

Seminar Organised by INFORSE & EUFORES & EREF



Brussels, November 9-10, 2004
 Presentation by Gunnar Boye Olesen, INFORSE-Europe

INFORSE-EUROPE
 International Network for Sustainable Energy - Europe

A Vision for a Sustainable Development of the EU Energy Systems
The 15 "old" EU countries
 (Poland and 10 new countries coming soon)

By Gunnar Boye Olesen, INFORSE-Europe

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 European Energy Policy Seminar
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Vision 2050

The World Energy System

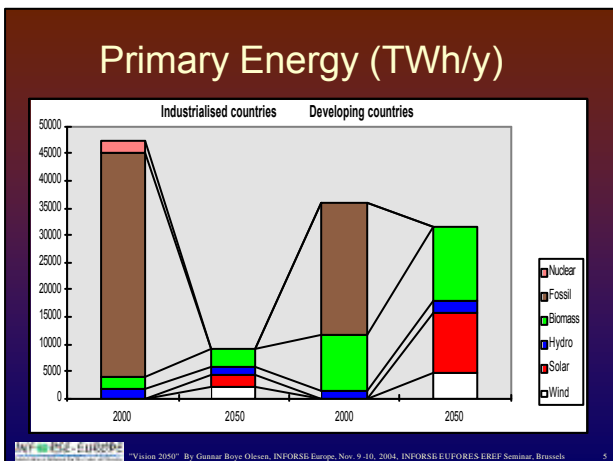
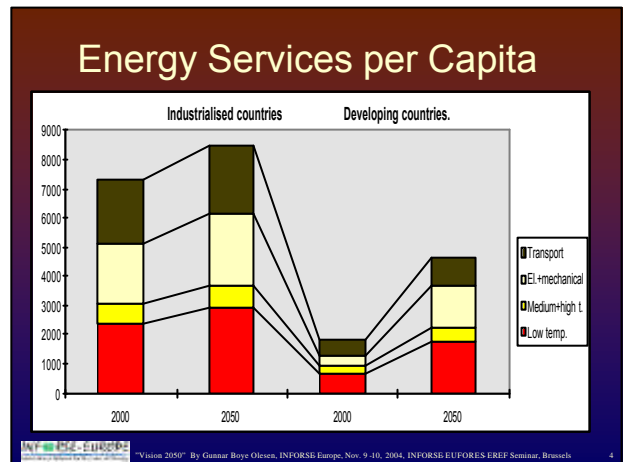
- ❖ is beyond the environmental limits
- ❖ does not provide basic energy needs as light and healthy cooking facilities to 1/4 of the world's population
- ❖ Environmental imperative: keep global warming to 1°C
- ❖ Social imperative: provide all with basic energy needs and allow developing countries to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

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Environmental Imperative

- ❖ The climate sensitivity is commonly accepted to be in the range of 1.5 to 4.5°C
- ❖ To be sure to keep global warming below 1°C century, we must limit global CO₂ emissions to 225 Gigaton of Carbon in 21st century = 35 years of current consumption (assumed climate sensitivity of 3.5°C)

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Vision 2050 for EU-15

Wind: Growth to 70,000 MW in 2010, 200,000 MW in 2020, and 310,000 MW in 2030, ending with 390,000 MW in 2050. Windpower is cost-effective: extra costs today will be paid back with future cost reductions (EU average)

Solar: Solar thermal growth to 5.5 m²/capita, PV to 4 m²/capita in 2050

Solid Biomass: Growth to 4100 PJ following WBGU ecological limits, (& EU White Paper target) + energy crops of 4-5% of agricultural area

Biogas: To grow to 750 PJ, about 20% above White Paper target

Hydro: Grow 20% from 2000

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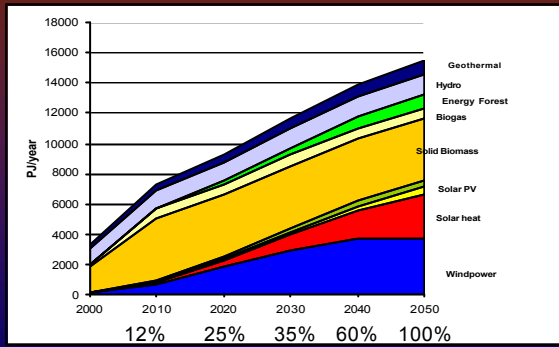
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Renewable Energy Supply



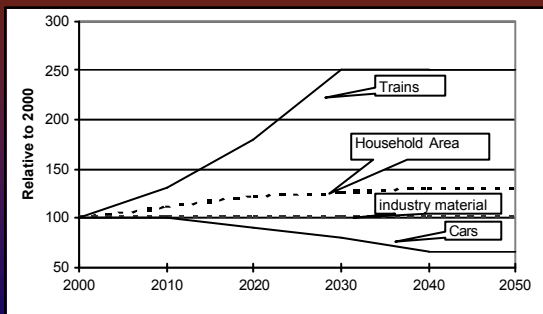
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Energy Demand

- ❖ Most energy consuming equipment will be replaced many times before 2050: new generations must be more effective. Technology learning drives prices down. Factor 4 realised to 2050 in industry & el
- ❖ One exception is houses. In EU, houses could use only 1/7 of today's heat demand, but transition takes time. Reduction 2%/year from 2010, 57% to 2050.
- ❖ For transport is expected increase in conversion efficiency from today's 15-20% to 50%, and re-gain of "break energy". Factor 4 realised to 2050.
- ❖ Vision of change from road to rail, no more cars, road transport reduction 35% for cars & trucks; large increase in rail transport

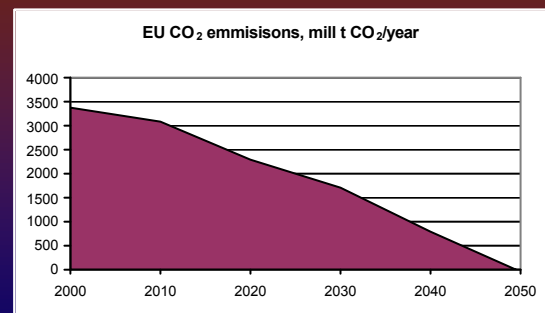
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Increase in Energy Services



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Effect: Large CO₂ Reduction



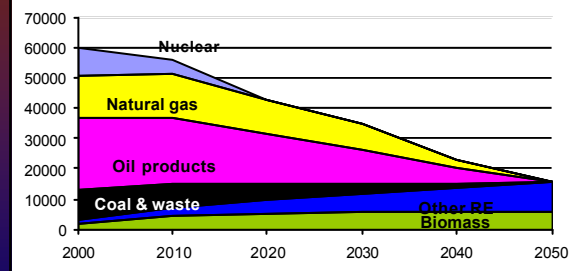
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Scenario Effects

- ❖ Electric grid remains
- ❖ Increase in energy storage demand from 2030 Intermittent electricity supply growing to 51% in 2030 and 64% in 2050, but flexible use grow to 6% in 2030 and 20% in 2050
- ❖ Nuclear phase-out 2010-2020
- ❖ Fossil phase out until 2050
- ❖ Because of large learning rates for the new technologies, costs can be minimal.

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Primary Net Energy Supply, EU-15 (PJ)



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