

21st OSCE ECONOMIC AND ENVIRONMENTAL FORUM
FIRST PREPARATORY MEETING
Vienna, 4 – 5, February 2013

*"Increasing stability and security: Improving the environmental footprint
of energy-related activities in the OSCE region"*

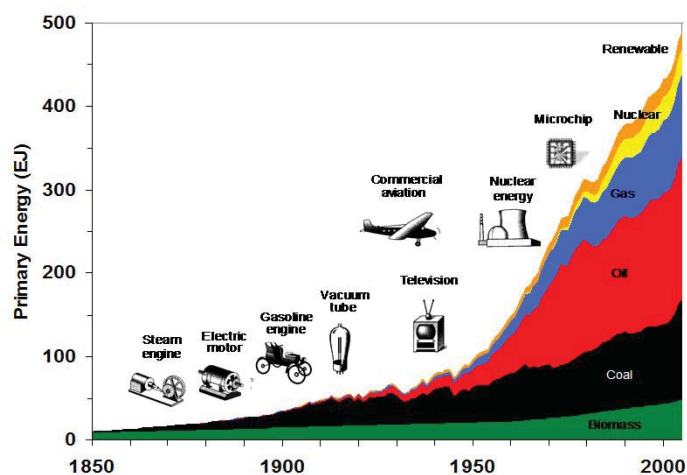
Session III: Promoting sustainable management of energy resources

Energy and the Challenges of Sustainability

Thomas B Johansson

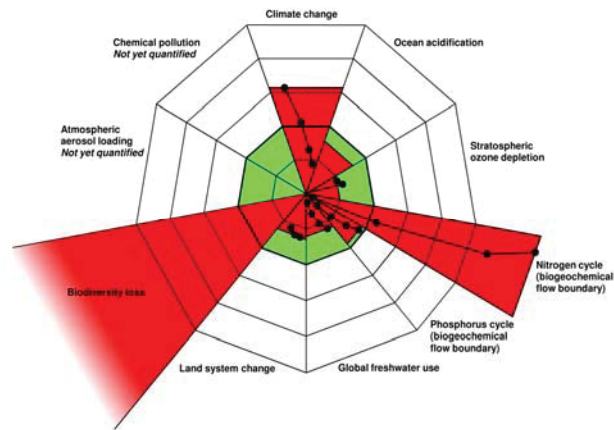
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World Primary Energy



Source: Nakicenovic et al., 1998

The concepts of planetary boundaries and of "safe operating space"



Source: J. Rockström et al., 2009

Challenges requiring actions on Energy

- a. **Energy services** for growing populations, 7 to 9 billion by 2050; and economies, 2%/a per capita
 - b. **Universal access** to modern forms of energy (the ~3 billion w/o access)
 - c. **affordable** energy services (@\$100/bbl??)
 - d. **secure** supplies, from households to nations; "peak oil"
 - e. **health and environment** challenges (WHO guidelines ++)
 - f. **planetary boundaries, incl. climate change mitigation** (<+2 deg above pre.ind.)
 - g. **Peace**
 - h. **ancillary risks** (large accidents, nuclear weapons proliferation, too high food prices, ...)
- => Major Energy System and Policy Changes Needed!**

These challenges must be addressed

adequately

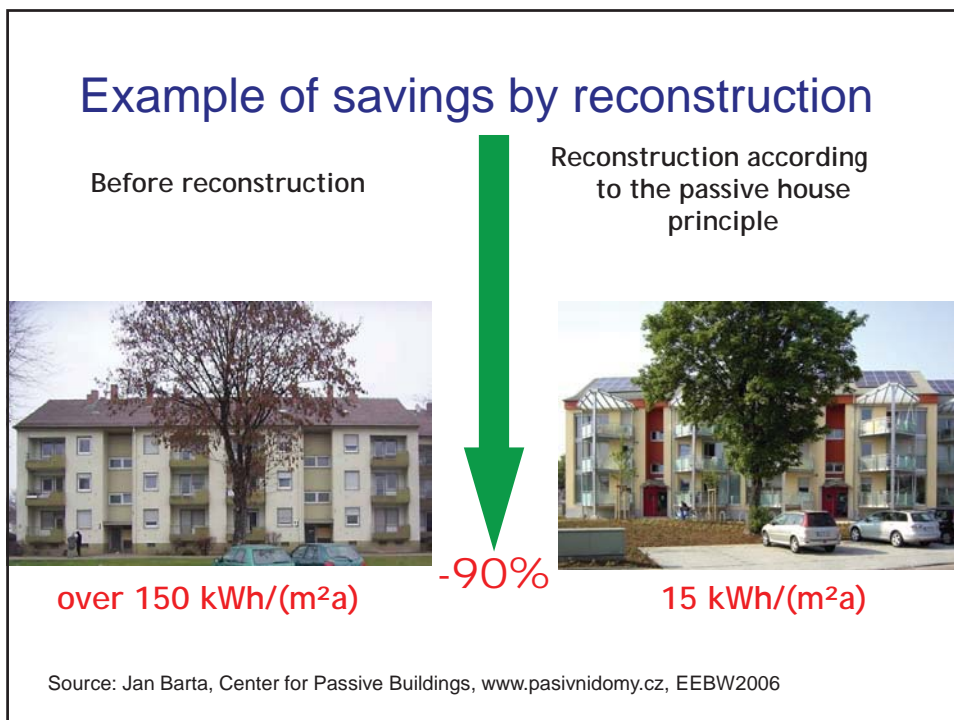
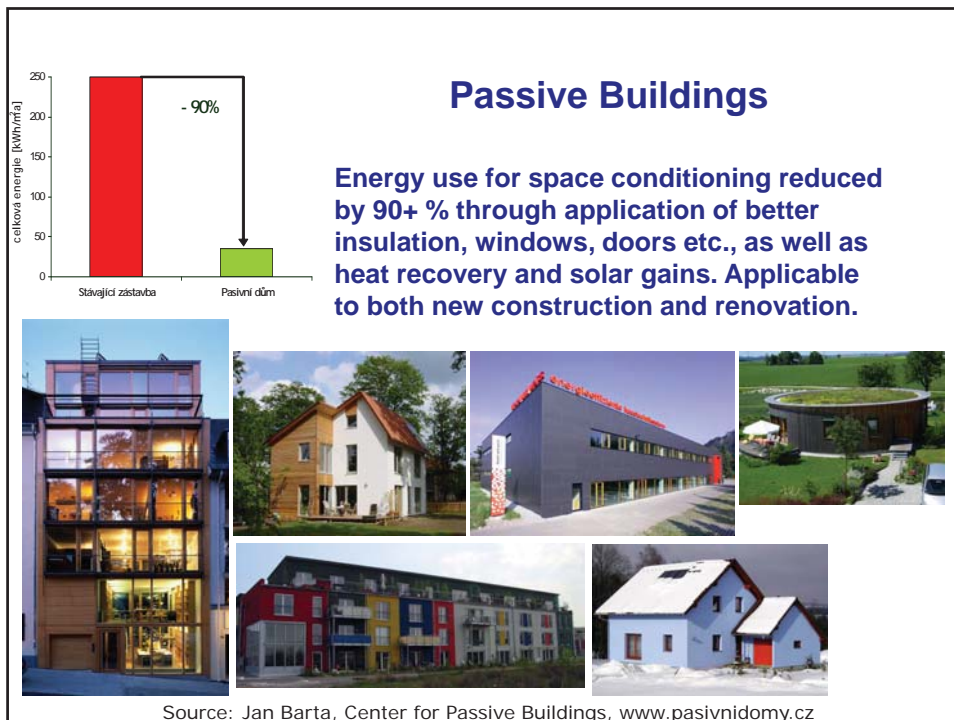
timely

simultaneously

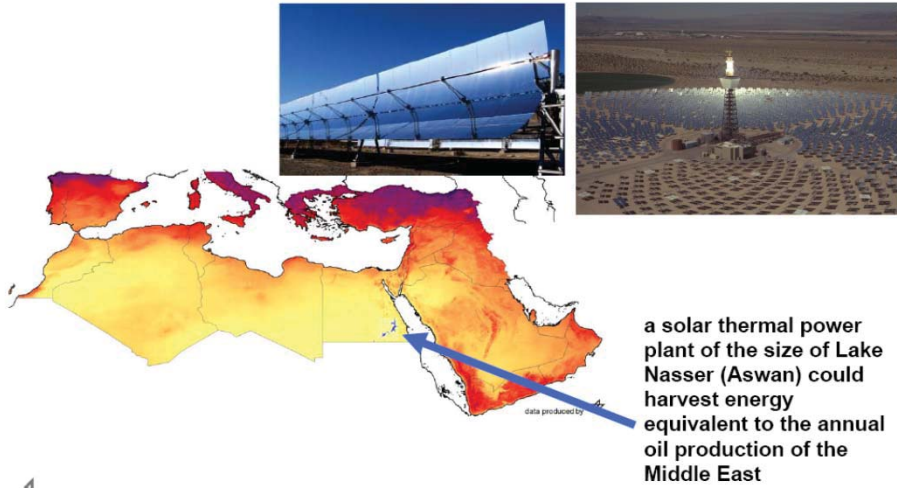
The challenges translate into a need for a major energy systems transformation

Main elements:

- **Energy end-use efficiency**
- **Renewable energies**
- **Carbon Capture and Storage (for CC only)**

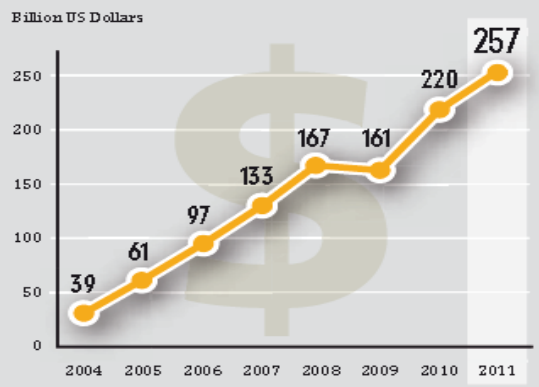


solar resources in the Middle East/North Africa region

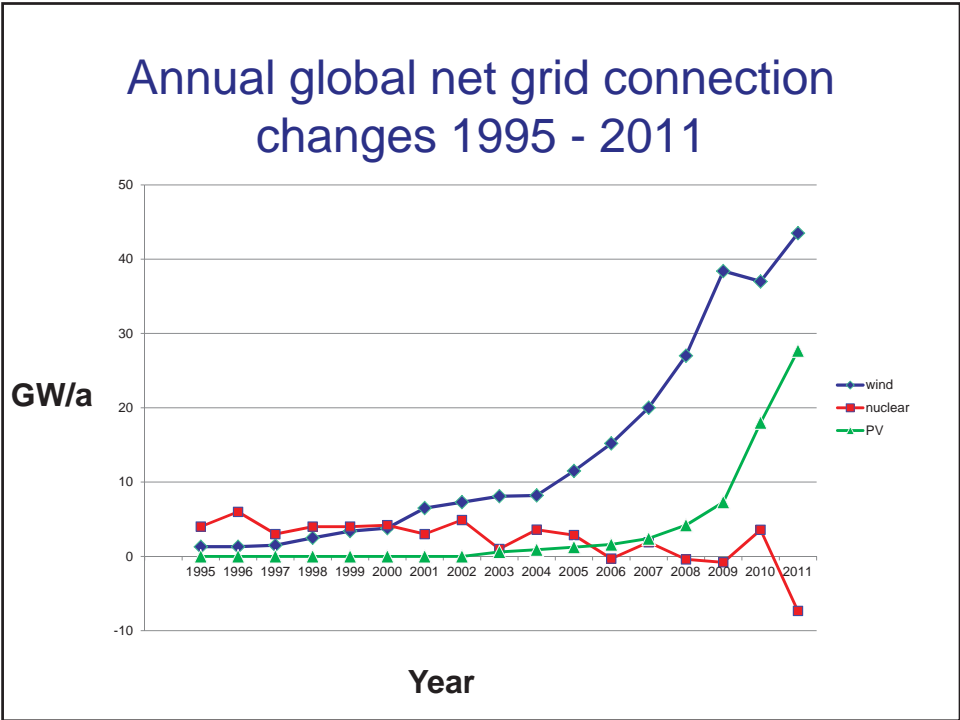
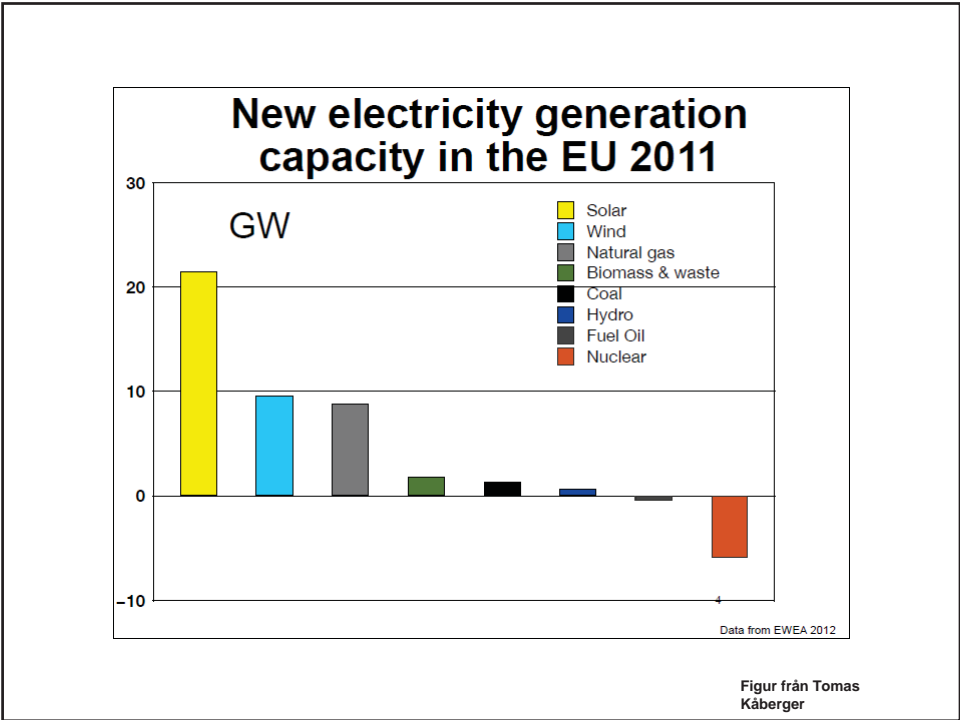


Global New Investments in Renewables

FIGURE 20. GLOBAL NEW INVESTMENTS IN RENEWABLE ENERGY, 2004–2011



Source: GSR, REN21, 2012



Simultaneous economic development, poverty alleviation, and reduced greenhouse gas emissions

- The concept **multiple benefits**
- Value all benefits (jobs, growth, security, health, local environment, reduced climate impacts,
- To characterize costs of a project in terms of €/per tC avoided is misleading.

- Efficient use of energy, esp. at the point of end-use
- Renewable energies

not just energy technology

- Urban planning
- Transportation systems, personal and freight
- Material use
- Land use
- Consumption patterns
-

GEA Key Findings:

- 1. Energy Systems can be Transformed to Support a Sustainable Future.**
- 2. An Effective Transformation Requires Immediate Action.**
- 3. Energy Efficiency is an Immediate and Effective Option.**
- 4. Renewable Energies are Abundant, Widely Available, and Increasingly Cost-effective.**
- 5. Major Changes in Fossil Energy Systems are Essential and Feasible.**
- 6. Universal Access to Modern Energy Carriers and Cleaner Cooking by 2030 is Possible.**
- 7. An Integrated Energy System Strategy is Essential.**
- 8. Energy Options for a Sustainable Future bring Substantial, Multiple Benefits for Society.**
- 9. Socio-Cultural Changes as well as Stable Rules and Regulations will be Required.**
- 10. Policies, Regulations, and Stable Investment Regimes will be Essential.**

