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OIL PRODUCTION

Oil is the lifeblood of modern civilization. It fuels the vast majority of the world's mechanized transportation equipments – Automobiles, trucks, airplanes, trains, ships, farm equipment, the military, etc. Oil is also the primary feedstock for many of the chemicals that are essential to modern life. This study deals with the upcoming physical shortage of world conventional oil, an event that has the potential to inflict disruptions and hardships on the economy of every country. The earth's endowment of oil is finite and demand for oil continues to increase with time.

What is oil? Together with natural gas, it makes up petroleum, which is Latin for "rock oil". Petroleum is basically a mix of naturally occurring organic compounds from within the earth that contain primarily hydrogen, carbon and oxygen. When petroleum comes straight out of the ground as a liquid it is called crude oil if dark and viscous, and condensate if clear and volatile. When solid it is asphalt, and when semi-solid it is tar. There is also natural gas, which can be associated with oil or found alone.

Petroleum in ancient times was called bitumen, and mankind for centuries was not at all sure what bitumen was made of or where it came from. Two ideas developed in ancient times to explain the composition and origin of bitumen. One held that bitumen was inorganic and bore no relation to living things, whereas the other theorized that it somehow formed from once-living plants or animals.

People have used oil obtained from the ground since at least 4,000BC. In the Middle East, crude oil that seeped to the surface was used to waterproof boats and as an adhesive in the construction of buildings and roads. Crude oil was also refined in minor quantities for lamp and heating oil in ancient China, though this technology never made it directly to modern times. By 600AD, the Byzantines used crude oil to produce a flame-throwing weapon known as Greek fire.

The modern oil industry began as a result of the search for inexpensive lighting. Until 1859, most people obtained artificial light by burning animal fats in the form of beeswax candles or whale oil. Whale oil shed the purest light of all available fuels, and became a luxury product. Over fishing led to a decline in the whale population (click here to see a cool whale video today) and a sharp increase in whale oil prices. In order to take advantage of the high prices of illumination, a group of investors hired a railroad conductor named Edwin Drake to head to a location close to where traces of crude oil had been observed on the surface. After a nervous few weeks in rural Pennsylvania, Drake struck oil on August 27, 1859. The 69 foot deep well on a salt dome rock formation yielded around 15 barrels a day. Others quickly followed Drake and drilling soon spread across the region. The petroleum that flowed from this well in what became known as Oil Creek, near Titusville, Pennsylvania, started the modern oil industry we know today (oil had been produced in other parts of the world, but the Titusville well kicked off industry on a large scale).

The new industry was gradually consolidated and monopolized by one man, John D. Rockefeller, and his Standard Oil Company. In 1911, Standard Oil was split by anti-monopoly legislation into several competing firms. Esso ("S. O." for Standard Oil), which later became Exxon, remains the most well known of the Standard Oil children.

Up until the early 1900s, although economically important for lighting, oil was not used for much else. This quickly changed with the development of mass produced automobiles and aircraft such that by the 1950s oil had almost completely transitioned to being a transportation fuel. Today (see charts below), two-thirds of oil is used for transportation with the remaining third used for

heating oil, plastics and road surfacing. A very small amount of oil is used for electricity generation as oil is generally more expensive than coal or natural gas.

Horses served as the primary means of transporting machinery to the oil field, as well as carrying the product to refineries, in the early Pennsylvania oil fields. By 1865 horses had been supplanted by the newly completed rail line, and tank cars, originally two open tubs, were developed for rail transport. The first pipeline was developed in 1863, when Samuel Van Syckle pumped crude through five miles of a two-inch pipe from the Pithole field in western Pennsylvania to a railroad terminal. In the 1870s a six-inch pipeline ran from oil fields to Williamsport, Pennsylvania, 130 miles away. Ten years later pipelines ran from Pennsylvania to Cleveland, Buffalo, and New York City. At the end of the twentieth century, the United States had over 1 million miles of oil pipeline in use. Most pipelines were buried, with the exception to the 800-mile trans-Alaska pipeline, built partially above ground in the 1970s to prevent damaging the fragile permafrost.

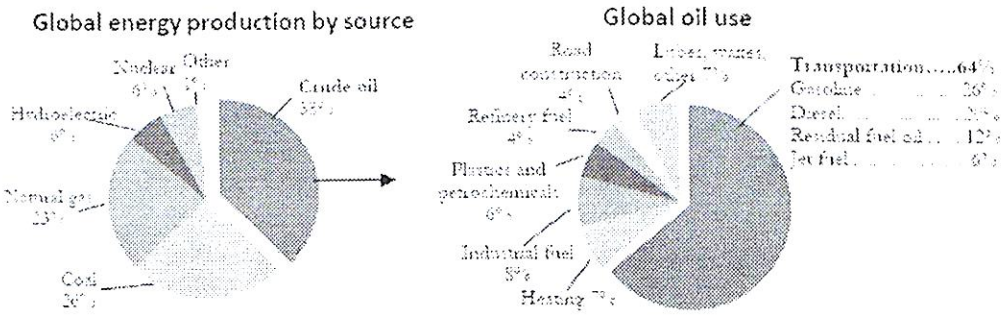

Figure: 1-1 Global energy production by source in comparison of Global oil use.

Figure: 1-1 makes comparison between Global energy production by source and Global oil use.

Countries with the Largest Oil Reserves

Countries with the largest oil reserves (billion barrels) (according to the BP Statistical review of world energy 2011.[1]

▲Country	Proved reserves of oil (bbl)
1.Saudi Arabia	264,5
2.Venezuela	211,2
3. Iran	137,0
4. Iraq	115,0
5.Kuwait	101,5
6.United Arab Emirates	97,8
7.Russia	77,4
8.Libya	46,4
9.Kazakhistan	39,8

OPEC the Organization of the Petroleum Exporting Countries (OPEC) was founded in Baghdad, Iraq, with the signing of an agreement in September 1960 by five countries namely Islamic Republic of Iran, Iraq, Kuwait, Saudi Arabia and Venezuela. They were to become the Founder Members of the Organization [1].

These countries were later joined by Qatar (1961), Indonesia (1962), Libya (1962), the United Arab Emirates (1967), Algeria (1969), Nigeria (1971), Ecuador (1973), Gabon (1975) and Angola

(2007). From December 1992 until October 2007, Ecuador suspended its membership. Gabon terminated its membership in 1995. Indonesia suspended its membership effective January 2009.

Currently, the Organization has a total of 12 Member Countries. The OPEC Statute distinguishes between the Founder Members and Full Members - those countries whose applications for membership have been accepted by the Conference.

The Statute stipulates that "any country with a substantial net export of crude petroleum, which has fundamentally similar interests to those of Member Countries, may become a Full Member of the Organization, if accepted by a majority of three-fourths of Full Members, including the concurring votes of all Founder Members."

The Statute further provides for Associate Members which are those countries that do not qualify for full membership, but are nevertheless admitted under such special conditions as may be prescribed by the Conference.

Peak oil. Peak oil is the point in time when the maximum rate of global petroleum extraction is reached, after which the rate of production enters terminal decline. This concept is based on the observed production rates of individual oil wells, projected reserves and the combined production rate of a field of related oil wells. The aggregate production rate from an oil field over time usually grows exponentially until the rate peaks and then declines sometimes rapidly until the field is depleted. This concept is derived from the Hubbert curve, and has been shown to be applicable to the sum of a nation's domestic production rate, and is similarly applied to the global rate of petroleum production. Peak oil is often confused with oil depletion; peak oil is the point of maximum production while depletion refers to a period of falling reserves and supply. M. King Hubbert created and first used the models behind peak oil in 1956 to accurately predict that United States oil production would peak between 1965 and 1970. His logistic model, now called Hubbert peak theory, and its variants have described with reasonable accuracy the peak and decline of production from oil wells, fields, regions, and countries, and has also proved useful in other limited-resource production-domains. According to the Hubbert model, the production rate of a limited resource will follow a roughly symmetrical logistic distribution curve (sometimes incorrectly compared to a bell-shaped curve) based on the limits of exploitability and market pressures.

Some observers, such as petroleum industry experts Kenneth S. Deffeyes and Matthew Simmons, predict negative global economy implications following a post-peak production decline and oil price increase due to the high dependence of most modern industrial transport, agricultural, and industrial systems on the low cost and high availability of oil. Predictions vary greatly as to what exactly these negative effects would be.

Optimistic estimations of peak production forecast the global decline will begin by 2020 or later, and assume major investments in alternatives will occur before a crisis, without requiring major changes in the lifestyle of heavily oil-consuming nations. These models show the price of oil at first escalating and then retreating as other types of fuel and energy sources are used. Pessimistic predictions of future oil production operate on the thesis that either the peak has already occurred, that oil production is on the cusp of the peak, or that it will occur shortly. Production of conventional crude oil peaked in 2004 at 74 million barrels per day, and greater records reached since then represent only small increases that are failing to keep pace with demand from growing countries, such as China and India. Throughout the first two quarters of 2008, there were signs that a global recession was being made worse by a series of record oil prices. Accordingly, geologists know that at some future date, conventional oil supply will no longer be capable of satisfying world demand. At that point world conventional oil production will have peaked and begin to decline.

Short history of Kazakh oil

Major actors in the oil and gas industry of Kazakhstan

1. The Tengiz oil field was discovered in 1979. This oil deposit is 19 km long and 21 km wide, the deepest among all the known developed super-giant oilfields. This oil field had to be developed

under very harsh conditions (considerable depth, abnormally high strata pressure, high temperature, high content of hydrogen sulphide, acid components, etc.) The discovery and assessment of Tengiz doubled Kazakhstan's oil reserves. Its size and favourable geographic and economic location, including closeness to main pipelines, power transfer lines, railway and a large industrial center, made it a priority for the national industrial strategy. Commercial oil production in Tengiz started in 1991.

2. Tengizchevroil, a USD 20 billion investment project was formed in 1993 to develop, produce and export oil and its products from the Tengiz Field. Due to low transportation capacity in 1993 TCO could only produce one million tons of oil. In November 1996 an oil-loading rack was commissioned in Tengiz, which allowed to increase oil production volumes.

3. Tengizchevroil produces four high quality products for domestic use and for export to world markets – crude oil, liquid petroleum gas (LPG), sulfur and dry gas. Tengizchevroil production in 2011 was 25.8 million metric tonnes (206.2 million barrels) of crude oil. TCO exports its crude oil to Europe and the Americas. In 2011, TCO produced and sold 1.3 million metric tonnes of LPG. TCO's European-grade LPG (propane and butane) is moved from Tengiz by rail to consumers across Kazakhstan and Europe.

Dry gas sales in 2011 were 6.9 billion cubic meters. The majority of dry gas is used domestically. TCO sold 3.8 million metric tonnes of sulfur or 169 percent of the 2.4 million metric tonnes of sulfur production for the period. TCO sells sulfur in four different forms: liquid, flaked, granulated and blocked. TCO's premium sulfur has been sold in four different forms to customers in many countries, including Kazakhstan, Russia, the Ukraine, China and other countries primarily in the Mediterranean and Central Asia regions.

For the latest production and sales numbers, please see our latest

4. By today, TCO is one of the largest oil-producing companies in the republic. It currently has a staff of approximately 3.300 employees. Kazakhstani nationals now comprise 78 percent of all staff, compared with about 50 percent at the start of the partnership. TCO's personnel are mostly Atyrau region residents, who regularly receive high salaries. Their families can improve their living conditions and provide quality education for their children. This boosts the development of the region's social infrastructure.

Employment with TCO is highly competitive. While recruiting staff, preference is given to young specialists with a modern education and experience in the oil business with international companies. In addition, TCO pays for young people's study in Kazakh universities, and is establishing a retraining center for oil industry professionals in Atyrau.

5. Tengizchevroil has consistently strengthened our strong safety and environmental records. Tengizchevroil has invested more than $2.34 billion in environmental improvement projects since the year 2000. In that time, we have achieved over 94 percent reduction in flared volumes and a 73 percent reduction in air emissions generated per tonne of oil produced (numbers as of year-end 2011). Air emissions in 2011 were 2.28 kilograms per tonne of oil produced, the lowest annual rate ever.[6,7]

The Closed Joint-Stock Company "National Company "KazMunayGas" (KMG) was founded by merging the National Oil and Gas Company "Kazakhoil" CJSC and the National Company "Oil and Gas Transportation" CJSC. The RK Government is the Founder and the Principal Shareholder in the new company.

KMG is a vertically integrated petroleum company uniting over 45 enterprises engaged in the full range of upstream and downstream operations, such as prospecting, production, refining, transportation and disposal of hydrocarbon raw materials, construction of oil industry facilities, telecommunications and ,transportation. The company is also involved in designing, building and operating oil and gas pipelines and output infrastructure.

KMG was set up to boost up the development of the Republic's petroleum industry, the effective operation and reproduction of hydrocarbons, thus promoting Kazakhstan's social and economic development and its integration into the world community.

KMG is the authorized body for the Government of the Republic of Kazakhstan in the PSA on the Karachaganak and North Caspian projects. As such, it protects the Republic of Kazakhstan's interests, the Caspian ecology, addresses the issues of the Local Content in performing petroleum operations and of constructing multidirectional export routes. Besides, it aims to establish long-term business relations with the gas transportation companies of the neighbouring states. Within the two years of operation, KMG has grown into a powerful and independent organization. It plans to keep up its economic and industrial growth. Currently, its subsidiaries produce 16% of all Kazakhstan oil, transport over 80% of Republic's oil and 100% of domestically produced gas and manage over 30% of the domestic refining facilities.

Key Figures:

Oil and gas condensate production in 2011 - 21.1 million tonnes.

Oil refining at Atyrau Refinery – 3millon 234,000 tonnes

Oil transportation via KazTransOil systems - over 30,000 tonnes

Gas transportation fact for January- March 2011 - 13 million 381,000 billion cubic meters.

The company places priority on environmental issues, safety on the production site, and protection of the environment. KMG is a key strategic partner in all relations with foreign investors, an authorized representative of state interests in petroleum projects.[9]

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Түйін

Бұл мақалада мұнай және газдың дүниежүзілік экономиканың дамуында айқындаушы фактор болып табылатындығы және әлемде жетекші рөл атқаратындығы туралы сөз қозғалады.

Резюме

В статье затрагивается тема как нефть и газ стала одним из определяющих факторов развития мировой экономики, и как она продолжет играть ключевую роль в мире.

Özet

Bu makalede petrol ve gazın küresel ekonomide belirleyici faktörlerden haline geldiğini ve dünyada önemli bir rol oynadığını göstermekte.