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FUTURE GEOLOGICAL AVAILABILITY OF OIL AND NATURAL GAS

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Overview

Hydrocarbons - oil and gas - are at present the most important energy fuels. Together they accounts for more than 60 % of world-wide total primary energy supply. Since more than 100 years oil is produced commercially. Usage of gas followed later. Oil is of extreme importance for transportation, heat production and the chemical industry – whereas natural gas is primarily of importance for heat and electricity production as well as for chemical industry. The sharp increase of the crude oil price in the last two years indicates, at least partially, the limits of its geological availability. International Energy Agencies (e.g. IEA 2005) predict a further increase of oil and gas demand. In their predictions the supply side is - in our opinion - under-represented. The availability of oil and natural gas – especially the geological availability – will be analyzed

Methods

The reserves and resources of oil and natural gas at the end of 2004 have been analyzed for single countries and regions, as well as globally. The analysis is based on published data from professional journals and other publications, reports from national organizations, embassy reports, and our own research. Additionally data of consumption, export and import of oil and gas, and trade movements have been considered.

Results

From a geological viewpoint, the remaining potential of conventional **oil** can provide for a moderate increase in oil consumption in the next 10 to 15 years without problems. Afterwards, an insufficient supply has to be anticipated owing to decreasing production when the depletion mid-point has been passed. Demand has to be met then by other fuels. The percentage of oil supply from the OPEC countries (especially in the Persian Gulf region) will significantly increase during the next decades.

The percentage of non-conventional oil will rise to 5–10 % of total oil production by 2020

Despite the possibilities mentioned above, it can be expected that in the foreseeable future, crude oil will not be available in the same unlimited amounts as it has been deliverable in the past.

From a geological viewpoint, **natural gas** is present in sufficient amounts to meet demand for several decades.

The present trend of increasing demand can be met by additional supplies from the present supplier countries and new exporters. A deficit will develop in the North American market. This can be covered only by LNG imports.

Long-term investments will be needed to increase production capacities and to expand transportation facilities. The finance markets, however, are mostly interested in short-term investment. Therefore, a reasonable natural gas price is needed to secure this investment.

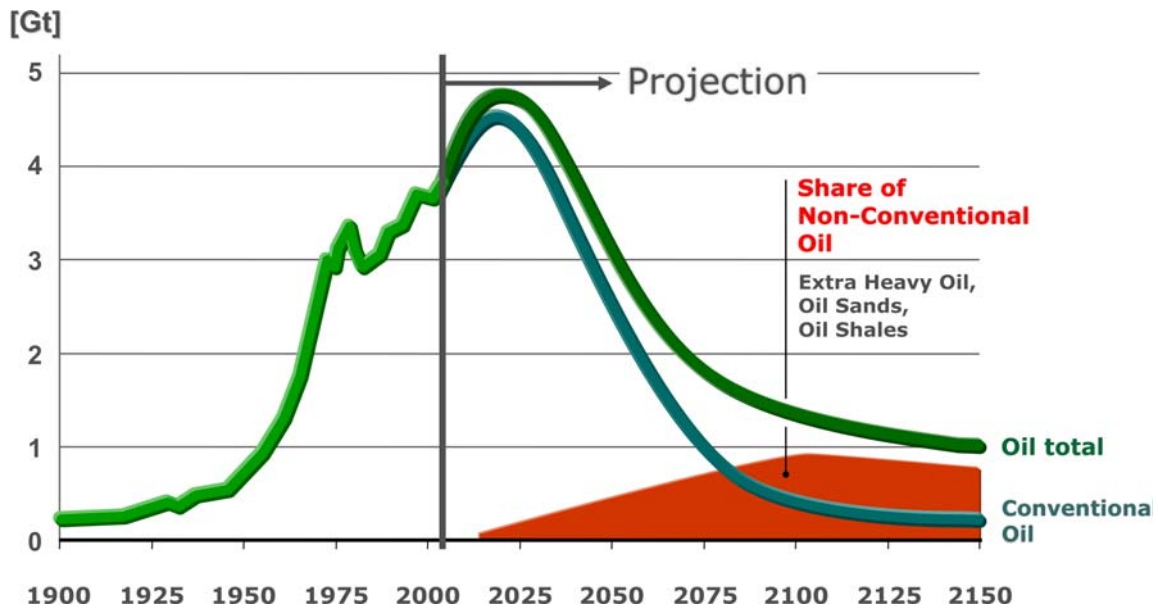


Fig. 1: Worldwide oil production from 1900 until 2150 – Historical development and attempt of an outlook.

Conclusions

Oil is the most important fossil fuel at the present time and will continue to be so some time.

Despite existing reserves and resources for several decades in the future, conservation of oil is necessary.

Because consumer and producer regions are not always the same, transport and trading is of considerable importance for oil.

Oil can be replaced by other energy resources for certain applications, eg power generation (coal, gas) or transportation (GTL, CTL, BTL).

Problems include

- political influence on trading,
- uncertainties in price development, and
- greenhouse gas emissions.

The role of natural gas will increase during the 21st century. It can substitute oil for many uses and will probably replace it as the predominant fuel.

Although natural gas reserves are sufficient for many decades natural gas is a non-renewable resource and hence conservation is necessary.

Problems include

- high transport costs,
- high long-term investment needs,
- uncertainty of future price, and
- CO₂ problems.

References

BGR ((Bundesanstalt für Geowissenschaften und Rohstoffe) (2005): Reserven, Ressourcen und Verfügbarkeit von Energierohstoffen 2004. Kurzstudie.

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IEA (INTERNATIONAL ENERGY AGENCY) (2005): World Energy Outlook 2005: Middle East and North Africa Insights. – International Energy Agency, Paris.