Energy security as a concern for governments and consumers with focus on prices versus volumes, priorities in different countries and implications for world energy markets, the international economy and global politics.

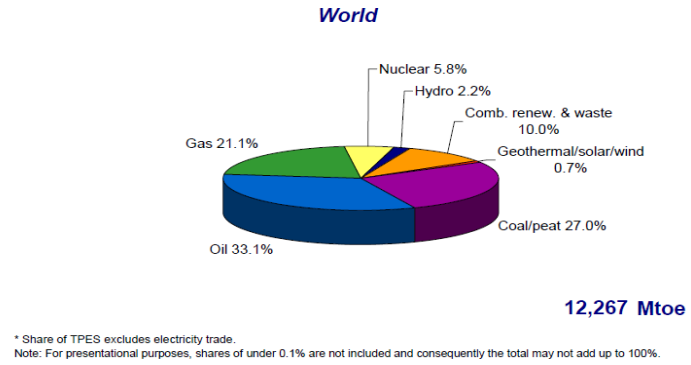
Anne-Grete Ellingsen. 2010

Energy security is a major strategic challenge as most oil and gas resources are located in a small number of countries, with ten countries controlling 80% of global oil reserves and three countries possessing over half the world's natural gas. The international focus on climate change introduces a new challenge. The impact on the environment has to be dealt with in parallel to balancing the supply and demand need for energy.

Fossil fuel emissions contribute to an increase in emission of greenhouse gases to the atmosphere and lead to increased risk of climate change and rising temperatures.

This dilemma was expressed by the former BP executive Tony Hayward in the following manner: "*There are three distinct challenges arising from the world's growing demand for energy. First, how to provide energy reliably in a world where there is a mismatch between where energy is produced and where it is consumed. Second, how to meet this demand in a way that is environmentally sustainable, and avoids damaging climate change; Third, how to meet this demand in a way that is affordable and enables economic development. So, the three challenges are security, sustainability and affordability."*
Economic growth and access to affordable energy to improved quality of life in many parts of the world, particularly in large industrializing economies such as China, India, Brazil and Russia, make this a significant challenge.

Figure 6: The share of total primary supply of energy in 2008



Source: IEA Energy statistics 2010

The three largest energy sources of the world are oil, gas and coal as can be seen from figure 6. Based on the IEA figures for future energy demand, Bloomberg predict that the world energy demand will grow 49 % by 2035 under the scenario in which prices rise to $133.

Energy demand in developing countries like China and India will rise by 84 %, outpacing growth of 14 % in the OECD, which include the U.S., U.K. and Japan. (Bloomberg/ IEA, May 25.2010). Today the OECD countries represent less than 50% of global energy demand, compared with 75% in 1974 when IEA was founded. (IEA 2010)

IEA expect the world oil production to increase by 25.8 million barrels a day by 2035, with the OPEC retaining its current 40 % share of global output.

Global natural gas consumption is predicted to rise 44 % by 2035 to 156 trillion cubic feet. To keep pace with rising demand for the fuel from factories and power plants, natural gas production should increase 46 % by 2035.

Based on figures published by WEO in 2009 they estimate that the OPEC's share of world production increases from 41% in 2009 to 52% by 2030.

Longitudinal comparison of sectorial uses of energy shows four gradual trends that reflect the changing economic structure and rising affluence of modern societies; declining shares of industrial consumption and slowly increasing share of residential, commercial and transportation demand. At the end of the 20^{th} century, industrial energy use was below 50% of the total in all rich Western countries. (Energy in Nature and Society, Smil)

The increased use of energy has increased the productivity in the OECD countries but it has also made the societies more vulnerable and dependent on stable and secure sources of energy to maintain the level of production, maintain growth in the national economies and well-being for the citizens.

In the transportation sector there has been little development to diversify the fuel for cars and trucks; the main focus has been on less consumption per kilometer and cleaner discharge from the vehicles. In 1983 Europe matched USA in numbers of cars and trucks and is today the largest marked for new vehicles, China became the fastest growing new car market during the 1990. (Energy in Nature and Society, Smil)

In many countries the public transportation system has not been developed to cope with the increasing demand for transport within the industrial and household sector. This leads to increased transport in smaller units by road instead of trains, ships and public transport systems.

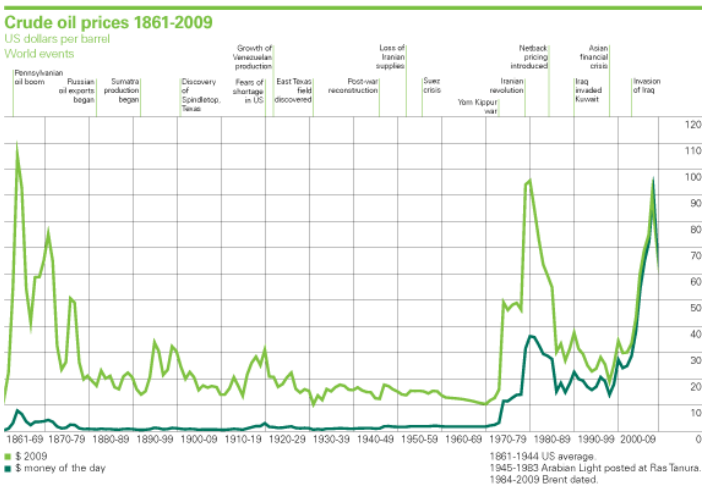
Several factors have led to an increase focus on security of supply in oil importing countries:

- Increasing level of terrorist action to transportation system and production facilities
- Higher concentration of the resources in the Middle East which is a geopolitical unstable region
- Decreasing production in the non OPEC petroleum regions (Europe and USA)
- Rapid increase in the energy demand in the emerging economies
- National strategies to acquire resources in countries such as China and India
- Fluctuation in the oil prices as seen in 2008

One way to increase the short term security of supply is to stimulate to investments in spare capacity in production and build a 90 days Strategic Petroleum Reserves (SPR) as recommended by IEA. These reserves might have a calming effect on energy prices in the developed countries with an oil market in relative controlled growth.
However, Coordinated Emergency Response Mechanism (CERM) is challenged now by new players like emerging economies, like China and India, which has a high and increasing domestic oil demand making it difficult secure a sufficient buffer capacity. (Chevalier, 2010).

Another challenge to the security of supply is the price of oil.

Figure 7: Development in the oil prices from 1861 to 2009



Source: BP Statistical Review of World Energy 2010

The figure shows the fluctuation of the oil prices over the time period from 1861 up to 2009. It shows that the prices were low and stable up to the 1970s when the world experienced two sharp price increases creating an economic slowdown in the world economy. This led to a fall in the consumption of oil and increased investments in nuclear energy.

Also during the 19080s the oil prices stayed on a high level and a new economic slowdown and less investments in future capacity of energy was the result. Especially the poor countries were hit hard as a higher degree of their national budget had to be used to buy expensive oil. This meant cut backs in many areas of the society.

2003 the prices started to increase both due to constraints on the supply side and increased geopolitical instability. The 2005-2009 oil prices were exceptionally high in a historical perspective. (Noreng 2010)

The lessons learned from this price shocks were to increase energy diversification and security of supply came higher up on the agenda of most oil and gas importing countries. A more stable and predictable price development is in the interest of both producers and importers. The producers need stable prices to allow investments in new capacity and to finance their national programs for development of the country.

Much of the increase in oil price before the 2009 financial crisis can be interpreted as a result of insufficient investment in oil production. OPEC counts for only 10% of petroleum industry's upstream capital investment during the past decade (Sandrea 2006/ James L, Smith 2009). In 2007, the super-majors reinvested 25% of their gross production revenues to expand capacity, whereas OPEC members are investing only 6% of their net export revenues (EIA 2008/James L, Smith 2009). A stable and predictable oil price regime will encourage further investments in new resources.

In an OPEC secretariat background paper presented at the International Energy Forum in Cancun, Mexico March this year this challenge was addressed: *"the global financial crisis and an economic crisis unseen since the Great Depression, a host of new challenges have arisen in preparing an outlook for oil. One of these challenges relates to assumptions for future price developments. For OPEC's Reference Case, the key to the oil price assumption is the perception of the behavior of marginal supply costs in the medium- to long-run. For the next decade, nominal prices are assumed to stay in the $70–80/b range, while longer term they are assumed to remain in the $70–100/b range. This assumption reflects the current broadly accepted view that prices that are too low are not sustainable as they limit the flow of upstream investment, while prices that are too high could hamper the global economic recovery and medium- to long-term growth prospects."*

An initiative taken by IEA to strengthen the producer-consumer dialogue leads to the creation of the International Energy Forum (IEF). The Forum aims to be an instrument for discussion on matters of mutual interest in the oil market in addition to an experience sharing on policies and energy technology with countries where energy demand is increasing rapidly.

Another measure to secure energy supply is to diversify sources of energy by investment in alternative sources, like renewables (water, wind, solar, waves, biomass etc.) or nuclear energy plants. As an example the European Union (EU) has set an ambitious target for the member countries in their 202020 goals. 20% less energy consumption, 20% increased investments in new renewable energy sources and 20% less emissions of greenhouse gases by 2020.

Energy savings in buildings and more efficient use of energy in the transportation sector are considered to be the two major factors to achieve the goals. All member countries have to enforce measures to ensure that the Union achieves these goals in 2020. Another measure to decrease the dependency of oil is to let the price of petrol vary with the price of oil in the market by removing or reduce the subsidies.
This will enhance more efficient fuel consumption especially during periods of high oil prices.

Other initiative is to increase spending and co-operation in R&D to development new technologies, notably in CCS and renewables.

But all analysis for future energy consumption predicts that oil will continue to play a significant role and suggest that the role of OPEC and interdependence will grow.

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