

# NoE BIOENERGY EU NETWORK of EXCELLENT in FP6



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**The European Forest-based Sector Research Forum**  
**November 9 – 10, Stockholm, Sweden**



Bioenergy NoE



## CONTENT

- **FOREST INDUSTRY IS USING TODAY ~ 40 % OF EUROPEAN BIOENERGY, BIOENERGY COVERS ~ 50 % OF ON-SITE FUEL DEMAND FOR INDUSTRY**
- **EU WHITE PAPER AND DIRECTIVES CALL FOR SUBSTANTIAL GROWTH**
- **MISSION AND STRUCTURE OF THE NoE BIOENERGY - RTD INSTITUTES**
- **ERA-NET BIOENERGY - RTD AGENCIES**
- **THE CHALLENGE OF THE BIOENERGY RELATED EU DIRECTIVES –**
  - FAST GROWTH OF BIOELECTRICITY, RES-E
  - NEW BUSINESS OPTIONS OF BIOFUELS FOR TRANSPORT
  - EMISSION TRADING WILL INCREASE THE VALUE OF BIOENERGY
- **WIN – WIN OPTION FOR FOREST INDUSTRY OR A RISK HOW TO CONTROL THE RAW MATERIAL SUPPLY AND PRICES ?**
- **CONCLUSIONS**





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# EU targets for bioenergy require research

## Energy policy targets:

- EU has to reduce Greenhouse Gas (GHG) emissions by 8 % between 2008-2012 compared to 1990 (Kyoto Protocol)
- Doubling the share of Renewable Energy sources: from 6 % to 12 % until 2010 (White Paper)
- Green Paper on Security of Energy Supply, transport 20 %

## Actions given by the EU Directives:

- Emission trading
- Power production from renewable sources: increase the share of green electricity from 14% to 22% in 2010
- Transportation fuels: 5.75 % biofuels in 2010



Waste management: Reduction of biodegradable waste to landfills

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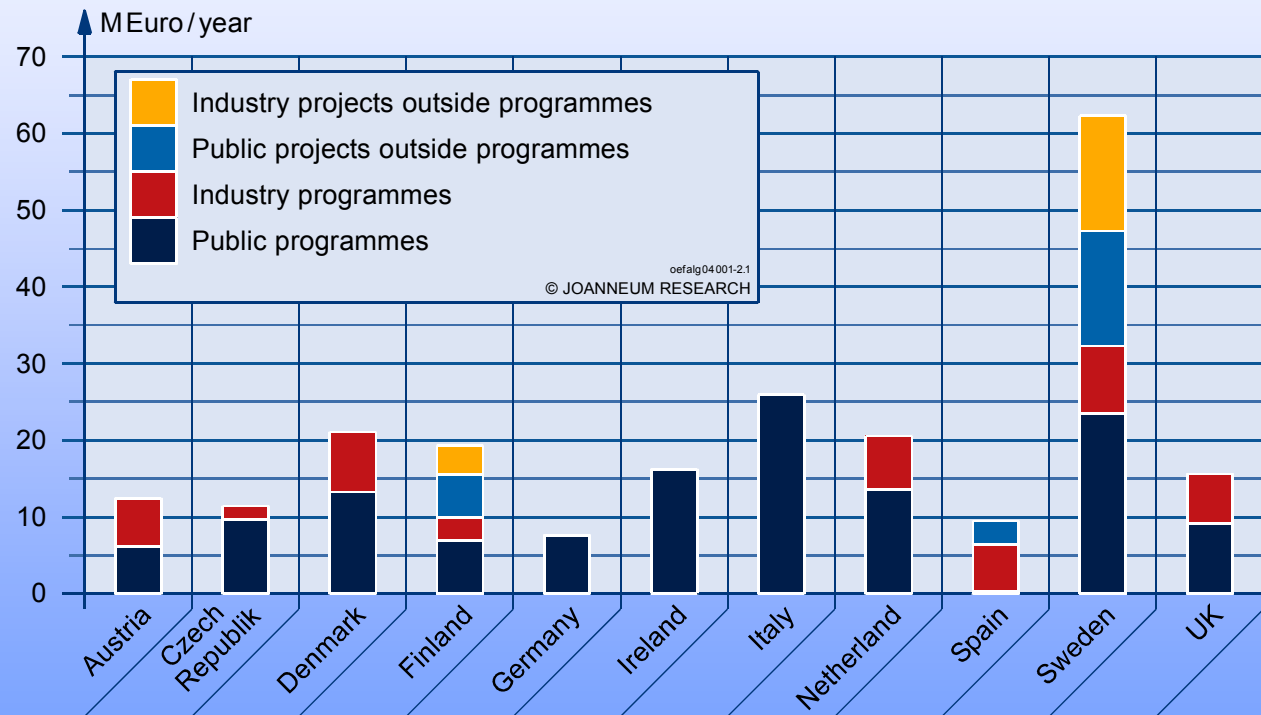
# Bioenergy RTD Funding in EU based on a questionnaire in 2002

Annual RTD  
Budgets, M€

Totally 220 M€/a  
in public RTD,  
EC funding ~10 %



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More info: ---> [www.joanneum.at/ief/erabioenergy](http://www.joanneum.at/ief/erabioenergy)



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# NoE Consortium

## New instrument:

- Duration 5 years, 2004-08
- Budget 8 M€

## Mission:

- To establish a durable integrated European research structure to promote the introduction of successful bioenergy chains

Forschungszentrum  
Karlsruhe, Germany

VTT, Finland  
Co-ordination

IIIEE, Sweden

Biogenic  
waste to  
energy

CHP, large  
scale systems,  
forest industry

Environment,  
socio-  
economics

Training,  
education,  
dissemination

Permanent  
Bioenergy  
R&D Centre

Climate issues,  
small scale  
applications

Joanneum  
Research,  
Austria

Aston  
University, UK

Agro-  
biomass

Land use  
change and  
biomass  
resources

Biofuels for  
transport

INRA, France

ECN, Netherlands

EC BREC, Poland



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# NoE Bioenergy - Phases in Integration

## Identification of barriers

### Integrating areas:

- Large scale, CHP and Forest industry
- Climate implication and Small scale systems
- Liquid biofuels for transport
- Biogenic waste to energy
- Socioeconomics and environment
- Agricultural biomass
- Land use change and resources

## Synthesis to overcome the barriers

Scenarios from Directives

Common NoE Strategy

Industrial partners and the Advisory Group

Interaction with the Technology Platforms

- Forest Based Sector Technology Platform
- Biofuels for Transport

## Integration and implementation

- Integration of NoE
- Joint research activities in 7.FP
- Additional partnership
- Industrial and SME co-operation, joint activities



2004 - Bioenergy NoE

2005

2005

2006

2006

2008

VTT

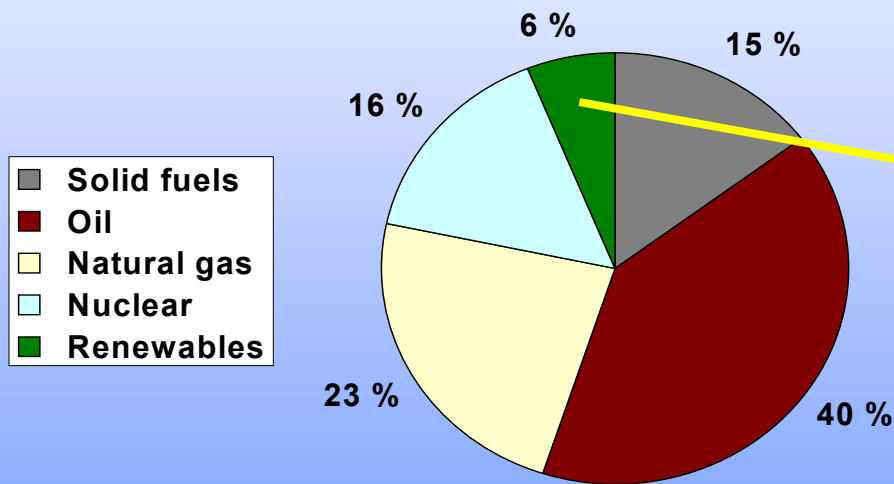


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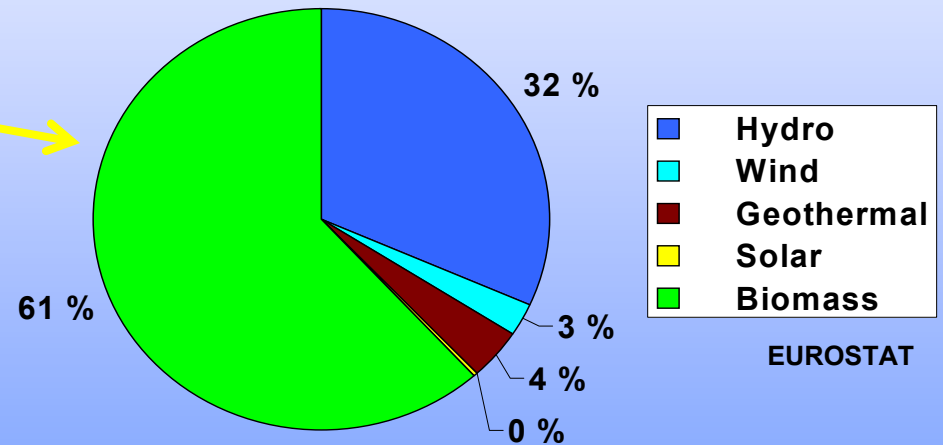
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# Bioenergy is the largest renewable resource

### European energy mix 2001



### Contribution of Bioenergy in the energy share for renewables 2001



EUROSTAT



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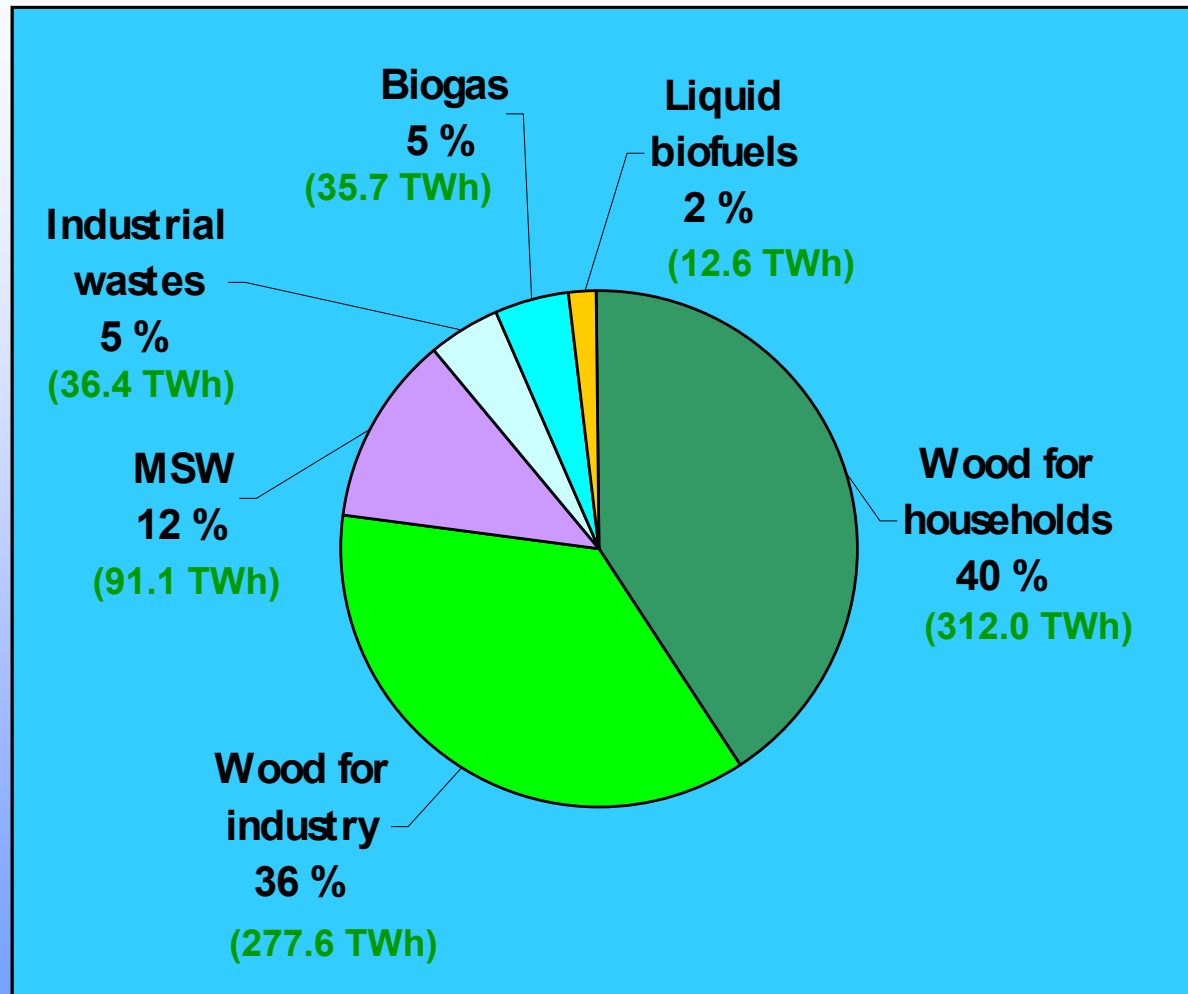
**Biomass & Waste in the EU in 2001 :** 57 Million ton of oil equivalent, Mtoe  
**Projected contribution in 2010:** 135 Million ton of oil equivalent



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# Bioenergy in EU-25



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**Total use of biomass and waste in EU-25 in 2002**

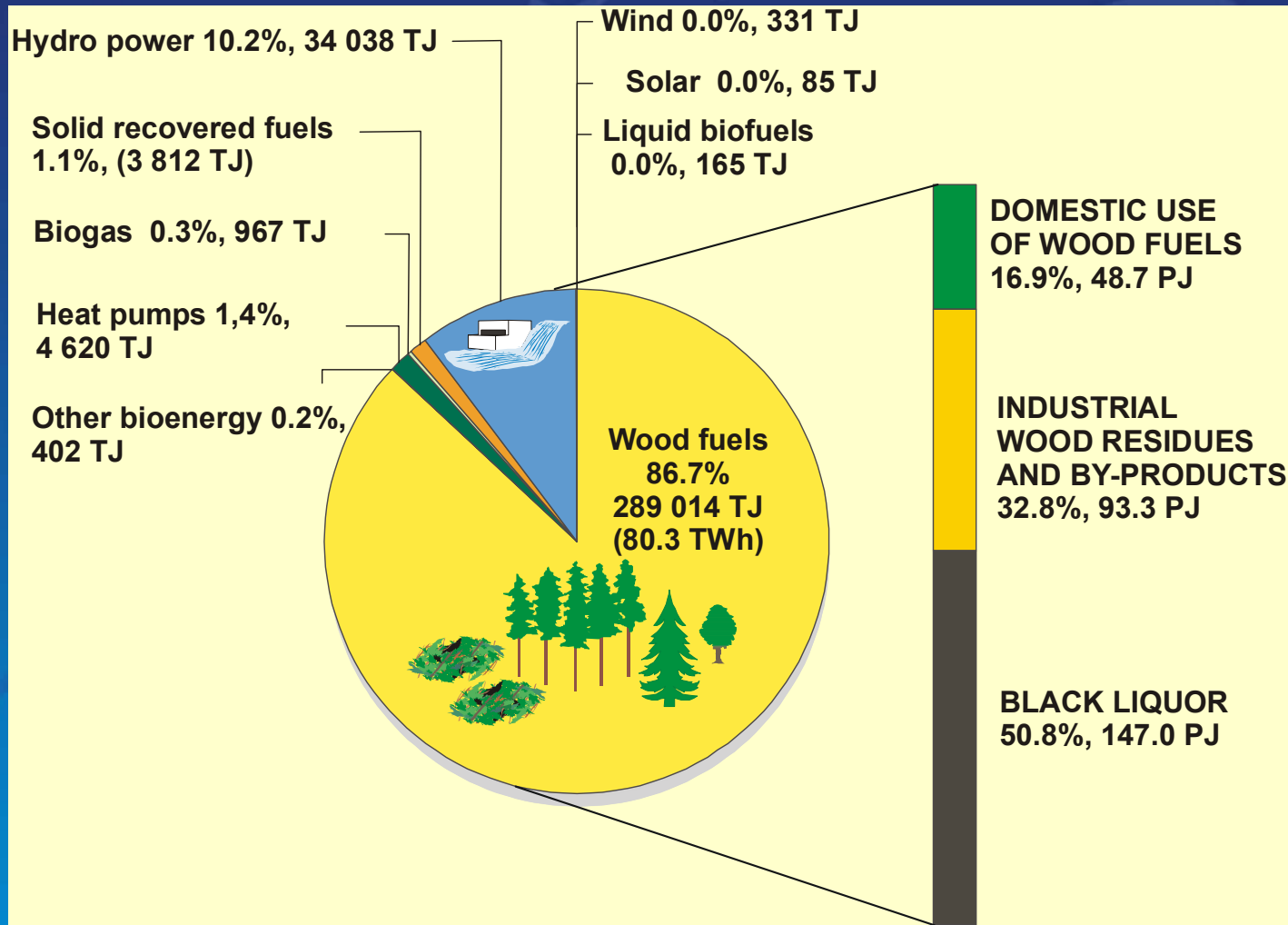
**was 68 Mtoe ~ 2 755 PJ ~ 765 TWh**

1 PJ = 0.278 TWh = 0.027 Mtoe

Source: Eurostat

# Renewable Energy Sources in Finland

- 20 % Bioenergy from Primary Energy Consumption



Total renewable energy sources in Finland 328 293 TJ (91.2 TWh)

23.4 % of total energy consumption



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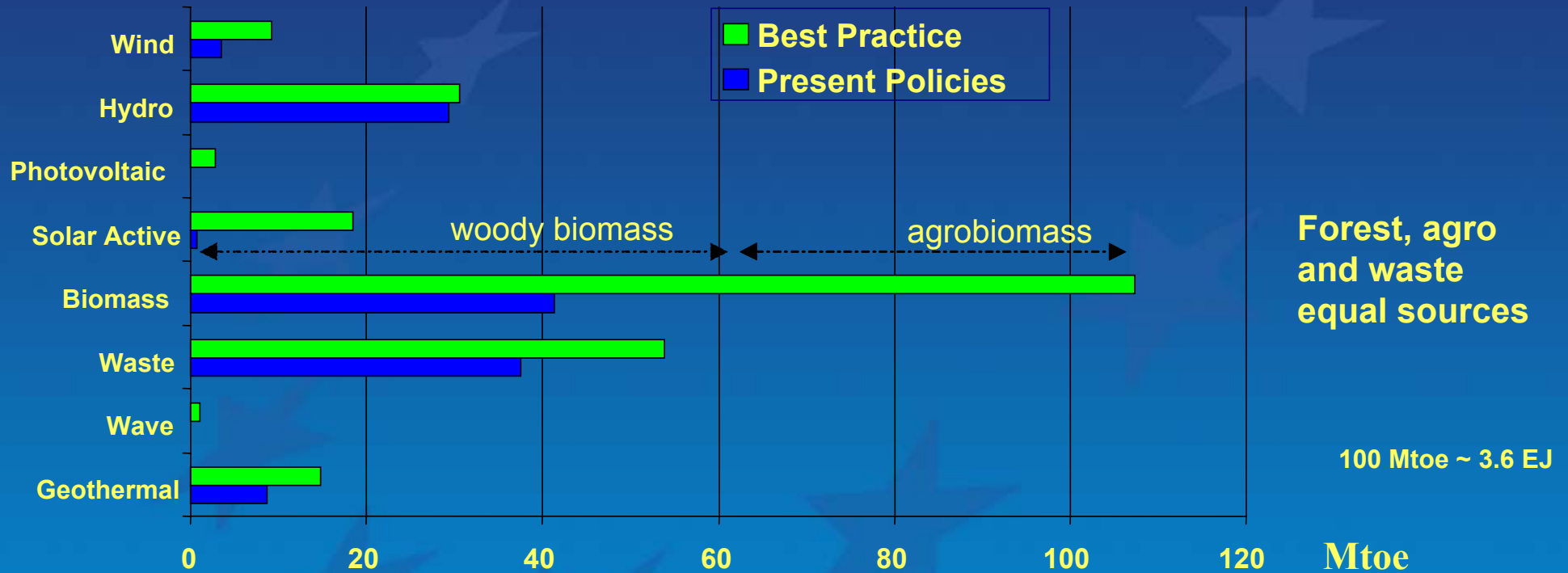




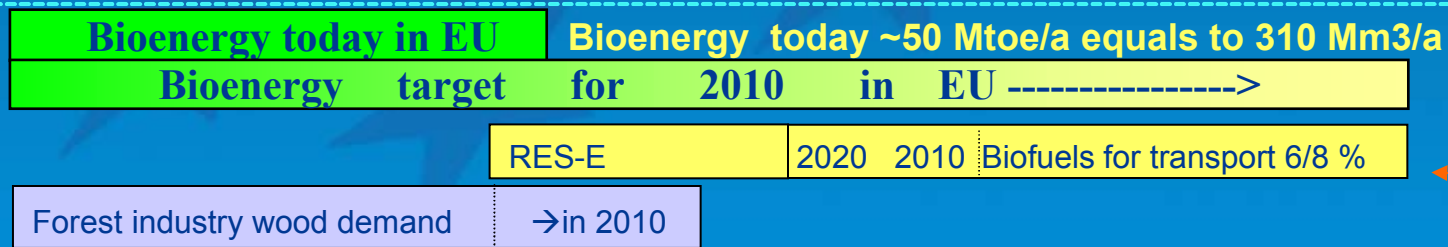
# RENEWABLE ENERGY PENETRATION EU15 IN 2010



Source : TERES II



Forest, agro and waste equal sources

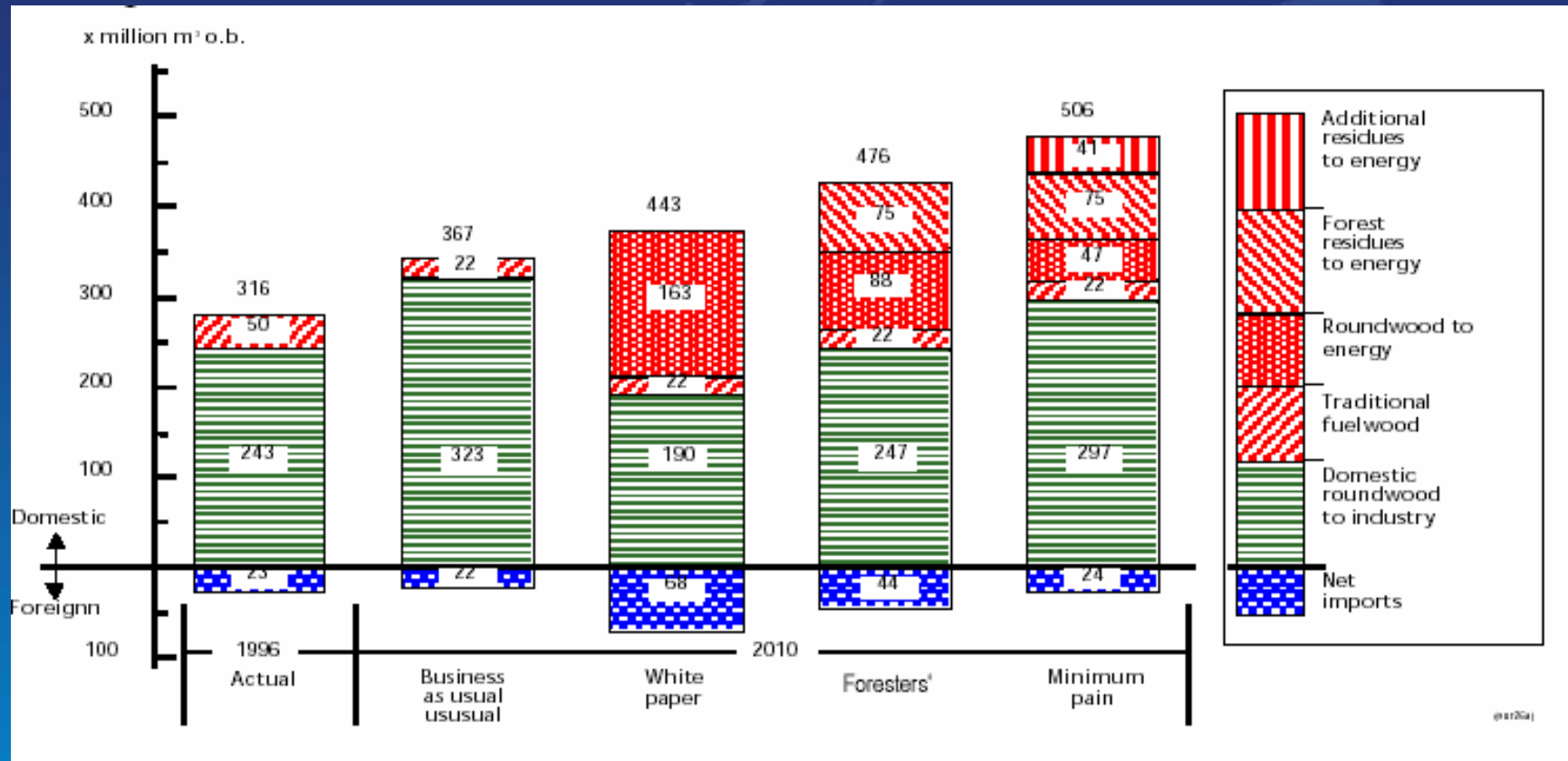


Raw material demand for Directives ?



# Forest Industry Wood Demand - Bioenergy in the EU White Paper ?

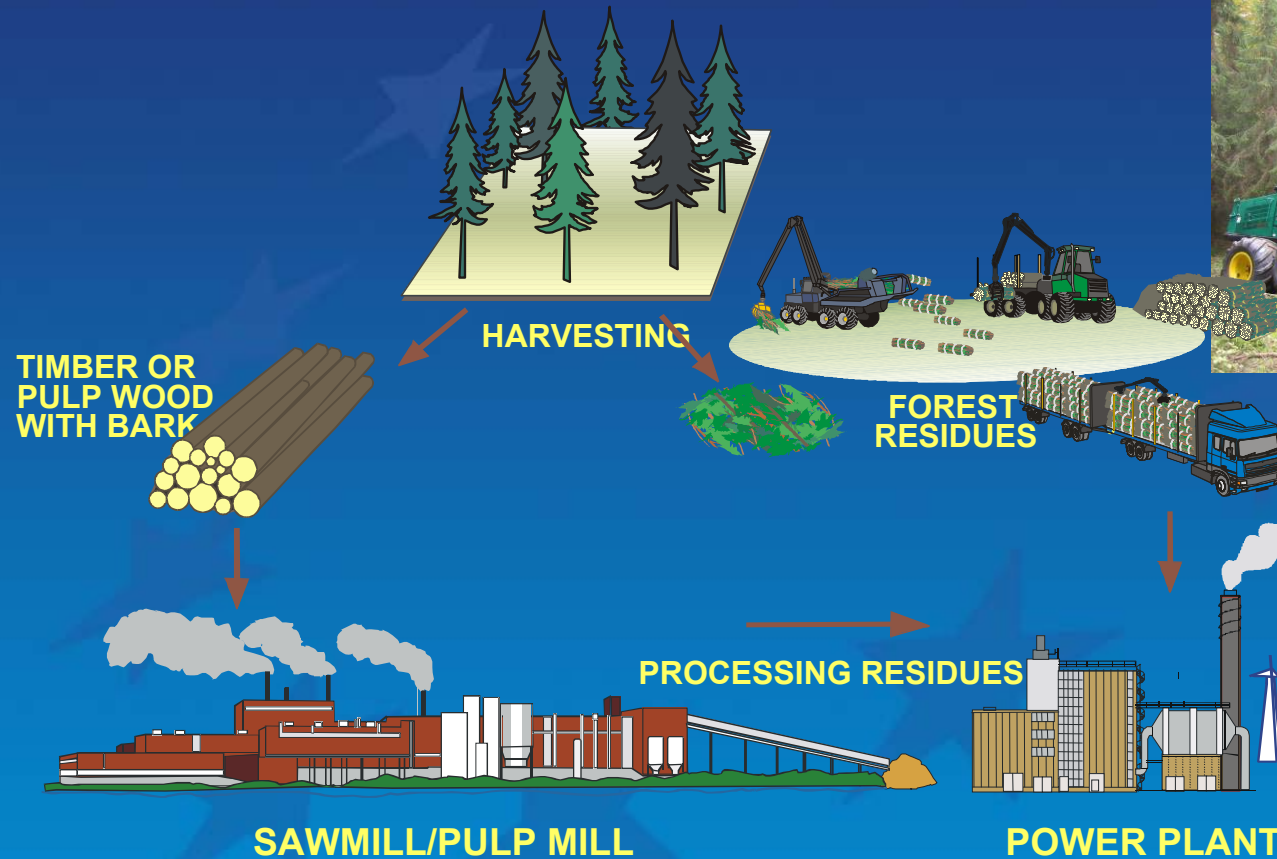
Source: EU Energy Policy Impacts on the Forest Based Industries, 2000, CEPI



- Roundwood to industry in 1996  $243+23 \text{ Mm}^3/\text{a} = 41 + 3 \text{ Mtoe/a}$
- total wood demand in 2010 in White Paper scenario  $443 \text{ Mm}^3 = 73.5 \text{ Mtoe/a}$  and in BaU-scenario  $367 \text{ Mm}^3 = 61 \text{ Mtoe/a}$
- Additional use of roundwood to energy  $163 \text{ Mm}^3/\text{a} = 27 \text{ Mtoe/a}$  in White Paper**



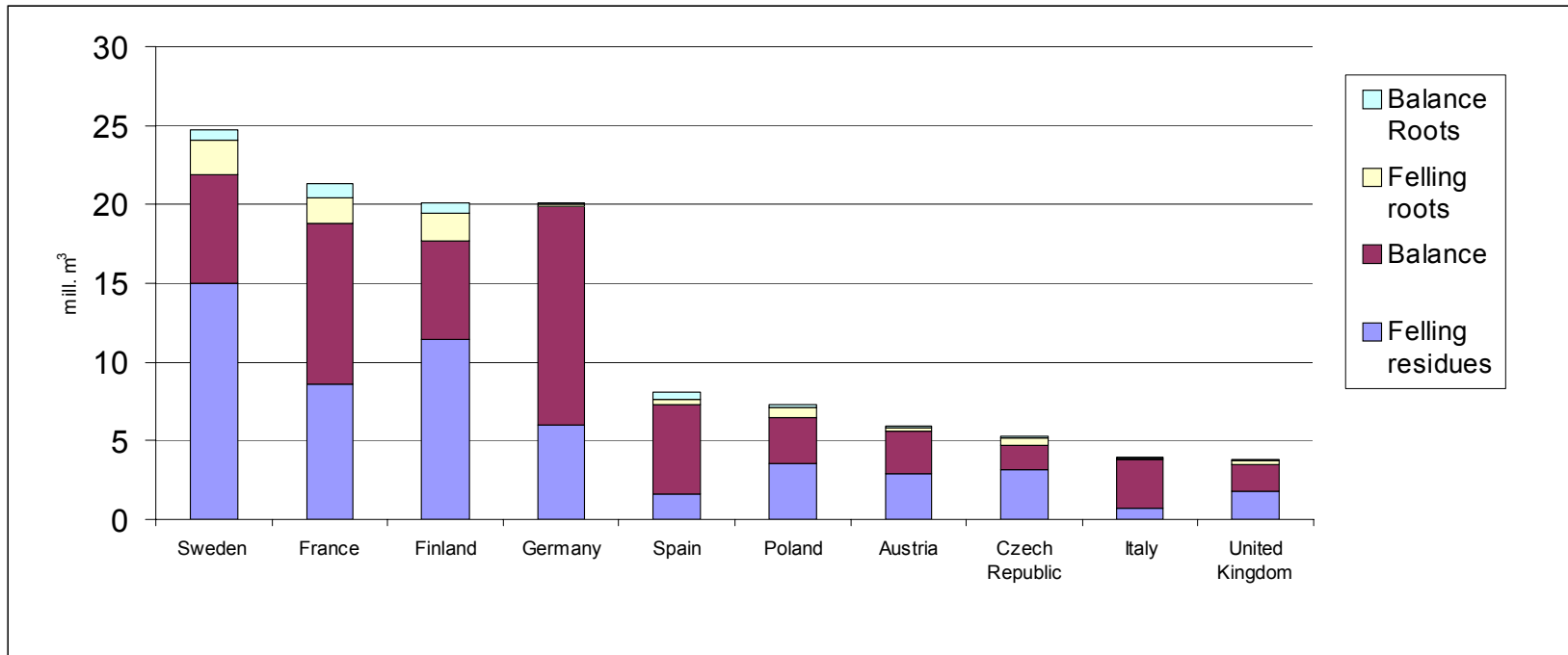
# Integration of raw material and wood fuel production



Significant cost reduction achieved with bundles ~ 10 €/MWh



## Forest residue potential in EU-25 using the Nordic experiences - volume of technically available forest fuels, top 10



Prof. Timo Karjalainen

Prof. Antti Asikainen

Dr. Jan Ilavsky

Ms. Kaisa-Elina Hotari (part I)

M.Sc. Raffaella Zamboni (part II)

METSÄNTUTKIMUSLAITOS

SKOGSFORSKNINGSINSTITUTET

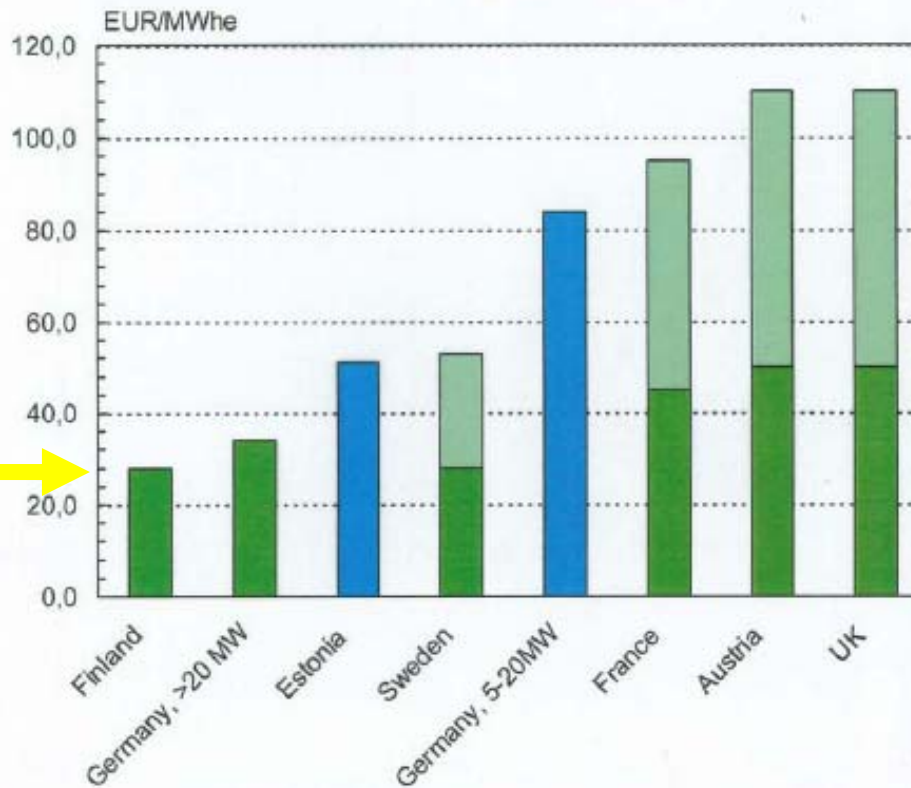
FINNISH FOREST RESEARCH INSTITUTE

www.metla.fi

1 Mm3 = 0.166 Mtoe ~ 2 TWh



# Promotion of green electricity by state subsidies has increased green power's prices



Measures vary country-by-country but all include guaranteeing high price for green electricity generation paid by all consumers of energy pushing up costs of energy use

- Feed-in tariff
- Green certificate
- Market price  
Electricity market price without green subsidy

Measures increase energy producers' ability to pay from wood based fuels: this will have an impact to fiber wood price.

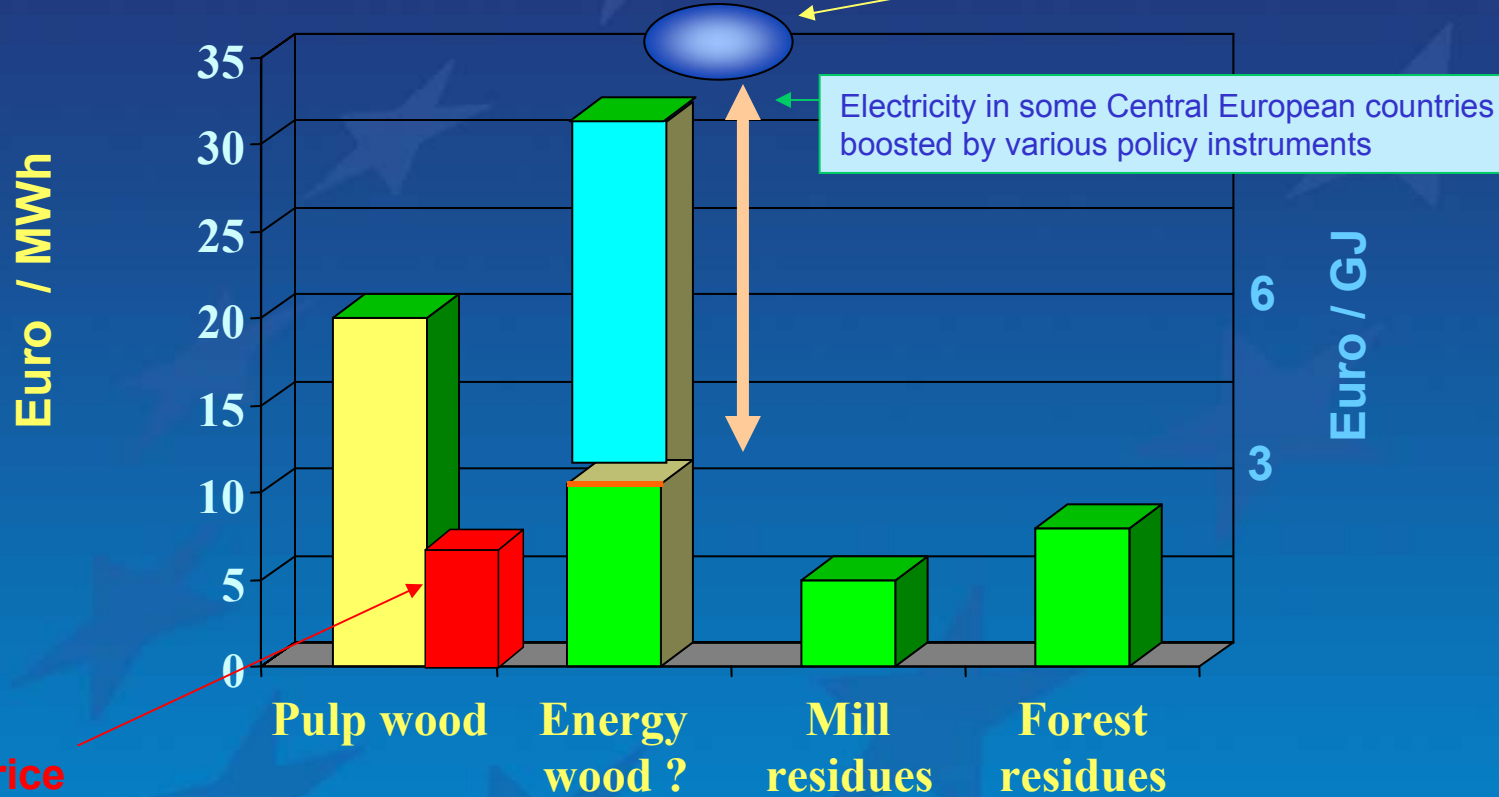
Production cost, ind.CHP



# WOOD FOR PULPING OR GREEN ENERGY ?

- typical prices in Northern Europe

Raw material price for non-taxed FT- biodiesel ?



Wood price in Brazil

“ In EU White Paper scenario the wood price will increase 39 - 75 % from current prices to 2010 “

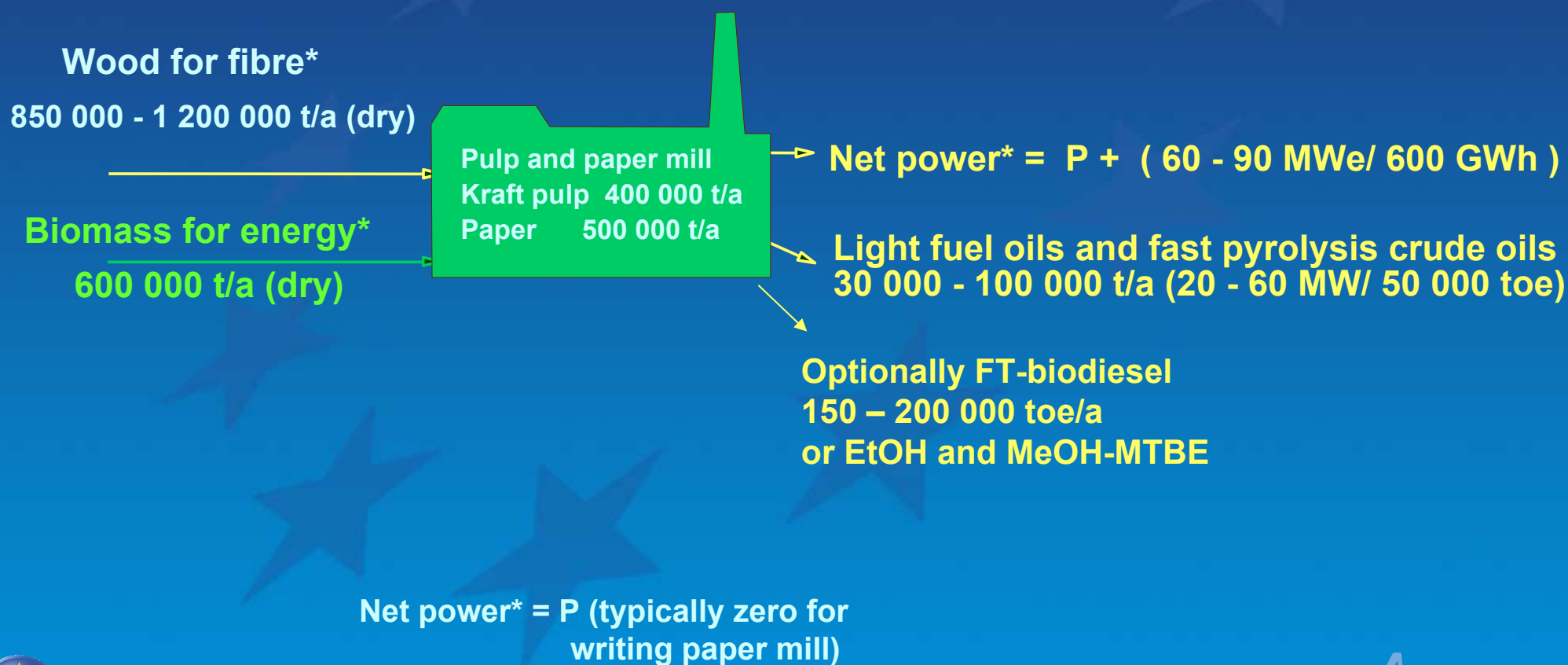
Source: CEPI - EU Energy Policy Impacts on the Forest Based Industry, 2000”





# Energy Production at Pulp and Paper Mill BioRefinery

- advanced green power and bio fuels production options
- green energy can give revenue as high as pulp production with existing policy instruments in some EU countries



# Potential in European Forest Industry Platforms

## - 100 sites out of 1300 mills -

- for IGCC plants: 4 000 MW<sub>e</sub> ~ **33 TWh<sub>e</sub>/a** of additional electricity from 4500 MW (37 TWh/a) ~ **3 Mtoe/a** of solid biomass residues or other biomass
- for FT-biodiesel plants: 14 500 MW (120 TWh/a ~ **11 Mtoe/a**) of FT liquids from 18 000 MW (150 TWh/a) ~ **14 Mtoe/a** of solid biomass residues
- Forest residues would be available, < 20 €/MWh price, up to **6 – 10 - 15 Mtoe/a**. Solid recovered fuels (SRF) and straw/annual crops should be supplementary fuels
- The forest industry platform offers up to 20 – 30 % lower production cost than in traditional stand alone option.
- The EU biofuel demand in 2010 is **18 Mtoe/a** according to the Biofuel Directive. **Total investments ~ 25 Billion €** and **8 Billion €/a** motor fuel **market on biofuels**



Bioenergy business and RTDD  
need visions, road maps and  
new partnerships with Forest based Industry  
to meet the ambitious  
targets given by EU Directives and  
Concern of Climate Change Impacts.

Thank you for your attention !

Additional information:

[www.vtt.fi/renewables](http://www.vtt.fi/renewables)

[www.noebioenergy.com](http://www.noebioenergy.com)



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