

World Economy

Global risks of the world economy
Energy and environmental problem

The second half of the twentieth century and the beginning of the 21st century is characterized by the growing demands and needs of the population of developed countries, which carry with them increased demands on ensuring the energy needs of these requirements.

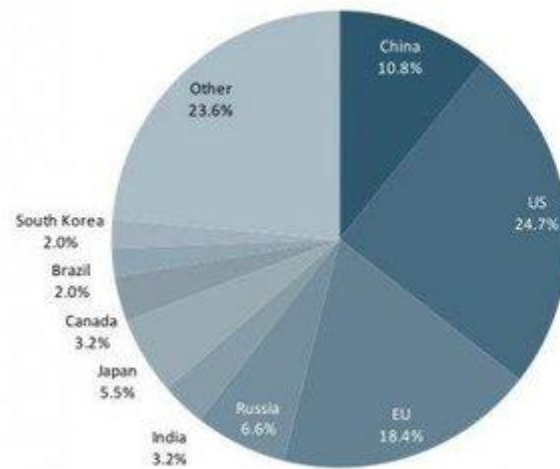
We are witness an exponential increase in energy consumption.



INVESTMENTS IN EDUCATION DEVELOPMENT

Exhibit 2: US was the largest user of energy in 2000...
Breakdown of global energy consumption in 2000

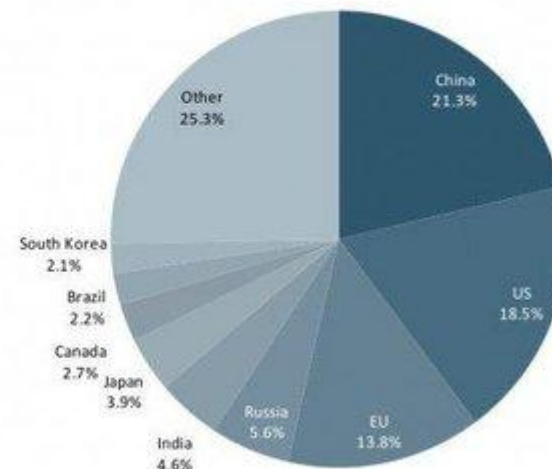
Total use in 2000: 9,355.6 million tons of oil equivalent



Source: BP Statistical Review of World Energy 2012.

Exhibit 3: ...China is now the global leader in energy use
Breakdown of global energy consumption in 2011

Total use in 2011: 12,274.6 million tons of oil equivalent

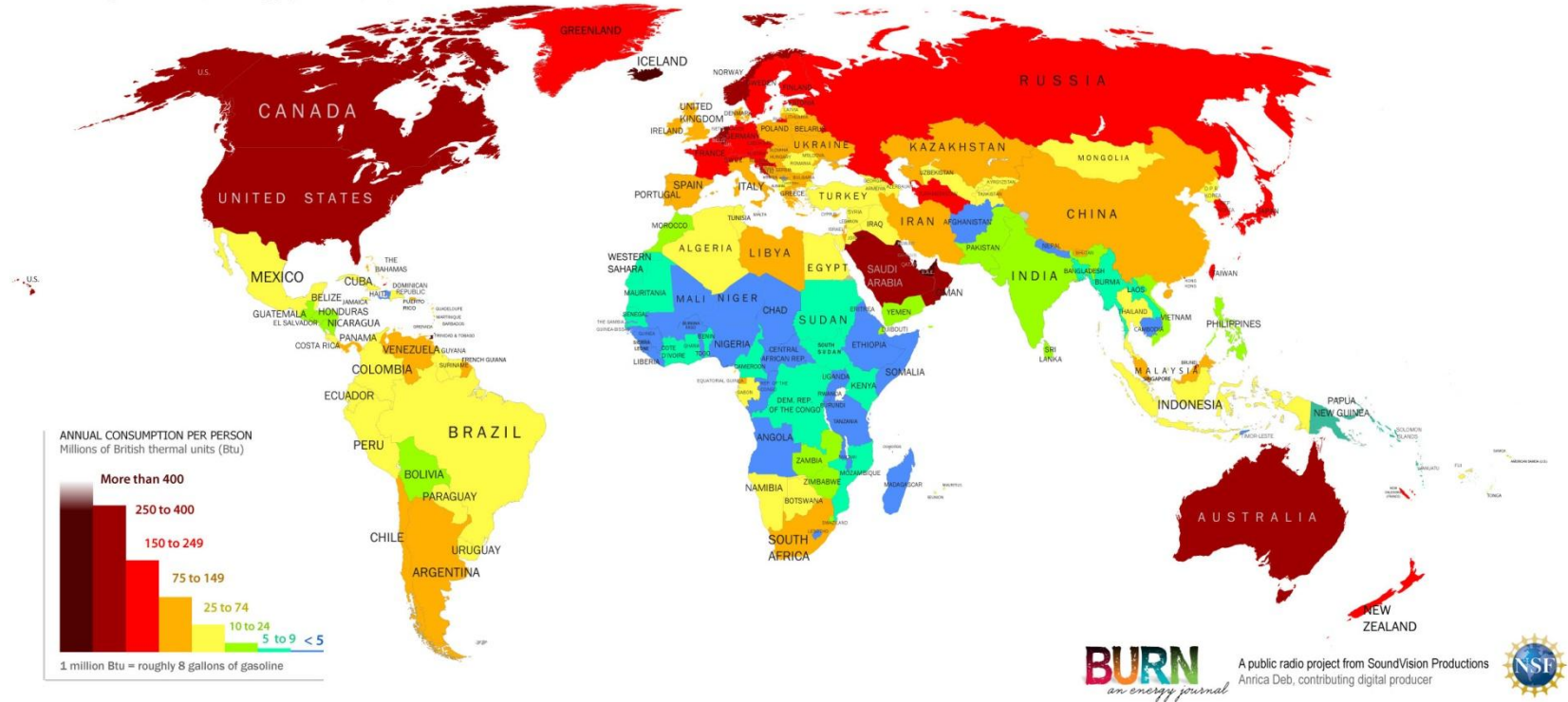


Source: BP Statistical Review of World Energy 2012.

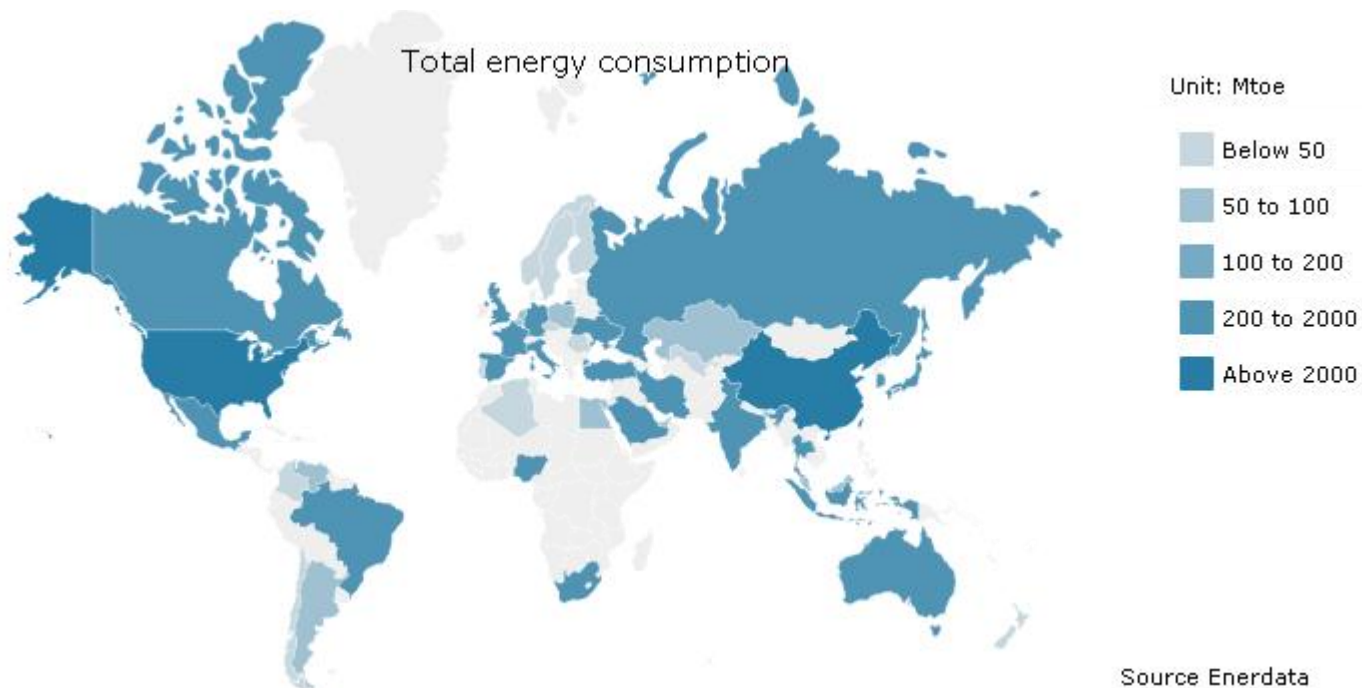
<http://www.investicniweb.cz/zpravy/graf-dne/2012/8/22/nejvetsi-spotrebitele-energie-na-svete/>

Energy Consumption Per Person, by country, 2010.

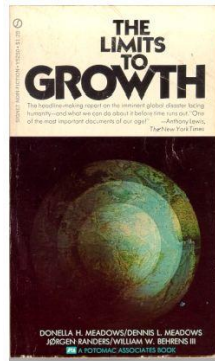
SOURCES: U.S. Energy Information Administration, International Energy Agency, CIA World Factbook, U.S. Dept. of Economics and Social Affairs



http://burnanenergyjournal.com/wp-content/uploads/2013/03/WorldMap_EnergyConsumptionPerCapita2010_v4_BargraphKey.jpg



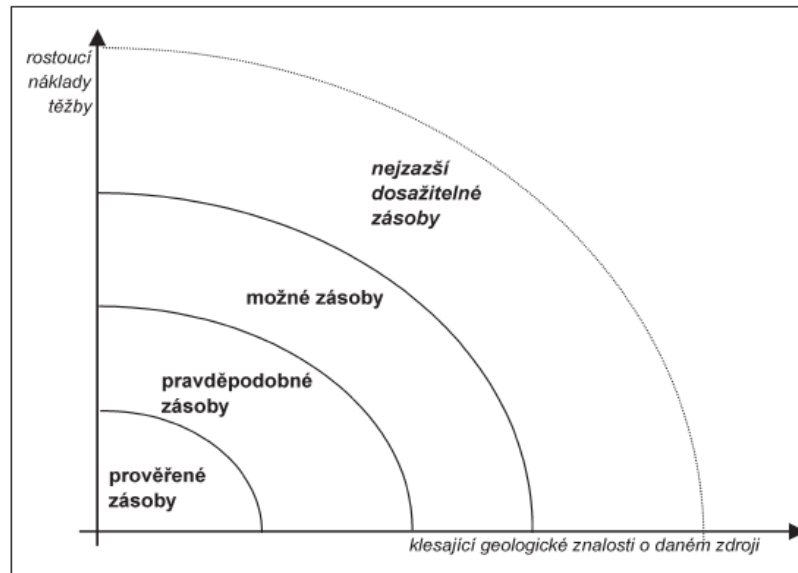
<http://yearbook.enerdata.net/energy-consumption-data.html>



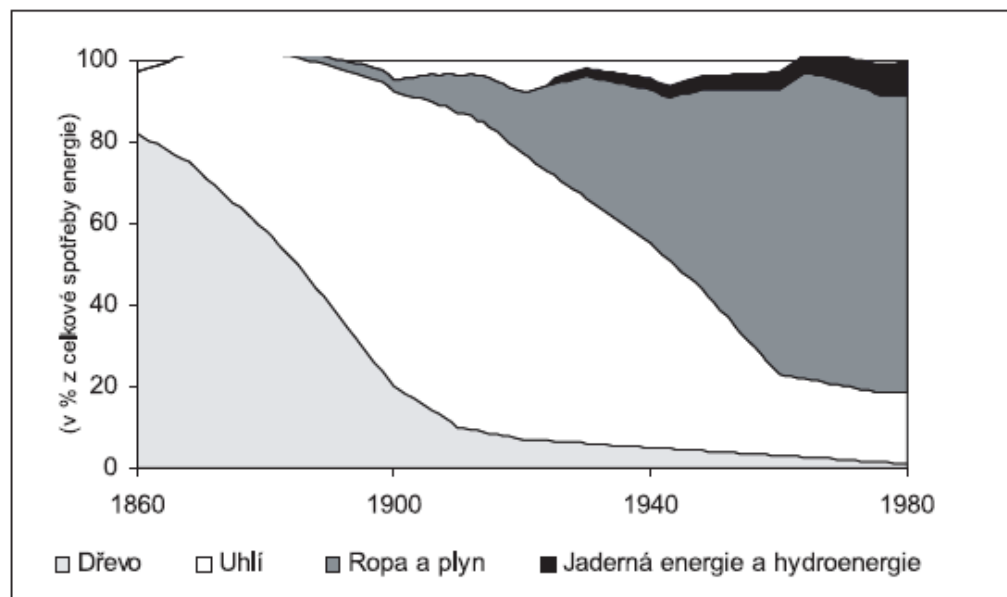
The Limits to Growth

The Limits to Growth is a 1972 book about the computer modeling of exponential [economic](#) and [population growth](#) with finite resource supplies. Funded by the [Club of Rome](#) it was first presented at the [St. Gallen Symposium](#).

Five variables were examined in the original model. These variables are: [world population](#), [industrialization](#), [pollution](#), food production and [resource depletion](#).



Zdroj: HAMPL, Mojmír. *Vyčerpání zdrojů: skvěle prodejný mýtus*. Vyd. 1. V Praze: CEP - Centrum pro ekonomiku a politiku, 2004, 65 s. ISBN 80-86547-28-0.



Zdroj: HAMPL, Mojmír. *Vyčerpání zdrojů: skvěle prodejný mýtus*. Vyd. 1. V Praze: CEP - Centrum pro ekonomiku a politiku, 2004, 65 s. ISBN 80-86547-28-0.

Biotic – Biotic resources are obtained from the [biosphere](#) (living and organic material), such as [forests](#) and [animals](#), and the materials that can be obtained from them. [Fossil fuels](#) such as [coal](#) and [petroleum](#) are also included in this category because they are formed from decayed organic matter.

Abiotic – Abiotic resources are those that come from non-living, non-organic material. Examples of abiotic resources include [land](#), fresh [water](#), [air](#) and heavy metals including [ores](#) such as [gold](#), [iron](#), [copper](#), [silver](#), etc.

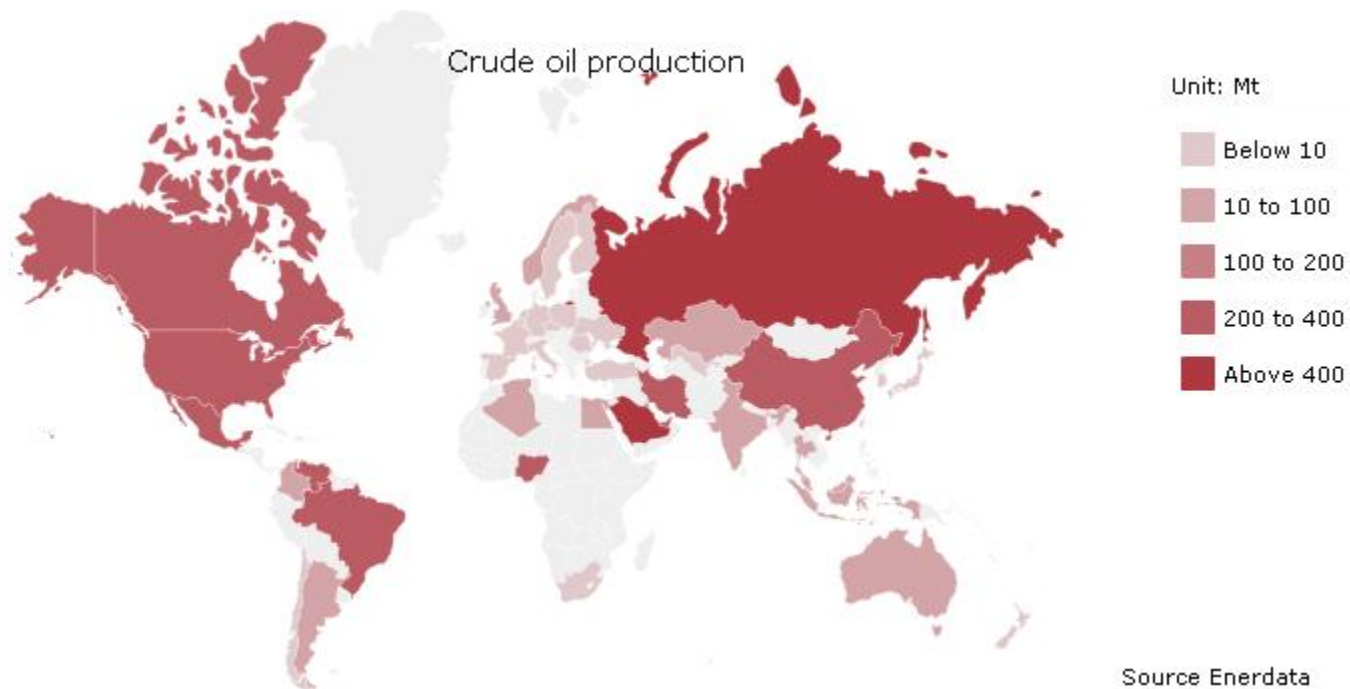
[Renewable resources](#) – Renewable resources can be replenished naturally. Some of these resources, like sunlight, air, wind, etc., are continuously available and their quantity is not noticeably affected by human consumption. Though many renewable resources do not have such a rapid recovery rate, these resources are susceptible to depletion by over-use. Resources from a human use perspective are classified as renewable only so long as the rate of replenishment/recovery exceeds that of the rate of consumption.

[Non-renewable resources](#) – Non-renewable resources either form slowly or do not naturally form in the environment. Minerals are the most common resource included in this category. By the human perspective, resources are non-renewable when their rate of consumption exceeds the rate of replenishment/recovery; a good example of this are fossil fuels, which are in this category because their rate of formation is extremely slow (potentially millions of years), meaning they are considered non-renewable.

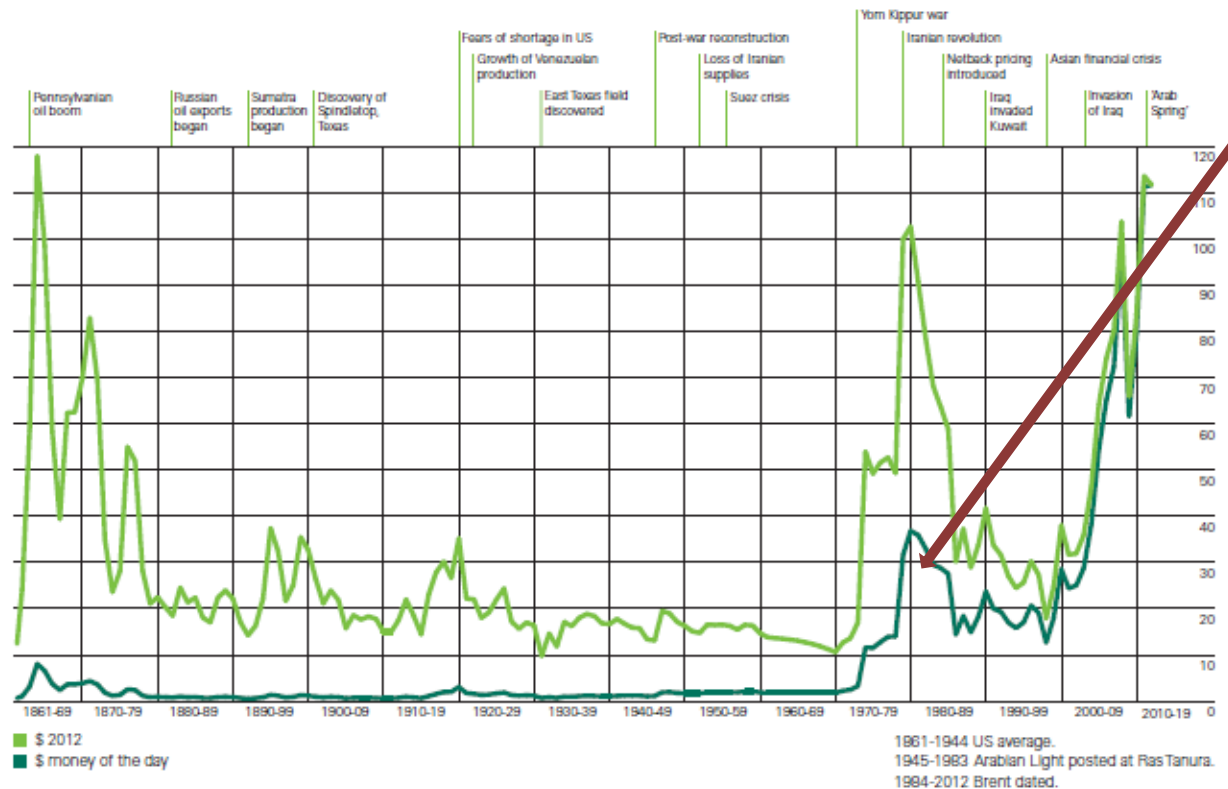
http://www.sciencearchive.org.au/nova/newscientist/027ns_005.htm?q=nova/newscientist/027ns_005.htm&id=mg19426051.200&print=true

The oil belongs to the non-renewable energy sources, the world stocks are very unevenly distributed around the world, which contributes to a high dependence on imports of this commodity.

Among the biggest oil producers in the world belongs to the countries of the Middle East, particularly Saudi Arabia, Russia, USA, Iran, Mexico, Venezuela, Norway, Canada, UAE, Nigeria, Kuwait.



The price of oil as a commodity is currently influenced by the political and security situation in the main production countries, decreasing supplies of North Sea oil, the growth in consumption in China and India, in particular, the development of the nominal exchange rate or, for example, the cost of new methods of extraction.



http://www.bp.com/content/dam/bp/pdf/statisticalreview/statistical_review_of_world_energy_2013.pdf

the growth of oil prices – hence the growth of fuel prices



supply inflation

consequences:

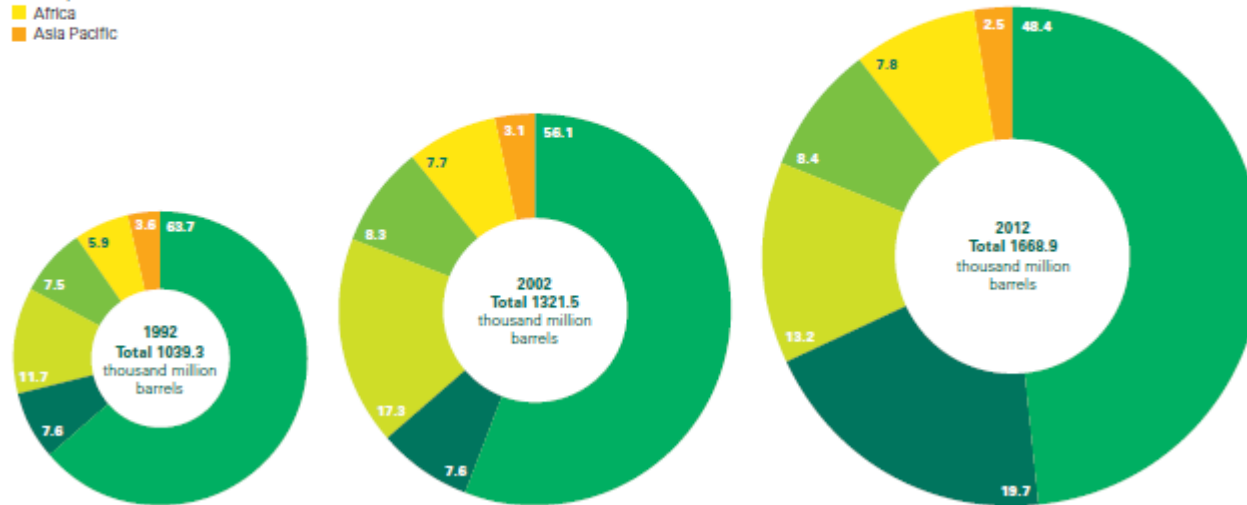
the household?

the company?

Distribution of proved reserves in 1992, 2002 and 2012

Percentage

- Middle East
- S. & Cent. America
- North America
- Europe & Eurasia
- Africa
- Asia Pacific



http://www.bp.com/content/dam/bp/pdf/statisticalreview/statistical_review_of_world_energy_2013.pdf

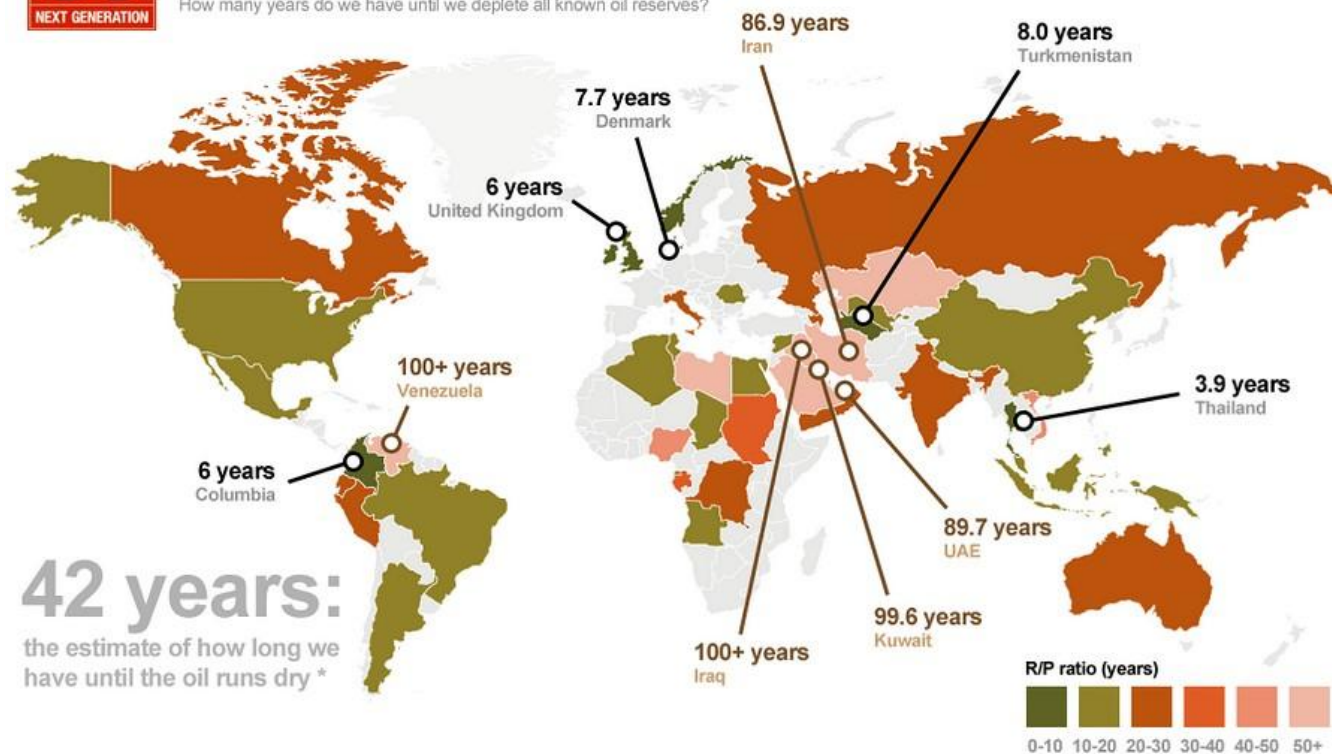


When Will the Oil Reserves Run Out?

How many years do we have until we deplete all known oil reserves?

○ Shortest R/P ratios

○ Longest R/P ratios



Total Oil Reserves (thousand million barrels)



* An average of the R/P ratios of all countries

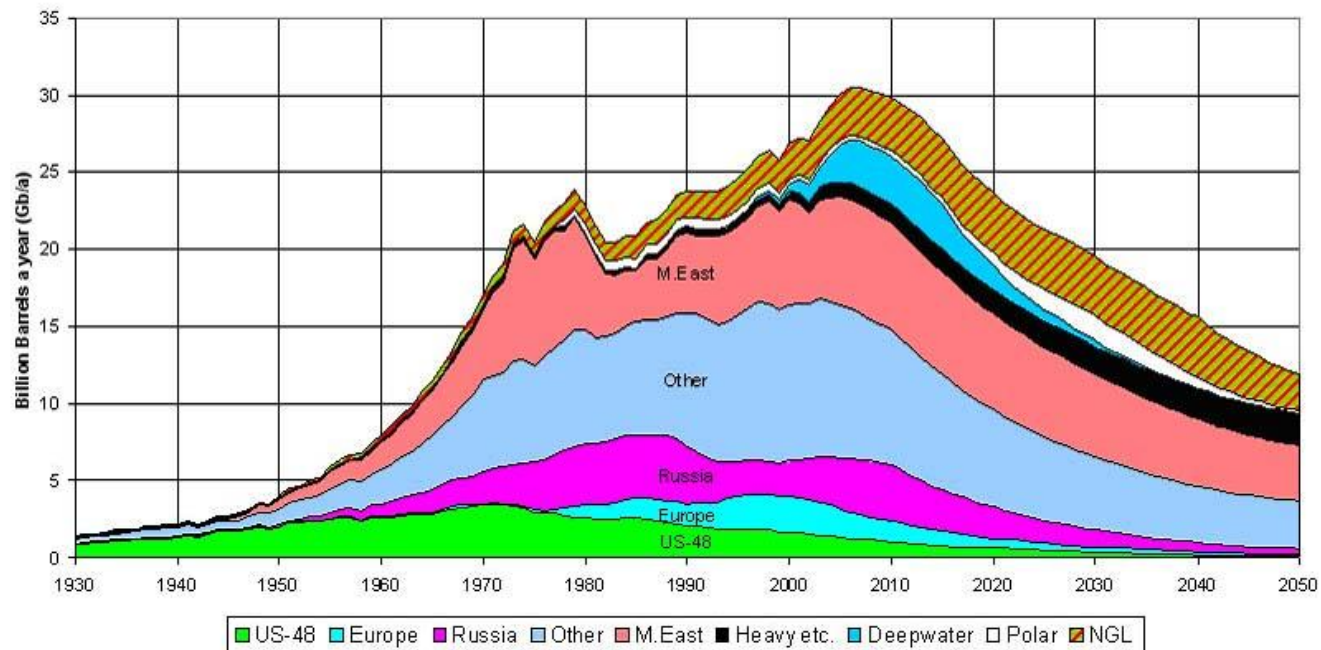
R/P ratio = Reserve / production ratio,

Source: <http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622>

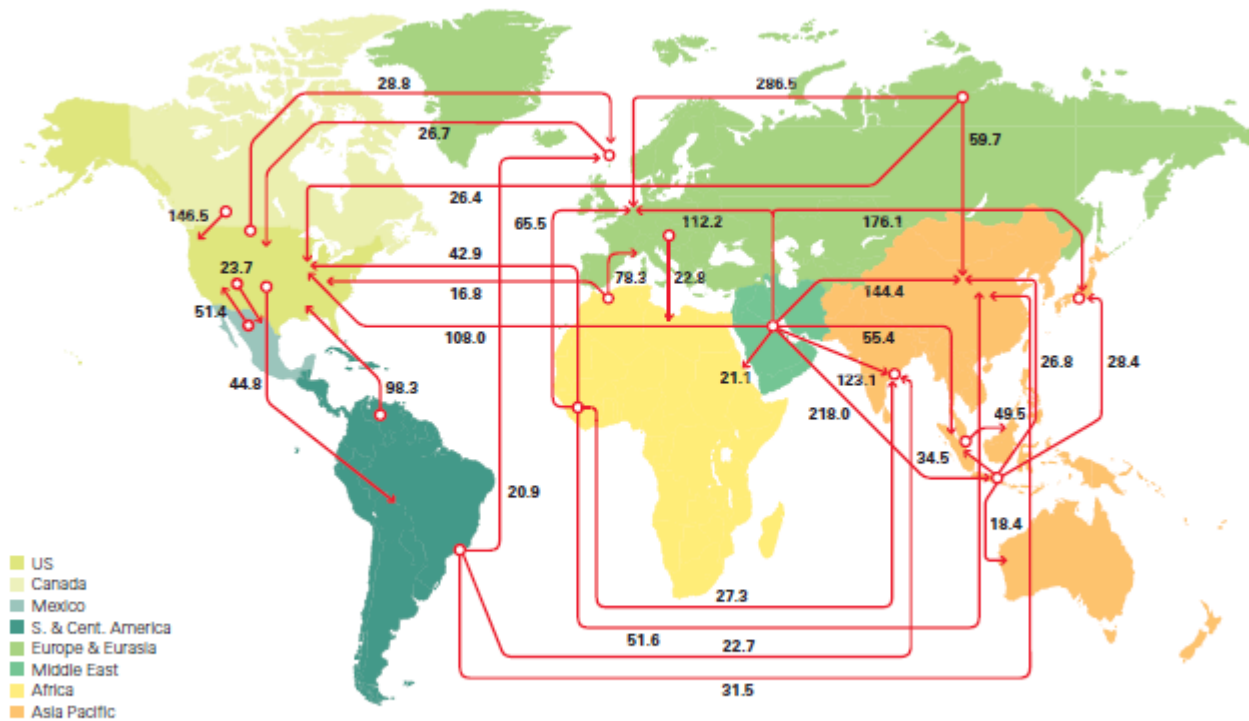
Hubbert's peak oil theory

geolog M. King Hubbert

OIL AND GAS LIQUIDS 2004 Scenario



Major trade movements 2012
Trade flows worldwide (million tonnes)

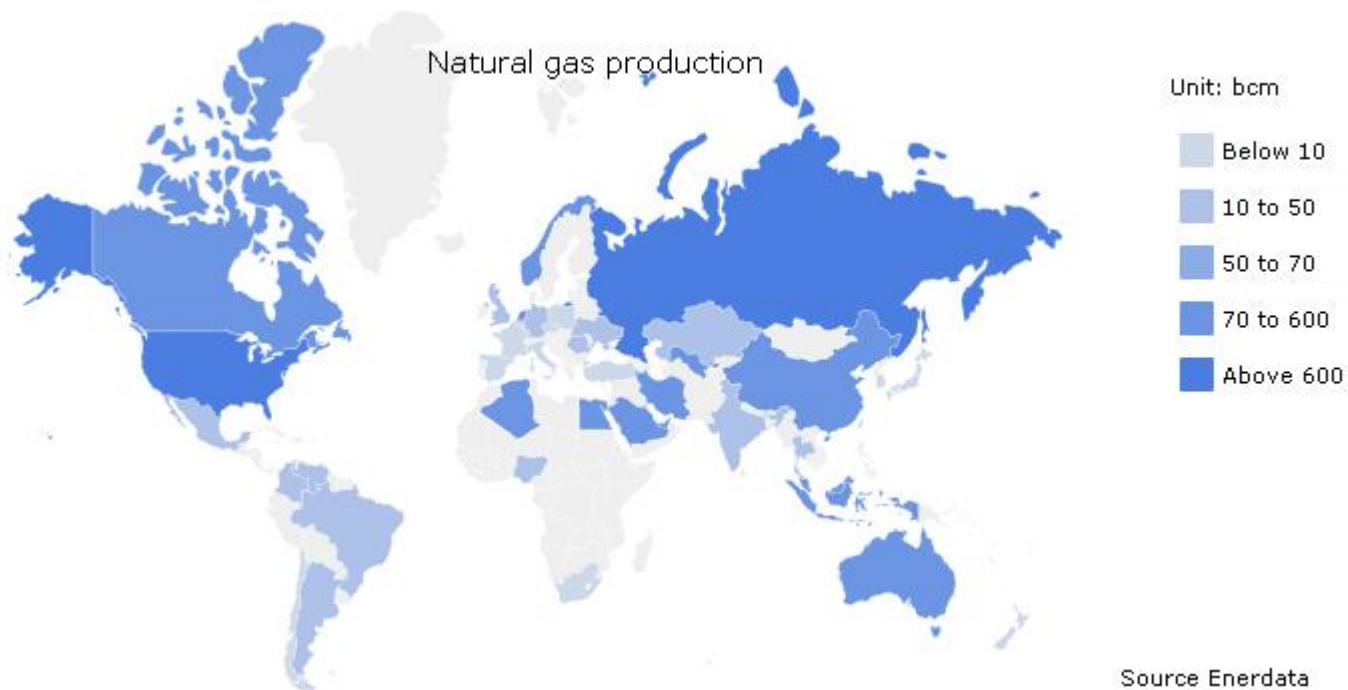


http://www.bp.com/content/dam/bp/pdf/statisticalreview/statistical_review_of_world_energy_2013.pdf

Natural Gas

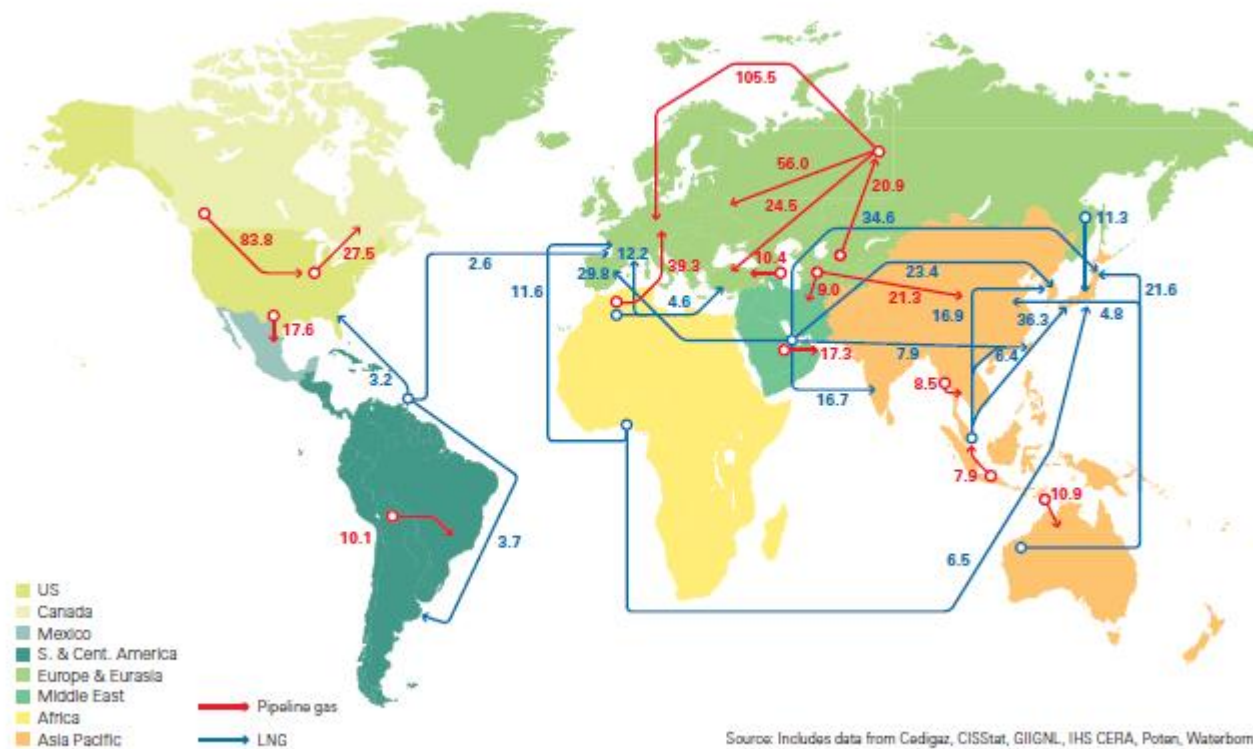
Natural gas is cheap and "clean" energy source, whose expansion was, in particular, from the 70 's. years 20th century. A significant advantage of natural gas is the ability to import without expensive modifications to the final consumer.

The largest reserves of natural gas are located in Russia, Iran, Qatar, Saudi Arabia, UAE, USA, Nigeria, Algeria and Iraq.



Major trade movements 2012

Trade flows worldwide (billion cubic metres)



Source: Includes data from Cedigaz, CISStat, GIIGNL, IHS CERA, Potan, Waterborne.



<http://www.youtube.com/watch?v=X5pCzqWHy0c>

Coal is the largest source of energy for the [generation of electricity](#) worldwide, as well as one of the largest worldwide [anthropogenic](#) sources of [carbon dioxide](#) releases.

In 1999, world gross [carbon dioxide emissions](#) from coal usage were 8,666 million tonnes of carbon dioxide.

In 2011, world gross emissions from coal usage were 14,416 million tonnes. In 2013, the head of the UN climate agency advised that most of the world's coal reserves should be left in the ground to avoid catastrophic global warming.

<http://web.archive.org/web/20110523215823/http://www.eia.doe.gov/iea/carbon.html>

<http://www.theguardian.com/environment/2013/nov/18/leave-coal-avoid-climate-catastrophe-un>

On a global scale is a coal oil right after the second most utilized energy raw material in the world.

The total annual consumption is estimated at approximately 7.8 billion tonnes.

China

proven reserves:	111 mld. t
probable reserves:	4 gazillions t
annual consumption:	3,8 mld. t
annual production:	3,5 mld. t

<http://www.okd.cz/cs/tezime-uhli/soucasnost-u-nas-i-ve-svete/uhli-ve-svete>

India

probable reserves:	92 mld. t
annual consumption:	0.7 mld. t
annual production:	0.595 mld. t

Russia

probable reserves:	157 mld. t
annual consumption:	0.22 mld. t
annual production:	0.36 mld. t

USA

probable reserves:	245 mld. t
annual consumption:	0,82 mld. t
annual production:	0,93 mld. t

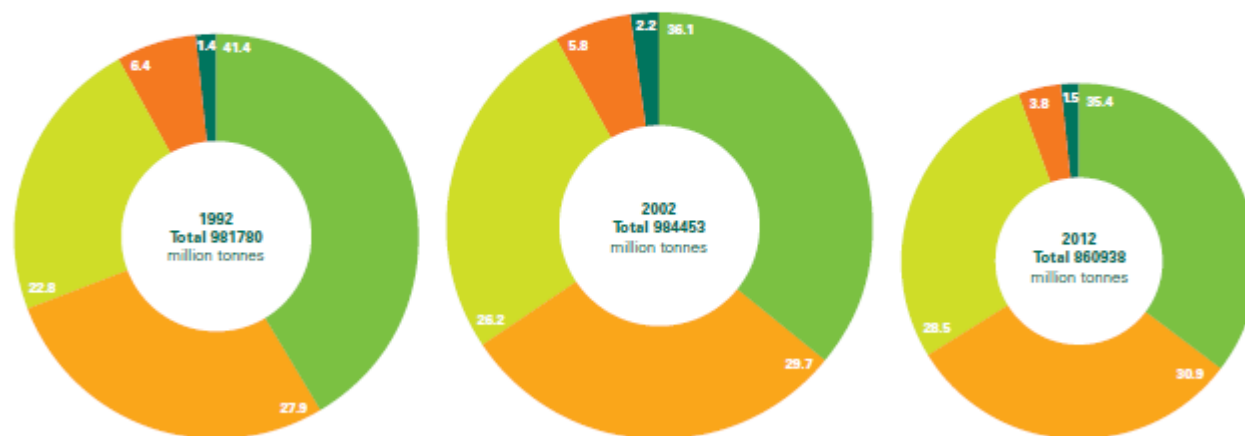
<http://www.okd.cz/cs/tezime-uhli/soucasnost-u-nas-i-ve-svete/uhli-ve-svete>



Distribution of proved reserves in 1992, 2002 and 2012

Percentage

- Europe & Eurasia
- Asia Pacific
- North America
- Middle East & Africa
- S. & Cent. America



Source: Survey of Energy Resources 2010, World Energy Council.

http://www.bp.com/content/dam/bp/pdf/statisticalreview/statistical_review_of_world_energy_2013.pdf

Figure 70. World coal consumption by region, 1980-2040

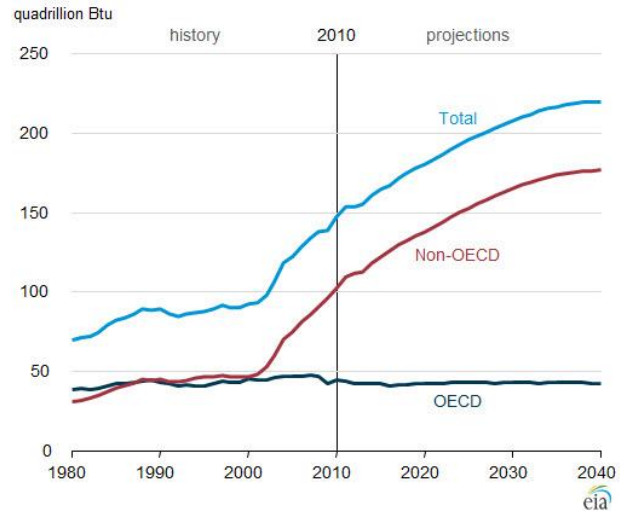
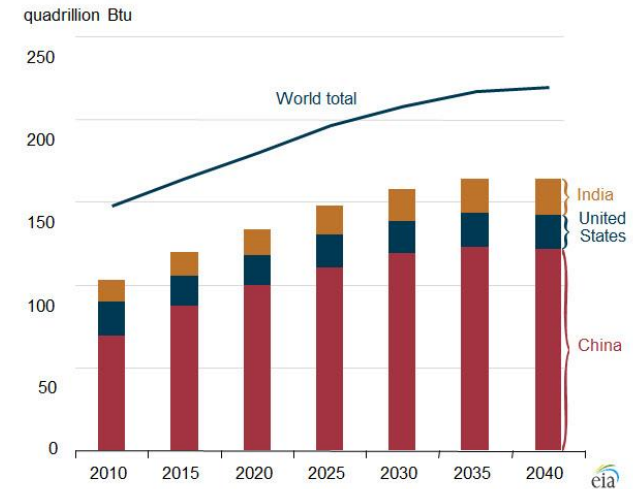


Figure 71. World coal consumption by leading consuming countries, 2010-2040



<http://www.eia.gov/forecasts/ieo/coal.cfm>

Nuclear energy accounts for nearly 13% of the world production of electric energy.

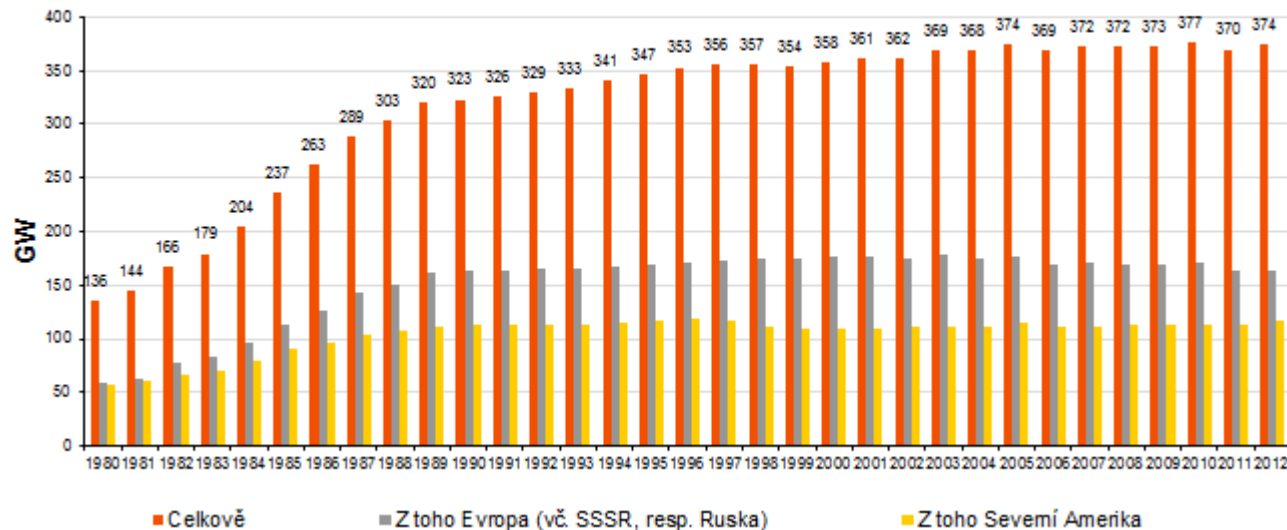
Among the countries with the largest number of nuclear reactors include USA, France, Japan, Russia, South Korea, Canada, China, the United Kingdom.

The total number of nuclear reactors is 432.

The increase in the number of nuclear power plants is so evident in the advanced economies, such as France, but also in less developed economies (India, China)

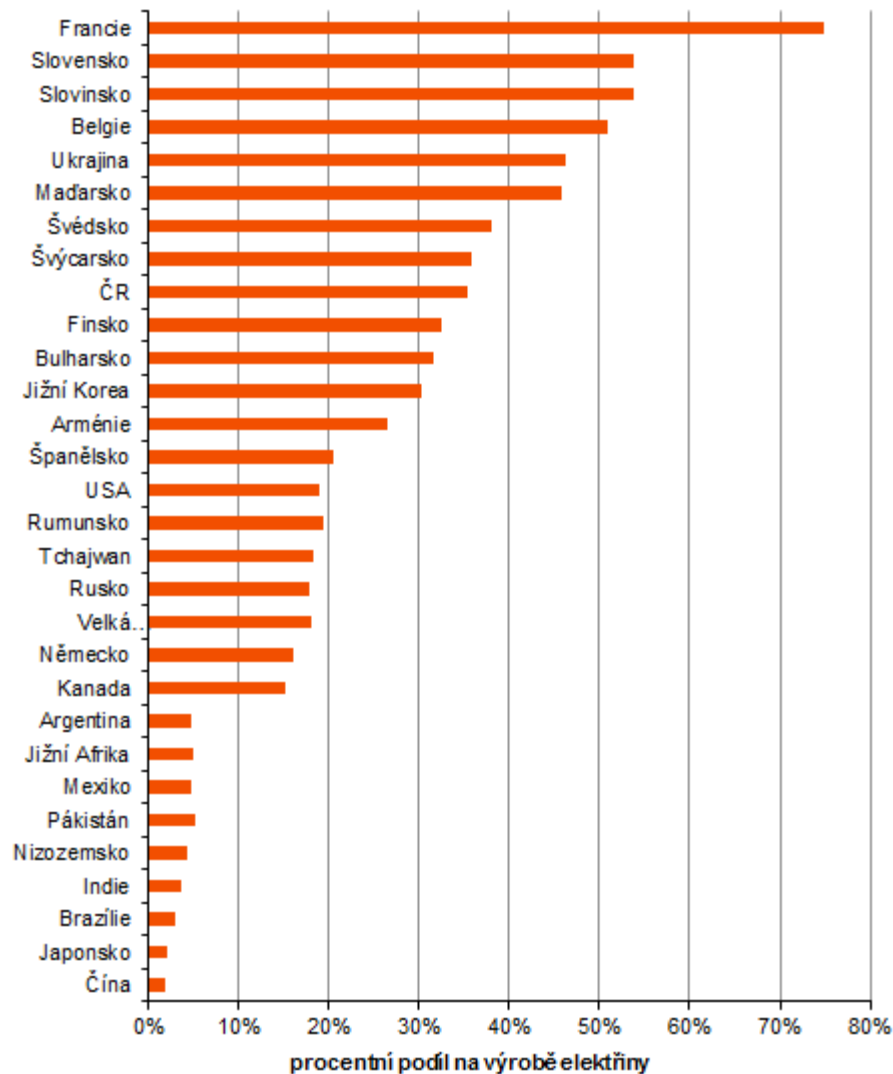
Total capacity of nuclear power plans

Světová instalovaná kapacita jaderných elektráren



<http://www.cez.cz/cs/pro-media/cisla-a-statistiky/energetika-ve-svete.html>

Podíl jaderné energie na výrobě elektřiny (2012)



<http://www.cez.cz/cs/pro-media/cisla-a-statistiky/energetika-ve-svete.html>

Rozmístění jaderných reaktorů v Evropě

BELGIE Doel 1 Tihange 2	NIZOZEHI Borssele 34 Ouderdijk 40	ŠVÉDSKO Barsebäck 44 Ringhals 67 Oskarshamn 58	VELKÁ BRITÁNIE Huntley 18 Trawess 74 Harbrow 88 Heysham 81 Wylfa 82 Hinkley Point 83 Dungeness 84 Sizewell 25
BULHARSKO Kozlevo 3 Belene 4	BUMUNSKO Cernavoda 41	ŠVÝCARSKO Mühleberg 69 Gösgen 70 Leibstadt 71 Bewin 72	
ČESKÁ REPUBLIKA Temelin 5 Dukovany 6	RUSKÁ FEDERACE Sverdlovsk 42 Leningradská 43 Leningradská 44 Smolensk 45 Kaliningrad 46 Kursk 47 Kursk 48 Novovoronežská 49 Moskva 50 Belovojsk 51 Březněvsk 52 Březněvsk 53 Březněvsk 54 Březněvsk 55	UKRAJINA Rovensk 73 Chmelnická 74 Chmelnická 75 Jhrodoljská 76 Zaporožská 77	
FINSKO Olkiluoto 1 Olkiluoto 6 Loviisa 9			
FRANCIE Fleurbaey 10 Fleurbaey 11 Paluel 12 Paluel 13 Cruas 14 Cruas 15 Daguerre 16 St. Laurent 17 Cruas 18 Cruas 19 Belleville 21 Le Mayeur 22 Gautier 23 Tricastin 24 Cruas 25 St. Alban 26 Bugey 27 Fessenheim 28 Cruas 29	SLOVENSKO Bukovica 86 Machovce 87 Machovce 88		
MAĎARSKO Paks 30	SLOVENSKO Kukla 89		
NĚMECKO Großkraft 31 Borsdorf 32 Grafing 33 Philippsburg 34 Neckarwestheim 35 Gundremmingen 36 Tiefen 37 Grafing 38	ŠPÁŇSKO Almaraz 80 S. M. de Barro 81 Trillo 82 Cabrera 83 Valdecañas 84 Asu 85		



<http://www.cez.cz/cs/pro-media/cisla-a-statistiky/energetika-ve-svete.html>

The emergence and development of a global environmental problem posed by the devastation of the environment can be divided into four stages.

The first stage describes the period from the beginning of human civilization until the end of feudalism

Stage of the development of manufacture production

The third stage is characterized by the period from the onset of the technological revolution to the second third of the 20th century.

The fourth stage is dated from the introduction and use of the concept of sustainable development (United Nations Conference on the environment in 1992, UNCED)

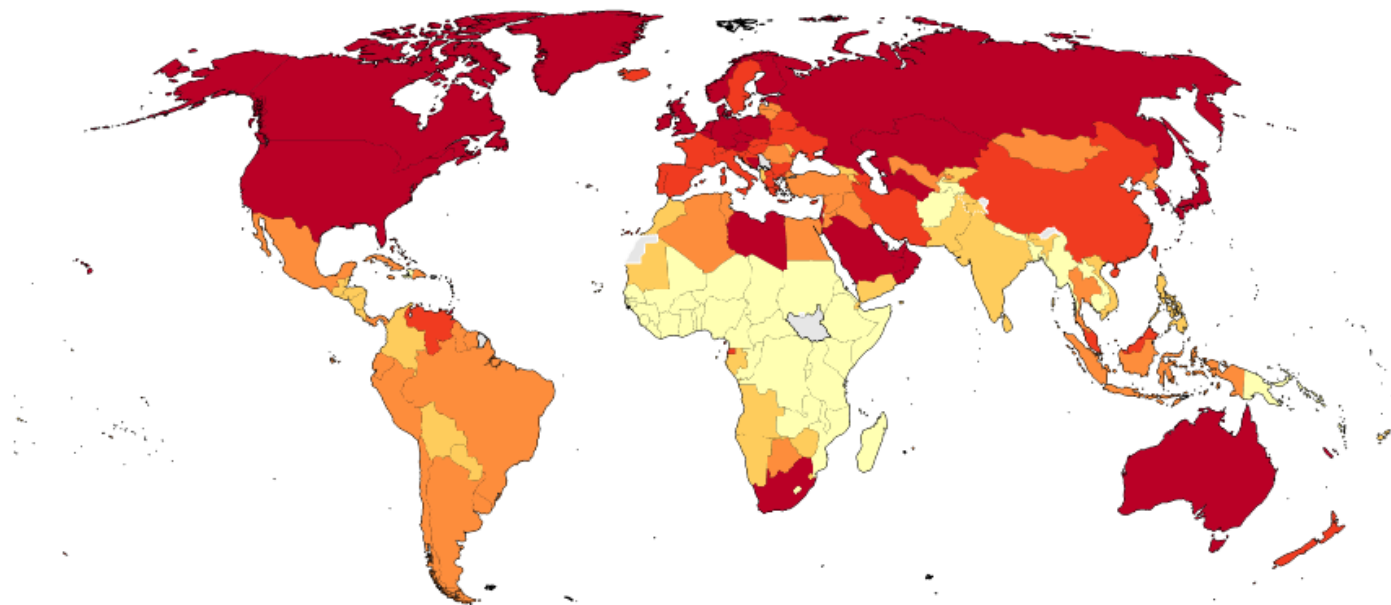
United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, Brazil

Rio Declaration on Environment and Development

Agenda 21

Kyoto Protocol

[http://www.mzp.cz/C1257458002F0DC7/cz/kjotsky_protokol/\\$FILE/O MV-cesky_protokol-20081120.pdf](http://www.mzp.cz/C1257458002F0DC7/cz/kjotsky_protokol/$FILE/O MV-cesky_protokol-20081120.pdf)



2010-CO2 emissions (metric tons per capita)

less than 0.5    7.8 or more

JENÍČEK, Vladimír a Jaroslav FOLTÝN. *Globální problémy světa: v ekonomických souvislostech*. Vyd. 1. V Praze: C.H. Beck, 2010, xix, 324 s. ISBN 978-80-7400-326-4.

HAMPL, Mojmír. *Vyčerpání zdrojů: skvěle prodejný mýtus*. Vyd. 1. V Praze: CEP - Centrum pro ekonomiku a politiku, 2004, 65 s. ISBN 80-86547-28-0.

MUSIL, Petr. *Globální energetický problém a hospodářská politika: se zaměřením na obnovitelné zdroje*. Vyd. 1. Praha: C.H. Beck, 2009, xiii, 204 s. ISBN 978-80-7400-112-3.