



INVESTMENTS IN EDUCATION DEVELOPMENT

Course: World Economy

## Contents

The aim of the lecture is to describe the energy and environmental problem Text is an overview of information resources for students (including links to official sources and supplement materials (green box)).

### Content:

- 1) introduction – history of the problem – Limits to growth
- 2) history of sustainable development
- 3) Classification of natural resources

Limits to Growth is a study about the future of our planet. On behalf of the Club of Rome, Donella Meadows, Dennis Meadows, Jorgen Randers and their team worked on systems analysis at Jay W. Forrester's institute at MIT. They created a computing model which took into account the relations between various global developments and produced computer simulations for alternative scenarios. Part of the modelling were different amounts of possibly available resources, different levels of agricultural productivity, birth control or environmental protection.

<http://www.clubofrome.org/?p=1161>

<http://www.donellameadows.org/wp-content/userfiles/Limits-to-Growth-digital-scan-version.pdf>

Description of history of sustainable development - Development that meets the needs of the present without compromising the ability of future generations to meet their own needs<sup>1</sup>.

[http://www.mddelcc.gouv.qc.ca/developpement/reperes\\_en.htm](http://www.mddelcc.gouv.qc.ca/developpement/reperes_en.htm)

1972 - The United Nations Conference on the Human Environment

The United Nations Conference on the Human Environment took place in the summer of 1972 in Stockholm. One of the key results of this historical meeting was the adoption by participants of a declaration of principles and action plan to fight against pollution. At the same time, the Club of Rome published the report Limits to Growth.

1992 - The Earth Summit

Rio de Janeiro, Brazil, was the setting for the Earth Summit, also called the United Nations Conference for Environment and Development (UNCED). Participants had defined the key principles and established a program of action called Agenda 21 on which several sustainable development initiatives today are based. Bringing together

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<sup>1</sup> [http://www.mddelcc.gouv.qc.ca/developpement/reperes\\_en.htm](http://www.mddelcc.gouv.qc.ca/developpement/reperes_en.htm)

nearly 200 government representatives and a large number of NGOs, the Earth Summit gave rise to the Rio Declaration on Environment and Development, a key document reaffirming an international commitment to the principles of sustainable development.

## The Rio Declaration on Environment and Development

Under the Rio Declaration, signatory countries agreed that protection of the environment and social and economic development are fundamental to reaching sustainable development. This declaration marks a significant step in the establishment of sustainable development priorities at the international level.

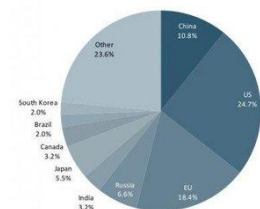
## Agenda 21

Agenda 21 is a comprehensive plan of action for the principles set forth by the Rio Declaration on Environment and Development. Agenda 21 addresses front-line global problems, which are grouped together under 39 themes involving social and economic development, environmental protection, resource management, participation of civil society in the decision-making process and the means to implement sustainable development. Adopted by 179 nations, the program is a world class reference document.<sup>2</sup>

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.

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

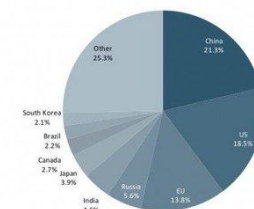
Total use in 2000: 9,355.6 million tons of oil equivalent



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

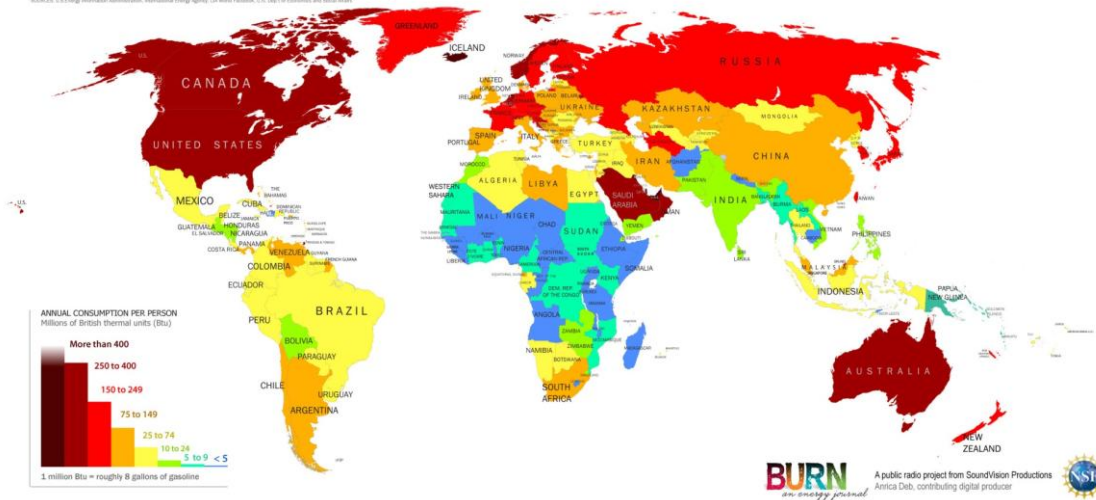


Source: BP Statistical Review of World Energy 2012.

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

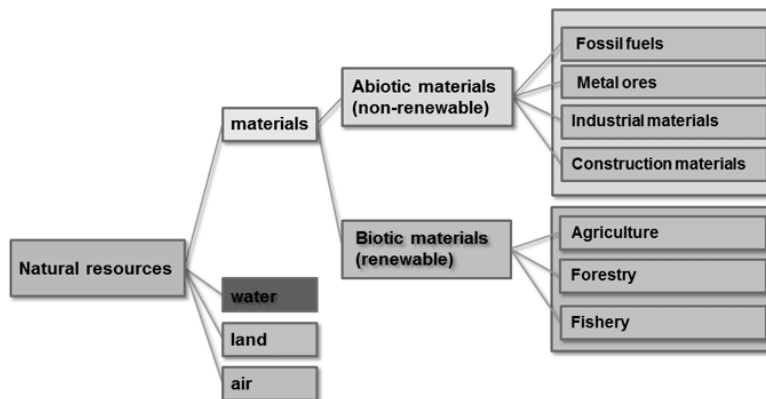
<sup>2</sup> [http://www.mddep.gouv.qc.ca/developpement/reperes\\_en.htm](http://www.mddep.gouv.qc.ca/developpement/reperes_en.htm)

Energy Consumption Per Person, by country, 2010.



[http://burnanenergyjournal.com/wpcontent/uploads/2013/03/WorldMap\\_EnergyConsumptionPerCapita2010\\_v4\\_BargraphKey.jpg](http://burnanenergyjournal.com/wpcontent/uploads/2013/03/WorldMap_EnergyConsumptionPerCapita2010_v4_BargraphKey.jpg)

### Classification of natural resources



Source: UN System of Integrated Environmental and Economic Accounts (SEEA)

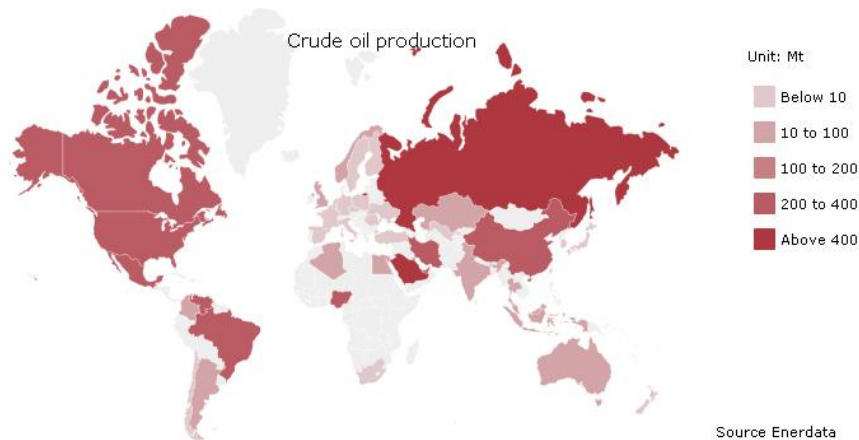
Renewable resources – „Renewable resources can be replenished naturally. Some of these resources, like sunlight, air, wind, etc., are continuously available and their quantity is not noticeably affected by human consumption. Though many renewable resources do not have such a rapid recovery rate, these 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 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<sup>3</sup>.

Description of Statistical Review of World Energy (oil, natural gas, coal)

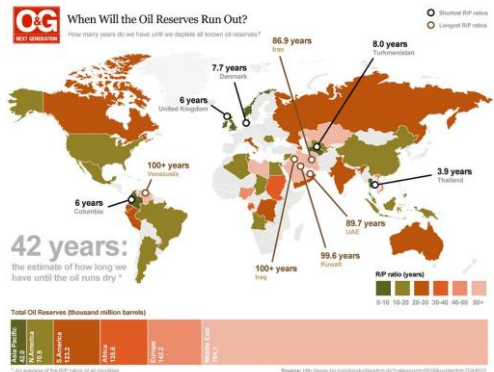
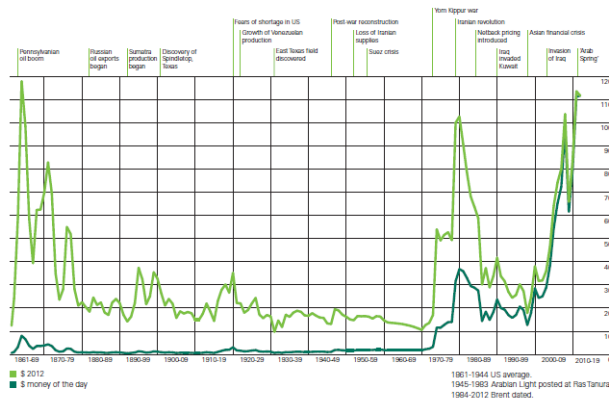
[http://www.bp.com/content/dam/bp/pdf/statisticalreview/statistical\\_review\\_of\\_world\\_energy\\_2013.pdf](http://www.bp.com/content/dam/bp/pdf/statisticalreview/statistical_review_of_world_energy_2013.pdf)

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.

<sup>3</sup>[http://www.sciencearchive.org.au/nova/newscientist/027ns\\_005.htm?q=nova/newscientist/027ns\\_005.htm&id=mg19426051.200&print=true](http://www.sciencearchive.org.au/nova/newscientist/027ns_005.htm?q=nova/newscientist/027ns_005.htm&id=mg19426051.200&print=true)

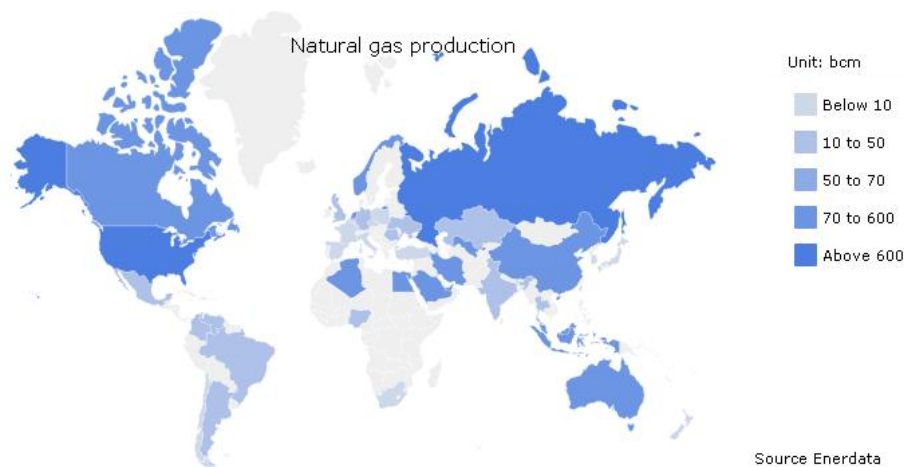


[http://www.bp.com/content/dam/bp/pdf/statisticalreview/statistical\\_review\\_of\\_world\\_energy\\_2013.pdf](http://www.bp.com/content/dam/bp/pdf/statisticalreview/statistical_review_of_world_energy_2013.pdf)

## 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.



Source Enerdata

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.



### C. Hubbert's Peak Theory

<http://www.globalization101.org/c-hubberts-peak-theory/>

<http://www.hubbertpeak.com/hubbert/1956/1956.pdf>



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.

Sustainable development: historical markers. [online]. 2014 [cit. 2014-11-11]. Dostupné z: [http://www.mddelcc.gouv.qc.ca/developpement/reperes\\_en.htm](http://www.mddelcc.gouv.qc.ca/developpement/reperes_en.htm)

Earth's natural wealth: an audit. [online]. 2014 [cit. 2014-11-11]. Dostupné z: [http://www.mddelcc.gouv.qc.ca/developpement/reperes\\_en.htm](http://www.mddelcc.gouv.qc.ca/developpement/reperes_en.htm)

Statistical review world energy. 2014 [cit. 2014-11-11]. Dostupné z: [http://www.bp.com/content/dam/bp/pdf/statisticalreview/statistical\\_review\\_of\\_world\\_energy\\_2013.pdf](http://www.bp.com/content/dam/bp/pdf/statisticalreview/statistical_review_of_world_energy_2013.pdf)