



Context: Energy today and tomorrow

Key words:

energy supply, fossil fuels and renewables, emission, emission trading, sustainability



Energy today and tomorrow:

What is the situation now?
Where are we going?

1. Oil refinery - when will lights turn off for oil as the leading energy source? © freefoto.com

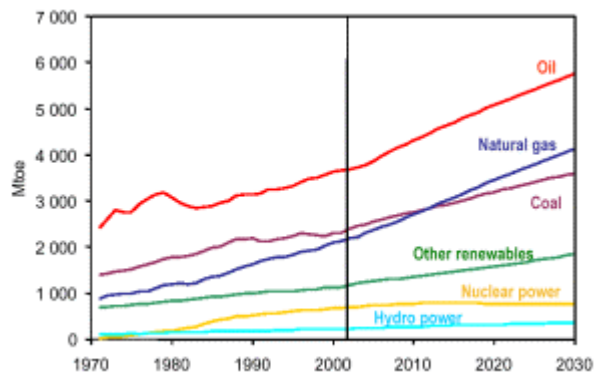


What is the situation now?

The world-wide economy is driven by huge amounts of energy. Most of it comes from fossil fuels (oil, natural gas and coal). Experts from the International Energy Agency (IEA) assume that in the coming decades fossil fuels will account for 85% of the energy need. However, we have two big problems:

- 1) Resources are getting shorter and the price is raising
- 2) Greenhouse gases from fossil fuels change the world's climate system

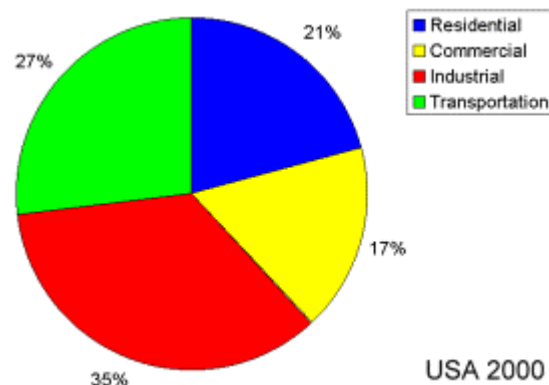
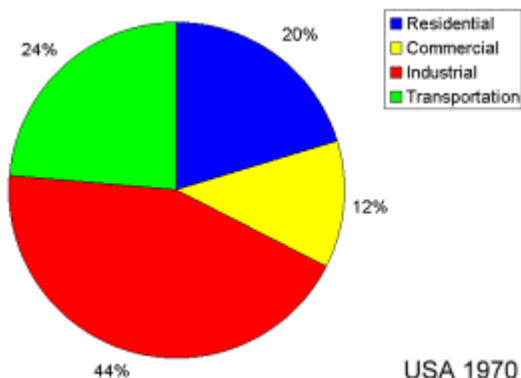
The need for energy goes up because the world's population grows and even though many technical processes have become more efficient the needs per person have also greatly increased. A major reason is increasing mobility. There are more car owners, cars have become bigger and more powerful and more people go by plane. It's not just people but also goods that are transported over longer distances.



2. Expected growth of the world's energy consumption by energy source.

Click the image for high resolution! (15 K)

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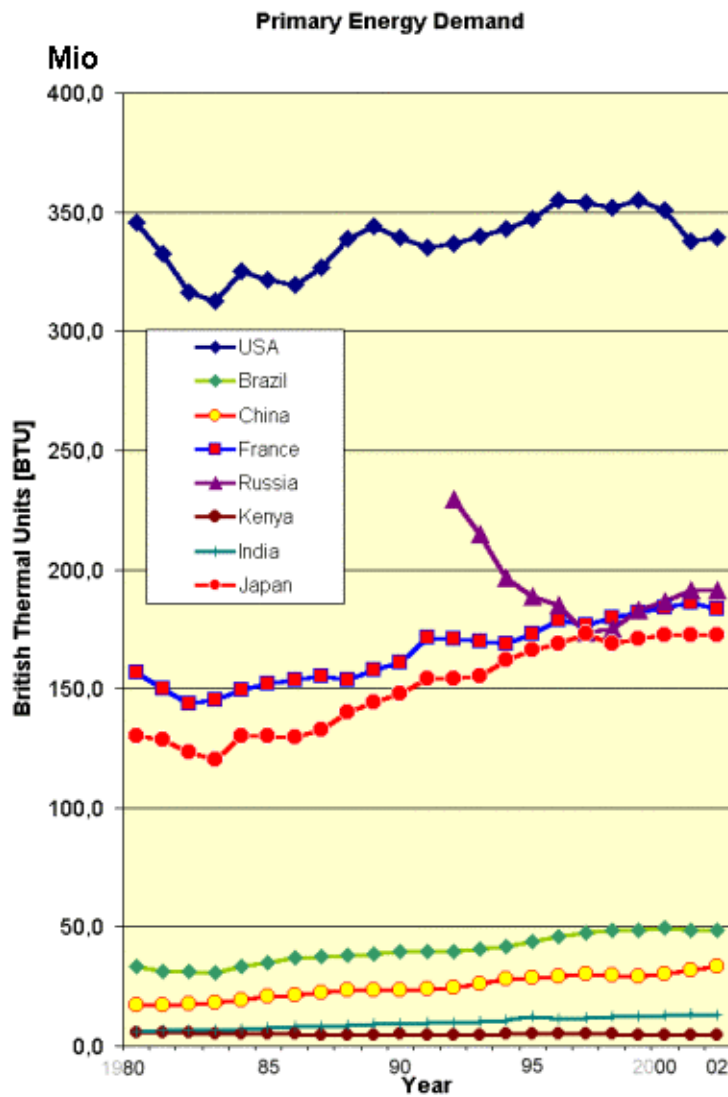


3. a) Energy needs in the US increased from 1970 to 2000. While the share from industry became smaller, more energy was needed in

transportation and commerce.

Data source: IEA

Graph: Elmar Uherek



The amount of energy we use depends heavily on our living conditions and varies enormously over the world. The primary energy consumption per person and year is given in Million BTU (British Thermal Units) on the graph on the left. 1 BTU = 252 cal = 1055 J

Energy experts are worrying about the increasing energy demand in the developing countries of Asia, and in particular China. However, the demand per capita there is still much lower than in Western Europe or North America.

4. Primary energy demand per capita
 Data source: IEA, Graph: Elmar Uherek

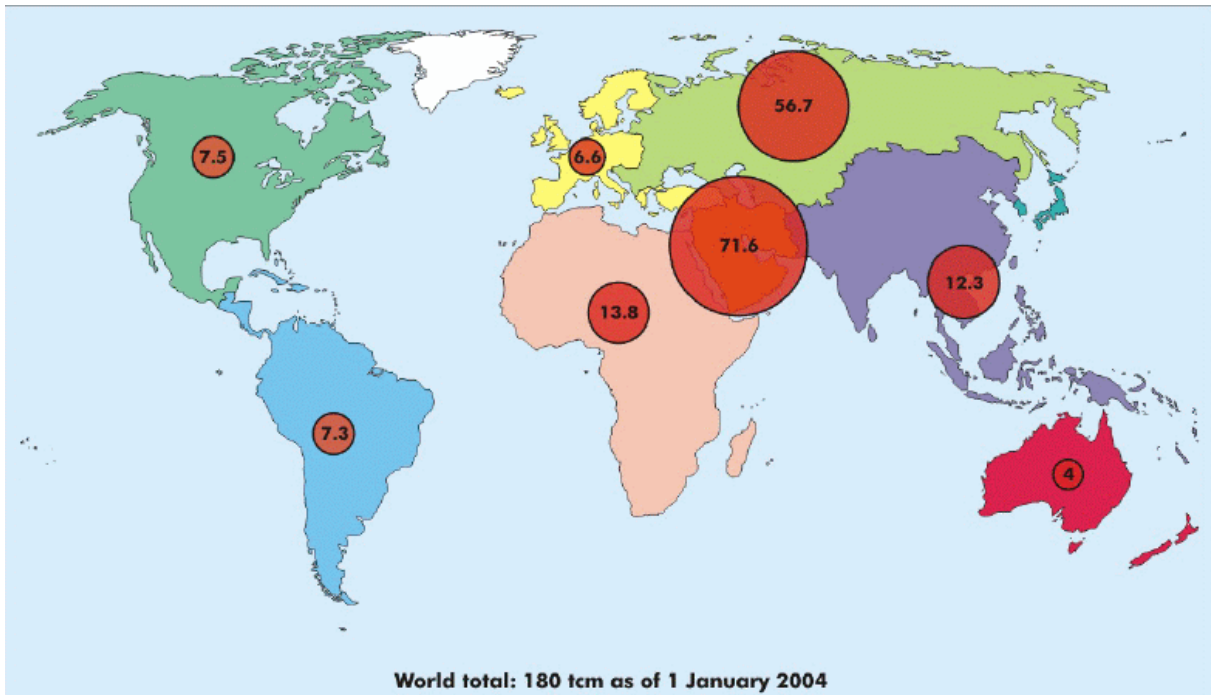


5. Import - Export - Transport ... More and more people and goods become more and more mobile.
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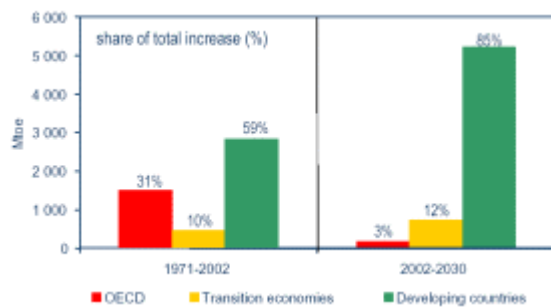
Where are we going?

We cannot clearly foresee where we are going exactly in the next decades. But if the present world-wide policy and consumer behaviour does not change drastically, it can be expected that in 2030 even more energy from fossil fuels will be used than now (see fig. 2).

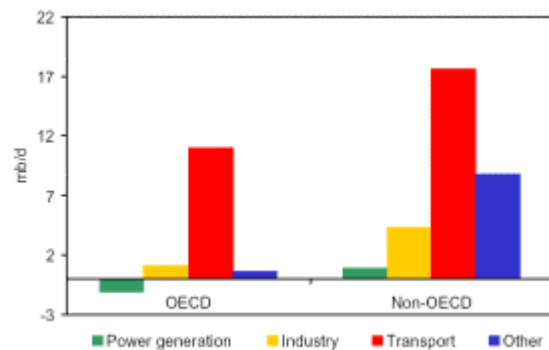
This is not only a burden for our climate system and living conditions owing to the further increase in greenhouse gases and global warming. The world's economy will also strongly depend on oil and gas rich regions, which are politically unstable at the moment.



6. Natural gas resources of the world in trillion cubic meters (tcm). © IEA / CSIS



7. Where did and where will energy production increase most? In the future further increases will come first of all (85%) from developing countries. In 2030 they may emit more greenhouse gases than the OECD countries, but they also have a higher population.
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8. Expected increase in oil demand 2002 - 2030 by sector: If we need more oil in 2030 than now, then it will be primarily because transport is growing not only in the developing but also in the industrialised countries.
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Further reading: The International Energy Agency IEA publishes the World Energy Outlook WEO. A brief overview of key contents of the WOE 2004 can be downloaded from the website of the Center for International and Strategic Studies in Washington:
http://www.csis.org/energy/041109_WEO-2004.pdf

Many illustrations are taken from this resource.

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