INFORSE-EUROPE
International Network for Sustainable Energy - Europe

Full Use of Local Flexibility: An Intelligent Grid for 100% Renewables in Denmark

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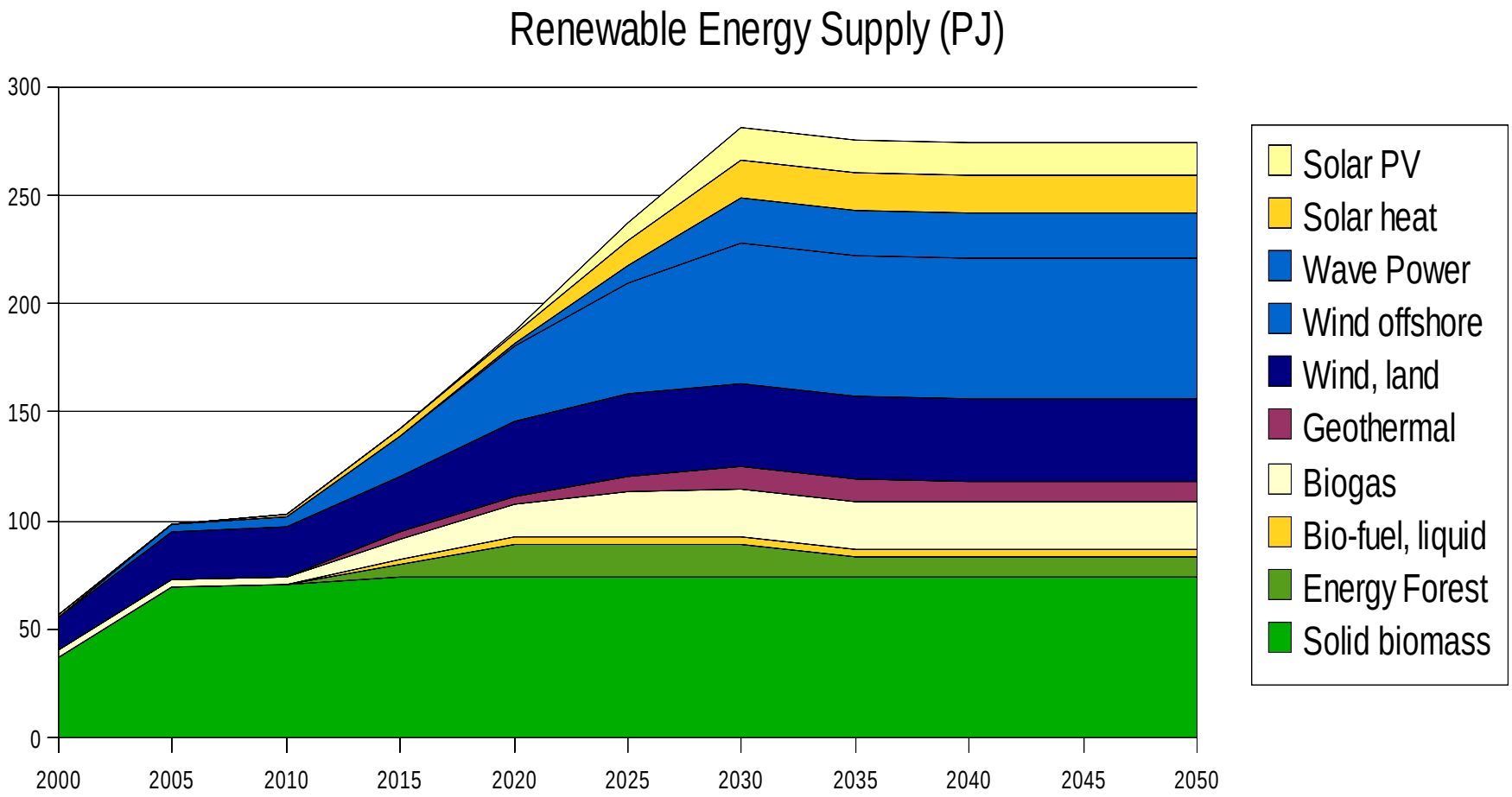
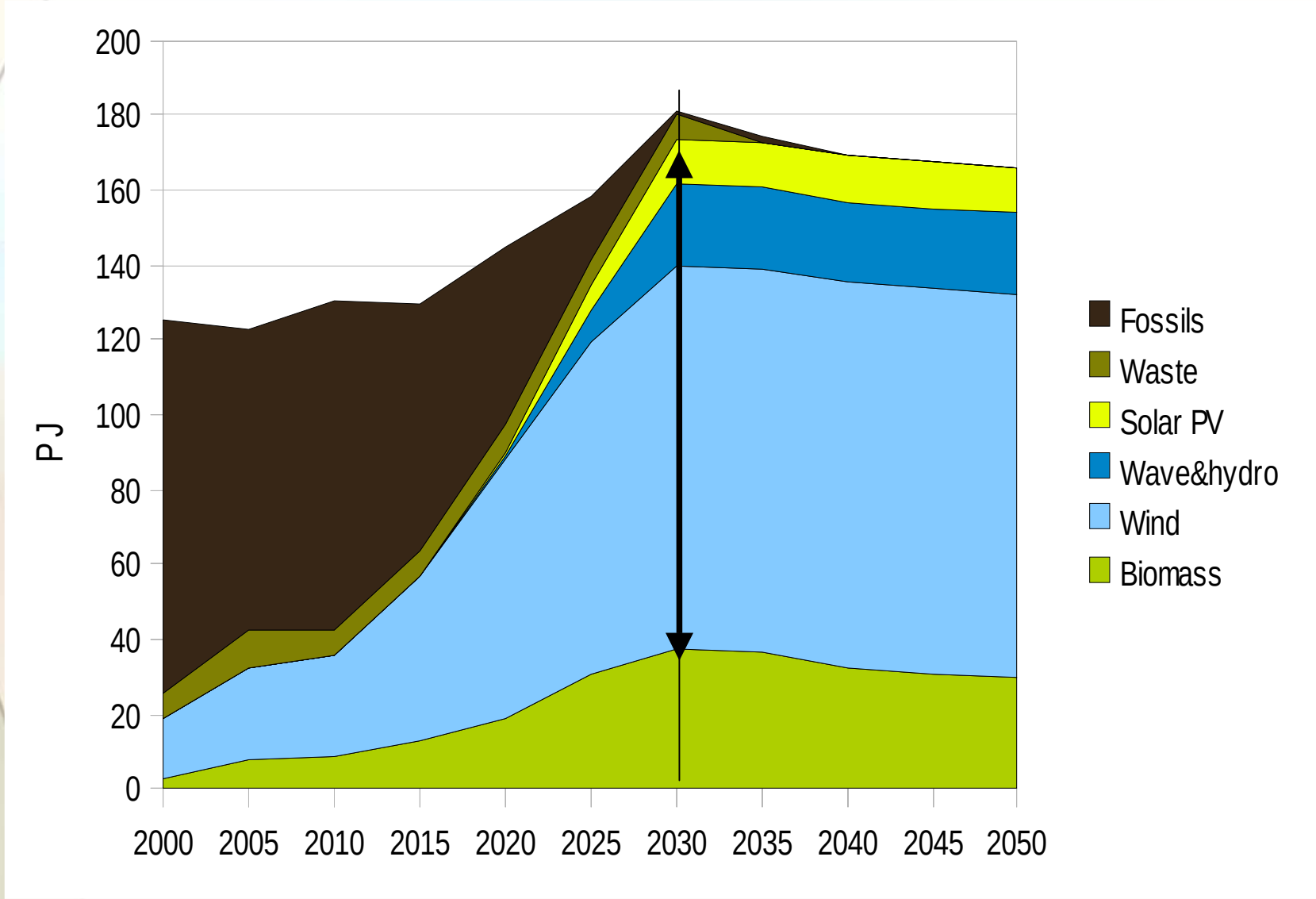
http://www.lowcarbon-societies.eu/index.php?id=22

EU Stakeholder Seminar on
Low Carbon European Energy Scenarios 28. April 2010

Danish Renewable Energy



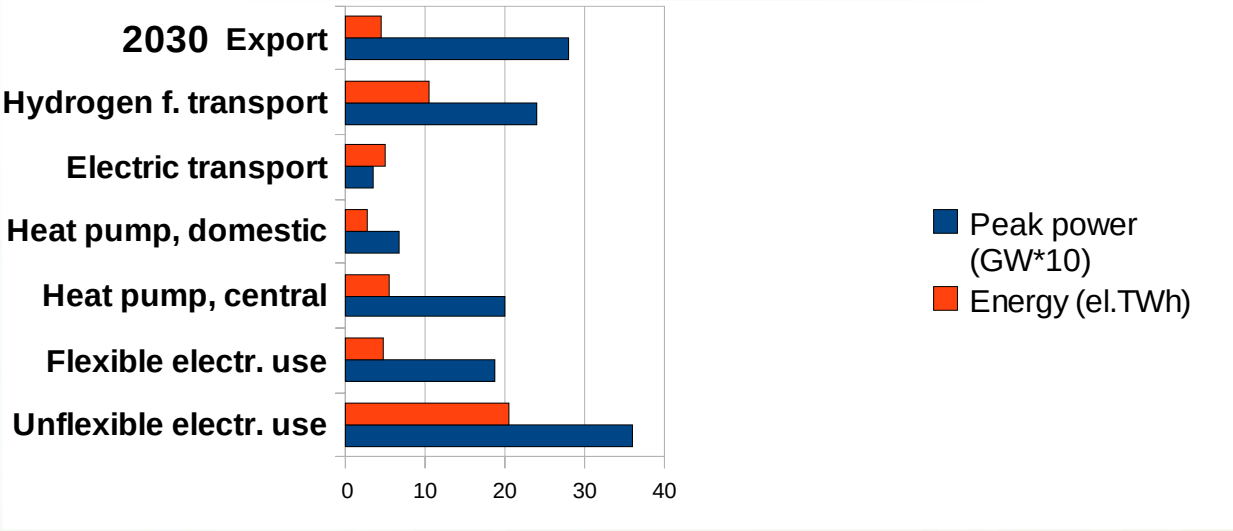
Danish Power Supply

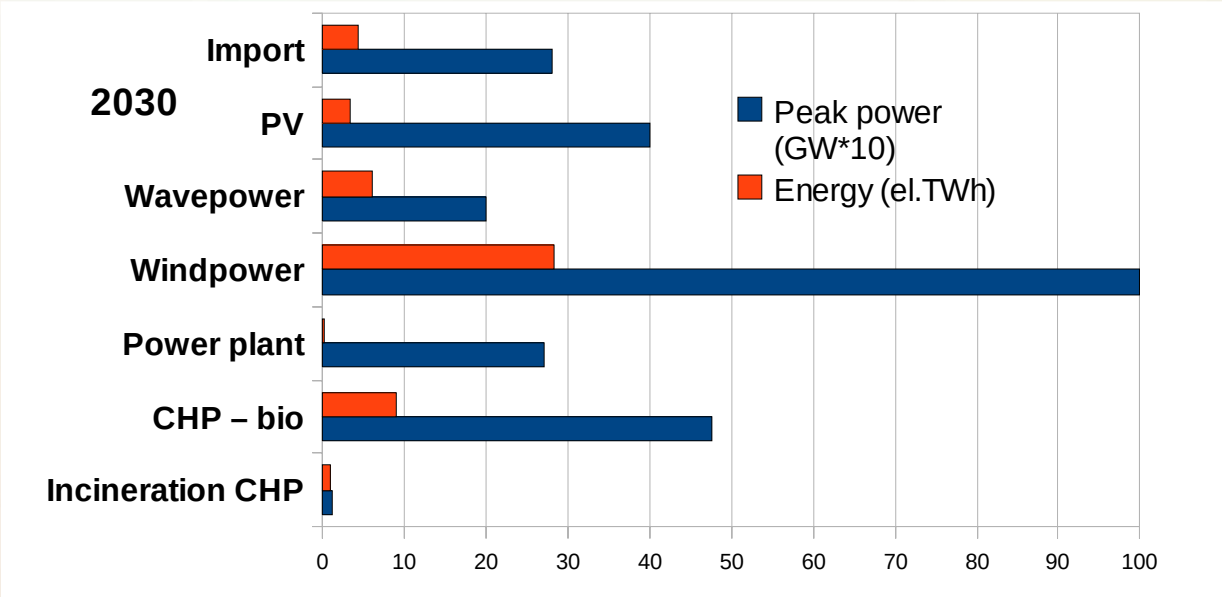


Power system for flexibility

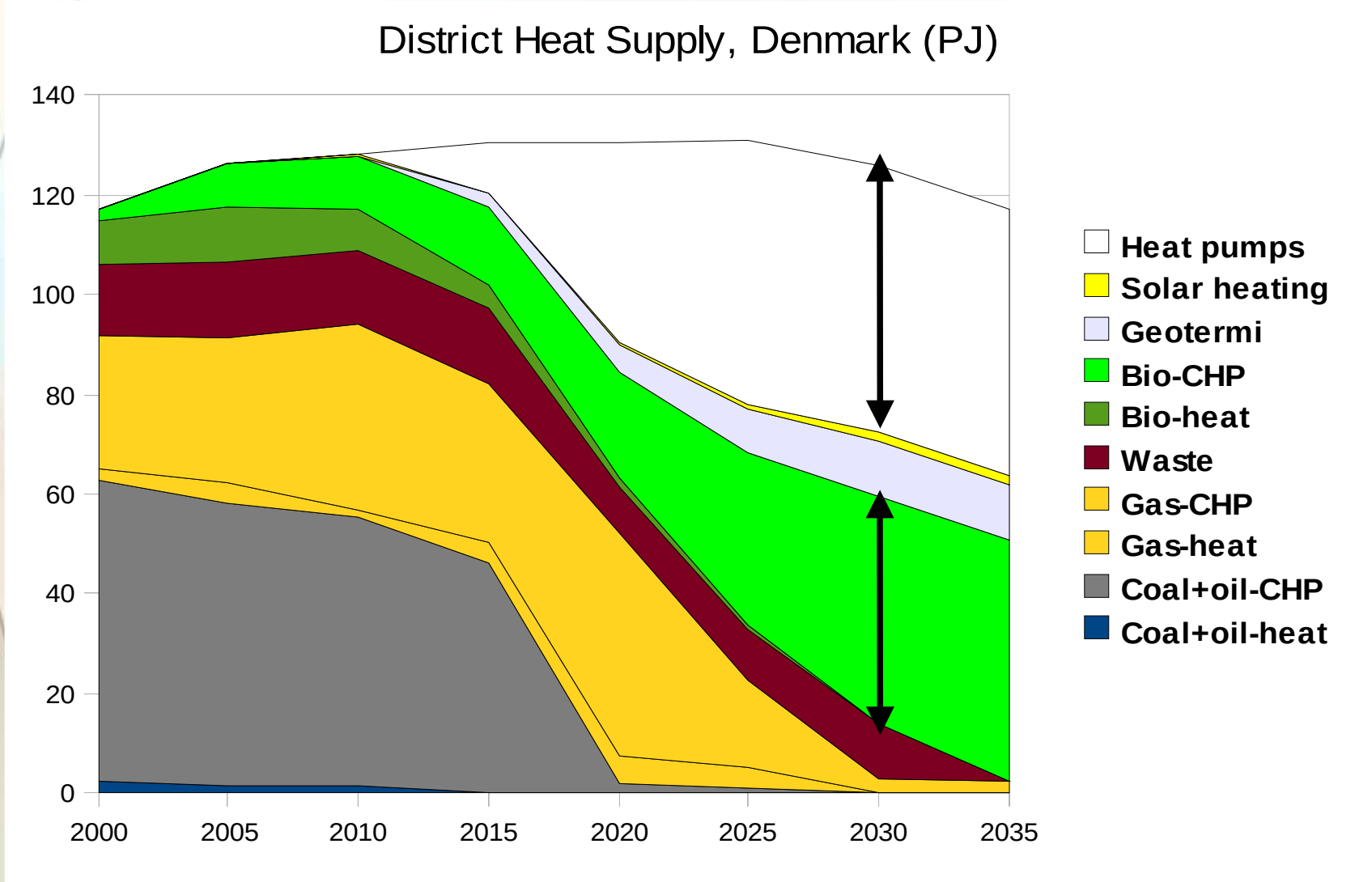
- Efficient power use, reduce demand 30%
- 10% flexible electricity use from current use
- Heat pumps in district heating + 3 day storage (water)
- Heat pumps in households, 25% of dwelling+day storage (water)
- Electric cars, flexible (smart) charge
- Hydrogen production for transport with H_2 storage
- Combined Heat and Power(CHP) in district heating

Power demand and suppply

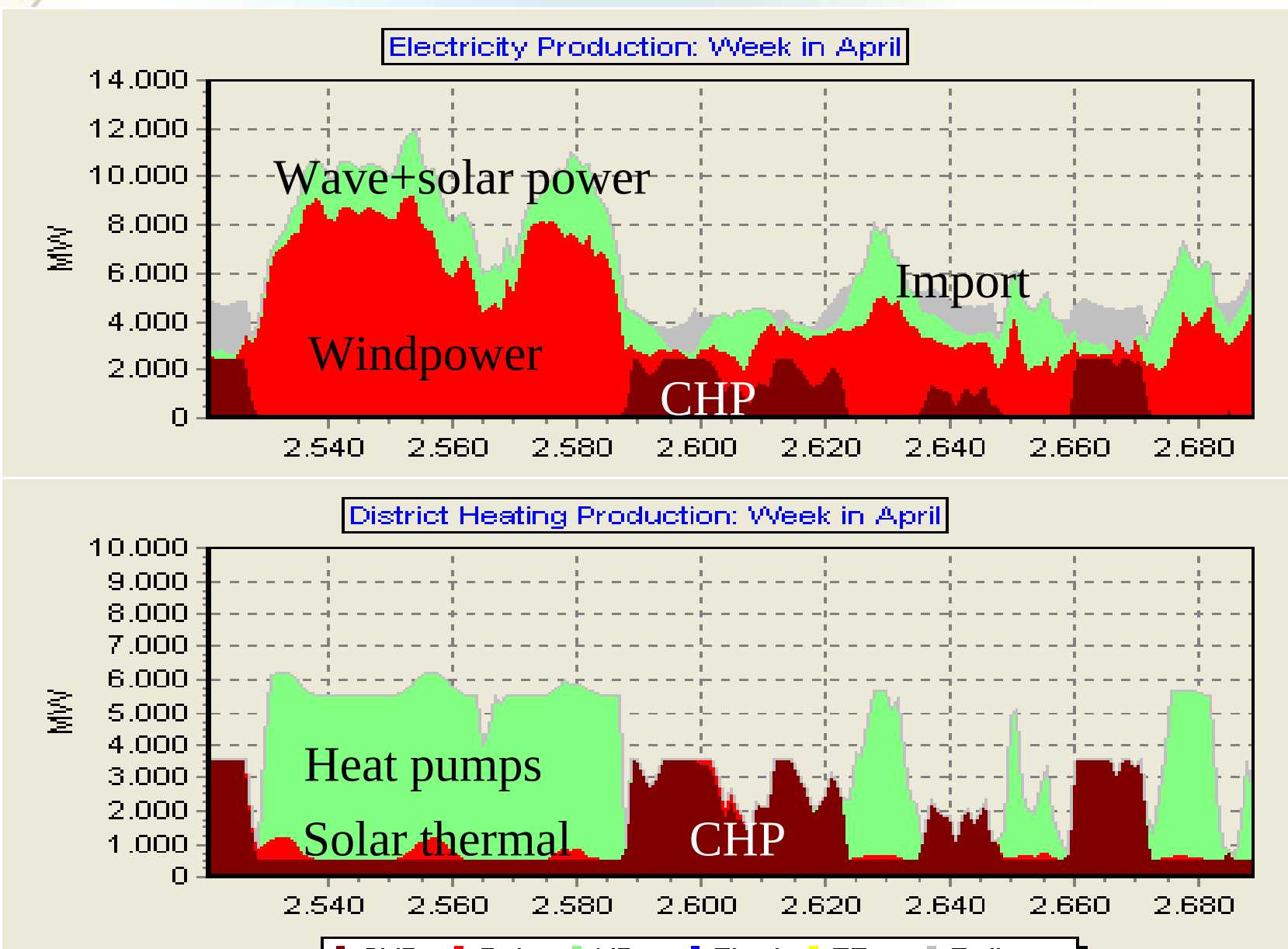




District Heating = 70% of Heat



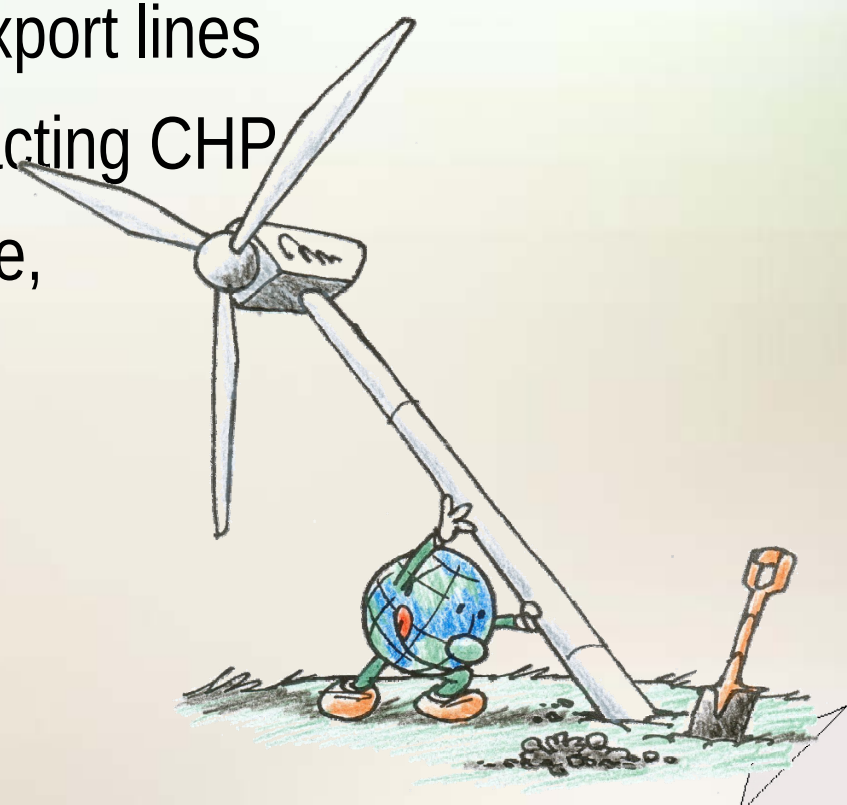
System in balance in 2030 – hour by hour



Some results

- System can be in balance
- 1% unused windpower
- only need for existing import/ export lines
- need for smart grid and fast reacting CHP
- not base load in traditional sense,

but need for regulation power



Thank you

See
www.inforse.org/europe