The crude oil is transported from the oil well to the refinery by pipeline or tanker ship. At the refinery, the oil undergoes sedimentation to remove any water and solid contaminants, such as sand and rock, that maybe suspended in it. During this process, the crude is pumped into large holding tanks, where the water and oil are allowed to separate and the contaminants settle out of the oil.

5.2 Fractionating

Next the crude oil is heated to about 700 degrees Fahrenheit (371 degrees Celsius). At this temperature it breaks down into a mixture of hot vapor and liquid that is then pumped into the bottom of the first of two fractionating towers. Here, the hot hydrocarbon vapors float upward. As they cool, they condense and are collected in different trays installed at different levels in the

tower. In this tower, normal atmospheric pressure is maintained continuously, and about 80 percent of the crude oil vaporizes.

Then the remaining 20 percent of the oil is then reheated and pumped into a second tower, wherein vacuum pressure lowers the residual oil's boiling point so that it can be made to vaporize at a lower temperature. The heavier compounds with higher boiling points, such as tar and the inorganic compounds, remain behind for further processing.

5.3 Filtering and solvent extraction

4 After further processing to remove unwanted compounds, the Lubricating oil that has been collected in the two fractionating towers is passed through several ultrafine filters, which remove remaining impurities. Aromatics, one such contaminant, contain six-carbon rings that would affect the Lubricating oil's viscosity if they weren't removed in a process called solvent extraction. Solvent extraction is possible because aromatics are more soluble in the solvent than the Lubricating oil fraction is. When the Lubricating oil is treated with the solvent, the aromatics dissolve; later, after the solvent has been removed, the aromatics can be recovered from it.

5.4 Additives, inspection, and packaging

Finally, the oil is mixed with additives to give it the desired physical properties (such as the ability to withstand low temperatures). At this point, the Lubricating oil is subjected to a variety of quality control tests that assess its viscosity, specific gravity, color, flash, and fire points. Oil that meets quality standards is then packaged for sale and distribution.

5.5 Quality Control

Most applications of Lubricating oils require that they be nonresinous, pale-colored, odorless, and oxidation-resistant. Over a dozen physical and chemical tests are used to classify and determine the grade of lubricating oils. Common physical tests include measurements for viscosity, specific gravity, and color, while typical chemical tests include those for flash and fire points.

Of all the properties, viscosity, a Lubricating oil's resistance to flow at specific temperatures and pressures, is probably the single most important one. The application and operating temperature range are key factors in determining the proper viscosity for an oil. For example, if the oil is too

viscous, it offers too much resistance to the metal parts moving against each other. On the other hand, if it not viscous enough, it will be squeezed out from between the mating surfaces and will not be able to lubricate them sufficiently. The Saybolt Standard Universal Viscometer is the standard instrument for determining viscosity of petroleum lubricants between 70 and 210 degrees Fahrenheit (21 and 99 degrees Celsius). Viscosity is measured in the Say bolt Universal second, which is the time in seconds required for 50 milliliters of oil to empty out of a Saybolt viscometer cup through a calibrated tube orifice at a given temperature.

The specific gravity of an oil depends on the refining method and the types of additives present, such as lead, which gives the Lubricating oil the ability to resist extreme mating surface pressure and cold temperatures. The Lubricating oil's color indicates the uniformity of a particular grade or brand. The oil's flash and fire points vary with the crude oil's origin. The flash point is the temperature to which an oil has to be heated until sufficient flammable vapor is driven off so that it will flash when brought into contact with a flame. The fire point is the higher temperature at which the oil vapor will continue to burn when ignited.

Common engine oils are classified by viscosity and performance according to specifications established by the Society of Automotive Engineers (SAE). Performance factors include wear prevention, oil sludge deposit formation, and oil thickening.

6.0 Lubricating oil Global Perspective:

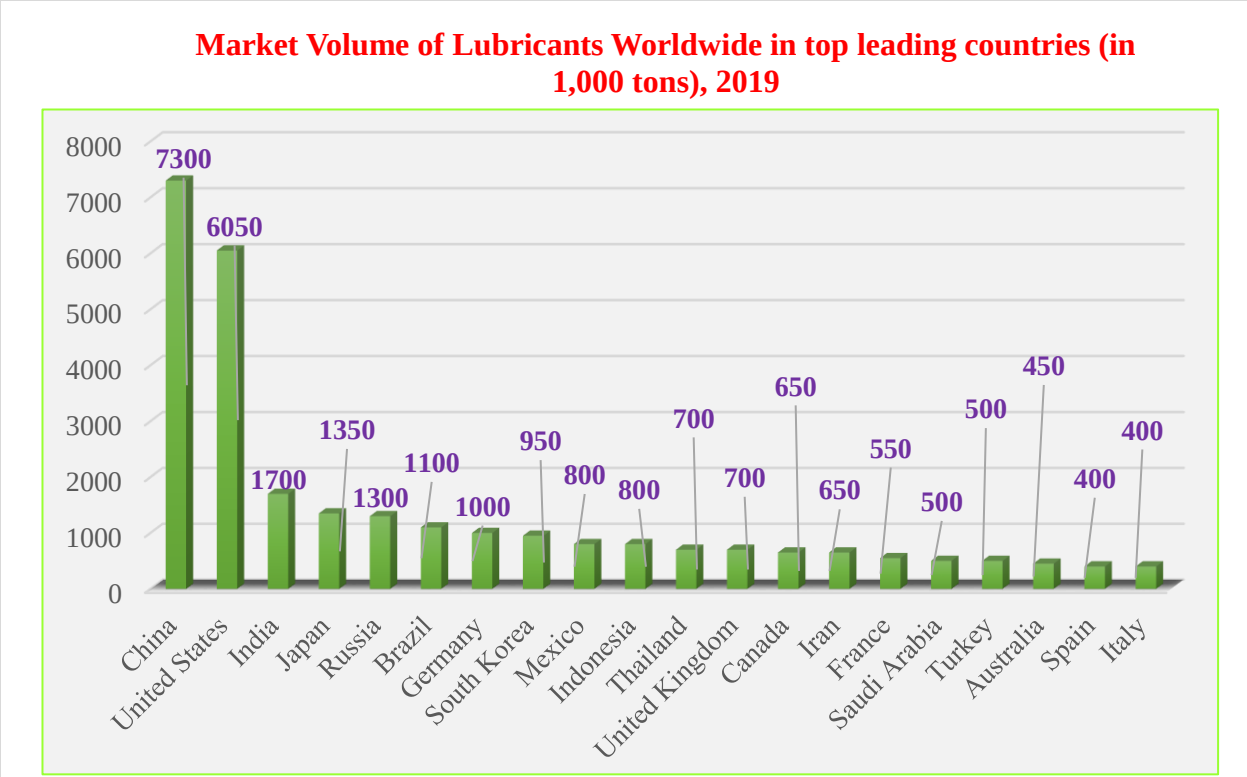
The global lubricants market size was valued at USD 125.81 billion in 2020 and is expected to grow at a compound annual growth rate (CAGR) of 3.7% from 2021 to 2028. [9] The industry dynamics are changing, in terms of raw material, owing to the rising demand for bio-based lubricants. The growing trade of vehicles and their spare parts is anticipated to fuel the demand for automotive oils and greases. The major economic recovery in North America and Europe is expected to boost the consumer vehicles segment, which, in turn, is a boon for the market. Typical lube manufacturers use crude oil, CBM, tight oil, and other additives to formulate all types of lubricants. Major companies, such as Royal Dutch Shell, Total SA, Chevron, ExxonMobil Corporation, British Petroleum, and Sinopec, have integrated their business operations globally. It

ensures a steady raw material supply to manufacture mineral oils & additives needed for production.

Table 2: Market Volume of Lubricants Worldwide in 2019, top-leading countries (in 1,000 tons)

No.	Country Name	Volume (in 1,000 Tons)
1	China	7300
2	United States	6050
3	India	1700
4	Japan	1350
5	Russia	1300
6	Brazil	1100
7	Germany	1000
8	South Korea	950
9	Mexico	800
10	Indonesia	800
11	Thailand	700
12	United Kingdom	700
13	Canada	650
14	Iran	650
15	France	550
16	Saudi Arabia	500
17	Turkey	500
18	Australia	450
19	Spain	400
20	Italy	400

[Source: https://www.statista.com/statistics/821076/lubricants-global-market-volume-by-country/]



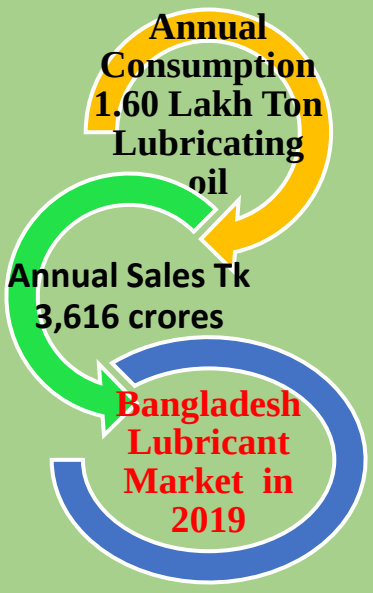
[Source: https://www.statista.com/statistics/821076/lubricants-global-market-volume-by-country/]

Figure 6: Market Volume of Lubricants Worldwide in 2019

7.0 Lubricating oil Bangladesh Perspective:

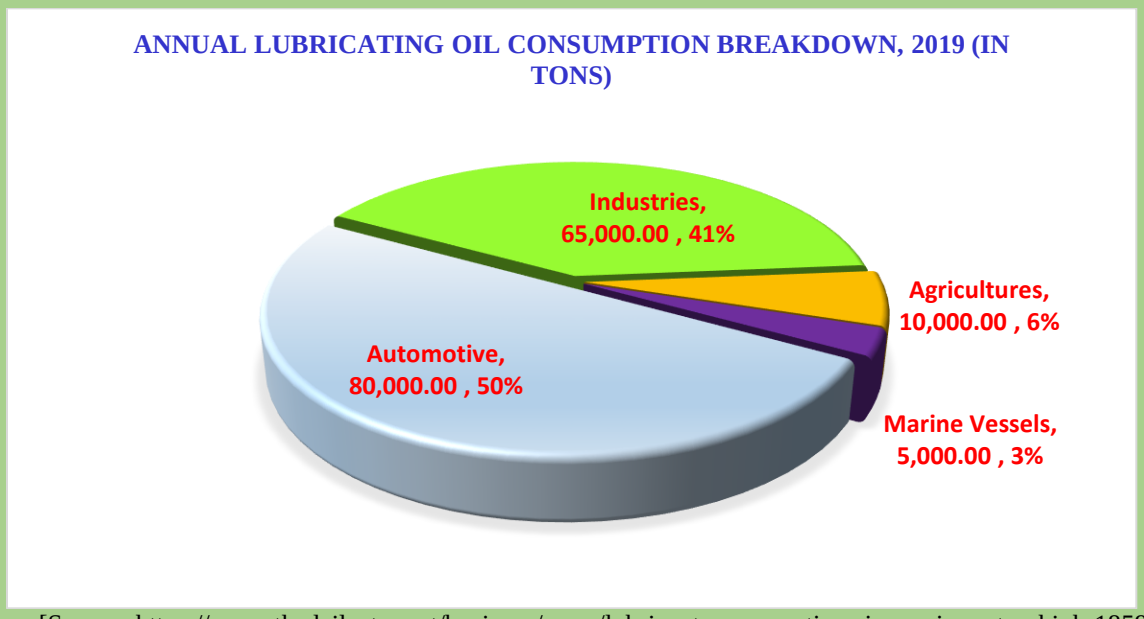
The market for various petroleum products has expanded at an average rate of about 6 per cent in the last eight years following a rise in the number of vehicles and power plants in service. However, the end users are yet to enjoy the benefits that usually accompany a competitive market, such as product diversity and lower costs, due to a lack of local production.

In 2019, the market size for petroleum products reached Tk. 3,616 crore, with total demand standing at 1.60 lakh tonnes.



[Source: https://www.thedailystar.net/business/news/lubricant-consumption-rises-prices-stay-high-1859560]

Figure 7: Bangladesh Lubricant Market at a glance in 2019



[Source: https://www.thedailystar.net/business/news/lubricant-consumption-rises-prices-stay-high-1859560]

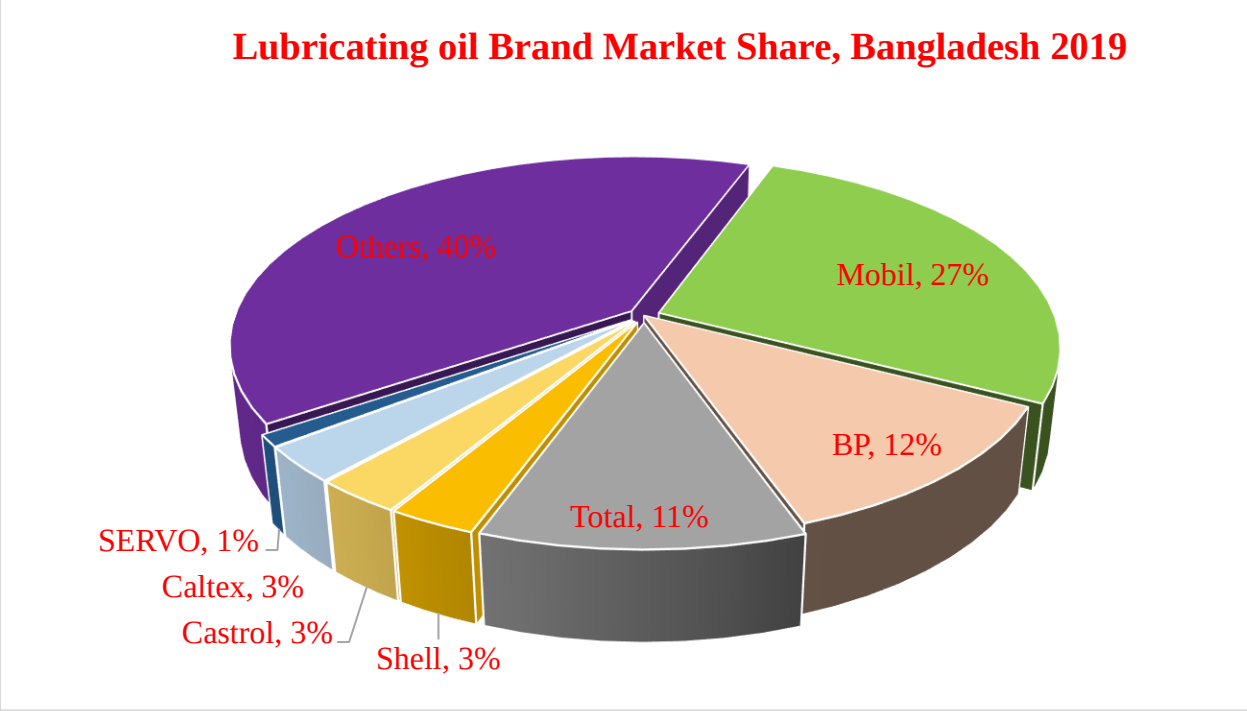
Figure 8: Annual Lubricating oil consumption breakdown, 2019 (in Tons)

The demand for the products will continue to rise in line with the increasing population as it is an essential part of maintaining or operating any kind of machinery, according to market insiders.

With the number of power plants operating in the country having jumped to 133 in the last nine years, electricity production has increased nearly four and a half times, according to data from the Bangladesh Power Development Board.

The Bangladesh Lubricating oil market is consolidated by the following top five brands:

- ✓ Mobil (MJL Bangladesh Ltd.)
- ✓ Caltex/Chevron (Navana Petroleum)
- ✓ Total (Trade Services International)
- ✓ BP (Rahimafrooz) and
- ✓ Royal Dutch Shell PLC (Ranks Petroleum Ltd.)



[Source: https://www.thedailystar.net/business/news/lubricant-consumption-rises-prices-stay-high-1859560]

Figure 9: Lubricating oil Brand Market Share, Bangladesh 2019

They account for about 50 per cent of the total market share while the remaining half is split up between other brands, according to industry insiders.

Mobil leads the charts with 27 per cent market share; it is followed by British Petroleum (BP), whose market share is 12 per cent. French multinational Total control 11 per cent of the market, while Shell, Castrol and Caltex enjoy 3 per cent each. SERVO sits at the bottom with one per cent of the total market share, industry insiders said.

Despite the growing market for engine oils, consumers are yet to experience any benefits seeing as the Original Equipment Manufacturers (OEM) say that the oils used in their machinery must meet certain requirements -- and the local producers are unable to meet them.

150+ Lubricating oil Brand & 14 Lubricating oil Blending Plant

Currently almost above 150 Lubricating oil brands are marketed in Bangladesh. They can be categorized as-

- ✓ Top Brand
- ✓ Mediocre Brand
- ✓ Lower Brand

7.1 Top Lubricating oil brands in Bangladesh

Top Lubricating oil Brands				
Mobil	Shell	BP	Caltex	Castrol
Total	Valvoline	Cepsa	Luke Oil	Fuchs

7.2 Some notable Mediocre Lubricating oil brands marketed in Bangladesh:

Mediocre Lubricating oil Brands				
PTT	Omera	BNO	Enoc	Petromin
Pertamina	Adnoc	GS-KIXX	Gulf	Petronas
Servo	Sigma	Eneos	Energy	Veedol
LiqyMoly	SK-ZIC	HP	National	Respsol

7.3 Some Lower brand Lubricating oil marketed in Bangladesh:

Jamuna	Q8	J1	Emarat	Texas
Sharlu	Philips	United	Philips	United
Molex	Lubrex	76	S-Oil	Hyundai
Hi Power	Citgo	ENI	SINO	Trane
Savita	77	RYMAX	Bhardal	Hyrax
Turbo	Scope	Well run	Cyclone	Mototrol
Amirat	Fossil	Saudi	Adilob	Unique
Rain	Olympia	Mannol	Boss	Wagon
Olympus	Eneos	AP	Idemitsu	Motex
Vanic	Lubzone	AXCL	Asco	Soil
Lydian	Rambo	Sea Horse	Star	Boss

7.4 Major Lubricating oil Marketer's Scenario in Bangladesh:

Company: **MJL Bangladesh Ltd.**

Lubricating oil Brand: Mobil (ExxonMobil) & Omera

Table 3: MJL (Brand: Mobil & Omera) Sales Data for FY 2015-19

Lubricating oil Brand	MJL Sales Data [Unit: Metric Ton (MT)]				
	2015	2016	2017	2018	2019
Mobil	21,115.33	21,613.61	22,826.82	23,299.44	19,495.00
Omera	1,036.37	1,049.46	1,090.25	1,206.59	1,049.73
Total	22,151.70	22,663.07	23,917.07	24,506.03	20,544.73

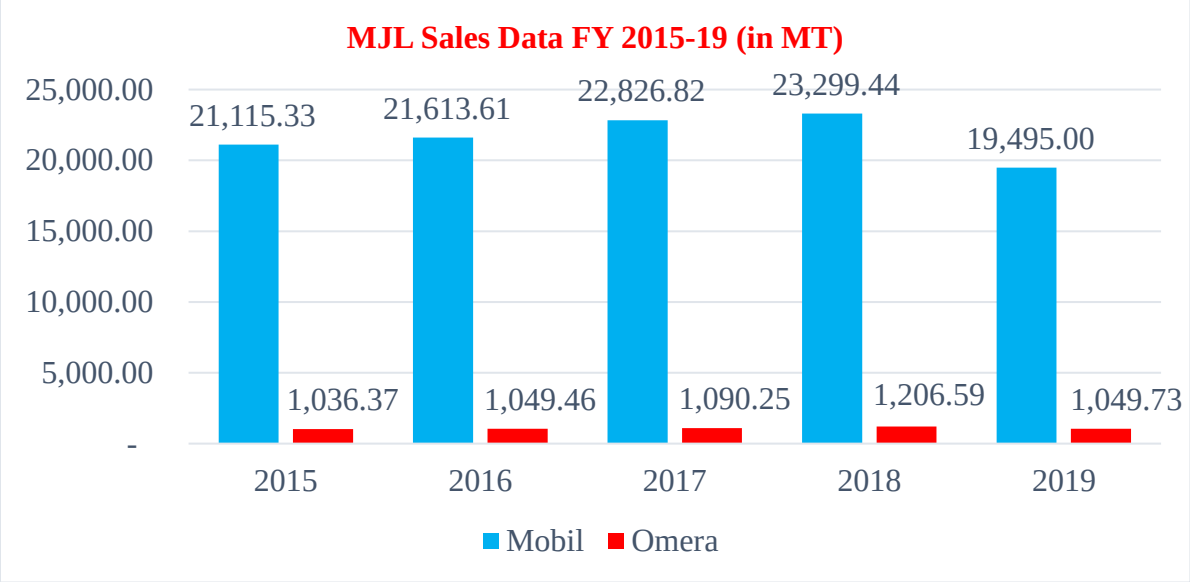


Figure 10: MJL Sales Data FY 2015-19

Company Name: **Ranks Petroleum Ltd.**

Lubricating oil Brand: Shell Lubricant

Table 4: Ranks Petroleum Ltd. (Brand: Shell) Sales Data for FY 2015-19

Lubricating oil Brand	Sales Data (Unit: Metric Ton)				
	2015	2016	2017	2018	2019
Shell	3,043.21	4,100.80	5,503.97	6,495.17	5,536.42
Total	3,043.21	4,100.80	5,503.97	6,495.17	5,536.42

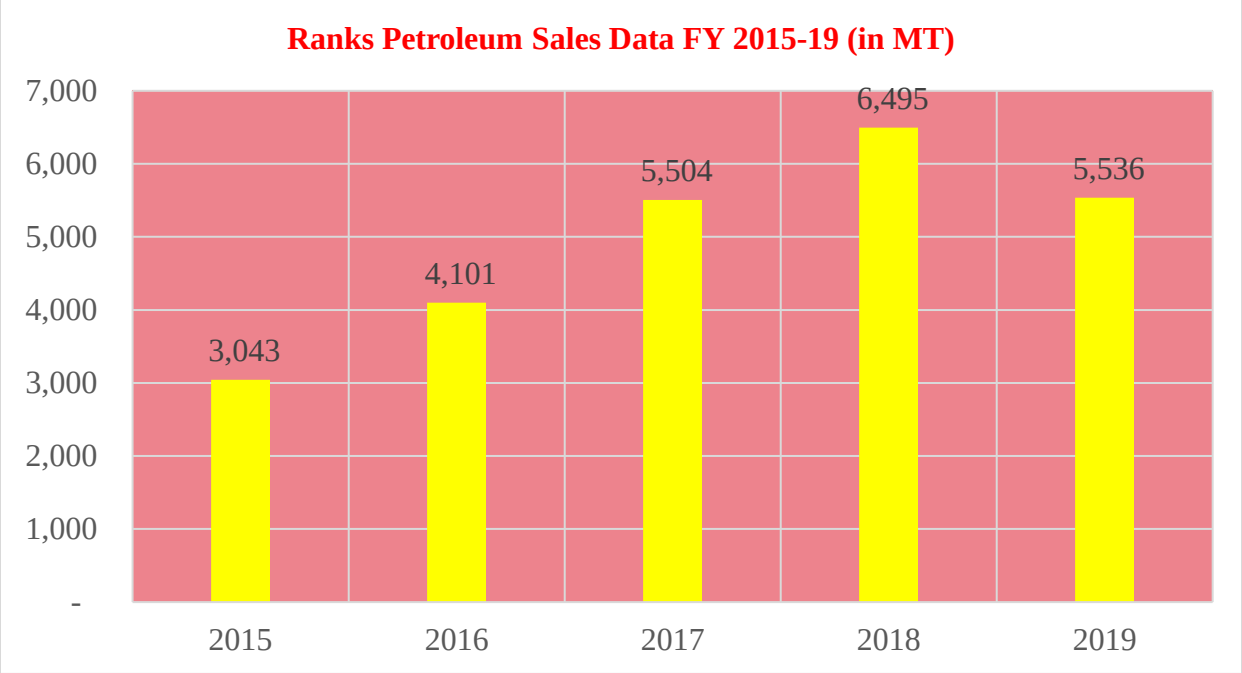


Figure 11: Ranks Petroleum Sales Data FY 2015-19

Company Name: **Rahimafrooz Distribution Ltd.**

Lubricating oil Brand: Castrol & Kennol

Table 5: Rahimafrooz (Brand: Castrol & Kennol) Sales Data for FY 2015-19

Lubricating oil Brand	Rahimafrooz Sales Data (Unit: Metric Ton)				
	2015	2016	2017	2018	2019
Castrol	1,664.62	1,991.55	2,253.67	1,308.94	19.89
Kennol					13.62
Total	1,664.62	1,991.55	2,253.67	1,308.94	33.51

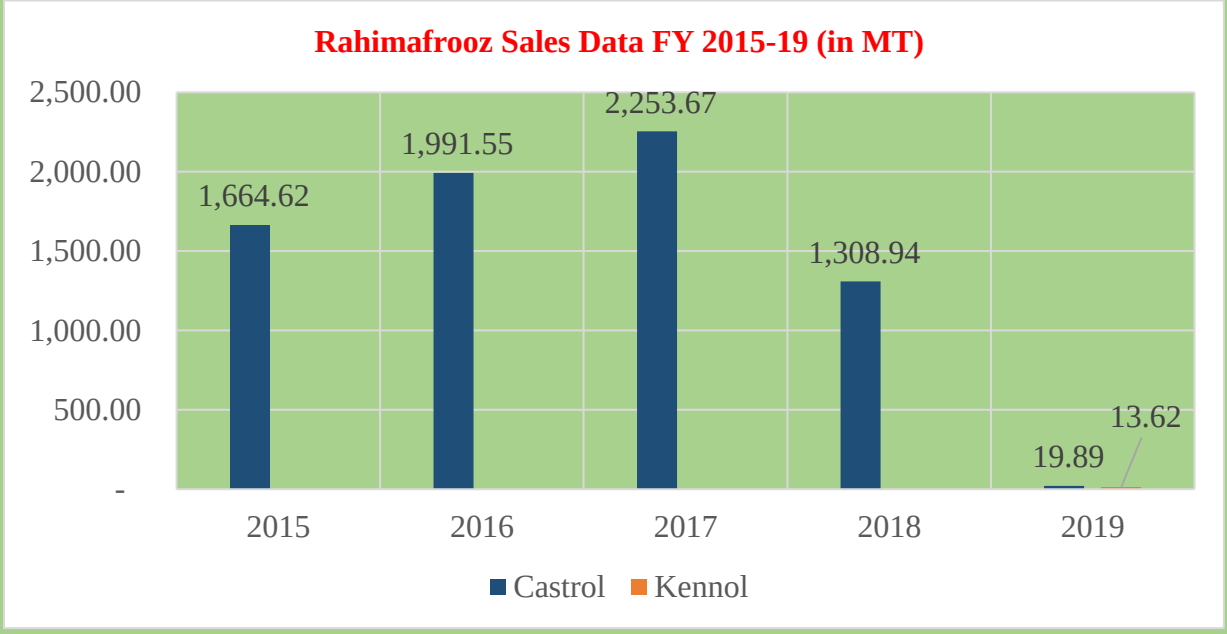


Figure 12: Rahimafrooz Sales Data FY 2015-19

Company Name: **Meghna Petroleum Ltd. (MPL)**

Lubricating oil Brand: BP, Castrol & Meghna Lube

Table 6: MPL (Brand: BP, Castrol & Meghna Lube) Sales Data for FY 2015-19

Lubricating oil Brand	MPL Sales Data (Unit: Metric Ton)				
	2015	2016	2017	2018	2019
BP	8,622	7,448	8,676	7,797	6,414
Castrol	-	-	-	266	1,203
Meghna Lube	1,985	2,040	1,985	1,973	1,755
Total	10,607	9,488	10,661	10,036	9,372

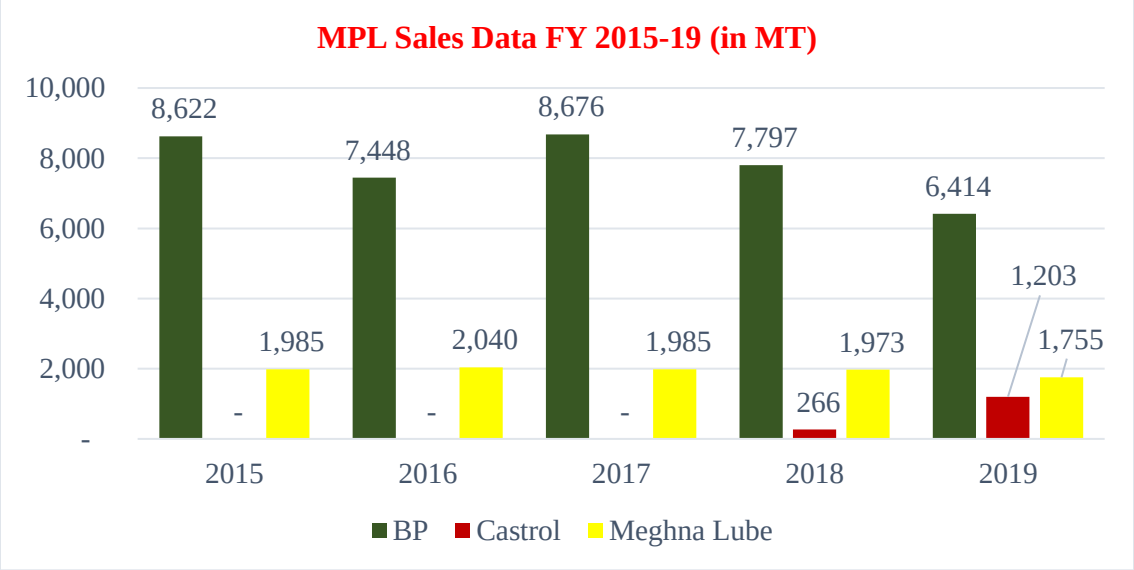


Figure 13: MPL Sales Data FY 2015-19

Company Name: **Padma Oil Company Ltd. (POCL)**

Lubricating oil Brand: Total & Padma Lube

Table 7: POCL (Brand: Total & Padma Lube) Sales Data for FY 2015-19

Lubricating oil Brand	Sales Data (Unit: Metric Ton)				
	2015	2016	2017	2018	2019
Total	3,075.00	3,105.00	3,072.00	3,339.00	3,061.00
Padma Lube	1,423.00	1,432.00	1,530.00	1,286.00	1,116.00
Total	4,498.00	4,537.00	4,602.00	4,625.00	4,177.00

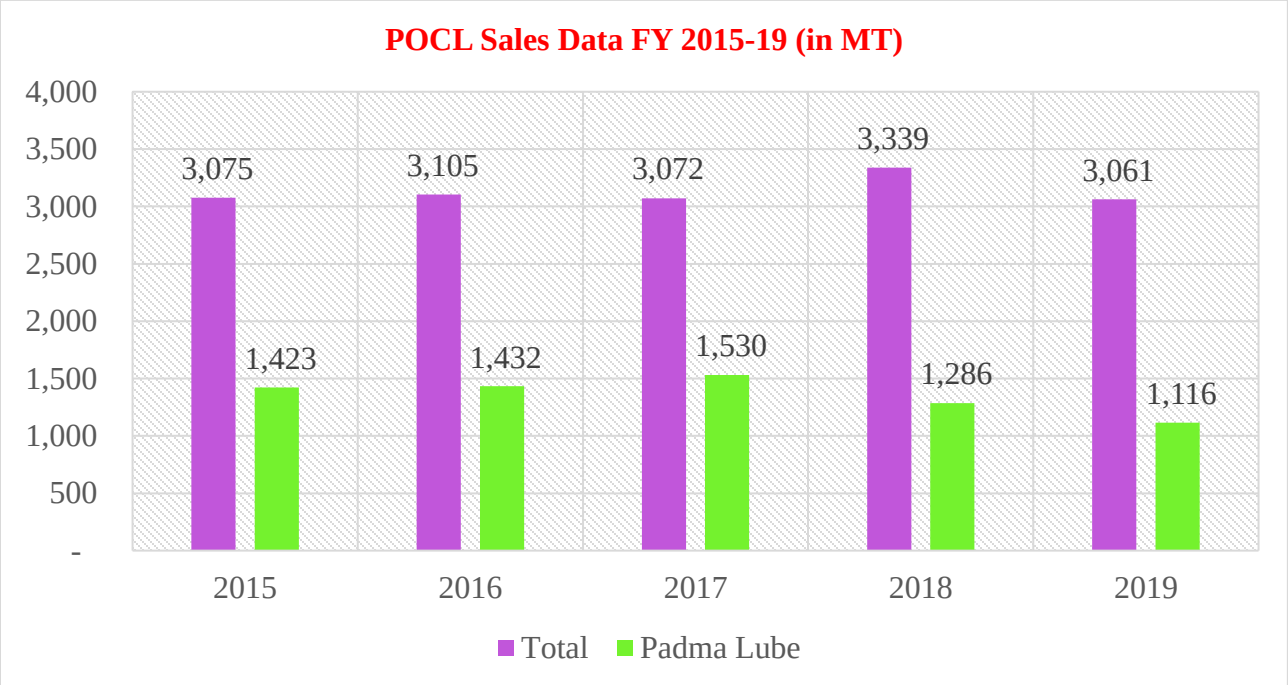


Fig 14: POCL Sales Data FY 2015-19

8.0 Lubricating oil Blending Plants in Bangladesh

In Chittagong Region

- ✓ MJL Bangladesh Limited – Mobil, Omera brands
- ✓ Jamuna Oil Company Limited- Jamuna Brand
- ✓ Meghna Oil company Limited- Meghna Brand
- ✓ Padma Oil company limited-Padma Brand
- ✓ Lubricant Asia Ltd - Fuchs
- ✓ Lubrref Bangladesh Limited – BNO Global Oil Co. Ltd. AP Oil
- ✓ Shah Aminullah Lubricants Ltd. - Boss Lubricants
- ✓ Moto Lubricating oil – Toll Blending from SOACL
- ✓ SOACL – Lube Zone Oil, Toll Blending other brands (Moto Lube etc.)
- ✓ Pacific Oil Ltd. - SINO brand
- ✓ Alhaj Abdul Kuddus Pvt. Ltd. – J-1 Oil
- ✓ Fossil Lubricants Pvt Ltd. – Fossil Oil
- ✓ City Lubricating oil Industries Ltd. – Amirath Oil

In Dhaka Region

- ✓ Sigma Oil Industries Ltd., Narayanganj – Sigma, Soil etc.
- ✓ Bashumoti Distribution Ltd., Hemayetpur- BOPIL & SPEEDY Oils
- ✓ Min Oil Co. Ltd., Savar- Mol-X (Use Recycle Oil)
- ✓ Lube House Industries Ltd., Norsingdhi – National Oil
- ✓ Karnafully Oil & Chemical Ltd. - (Use Recycle Oil)

In Jessore Region

- ✓ Oriental Oil Company Ltd., Jessore – blending HP, Veedol and Gulf.
- ✓ United Lubricating oil Limited, Mongla – (Petronas product)
- ✓ Star Lube Pvt Ltd. – Star Brand

[Source: Lubricating oil market intelligence]

9.0 Disposal and environmental impact

It is estimated that about 50% of all lubricants are released into the environment. Common disposal methods include recycling, burning, landfill and discharge into water, though typically disposal in landfill and discharge into water are strictly regulated in most countries, as even small amount of lubricant can contaminate a large amount of water. Most regulations permit a threshold level of lubricant that may be present in waste streams and companies spend hundreds of millions of dollars annually in treating their waste waters to get to acceptable levels.

Burning the lubricant as fuel, typically to generate electricity, is also governed by regulations mainly on account of the relatively high level of additives present. Burning generates both airborne pollutants and ash rich in toxic materials, mainly heavy metal compounds. Thus lubricant burning takes place in specialized facilities that have incorporated special scrubbers to remove airborne pollutants and have access to landfill sites with permits to handle the toxic ash.

Unfortunately, most lubricant that ends up directly in the environment is due to the general public discharging it onto the ground, into drains, and directly into landfills as trash. Other direct contamination sources include runoff from roadways, accidental spillages, natural or man-made disasters, and pipeline leakages.

Improvement in filtration technologies and processes has now made recycling a viable option (with the rising price of base stock and crude oil). Typically various filtration systems remove

particulates, additives, and oxidation products and recover the base oil. The oil may get refined during the process. This base oil is then treated much the same as virgin base oil however there is considerable reluctance to use recycled oils as they are generally considered inferior. Basestock fractionally vacuum distilled from used lubricants has superior properties to all-natural oils, but cost-effectiveness depends on many factors. Used lubricant may also be used as refinery feedstock to become part of crude oil. Again, there is considerable reluctance to this use as the additives, soot, and wear metals will seriously poison/deactivate the critical catalysts in the process. Cost prohibits carrying out both filtration (soot, additives removal) and re-refining (distilling, isomerization, hydrocrack, etc.) however the primary hindrance to recycling still remains the collection of fluids as refineries need continuous supply in amounts measured in cisterns, rail tanks.

Occasionally, unused lubricant requires disposal. The best course of action in such situations is to return it to the manufacturer where it can be processed as a part of fresh batches.

Environment: Lubricants both fresh and used can cause considerable damage to the environment mainly due to their high potential of serious water pollution. Further, the additives typically contained in lubricant can be toxic to flora and fauna. In used fluids, the oxidation products can be toxic as well. Lubricant persistence in the environment largely depends upon the base fluid, however if very toxic additives are used they may negatively affect the persistence. Lanolin lubricants are non-toxic making them the environmental alternative, which is safe for both users and the environment.

10.0 Discussion & Way Forward:

Overall lubricant Market Scenario in Bangladesh

- **Following market scenarios are gathered through Branded Product's market intelligence:**
  - ✓ Customers are generally **Indifferent** in **Nature** & **Low** in **Brand Preferences**.
  - ✓ Mostly **Price Sensitive** & **Choose Lower Grade Lubricants** rather than **Quality** brand Lubricants.
  - ✓ Not really value consolidated **Technical Service** by major portion of customers
  - ✓ Wholesalers/Retailers are mostly doing **Multi-Branded Business** & not much interested in **Exclusive Brand Business**.
  - ✓ Large wholesaler are having their **Own Products** either through **Direct Import** or through **Toll Blending**.
  - ✓ Widespread practices of **Fake** products selling by wholesalers/Retailers driven by high margin due to **Lack of Market Monitoring** by regulatory authorities.
  - ✓ Number of **14 New Blending Plants** came in operation
  - ✓ Lubricant processing plants are installed at different locations of the country producing lubes from USED OILS (List in later part of the presentation).

Way Forward in terms of Regulatory Measures

- Voice up for regulatory measures on locally blended products with recommended API grading.
- Communicate & Influence law enforcement agencies in retail markets to identify and take action against fake products' sellers.
- Assist to locate adulterating factories by law enforcement agencies and take action.

- Liaison between Government and Private Lubricating oil operators to set a minimum standard for the use of lubricants in the vehicles.
- Monitoring cell to strictly follow and maintain the standard of imported lubricants. (Govt. authority like BSTI to check the product quality in case of local blending or imported product.)

Societies and Industry bodies

- ✓ American Petroleum Institute (API)
- ✓ Society of Tribologists and Lubrication Engineers (STLE)
- ✓ National Lubricating Grease Institute (NLGI)
- ✓ Society of Automotive Engineers (SAE)
- ✓ Independent Lubricant Manufacturer Association (ILMA)
- ✓ European Automobile Manufacturers Association (ACEA)
- ✓ Japanese Automotive Standards Organization (JASO)
- ✓ Petroleum Packaging Council (PPC)

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