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Guidelines on local European forest energy networks
THE SOCIO-ECONOMIC DIMENSION

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Paper outline

1. **The framework**
   A. The international context
   B. Sectoral problems/policies
2. **The socio-economic dimension**
   A. Macro-economic consideration
   B. Micro-economic consideration
3. **A synthesis:** SWOT analysis of the wood energy chain

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1. The Policy framework

Two driving forces

A. The international context:
- International processes: UNFF
- Pan-European: MCPFE
- EU: Forest Action Plan, Rural Development Policy, Renewable Energy Policy

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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: increased % bio-fuels

and

The 2007 Spring European Council decisions

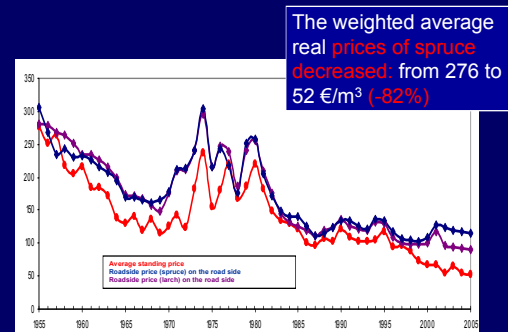Communication from The Commission: An energy policy for Europe COM(2007)1

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.

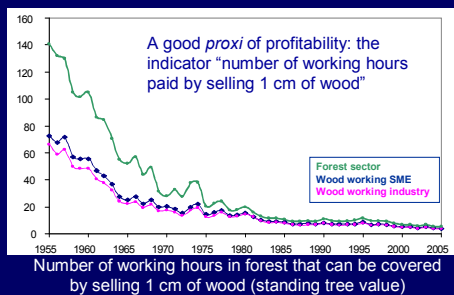## → key role for the agriculture and forest sectors

- cutting 20% of the GHS gas emissions

- 20% for renewable energy sources

- 10% for the share of biofuels consumption

- Kyoto forests, forest management (fire prevention), less intensive agriculture, … and

- SRF, use of residues from harvesting operations, complementary fellings, … and

- Biodisel, bioethanol and oil from crops (forest)

B. Sectoral problems/policies:
- Decreased price (and profitability) of timber production in Europe

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The weighted average real prices of spruce decreased: from 276 to 52 €/m³ (-82%)

Average standing price
Roadside price (spruce) on the road side
Roadside price (larch) on the road side

Average real prices of conifer industrial roundwood in the Southern Alpine Region (1955-2005)
Source: Ciotti & Pettenella (2005)

A good *proxi* of profitability: the indicator "number of working hours paid by selling 1 cm of wood"

Forest sector
Wood working SME
Wood working industry

Number of working hours in forest that can be covered by selling 1 cm of wood (standing tree value)

In 1955 **1 cm of wood** sold covered the cost of **141 working hours** of a forest worker.

In 2005 only **5.3 working hours** (-96%).

B. Sectoral problems/policies:
- Decreased price (and profitability) of timber production in Europe
- Increased forest land abandonment (with some negative spillovers)
- Development of wood energy conversion technologies
- (In some countries) changes in forest employment social structure

2. The socio-economic dimension

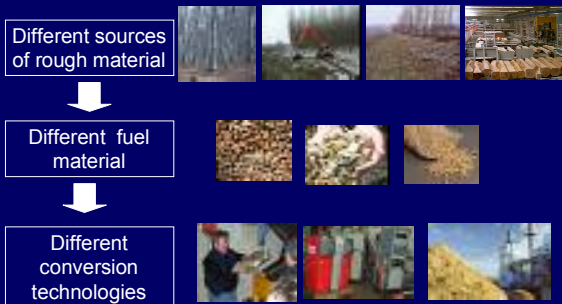## A useful distinction to analyse the economic and social dimension of the wood-energy market

- the macro-economic aspects (i.e. general interests in the promotion of woodfuel in relation to some variables like GDP, employment, security and diversification in the country's energy sources)
- and the micro-economic aspects connected with the profitability of the investments and their impacts at local scale.

A. Macro-level considerations

No general model, but "tailor made" models for each country and region

Different sources of rough material

Different fuel material

Different conversion technologies

A. Macro-level considerations

No general model, but "tailor made" models for each country and region

Different sources of rough material

Different fuel material

Different conversion technologies → Different network organization → Different consumers

## Categories of woody biomass that contribute to renawable energy supply

- Industrial wood residues (saw-dust and black liquor)
- Redidues 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
- Recycled wood

…as a consequence:

- **diversification** (→ stability in energy supply),
- adaptation to **local resources** availability
- efficient use of resources: **costs saving** (especially in the case of thermal energy);
- **positive environmental impacts** connected both to the substitution effects of the use of biomass (< C emissions) and to the maintenance of the stable forest environments (e.g. less fire hazards);
- **positive social impacts** in terms of employment, mainly concentrated in rural and sometimes marginal (mountain) areas.
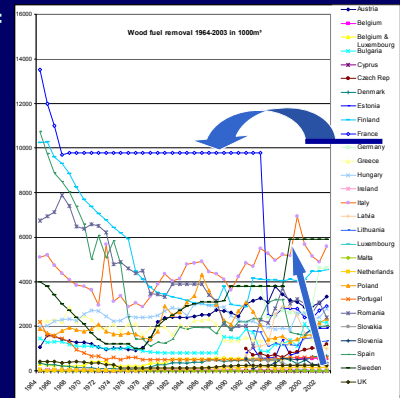
Employment effects

- 1 full-time post for 1 000 cm of wood per year (1.5-2 considering indirect impacts)
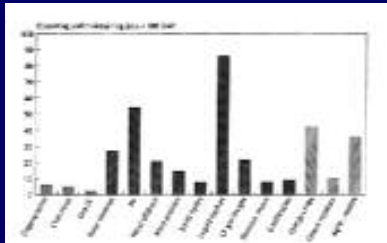
Official data =

Low quality data:
- How to make macro-economic analysis?
- how to make and control policies?

B. Micro-level considerations

3 key-factors to be considered:
- Production costs
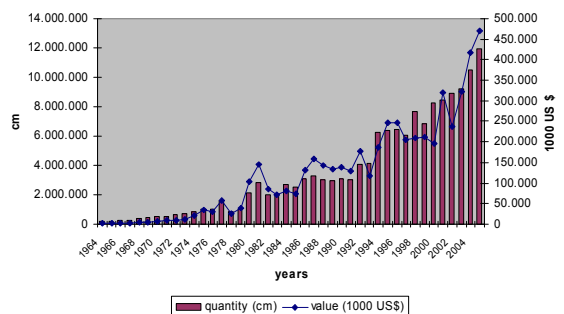- Logistic strucure
- Consumption

Production costs

- **Selling prices** range from 5 to 35 €/cm and 15 to 25 €/t (cm of dry woodchips and tons of dried material)
- **Profits for the forest owners** range from 0 to 15 €/acm or 5 to 50 €/t (when woodchips produced in the forest)
- **Profits for chipping companies** range from 15 to 25 €/acm or 35 to 81 €/t (when woodchips produced in the forest)

Woodchips production costs
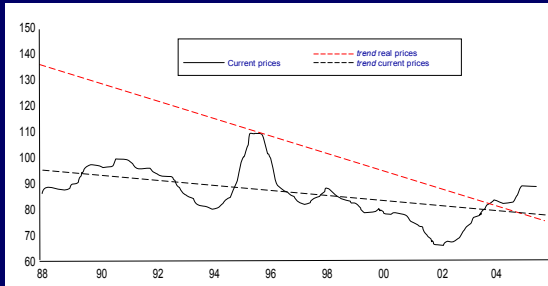Source: EUROFORENET, 2007
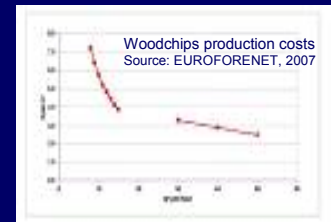
Logistics

- **road transport costs** of chips are around 3€/40 km → small-medium scale investments: local development;
- The price for **storage** is from 1,5 to 3 €/cm.
- **Loading** is around 0,75 €/m3.
- Working within a tied flux allows in reducing logistic costs (up to 7 or 8 €/cm)

- **Huge scale economies** in shipping: large scale investments (power generation)

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Wood chips prices in the world market

Legend: Current prices — *trend* real prices — *trend* current prices (axis 60–150, years 88–04)

Source: Wood Resources, CIBS World Markets

	2000	2001	2002	2003	2004
Germany	792.821	842.029	699.824	505.678	337.726
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	
Switzerland	52.184	39.214	19.902	64.235	110.398
USA	1.004	2.389	38	38.066	86.074
Brazil				33.013	47.634
Estonia					55.814
Slovenia	3.732	9.033	6.813	10.129	17.500
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	2.727	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					20
Turkey				11	
Tunisia				9	
Canada					7
Denmark		4			
Lithuania			3		
United Kingdom	3				
Ecuador			1		

Import by Italy of wood chips (cm)

Problems:
- energy balance
- many countries with problms of IL and curription
- many un-stable commercial flows

Source: FAO

Consumption

Clear and fair **contractual agreements** are essential

- wood supplied and sold **on a single delivery basis** or on an **annual basis**
- **forward sales agreements** (also long-term contracts) for chips to the plant (with penalty clause for non-delivery)
- **supply, on a long-term contractual basis, of heat and/or electricity** to the customer at an agreed price (fuel, plant and maintenance are part of the service contract) = the most advanced experiences in contracting in the wood chain (Energy Service Companies - ESCO)

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3. A synthesis

A SWOT analysis

- **strengths (S)**, needed to be maintained, built upon or leveraged
- **weaknesses (W)**, needed to be remedied or stopped
- **opportunities (O)**, needed to be prioritised and optimised
- **threats (T)** which need to be countered or minimized

	Positive aspects	Negative aspects
Internal to the investment/ activity	S	W
External to the investment context	O	T

	S	W
	O	T

STRENGTHS

ENVIRONMENT
- Carbon neutral process; low-energy material
- Increased durability
- Reduced fossil fuels imports
- Harvesting lower than net annual increment
- Annual growth exceeds annual cut

ECONOMY
- Provide added value to base material
- Economies of scale
- Diversity and security of energy supply
- Reduced fossil fuels imports
- Stimulation in the development of renewable technologies
- Modern and efficient technologies
- "Localness"
- Technological asset compared to agricultural sector (i.e. combustion efficiency)

SOCIAL
- Creation of rural revenue streams
- Local job creation or maintaining
- Involvement of local community, including private owners and entrepreneurs
- Localness (defined as "being within a fifty mile radius of home") and re-centering activities on the "local" (re-localisation)

WEAKNESSES

ENVIRONMENT
- Multiple environmental benefits not economically rewarded

ECONOMY
- Not fully accepted by the market
- Many potential applications with low demand
- Consumers stick with what they know
- High investment and wood mobilization costs
- Negative public perceptions
- Lack of awareness among decision-makers
- Lack of existing standards
- Logistical problems in the potential woodfuel supply
- Transport distances (best energy must be used efficiently to be effective)
- Workforce skills availability decreasing
- Lack of data on available biomass potential
- Uncertainties as for changes in legislation and support
- Some competition in wood use
- Insufficient data on projections of the whole energy chain
- Different stages of development in different countries

SOCIAL
- Land ownership fragmentation and lack of horizontal and vertical integration
- Lack of knowledge of the general public

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A lesson learned from the EUROFORENET:
The need of a network of local networks!