



**TRADE DEVELOPMENT
AUTHORITY OF PAKISTAN**



A Report on

PETROLEUM



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Minerals & Metals Division

Abbreviation

POL	Pakistan oil field LTD
BP	British Petroleum
BOPD	barrels of oil per day
PARCO	Pak-Arab Refinery Limited
ARL	Attock Refinery Limited
PRL	Pakistan Refinery limited
DRL	Dhodak Refinery Limited
LDO	Light Diesel oil
LSDO	Low speed diesel oil
CNG	Compressed natural gas
JP	Jet propellant (jet Fuel)
MS	Motor Spirit
HOBC	High octane blending component
SKO	Superior kerosene oil
FO	Furnace oil
TCF	Trillion cubic feets
CFT	Cubic Feet
TOE	Tones of Oil Equivalent
BC	Billion Cubic Feet
BD	Barrels per Day

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Background

The modern history of petroleum began in the 19th century with the refining of kerosene from crude oil. Although the Russian Dubinin brothers had purified kerosene directly from petroleum in their factory in 1823, and the process of refining kerosene from coal was discovered by Nova Scotian Abraham Pineo Gesner in 1846, it was only after Ignacy Kasiewicz had improved Gesner's method to develop a means of refining kerosene from the more readily available "rock oil" ("petr-oleum") seeps, in 1852, that the first rock oil mine was built in Bóbrka, near Krosno in central European Galicia (Poland/Ukraine) in 1853. In 1854, Benjamin Silliman, a science professor at Yale University in New Haven was the first person to fractionate petroleum by distillation. These discoveries rapidly spread around the world, and Meerzoeff built the first modern Russian refinery in the mature oil fields at Baku in 1861. At that time Baku produced about 90% of the world's oil.

The world's first commercial oil well was drilled in Poland in 1853, and the second in nearby Romania in 1857. At around the same time the world's first, but small, oil refineries were opened at Jasło, in Poland, with a larger one being opened at Ploiești, in Romania, shortly after. Romania is the first country in the world to have its crude oil output officially recorded in international statistics, namely 275 tonnes. By the end of the 19th century the Russian Empire, particularly the Branobel company in Azerbaijan, had taken the lead in production.

The first oil well in North America was in Oil Springs, Ontario, Canada in 1858, dug by James Miller Williams. The US petroleum industry began with Edwin Drake's drilling of a 69-foot (21 m) oil well in 1859, on Oil Creek near Titusville, Pennsylvania, for the Seneca Oil Company (originally yielding 25 barrels per day (4.0 m³/d), by the end of the year output was at the rate of 15 barrels per day (2.4 m³/d)). The industry grew through the 1800s, driven by the

demand for kerosene and oil lamps. It became a major national concern in the early part of the 20th century; the introduction of the internal combustion engine provided a demand that has largely sustained the industry to this day. Early "local" finds like those in Pennsylvania and Ontario were quickly outpaced by demand, leading to "oil booms" in Ohio, Texas, Oklahoma, and California.

By 1910, significant oil fields had been discovered in Canada (specifically, in the province of Alberta), the Dutch East Indies (1885, in Sumatra), Persia (1908, in Masjed Soleiman), Peru (1863, in Zorritos District), Venezuela, and Mexico, and were being developed at an industrial level.

Access to oil was and still is a major factor in several military conflicts of the twentieth century, including World War II, during which oil facilities were a major strategic asset and were extensively bombed.

Until the mid-1950s coal was still the world's foremost fuel, but after this time oil quickly took over. Later, following the 1973 and 1979 energy crises, there was significant media coverage on the subject of oil supply levels. This brought to light the concern that oil is a limited resource that will eventually run out, at least as an economically viable energy source. Although at the time the most common and popular predictions were quite dire, a period of increased production and reduced demand in the following years caused an oil glut in the 1980s. This was not to last, however, and by the first decade of the 21st century discussions about peak oil had returned to the news.

Today, about 90% of vehicular fuel needs are met by oil. Petroleum also makes up 40% of total energy consumption in the United States, but is responsible for only 2% of electricity generation. Petroleum's worth as a portable, dense energy source powering the vast majority of vehicles and as the base of many industrial chemicals makes it one of the world's most important commodities.

Introduction

Petroleum (L.petroleum, from Greek: petra (rock) + Latin: oleum (oil) or crude oil is a naturally occurring, flammable liquid consisting of a complex mixture of hydrocarbons of various molecular weights and other liquid organic compounds, that are found in geologic formations beneath the Earth's surface. Petroleum is recovered mostly through oil drilling. This latter stage comes after the studies of structural geology (at the reservoir scale), sedimentary basin analysis, reservoir characterization (mainly in terms of porosity and permeable structures). It is refined and separated, most easily by boiling point, into a large number of consumer products, from petrol and kerosene to asphalt and chemical reagents used to make plastics and pharmaceuticals. Petroleum is used in manufacturing a wide variety of materials.

Pakistan's economy is growing at a very steady rate and this growth is demanding higher energy consumption and thus putting a huge pressure over countries limited energy recourses. Energy sector in Pakistan comprises petroleum, gas, power and coal. Due to the limited reserves of oil and gas with in the country, Pakistan has to import large quantity of oil and oil related products to satisfy the growing domestic oil demand.

Pakistan has long been considered a petroleum province; the first well was drilled in 1866 at Kundal in the upper region of **Indus Vally**. Shallow wells were drilled in the following years, and from 1886, small scale production of oil started in Khattan (Balochistan). In 1915, the first of a series of commercial oil discoveries was made in the Potwar basin (Punjab). The first major gas discovery (9.6 TCF) was made in the Central Indus basin by Pakistan Petroleum Ltd. (majority shareholder was Burmah Oil) in 1952 at Sui (in Balochistan).

So far 728 exploratory wells have been drilled across the country, out of which a total 219 remained successful. The rate in oil and gas exploration was 'very high' in Pakistan as compared to other discoveries at the international level. The Exploration and Production (E&P) companies would be offered \$4.08 per mmbtu in as per 2009 petroleum policy, which was \$3.65 per mmbtu in 2007 and \$2.99

per mmbtu in 2001 petroleum policy. The country has about 45 rigs from which the country's oil and gas demands are met. Local gas production is 4 billion cubic feet per day (bcfd) and the oil production is 37,000 barrels per day (bpd) against the demand of 9-10 bcfd of gas and 77,000 bpd of oil.

There are almost four major national oil companies currently involved in the sector, namely Oil and Gas development corporation limited (OGDCL), Pakistan petroleum limited (PPL), Pakistan state oil company limited (PSO) and Pakistan oilfields limited (POL). All these four companies are joint ventures and partnership between different international companies and some domestic firms. These four listed companies have cumulative market capitalization of PKR 765 Billion and hold 22.5% weightage in KSE- 100 index. Major international oil companies currently involved in the business in country are BP (UK), ENI (Italy) OMV (Austria) and Orient petroleum (Canada).

Oil consumption of different energy products is dominated by Gasoline and Fuel oil. In Pakistan transport sector is the biggest user of the petroleum products which accounts about 48 percent followed by power generation which uses about 36 percent, and industrial sector which has a share of 12 percent while remaining is shared by the residential sector.

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Composition of Petroleum

In its strictest sense, petroleum includes only crude oil, but in common usage it includes all liquid, gaseous, and solid (e.g., paraffin) hydrocarbons. Under surface pressure and temperature conditions, lighter hydrocarbons methane, ethane, propane and butane occur as gases, while pentane and heavier ones are in the form of liquids or solids. However, in an underground oil reservoir the proportions of gas, liquid, and solid depend on subsurface conditions and on the phase diagram of the petroleum mixture.

An oil well produces predominantly crude oil, with some natural gas dissolved in it. Because the pressure is lower at the surface than underground, some of the gas will come out of solution and be recovered (or burned) as *associated gas* or *solution gas*. A gas well produces predominantly natural gas. However, because the underground temperature and pressure are higher than at the surface, the gas may contain heavier hydrocarbons such as pentane, hexane, and heptane in the gaseous state. At surface conditions these will condense out of the gas to form natural gas condensate, often shortened to condensate. Condensate resembles petrol in appearance and is similar in composition to some volatile light crude oils.

The proportion of light hydrocarbons in the petroleum mixture varies greatly among different oil fields, ranging from as much as 97% by weight in the lighter oils to as little as 50% in the heavier oils and bitumens.

The hydrocarbons in crude oil are mostly alkanes, cycloalkanes and various aromatic hydrocarbons while the other organic compounds contain nitrogen, oxygen and sulfur, and trace amounts of metals such as iron, nickel, copper and vanadium. The exact molecular composition varies widely

from formation to formation but the proportion of chemical elements vary over fairly narrow limits as follows.

Composition by Weight	
Element	Percentage
Carbon	83 to 87%
Hydrogen	10 to 14%
Nitrogen	0.1 to 2%
Oxygen	0.05 to 1.5%
Sulfur	0.05 to 6.0%
Metals	< 0.1%

Four different types of hydrocarbon molecules appear in crude oil. The relative percentage of each varies from oil to oil, determining the properties of each oil.

Composition by weight		
Hydrocarbon	Average	Range
Paraffins	30%	15 to 60%
Naphthenes	49%	30 to 60%
Aromatics	15%	3 to 30%
Asphaltics	6%	remainder

Crude oil varies greatly in appearance depending on its composition. It is usually black or dark brown (although it may be yellowish, reddish, or even greenish). In the reservoir it is usually found in association with natural gas, which being lighter forms a gas cap over the petroleum, and saline water which, being heavier than most forms of crude oil, generally sinks beneath it. Crude oil may also be found in semi-solid form mixed with sand and water, as in the Athabasca oil sands in Canada, where it is usually referred to as crude bitumen. In Canada, bitumen is considered a sticky, black, tar-like form of crude oil which is so thick and heavy that it must be heated or diluted before it will flow.

Specifications of Petroleum Products

HEAVY FUEL Oil / MAZUT M100 GOST 10585/75

Ash content, not more % 0,14
Mass fraction of sulphur, not more % 0,5
Temperature of the flash, not less °C 110 min
The temperature of solidification, not higher °C 25
Kinematics viscosity 118 max
Water content 0.5%
Mechanical impurities Lower than 0.1%
Acidity Lower than 5 mg KOH/ 100ml
Alkalinity nil
Gross Calorific Value Kcal/kg / KJ/kg min 9200/41300
Density at 15.0 deg. °C Kg/l 0.8900-0.9200
Hydrogen Sulfide Content (H₂S) ppm 0.5 max
Carbon Residual Lower than 7%
Vanadium (V) ppm 23
Aluminium (Al) ppm 5
Silikon (Si) ppm 12
Nickel (Ni) ppm 49
Asphaltenes m/m 3.6%
Destillation @4 mm Hg
Extracted to 760 mm Hg Initial Boiling Point deg. °C 216
5% recovered deg. °C 259
10% recovered deg. °C 310

SPECIFICATIONS SLCO Saudi Light Crude Oil

API Gravity 33.34
Sediment Content 0.1
ASTM Stabilized Gravity 34.5
Wax Wt. Percentage 9
Vanadium ppm V200 11.0
Gross Heating Value 19.23
Reid Vapor Pressure 2.0
Salt Content ppm NaCl 8
SulphurWt, Percentage ` 1.8 Max
Ash ppm 100.0
Comp Carbon Residue Wt. Percentage 3.1

SPECIFICATIONS JET FUEL COLONIAL GRADE 54

Density at 15° 0.8 / 0.83 g/ml

DIST_D86 / I.B.P. 159.8

DIST_D86 / 10% recovered 187.4

DIST_D86 / 20% recovered 194.8

DIST_D86 / 50% recovered 208.8

DIST_D86 / 90% recovered 232.7

DIST_D86 / F.B.P. 244.1

DIST_D86 / Residue 1.2 % vol

DIST_D86 / Loss 1.4 % vol

Saybolt Color 28

Appearance Clear & Bright

Flash Point 51.5

Copper Strip Corrosion 2h@100 Class 1

Acid number 0.004 mg KOH

Total Sulphur 0.12 % w/w

Mercaptan Sulphur 0.0005 % w/w

Existent Gum 1mg / 100 ml

FIA / Aromatics 16.5 % vol

Water Reaction : Interface Rating 1

Net Heat of Specific Energy 43.222 ml/kg

Freezing Point -43.5 °C

Kinematics Viscosity @ - 20 6.86 cSt

Smoke point 25 mm

Naphthalene's 1.2 % vol

JFTOT / Change in pressure drop 1 mm HG

JFTOT / Filter Tube Deposit 1

Common Uses of Petroleum

Why is Petrol Useful?

It makes the motor of your car run you to the store Answer Petrol is useful for two reasons: it burns with a very hot flame, shence is useful as a fuel, and it is a very good solvent. You're not supposed to wash auto parts in it because that is evaporates.

What can Petrol is used for?

Gasoline is used, in various grades, to fuel automobiles, aircraft, boats, lawn-care equipment, generators, and various other machines that utilize an internal combustion engine.

What are the uses of Petrol?

uses of petrol are : vehicles to make electricity: this is done by: the petrol is burnt and the heat goes to the boiler which makes the water boil then the steam from that goes into the turbines which then makes the magnets turn which then converts in to energy.

What are the uses of White Petrol?

White petrol, Parafin or as it is refered to in some places, Kerosine (kero) is widely used as Jet fuel, Rocket fuel, and is a very popular Heating fuel.

How is Petrol used by us?

Petrol is used by us in Motor Car and Generators.

What was the original use of Petrol?

It was used for killing off Parasites Bed Bugs lice and for removing grease stains.

Reserves of Petroleum in Pakistan

Reserves to production ration of Pakistan's energy resources are describes below. Depletion of oil and gas resources are expected to be with in 14 and 21 years respectively while Pakistan has huge quantity of low grade Coal which contains high content of sulphur due to which it has to import Coal for neighboring country while 16 percent of hydel power is yet to be realized So Oil and Gas are the dominant sectors as far as energy resources are Concerned. Their past, present and future will be discussed in detail here. Table gives reserve to production ratio of countries energy resources

Energy Reserves of Pakistan

Source: Pakistan energy year book 2006-07

Million US\$

Fuel	Annual production	Reserve to production ratio	Petroleum Reserve Size
Oil	23.94 Mbbl	14	326.678 M.barrel 43.83 Million TOE
Gas	1.40 Tcf	21	29.7891 TCF (551.22 Million TOE)
Coal	4.59 M tons	678	186,008 MT
Hydro	16%		

Pakistan Oil Sector Over view

Million US \$

Potential Expected	Discoveries	Produced	Up dated Potentials	Refinery capacity	Crude Oil Production 04-05	Crude oil Import,04-05	Up to 30 th June Oil & Gas Wells
27 Billions Barrels-100%	844 Millions Barrels 35	535 Millions Barrels	26.222 Billion Barrels	12.82 Millions Tons Year 97 %	24.12 Million Barrel 18% of Demand	8.28 Millions Tons 82% of Demand	620 Explored 180 Discover ed

Source: Ministry of Petroleum and natural resources Pakistan

Share of Government in Oil Sector

Name	Business	Direct & indirect Share holding
Oil & Gas Development Co.	Exploration & Production	100%
Pakistan Petroleum Limited.		93.45
Mari Gas co.ltd		40.005
Pakistan oil fields ltd.		11.00%
National Refinery Ltd.	Oil Refining	55.00%
Attock Refinery Ltd.		26.00%
Pak Arab Refinery co. ltd.		60.00%
Pakistan State Oil co.Ltd.	Oil Marketing and Distribution	55.22%

Source: Oil Companies Advisory Committee Pakistan

Drilling Exploring & Appraisal /Development Wells

S.NO.	Operator	Well Name	Concession/Lease	Status
1.	MGCL	Halini-1	Karak	Oil
2.	PPL	Bhit Shah X-1	Hala	Temporarily Suspended
3.	OGDCL	Zin-X-1	Zin	Drilling in Progress
4.	BP	Mulaki-1	E Khorewah	Testing
5.	OGDCL	Jabbi-1	Kohat	Drilling in Progress
6.	OGDCL	Saand-1	Nim	Due to Heavy Rain
7.	OGDCL	Suleman-1	Khewari	Drilling in Progress
8.	OGDCL	Ajuwala-1	Fateh Jang	Hole Cleaning
9.	BP	Kakejani-1	Khaskheli	Due to Heavy Rain
10.	POL	Dhulian Deep-1	Dhulian	Drilling in Progress
11.	OMV	Missri Bhambro-1	Miano-II	Suspended
12.	OMV	Lundo-1	Gambat	Drilling in Progress
13.	OGDCL	Dhodak Deep	Nashpa	DST
14.	OGDCL	Nashpa-2	Nashpa	DST
15.	POL	Domial-2	Ikhlas	Hole Cleaning
16.	OGDCL	Nashpa-3	E Nashpa	Drilling in Progress
17.	MOL	Makori East-2	Tal	Drilling in Progress
18.	Petronas	Rehmat	Mubarik	Temporarily Suspended
19.	MOL	Manzalai-9	Manzalai	M RIH 7"
20.	Eni	Bhit-13	Bhit	Gas
21.	OPII	Ratana-4	Ratana	Drilling in Progress
22.	RPL	Chachar-4	Chachar	Under Completion
23.	OGDCL	Rajian-6	Rajian	Drilling in Progress
24.	OGDCL	Uch-19	Uch	Drilling in Progress
25.	OGDCL	Qadirpur-43	Qadirpur	Drilling in Progress
26.	OGDCL	Uch-32	Uch	Drilling in Progress
27.	BP	Zaur-19	Zaur	Drilling in Progress

Long Term Petroleum Product Projection Pakistan

Million US\$

Product	2004-05	2008-09	2010-11	2013-14	2017-18
100 LL	2.5	2.5	2.5	2.5	2.5
JP-1	749.4	806.4	835.4	879.4	934.4
JP-4	150	150	150	150	150
MS	1125.7	1218.5	1267.8	1345.3	1456.2
HOBC	15	15	15	15	15
SKO	300	300	300	300	300
HSD	7297.2	8133.3	8628.6	9428.7	10612.1
LDO	275	275	275	275	275
FO	4993	5383	5492	5465	5545
T o t a l:	14907.8	16283.7	16956.3	17860.9	19290.2

Source: Oil Companies Advisory Committee Pakistan

Pakistan's Ranking in World Petroleum Production

World Production	Pakistan's Production	Pakistan's Ranking	Pakistan's Share %
85.160 Million Barrel Per Day	0.062 Million Barrel Per Day	58	0.073

Pakistan's Ranking in World Petroleum Reserves

World Reserves	Pakistan's Reserves	Pakistan's Ranking	Pakistan's Share %
1,349,417 Million Barrels (1.349 Trillion Barrels)	341 Million Barrels	53	0.025

Source: CIA World Fact Book

Top 10 largest world oil companies by reserves and production

Rank	Company	Worldwide Liquids Reserves (10⁹ bbl)	Worldwide Natural Gas Reserves (10¹² ft³)	Total Reserves in Oil Equivalent Barrels (10⁹ bbl)	Company	Production (10⁶ bbl/d)
1	Saudi Aramco	260	254	303	Saudi Aramco	11.0
2	National Iranian Oil Company	138	948	300	National Iranian Oil Company	4.0
3	Qatar Petroleum	15	905	170	Kuwait Petroleum Corporation	3.7
4	Iraq National Oil Company	116	120	134	Iraq National Oil Company	2.7
5	Petróleos de Venezuela	99	171	129	Petróleos de Venezuela	2.6
6	Abu Dhabi National Oil Company	92	199	126	Abu Dhabi National Oil Company	2.6
7	Kuwait Petroleum Corporation	102	56	111	Petróleos Mexicanos	2.5
8	Nigerian National Petroleum Corporation	36	184	68	Nigerian National Petroleum Corporation	2.3
9	Libya NOC	41	50	50	Libya NOC	2.1
10	Sonatrach	12	159	39	Lukoil	1.9

Source: CIA Fact Book

Objectives of Petroleum

Objectives are following:

- 1.To accelerate Exploration & Production activities in Pakistan with a view to achieve maximum self sufficiency in energy by increasing oil and gas production.
- 2.To promote direct foreign investment in Pakistan by increasing the competitiveness Of its terms of investment in the upstream sector.
- 3.To promote the involvement of Pakistani oil and gas companies in the countries upstream investment opportunities.
- 4.To train the Pakistani professionals in Exploration & Production sector to international standards and Create favorable conditions for their retaining within the country.
- 5.To promote increased E&P activity in the onshore frontier areas by providing Globally competitive incentives.

Petroleum Export Markets Increase Trend FY 2010-11

Source: FBS

Value in US \$ 000'

Country Increased Trend	July-June 2010-11	July-June 2009-10	VAR.
AFGHANISTAN	859,464	592,884	266,580
U.A.E.	347,673	281,782	65,891
KOREA, REP. OF	22,943	11,506	11,437
CHINA	18,067	2,037	16,030
TURKEY	8,397	3,785	4,612
MALAYSIA	4,373	-	4,373
EGYPT(U.A.R.)	70	17	53
IRAN(ISLAMIC R.)	44	-	44
DJIBOUTI	25	19	6
SAUDI ARABIA	14	2	12
U.R.OF TANZANIA			4
CANADA			2
TOTAL	1,261,076	892,032	369,044

Petroleum Export Markets with Decreased Trends FY 2010-11

Source: FBS

Value in US \$ 000'

Country Decreased Trend	July-June 2010-11	July-June 2009-10	VAR.
INDIA	15,351	16,158	(807)
BANGLADESH	260	2,289	(2,029)
U.S.AMERICA	27	41	(14)
RUSSIAN FED.	6	41	(35)
KENYA	-	1	(1)
SOUTH AFRICA	-	25	(25)
NETHERLANDS	-	83	(83)
OMAN	-	8,451	(8,451)
JAPAN	-	10,183	(10,183)
OTHER COUNTRIES	75,596	104,011	(28,415)
TOTAL	91,240	141,283	(50,043)

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World Top Ten Petroleum Exporters 2010

Source: ITC

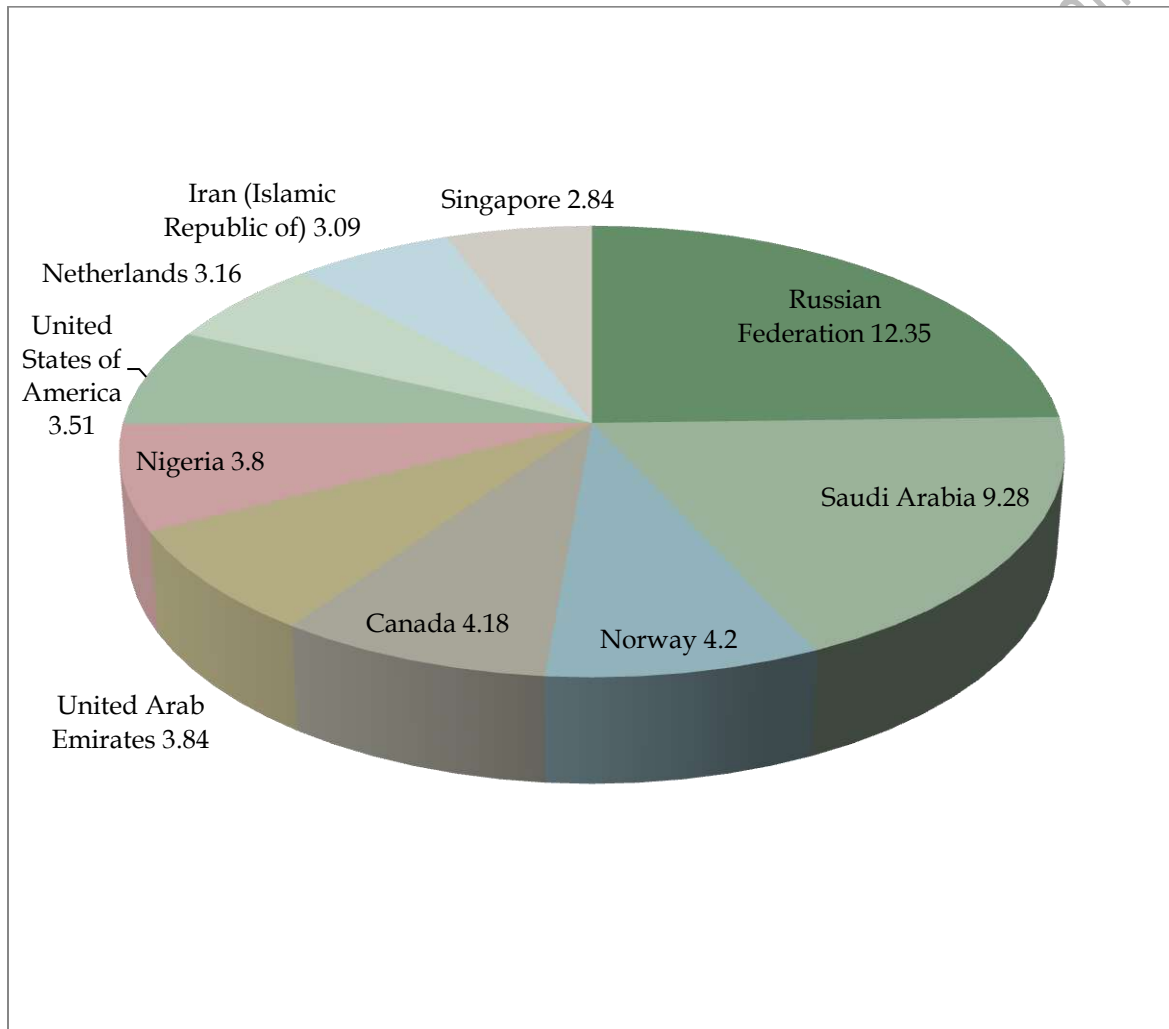
Value in Million US \$

Sr. #	Country	Value in 2010	%age Share
	World	1,998,530.81	100.00
1	Russian Federation	246,878.67	12.35
2	Saudi Arabia	185,530.46	9.28
3	Norway	83,975.13	4.20
4	Canada	83,478.48	4.18
5	United Arab Emirates	76,773.62	3.84
6	Nigeria	75,945.29	3.80
7	United States of America	70,212.99	3.51
8	Netherlands	63,060.59	3.16
9	Iran (Islamic Republic of)	61,711.21	3.09
10	Singapore	56,684.49	2.84

%age Share of World Top Ten Petroleum Exporters 2010

Source: ITC

Value in Million US\$



World Top Ten Petroleum Importers 2010

Source: ITC

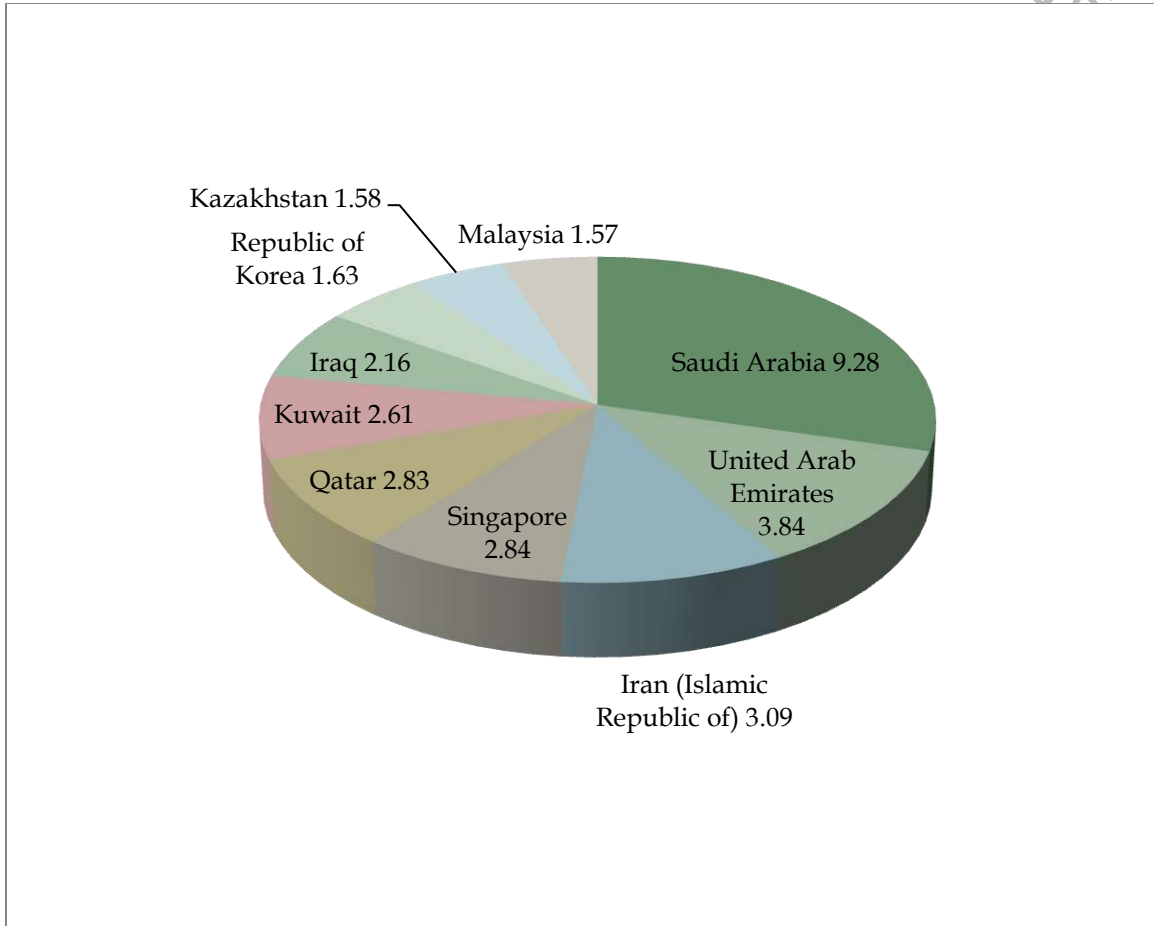
Value in Million US \$

Sr. #	Country	Value in 2010	%age Share
	World	1,998,530.81	100.00
	Asia Aggregation	824,074.52	41.23
1	Saudi Arabia	185,530.46	9.28
2	United Arab Emirates	76,773.62	3.84
3	Iran (Islamic Republic of)	61,711.21	3.09
4	Singapore	56,684.49	2.84
5	Qatar	56,545.68	2.83
6	Kuwait	52,160.98	2.61
7	Iraq	43,257.06	2.16
8	Republic of Korea	32,499.74	1.63
9	Kazakhstan	31,558.88	1.58
10	Malaysia	31,475.04	1.57

%age Share of World Top Ten Petroleum Importers 2010

Source: ITC

Value in Million US\$



Asia Top Ten Petroleum Exporters 2010

Source: ITC

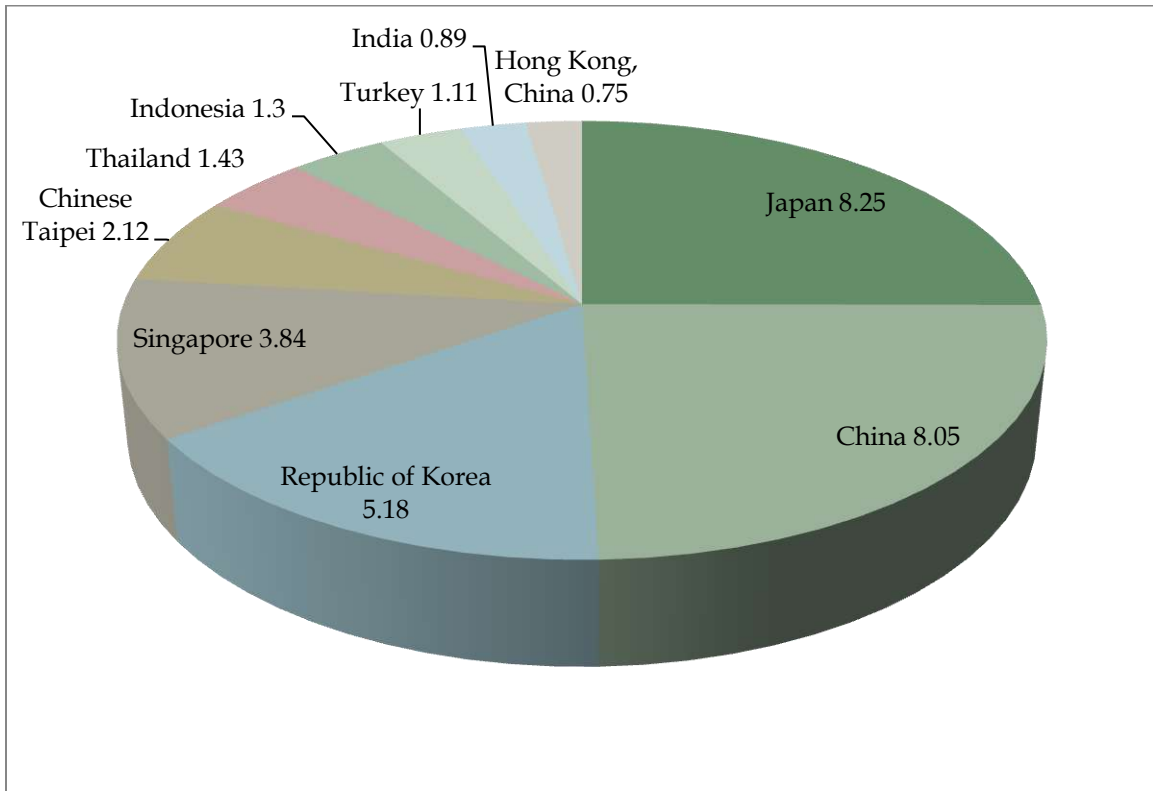
Value in Million US\$

Sr. #	Country	Value in 2010	%age Share
	World	2,112,303.03	100.00
	Asia Aggregation	777,550.45	36.81
1	Japan	174,268.26	8.25
2	China	169,998.07	8.05
3	Republic of Korea	109,474.86	5.18
4	Singapore	81,099.76	3.84
5	Chinese Taipei	44,772.37	2.12
6	Thailand	30,152.01	1.43
7	Indonesia	27,491.56	1.30
8	Turkey	23,403.90	1.11
9	India	18,901.01	0.89
10	Hong Kong, China	15,738.46	0.75

%age Share of Asia Top Ten Petroleum Exporters 2010

Source: ITC

Value in Million US \$



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Asia Top Ten Petroleum Importer 2010

Source: ITC

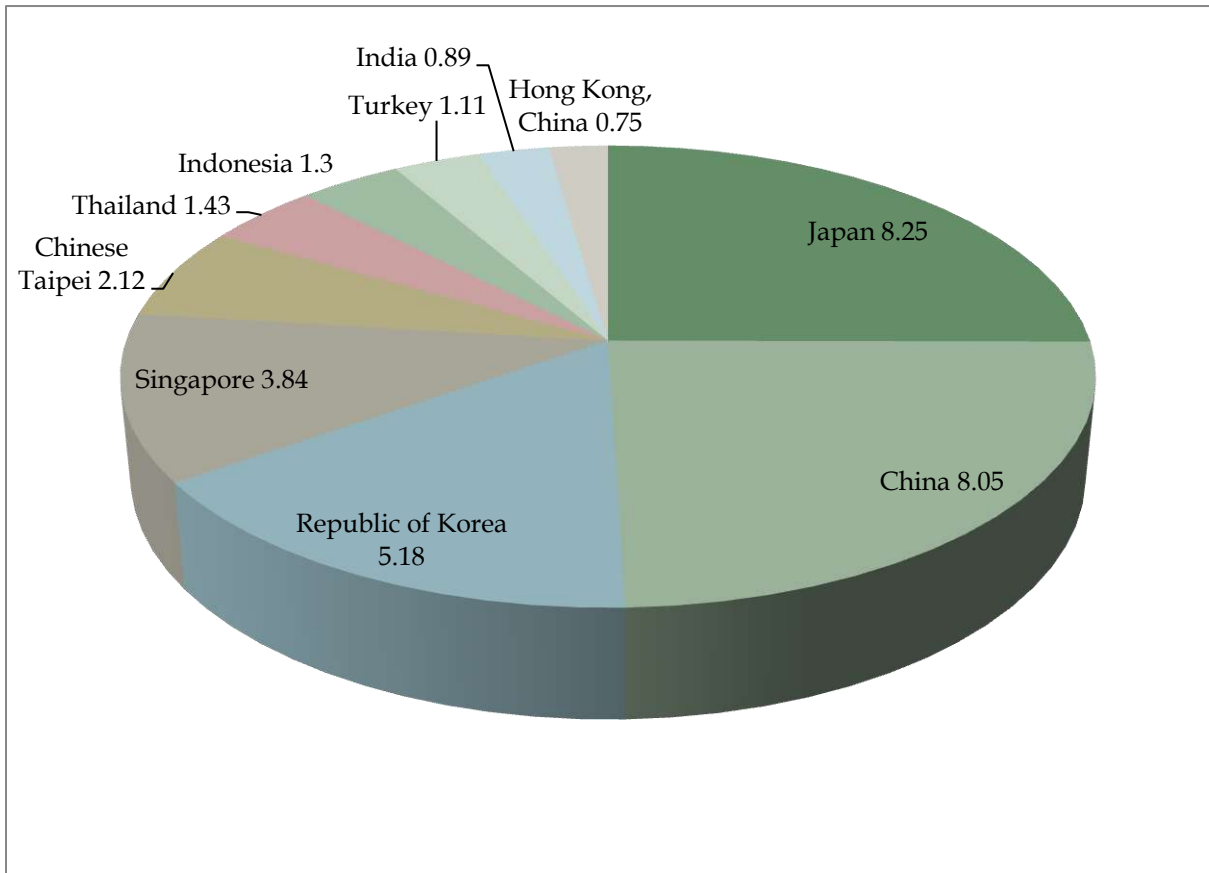
Value in Million US\$

Sr. #	Country	Value in 2010	%age Share
	World	2,112,303.03	100.00
	Asia Aggregation	777,550.45	36.81
1	Japan	174,268.26	8.25
2	China	169,998.07	8.05
3	Republic of Korea	109,474.86	5.18
4	Singapore	81,099.76	3.84
5	Chinese Taipei	44,772.37	2.12
6	Thailand	30,152.01	1.43
7	Indonesia	27,491.56	1.30
8	Turkey	23,403.90	1.11
9	India	18,901.01	0.89
10	Hong Kong, China	15,738.46	0.75

%age Share of Asia Top Ten Petroleum Importer 2010

Source: ITC

Value in Million US \$



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Petroleum Products exported by Pakistan till to 2010

Source: Trade map

US \$ '000'

Products Code	Petroleum Products	Value in 2008	Value in 2009	Value in 2010
'271019	Light petroleum distillates nes	1,120,370	707,092	1,194,773
'271410	Bituminous or oil shale and tar sands	0	1,379	3,307
'271011	Aviation spirit	28,137	2,572	1,799
'271320	Petroleum bitumen	490	2,678	1,646
'270600	Tar distilled from coal, lignite or peat & other mineral tars etc	56	115	283
'271290	Mineral waxes nes and similar products obtained by synthesis etc	39	1	186
'271490	Bitumen and asphalt; asphaltites and asphaltic rocks	22	345	126
'271390	Residues of petroleum oils/of oils obtained from bitumin minerals nes	19	63	41
'271500	Bituminous mixtures based on natural asphalt etc	0	17	21
'271119	Petroleum gases and other gaseous hydrocarbons nes, liquefied	2,818	0	5
'271220	Paraffin wax containing by weight less than 0.75% of oil	2	38	5
'271099	Petroleum oils and products nes	21	0	3
'271129	Petroleum gases and other gaseous hydrocarbons nes, in gaseous state	2	15	2
'271111	Natural gas, liquefied	137	0	1
'271210	Petroleum jelly	0	0	1
'270710	Benzole	0	0	0
'270740	Naphthalene	77,384	0	0
'270750	Aromatic hydrocarbon mixtures etcnes	0	0	0
'270799	Oils&oth products of the distillation of high temp coal tar etcnes	0	0	0
'270810	Pitch	67	0	0
'270900	Petroleum oils and oils obtained from bituminous minerals, crude	0	0	0
'271091	Heavy furnace oil (heating or motor fuel) <1% sulphur	0	0	0
'271121	Natural gas in gaseous state	0	0	0

Major Refineries of Pakistan and Their Capacity

Currently there are about five major refineries operating in Pakistan, which are explained below

1. Pak. Arab Refinery (PARCO) with refining capacity of **4.50 MTO** (2005-06)
2. Attock Refinery (ARL) with refining capacity of **1.80 MTO** (2005-06)
3. National Refinery (NRL) with refining capacity of **2.70 MTO** (2005-06)
4. Bosicor Pakistan Limited (BPL) with refining capacity of **1.50 MTO** (2005-06)
5. Pakistan Refinery Limited (PRL) with refining capacity of **2.20 MTO** (2005-06)
6. Dhodak Refinery Limited (DRL) with refining capacity of **0.12 MTO** (2005-06)

Proposed Advisory Committee for Petroleum Products

Members from:

- Ministry of Petroleum & Natural Resources (Development & Policy Wings)
- Pakistan Petroleum Ltd.
- Oil & Gas Development Company
- Pakistan State Oil
- Pakistan Shell
- Hydro Carbon Development Institute of Pakistan
- Pakistan Oil Refinery
- Attock Oil Refinery
- Pak Arab Oil Refinery
- BYCO Oil Refinery

Top Oil Consuming Countries in the World about 87 bbl each day

Consuming Nation 2008	(1000 bbl/day)	(1000 m³/day)	population in millions	bbl/year per capita	m³/year per capita
United States	19,497.95	3,099.9	314	22.6	3.59
China	7,831.00	1,245.0	1345	2.1	0.33
Japan	4,784.85	760.7	127	13.7	2.18
India	2,962.00	470.9	1198	0.9	0.14
Russia	2,916.00	463.6	140	7.6	1.21
Germany	2,569.28	408.5	82	11.4	1.81
Brazil	2,485.00	395.1	193	4.7	0.75
Saudi Arabia (OPEC)	2,376.00	377.8	25	33.7	5.36
Canada	2,261.36	359.5	33	24.6	3.91
South Korea	2,174.91	345.8	48	16.4	2.61
Mexico	2,128.46	338.4	109	7.1	1.13
France	1,986.26	315.8	62	11.6	1.84
Iran (OPEC)	1,741.00	276.8	74	8.6	1.37
United Kingdom	1,709.66	271.8	61	10.1	1.61
Italy	1,639.01	260.6	60	10	1.6

Top Oil Producing Countries of the World

S.NO.	Producing Nation	10 ³ bbl/d (2006)	10 ³ bbl/d (2007)	10 ³ bbl/d (2008)	10 ³ bbl/d (2009)	Present Share
1	Saudi Arabia (OPEC)	10,665	10,234	10,782	9,760	11.8%
2	Canada	3,288	3,358	3,350	3,294	4.0%
3	Russia	9,677	9,876	9,789	9,934	12.0%
4	United States	8,331	8,481	8,514	9,141	11.1%
5	Iran (OPEC)	4,148	4,043	4,174	4,177	5.1%
6	China	3,846	3,901	3,973	3,996	4.8%
7	Canada	3,288	3,358	3,350	3,294	4.0%
8	Mexico	3,707	3,501	3,185	3,001	3.6%
9	United Arab Emirates (OPEC)	2,945	2,948	3,046	2,795	3.4%
10	Kuwait (OPEC)	2,675	2,613	2,742	2,496	3.0%
11	Venezuela (OPEC)	2,803	2,667	2,643	2,471	3.0%
12	Norway	2,786	2,565	2,466	2,350	2.8%
13	Brazil	2,166	2,279	2,401	2,577	3.1%
14	Iraq (OPEC)	2,008	2,094	2,385	2,400	2.9%
15	Algeria (OPEC)	2,122	2,173	2,179	2,126	2.6%
16	Nigeria (OPEC)	2,443	2,352	2,169	2,211	2.7%
17	Angola (OPEC)	1,435	1,769	2,014	1,948	2.4%
18	Libya (OPEC)	1,809	1,845	1,875	1,789	2.2%
19	United Kingdom	1,689	1,690	1,584	1,422	1.7%
20	Kazakhstan	1,388	1,445	1,429	1,540	1.9%

21	Qatar (OPEC)	1,141	1,136	1,207	1,213	1.5%
22	Indonesia	1,102	1,044	1,051	1,023	1.2%
23	India	854	881	884	877	1.1%
24	Azerbaijan	648	850	875	1,012	1.2%
25	Argentina	802	791	792	794	1.0%
26	Oman	743	714	761	816	1.0%
27	Malaysia	729	703	727	693	0.8%
28	Egypt	667	664	631	678	0.8%
29	Colombia	544	543	601	686	0.8%
30	Australia	552	595	586	588	0.7%
31	Ecuador (OPEC)	536	512	505	485	0.6%
32	Sudan	380	466	480	486	0.6%
33	Syria	449	446	426	400	0.5%
34	Equatorial Guinea	386	400	359	346	0.4%
35	Thailand	334	349	361	339	0.4%
36	Vietnam	362	352	314	346	0.4%
37	Yemen	377	361	300	287	0.3%
38	Denmark	344	314	289	262	0.3%
39	Gabon	237	244	248	242	0.3%
40	South Africa	204	199	195	192	0.2%
41	Turkmenistan	No data	180	189	198	0.2%

Top Oil Exporting Countries of the World

S.NO.	Exporting Nation	10 ³ bbl/d (2009)	10 ³ m ³ /d (2009)	10 ³ bbl/d (2006)	10 ³ m ³ /d (2006)
1	Saudi Arabia (OPEC)	7,322	1,164	8,651	1,376
2	Russia	7,194	1,144	6,565	1,044
3	Iran (OPEC)	2,486	395	2,519	401
4	United Arab Emirates (OPEC)	2,303	366	2,515	400
5	Norway	2,132	339	2,542	404
6	Kuwait (OPEC)	2,124	338	2,150	342
7	Nigeria (OPEC)	1,939	308	2,146	341
8	Angola (OPEC)	1,878	299	1,363	217
9	Algeria (OPEC)	1,767	281	1,847	297
10	Iraq (OPEC)	1,764	280	1,438	229
11	Venezuela (OPEC)	1,748	278	2,203	350
12	Libya (OPEC)	1,525	242	1,525	242
13	Kazakhstan	1,299	207	1,114	177
14	Canada	1,168	187	1,071	170
15	Qatar (OPEC)	1,066	169		
16	Mexico	1,039	165	1,676	266

World's Largest Refineries (minimum capacity of 400,000 b/cd)

Rank	Company	Location	Crude Capacity, barrels per calendar day (b/cd)
1.	Paraguana Refining Center	Cardon/Judibana, Falcon, Venezuela	940,000
2.	SK Corp.	Ulsan, South Korea	817,000
3.	GS Caltex Corp.	Yeosu, South Korea	750,000
4.	Reliance Petroleum Ltd.	Jamnagar, India	660,000
5.	ExxonMobil Refining & Supply Co.	Jurong/Pulau Ayer Chawan, Singapore	605,000
6.	Reliance Industries Ltd.	Jamnagar, India	580,000
7.	S-Oil Corp.	Onsan, South Korea	565,000
8.	ExxonMobil Refining & Supply Co.	Baytown, Texas, USA	560,500
9.	Saudi Arabian Oil Co. (Saudi Aramco)	RasTanura, Saudi Arabia	550,000
10.	Formosa Petrochemical Co.	Mailiao, Taiwan	540,000
11.	ExxonMobil Refining & Supply Co.	Baton Rouge, Louisiana, USA	503,500
12.	Hovensa LLC	St. Croix, Virgin Islands, USA	500,000

13.	Kuwait National Petroleum Co.	Mina Al-Ahmadi, Kuwait	466,000
14.	Shell Eastern Petroleum (Pte) Ltd.	Pulau, Bukom, Singapore	462,000
15.	BP PLC	Texas City, Texas, USA	451,250
16.	Citgo Petroleum Corp.	Lake Charles, Louisiana, USA	440,000
17.	Marathon Petroleum Co. LLC	Garyville, Louisiana, USA	436,000
18.	Shell Nederland Raffinaderij B.V.	Pernis, Netherlands	404,000
19.	Sinopec	Zhenhai, China	403,000
20.	Saudi Arabian Oil Co. (Saudi Aramco)	Rabigh, Saudi Arabia	400,000
21.	Saudi Aramco-Mobil	Yanbu, Saudi Arabia	400,000

Source: Oil & Gas Journal, Dec, 2010.

Top Ten Asian Refining Companies

Rank	Company	No. Refineries	Crude Capacity, barrels per calendar day (b/cd)*
1.	Sinopec (China)	27	3,971,000
2.	CNPC (China)	25	2,615,000
3.	ExxonMobil (USA)	10	1,937,500
4.	JX Nippon Oil & Energy Corp. (Japan)	7	1,423,200
5.	Royal Dutch Shell PLC (NL/UK)	13	1,324,875
6.	Indian Oil Co. Ltd. (India)	11	1,274,293
7.	Reliance Petroleum Ltd. (India)	2	1,240,000
8.	Pertamina (Indonesia)	8	1,011,825
9.	SK Corp. (South Korea)	1	817,000
10.	Chinese Petroleum Corp. (CPC, Taiwan)	3	770,000

Source: Oil & Gas Journal, Dec 6,2010.

Process Plants Resume in Pakistan (OGDC)

Plants	Products	Design/Installed Capacity	Start-up Date
Qadirpur Gas Processing Plant – gas sweetening through membrane technology. Phase-I Phase-II Phase-III	Sales Gas	235 MMSCFD	1995
	Condensate	300 BPD	
	Sales Gas	500 MMSCFD	2004
	Condensate		
	Sales Gas		
	Condensate	900 BPD	2009
		600 MMSCFD	
		900 BPD	
Uch Gas Processing Plant Gas Sweetening through MDEA process having low heating value gas	Sales Gas	250 MMSCFD	1999
Dhodak Gas Dehydration, unit	Dehydrated Gas	20 MMSCFD	2010
Dakhni Gas / Condensate Processing Plant Gas sweetening through Amine process, LPG and Sulphur Recovery Unit Gas Dehydration unit – train II	Sales Gas	25 MMSCFD	1989
	Condensate	1760 BPD	
	LPG	26 MT/D	2008
	Sulphur	67 MT/D	
	Sales Gas	50 MMSCFD	
Bobi Gas / Condensate Processing Plant - gas dehydration, LPG recovery and condensate stabilization	Sales Gas	16 MMSCFD	2004
	LPG	120 MT/D	
	Condensate	2762 BPD	
Kunnar Gas / Condensate Processing Plant - gas dehydration, LPG recovery and condensate stabilization	Re-injection	10 Gas* MMSCFD	1999
	LPG	41 MT/D	
	Condensate	3880 BPD	
Chanda Gas / Condensate Processing Plant - gas dehydration, LPG recovery and condensate stabilization	Sales Gas	19 MMSCFD	2004
	LPG	54 MT/D	
	Condensate	5300 BPD	

NandPur Gas Dehydration Plant	Sales Gas		50 MMSCFD		2005
Sadqal Gas Dehydration Plant	Sales Gas		40 MMSCFD		2nd quarter of 1992
Pakhro Membrane Plant	Sales Gas		10 MMSCFD		2010
Hundi Sari Gas Dehydration/Compression Plant	Sales Gas		20 MMSCFD		1975
Mela Gas Dehydration Plant	Sales Gas	Condensate	30 MMSCFD 7000 BPD		2007
Nashpa Gas Dehydration Plant	Sales Gas	Condensate	50 MMSCFD 6000 BPD		2010
Sheikhan Gas Dehydration Plant	Dehydrated Gas		100		2010

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New Locations of Oil reserves in Pakistan

Halini well Mianwali Punjab

Ziarat well Balochistan

Koonj well –sukkur

Sujawal well Sindh

Kark well on KPK border area

Sangur well and Kirk new oil reserves

Miano Gas field

Sawan Gas Field

Kandhkot Gas oil field

Block 2669-3 LATIF

Block 2668-4 Gambat

Marmazia Discovery

Makori East Discovery

Tolang Discovery

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Activities Comprising on Exploration and Development by OGDC.

- 31 wells spudded, comprising 13 exploratory / appraisal and 18 development wells
- Two new exploration blocks (Eastern Offshore Indus – A and Shaan) were added to OGDCL's
- existing blocks during FY 2008
- Five new discoveries namely Moolan-1, Moolan N-1, Pasakhi E-1, Pakhro-1 and Dhodak Deep-1
- were made in FY2008. In July 2008, another discovery, Kunnar S-1 was made. Initial testing results
- from these discovery wells produced a cumulative 1,150 bpd of crude oil, 593 bpd of condensate and
- 46 MMscfd of gas
- 2,889 Linear Kms of 2D seismic survey and 1,067 Sq. Kms of 3D seismic survey completed during
- FY2008.
- All Eight phases of the OGDCL financed Basin Study have been completed and the phase-wise
- reports are being finalized. Reports on Phases I, II, and III are complete and we expect that Fugro
- Robertson will finalize the report on the remaining phases (Phase IV to VIII) by the end of current year
- 2008.
- Annual Turn Around (ATA) was completed at Qadirpur, Uch, Dakhni, Kunnar, Bobi and Dhodak fields
- as part of scheduled annual maintenance.

Pakistan's Top Petroleum Products Exporters

S.No.	Pakistan's top petroleum products exporters (PRAL data 2008-09)	Value in US \$ '000'
1	SHELL PAKISTAN LTD	157,070,351
2	PAKISTAN STATE OIL CO LTD	129,878,851
3	ATTOCK REFINERY LTD	112,782,176
4	PAKISTAN REFINERY LIMITED.	92,177,848
5	ATTOCK PETROLEUM LTD	81,360,036
6	NATIONAL REFINERY LTD	76,031,629
7	BOSICAR PAKISTAN LTD	72,868,139
8	JAMSHORO JOINT VENTURE LIMITED	17,771,301
9	JAN FILLING STATION	7,716,574
10	ADMORE GAS (PRIVATE) LIMITED	4,210,955
11	M AL-NOOR ENTERPRISES IMPORT & EXPORT G.O SUPPLR	3,544,928
12	CHEVRON PAKISTAN LIMITED	2,235,659
13	NAWAZ PETROLEUM	706,432
14	TUFAIL FILLING STATION	586,057
15	ISLAM LUBRICANTS (PVT) LTD	416,156
16	ZAHOR CORPORATION CLEARING FORWARDING AGY	347,653
17	ABBAS & SONS	251,605
18	AFZAL MULTINATIONAL TRADING CO	224,336
19	AUTOMOBILE CORPORATION OF PAKISTAN (PVT) LTD	187,600
20	TOTAL ATLAS LUBRICANTS PAK LTD	106,529
21	MALIK IMTIAZ KHAN & CO	91,713

S.No.	Pakistan's top petroleum products exporters (PRAL data 2008-09)	Value in US \$ '000'
22	SHINWARI ENTP&IRFANULLAH&BROS&STAR FILLING STATION	90,417
23	OVERSEAS OIL TRADING CO. (PRIVATE) LIMITED	70,120
24	TOTAL PARCO PAKISTAN LIMITED	54,800
25	HAYAT ULLAH & CO	2,300
26	MUSTAFA ENTERPRISES	2,300
27	M/S HAJI MAHMOOD HAJI ESSA & CO	9,546
28	FAUJI FERTILIZERS BIN QASIM LIMITED	7,222
29	SHINWARI TRADING COMPANY	3,577
30	M/S FREIGHT LINKERS/SKYLARK ENTERPRISES	1,881
31	RESEARCH & DEVELOPMENT ENGINEERING COMPANY	778
32	MUHAMMAD HUSSAIN	757
33	M/S MANSOOR AHMED & COMPANY	692
34	A.A KHAN & CO	600
35	F.A.INTERINTERNATIONAL	397
36	AL NOOR GEMS CO235	235
37	IMRAN BROTHERS	203
38	RIAZ ENTERPRISES	53
39	KALI KO TRADERS	35
40	CLARIANT PAKISTAN LTD	8

SUGGETION/RECOMMENDATION AND ACTION PLAN OF PETROLEUM

- Pakistan is located in the Petroleum bearing area of the region i.e. adjacent to Iran and as such exploration in the country is to be carried out at War Scale.
- Oil exploration Organizations of Pakistan (e.g. OGDC , PPL) should be technically strengthened at par with foreign companies .
- Petroleum policy should be revised giving more incentives to foreign oil companies to carry out exploration in Pakistan.
- Coastal areas of Pakistan also show prospects of Oil reserves and as such off shore drilling Program is to be planned on priority .

SUGGETION/RECOMMENDATION AND ACTION PLAN OF PETROLEUM

- Presently there are 05 Oil Processing Facilities (Indus Refinery Ltd., Pakistan Oil Refinery, Pak-Arab Oil Refinery, Attock Oil Refinery and Khalifa Coastal Refinery) with the total refining capacity of 270,000 Barrels per day with largest capacity of refining of 95000 Barrels per day of Pak Arab Refinery. However, in order to accelerate the export of Petroleum Products a substantial increase in the refining capacity is essential.
- With the commissioning of two big oil refinery plants within 6 to 18 months with combined processing capacity of 220,000 barrel per day, there will an increase more than 80 percent of the country's existing refinery capacity. These are BYCO's 120,000 barrel per day and Trans Asia's 100,000 barrel per day processing plant.
- MMD is in contact with all the major Production & Marketing stakeholders of Petroleum & Petroleum Products in the country. To this effect an advisory committee exclusively for this sector is being constituted to chalk out a plan for enhancement of export by taking all the stakeholders on board.

Conclusion

Pakistan has recently begun exporting a range of quality petroleum products which includes Light petroleum Distillates, Aviation spirit, Bituminous and Tar sands, Petroleum gases and other gaseous, naphtha, lamp oil and white spirit residual fuel oil, lubricating oils and greases, toluene and xylene.

The response from foreign buyers has been so encouraging as to give a further boost to local production. Pakistan refineries produce petroleum products under strict quality that conform to international standards.

It is very important to enhance the investment with foreign Oil Companies/Refineries in the Upstream and Downstream Sectors for the rapid development in Petroleum Products exports of the sector.

Activities should be increased in Exploration and Production in Offshore and Onshore areas of Pakistan.

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GLOSSARY OF TERMS USED IN THE PETROLEUM INDUSTRY

Bcf:

Billion cubic feet. Measures petroleum.

B/D:

Barrels per Day. Usually used to quantify a refiner's output capacity or an oilfield's rate of flow.

Bitumen:

Heavy oil or petroleum in semi-solid or solid forms.

Block:

Applies to an area of land - main subdivision used for exploration and production acreage.

Blowouts:

Uncontrolled releases of fluids, solids, or gases.

Bunker C Fuel Oil:

Heavy fuel used for ships. Generally refers to a No. 6 grade of residual fuel oil which has had limited refining.

Casing:

Lining drilled hole with steel pipe. The pipe is cemented in place to prevent the hole caving in.

Casinghead Gas:

Gas present in an oil well that is removed when it flows to the surface at the well's casing.

Centrifugal pump:

A rotating pump, like a large screw, used for pushing large volumes of oil and gas through pipelines.

CF/D:

Cubic feet per day. Usually used to quantify the rate of flow of a gas well or pipeline.

Christmas tree:

The arrangement of pipes and valves at the wellhead which controls the flow of oil and gas and prevents blowouts.

Completion

The final installation of permanent equipment for the production of oil or gas.

Compressor station:

Stations located every 60-80 km along gas pipeline which recompress gas to ensure an even flow.

Concession:

A defined license area granted to a company for the exploration of oil and/or gas under specific terms and conditions for a fixed period of time.

Conventional crude:

Liquid petroleum that is capable of flowing naturally without any processing.

Crown lands:

Government owned properties.

Crude Oil:

A mixture of hydrocarbons that exists as a liquid in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. Crude is the raw material which is refined into gasoline, heating oil, jet fuel, propane, petrochemicals, and other products.

Cubic foot:

The amount of gas required to fill a volume of one cubic foot.

Cubic feet per day (cfd):

The number of cubic feet of natural gas produced from a well over a 24 hour period, normally an average figure from longer period of time.

Cushion Gas:

The amount of gas required in a storage pool to maintain sufficient pressure to keep the working gas moving so it can be recovered.

Daisy chain:

Term refers to the "chain" of linked sales and transfers by which cargo of oil or oil products is sold many times before being delivered to the customer.

Density:

The gravity of crude oil. Density is measured in kilograms of large, carbon-rich molecules per cubic metre or degrees on the American Petroleum Institute (API) gravity scale.

Development Well

A well drilled within the proved area of an oil or gas reservoir down far enough to reach the layers of rock which are known to produce petroleum products.

Diesel Fuel:

Distillate fuel oil used in compression-ignition engines. It is similar to home heating oil, but must meet a cetane number specification of 40 or more.

Downstream sector:

Refers to all of the linked businesses which refine and market petroleum including pipeline systems, refineries, gas distribution, and petrochemical companies.

Drill string:

Steel pipes roughly 10m long joined together to form single pipe from the drill bit to the drilling platform. It is rotated during drilling and is also the conduit for the drilling mud.

Dry gas:

Gas containing no water vapor, same as lean gas.

Dry hole:

An unsuccessful well, drilled without finding commercial quantities of oil or gas.

Gas cap:

In field containing both gas and oil, some gas will often collect at the top of the reservoir in a single deposit known as gas cap.

Gas field:

A field or group of reservoirs of hydrocarbons containing natural gas but insignificant quantities of oil.

Gasoline, Straight-Run:

Also known as raw gasoline. Gasoline which is obtained directly from crude oil by fractional distillation. Straight-run gasoline generally must be upgraded to meet current motor fuel specifications.

Gathering lines:

Pipelines that move petroleum from wells to processing or transmission facilities.

Geophones:

Sensors used in seismic surveys capable of detecting the velocity of energy waves.

Gross:

Used to refer to acres or wells, refers to the total acres or wells in which a company, individual, trust, or foundation has working interest.

Heating Oil:

No. 2 fuel oil, a distillate fuel oil used either for domestic heating or in moderate capacity commercial-industrial burners.

Hydrocarbon:

Any compound or mix of compounds, solid, liquid or gas, comprised of carbon and hydrogen (e.g., coal, crude oil, and natural gas).

Infill drilling:

Drilling more wells into the same pool so that oil does not have to travel as far through the rock.

Injection well:

A well used for injecting fluids into a formation in an attempt to increase force the petroleum out of the rock more efficiently.

Jet Fuel:

Kerosene-type; high-quality kerosene product used primarily as fuel for commercial turbojet and turboprop aircraft engines.

Joint venture:

An investment undertaken by consortium, usually with one member acting as the operator.

Liquefied natural gas (LNG):

Natural gas that has been liquefied for ease of transport by cooling the gas to -162-C. Natural gas has 600 times the volume of LNG.

Liquefied Petroleum Gas (LPG):

Propane, butane, or propane-butane mixtures derived from crude oil refining or natural gas fractionation. For convenience of transportation, these gases are liquefied through pressurization.

Major

A term broadly applied to those multinational oil companies ' which by virtue of size, age, or degree of integration are among the preeminent companies in the international petroleum industry.

Natural Gas:

A naturally occurring mixture of hydrocarbon and non- hydrocarbon gases found in porous rock formations. Its principal component is methane.

Netback:

The amount of money a company receives per barrel of oil equivalent produced, after subtracting operating costs, royalties, and general and administrative costs.

Net debt:

Long-term debt plus working capital.

Non-associated Gas:

Natural gas in a reservoir which contains no crude oil.

Net production:

Petroleum production that is owned by a company, individual, trust, or foundation, less royalties and production due others.

Oil

Crude oil or condensate.

Oil in place:

The estimation of the real amount of oil in a reservoir.

OPEC:

Organization of Petroleum Exporting Countries.

Permeability:

The capacity of a reservoir rock to transmit fluids.

Petrochemical:

An intermediate chemical derived from petroleum, hydrocarbon liquids, or natural gas, such as ethylene, propylene, benzene, toluene, and xylene.

Petroleum:

A natural mixture of hydrocarbons in gaseous, liquid, or solid form.

Pinnacle reef:

A conical formation in the subsurface rocks where hydrocarbons may be trapped.

Pipeline:

A pipe through which oil or natural gas is pumped between two points, either offshore or onshore.

Pool:

A natural underground reservoir that either contains or appears to contain petroleum.

Porosity:

The amount of open space within a rock, similar to a sponge.

Possible reserves:

An estimate of possible oil and/or gas reserves based on geological and engineering data from undrilled or untested areas.

Rich gas:

Gas which is predominately methane but with a relatively high proportion of other hydrocarbons.

Royalty holiday:

Some jurisdictions or regulators grant royalty free wells in certain situations. For instance, In Alberta, the first 70,000 boe produced from a horizontal well are generally royalty free.

Solution gas:

Natural gas which is dissolved in the crude oil within the reservoir.

Spot market:

An international market in which oil or oil products are traded for immediate delivery at the current price.

Transmission pipeline:

A network of pipelines distributing any petroleum product from a station, via compressor stations, to storage centres or distribution points.

Nitization:

Owners of adjoining properties pool reserves together to form a single producing unit in which each has an interest.

Upstream: In the daisy chain of petroleum production, all the activities that occur from exploration through to production of raw product at the wellhead.

Wellhead:

The control equipment fitted to the top of the well consisting of outlets, valves blowout preventors, etc.

Wet Gas:

Natural gas containing condensable hydrocarbons.

Wildcat:

A well drilled in an unexplored area.

Working capital:

Current assets minus current liabilities, shows a company's ability to meet its short-term obligations.

Workovers:

Major repairs or modifications which restore or enhance production from a well.

Crude Oil Conversion

1 Barrel = 117.347 liters

1 Gallon = 4.546 Liters

1 Metric tone (1000kgs) = 7.3 barrels

1 Metric tone crude Oil = 7.3 barrels

1 Barrel [Oil] = 42 Gallons

Source: Texas A & M University and the valued assistance of Dr.AT Anderson Napa California.

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