COP-16

IIASA side event 2010-12-06

Global Energy Assessment

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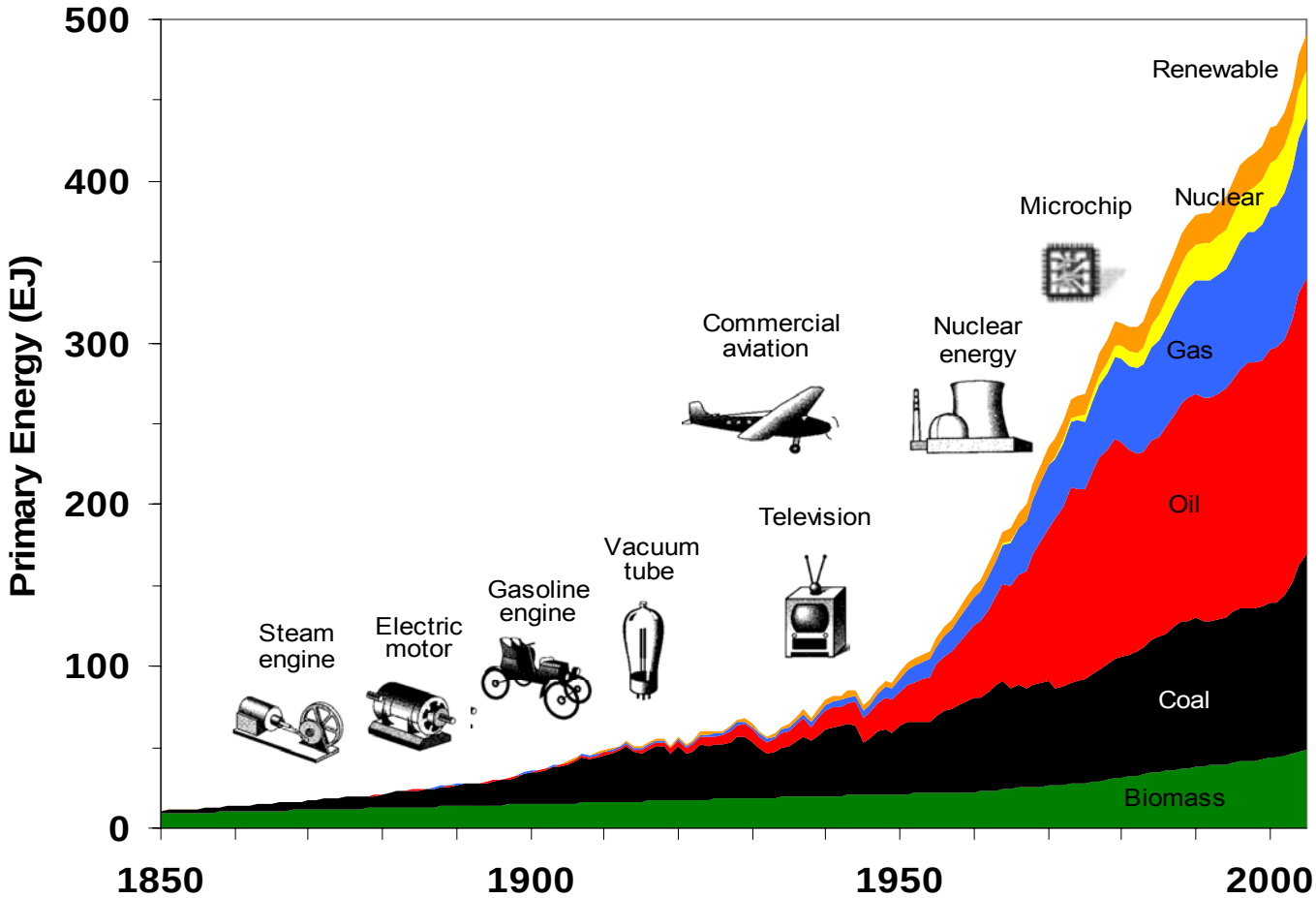
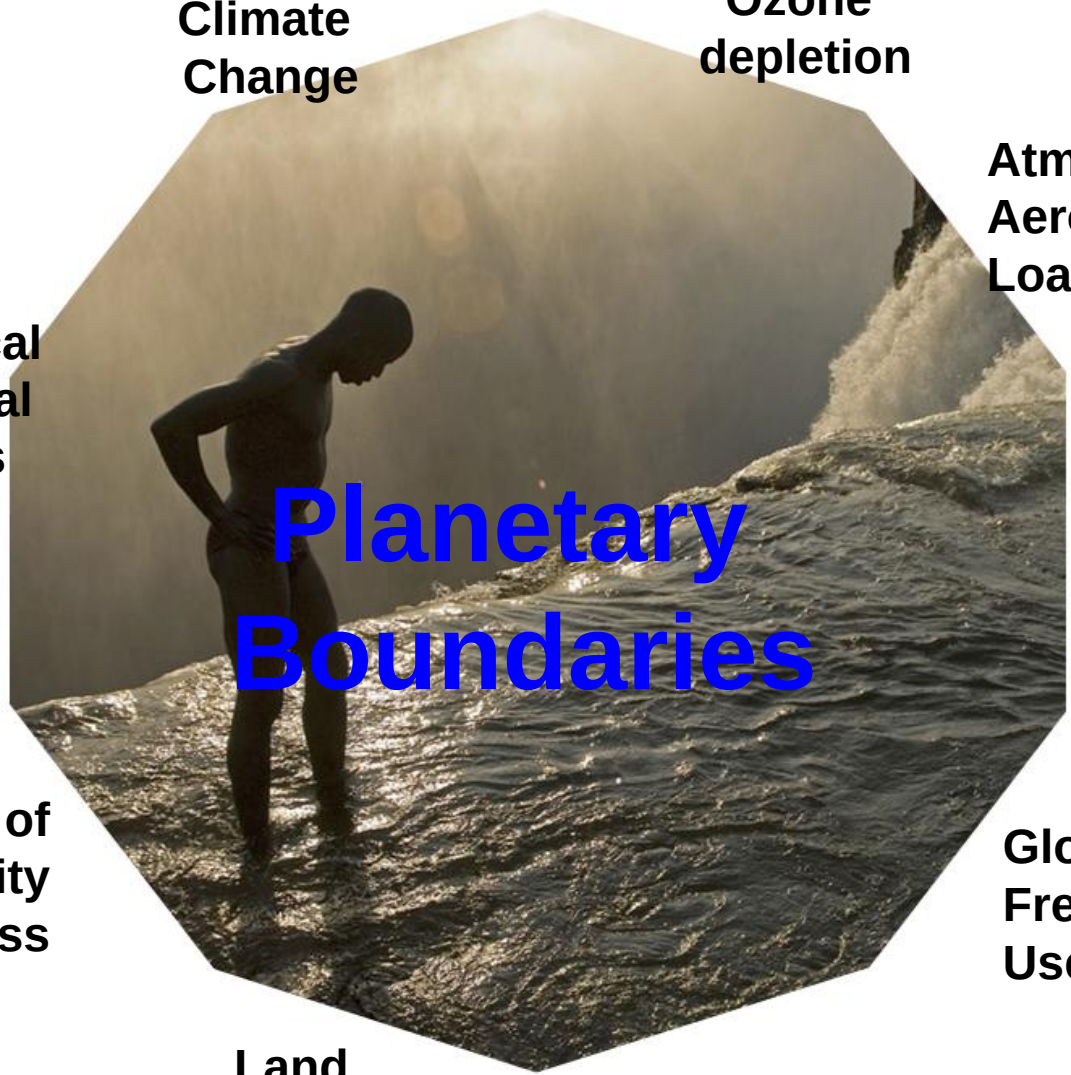
World Primary Energy



Source: Nakicenovic et al., 1998



Source: Rockström et al., 2009

Challenges requiring actions on Energy

a. **Energy services for growing populations and economies**
b. **access to modern forms of energy** (the ~2 billion w/o access)
c. **affordable** energy services (@$100/bbl??)
d. **secure** supplies, from households to nations ("peak")
e. **local and regional health and environment challenges**
f. **climate change mitigation**
g. **ancillary risks**

=> Major Energy System Changes Needed!

These **challenges** must be addressed

adequately

timely

simultaneously

Four Clusters of Knowledge modules:

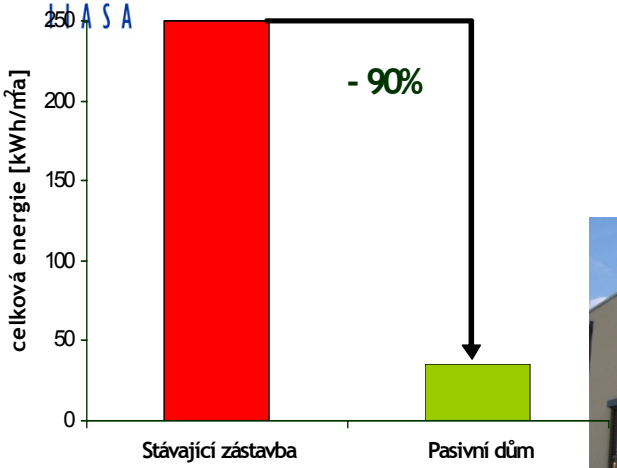
1.The Challenges, nature and magnitude of change required

2.Resources and technology options

3.Pathways to sustainability, urbanisation, rural energy, and land use

4.Policies, energy end use and supply sectors, access, innovation, capacity development

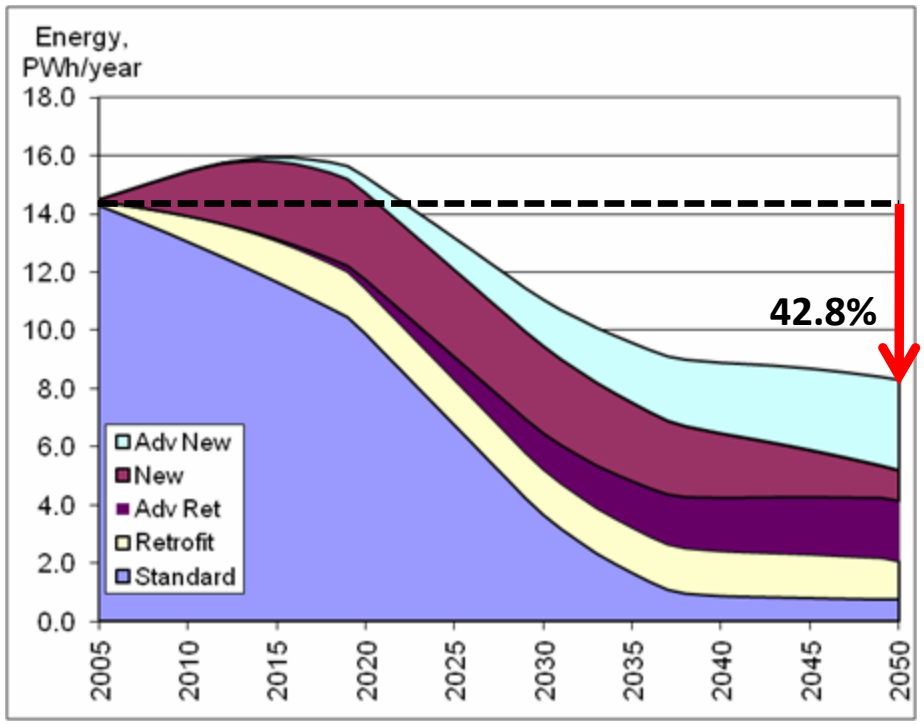
“PassivHaus”



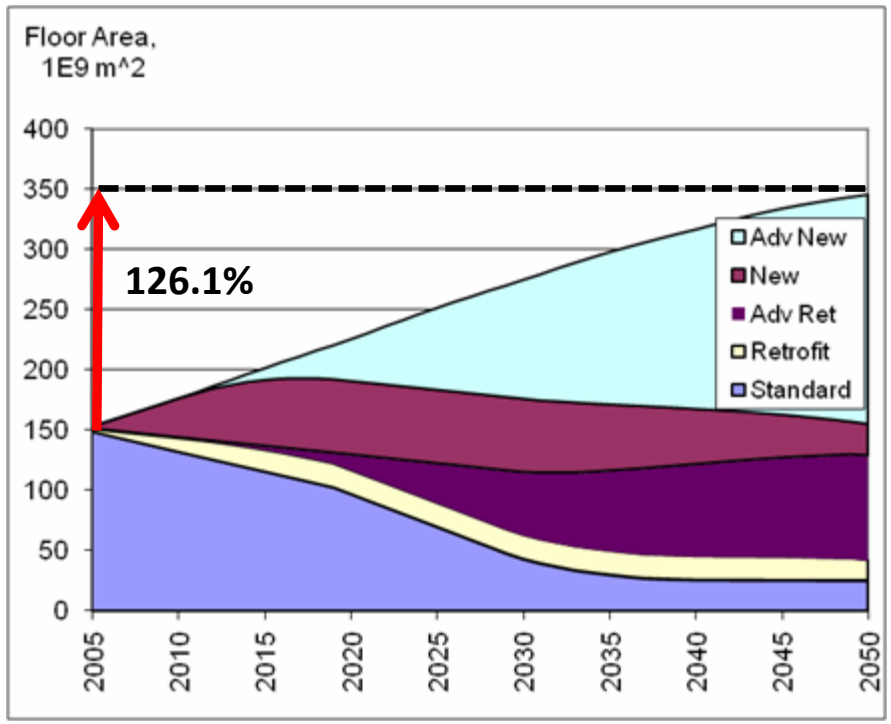
Source: Jan Barta, Center for Passive Buildings, www.pasivnidomy.cz

State-of-the-Art Scenario Results: world heating and cooling final energy consumption as compared to development in building floor area

Thermal Comfort Final Energy



Floor Area



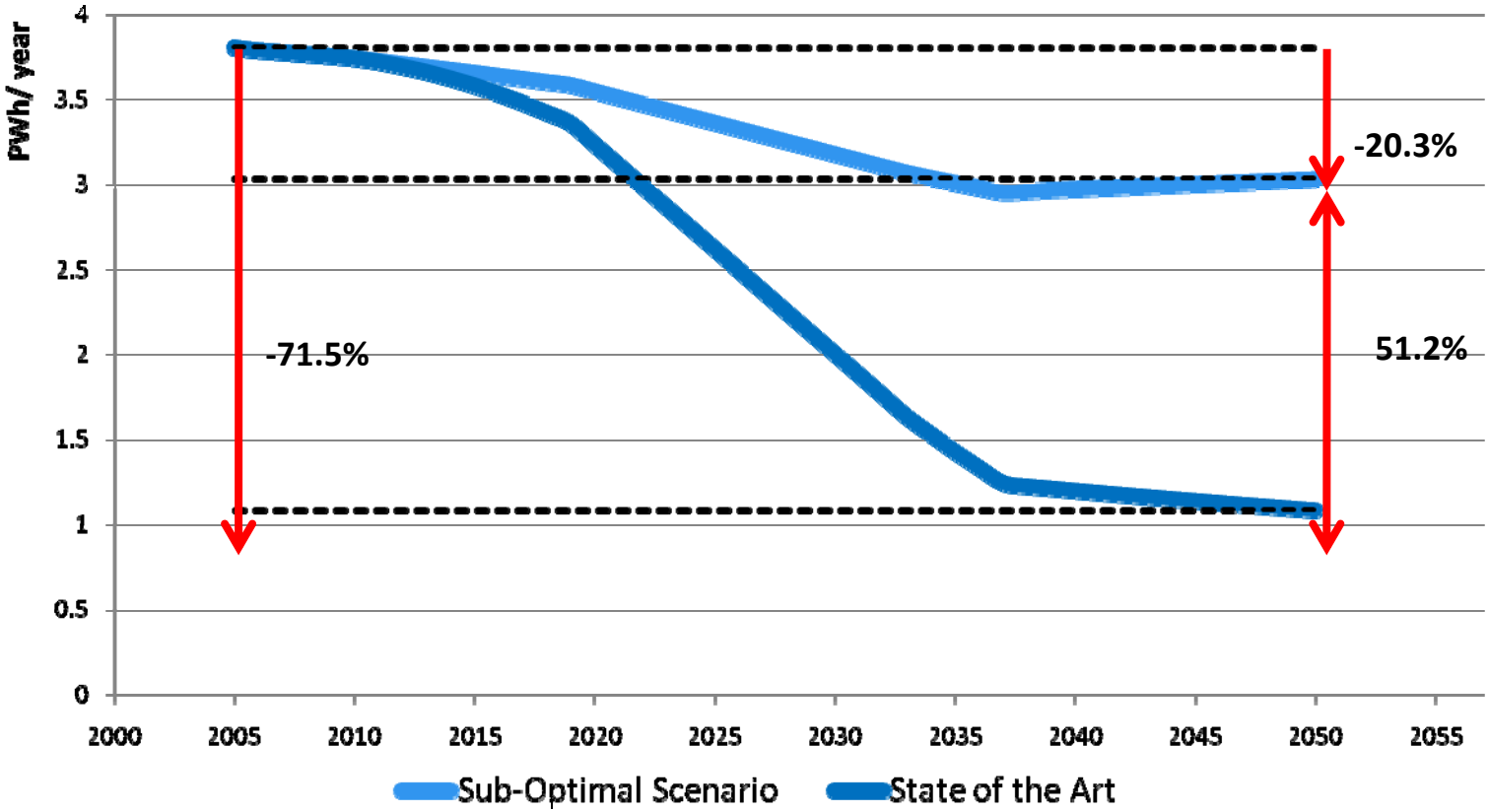
WORK IN PROGRESS
DO NOT CIT OR QUOTE

UNEP SBCI
Sustainable Buildings & Climate Initiative

The risk of the lock-in effect

Final thermal energy consumption in Europe*

State-of-the-art vs. suboptimal renovation scenarios



WORK IN PROGRESS

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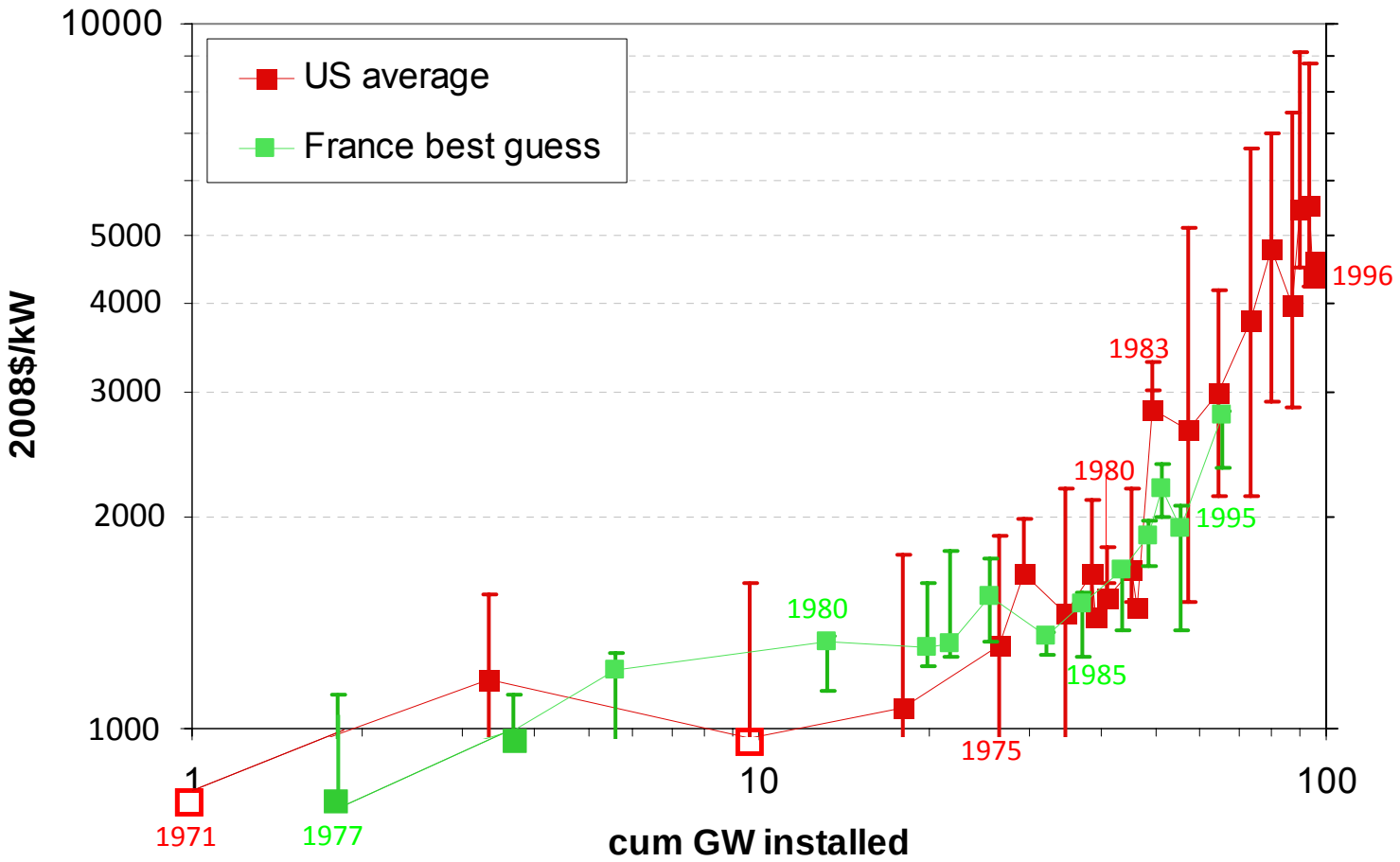
** Results for Europe is a sum of the results for Western Europe (WEU) and Eastern Europe (EEU)*

UNEP SBCI
Sustainable Buildings & Climate Initiative

Nuclear PWR Investment Costs

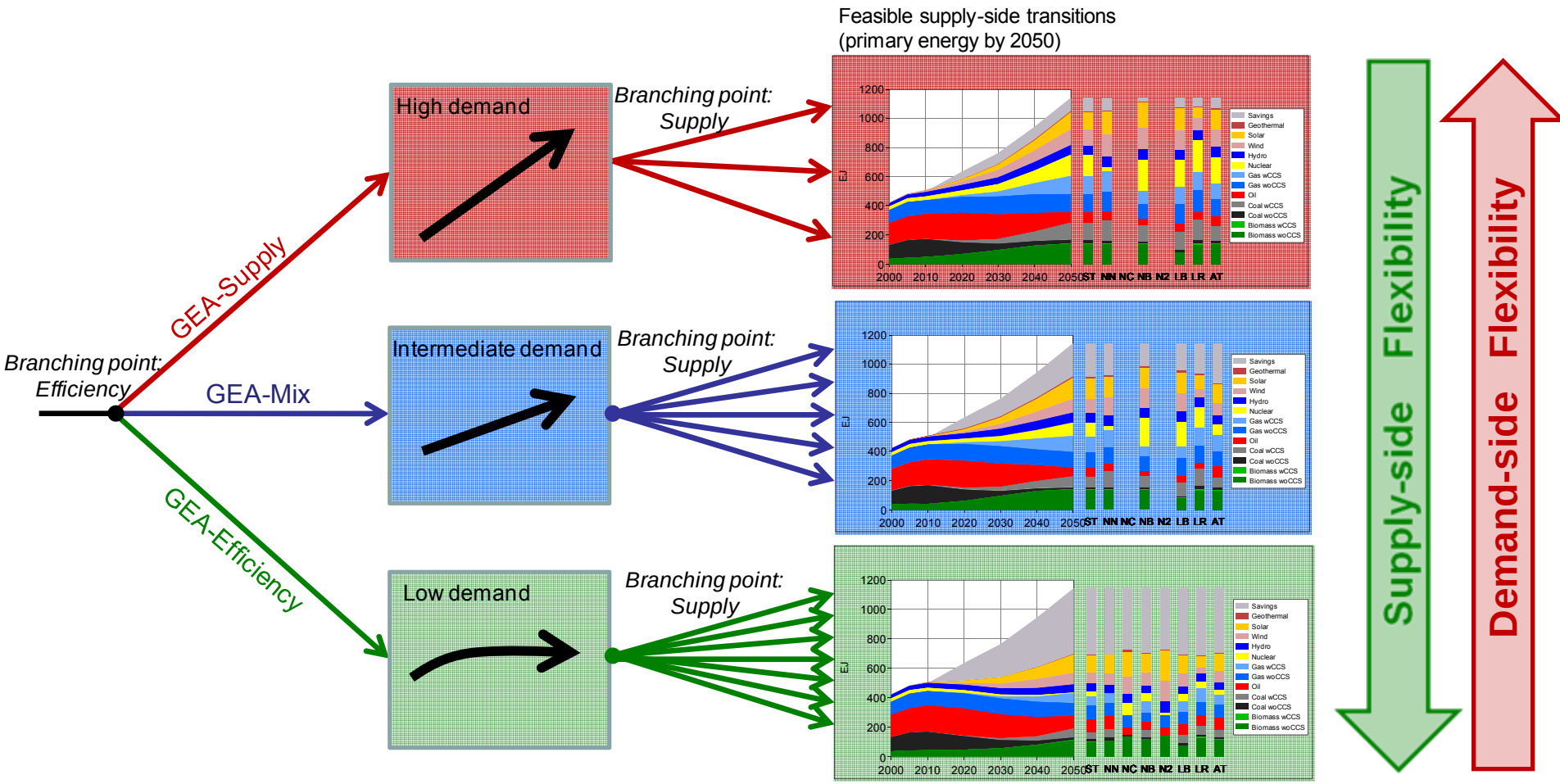
US overnight excl. interest, France partly incl. interests
mean/best guess and min/max of costs



US: Koomey&Hultman, 2007, France: Grubler, 2009

Source: GEA KM24 forthcoming

Global Energy Assessment (GEA) Pathway Taxonomy



GEA Pathways – Efficiency, Mix, Supply

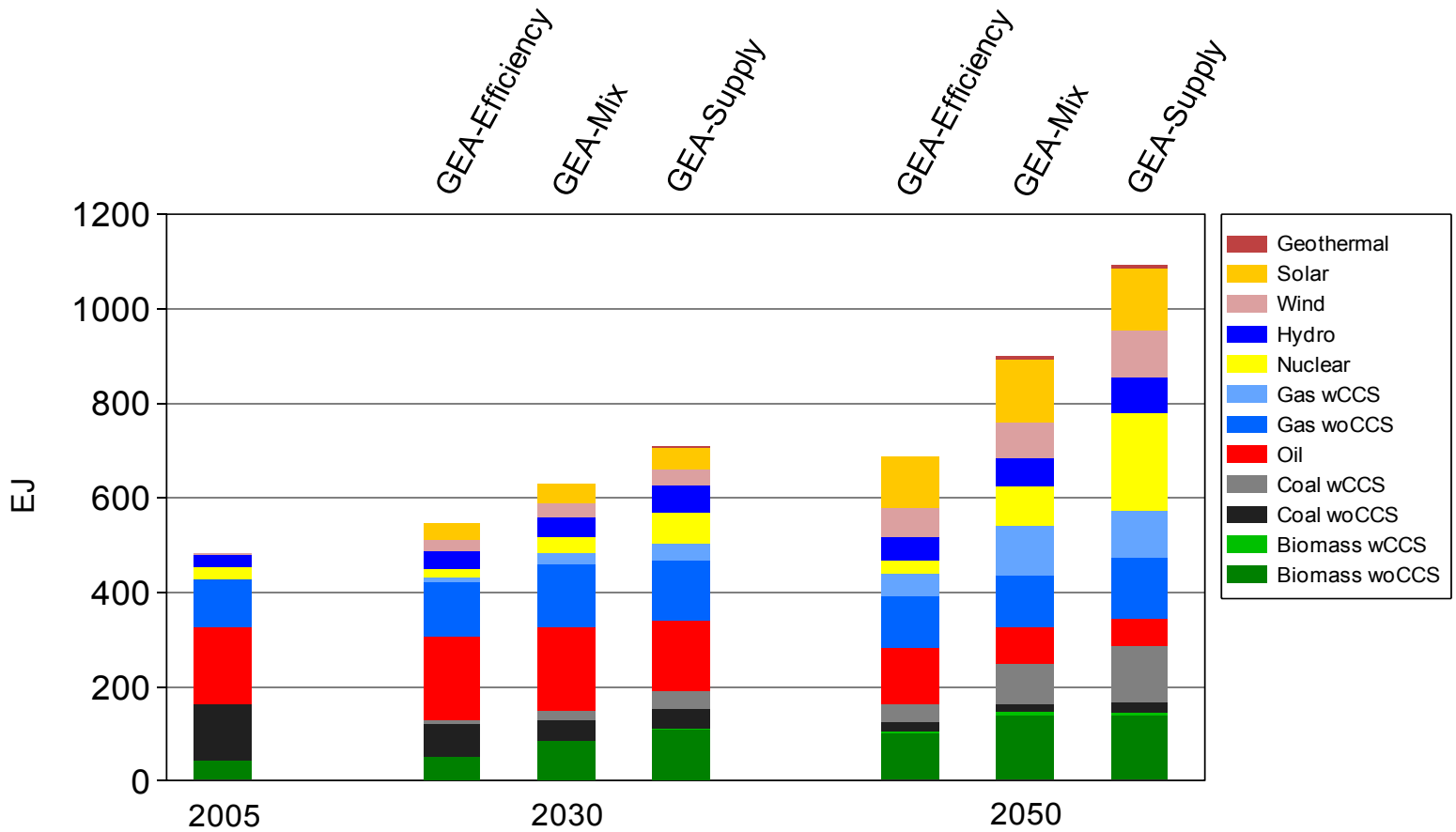
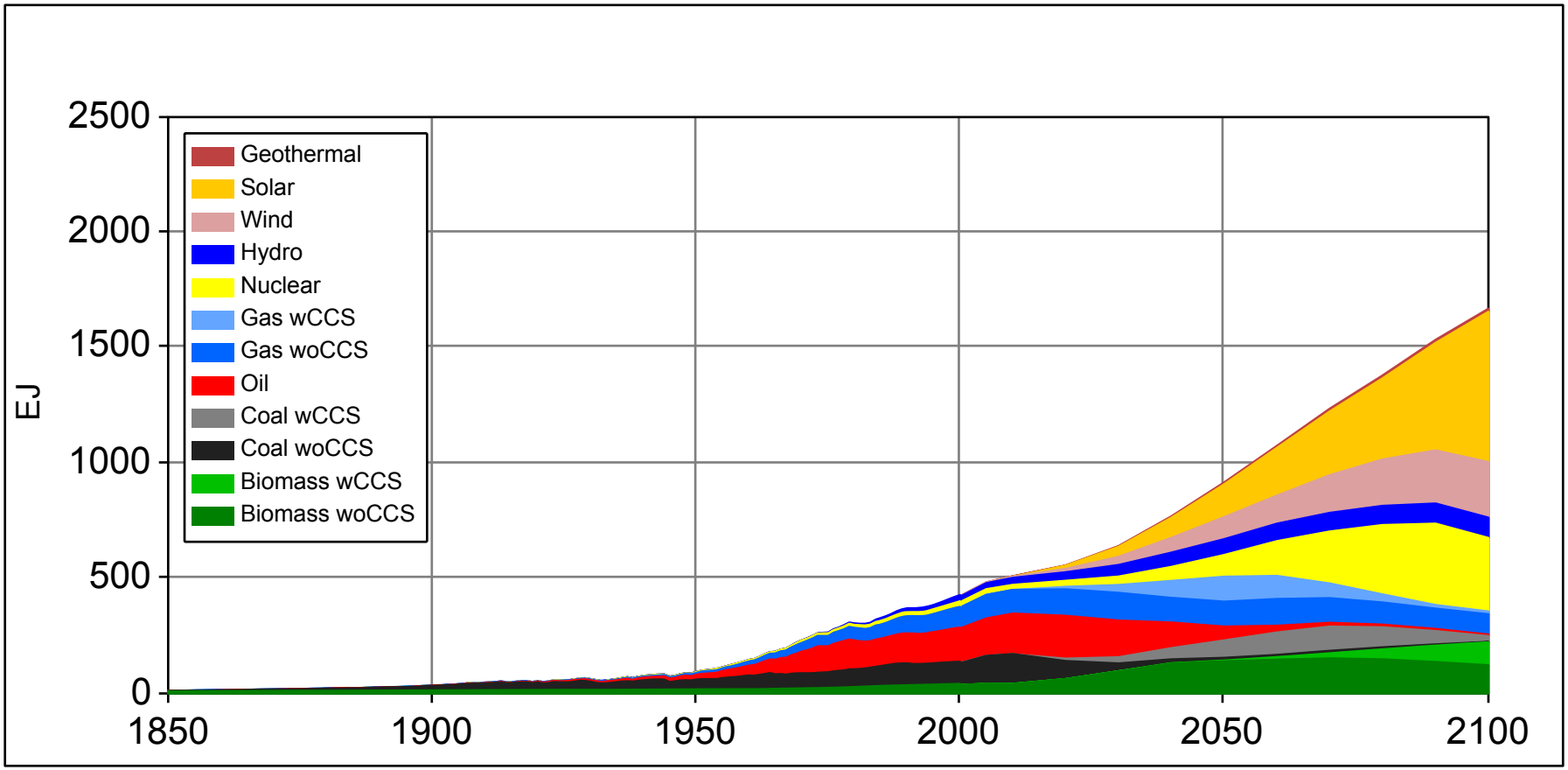
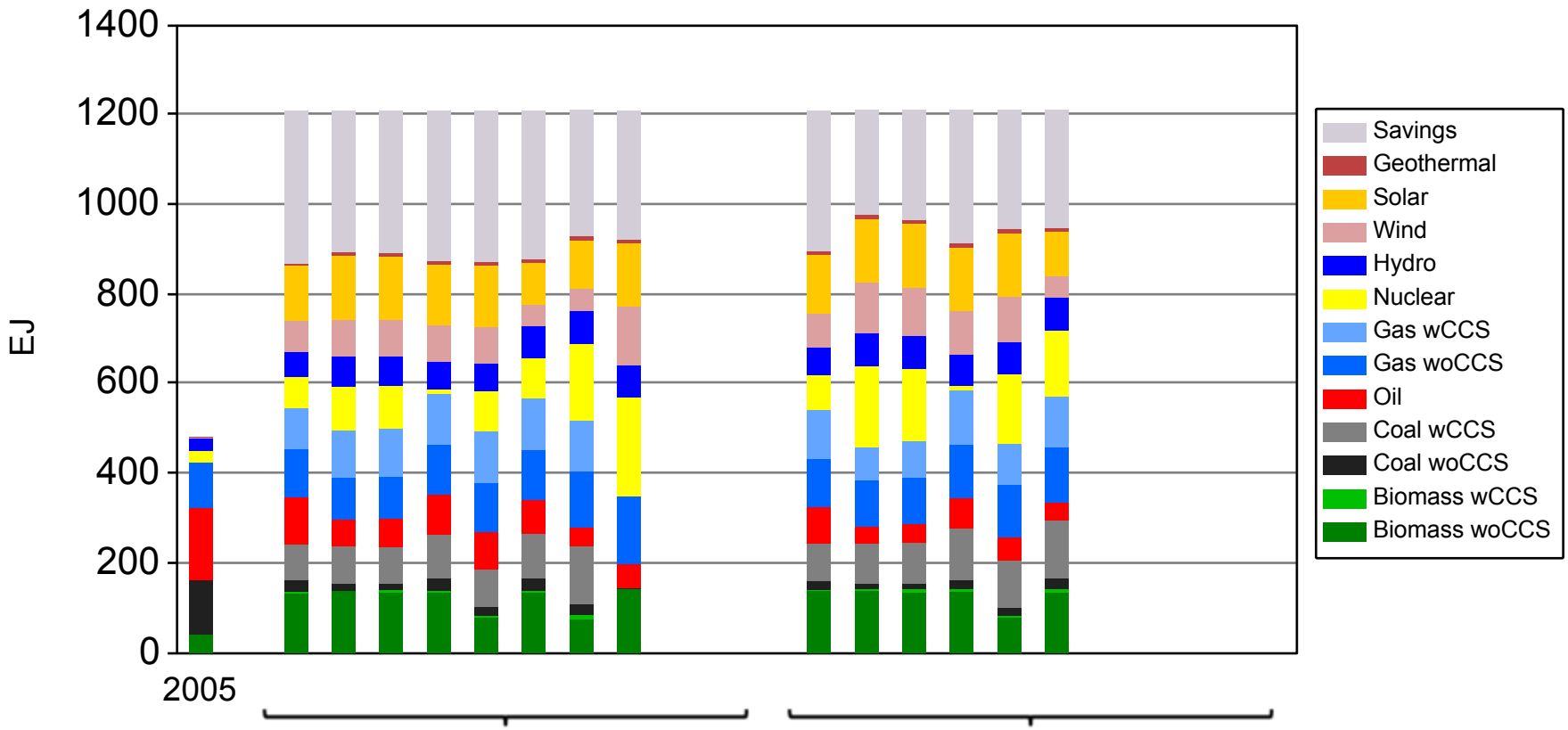


Figure shows primary energy and conventional transport

Global Primary Energy
GEA Mix (intermediate demand)



Global Primary Energy Supply by 2050
GEA-Mix

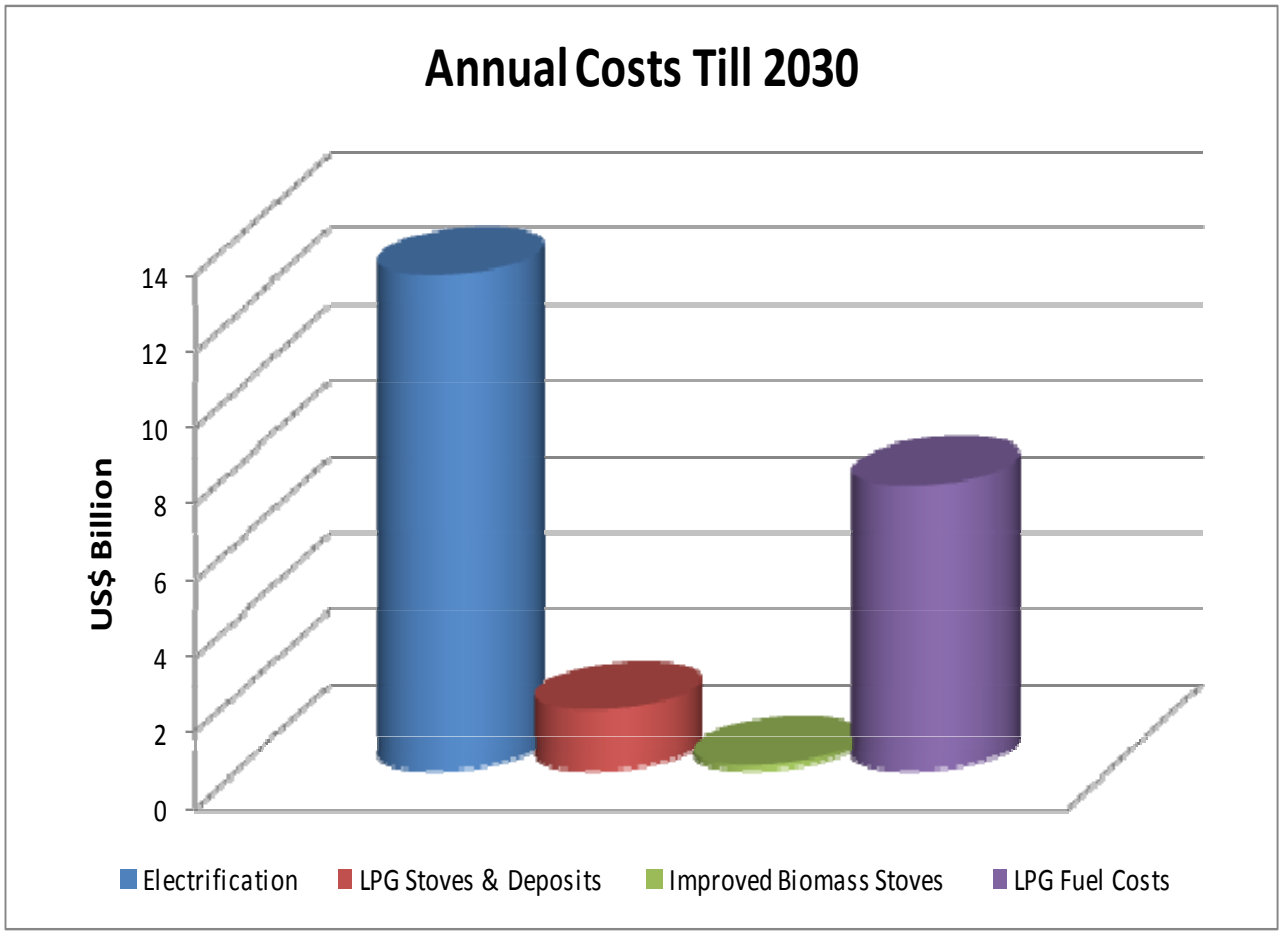


Advanced transportation
transition to electricity and/or hydrogen

Conventional transportation
continued reliance on liquid fuels

Total Costs* of Meeting the GEA Access Target

*Tentative Estimates inclusive of costs for:
•New electricity connections for almost 20 million households yearly;
•ICS (biomass) for almost 7 million households yearly;
•LPG stoves and cylinder deposits for about 25 million households yearly;
•LPG fuel costs (subsidies) for the poorest 30% of LPG users.



Economic development and poverty alleviation while mitigating climate change

- Multiple benefits concept
- Value **all** benefits (jobs, growth, security, health, local environment, ...)
- Costs in terms of € per tC misleading

- Energy efficiency
- Renewable energies

Major findings and conclusions

- Rapidly changing world
- Transformative changes needed on energy
- Resources and technologies exist
- Energy end-use efficiency #1 priority
- Rapidly growing role for renewable energies
- Electricity growing importance
- Policies and institutions critical
- Energy subsidies and R&D misallocated
- Capacity development worldwide

Thank you!

www.globalenergyassessment.org