


Seminar Organised by INFORSE & EUFORES & EREF



Brussels, November 9-10, 2004

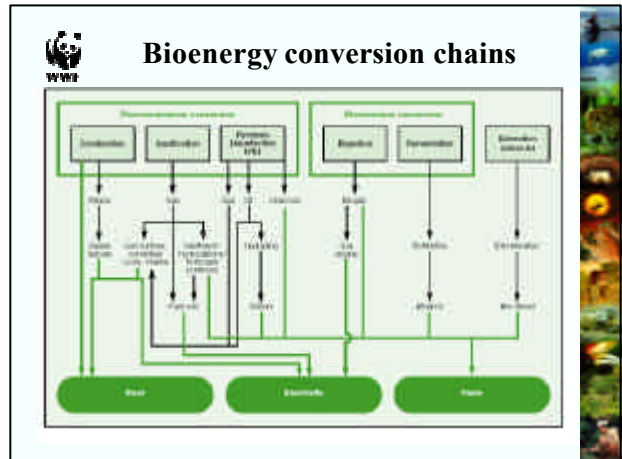

Presentation by Giulio Volpi, WWF




Bioenergy for Europe status, trends, gaps and future actions

Seminar on New and Upcoming EU Policies for Sustainable Energy and Climate Protection
Organised by INFORSE - EUFORES - EREF
Brussels, 9-10 November 2004

Giulio Volpi, WWF International
www.panda.org/powerswitch





STATUS



Bio-energy use worldwide



- Global energy demand: ~420 EJ
- About 10-15% (or 45 ± 10 EJ) of this demand is covered by biomass resources:
 - Traditional biomass: ~29
 - Commercial non-modern: 9 ± 6 EJ
 - Commercial: ~7 EJ (16%)
 - Liquid biofuels ~0.5 EJ



BIO-POWERSWITCH! Study

Key findings:

- 15% of OECD power demand by 2020 (30% under PowerSwitch Scenario)
- Up to 1800 Mt of CO₂ emissions savings (between about 10% and 30% power sector CO₂ by 2020)
- At least 400,000 full time equivalent jobs
- About 2% of the total available land dedicated to biomass production

Renewables targets (EU 15)

Doubling RES from 6 to 12% between 1995 and 2010

Type of RES	Contribution in 1995	Contribution in 2010	Additional contribution
Biomass	44.89	135.00	+ 90.20 (+ 201 %)
Hydropower	26.40	30.55	+ 4.15 (+ 15.7 %)
Wind energy	0.25	6.30	+ 6.05 (+ 2421 %)
Solar thermal collectors	0.06	4.40	+ 4.34 (+ 7408 %)
Photovoltaics	0.001	0.25	+ 0.25 (+ 25000 %)
Geothermal	2.20	5.20	+ 3.00 (+ 136 %)
Total	74.81	191.91	117.10


Source: EC White Paper 1997

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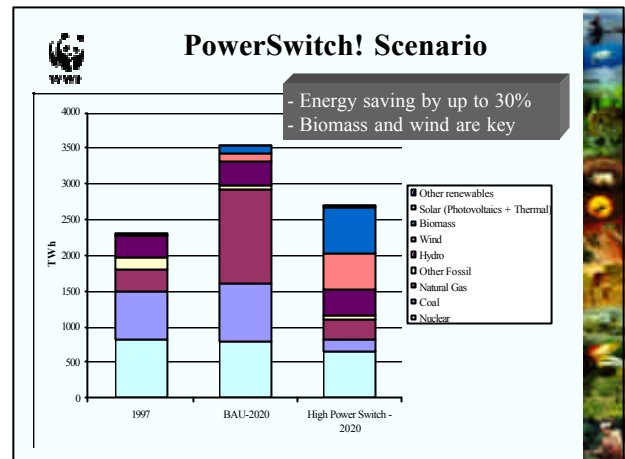

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The role of biomass


- Biomass production in 2001: 56 Mtoe
- Additional estimated 79 Mtoe:
 - +34 Mtoe for power
 - + 27 Mtoe for heating
 - + 18 Mtoe for transport biofuels

Energy production from biofuels (Mtoe)			
	2001	Additional contribution	2010
Power	13	34	47
Heat	42	27	69
Transport	1	18	19
Total	56	79	135





Biomass availability

- Not an issue! EC 2004 study "Bioenergy role in the EU market"
- Overall biomass availability in the EU 25: 140-150 Mtoe
- New Member States have high potential for both electricity and heat generation
- Untapped large biopower potential in Poland, Hungary, Czech Republic, Slovakia, Baltic countries




TRENDS



How are we doing?

- The share of renewable energy was still only 6% in the year 2000
- The increase of bioenergy in the first 5 years from 1995 to 2001 was only 6 Mtoe equal to 7% of the proposed total increase in 15% years
- Production concentrated in 2 countries. Finland accounts for 30% and Sweden for 17%. Need for other countries to follow (Germany, Spain, France, Poland, Italy)



Biopower

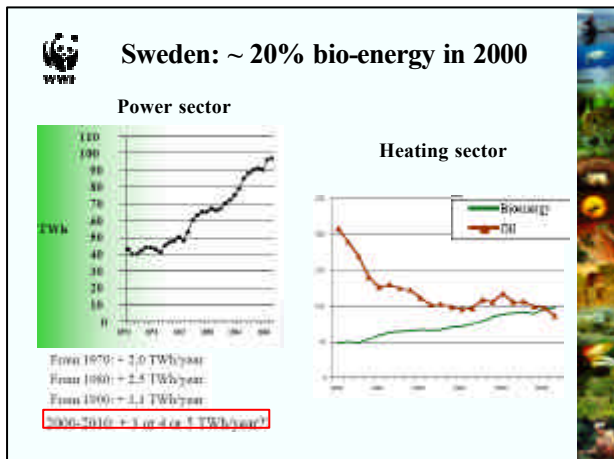
- 21% target will only be achieved if biomass contributes to 40% to it
- Biopower would need to grow by 18% per year over the next 8 years compared to the 7% average between 1997-2004
- An additional 32 Mtoe of biopower is need in the EU by 2010

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GAPS

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- ### What is not working?
- **Demand side**
 - Great potential in heating sector but competition from large scale natural gas deployment (short-term solution)
 - Lack of mandated markets for RES heating
 - **Supply side**
 - Carbon trading is not expected to benefit bioenergy
 - Need to meet increasing demand for woody biomass
 - Flow of solid and liquid biomass into EU
 - Lack of environmental certification

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- ### Energy crops
- A additional 27 Mtoe of woody energy crops is needed
 - Short rotation forestry (SRF) is a good replacement of annual food crops: more efficient and environmental friendly
 - Large scale development is needed to reduce costs (e.g. Swedish strategy estimates to cost reduced by 20-25% if area = 100,000 ha)
 - Market intervention needed to make SRF (e.g. Coppice or Miscanthus) competitive
 - Current area-payment of EUR 45/ha is expected to have marginal effect on biogas -power and bioethanol, let alone woody crops.

FUTURE ACTIONS

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- ### Actions needed
- EU level**
- Adopt renewable heat directive
 - New area-based scheme for woody and grass energy crops needed (EUR 300/ha) within the CAP reform
 - Prioritise bioenergy schemes with Structural Funds
 - Link incentives to sustainability certification schemes
- National level**
- Adopt strategic national bioenergy plans and targets (heat and power)
 - Implement realistic biopower and bioheat tariffs
 - Focus R&D on syngas based fuels (to allow biofuels from woody crops)

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Conclusions

- Bioenergy is key to meet renewables and climate goals
- Need to build political momentum for European biomass deployment strategy
- Strategic policy support has resulted in massive increase in some European countries
- CAP reform must prioritise perennial woody and grass crops
- Environmental certification is needed to guarantee sustainability

More info

www.panda.org/powerswitch

www.eugenestandard.org

Potential for Biopower in OECD Countries by 2020

Assumption (conservative)

- Recovery of 25% of technically recoverable forestry and agricultural waste corresponding to 6 EJ of primary energy
- Conversion of 5% of crop, forest and wood land to energy plantations corresponding to 10 EJ of primary energy

Results

- 15% of the power demand - 30% under PowerSwitch Scenario
- No conflict between nature conservation and biomass production - about 2% of the total available land dedicated to biomass production
- Supply for at least 100,000,000 households - estimated additional capacity of 200 GW -

Commercial bioenergy production worldwide

technology	Increase in energy production 1997-2001 (%/year)	Operating capacity, end 2001	Capacity factor (%)	Energy production, 2001	investment costs (US\$/kW)
Electricity	~ 2.5	~ 40 GWe	25 - 80	~ 170 TWh (e)	500 - 6,000
Heat ^a	~ 2	~ 210 GWth	25 - 80	~ 730 TWh (th)	170 - 1,000
Ethanol	~ 2	~ 19 bln litres		~ 450 PJ	
Bio-diesel	~ 1	~ 1.2 bln litres		~ 45 PJ	

a: Heat embodied in steam (or hot water in district heating), often produced by combined heat and power systems using forest residues, black liquor, or bagasse. Source WEA 2001

Changing technology choices

- Heat production (domestic, industrial, via CHP)
- Combustion: CHP, Co-combustion, BFB/CFB concepts; continuous increasing capacities (largest so far: 500 MWth), limited waste incineration.
- Digestion; succesfull, but limited contribution.
- Classic biofuels (RME, starch/sugar EtOH)
- RD&D: wide portfolio and considerable expenditures
 - Strong R&D effort gasification; so far limited market deployment.
 - new concepts: hydrolysis and syngas based fuels (FT, MeOH, DME H2)?

Future world's energy supply... (combined with 80% reduction of GHG-emissions)

Source: IIASA

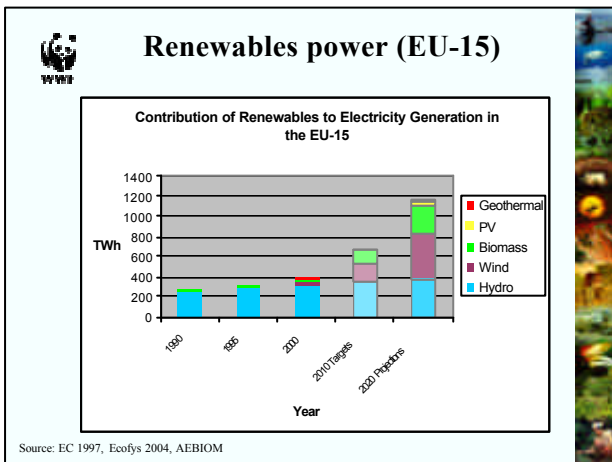
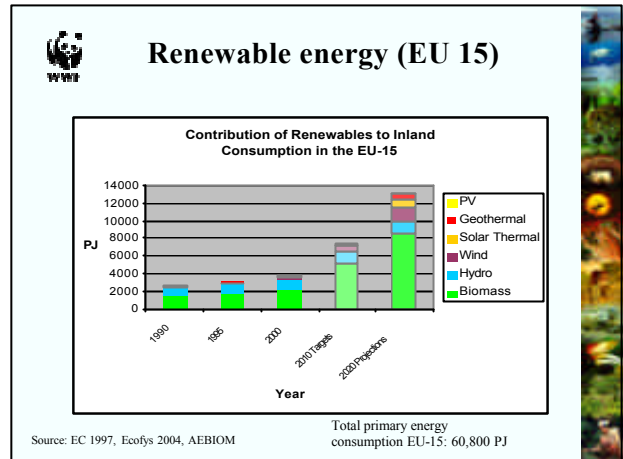
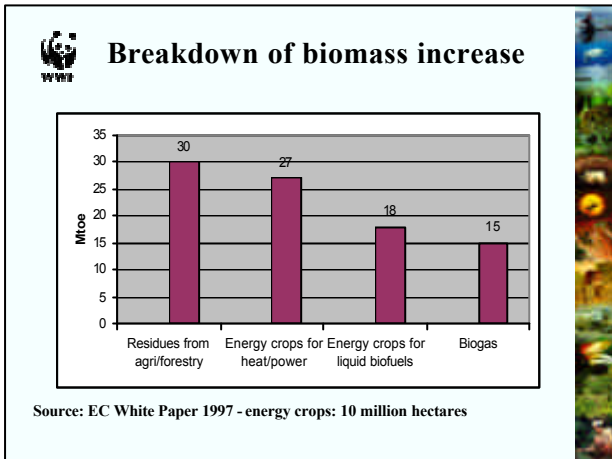
Source: Shell

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- ### How are we doing?
- **Heat:** In 1990 the production of heat from biomass 1500 PJ_{th} to over 1800 PJ_{th} in 1999 (2% per year).
 - **Electricity:** 54 PJ_e in 1990 to 166 PJ_e in 1999 (9% per year).
 - **Biofuels:** Currently 25 PJ_{fuel}
 - Biodiesel: 80 ktonne in 1993 to 780 ktonnes in 2001. (Germany and France)
 - Ethanol: 48 up to 216 ktonne in the same period. (France, Spain and Sweden)

Biopower markets (EU 15)

Country	Without large hydropower				Biomass demand (TWh)
	RES of 1997 (%)	RES of 2010 (%)	Increase to 2010 (TWh)	Increase of biomass of (TWh)	
Finland	10,4	21,7	12	10	29
Denmark	8,7	29,0	10	7	20
Germany	2,4	10,3	51	42	120
Holland	5,5	12,0	12	10	29
England	0,9	9,3	42	35	100
France	1,2	8,9	38	30	86
Sweden	5,1	15,7	18	14	49
EU 15	3,2	12,5	300	240	686

Source: AEBIOM 2004