

Transition to Renewable Energy until 2030 – 2050 in the EU and 7 countries, INFORSE Vision

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http://www.inforse.org/europe/conf_EUSEW_09_INFORSE.htm

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International Network for Sustainable Energy - Europe

International Network for Sustainable Energy

- Network of 150 NGOs worldwide, 72 in Europe
- Publish Sustainable Energy News
- Develop & promote sustainable energy visions
- Members cooperate and exchange information
- Training with Distance Internet Education for RES
- Follow international processes: Climate, IRENA
- INFORSE-Europe is European Region
- Follow EU Policies
- Supported by EC - DG ENV, Nordic Council & others

Global Energy Challenges

Global imperatives:

- ❖ The world energy use is beyond the environmental limits, we must limit global warming to 1.5-2°C above pre-industrial level
- ❖ Does not provide basic energy needs as light and healthy cooking facilities to 1/4 of the world's population

Greenhouse gas emissions should be reduced > 80%

- ❖ EU must take the lead

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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 Climate Challenge

- We must limit climate change to 1.5 – 2 °C above pre-industrial level to avoid dangerous climate change
- Even this modest temperature increase can lead to the melting of most of Greenland's ice if maintained for centuries (+7 m of sea level)
- The temperature has already raised 0.7°C
- AND we already see climate effects (stronger storms, droughts, floods) that are dangerous on local level for those affected

How to keep Temp. Raise < 1.5-2'C

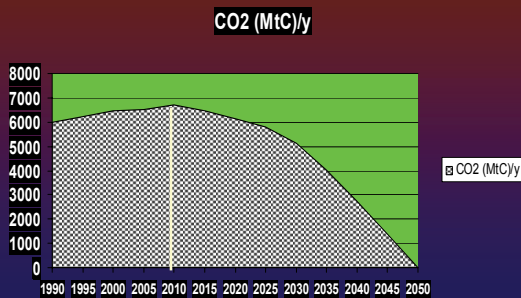
- IPCC-4 AR said that limit of greenhouse gases to 450 ppm CO_{2eq} gives a reasonable chance of keeping global av temperature increase at 2'C
- Hansen(Nasa Goddard) argues for peak of 425 ppm CO₂ and limit to 350 ppm concentrations
- Climate Safety Report (collecting newer studies) finds that we should reduce concentrations to about 300 ppm

CO₂ has increased from 280 ppm (0.028%) to 385 ppm, + 2 ppm/year
 Uncertainty is still large, mostly climate sensitivity

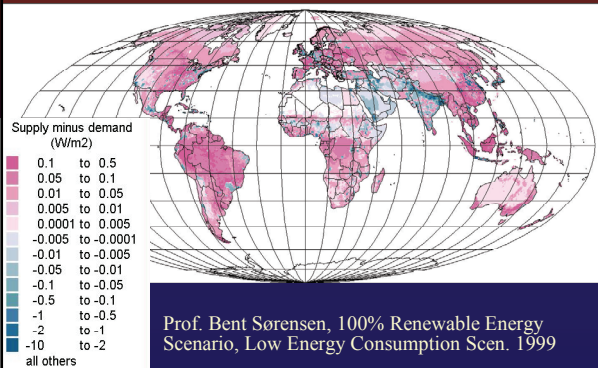
How to Keep GHG Concentrations Down

- IPCC 4AR: to keep GHG concentrations to 450 ppm CO_{2eq}, emissions must peak in 2015 and reduce 85% in 2050
 - INFORSE proposes to reduce 100% until 2050, which would lead to concentrations about 400 ppm. This will require an energy transition AND to make land-use + agriculture carbon neutral, etc.
 - Lower concentrations than 400 ppm will require faster reductions and active man-made carbon sinks
- And we must keep below triggers of natural positive climate feed-backs

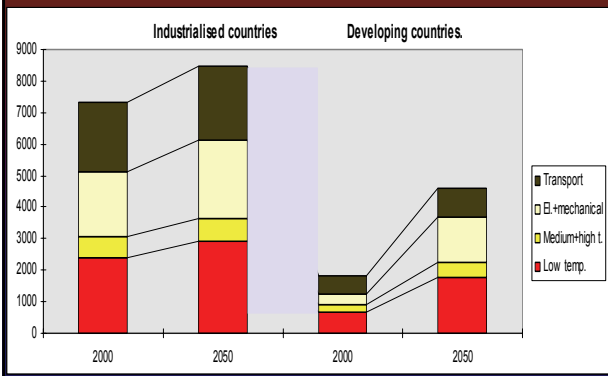
The Global Emissions Needed



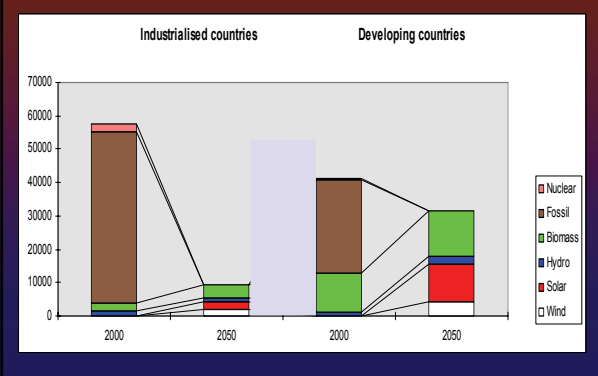
The Global Vision



Energy Services per capita



Primary Energy (TWh/y)



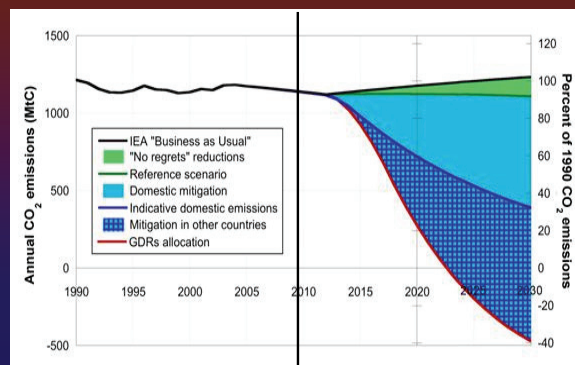
Europe's Climate Challenge

- Europe has much higher per capita emissions than global average
- Europe have even higher historical emissions
- Europe can invest in climate mitigation and adaptation without anybody suffering

One proposal for a just global division of efforts is the Global Development Rights Framework:

- all citizens with higher income above 16\$/day must act/pay
- historic emission since 1990 count

EU's Challenges in a Global Development Rights Framework



EU-27 Sustainable Energy Vision

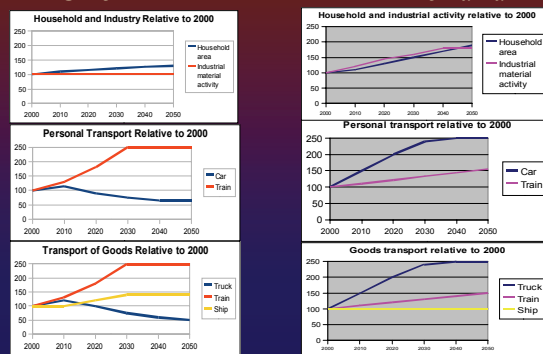
Input:

- 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 finishing in 2025

Energy Services (selected)

EU-15

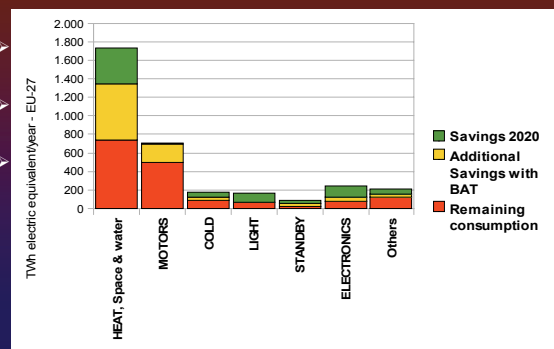
Romania



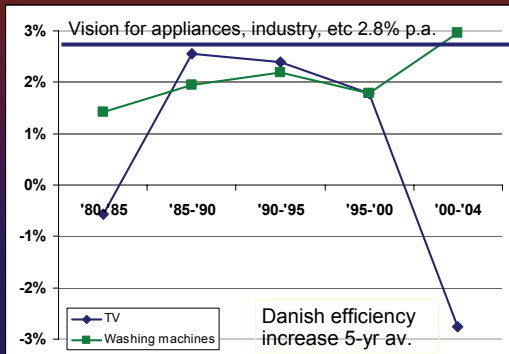
Energy Efficiency

- Most equipment replaced many times before 2050: new efficient generations can come. Technology learning drives prices down.
- EU Ecodesign will lead reductions until 2025
- One exception is houses. They could use only 1/7 of today's heat demand, but slow change. For the vision is proposed 2%p.a. specific reduction from 2010 for most countries = 57% reduction to 2050.
- For transport: increase in conversion efficiency from today's 15-20% to 50%, and re-gain of "break energy": factor 4 efficiency increase, 41% eff. increase 2000-2020 equal to change from 160 g CO₂/km to 95 g CO₂/km

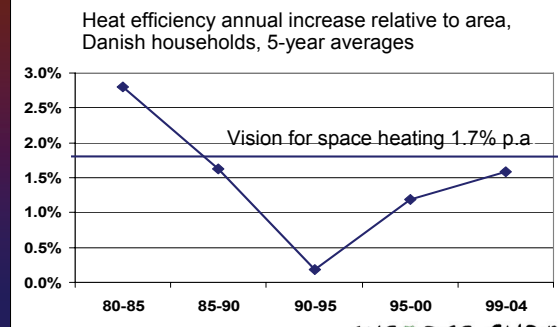
EU Ecodesign Can Drive Efficiency



Realise Efficiency – example



Realise Efficiency – example



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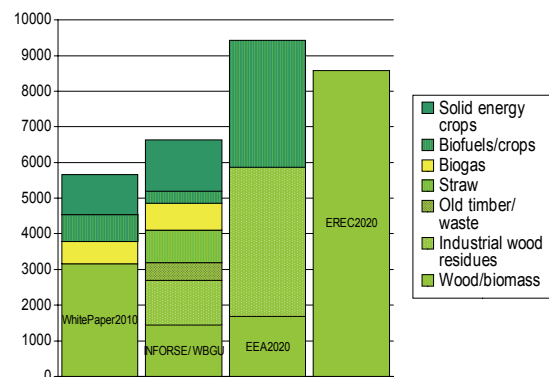
EU Energy Supply

Wind: Growth to 75,000 MW in 2010 (current trend), 230,000 MW in 2020 and 400,000 MW in 2040 (up to 15,000 MW/year), ¼ offshore. This is higher than EWEA/EREC forecasts for 2020.

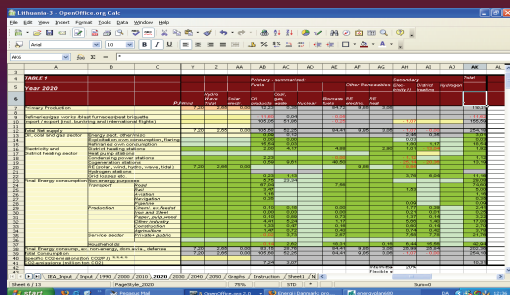
Solar: PV take-off from 2010 with 30 mill. m²/year (3 GW/year) until 2020; more later, (less than EPIA forecast), solar thermal: more until 2030 then less

Biomass: use potential of residues, biogas, 7% agri.land for solid biomass, 7% for biofuels

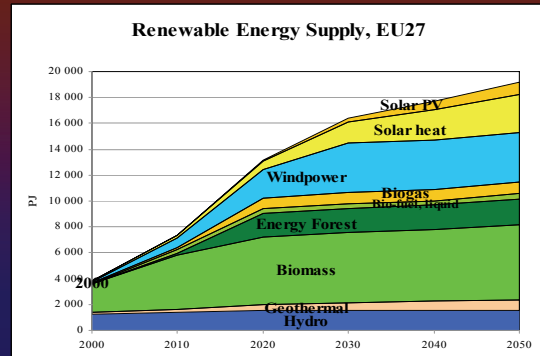
Biomass, Sustainably in EU (PJ)



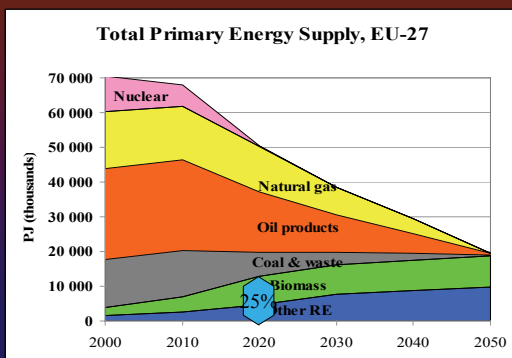
EU Sustainable Energy Vision Develop energy balances for 2010, 2020, 2030, 2040 and 2050



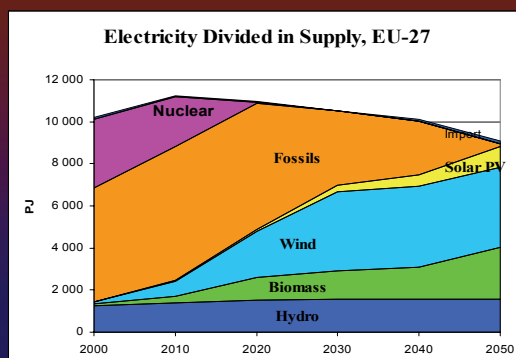
Renewable Energy Supply - EU27



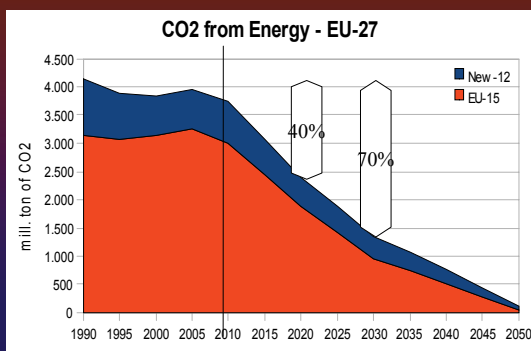
Primary Energy



INFORSE's EU-27 Vision



INFORSE's EU-27 Vision

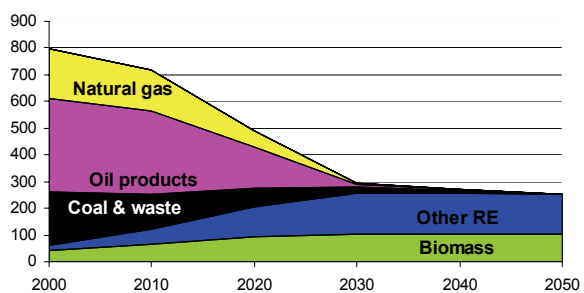


Vision for Denmark (OVE)

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



Primary Net Energy Supply, Denmark (PJ)



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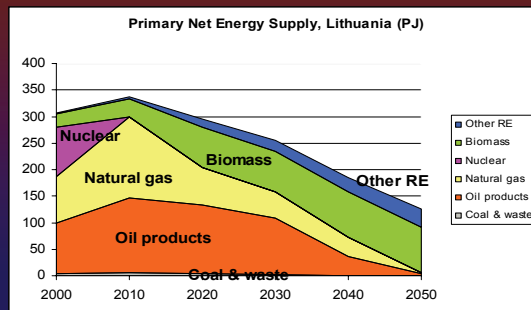
A Sustainable Energy Vision for Lithuania

- ❖ High growth of windpower, straw, wood, energy plantations until 2020, then growth in solar
- ❖ Growth trends in energy services in transport, buildings etc. will continue till 2015, and then level off gradually
- ❖ Substantial energy efficiency potentials to be realised
- ❖ Biomass CHP important part of new structure

Proposals for Actions until 2020

- ❖ Windpower development
- ❖ Better biomass use, also more efficient
- ❖ Straw use and energy plantations
- ❖ District heating and CHP plans
- ❖ Transport strategy to reduce fossil fuel use
- ❖ Strategies for biogas, solar, geothermal, hydro
- ❖ Energy efficiency strategies for heating, electricity, service sector, production

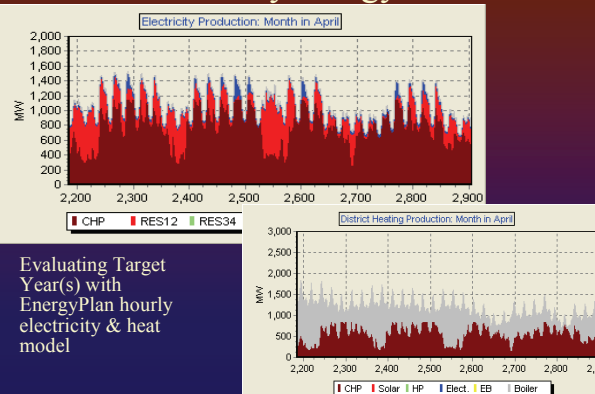
Lithuania Energy Vision



Supplementary Work

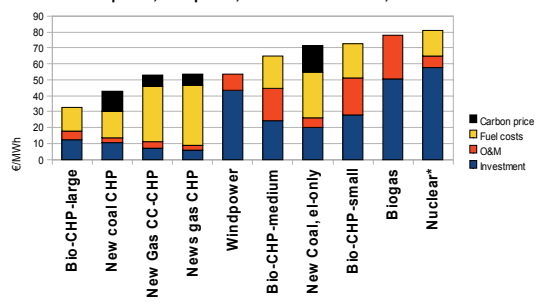
- Electricity Balance
- Costs of Alternatives
- Employment and other social effects

Evaluate hourly energy balance



Evaluating Target Year(s) with EnergyPlan hourly electricity & heat model

Power prices, new plants, reference conditions, Latvia Nov'08



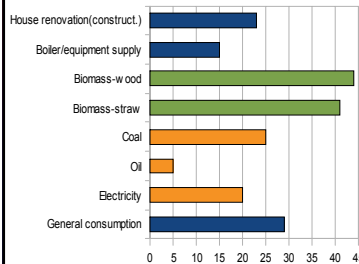
Gas price: 350 USD/1000m3
 Coal price: 100 USD/ton
 Biomass price: 12€/MWh(7Lat/m3)
 Uran price: 100 USD/pund

Operating hours: 5500 h/year
 (biogas 8000, wind 2000)
 Heat selling price:
 30€/MWh(21Lat)/MWh

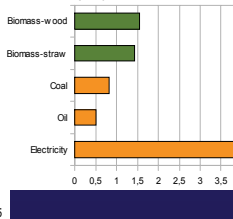
Energy & Employment (Poland)

PRELIMINARY FIGURES

Employment for 1 mill. Zloty Used (job-years)

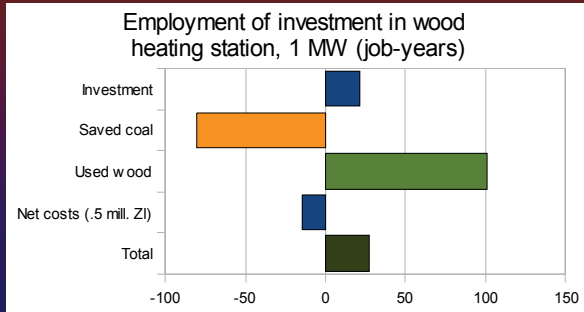


Employment of Polish energy supply (job-years/GWh)



Employment of Change to Biomass

PRELIMINARY FIGURES



Thank you



www.inforse.org/europe/Vision2050.htm

