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The countryside: production and use of renewable energies

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Paper organization

Background: our targets

Risks and challenges for the environment
- the effects of land specialisation
- the scale of the industrial plants
- the environmental and social effects outside Europe

Final remarks

Background

EU Renewable Energy Policy since 2000

- "Green Electricity" Directive (22% RES by 2010)
- Bio-fuels Directive (5.7 % transport fuels by 2010)
- Combined Heat & Power (CHP) Directive
- Directive on Energy Efficiency in Buildings
- Biomass Action Plan
- Bio-fuels communication

Backgroud: the 2007 Spring European Council decisions

Communication from The Commission: An energy policy for Europe COM(2007)1

2020 targets:

- cutting 20% of the EU's greenhouse gas emissions

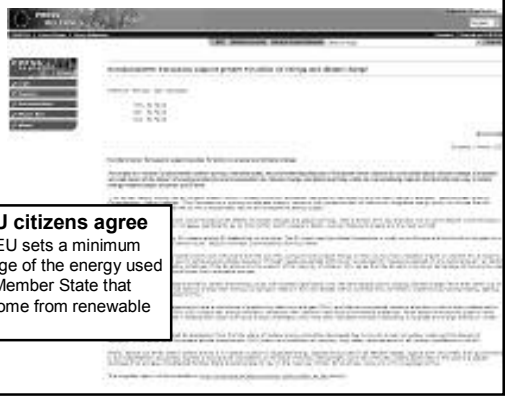
  (the EU will be willing to put this goal up to 30% if the US, China and India make similar commitments)
- 20% for renewable energy sources (compared to the present 6.5%)
- 10% for the share of biofuels in overall transport petrol and diesel consumption by 2020.

→ key role of the agriculture and forest sectors

- cutting 20% of the GHS gas emissions
- 20% for renewable energy sources
- 10% for the share of biofuels consumption

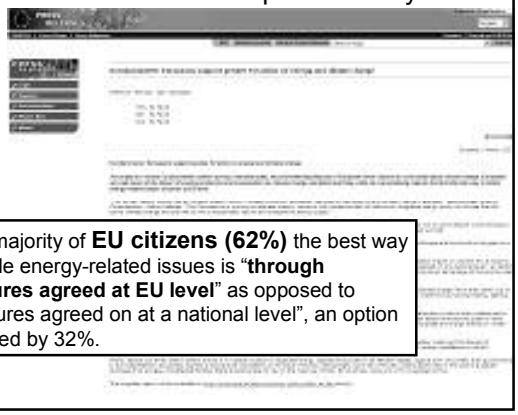
- Kyoto forests, forest management (increasing stocks), less intensive agriculture, … and
- SRF, use of residues from harvesting operations, complementary fellings, … and
- Biodisel, bioethanol and oil from crops

Not only a new policy scenario, but a new public perception of the role of agriculture



83% EU citizens agree that the EU sets a minimum percentage of the energy used in each Member State that should come from renewable sources.

..and of the EU Rural Development Policy



For a majority of **EU citizens (62%)** the best way to tackle energy-related issues is "**through measures agreed at EU level**" as opposed to "measures agreed on at a national level", an option preferred by 32%.

Risks and challenges for the environment

Changes in the countryside

Crop productions: concentration and specialization in land use.

Main EU producers

	Biogas		***Bio-ethanol***		***Bio-diesel***	
1st	UK	36.0	Spain	28.8	Germany	52.4
2nd	Germany	32.2	Germany	23.3	France	15.5
3rd	Italy	7.6	France	18.9	Italy	12.4
4th	Spain	6.4	Poland	9.0	Czech Rep.	4.2
Total		**82.1**		**80.0**		**84.5**
UE		100		100		100

A key role played by the more environmental-sensitive sector: forests

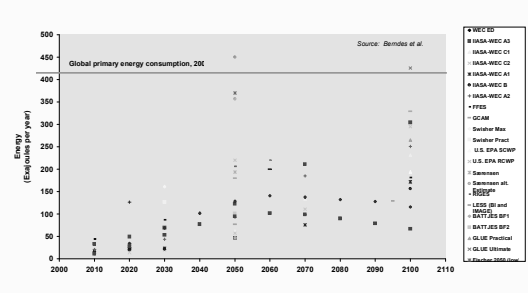
- Expanding forest area
- Harvest below increment
- Growing stock constantly rising
- Increasing abandonment of marginal forests (esp. mountain areas)

Suitability for residue extraction in EU-25 under site fertility and soil constraints (EEA, 2007)

Categories of woody biomass that contribute to renewable energy supply

- Residues from harvesting operations in the forest
- Complementary fellings (i.e. increased fellings to reach the NAI)
- Biomass from SRF
- Woody biomass from trees outside forests
- Industrial wood residues (saw-dust and black liquor)
- Recycled wood

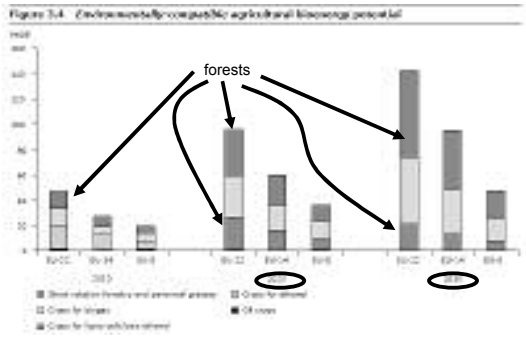
A comparative study of 13 papers on biomass consumption in 2010–2110 (source: Goran Berndes et al., 2003)



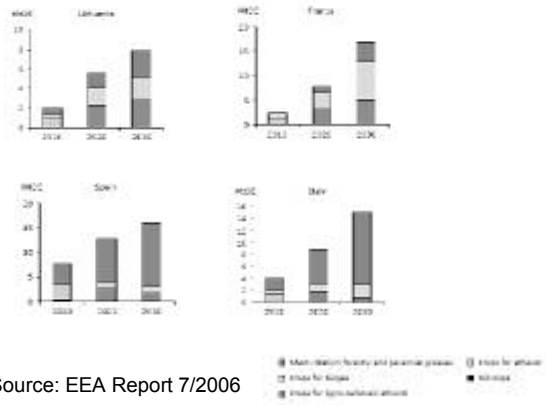
Strong **substitution process** in the panel industry:

from forest residues to wood working wastes to recycling of final wood products

http://www.pannelloecologico.com



Fonte: EEA Report 7/2006



Source: EEA Report 7/2006

Risks connected with an increased use of SRF, wood residues from harvesting and complementary fellings

- Reduction in soil fertility (and loss of C) and water protection
- Biodiversity consideration

Most of the concerns are connected with:

i. the effects of land specialization
ii. the scale of the industrial plants
iii. the environmental and social effects outside Europe

A clear trend: concentration of forest products supply

	% on total production	
	2000	*2050*
Primary forests	22	5
Secondary forests irregularly managed	14	10
Secondary forests regularly managed	30	10
Plantations with indigenous species	24	25
Plantations with exotic species	10	50

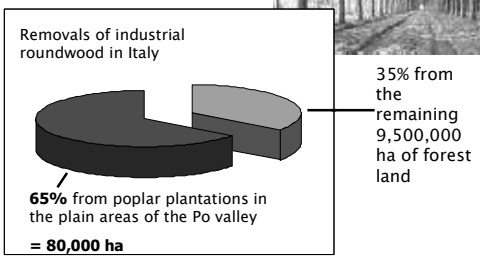
Source: Unasylva, 2001 (Sedjo)

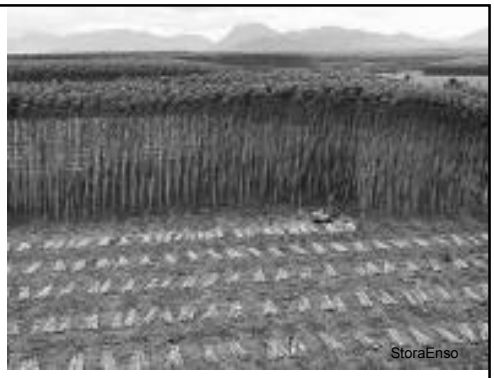
About **34% of the total timber yield in the world actually comes from plantations** (3,5% of the total world forest area)

⇨ in 2050 **about 75%**

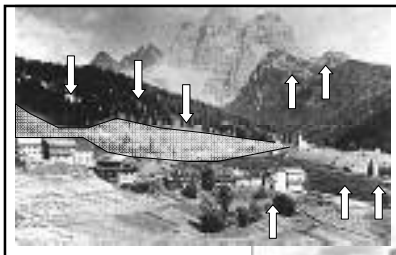
Poplar plantations in Northern Italy:

- Rotation period: 10 yr
- NAI: 15-20 cm/ha/yr
- IRR = 5-7%





Eucalyptus plantation in Brazil
NAI: > 50 cm/ha/year
t = 7 years
20-30 km from the industrial plant



b. The scale of the industrial plants

(Laszlo & Pollard, 2005)

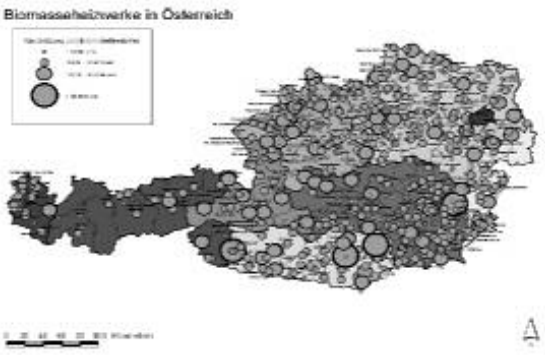
Large power plants require continuous biomass supply

- Large procurement areas are needed in a close distance
- Impacts of transportation means
- Continuous flow vs. seasonal operations.
  In many countries exploitation is only permitted in the winter. In some countries there are signs that these rules tend to be disregarded

An example: the ENEL power plant in Porto Tolle

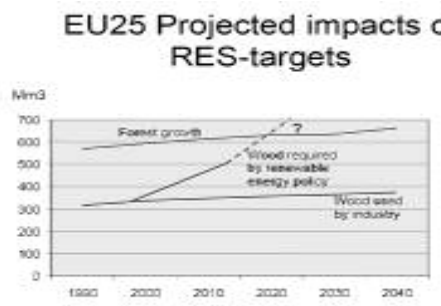
- 3 boilers (660 MWe each) using coal
- Net efficiency rate in power production: 44.6%
- Raw material consumption:
  - 3.8 M ton coal
  - 250-300,000 ton of wood biomass
    20-30,000 ha SRF

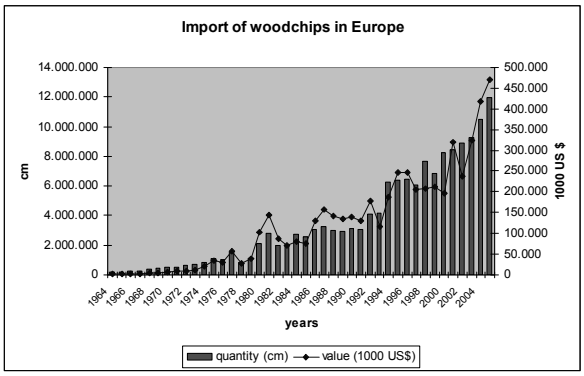
Regional Park of the Po Delta



More than 60,000 energy plants

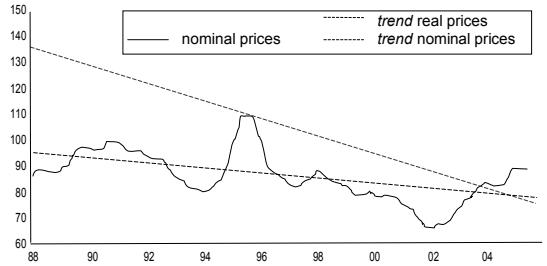
c. The environmental and social effects outside Europe





Source: FAO

Wood chips prices (softwood) in the world market



Source: Wood Resources, CIBS World Markets

	2000	2001	2002	2003	2004
Germany	792.821	842.029	699.824	505.679	337.728
Austria	392.056	274.021	478.319	342.158	205.997
France	134.984	118.187	97.523	68.677	352.020
Australia				358.521	71
Switzerland	52.184	39.214	19.902	64.235	110.396
USA	1.004	2.389	38	38.066	86.074
Brazil				33.013	47.634
Estonia					55.814
Slovenia	3.720	9.033	6.813	10.129	17.507
Netherlands	28.333				
Argentina	236			20.333	11
Portugal	8.599	7.365	2.462	1.287	188
Croatia	2.016	1.247	2.899	6.052	6.293
Albania	2.738	1.089		2.755	59
Spain	1.308	759	386	914	2.447
Belgium	2.128	3	2.714		
Hungary		34	127	24	2.631
Slovakia	60	294	179	73	600
Bosnia and Herzegovina				387	459
Kazakhstan	471				
Greece	83		177		
Malaysia	143				
Korea, Republic of		107			
Serbia and Montenegro	81				
Bulgaria	59				21
Indonesia	56			24	
Malta				60	10
Sweden					70
Chile			12	44	11
Czech Republic				23	25
Romania	14			5	22
Poland					29
Turkey				11	
Tunisia				9	
Canada					7
Denmark		4			
Lithuania				3	
United Kingdom	3				
Ecuador			1		

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771.391	154278,2
358.522	71704,4
285.931	57186,2
127.571	25514,2
80.647	16129,4
55.814	11162,8
47.208	9441,6
28.333	5666,6
20.580	4116
19.901	3980,2
18.507	3701,4
6.637	1327,4
5.814	1162,8
4.845	969
2.816	563,2
1.206	241,2
846	169,2
471	94,2
260	52
143	28,6
107	21,4
81	16,2
80	16
80	16
70	14
70	14
67	13,4
48	9,6
41	8,2
29	5,8
11	2,2
9	1,8
7	1,4
4	0,8
3	0,6
3	0,6
1	0,2

Import by Italy of wood chips (cm)

- many countries with problems of IL and corruption
- Many un-stable commercial flows

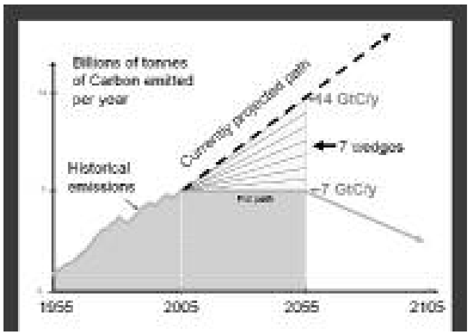
Source: FAO

Chips and fuelwood imported from Chile, Malaysia, Australia, Indonesia,… :

at which energy costs?

An EU Strategy for biofuels (COM(2006) 34) sets out that “both domestic producers and **importers** should benefit from a growing EU market for biofuels”.

An IPCC proposal for stabilising CO_2:
the Pascala & Socolow wedges
Each wedge saves 25 billion tons of emissions between now and 2050



- Fossil-carbon fuel can be replaced by biofuels such ethanol
- A wdge of biofuel could be achieved by the production of 34 millions barrel per day of ethanol to replace gasoline in 2055, provided that the ethanol is fossil carbon free
- Using current practices, one wedge requires planting an area of the size of India with biofuel crops

Source: http://www.biofuelwatch.org.uk/ .

OPEN LETTER: WE CALL ON THE EU TO ABANDON TARGETS FOR BIOFUEL USE IN EUROPE

31 January 2007

To: The Council of the European Union, the European Commission, the European Parliament, and citizens in Europe

BIOFUEL TARGETS WITHOUT MUCH STRONGER COMMITMENTS TO REDUCE CONSUMPTION ARE COUNTERPRODUCTIVE

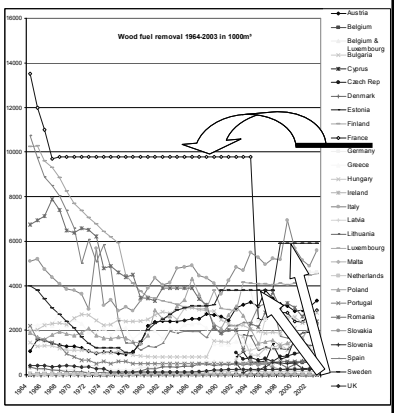
TARGETS WILL NEGATIVELY IMPACT THE GLOBAL SOUTH

Source: www.biofuelwatch.org.uk/

Final remarks

- ✓ Not always, not everywhere environmental and social impacts of the use of bioenergy are positive
- ✓ We need to focus on a gradual development of small- and medium-scale use of bieonergy for the production of heat or for co-generation
- ✓ Better information on real production and consumption is urgently needed

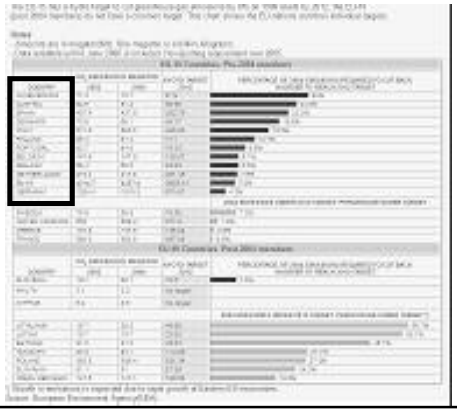
Official data =



Source: ECE-FAO
Tmber Committe

- ✓ Not always, not everywhere environmental and social impacts of the use of bioenergy are positive
- ✓ We need to focus on a gradual development of small- and medium-scale use of bioenergy for the production of heat or for co-generation
- ✓ Better information on real production and consumption is urgently needed
- ✓ Let's be realistic: reducing overall energy use, and improving energy efficiency are the real priorities

European CO_2 emissions



"Ignoranti quem portum petat nullus suus ventus est"

The wind is never favorable
to those who don't know where they are going
(Seneca)

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www.tesaf.unipd.it/pettenella/index.html