Scenario « 100% Renewables in EU »

Transition till 2030 - 2040 in the EU - countries

- The INFORSE Vision

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Presentation, 2. December, 2010
European Parliament, Brussels
European network of 80 NGOs working for renewable energy and energy efficiency

Active on EU policies, sustainable energy, visions/scenarios, sustainable energy education, etc

Work on global climate and energy issues with INFORSE members in other continents, e.g. climate negotiations

Supported by EU DG Environment, members and others

See www.inforse.org/europe
The INFORSE Vision

- Phase out fossil fuel and nuclear power
- Provide everybody with basic energy needs, also the 1 billion that lack basic clean energy for cooking and light today
INFORSE Sustainable Energy Visions

- Global Vision
- Vision for EU-27
  - Bulgaria
  - Denmark
  - Hungary
  - Latvia
  - Lithuania
  - Romania
  - Slovakia
- UK Zero Carbon Britain
  - Belarus
  - Russia
  - Ukraine
We need to limit global climate change to 2\(^\circ\)C (or better 1.5\(^{\circ}\)C)

Only than can we avoid catastrophes for nature and humanity

In spite of recent press there has been very broad scientific consensus on this for several years

It is expressed in the IPCC 4\(^{\text{th}}\) Assessment report (2007) and stronger emphasized in later studies
EU's Challenges in a Global Development Rights Framework

http://www.ecoequity.org
The Global Vision – Enough Renewables for 9 billion people if we use it efficiently

Supply minus demand (W/m²)

0.1 to 0.5
0.05 to 0.1
0.01 to 0.05
0.005 to 0.01
0.0001 to 0.005
-0.005 to -0.0001
-0.01 to -0.005
-0.05 to -0.01
-0.1 to -0.05
-0.5 to -0.1
-1 to -0.5
-2 to -1
-10 to -2
all others

Prof. Bent Sørensen, 100% Renewable Energy Scenario, Low Energy Consumption Scen. 1999
EU-27 Sustainable Energy Vision

- Above 98% reduction by 2040,
- Fast application of known solutions to 2020 and 2030
- Sustainability issues addressed (biomass, biofuels)
- No net import or export over longer periods
Emission Reductions Close to Global Development Right Scenario
(different scales and basis, comparison not precise)
EU-27 Sustainable Energy Vision

Demand side:

- Modest increase in energy services (sufficiency/sust.)
- Less road transport in EU-15 (sufficiency, environm.)
- Large increases in energy efficiency:
- Transition to electric and hydrogen transport, ~95%
Energy Service Developments

EU-15 Activity - Relative to 2000

EU-10 Activity - Relative to 2000
Energy Efficiency Increases

► Ecodesign, EU will drive efficiency of many products until 2020, and with updates also later, energy efficiency factor 2.5 to 2040

► Factor 4 energy efficiency for personal cars until 2040

► Factor 3 energy efficiency for industry until 2040

► Factor 2 en. eff. for space heating, until 2040 (2%/year)

► 40% en. eff. for railways, agriculture, road freight

Specific energy consumption - relative to 2000
How the energy efficiency looks like (examples)
EU-27 Sustainable Energy Vision

Supply side:

- Efficient energy supply with combined heat and power (CHP), smarter and more efficient grids
- Rapid development of renewable energy
- Phase out of nuclear until 2025 (end of lifetime), no CCS
- No major imports or exports to/from EU, but electricity exchange with e.g. Norway
- Core gas network for storage, supplied with biogas
EU-27 Sustainable Energy Vision

Renewable Energy

- 460,000 MW windpower, installation rate 10% higher from 2010, 30% higher from 2020
- Solar PV and solar heating as EREC “Rethinking2050”
- Biomass total 8600 PJ, identified sustainable level (EREC ~14000 PJ)
- Biofuel as today (year 2010)
- Geothermal 1200 PJ, not much hot dry rock (¼ of EREC's potential for 2050)
EU-27 Sustainable Energy Vision

Electricity divided in sources in EU27, INFORSE Vision

- Nuclear
- Fossils
- Solar PV
- Wind
- Biomass
- Hydro
Will the EU Biomass Use be Sustainable?

* EU-15 figures up-scaled with 20% to EU-27

** DK figures up-scaled with population ratio to EU-27
Vision for Denmark (OVE) 2030

- 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
DK 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
Danish Sustainable Energy Vision

7 Scenarios for 100% Renewables in 2030

Energy supply, PJ/year

MW Windpower

Ambient heat: heat collected by heat pumps
Danish Sustainable Energy Vision

Costs

Costs calculated based on Danish national price forecasts, standard and high fossil fuel prices,
Price for entire Danish energy supply system in 2030*

*Excluding CO₂ costs, external trade is only electricity exchange with zero net annual import
Thank you

See

www.inforse.org/europe