

GEO-POLITICS OF OILTRADING: SCANNING THE GLOBAL BUSINESS SCENE

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Fossil fuels, such as oil and natural gas, meeting nearly 85 % of the global energy demand, constitute the backbone of many petrochemical based and allied industries- prominently in energy, commercial, domestic and transport sectors. The demand for these resources is presently high from the developed economy; but the projected demand in the next decade is predicted to be higher from the developing economies, especially from BRIC's such as Brazil, Russia, India and China. The demand-supply equation has been artificially disrupted off-and-on by creating a divide across OPEC and Non-OPEC oil producing and exporting countries, which, in turn, are attributable to such factor as geo-politics, causing both trade distortions in one hand, regional and economic imbalances on the other. The paper highlights the various aspects and dimensions of geo-politics in oil-trading in the global business scene and seeks to suggest future strategies and options to minimize the negative impact of geo-politics on the global economy by resorting to certain positive policy interventions- both at the regional as well as global levels.

Global Energy in Perspective

Anticipated worldwide economic growth in the first decade of the 21st century will lead to concomitant increases in energy demand and carbon emissions. In the developing world in particular, the global tendencies are going to be pronounced. Over the next two decades, total world energy consumption is expected to increase by more than 50 %. By 2020, energy demand in the developing world will be more than double, which will roughly equal that of industrialized nations. According to the estimates by the IEA, World Energy Outlook (2003), the prominent sources of Energy production is projected to be oil, natural gas and coal in the given order of priority during 2010-2030 (Fig. 1).

Electricity consumption forecasts, considered separately, tell an even more dramatic story. Global demand for electricity is predicted to grow by three-quarters from 1999 to 2020. In developing Asia, electricity consumption is forecast to increase by 150 % over the same period. As with total energy, electricity consumption in the developing world will nearly equal that of the industrialized world by 2020. Fossil fuels (oil, gas, and coal) will continue to provide more than 85 % of the world's energy for the foreseeable future. The data used to prepare the figure do not include energy generated by biomass fuels such as wood, charcoal, crop wastes, and

manures. Such fuels, used especially in the developing world, may account for as much as 50 additional quads of energy each year.

World Primary Energy Demand

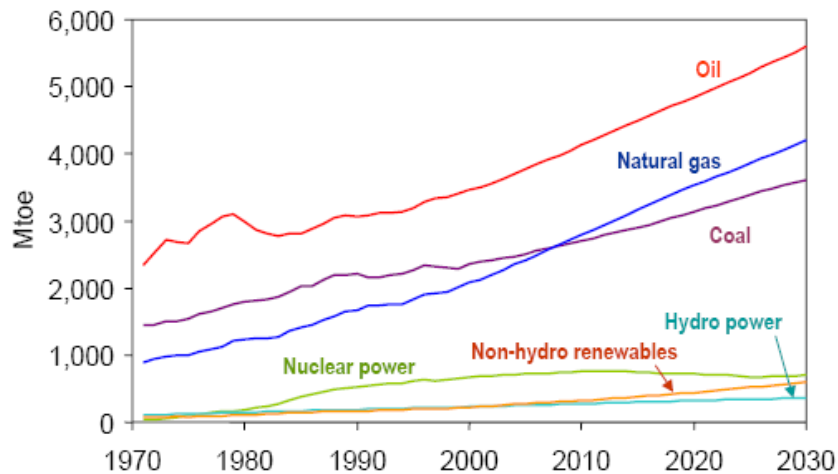


Figure 1. World Primary Energy Demand Projection
(Source: World Energy Outlook, 2003)

Transportation is the primary driver of increased oil demand, while increased natural gas consumption will be largely for power generation and greater industrial requirements. US consumption represents roughly half of that for the industrialized world and US fuel source consumption closely mirrors world patterns. Developing Asia, Central America, and South America will see the greatest increase in requirements for natural gas; they are each expected to triple their demand over the next twenty years.

World Oil Production and Consumption

In 2004, world oil production was 83.1 MMB/D with about 48.1 MMB/D of this oil exported to various countries around the world. Exports are transported to the market using a variety of means including tankers, pipelines, trains, trucks and barges. When the crude oil reaches its destination it is processed and refined into petroleum products such as gasoline, heating oil and jet fuel. The price of crude oil is reflected in the price

of these refined products. However, oil product prices are also affected by other factors, such as refining and marketing operating margins, taxes, transportation costs and local/regional market conditions and competition. In turn, oil product prices and pressures feed back into crude oil prices (OPPI, 2005). The Global proven oil reserve positions, as estimated by different international agencies, is shown in Fig. 2. The relative position of estimated oil production by OPEC & Non-OPEC countries during 2002-2030 is depicted in Fig. 3. It could be noted that in years of low production of oil by OPEC countries the oil production by the Non-OPEC countries has been stepped up to meet the global demand and maintain favourable supply-demand ratio. However the projected outlook predicts that there may be spurt in production of oil by OPEC for period 2010-2030 to meet the growing energy demand, especially by the BRIC nations. The regional scenario in terms of oil production is shown in Fig 4. The world gas reserve, sector-wise natural gas demand position and gas production region-wise are shown in Fig. 5, 6 and 7 respectively.

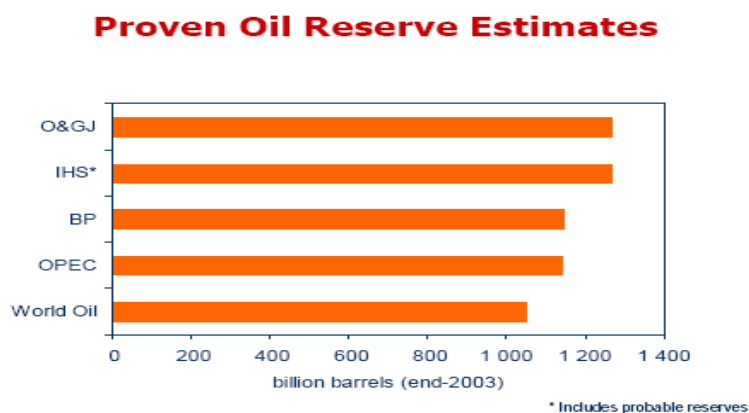


Figure 2. Proven Oil Reserve Estimates
(Source: IEA, World Energy Outlook, 2004)

OPEC & Non-OPEC Oil Production

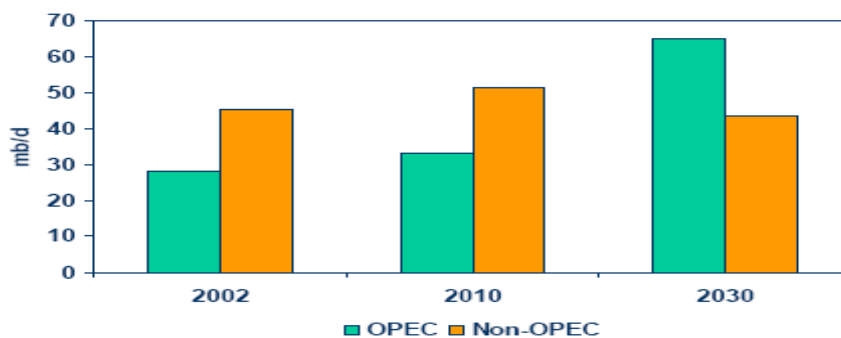


Figure 3. OPEC vs. Non-OPEC Oil Production
(Source: IEA, World Energy Outlook, 2004)

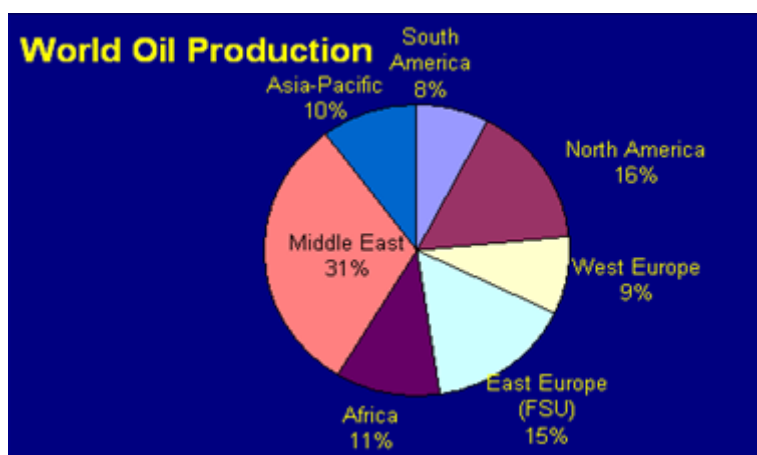


Figure 4. World Oil Production (in per centage), IEA, 2004

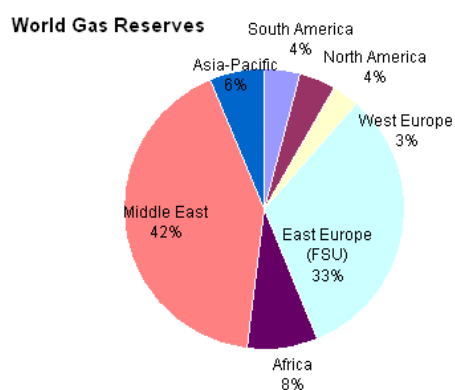


Figure 5. World Gas Reserve (per centage distribution), IEA, 2004

World Natural Gas Demand

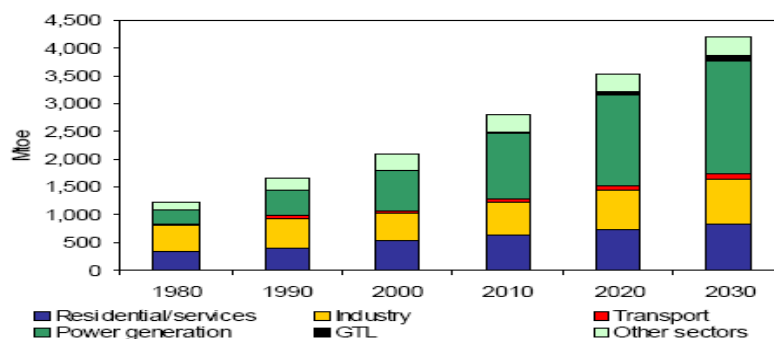


Figure 6. World Natural Gas Demand
(Source: IEA, World Energy Outlook, 2003)

Gas Production by Region

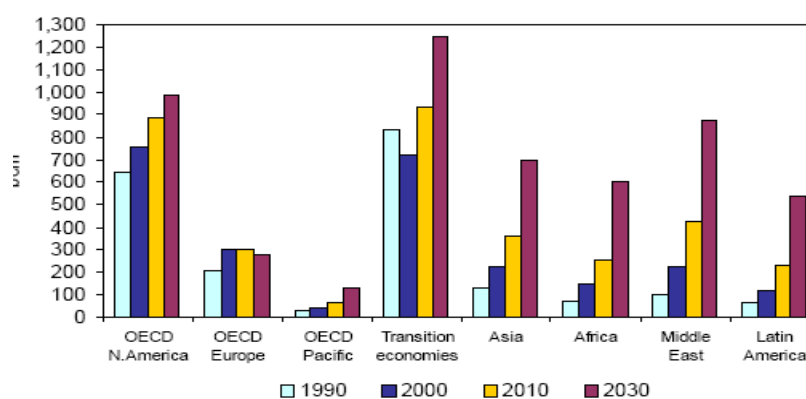


Figure 7. Gas Production by region
(Source: IEA, World Energy Outlook, 2003)

The comparative scenario of global oil production vis-a-vis exports by major producers and exporters, representing OPEC and Non-OPEC countries during 2004, are shown in Table1 and Table2 below.

Table 1

Top World Oil Producers, 2004 (OPEC members in italics)

	Country	Total Oil Production (million barrels per day)
1)	<i>Saudi Arabia</i>	10.37
2)	Russia	9.27
3)	United States	8.69
4)	<i>Iran</i>	4.09
5)	Mexico	3.83
6)	China	3.62
7)	Norway	3.18
8)	Canada	3.14
9)	<i>Venezuela</i>	2.86
10)	<i>United Arab Emirates</i>	2.76
11)	<i>Kuwait</i>	2.51
12)	<i>Nigeria</i>	2.51
13)	United Kingdom	2.08
13)	<i>Iraq</i>	2.03

Source: Energy Info. Administration (*eia.doe.gov*)

Table 2

Top World Oil Net Exporters, 2004
(OPEC members in italics)

	Country	Net Oil Exports (million barrels per day)
1)	<i>Saudi Arabia</i>	8.73
2)	Russia	6.67
3)	Norway	2.91
4)	<i>Iran</i>	2.55
5)	<i>Venezuela</i>	2.36
6)	<i>United Arab Emirates</i>	2.33
7)	<i>Kuwait</i>	2.20
8)	<i>Nigeria</i>	2.19
9)	Mexico	1.80
10)	<i>Algeria</i>	1.68
11)	<i>Iraq</i>	1.48
12)	<i>Libya</i>	1.34
13)	Kazakhstan	1.06
14)	<i>Qatar</i>	1.02

Source: Energy Info. Administration (*eia.doe.gov*)

The main consumers of oil continue to be the industrialized countries of the Organization for Economic Cooperation and Development (OECD), particularly the US, Europe and Japan, which together consume about half of the world's annual oil output. However, consumption in emerging market regions is expanding at a faster pace (especially in China and India) as these countries grow rapidly and their use of energy in transportation, industry and residential sectors expands. The transportation sector accounts for about two-thirds of the oil consumed in the United States and around half of the oil used in the world. The petro-flows of advanced economies vis-a-vis developing economies and corresponding changes in the current account balances from 2002 to 2005 (in million \$) is shown in Table 3.

Based on the global trend in crude oil production a long-term (50 years) crude oil production projection for the period 2000-2050 with Maximum Sustainable Capacity is depicted in Fig. 8. The world scenario of oil consumption, region- wise as well as by the different country- groups, projected during 2030-2030, may be seen from Fig. 9.

Table 3

Petro- Flows and Other Imbalances

(Table 3) Changes in current account balances 2002 to 2005 (Billions of Dollars)							
Advanced economies	2002	2005	Δ	Developing economies	2002	2005	Δ
United States	-475	-759	-284	Middle East	30	218	188
Euro area	49	24	-25	China	35	116	81
Germany	46	121	75	CIS (Russia, etc.)	32	105	73
Japan	113	153	40	Latin America	-16	22	38
Other	87	131	44	Africa	-8	13	21
				Emerging Asia excl. China	37	-6	-43
				Central and Eastern Europe	-25	-56	-31

Source: International Monetary Fund, World Economic Outlook, September 2005, pp. 242, 245, 257-9.

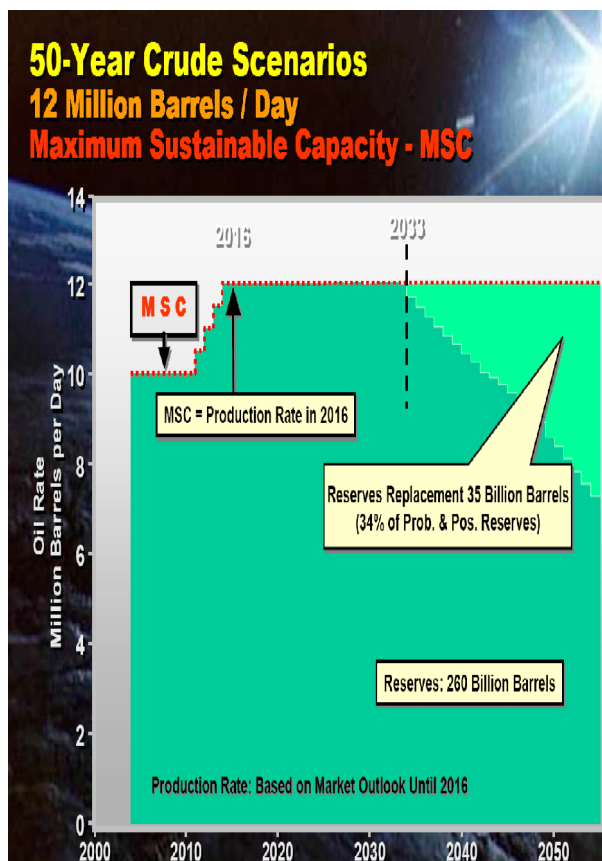
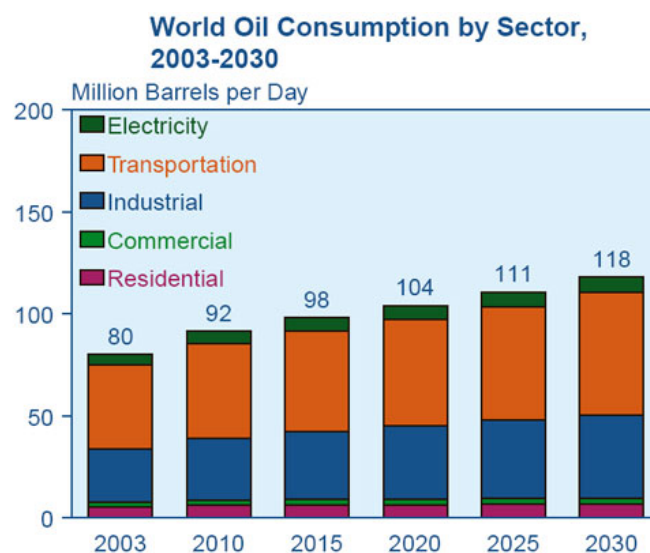


Figure 8. 50-year Crude oil scenario & Maximum Sustainable Capacity



Sources: **2003:** Derived from Energy Information Administration (EIA), *International Energy Annual 2003* (May-July 2005), web site www.eia.doe.gov/iea/. **Projections:** EIA, *System for the Analysis of Global Energy Markets* (2006).

Figure 9

Oil Dependence and National Security

World oil consumption is expected to grow by 60 % over the period 1999-2020, from 75 million to 120 million barrels per day. Much of this increased consumption will be in transportation. In the developing world, people will own more cars and trucks — China alone expects a five-fold increase in vehicles by 2020. In the US, vehicle fleet efficiency is expected to remain flat for several years.

Large increases in oil and gas consumption raise significant geopolitical issues that could intensify as competition for supplies increases, market power is accumulated in fewer places and more products is moved over longer distances. Oil supply and demand are not geographically well correlated. Despite the diversification of oil-producing regions in the past 20 years, global dependence on the Persian Gulf—which holds two-thirds of the world's proven oil reserves—will increase over the next two decades. The oil wealth of the Persian Gulf gives the region substantial geopolitical influence and constrains the ability of the US to fully exercise its strategic interests.

These effects are magnified by the concentration of excess production capacity (unused capacity that can be quickly produced when demand is high) in the Gulf. OPEC cohesion contributed to extreme oil price volatility since 1999; the high oil prices of 1999 and 2000 likely cost the US as much as 0.7 percentage points in gross domestic product (GDP). The most significant increases in oil demand will be in Asia, further enhancing the Gulf's influence. Earlier in this article we referred to the shifting web of alliance and conflict connected to oil production and consumption. The evolving reliance on Gulf oil has the potential to dramatically redefine that web.

A number of policies can be initiated or expanded whose objectives address oil and national security issues. Some of those objectives depend on investment, financial, or diplomatic actions for their realization. Examples include increasing protection against supply disruptions by expanding strategic stocks, more effectively managing oil price volatility, and encouraging expanded international production capacity. Other objectives, such as developing unconventional oil resources or affordable alternatives to oil, and using oil more efficiently are largely driven by technology.

Developing Natural Gas Resources

Geopolitical issues related to energy security are likely to emerge in connection with natural gas supply. Global demand for natural gas is growing as unevenly as it is dramatically, and the most significant increases are in those regions of the world with the fewest indigenous resources. Natural gas markets are limited by the inflexibility and expense of gas (versus liquid) transportation. Over half of the world's natural gas reserves are very far from users and it is currently not profitable to transport such "stranded" gas from these reserves to customers. Geographic disparities exist between natural gas production and consumption. These disparities highlight the need to address key technical challenges concerning natural gas: developing resources; accessing stranded resources through gas-to-liquid conversion, liquefied natural gas process improvements, and new transportation and processing infrastructures; extending the resource base using alternative fuels such as biomass or, in the long-term, methane hydrates; and using gas more efficiently in, for example, advanced turbine systems and smart buildings.

Peak Oil: An Overview

What is Peak Oil? No, it's not a top in energy prices. Peak Oil, also commonly referred to as Hubbert's Peak which was named after the late Dr. M. King Hubert, a Geophysicist who made several important contributions to geophysics but is most well-known for his research on the capacities of crude oil fields and natural gas reserves, is the tendency of crude oil production to follow a bell shaped curve, steadily rising before reaching its pinnacle then entering into a permanent decline hence "Peak Oil". Hubert's research into forecasting oil production has been stunningly accurate for predicting crude oil production peaks of various countries, such as the U.S. and Russia, many times. Initially, Hubbert's prediction in 1956 that U.S. crude oil production would peak around 1970 and decline thereafter was scoffed at then but his analysis has since proved to be extraordinarily accurate as U.S. Crude Oil production peak in the early 1970's and has steadily declined since.

Based on Hubbert's original research the potential peak in crude oil production, not just for one country, such as Saudi Arabia, but for the entire world has potentially arrived! At present, current crude oil depletion rates are running around 1.25-1.5 million

barrels/day (Mbd). While Saudi Arabia, the world's largest crude oil producer, is still technically a swing producer their control over global crude oil markets, along with OPEC's, has diminished greatly and will continue to erode into the future, as Matthew Simmons, founder and Chairman of the world's largest energy investment banking company, Simmons & Co. International, points out in his new book, *Twilight in the Desert. The View Hubbert's Peak*, subscribe to the belief that Saudi Arabia and global crude oil production in general will soon reach an apex, after which its production will decline and the world will be confronted with an immense and potentially catastrophic oil shortage that will halt economic growth, create run away inflation, potentially destabilize the entire Middle East, and create natural resource based wars between the world's economic powers such as the United States and China (Simmons, 2008).

Developing World Energy Use

According to projections of the International Energy Agency's (IEA) *World Energy Outlook 2002*, by the year 2030 global primary energy demand will be nearly two-thirds above the levels of 2000, reaching 15.3 billion tons of oil equivalent per year by the end of the forecast period, with developing countries accounting for 62 percent of the rise. Similarly, the U.S. Energy Information Administration forecasts that by 2025, energy use in the developing world will have almost doubled. Because the emerging economies are projected to rely increasingly on coal and other fossil fuels, they will contribute much more to worldwide carbon dioxide emissions as their demand for energy quickly grows. Developing countries are forecast to account for two-thirds of the projected increase in carbon dioxide emissions, which according to many scientists contribute to global warming. Four major countries alone — Indonesia, China, India, and Brazil — will emit 2 billion tons of carbon annually by 2010, creating special challenges for international cooperation on climate issues. The United States and other industrialized nations need to engage these countries in multilateral climate initiatives such as research and development of cleaner energy technologies.

Explosive growth in Asia is expected to contribute significantly to the rise in use of energy by the developing world and have the greatest impact on world oil use, thus playing the largest role in shifting oil geopolitical trends. In developing Asian countries,

where an average annual growth rate of 3 percent is projected for energy use as compared with 1.7 percent for the entire global economy, energy demand is expected to more than double in the next two decades. According to IEA projections, demand in the region will account for 69 percent of the total projected increase in developing world consumption and almost 40 percent of the increase for total world energy consumption. Asia's rapid economic growth, explosive urbanization, dramatic expansion in the transportation sector and politically important electrification programs will have a dramatic effect on the region's dependence on imported energy. Absent significant growth in renewable energy supplies and/or new energy technologies, consumption of crude oil and natural gas in Asia will rise substantially and with it significant environmental challenges. Given the inadequate resource endowment of the region and the region's already high dependence on imported oil supplies, it is anticipated that Asia will exert an increasing pull on the Middle-East and Russia in coming years.

According to '*Oil Market Intelligence, 2001*' published by the Energy Intelligence Group, an independent research service, Asia's oil use, which exceeds 20 million barrels per day (b/d), is already larger than that in the United States. By 2010, total Asian oil consumption could reach 25-30 million b/d, most of which will have to be imported from outside the region. China alone can be expected to see its oil imports rise from around 1.4 million b/d in 1999 to 3-5 million b/d by 2010. This has awakened fears in Tokyo, Seoul, and New Delhi about competition or even confrontation over energy supplies and lines of transport.

Geopolitics: the Great Unknown

Geopolitics is defined as a branch of geography that promises to explain the relationships between geographical realities and international affairs. The idea that such relationships exist was noted as early as the ancient Greeks (18,309-328). The roots of modern geopolitics spring from the work of a German geographer, Professor Friedrich Ratzel in 1897. It was Professor Ratzel who coined the phrase anthro-geographical, meaning a combination of anthropology, geography and politics. He believed that states have many of the characteristics of living organisms. He thought a state had to grow. It must expand or die. He also introduced the idea of "living frontiers" that borders were dynamic and subject to change. A Swedish Professor of geography at Gothenburg

University in 1900 was the first to use the term geopolitics (in Swedish "geopolitik"). Expanding on Ratzels' earlier thoughts Professor Rudolf Kjellen is usually regarded as the founder of the science of geopolitics

Market anxiety about access to uninterrupted supply of oil and natural gas will not disappear overnight and will persist as long as the ongoing geopolitical tensions are not eased. Signs are appearing that higher prices are beginning to impact the global economy, moderate oil demand growth and stimulate a rebound of oil industry investment worldwide, both upstream and downstream. The physical market tightness should, therefore, gradually recede but market anxiety over potential supply disruptions will persist for a while under the current geopolitical environment.

The process of adjustment to a lower more sustainable price level will take some time depending on both short-term price developments and the evolution of the ongoing geopolitical tensions (affecting the major producing countries) which, among all the forces affecting the oil market, is the most difficult to predict.

The Seven Sisters

Petroleum has for long been the object of geopolitical confrontations. The ability to fix the price and the production of oil was first established in 1928 by the Achnacarry Agreements. Among the "seven sisters", namely Major oil multinationals such as Exxon, Texaco, British Petroleum, Shell, Gulf, Standard Oil and Mobil Oil an oil oligopoly was formed to safeguard the interests of the strategically aligned oil partners. The seven sisters invested massively in extraction infrastructures, especially in the Middle- East. Several producing countries, mostly in the Third World, wanted to have a more important share of the incomes of this lucrative market.

OPEC

Venezuela, Iran, Iraq, Saudi Arabia and Kuwait founded the Organization of Petroleum Exporting Countries (OPEC) in 1960 at the Baghdad conference. Several other oil-producing nations joined thereafter the organization; viz. Qatar (1961), Indonesia (1962), Libya (1969), Algeria (1970), Nigeria (1971), Ecuador (1973-1992, left the organization in order to avoid production quotas), The United Arab Emirates (1973) and Gabon (1973-1994). From its foundation until the beginning of the 1970s,

OPEC was unable to increase oil prices. Production was very important in non-member countries. However, there was difficulty of OPEC members to agree on a common policy with global outreach.

Context

First commercial exploitations of petroleum in the USA were in Pennsylvania in 1859. Importance of oil increased significantly in the global economy. In 1920, 95 million tons were produced annually. The number reached 500 million tonnes by 1950 and a billion tonnes in 1960. Average annual production was around 3 billion tons in the 1990's. Strong growth rests for a very large part on the availability of oil resources and their low cost. Economic systems, which include industry, housing, energy generation and transportation, became dependant on cheap oil prices.

The First Major Oil-Shock

In the 1970s, OPEC countries achieved control over more than 55 % of the oil supply. OPEC started to fix production quotas and established co-operation between producers in order to avoid competition that would bring the price of oil down. This was feasible in the context of a growing market demand and the dependency on only a few oil suppliers. Between 1970 and 1973, the price of the oil barrel passed from 1.80 dollars to 3.01 dollars.

The Kippur War of 1973 was fought between Israel and Egypt (and several other Arabian countries). OPEC intervened by nationalizing production facilities, reducing production by 25 % and imposing export quotas. OPEC imposed quotas on countries supporting Israel. The price of oil consequently reached 11.65 dollars per barrel at the end of the same year. High oil demand, the limited capacity of developed countries to supply oil and no readily energetic substitutes gave OPEC a strategic advantage of oil trading in global market. OPEC gained the ability to control the price of oil with a market controlled by oil producers. This caused the first oil shock.

The Second Oil-Shock

In the 1970s and early 1980s the price of oil remained high but stabilized over the 1970s, around 20 dollars per barrel. Developed countries started to worry about the exhaustion of oil reserves and unreliable supply sources. This however was followed by instability in two major oil producers, Iran and Iraq. The Iranian revolution took place on 1979. Iran-Iraq War was fought in 1979-1980, because Iran was trying to export the Islamic revolution to Iraq, which effected 8 % removal of the world oil supply resulting in the second oil shock where the price of oil went over 35 dollars per barrel. The second oil-shock was however countervailed by resorting to the following strategies:

- drastic, but somewhat temporary, measures to lower oil consumption;
- relocation of energy-consuming industries;
- consuming less energy in a more efficiently manner;
- relying on national energy sources (petroleum, coal, natural gas, hydroelectricity, nuclear energy).

Substituting petroleum for other energy sources when possible.

Oil Counter-shock

A changing scene was observed at the end of the 1980s and at the beginning of the 1990s, OPEC countries lost their price-fixing power. Internal problems such as economic and geopolitical conflicts between its members vitiated the leadership status of OPEC conglomerate. New producers such as Russia, Mexico, Norway, England and Colombia combined to form alternate and new conclave which was not constrained by OPEC policies and were free to fix their own prices. Mexico surpassed Saudi Arabia in 1997 to become the second largest oil exporter to the United States, after Venezuela. Latin American countries such as Columbia and Brazil were also tried to boost their oil production to compete with OPEC nations to break he monopoly. Vietnam is exploring offshore fields, as are other Southeast Asian countries, hoping that there would be major oil reserves under the South China Sea.

Since 1982, divergences occurred within OPEC members to fix quotas and prices as competition increased. The share of OPEC dropped from 55 % of all the petroleum exported in the 1970s to 41 % in 1992 with all-time low of 30 % in 1985.

That year Saudi Arabia lowered the price of its oil to increase its market share. Oil counter-shock that lowered the price of the barrel under 20 dollars, even reaching a record of 15 dollars in 1988 was continued unabated. The oil market was again a market controlled by the demand.

During the Gulf War that followed, respecting production quotas became a major issue among OPEC members. Countries such as Kuwait started producing well above quota. This event was a motivation for the invasion of Kuwait by Iraq in 1990, which saw the price of petroleum jump to 41\$. 7.8 % of the world's oil production was removed (Iraq and Kuwait). Other petroleum-producing countries were quick to expand their production to replace Iraq's and Kuwait's shortfalls. The increase in oil price was however short-lived. The aftermath of the Gulf-war and the reemergence setting of OPEC may be summed-up as follows:

- Aftermath of the Gulf War
 - The price of oil fell to 25 dollars per barrel by the mid 1990s.
 - By 1998, the price of petroleum went under 10 dollars per barrel.
 - Rendering several producing regions temporarily unprofitable.
 - OPEC countries only control about 42 % of the global oil production and are so in a weak position to fix prices.
 - Reemergence
 - At the end of the 1990s, the price of petroleum increased.
 - Oil reserves are in the Middle East.
- Share of OPEC expected to climb to 48 % in 2005 and 52 % in 2010.

The Middle-East in the Global Oil Balance

The MENA region, through its dominance of world oil reserve ownership, occupies a central position in the global energy balance—quite apart from its substantial gas reserves, although the latter is not yet well developed. Even with the loss of ground to other energy carriers, oil (and the region) will continue to play a core role in the future of world energy (Cedoz, 2003). The prestige of Middle- Eastern countries in world energy markets stems primarily from their role in the oil market, even though the region also owns substantial reserves of natural gas. Their fortune is thus directly related to how well oil holds its share vis-a-vis other forms of energy in the evolving

global energy balance. Over the years, starting with the sharp price increases of the 1970s, it has lost some ground to other fuels. The continued strength of oil in global energy stems from its dominance of the transportation sector, where it now accounts for about 96 percent of the market. It also accounts for 27 percent in the industrial sector and 9 percent in power generation—having lost ground to coal, gas, and nuclear power in these sectors. The rate of substitution away from oil is directly related to how technically feasible such changes are and to the availability of cost-effective substitutes, which explains why oil has continued to dominate the transportation sector, where efforts to introduce alternatives have so far had limited success.

In contrast to oil, the share of natural gas in total primary energy has been on the increase; it rose from 18 percent to about 23 percent between 1973 and 2001, spurred by a combination of higher oil prices, the need for energy self-sufficiency in the major consuming countries, and diversification, as well as recent environmental concerns relating to global warming and climate change. Natural gas is the least carbon-intensive of the fossil fuels, followed by oil and then coal. The use of natural gas has also increased as a result of secular growth in the petrochemical industry, where it is the main feedstock for a wide variety of petrochemical products.

There are indications that the gas industry in the Middle East is under invested because its share of the world output (at about 14 percent) is much lower than its share of reserves (40 percent). An illustration of this can be seen from the fact that although Iran owns the world's second-largest reserves (15.3 percent of total) after Russia, it produces only about 2 percent, and indeed, imports some gas from neighbouring Turkmenistan (4.9 billion cubic meters in 2002). Projections of demand for natural gas up to 2020 by the International Energy Agency (IEA, 2002) suggest continued gains for gas in the global energy balance, while oil is expected to just maintain its present share.

The Iraq Episode

There were only two credible reasons for invading Iraq: control over oil and preservation of the dollar as the world's reserve currency. Yet the government has kept silent on these factors, instead treating us to the intriguing distractions of the Hutton and Butler reports. Butler's overall finding of a "group think" failure was pure charity.

Absurdities like the 45-minute claim were adopted by high-level officials and ministers because those concerned recognized the substantial reason for war - oil. WMD provided only the bureaucratic argument: the real reason was that Iraq was swimming in oil (John Chapman, 2004). It is an understatement to say the aftermath of the war in Iraq is proving to be a difficult period. World media attention is focused on anti-American demonstrations and the failure of the American military to establish civil order. Diplomats and commentators debate and opine on how, and by whom, a stable government, an orderly social system and a functioning economy should be established in Iraq; as well as what actions the United States will take regarding other Middle Eastern countries and North Korea.

For several decades, the United States, as a matter of its own enlightened self-interest, has undertaken to establish and maintain security of oil supply for all the world's economies. Any serious consideration of energy or foreign policy must recognize that now, and for the foreseeable future, oil represents the life's blood of the international economic order. The Iraq affair highlighted a coincidental development in international economics. Combined with the strike in Venezuela and political unrest in Nigeria, it showed the world's discretionary surplus oil productive capability is much less than had been previously estimated. As world economies resume normal growth with accompanying increases in oil demand, the world is likely to be faced, for the first time, with oil-supply shortages and persistent upward pressure on prices over the next several years.

Oil prices have declined since the end of the war due to the return of Iraqi and Venezuelan production and a seasonal spring demand slump, but this price drop should not induce a false complacency regarding supplies. A prolonged trend of increasing prices would severely restrain economic recovery in the United States, Europe and Japan. Oil shortages would be particularly disruptive to stability in Asia, the area of fastest economic and oil demand growth. Japan is still in a prolonged depression and barely avoiding financial collapse. China has been an oil importer since 1993, while India has always been dependent on imports. Both are rapidly industrializing. The strike of oil workers in Venezuela, concurrent with worries about oil supplies from Iraq, revealed the lack of worldwide surplus productive capacity. It also focused attention for

a short time on the deterioration of political stability in several Latin American countries.

If the United States is to develop secure, long-term and diverse supplies of oil for world economic stability, it must devote diplomatic attention to restoring relations with Russia and Latin America. As the world's largest importer, the U.S. can use oil as a tool to stabilize the political and economic systems in Russia and in several Latin American countries where potential oil reserves are large and oil production represents a large part of the economy. For the purpose, contracts should be written with Venezuela, Mexico, Argentina, Peru and Colombia (Charles Kohlhaas, 2006).

Energy dominates growth debate in South Africa

Where electricity sector was previously – in the words of Thomas Edison –“a natural monopoly”, it has now become a political game. The oil shocks of the Seventies resulted in governments worldwide reconsidering their energy plans – resulting in scores of nuclear power stations being built at the time. The emphasis on the growth of South Africa's energy capacity must be seen to underpin the previous policy of separate development to succeed through a healthy economy (Johan Richard, 2005).

An energy-driven economy could ensure relative peace in the labour sector. Energy self-sufficiency and labour stability was the reason for the second and third Sasols, Mossgas and the string of power stations – such as Arnot, Tutuka, Lethabo, Kendal, and the Drakensberg pumping station, Grootvlei, Hendrina, Koeberg, Majuba, Kriel and others. These projects negated the possibility of an international energy boycott and promoted economic and labour stability. The consequences of an energy shortage are today just as real as they were 30 years ago. Those consequences hold the same serious political and economic problems in the economic, social and labour spheres of today. The energy industry should lead the economic system and not be seen as an unwilling partner or subservient, economic milking cow. A country's energy certainty is related to its ability to have sufficient reserve capacity available to accommodate its economic growth rate. Economic stability usually brings political stability, and *vice-versa* (Amit Kumar, 2005).

Geo-Politics of Oil and Natural Gas

Ensuring the reliability of global energy supplies will call for policies that both encourage the use of newer, cleaner energy technologies and address the political challenges posed by the world's growing demand for oil and natural gas. Global energy policy involving high consumption of oil and natural gas as potential feedstocks seeks to encourage expansion and diversification of world energy supplies and to promote the transparency and democratic institutions that help energy-producing countries make the most productive use of their resources (Jaffe & Hayes, 2005).

Energy is the vital ingredient in the world economy. While concerted efforts are being directed towards energy efficiency and investing in to develop new energy technologies, oil and natural gas will remain critical for many years to come. Economic development around the world means global demand for oil and gas will continue growing in the near term. Most significantly, China's rapid growth and increase in overall energy demand continue to affect energy markets. Some analysts estimate that China could account for as much as one-third of the world's marginal increase in oil demand in the coming years. As a result, the world must find and develop more reliable supplies of oil and gas at prices that permit sustained economic growth. Unfortunately, it is almost an axiom in the petroleum business that oil and gas are most often found in countries with challenging political regimes or difficult physical geography.

Several ground realities shape our thinking about energy security and how we should build reliability into our energy supplies taking a cognizance of the following (Klare, 2005):

- two-thirds of the world's known oil reserves are in the Middle-East;
- imports supply roughly half of the oil and 15 percent of natural gas consumed by the United States, and an even greater share of the needs of some of the United State's most important allies and economic partners.

Oil-supply shocks in any region of the world will have an impact on the U.S. economy through the instantaneous operation of international oil markets.

Geopolitics of EU Energy supply

As one of the world's largest importers of oil, gas and coal, the EU is a major player on the international energy market. However, it remains a dwarf on the political stage as member states keep the upper hand on foreign policy. With external dependence on imports forecast to grow steadily, the EU has started to integrate energy aspects into relations with third countries (EurActiv.com, 2006). The geopolitical aspects of Europe's external energy policy remain within the competence of EU member states' foreign policies and a matter of national sovereignty. However, the progressive incorporation of previously secluded energy markets into one single, combined with the EU's exclusive competence when it comes to commercial relations with non-EU countries, is slowly driving the issue up the EU political agenda (Data Monitor,2005).

Oil and gas reserves are unevenly distributed around the globe, and the largest reserves are situated in politically or economically insecure regions (Middle-East, Russia). North Sea oil and gas fields have already been exploited beyond their peak, leaving Europe dependent on non-EU countries for future supply. The Commission Green Paper in its deliberation on 29 November 2000 'Towards a European strategy for the security of energy supply' (<http://europa.eu/scadplus/leg/en/lvb/l27037.htm>) drew a sobering picture of the EU's energy situation. If no action is taken, it predicted, the EU's energy dependency will climb from 50 % in 2000 to 70 % in 2030. The particular situation for the main imported fossil fuels was described as follows:

Oil :

- (i) 45 % of EU oil imports originate from the Middle East;
- (ii) By 2030, 90 % of EU oil consumption will have to be covered by imports

Gas:

- (i) 40 % of EU gas imports originate from Russia (30% Algeria, 25 % Norway);
- (ii) By 2030, over 60 % of EU gas imports are expected to come from Russia with overall dependency expected to reach 80 %.

Coal:

- (i) By 2030, 66 % of EU needs is expected to be covered by imports.

The Geopolitics of Oil in Central Asia

One important geopolitical consequence of the demise of the Soviet Union was the rise of intense political and commercial competition for control of the vast energy resources of the newly independent and vulnerable states of the Caucasus and Central Asia. These energy resources and, in particular, the oil and natural gas deposits have now become the apple of discord in Central Asia introducing, according to analysts, a new chapter in the Great Game of control over Eurasia. Although the stakes involved remain the same, i.e., power, influence, security, wealth, the new playing field is further complicated by an array of problems. These include intra-regional conflict, political instability, fierce competition among multinational conglomerates, and a shortfall in commercial expertise and legal infrastructures. Moreover, the fact that the three countries which share the majority of the region as energy and resources, namely Kazakhstan, Azerbaijan and Turkmenistan, are landlocked makes them depend on their immediate neighbours for access to the Western markets.

The essence of this new geopolitical game in Central Asia is two-fold: first, control of production of the oil and gas, and second, control of the pipelines which will transfer the oil to the Western markets. From a geopolitical point of view, Central Asia has always been important. From the middle to the end of the 19th century, while the region was part of the Russian Empire, the oil-bearing areas of Baku were producing half of the world as oil supplies. In World War II, during his campaign against Russia, Hitler tried to capture Baku and the Caucasian oil fields as part of his strategy for world domination. After the war, the Soviets retained these areas as reserves, choosing to exploit oil deposits on Russian soil, in Tatarstan and Siberia.

Following the collapse of communism, the ex-Soviet republics of Central Asia, especially Azerbaijan and Kazakhstan, have been trying to exploit their natural resources, since they consider oil to be the prime means of securing their economic and political independence. According to the estimates of geologists, the oil deposits of the Caspian Sea may not be quantitatively comparable to the deposits of the Persian Gulf, but they are still considered of excellent quality and able to provide a significant alternative source of energy in the 21st century. In particular, it is estimated that the entire Caspian Sea is a basin full of oil and natural gas, starting from Azerbaijan and continuing to the opposite shore in the territory of Kazakhstan and Turkmenistan. These

deposits take on enormous importance because of the expected exhaustion of the deposits of Alaska and the North Sea by the year 2015. The US foreign policy in Central Asia is founded on the following rationale:

- the US intends to help the former Soviet republics of Kazakhstan and Azerbaijan develop their oil and natural gas industries;

- through the development of their oil and gas industry, which will bring economic growth, the US hopes to extricate them from the Russian sphere of influence;

- the US Government is actively supporting American companies in Central Asia involved in oil development as well as in the construction of pipelines which will channel the oil to the West;

- the US will try to channel the oil coming from those countries into the international markets in order to diversify its own sources of supply and keep oil prices at low levels;

- the US Government believes that economic growth will promote regional stability and the resolution of local disputes.

Finally, the US aims at reinforcing the role of Turkey in the region, while at the same time maintaining the policy of containment and isolation of Iran. For that reason it has actively lobbied for a pipeline which will transport oil from Baku to the Turkish port of Ceyhan.

Russia and the Caspian Basin

Russia already is an energy superpower. To achieve its full potential, Russia needs to strengthen corporate governance and the legal/regulatory framework for business, improve its foreign investment climate, allow competition in the transportation system, open the gas and oil companies Gazprom and Transneft up to reform and competition, improve its technological capabilities, and move domestic energy prices to world levels.

The Caspian Basin has tremendous potential, offering the possibility of production increases from 1.6 million barrels/day (b/d) in 2001 to 5.0 million b/d in 2010. The key issues in Caspian energy development at the moment are to: (i) complete the second pillar of the East-West Energy Corridor by developing the South Caucasus natural gas pipeline; (ii) improve the investment climate throughout the region; and (iii)

bring Kazakhstan oil into the East-West corridor. Multiple pipelines that economically bring Caspian resources to the world market strengthen the sovereignty and economic viability of the new nation states in the region. U.S. efforts in the Caspian are intended to complement and not to detract from U.S. support for Russia's efforts to develop its energy export potential.

Africa

Africa is playing an increasingly important role as an energy supplier to U.S. and global markets. In 2003, both Nigeria and Angola were among the top 10 suppliers of oil to the United States. Oil production generates substantial revenue in countries such as Nigeria, Angola, Gabon, Equatorial Guinea, Republic of Congo, Chad, and Cameroon. Sao Tome and Mauritania also may become oil suppliers in the coming years. Foreign direct investment is needed to develop African energy resources as most new fields are in deepwater offshore environments that require advanced capital-intensive facilities for development. Growing oil and gas production could be a powerful engine for national economic development in these countries. However, the Niger Delta experience of 2002, in which protesters stormed oil facilities and caused their temporary shutdown, shows that oil can also be a disruptive force if a country's oil revenues are not managed in a fair and transparent manner. Nigeria has learned from its experience in the Niger Delta and is setting an example on transparency and economic reform enabled by oil revenues that the United States hopes other countries in Africa will follow.

North America

The most important and reliable sources of energy for the United States are its neighbors and we are strengthening our energy cooperation with Canada and Mexico. Senior energy experts from Canada, Mexico, and the United States recently released a North American *Energy Picture* report that, for the first time, jointly measures energy stocks, trading balances, and energy flows. What often goes unrecognized is that North American energy trade is a two-way street. Mexico is becoming an important source of U.S. oil imports. At the same time, the United States is a net natural gas exporter to Mexico, and U.S. refineries supply over 15 percent of Mexico's refined petroleum

products (Work-Fall, 2005). The reliability of North American energy trade is enhanced by geographic proximity. More important than geography, however, are the rule of law and predictable investment conditions created by the North American Free- Trade Agreement (FTA), integrated pipeline networks and long-term reliable supply relationships.

Venezuela

The economic importance of oil in terms of Venezuelan-U.S. relations cannot be overstated. Venezuela is the fifth largest oil exporter in the world and the fourth largest supplier of oil to the United States after Canada, Mexico, and Saudi Arabia. Last year, Venezuela's state owned oil company, Petroleos de Venezuela (Pdvs) accounted for 11.8 % (1.52-million barrels a day) of U.S. imports.

Venezuela and the United States have enjoyed strong historical energy ties. Venezuelan oil policy, until recently, has been built upon a reputation of reliability. Unfortunately, actions and statements by parties from all sides over the last 18 months have called into question the priority Venezuelans place on their reputation as a reliable supplier. The United States will continue to work to help Venezuelans resolve their political differences. But until a constitutional, democratic, peaceful, and electoral solution is achieved, and the level of rhetoric lowered, world energy markets simply cannot view Venezuela with the same certainty that they once did (Kozloff-Coha, 2005).

Saudi Arabia and the Gulf Producers

The general thrust of Saudi economic policy has undergone a fundamental change after the oil price crash of 1986. The serious depletion of foreign assets, combined with the extensive decline in oil revenues, necessitated a revised economic policy. The depreciation of the United States dollar on international financial markets also hurt Saudi purchasing power abroad. The kingdom's external terms of trade deteriorated rapidly because oil exports were largely denominated in United States dollars, and the bulk of Saudi imports came from countries whose currencies were appreciating relative to the United States dollar. The Middle- East holds some two-thirds of proven world oil reserves. The size of its reserves, combined with its low

production cost, guarantees that the Middle East will continue to play a pivotal role in the world energy market. Saudi Arabia plays a key role in global oil markets as the world's largest oil exporter. Moreover, Saudi Arabia supports international energy security by maintaining considerable excess production capacity that can be brought on line quickly in the event of a serious supply disruption anywhere in the world.

Diversifying global oil supplies should not be interpreted as diversifying “away” from Saudi Arabia or other Gulf producers. Gulf producers will continue to have an indispensable role in the world market, and the United States encourages them to increase foreign investment and steadily expand supplies. What we seek is better balance and a more flexible, resilient oil market that responds to price signals. In this regard, Gulf producers could reap greater benefits by opening their economies to more private investment so that oil and gas capacity could grow and energy supplies could respond more fully to shifts in demand. Investment in natural gas is one sector where this process is beginning. Once only for local or regional use or wasted through harmful flaring, natural gas in the form of liquefied natural gas (LNG) has become an increasingly globally traded energy source for key markets. Qatar is working with major international energy companies to become a leading LNG exporter.

Energy Scenario in South Asia

The South Asian region, which comprises Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka, is home to 1.3 billion people, close to a quarter of the world's population. The region is currently experiencing a rapid growth in energy demand, concomitant with economic growth and industrialization. Adequate energy supply is, therefore, a major challenge facing the economies in the region (Avaritopoulos, 2006).

Economic growth in South Asia averaged 5.3 % a year between 1990 and 1997 with India and Pakistan recording the highest growth rate of 5.4 % and 4.8 %, respectively, in the same period (IEA, 1999). The total primary energy supply in South Asia, which is indicative of the total energy consumption, increased at the rate of 3.6 % annually during that period. In 1997/98, the total primary energy supply in the region, including 250.7 MTOE (million tonnes of oil equivalent), renewable energy was 556.5 MTOE, of which India claimed the dominant share, accounting for about 88 % of the

total energy consumption. The total primary energy supply, including renewable energy, is expected to increase to 1411 MTOE in 2010/11, with biomass accounting for 28 % of the total energy consumption.

While the average oil intensity in the world has declined from 0.19 TOE (tonnes of oil equivalent) for every 1000 US dollars in 1990/91 to 0.13 TOE in 1997/98, oil intensity in the region increased from 0.17 TOE to 0.19 TOE in the same period. Despite the rapid growth in energy demand, the average per capita energy consumption in the region is lowest in the world. In 1997/98, the average per capita energy consumption was 0.37 TOE compared to the world average of 1.7 TOE. Though the regional average has increased in the recent years, it has remained far below the world average; in Bangladesh and Nepal, it continues to remain far below even the regional average. A similar trend is observed in the case of per capita oil consumption, with a regional average of 0.08 TOE compared to the world average of 0.60 TOE (1997/98 figures). The regional per capita electricity consumption of 219 kWh was also far below the world average of 2258 kWh in 1997/98, illustrating the need for large-scale rural and urban electrification.

The fuel structure amongst the countries of the region varies significantly. Coal constitutes as much as 30 % of the total commercial energy requirement in India. In Bangladesh, oil (53 %) and natural gas (47 %) are the dominant fuels (the shares refer to the total energy consumption). The pattern is similar in Pakistan (oil constitutes 46 % and natural gas 38 % of the total energy consumption). Sri Lanka is largely dependent on oil (87 %), whereas Nepal used both oil, which is largely imported, and hydroelectricity. A significant change in the fuel structure in recent years has been the increase in the share of natural gas, because of the important gas discoveries made in India, Pakistan, and Bangladesh and the environmental considerations arising from the large quantities of coal consumed in the region. At present, gas accounts for only about eight per cent of the total energy consumption in India whereas it is the main source of energy in Bangladesh.

South Asia accounts for less than 0.5 % of the world's crude oil reserves and produced 40.5 million tonnes in 1997/98. India's recoverable reserves of crude oil and natural gas have declined continuously after peaking at 806 million tonnes and 735 billion cubic metres, respectively, in 1991/92 (TERI, 1999). The current balance

recoverable reserves in India are estimated at 726 million tonnes of crude oil and 692 billion cubic metres of natural gas. Most of the crude oil production in South Asia is accounted for by India, which, in 1997/98, accounted for 93 % (38 million tonnes) of the total oil production in the region whereas Pakistan accounted for only 7 % (3 million tonnes) in the same year. India is also the largest consumer and importer of crude oil and petroleum products. Between 1990 and 1996, the consumption of petroleum products grew at the rate of 6.7 % in the region, with Nepal and Sri Lanka recording the highest growth rates of 18.9 % and 9.8 %, respectively. The country wise position of per capita energy and electricity consumption in South Asia is depicted below in Figure 10.

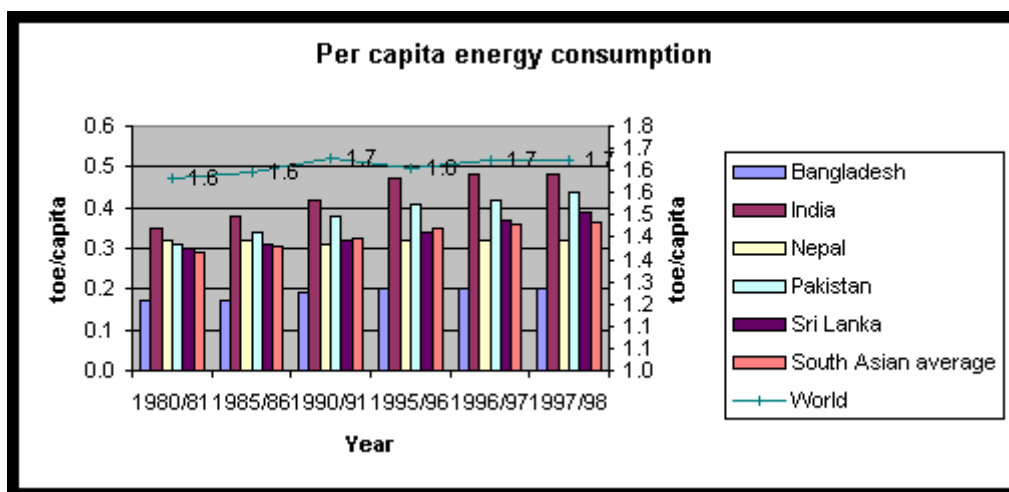


Figure 10. Per capita energy consumption

South Asia contains about 1.44 trillion cubic metres or about one per cent of the total gas reserves in the world. Of the total gas produced, 48 % is accounted for by India, 36 % by Pakistan, and 16 % by Bangladesh. The countries of the region have so far been self-reliant in natural gas. However, with the demand for natural gas projected to increase to 77 billion cubic metres by 2010/11 (IEA, 1998), an increase in production and imports would be required.

The total power generation in South Asia in 1997/98 was 541 TWh, of which about 61 % was coal-based, 19 % was from hydroelectric plants, 10 % from natural gas, 7 % from oil, 2 % from nuclear, and less than 1 % from renewable energy sources. The share of natural gas is likely to increase in the future due to environmental concerns.

In India, the total installed capacity in 1997/98 was 89 GW, which increased to 91 GW in 1998/99, of which 73 % is thermal, 24 % hydel, and 3 % nuclear-based. The total power generated was 463 TWh in 1997/98, which was about 30 % below the demand, thereby necessitating hydro power imports of 1440 GWh in 1990/91 and 1547 GWh in 1997/98.

The World Oil Crisis: Implications for Global Security and the Middle-East

The following uses relating to the World Oil crisis are critical and have their far-reaching implications in the context of Global security in general and the Middle-East in particular (Luft, 2005):

- the global oil market environment of very strong demand and very little spare capacity offers a huge opportunity to the radical *jihadists*. The terrorists believe that the best way to hurt the global Western economy is to go after oil;

- since the end of the major hostilities in Iraq, there have been close to 300 attacks on pipelines, refineries, and other facilities, and there have been attacks on oil installations in many other parts of the world, including Chechnya, Pakistan, India, Russia, Azerbaijan, and Nigeria⁴

- the cumulative impact of those attacks amounts to about 1 million barrels a day that has been taken off the market as a result of sabotage. If these million barrels a day had reached the market, oil prices would have been at least \$20 a barrel lower;

- we are seeing today in essence a transfer of wealth of historic proportions from the economies of the United States, Japan, China, and Europe to the economies of the oil-producing countries. Of course, this is not a way to win a war on radical Islamic terrorism when the side that needs to defeat terrorism and radical Islam is constantly enriching the enemy;

- we are seeing the beginning of a new era in the Middle East where other players, particularly China, will move in and want to cut deals and alliances. The U.S. and Europe are trying to curb Iran's nuclear program, to stop it from developing the bomb, but the Chinese have signed a \$70 billion energy deal with Iran, and it will be very difficult to get them on board at the UN Security Council;

- one of the main causes of friction between China and Japan involves access to oil and gas deposits in the East China Sea. The Chinese are also developing a strong

foothold in Pakistan, where thousands of Chinese workers are building a new port in Baluchistan at Gwadar, which sits right at the entrance to the Persian Gulf.

China's Middle-East Strategy

The People's Republic of China has neither strong historical ties nor long-standing strategic interests in the Middle-East. Yet its relationship with the region is an interesting and increasingly important one. China's emphasis on modernization has required extensive financing and increasing access to oil. The Middle East has become China's fourth largest trading partner, but developing this commerce has sometimes involved China in political controversies and regional issues. Being so late in entering the region, and having less to offer in economic or technology terms than the United States, Russia, Japan, and Europe, China must go after marginal or risky markets where others cannot or will not go, supplying customers no one else will service with goods no one else will sell them. Yet while China wants to exploit and expand such links, it does not want to sacrifice too much regarding relations with the United States or incur costs in other, more important, policy areas.

By 1990, China's exports to Middle- East countries reached \$1.5 billion, and more than 50,000 Chinese workers were employed in the region. By 1994, overall trade with the Gulf Cooperation Council was estimated at \$2.26 billion, with China exports falling about \$700 million short in covering its bills. Iran has been a special focal point. From 1990 to 1993, China-Iran trade rose from \$314 to \$700 million. In 1995, the two countries signed a \$2 billion trade deal. China also tripled oil purchases to 60,000 barrels a day and agreed to build a joint oil refinery in China and cooperate in oil exploration. China also built power plants, cement factories, and joint shipping lines in Iran. Still, arms sales have been China's leading single field of endeavor.

By the 1990s, however, a new factor stimulated China's economic interest in the Middle East. As its rapid economic growth required more oil, China became an importer in 1993 and is becoming a major buyer, expected to require 30-50 million tons by 2000. The Middle East (Saudi Arabia, Kuwait, and Iran) and Central Asia (whose estimated, barely tapped reserves are currently a whopping 170 billion barrels) are the best sources for these needs. In June 1997, the China National Petroleum Corporation (CNPC) outbid U.S. and other companies to win a major share in two of Kazakhstan's

largest oilfields and a contract to build a 3000-kilometer pipeline from Kazakhstan to China which would also supply Iranian refineries. Chinese Premier Li Peng lobbied hard to close this \$4.4 billion deal. One potential advantage of China is its lack of political baggage, since its political ambitions are more limited than the United States, Russia, Iran or Turkey. For example, Kazakhstan is using China to gain more independence from Moscow, which tried to use its political leverage while offering poor terms for an oil deal. The Chinese plan would bring Kazakhstan more money and employment opportunities. China can make better bids since it lacks alternative supplies and has a government willing to give subsidies at commercially unprofitable levels. But China is hurt by the inefficiency of its oil industry and may not be able to build the proposed pipeline. In political terms, the Kazakhstan deal will make China an even closer ally of Iran in the region. Being a late arrival on the highly competitive oil market, China must pursue more risky and marginal sources neglected by others - including Iran, Iraq and Sudan - which raise international political problems. More conventionally, China has made a \$1.5 billion deal for a huge Sino-Saudi oil refinery in China and 10 million tons of Saudi oil annually for a 50-year period.

India joins the scramble for oil and Natural Gas

India has recently joined the global scramble for oil and natural gas alongside other Asian states, including China, South Korea and Japan. Through diplomatic maneuvers aimed at securing transnational pipeline routes and overseas crude oil and natural gas production deals, India is seeking to lay claim to a larger share of the world's energy resources. It is also carrying out a major restructuring of the national energy industry. Though India's thirst for oil is rooted in economic imperatives, the emergence of India as a major player in foreign energy ventures will have a profound impact on world geopolitics. It takes place under conditions in which oil is already the object of the most intense competition between the US, the European Union, China, Japan and Russia. The country's international oil policy is becoming a growing point of friction with the United States. In particular, the US is determined to scuttle Indian negotiations with Iran over a pipeline to India via Pakistan. The development of closer ties between India, China and Russia, as well as India's courting of oil-rich Venezuela, are also potential threats to American interests.

In terms of global oil consumption, India is still a relatively small player. Although India is home to more than 15 percent of the world's population, it accounts for only 3 percent of world oil consumption. China, by contrast, consumes 7.6 percent of the world's oil. India's energy needs are rising sharply, however. Last year alone India's crude oil consumption increased by 10 percent. Moreover, India is highly dependent on oil imports. Some seventy percent of India's oil is imported and oil imports account for one third of the total value of all India's imports. By 2020, India is expected to have to import 80 percent of its energy needs. India has the world's fastest-growing car market, which is driving oil consumption and imports. Economic growth, rising oil prices and recent disruptions in oil supplies due to the US military interventions in Iraq and Afghanistan are propelling the Indian government to join the hunt for cheap and secure sources of oil and natural gas.

India's Energy security pact with Russia

India already holds a 20 percent stake in Russia's energy-rich Sakhalin-1 block. ONGC Videsh Ltd. (OVL), the overseas arm of India's Oil and Natural Gas Corp. Ltd. (ONGC), has made an investment of \$1.7 billion, which is expected to go up to \$3.5 billion later this year. Reportedly, India is to consider investing a further \$1.5 billion in the Sakhalin-3 gas field and another \$1.5 billion in the joint Russian-Kazakh Kurmangazy oilfield, both in the Caspian Sea. The Russian invitation to India to join the Sakhalin-3 project is especially noteworthy, since it occurred shortly after Moscow removed a major US oil company from the same project. As one of the planned Indo-Sino joint ventures, Indian and Chinese oil firms lined up together as Asian customers for the possible purchase of some of the assets of the Russian Yukos Oil Co., confiscated by the Putin regime in Russia. These moves are clearly aimed at establishing some sort of counterweight to American dominance over energy production. On February 14, inaugurating the third Asian gas buyers' summit in New Delhi, the Indian petroleum minister Mani Shankar Aiyer proclaimed that Asian natural gas players should come together to form an Asian gas grid. The aim of such a grid would be to enable the countries in the region to take full advantage of oil profits and thereby end the "wretched western dominance" that has prevented energy security and economic growth in Asia.

Diplomacy over oil-bids with Iran and Pakistan

The suggestion by Iran to the previous BJP-led Indian government about the construction of a pipeline to supply oil and gas from Iran to India is once again on the table. Iran is scurrying to secure diplomatic ties with Asian powers via energy deals in order to counteract US threats of economic sanctions and military invasion. A \$40 billion deal was drafted on the 7th of January with the National Iranian Oil. Co. (NIOC). The deal would allow India to import natural gas over a period of 25 years, starting in 2009. NIOC would also develop two Iranian oil fields and a gas field.

Iran is the second largest crude oil producer among the Organization of the Petroleum Exporting Countries (OPEC). It owns 10 percent of the world's proven oil reserves and also has the world's second largest natural gas reserves. India perceives Iran as a viable corridor to access the natural resources and economic opportunities of Central Asia and the Middle East. During the third gas buyer's summit in February, officials of the National Iranian Gas Exports Company (NIGE Co.) began their preliminary discussions on the delivery of Iran gas via a pipeline at the India-Pakistan border, expected to be signed in Teheran soon.

The development of an Indo-Pakistani-Iranian pipeline is seen by New Delhi as a means of both helping to meet its energy needs and fostering a closer economic relationship with Pakistan. The Indian political elite calculate that this will cut across Pakistan's ability to pursue a policy of geopolitical confrontation with India and enable Indian business to dominate the Pakistani market. However, to bypass a direct agreement with Pakistan, India has proposed two separate agreements—one between India and Iran on purchasing the gas and another between Iran and Pakistan for the pipeline. During the summit the initial construction plan was revised to include plans to extend the pipeline to Southern China.

A Hemisphere of Energy Security Environment in NAFTA Region

Canada and Mexico are the top two suppliers of oil to the United States, respectively. When combined with domestic production, imports from these two continental neighbors supply more than 50 percent of total U.S. daily oil consumption. More promising still, Canada recently vaulted to the number-two spot among the world's proven reserve holders (behind Saudi Arabia) with its classification of 176

billion barrels of economically recoverable oil from massive oil sands deposits, located primarily in northern Alberta. Regardless of America's perception of Canada—and, indeed, sometimes even Canada's perception of itself—our northern neighbor is officially an energy superpower. The U.S. currently imports roughly 2 million barrels per day of Canadian crude. Of that volume, approximately 800,000 barrels come from oil sands deposits. And with oil sands production projected to increase from 1.2 million barrels daily to as much as 4 million by 2015, we will be able to count on increased supplies even amid mounting interest in Canadian oil from countries such as China. In the next decade, Canada's total daily oil production will reach close to 5 million barrels a day over half of which (more than 2.5 million barrels daily) will likely flow to the U.S. (Frederick Cedoz, 2006).

This oil trade would be more than simply an expansion of the largest commercial trading relationship in the world. Along with additional supplies of Canadian crude will come the need for American and Canadian jobs to produce the oil, and—just as important—expand the infrastructure to get that crude to market. Each barrel of oil we buy from Canada is a barrel whose profit does not end up in the hands of those who may wish us harm. And every job building a pipeline or expanding a refinery in the U.S. puts food on the table of Americans and tax revenue in our national treasury.

Mexico, on the other hand, has an uphill climb with respect to expanding its oil output, but the tools are all there. The Mexican government has allowed the nationalist sentiment that goes along with being a major oil producer to impede its ability to reliably expand production to meet domestic demand, let alone produce additional crude for export. The geology of the under-explored Mexican portions of the Gulf of Mexico is likely to be as prolific as the American waters of the Gulf have proven to be.

Transferring the World's Wealth

In 2001, oil was selling for \$20 a barrel; today it sells for more than triple. This means that the Saudis, the Iranians, and all the other producers are making an extra \$40 a barrel. We are seeing today in essence a transfer of wealth of historic proportions from the economies of the United States, Japan, China, and Europe to the economies of the oil-producing countries. Of course, this is not a way to win a war on radical Islamic terrorism when the side of the world that needs to defeat terrorism and radical Islam is

constantly enriching the enemy. American taxpayers send their dollars and soldiers all over the world to fight for freedom and democracy. Some 77 percent of the world's oil reserves are in the hands of governments. These governments have little interest in bringing down oil prices. Unfortunately, most of the oil-producing countries are corrupt dictatorships (Luft, 2005).

How Oil Shapes Foreign Policy?

What happens when you have the United States, China, India, Europe, and Japan all competing over the same oil? We are seeing today the beginning of a new era in which the Middle East will no longer be a unipolar arena. There will be other players, particularly China, that will move in and want to cut deals and alliances (Luft, 2005). The United States and Europe are trying to curb Iran's nuclear program, to stop it from developing the bomb, but the Chinese have signed a \$70 billion energy deal with Iran, and said they will veto any attempt to impose sanctions on Iran at the UN Security Council. When the Security Council tried to impose sanctions on Sudan - one of China's main oil suppliers - over the issue of Darfur, the Chinese vetoed it. These are two cases in which China's energy interest trumped their interest to be part of the international community (Baker Institute, 1999).

Currently, we are seeing a situation in which America's policy of bringing democracy to the Middle East is being constantly compromised by the fact that the United States and China are essentially competing over energy resources. This is happening all over the world, not only in the Middle East and Central Asia. It is happening in Africa and even in the Western Hemisphere, where China is moving into Venezuela and Canada. Access to energy resources will shape the world in the years to come. It will dictate the international behavior of countries as it plays an increasing role in relations between the major powers. In future, we will see new alliances forged, such as between China and Saudi Arabia.

One of the main causes of friction between China and Japan involves access to oil and gas deposits in the East China Sea. Similar occurrences are happening all over the world. The Chinese are also developing a strong foothold in Pakistan, where thousands of Chinese workers are building a new port in Baluchistan at Gwadar that sits right at the entrance to the Persian Gulf. Israel should be very sensitive to developments

between the United States and China, and should be very careful in pursuing military relations with China because there will be a cost. There are a lot of things that can be done with China on many issues, but for Israel to pursue military relations with China at a time when very important parts of the U.S. defense establishment and Congress are extremely hawkish on China is a very dangerous game to play. Americans are beginning to understand that their dependence on foreign oil has doubled in the past thirty years. In 1973 America imported 30 percent of its oil. Today, it imports more than 60 percent and that will increase. Americans are beginning to understand that dependence on oil imports is America's Achilles heel and that this needs to be addressed. Oil is no longer an environmental issue. It is increasingly becoming a national security issue.

In 1973, Brazil imported 80 percent of its fuel. Today the Brazilians are on the road to energy independence because they have developed an agricultural sector that allows them to produce transportation fuel from sugar cane. Brazil today does not feel the impact of an oil crisis as other countries do. A lot of investment is going toward producing transportation fuel from coal. In South Africa, planes that fly out of Johannesburg run on synthetic jet fuel made from coal, not oil. So a country does not have to subjugate its entire foreign policy just to satisfy its need for petroleum products. Two-thirds of U.S. oil consumption is in the transportation sector. With a quarter of the world's coal reserves, America can do the same and embark on a path toward weaning itself from its oil dependence. This has already been done in the U.S. power sector - today only about 2 percent of U.S. electricity is generated from oil.

India, as a gesture of regional cooperative venture, has succeeded to tap oil and gas through pipelines from Iran. In January, 2005, the Gas Authority of India Ltd. (GAIL) signed a 30-year deal with the National Iranian Gas Export Corporation for the transfer of as much as 7.5 million tons of LNG to India per year. The deal, worth an estimated \$50 billion, will also entail Indian involvement in the development of Iranian gas fields. Even more noteworthy, Indian and Pakistani officials are discussing the construction of a \$3 billion natural gas pipeline from Iran to India via Pakistan - an extraordinary step for two long-term adversaries. When completed, the pipeline would provide both countries with a substantial supply of gas and allow Pakistan to reap \$200-\$500 million per year in transit fees. The gas pipeline is a win-win proposition for Iran,

India, and Pakistan (Klare, 2005).

Role of IEA

The International Energy Agency (IEA) was created in 1974 as a response to the threat posed by the first oil crisis and commemorated its 30th anniversary in 2004. While energy markets and the world have changed in many ways since then, energy security remains a fundamental goal of its member countries. However, security considerations have become more broadly defined. IEA's focus has been expanded from oil to other forms of energy, such as natural gas, of which consumption and imports are rapidly increasing, and to electricity, following several serious transmission failures in recent years. Furthermore, reliable access to energy supply needs to be compatible with other policy objectives, namely, the pursuit of greater economic efficiency in the energy sector and the mitigation of environmental consequences of energy production and use.

Recent energy market and geopolitical developments have pushed security of supply back to the top of the energy policy agenda. The events of 11th September 2001 and worsening political instability in the Arab Gulf and elsewhere have heightened the sense of vulnerability to disruptions to energy supplies. Energy installations such as nuclear power stations, gas terminals, gas pipelines, and oil installations have moved to a higher state of alert. Global cross-border energy trade has grown by almost three-quarters since 1973 and will continue to expand between now and 2030. Because of cost, geopolitical and technical factors, almost all the increase in energy production from now on will occur in non-OECD countries. As a result, the reliance of IEA members and non-IEA oil-importing developing countries on imported oil and gas will continue to grow. This will increase mutual economic interdependence, but will also intensify concerns about the world's vulnerability to a price and supply shock. These developments underline the need for IEA member countries and non-member oil- and gas importing countries to take a more proactive role in dealing with the energy security risks in fossil fuel trade. Measures to deal with short-term supply emergencies or price shocks will need to be enhanced. Countries will also have to diversify their fuels as well as the geographic sources of imported fuels. Indigenous renewable energy sources will contribute to this end. Improving relations with energy suppliers will also be essential for IEA countries' security strategies. The importance of this dialogue was apparent in

the effective response by producer countries to the threat of market disruption during the military action in Iraq in 2003. Better data collection and exchange for improving transparency in world markets will remain the key in this dialogue. Similarly, the importance of co-operation with other non-member countries in such fields as emergency preparedness, data exchange and energy policy reform will also grow as their shares in global energy demand and imports rise.

Long-term security of supply will depend on whether the investment needed to expand energy supply capacity will be forthcoming in a timely manner. **The 2003 *World Energy Investment Outlook*** estimates that more than \$16 trillion of investment in maintaining and expanding energy supplies will be needed up to 2030. Mobilizing all this investment will require the lowering of regulatory and market barriers, and the creation of an attractive investment climate, including stable and enforceable legal and regulatory systems, is a daunting task in many developing countries and the former Soviet Union. Stamping out corruption is also essential in many countries. Good governance is crucial to extend electricity supplies to the energy-poor and give them better access to other forms of modern energy. The environmental implications for rising energy use will remain a key issue for IEA countries. Energy-related CO₂ will continue to grow steadily unless tough new policies are adopted to counter this trend. The adoption of new policies in OECD and non-OECD countries, together with faster deployment of more efficient and cleaner technologies, would yield big savings in energy and promote switching to less carbon-intensive fuels. Political will and public acceptability of the economic cost of such policies will determine how far IEA countries go down this path.

New technologies will undoubtedly be a major part of the solution. Governments and the private sector should share the responsibility for RD&D of new energy technologies. While this type of involvement has declined significantly in the past decade in IEA countries, given that the energy industry's overall research efforts are undermined in new market structures, governments need to reappraise the need for renewed public commitment to energy R&D. Sharing costs and gains through international collaboration via such instruments as IEA's Technology Implementing Agreement, is one way of getting better value for the money spent on R&D. Addressing all of these policy challenges can be encompassed in how to strike the balance between

the “3Es”, namely, energy security, economic development and environmental protection, in a cost-effective manner. The IEA’s mission is to support member countries’ efforts to devise policies to this end. The IEA’s operational mandate has expanded considerably over the past three decades. The concept of energy security has broadened from oil to natural gas and electricity. This trend will continue in accordance with the changes in political, technological and market framework and the emergence of new policy challenges in future.

Geopolitics of Natural Gas

Natural gas is rapidly gaining in geopolitical importance. Gas has grown from a marginal fuel consumed in regionally disconnected markets to a fuel that is transported across great distances for consumption in many different economic sectors. Increasingly, natural gas is the fuel of choice for consumers seeking its relatively low environmental impact, especially for electric power generation. As a result, world gas consumption is projected to more than double over the next three decades, rising from 23 % to 28 % of world total primary energy demand by 2030 and surpassing coal as the world's number two energy source and potentially overtaking oil's share in many large industrialized economies.

Gas consumption is projected to grow in nearly all world regions, with the largest absolute increases in gas use in North America and Europe and rapid growth in new markets such as China, South Asia and Latin America. It is likely that rising gas consumption in many of these markets will force an increase in imported supplies as low-cost local resources are exhausted. Three countries alone - Russia, Iran, and Qatar possess 55 % of current proved gas reserves. Simultaneously, falling costs for transporting gas-both by pipeline and by ship as liquefied natural gas (LNG)-will continue to improve the viability for these distant suppliers to develop markets outside their borders.

The growing importance of natural gas imports to modern economies will force new thinking about energy security. The relationships that are developing between major gas suppliers and key end use consuming countries will create new geopolitical considerations that will rise to the highest levels of economic and security policy. Already, U.S. Federal Reserve Bank Chairman Alan Greenspan has publicly discussed

the implications of rising domestic gas prices and the need for LNG imports to supplement North American gas production. Security agencies have redoubled their attention to gas transportation infrastructures. With the prospect of much greater dependence on foreign supplies of natural gas, the U.S. Department of Energy in December 2003 convened a gathering of the Energy Ministers from current and future major gas exporters to the U.S. to build diplomatic ties to these important suppliers.

The Energy Forum of the James A. Baker III Institute for Public Policy and the Program on Energy and Sustainable Development at the Stanford University Institute for International Studies have begun a major effort to investigate the geopolitical consequences of a major shift to natural gas in world energy markets. A case in point of recent efforts to look at infrastructure development is the recently completed World Bank (ESMAP) study *Cross-Border Oil and Gas Pipelines: Problems and Prospects*. This study briefly examines twelve cases of cross-border energy infrastructures to identify common challenges and the best practices for mitigating these challenges. The International Energy Agency (IEA) has convened a series of workshops on cross-border gas trade, including policy makers, industry experts and academics and continues to examine issues of gas import security.

There is also a voluminous literature on hypothetical gas transport projects—lines drawn with crayon on maps that represent hundreds of proposed gas lines. Some studies such as the *Shell Global Scenarios*, have considered gas infrastructure expansion in the broadest social and geopolitical contexts. Still other efforts have focused on the specific economics of hypothetical natural gas pipeline options in particular regions. In 2000, the Asia Pacific Energy Research Center published two reports—one focused on the economics of gas pipeline options in Northeast Asia and a second on gas pipeline options for Southeast Asia. Similarly, the Baker Institute at Rice University has analyzed the pipeline and LNG options for importing gas from the Russian Far East to Japan. The International Institute for Applied Systems Analysis has also conducted a large-scale economic modeling effort to study the routing of Central Asian natural gas to European and Asian markets. Every major commercial enterprise that produces transports or sells gas across borders enlists models to explore the economics of different projects and scenarios.

The Baker Institute-Stanford University effort will expand on this existing work.

In particular, the Institute shall consider the more complex issues of the international security and geopolitical consequences of emerging gas producer-consumer relationships. The Institute is currently contemplating to explore the political consequences of integrating what have historically been disconnected regional natural gas markets. The study will allow examination of whether the advent of LNG will create a truly global market for natural gas, as well as the role of likely key gas suppliers in affecting prices and security of supply in that global market. The study will also allow for systematic analysis of many questions that have long been a mainstay of the energy security debate in oil, such as the whether large gas consuming countries will compete to secure uninterrupted access to the world's most prolific natural gas resources (Jaffee & Hayes, 2006).

Conclusions

Energy-intensive industrial sector consumes nearly 85 million barrels per day of Petroleum for economic growth. Expanded demand from the augmented capacities is being met through an optimal mix of oil and natural gas resources to support industrial and business operations worldwide at economies of scale. The projected demand of oil from China and India in near future is going to be almost two to three fold to keep pace with fast-developing economy. The potential sources to tap to meet the growing demand are going to be the Middle–East, Eastern Europe, Russia, Canada, Western and South Africa, China etc. Demand for oil and natural gas has historically maintained a striking balance until the first oil-shock experienced by the non-OPEC countries from the OPEC countries in 1974. Periodical hike in the prices of Oil and natural gas by OPEC has left little option but to diversify the production bases of the commodities by exploring alternate sources of production and supply at cheap, convenient and competitive costs. In the paper this has been suggested to be strategized in the following manner to minimize the negative impact of geo-politics of oil trading in the global scene:

I. Creation of authentic database on country and region- wise potential reserve of oil and natural gas resources.

II. Optimize the production of oil and natural gas and ensure steady and uninterrupted supply of oil and natural gas at prices that are universally acceptable without hurting the interests of oil producers, exporters and consumers globally.

III. Discrimination between OPEC and Non-OPEC nations in matters of supply and price-fixing should be altogether dispensed with to bring in greater parity and harmony in the global marketing scene.

IV. Considering limited life-span of oil and natural gas, there has to be greater diversification of sources to be tapped (biomass, biogas, wind hydel-thermal, geothermal, nuclear etc.) along with mode of feedstock to be used, especially in industrial, energy, transport, domestic and other conventional and non-conventional sectors to avoid over-exploitation in one hand and rapid depletion on the other.

V. There is a clear need to break intra-regional monopoly and encourage inter-regional cooperation for production, supply, export and marketing of oil and natural gas in globally competitive and acceptable prices to circumvent possible negative impact of geo-politics in oil- trading.

VI. After read through this study, a fairly stark picture of the near-to medium-term future of oil, and in fact, for the world economy, begins to emerge. Oil is such an important part of we humans to secure our lifestyles.

VII. Increasingly, the world must rely on available energy sources which, for historical, political and even religious reasons, are at great risk. Also, it is easy to forget the balance of the 6000 oil-related items that we use every day to assure our comfort.

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