Past and Future Trajectory of Energy Flows: An Asian Perspective

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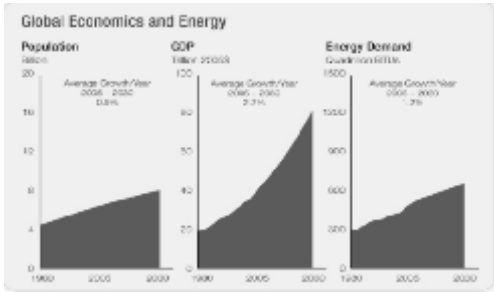
The upsurge in the global energy demand post - economic crisis is inevitable, as the population and the development standards are growing. Long term trajectory expects the global energy demand to increase substantially, especially in the developing countries. A rapid conversion of small time locales into big industrial cities and continuous exposure to better and luxurious lifestyles for the people has led to the popular thinking out of the box and enhanced usage of energy for household consumption, largely for transportation. A major upheaval in the consumption pattern is to be seen in the rising Asian economies like India, China or South Korea. Some of these countries are net importers of oil and therefore, a major portion of oil and gas (LNG) is directed to these economies from the global producers. Particularly, where the Middle Eastern producers have moved one step closer to east, it could be rightly mentioned that the market is witnessing a paradigm shift in its energy trade, from the western countries to the Asian economies. The present and the coming demand will be so huge, that it has to be met by large imports.

Graph 1[1]



Source: ExxonMobil, "Global Energy Demand".

The Growing Demand

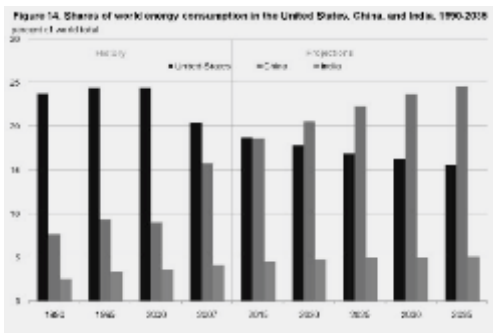
The increased use of energy could well evidently be seen from developing Asia. The rising global interests in the energy rich regions will have its own effects on the energy trade and many consumers as well. This will depend upon, how the growing Asia makes best possible use of its expertise and bring together the other consumers to co - operate to pursue energy security. Fossil fuels continue to play a significant role in the global energy mix, "….. meeting close to 80 per cent of global demand through 2030. Oil and natural gas alone will still make up almost 60 per cent of global energy supplies in 2030. The fastest - growing fossil fuel will be natural gas, because it is abundant, affordable and the cleanest - burning. By 2030, global demand for natural gas will be more than 55 per cent higher than in 2005"[1].

Graph 2[2]

Source: ExxonMobil, "Global Energy Demand".

"With the United Nations predicting world population growth from 6.6 billion in 2007 to 8.2 billion by 2030, demand for energy must increase substantially over that period. Over 70 per cent of the increased energy demand is from developing countries, led by China and India …. The global electricity demand is increasing twice as fast as overall energy use and is likely to rise 76 per cent to 2030. Nuclear power provides about 14 per cent of the world's electricity, almost 24 per cent of electricity in OECD countries, and 34 per cent in the EU. Nuclear power generation is an established part of the world's electricity mix providing in 2007 some 15 per cent of the world's electricity (cf. coal 42 per cent, oil 6 per cent, natural gas 21 per cent and hydro & other 18 per cent)"[1]. Even then, as the alternative sources of energy are getting ready to take – on the world, the global economies will be dependent on fossil fuels, mainly due to their convenience. However, the chief factors that are driving the global energy demand are expanding globalization process, where today, the people are connected globally through inter – connected roads and highways. This has also led to intense Industrialization process, where factories and manufacturing businesses require a huge amount of energy to run. At the same time, the rise of the middle class globally, which "..… has also raised the needs of the people, aspiring for a better and luxurious life"[2].

Graph 3[3]



Source: Energy Information Administration (EIA), "International Energy Outlook 2010".

New Competition and the Security of Supply

Worldwide energy markets have witnessed increasing activity by the energy consumers. Now, this presence could be divided into old and new players. Old consumers, i.e., US and Europe are dominant energy players in the energy - rich countries, most notably, the Middle East is centric to this presence, and gains a strategic importance. In addition to the old players in the market, the new stakeholders are Asia. The new players are clearly defined as the energy consumers, which have experienced a drastic increase in its energy consumption due to the higher economic growth. Thus, the 21st century sees a new competition from the new energy rivals. As time passes, these energy consumers do see a stiff competition for hydrocarbon resources. Gradually, the competition is also carried out in other areas where there are huge reserves of oil and gas such as, Europe & Eurasia and Africa. With this, the competitors also face the challenge to contribute for regional security and development of these societies.

Post - Second World War, saw the emergence of hydrocarbon as a basic factor in the development of the world. Thus, the major oil producer i.e., the Middle East became the centre of attraction for the global powers. Oil, therefore became the basic factor for the powers involvement in many energy rich countries of the world. The Middle East especially, where there are the largest reserves of oil in the world, became the centre stage. Many of the energy rich states today are majorly dependent on income from oil exports. Some countries are dependent upto 90 per cent. This clearly identifies the space energy holds in the economic development of a country. However, the oil exports made the producers completely dependent on the revenues, with no development whatsoever. This made the producers a rentier economy. Although, the enormous wealth that was incurred as oil revenues, made the producing countries rich and powerful, and helped them in the development of their country. Thus, over a period of time, the intensity of competition has increased and become more complex.

The oil money came in billions, which made the economy rich and provided huge subsidies. The wealth was used for the development of the people and the state. On the other hand, regions such as Africa has remained deprived, despite huge oil and gas exports. The oil money is utilized for personal benefits by the political elites and not for the development of the people. Certain countries such as Nigeria, Sudan or Angola have large amount of oil resource, and the countries governments earn billions annually, however the money doesn't reach the people. It is evident that the region has no facilities, high unemployment rate and serious health problems such as, cholera and malaria. Hence, the equation underlines that in the midsts of plenty, where the people are contended and avail the benefits of oil wealth, another side of the world lies in darkness and ages away from progress.

In the last few years, the global energy demand has increased mainly due to the economic surge and the rise of global middle classes. The need for energy is rising due to the new consumers joining the market. This increased demand is coming from the Asian countries. The energy demand within the producer countries have also gone up. "Energy demand in the Gulf has more than doubled in the past 10 years and is forecast to increase by 85 per cent by 2030 compared

with 2008 levels, a Wood Mackenzie report said. An energy demand surge in the Arabian Peninsula will be largely met by oil - fired generation, removing about 1.5 million barrels of oil equivalent per day (boepd) otherwise available for export….." . The rise of new energy suppliers outside OPEC have also impacted on the Middle East exports. Due to the instability in the region, the consumers are looking for other sources, which happen to be Europe and Eurasia and Africa. Thus, the consumer market has shifted to new energy supplies, however, the oil finds are cheaper in the Middle East, which will be a major attraction for the consuming countries. The rise in demand of the Asian countries, which will have its impact on the energy transaction in the coming time. Asian economies such as China, India and South Korea have become leading gas importers.

- **China**

  China is the second largest oil consumer after US. From the net exporter of oil in the 90s, China has emerged a net importer of oil, and also consumes a large amount of natural gas. China imported its first shipment of LNG in the summer 2006, and the country has quickly ramped up imports since then, importing about 730 MMcf/d in 2009 and 1,120 MMcf/d in the first half of 2010 . "Natural gas usage in China has also increased rapidly in recent years, and China has looked to raise natural gas imports via pipeline and liquefied natural gas (LNG). China is also the world's largest producer and consumer of coal, an important factor in world energy markets. China is targeting almost all sectors of the economy: real estate/construction, transportation and power infrastructure, agriculture, social services, heavy and light industry" . "Coal supplied the vast majority (71 per cent) of China's total energy consumption of 85 quadrillion British thermal units (Btu) in 2008. Oil is the second - largest source, accounting for 19 per cent of the country's total energy consumption. While China has made an effort to diversify its energy supplies, hydroelectric sources (6 per cent), natural gas (3 per cent), nuclear power (1 per cent), and other renewables (0.2 per cent) account for relatively small amounts of China's energy consumption mix" . China's energy strategy is a complexity of hydrocarbon constraints and environment friendly energies . EIA envisages coal's share of the total energy mix will fall to 62 per cent by 2035 due to anticipated increased efficiencies and China's goal to reduce its carbon intensity or carbon emissions per unit of GDP by at least 40 per cent from 2005 levels by 2020 .

- **India**

  In 2009, India was the fourth largest oil consumer in the world, after the United States, China, and Japan. "According to the International Energy Agency (IEA), coal / peat account for nearly 40 per cent of India's total energy consumption, followed by nearly 27 per cent for combustible renewables and waste. Oil accounts for nearly 24 per cent of total energy consumption, natural gas six per cent, hydroelectric power almost 2 per cent, nuclear nearly 1 per cent, and other renewables less than 0.5 per cent. Although nuclear power comprises a very small per centage of total energy consumption at this time, it is expected to increase in light of international civil nuclear energy co - operation deals" . Increased consumption and low

production rate has compelled India to import from outer sources. "India began importing liquefied natural gas (LNG) in 2004. In 2008, India imported 372 Bcf of LNG, nearly 75 per cent of it from Qatar, making it the sixth largest importer of LNG in the world " .

- **South Korea**

  "The country is the fifth largest importer of crude oil and the second largest importer of both coal and liquefied natural gas (LNG). South Korea has no international oil or natural gas pipelines, and relies exclusively on tanker shipments of LNG and crude oil. South Korea consumed over two million barrels of oil per day (bbl/d) in 2009, making it the tenth largest consumer of oil in the world. South Korea is home to three of the ten largest crude oil refineries in the world, and produced over 2.5 million bbl/d of refined products in 2009. South Korea is highly dependent on the Middle East for its oil supply, with the Persian Gulf accounting for nearly 75 per cent of its 2009 total oil imports. Saudi Arabia was the leading supplier, and the source of more than a quarter of total oil imports" .

A safe and secure supply of energy resources to the end consumer is a major challenge for both the producers and the consumers. Today's consumers face tremendous challenges in terms of a safe passage of oil and gas through pipelines or tankers. "About two - thirds of the world's oil trade (crude oil & refined products) moves by tanker. Oil transported by sea flows through fixed routes, the most important being the Strait of Hormuz and Strait of Malacca. External threats like piracy and terrorism have threatened the secure transit of energy supplies in the straits". Apart from the terrorist activities, piracy remains a major threat, specifically along the straits. Most of these pirates lack philosophy or any belief and are small time thief's or criminals and would readily kill or become a part of a terrorist activity for a small reward. Hence, safeguarding these straits is important to maintain stable prices . Any threat to these supplies would create a worst scenario for the global economy. "….., the worst hit would be the Gulf states, unable to export their oil and their main source of income would come to an end" . The significance of the Middle Eastern countries such as, Saudi Arabia, producer of spare capacity of oil should be recognized . Thus, today's energy business has become more complex, where any instability in the market will affect the producers and the consumers alike.

Resources other than the Middle East

The African oil and gas reserves stand at 127.7 ('000) mb and 14.76 tcm respectively at the end of 2009 . While, Eurasia has emerged as a major player in the global energy market. The overall importance of countries such as Azerbaijan will increase in lieu of its oil and gas reserves. "Azerbaijan's proven crude oil reserves are estimated at 7 billion barrels in January 2010, …. The country's largest hydrocarbon basins are located offshore in the Caspian Sea, particularly the Azeri Chirag Guneshli (ACG) fields, which accounted for about 80 percent of Azerbaijan's total oil output in 2009" . Oil production in Azerbaijan increased from 283,000 barrels per day (bbl/d) in 1999 to more than 1 million bbl/d in 2009, increasing more than 15 per cent compared with the prior year and exported

an estimated 876,000 bbl/d in 2009, according to EIA, increasing more than 16 per cent compared with 2008 and nearly tripling since 2005 . Azerbaijan has proven natural gas reserves of roughly 30 trillion cubic feet (Tcf) as of January 2010 .

"Kazakhstan has the second largest oil reserves as well as the second largest oil production among the former Soviet republics after Russia. With production of 1.54 million barrels per day (bbl/d) in 2009, Kazakhstan is already a major producer, and continued development of its giant Tengiz, Karachaganak, and Kashagan fields is expected to at least double its current production by 2019" . "… Kashagan, was discovered in the Caspian and 'is believed to rank among the five largest fields on Earth… Kazakhstan produced 1.2 million barrels a day last year (2005), but it is expected to pump 3 million barrels a day by 2015 - almost as much as Iran. Chevron is spending over $ 5 billion to expand production there, its largest project anywhere" . Kazakhstan's oil production reached 1.54 million barrels per day (Mmbbl/d) in 2009, more than double the level of a decade earlier, while domestic oil consumption averaged 241,000 bbl/d . Kazakhstan also has the proven natural gas reserves at 85 trillion cubic feet (Tcf) .

Russia has the largest reserves of natural gas in the world. It could buy gas in central Asia for $ 65 per thousand cubic meters and sell it in Europe for four times as much . Europe is extremely dependent on the Russian energy supplies, and its growing influence in the Caspian Sea region gives Russia leverage for the European and the Asian markets. Europe's energy dependency has been rising. It was 14.1 mbpd (approx.) in 2004 and is expected to grow to 15 mbpd (approx.) in 2010, 15.3 mbpd (approx.) in 2020 and 15.9 mbpd (approx.) in 2030 . In terms of European demand for oil, the Caspian reserves, specifically Russia is crucial. In 2009, Russia was the world's second - largest natural gas producer (19.3 Tcf), second only to the United States (21Tcf), however, Russia was the world's largest exporter (7.3 Tcf) . "Russia exports significant amounts of natural gas to customers in the Commonwealth of Independent States (CIS). In addition, Gazprom (through its subsidiary Gazexport) has shifted much of its natural gas exports to serve the rising demand in countries of the EU, as well as Turkey, Japan, and other Asian countries" Asian countries like Bangladesh and Myanmar also have substantial amount of energy reserves. A huge amount of natural gas was discovered in Bangaladesh "….. between 1955 and 1971, 29 exploratory wells were dug and eight gasfields, with the 'ultimately recoverable' reserves of 9.3 trillion cubic feet (tcf) were discovered" . According to the United States Geological Survey (USGS), Bangladesh has a potential new gas reserve of around 33.5 trillion cubic feet (TCF) . In 1993, after the formation of a new National Energy policy, the government of Bangladesh divided its offshore sites into 23 blocks and offered them to foreign oil companies through bidding. Natural gas exploration and production is dominated by three state - owned companies, all of which are subsidiaries of Petrobangla.

Historically, over the past 10 to 15 years, the bulk of discoveries worldwide have come from deep - water areas: Nigeria, Angola, Gulf of Mexico, Offshore Brazil and therefore the western coast of Myanmar is one of the last remaining deep water areas in the world which remains to be fully explored . Proven

reserves of between 5.7 and 10.0 trillion cubic feet (TCF) of natural gas, with up to 8.6 TCF considered recoverable, quickly attracted investment from oil and gas firms from China, Malaysia and India . Myanmar's geographical location and shared borders is well exploited by the developing economies like India and helped Myanmar to expand its energy market. Thus, the intense competition worldwide has made the countries to co - operate and find solutions for the issues and challenges faced in the way of ensuring energy security.

The Demand Within

As the global energy demand increases, the energy rich areas specifically the countries which are benefitted by the oil wealth such as Saudi Arabia and UAE, their domestic demand has also taken an upswing. To meet the increased consumption, the Middle Eastern states need huge proportion of energy. Countries like Saudi Arabia, Qatar and UAE are known to be the economic powerhouses of the region. "Saudi Arabia is the largest consumer of petroleum in the Middle East, particularly in the area of transportation fuels. Domestic consumption growth has been spurred by the economic boom due to historically high oil prices and large fuel subsidies. In 2006, Saudi Arabia was the 15th largest consumer of total primary energy, of which 60 per cent was petroleum - based. The remainder was made up of natural gas, the growth of which has been limited by supply constraints. In 2008, Saudi Arabia consumed approximately 2.4 million bbl/d of oil, up 50 percent since 2000, due to strong economic and industrial growth and subsidized prices. According to independent analysis quoted in industry reports, demand is expected to rise by eight to 10 percent through 2010, mostly in the area of electricity and NGLs for petrochemical production. Saudi Arabia also does direct burn of crude oil for power generation during summer months" .

"In 2008, Qatar consumed approximately 129,000 bbl/d of petroleum. This is nearly 15 per cent more than 2007 consumption levels. Qatar's natural gas consumption in 2008 was approximately 715 billion cubic feet (Bcf). The expected increase in natural gas production will fuel the growing natural gas requirements of domestic industry, LNG export commitments, piped natural gas exports through the Dolphin pipeline, and several largescale gas - to - liquids (GTL) projects" . While, "... UAE's domestic oil consumption averaged only 525,000 bbl/d in 2008, … Net natural gas imports amounted to about 280 Bcf, imported mainly from Qatar" . Also, "Nigeria began exporting some of its natural gas via the West African Gas Pipeline (WAGP) in early 2010. The 420-mile pipeline carries natural gas from Nigeria to Ghana via Togo and Benin" . Thus, in order to keep upto the pace of the growing economic boom, a regional gas grid was developed to facilitate the export of natural gas within the countries of the region. Such projects like the West African Gas Pipeline (WAGP) or Dolphin, which is the largest natural gas project ever developed between two countries within the region will facilitate the regional energy demand. The Project has been designed to produce and supply large quantities of natural gas from offshore Qatar to UAE. The idea became a reality, when supported by the fact that Qatar

has huge reserves of gas and therefore could be exported to neighbouring countries.

Energy today, has become a basic pillar of development and growth, for the western and the developing nations alike. The new economies, namely rising Asian countries such as India are also racing to catch upto the global requirements. The countries are slowly moving towards the knowledge oriented system. This has raised the aspirations of the societies globally, to achieve better living standards for themselves. Thus, the growing economic boom post - recession has flexed its muscles, demanding ever more energy.

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