


Sustainable Energy: Future Prospects for Development in North and South, including Poverty Reduction

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 International Network for Sustainable Energy
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OVE, Denmark
 INSEDA, India

Global Sustainable Energy Vision 2050

The world energy system:

- ❖ is beyond the environmental limits
- ❖ does not provide basic energy needs as light and healthy cooking facilities to 1/4 of the world's population
- ❖ Environmental imperative: keep global warming to 1°C in 21. century (1.6°C above pre-industrial)
- ❖ Social imperative: provide all with basic energy needs and allow developing countries to develop, including use of cheap energy supply



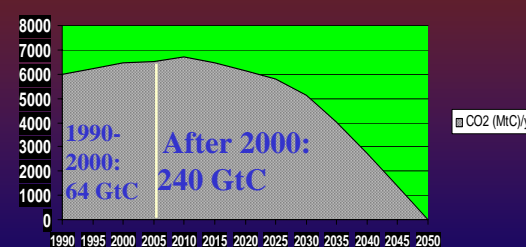
Environmental Imperative


- ❖ To be sure to keep global warming below 1 °C during the 21. century, we must limit global CO₂ emissions to 35 years of current consumption (assumed climate sensitivity of 3.5°C)
- ❖ This can be done by phasing out fossil fuel use until 2050

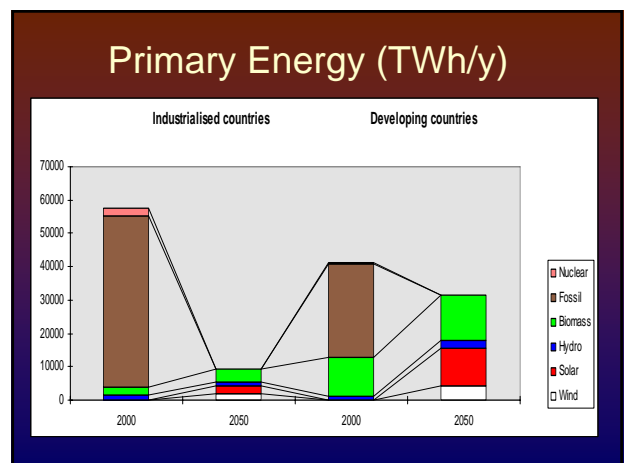
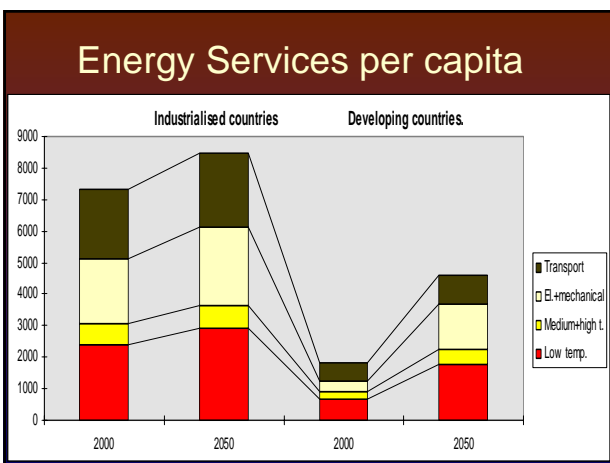


A Global Sustainable Scenario

CO₂ (MtC)/y

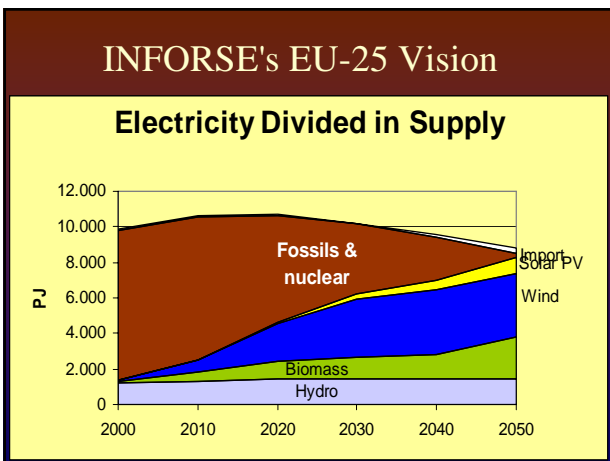
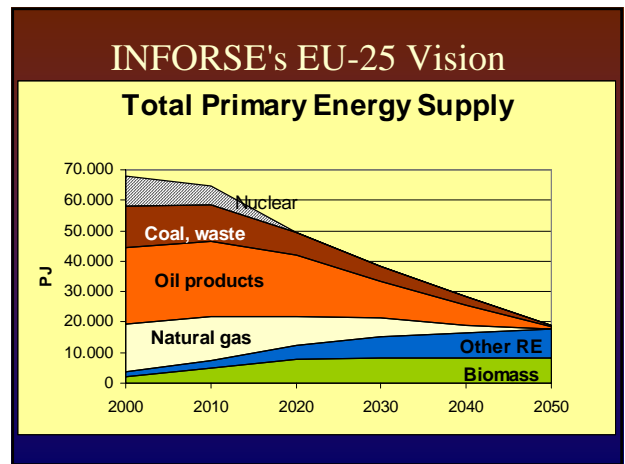
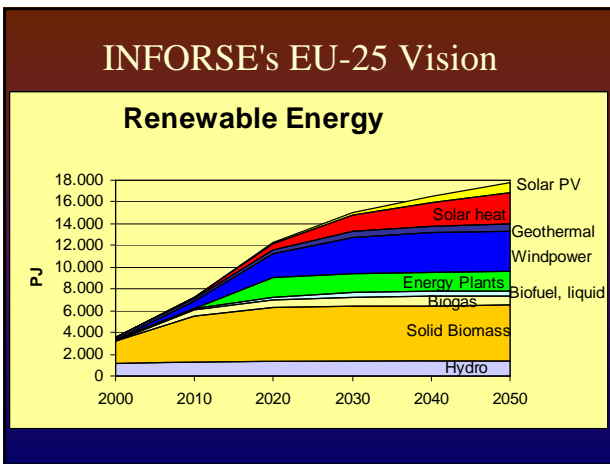
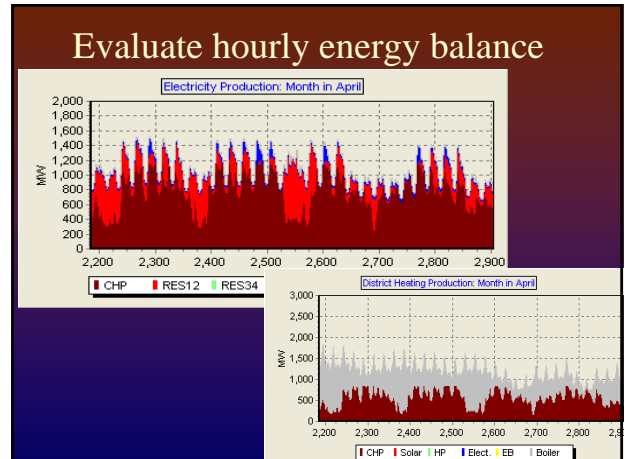




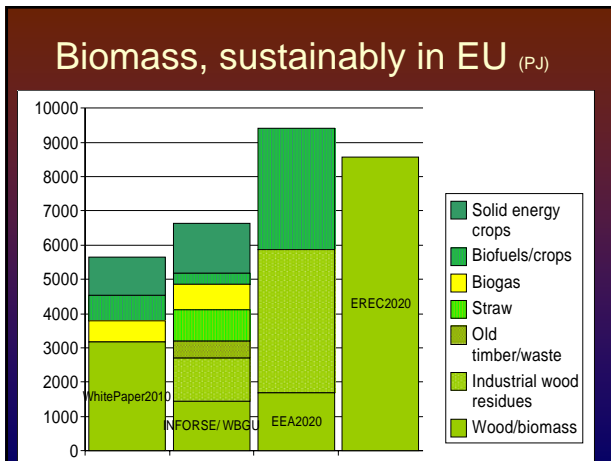


Development of individual visions:
 -base year 2000

-find potentials for RE, EE
 -Develop energy balances for 2010, 2020, 2030, 2040 and 2050
 -documentation
 -action plan for first decades
 (-economy of actions individually)



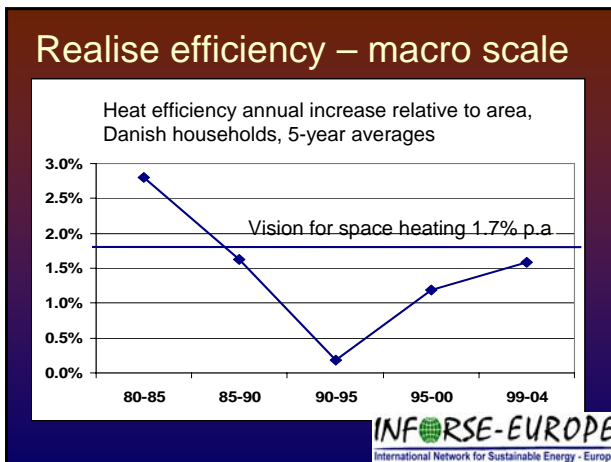
Can we reach it?
 or
 What does it take to reach the goals of the vision ?



Energy Demand

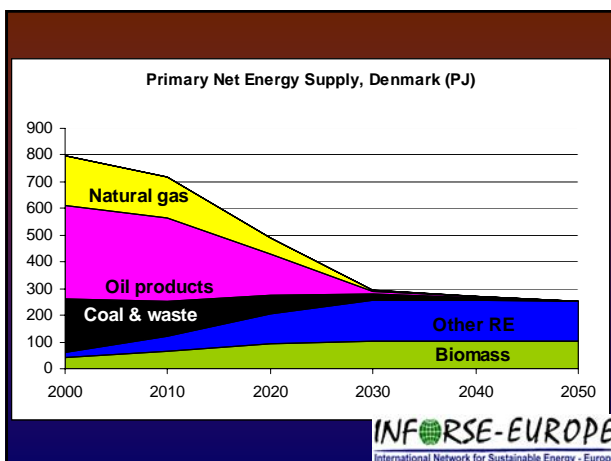
- ❖ New generations of equipment should maximize efficiency. Technology learning drives prices down. We can realize factor four within 2050
- ❖ One exception is houses. In EU houses could use only 1/7 of today's heat demand in 2050. EU Industry (Eurima/EuroACE) finds that more than 50% of energy use in buildings could be reduced.
- ❖ For the vision is proposed 57% reduction '00 – '50.
- ❖ For transport is expected increase in conversion efficiency from today's 15-20% to 50%, and re-gain of "break energy": factor 4 efficiency increase
- ❖ Energy service demand will increase, 0-100%
- ❖ -33% in car use in EU-15, but + 100% in Lithuania

INFORSE-EUROPE
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Vision for Denmark (OVE)

- ❖ RE supply by 2030
- ❖ Strong growth in windpower until 2030
- ❖ Half specific building consumption 2005-2025
- ❖ Flexible electricity use: heat pumps and hydrogen
- ❖ Sustainable transport system by 2030 (33% reduction in car use)
- ❖ el-storages from 2030



A Sustainable Energy Vision for Lithuania

- ❖ Good potentials for renewable energy with wind, solar, wood, straw, energy plantations, biogas, geo
- ❖ Possible high growth of windpower, straw, wood, energy plantations until 2020, then growth in solar
- ❖ Growth trends in transport, construction etc. will continue till 2015, and then level off gradually
- ❖ Energy efficiency potentials to be realised
- ❖ Biomass CHP important part of new structure

Proposals for Actions until 2020

- ❖ Windpower development, 1300 MW
- ❖ Better biomass use
- ❖ Straw use and energy plantations (7% agri.area)
- ❖ District heating and CHP plans, 1100 MWe CHP
- ❖ Biofuels strategy for transport
- ❖ Strategies for biogas, solar, geothermal, hydro
- ❖ Energy efficiency strategies for heating, electricity, service sector, transport

Opportunities for Lithuania

- ❖ Phase out nuclear by 2010
- ❖ Reduce gas use with half by 2020
- ❖ Phase out fossils by 2050
- ❖ Electricity costs 3-5 €cent/kWh (below nuclear)

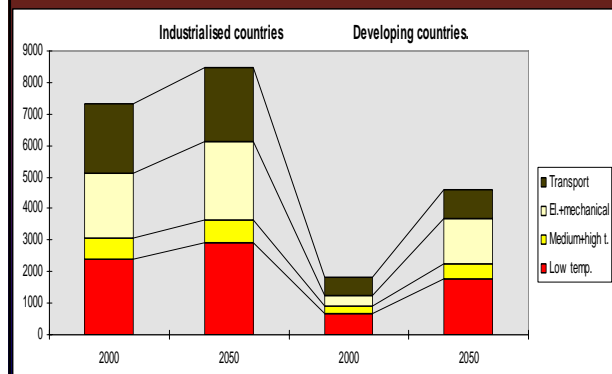


Compare with Energy [R]evolution

- | | |
|---|---|
| ❖ VISION2050 | ❖ E-REVOLUTION |
| ❖ Phase out of nuclear | ❖ Phase out of nuclear |
| ❖ Efficiency revolution twice energy service growth | ❖ Efficiency revolution match economic growth |
| ❖ Primary energy cur by half to 50 | ❖ Primary energy stable globally |
| ❖ 100% RE by 2050 | ❖ 50% RE by 2050 |

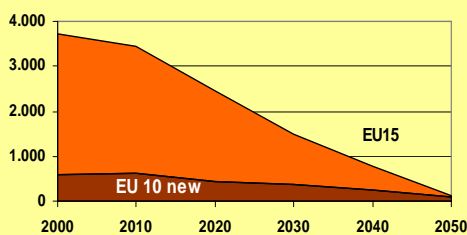


Energy Services per capita



INFORSE's EU Vision

CO₂ emissions, million tons/year



EU Energy Supply

Wind: Growth to 70,000 MW in 2010 (current trend), 220,000 MW in 2020 and 375,000 MW in 2040 (up to 15,000 MW/year), now 6000 MW/year), 1/4 expected offshore.

Large windpower development programs are cost-effective: extra costs today will be paid back with future cost reductions due to technology learning. Many sites cost-effective today.

Solar: PV market has reached the critical 500 MWp/year globally, and grows > 25% pr. year

