


Transition to Renewable Energy until 2030 – 2050 in the EU and Denmark, INFORSE Vision

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http://www.inforse.org/europe/seminar09_Artefact.htm



The INFORSE Vision

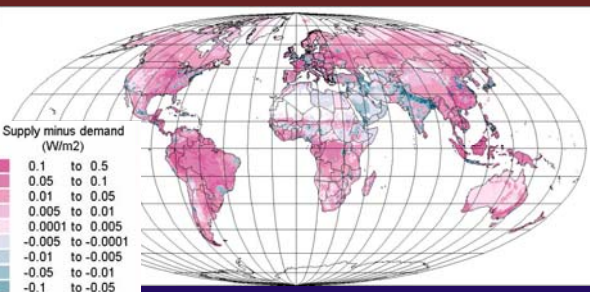
- Phase out fossil fuel and nuclear power
- Provide everybody with basic energy needs



INFORSE Sustainable Energy Visions

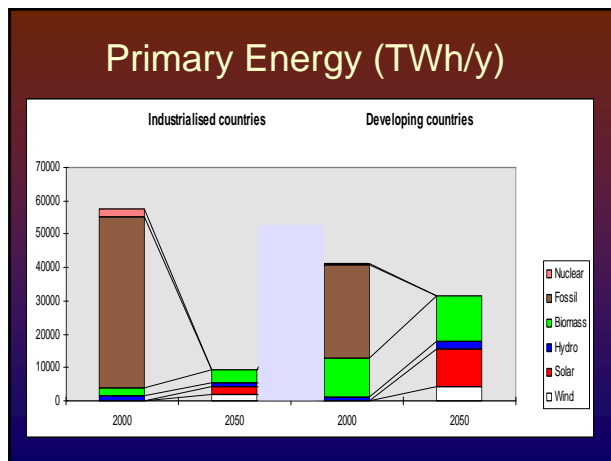
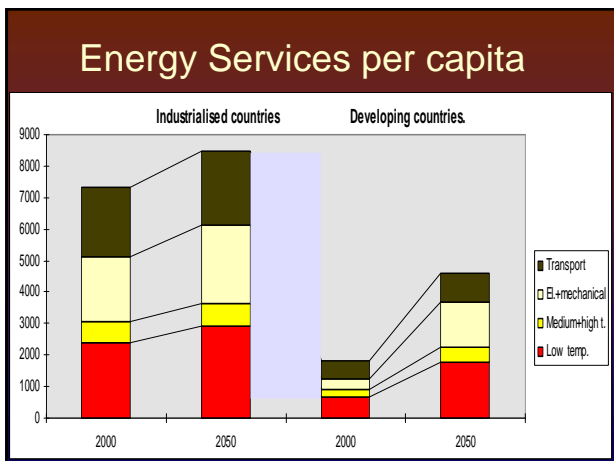
- Global Vision
- Vision for EU-27
 - Bulgaria
 - Denmark
 - Latvia
 - Lithuania
 - Romania
 - Slovakia
- UK Zero Carbon Britain
 - Belarus
 - Russia
 - Ukraine

The Global Vision

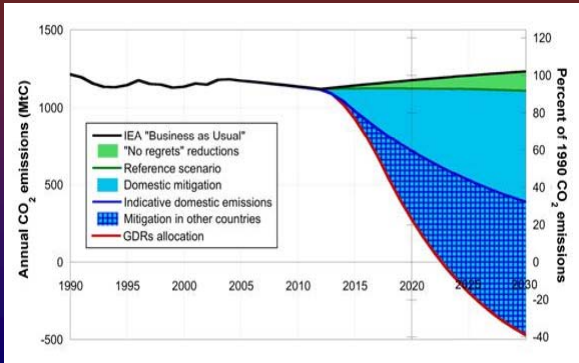


Supply minus demand (W/m²)

Prof. Bent Sørensen, 100% Renewable Energy Scenario, Low Energy Consumption Scen. 1999



EU's Challenges in a Global Development Rights Framework

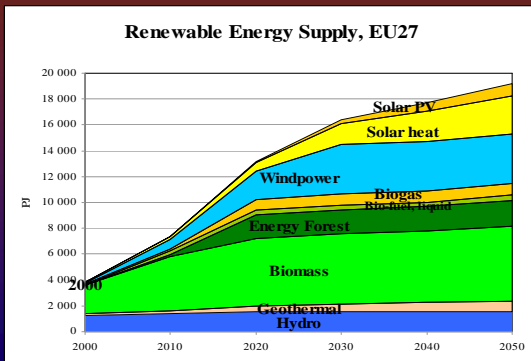


EU-27 Sustainable Energy Vision

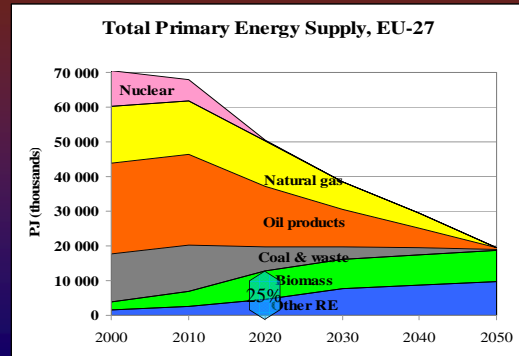
Input:

- Modest increase in energy services, less road transport
- Large increase in energy efficiency, factor 4 in end-use sectors when possible
- Efficient energy supply with combined heat and power, smarter and more efficient grids
- Rapid development of renewable energy
- Phase out of nuclear until 2025

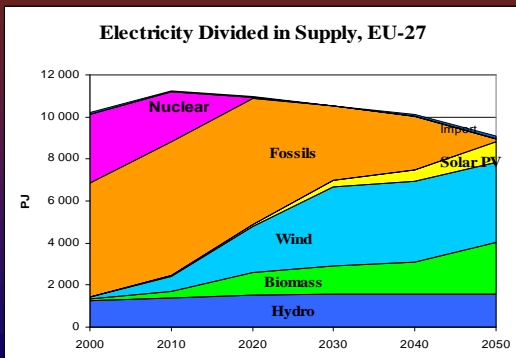
Renewable Energy Supply - EU27



Primary Energy



INFORSE's EU-27 Vision

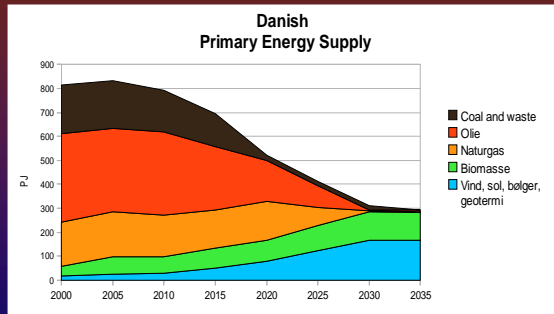


Vision for Denmark (OVE)

- ❖ Strong growth in windpower, sust. biomass
- ❖ Reduce specific building consumption 39% to '30
- ❖ Reduce specific electricity use, industry 42% to '30
- ❖ Flexible energy: district heating, heat pumps, electric cars and hydrogen
- ❖ Sustainable transport system, 80% more efficient
- ❖ No new international power lines



Danish Primary Energy Demand



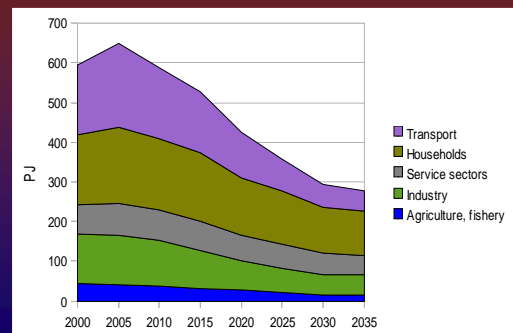
Development of activities, DK



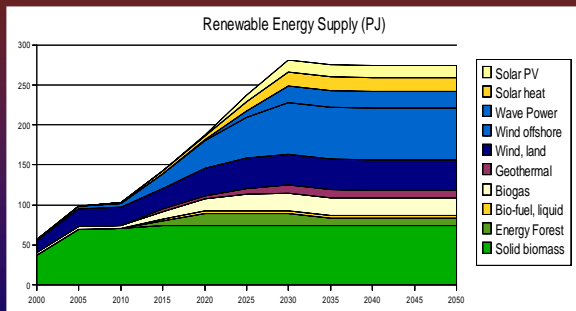
Energy efficiency in Denmark



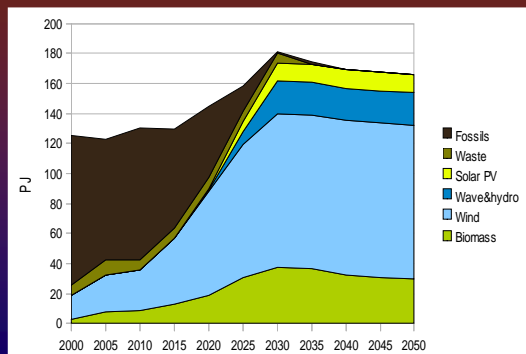
Final energy demand, all energies




Danish Renewable Energy



Danish Power Supply



CO₂ emissions from energy

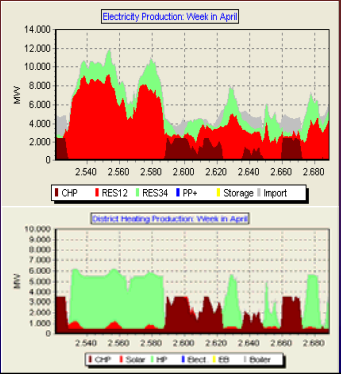


- In total 2 t/capita per year in average 2010 – 2049 = sustainable level

System in balance in 2030

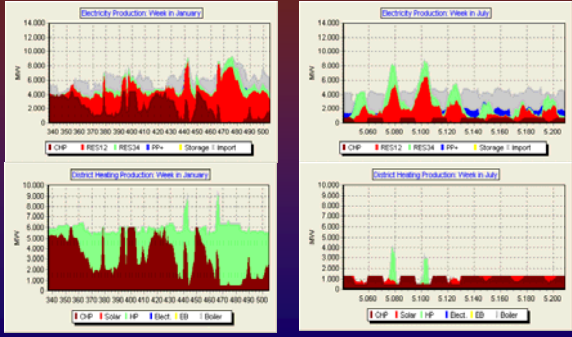
- Hourly balances made with Energy Plan programme
- 1% unused windpower
- Existing import/export lines

RES12 = Wind
 RE34 = wave+PV
 CHP incl. geothermal

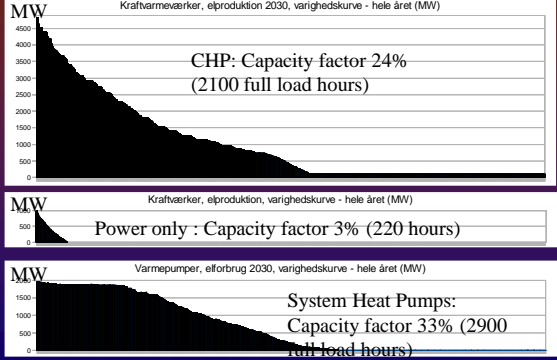


Balance in all Seasons

January, calm July, calm



Variations in Power Supply & Heat P.



Kraftvarmeverker, elproduktion, varighedskurve - hele året (MW)
 CHP: Capacity factor 24% (2100 full load hours)

Kraftværker, elproduktion, varighedskurve - hele året (MW)
 Power only : Capacity factor 3% (220 hours)

Varmepumper, elforbrug 2030, varighedskurve - hele året (MW)
 System Heat Pumps:
 Capacity factor 33% (2900 full load hours)

Thank you



See www.inforse.org/europe