

Fiber – Raw Material for Energy or Pulp?

Lauri Hetemäki

*Senior Researcher, Ph.D.(Econ)
Finnish Forest Research Institute*

*Signs of Renewal in the Forest Industry, Summer School 2008, Lappeenranta
University of Technology, 9th September 2008, Lappeenranta*

METLA

Outline

1. Introduction – why is the question relevant?
2. Different perspectives on the issue
3. Energy vs. Pulp and Paper: Economic Impacts
(chemicals are also important, but not addressed here!)
4. Outlook for wood for energy & pulp
5. Conclusions

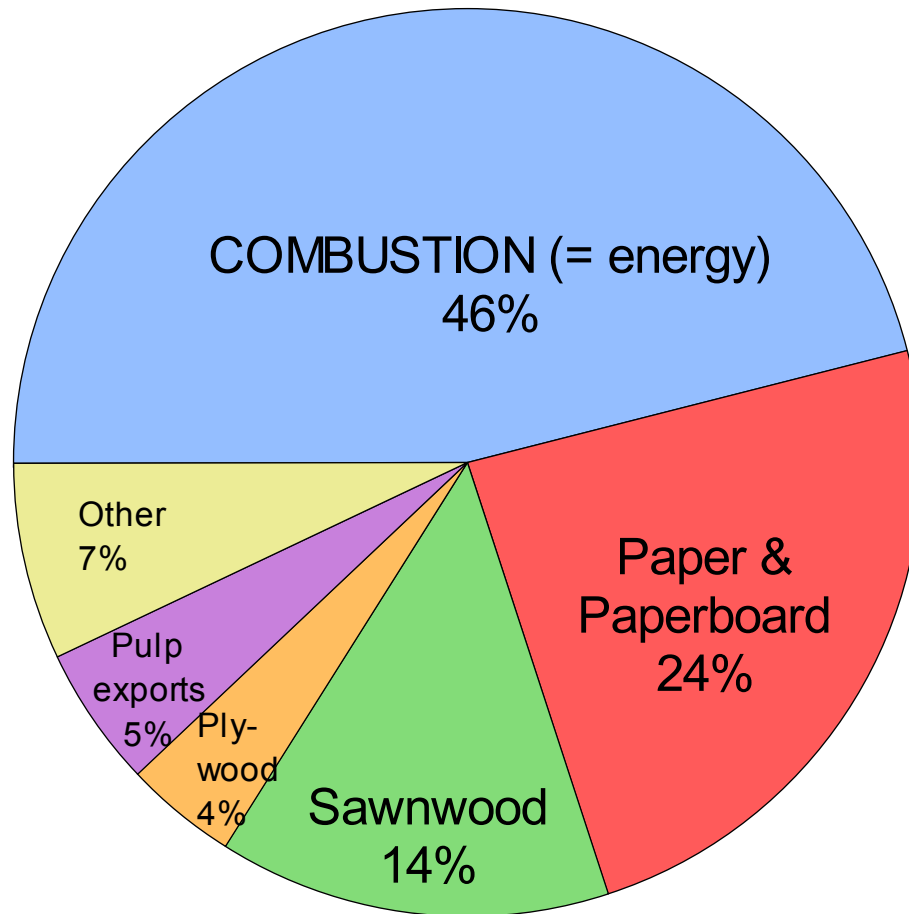
→ the perspective is Finland

Energy or Pulp?

– why is the question relevant?

- The question should be understood in relative terms. Wood is used already today for energy *and* pulp → often *you can not have one without the other*
- Thus, the relevant questions are:
 - Is the wood use balance between energy and pulp going to change in Finland?
 - If so, why?
 - If there is a change, what would the impacts be?
- These question are the focus of this presentation

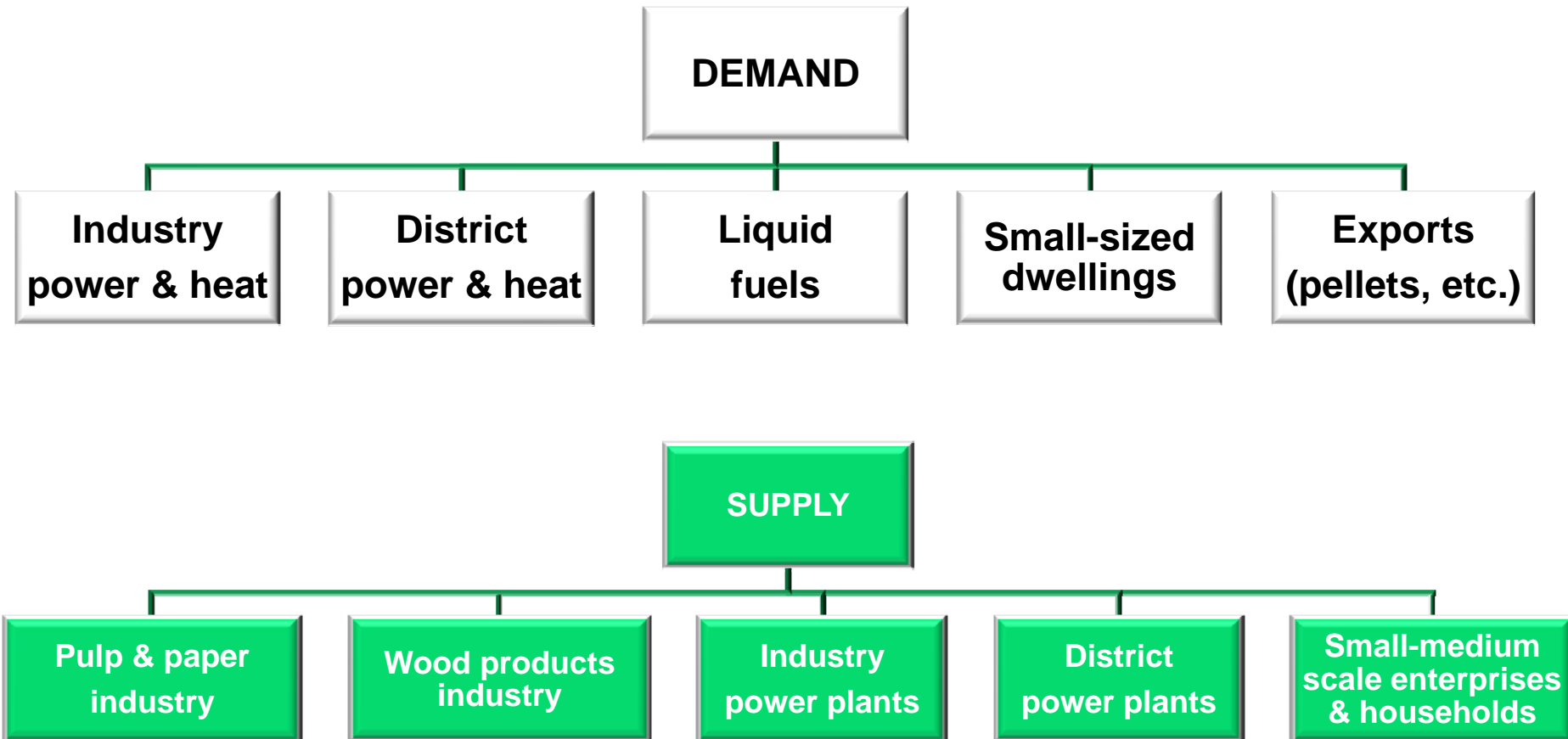
Where does the wood fiber go in Finland?



→ energy production is the most important wood fiber user

(data 2004, Statistics Finland)

The Demand and Supply of Wood Fiber Based Energy is Heterogenous



Characteristics of Wood Energy Production

- ❑ In forest industry, energy production is joint production with pulp, paper, or wood products
- ❑ In energy industry it is the only product
- ❑ The impact of energy- and climate policy impacts differ between technologies and industry sectors
- ❑ Wood energy production may rely on domestic markets (eg. district heating), or to export markets (e.g. pellets)
- ❑ Wood may be used as single raw-material; or it can be used in combination with other (peat, agri, waste)
- ❑ There is no single best way to use wood fiber for energy. Depends e.g. on policy, technology, and local conditions

Different Levles of the Issue

1. To what extent the society (policy) should seek to direct fiber to pulp or energy?
2. To what extent the pulp & paper industry should use fiber to pulp or energy?
3. To what extent other players (energy sector, sawmills) should use fiber to energy?
 - What are the interdependences between 1-3?
 - It is necessary to look at the larger picture, even if your focus is on pulp & paper industry

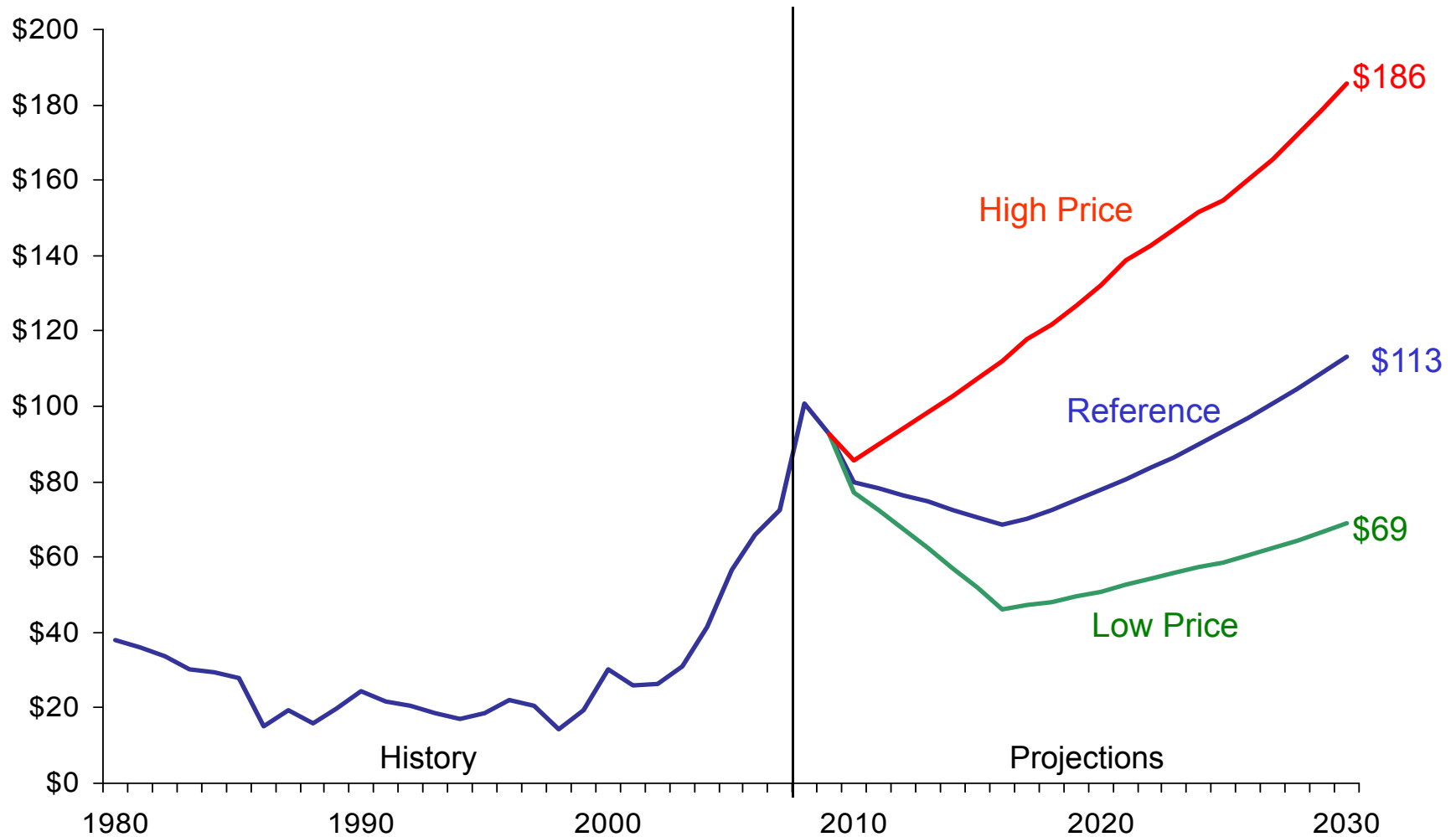
Society (policy) perspective

The higher the price of oil, the higher the demand for wood to energy



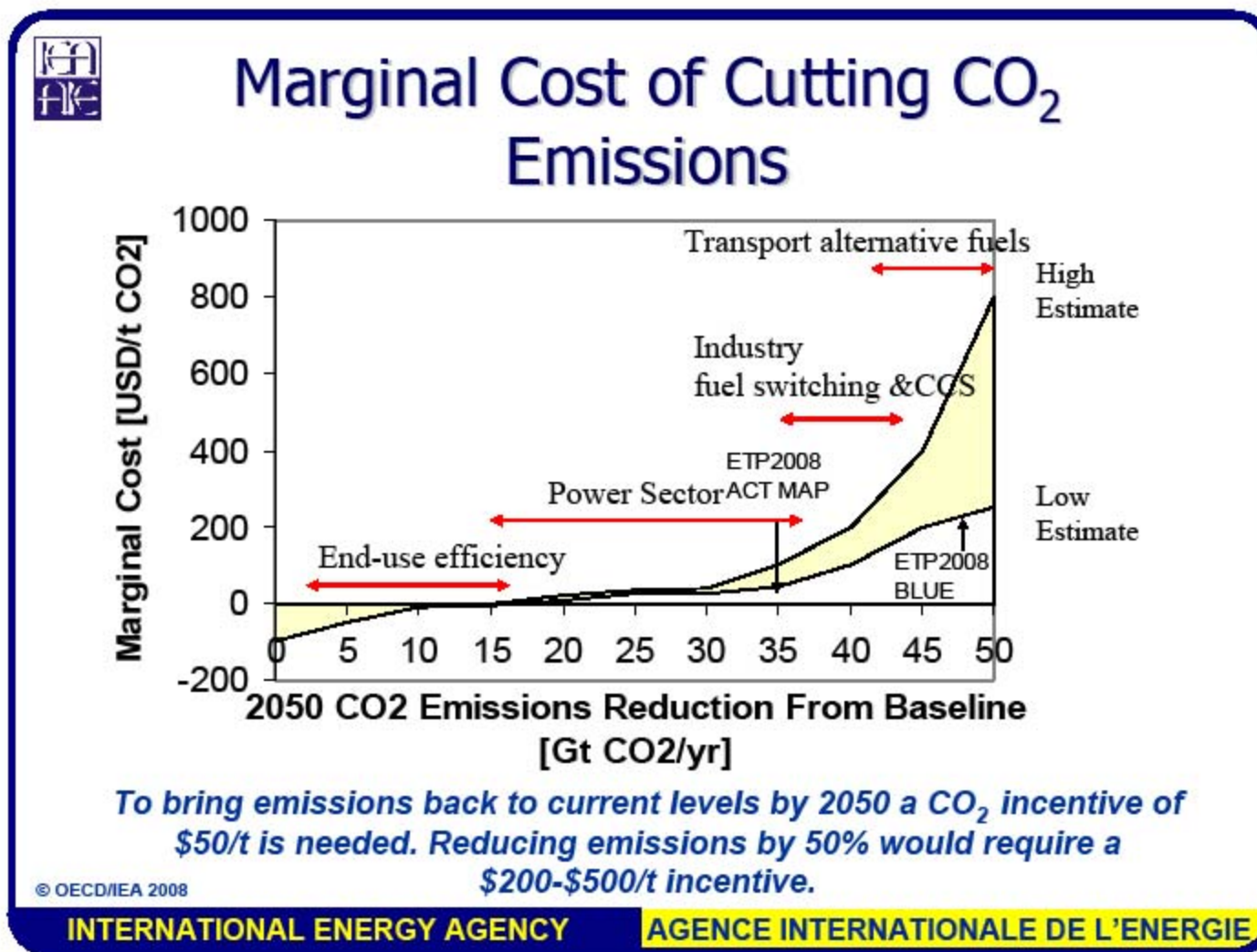
World oil prices are expected to be higher than before 2005 in all EIA scenarios

nominal dollars per barrel



Source: USA EIA, International Energy Outlook 2008

The higher the price of CO₂, the higher the demand (and price) for wood to energy



Nord Pool price Sep. 3, 2008 was 24 eur/tCO₂

The more the politics supports renewable energy use, the higher the demand for wood to energy

- ❑ Kyoto (Copenhagen 2009)
- ❑ EU energy policy 2020
- ❑ National energy policy
- ❑ Regional & agricultural policies
- ❑ Energy security policies (e.g. OPEC, Russia)

→ all the above policies tend to enhance wood energy production & consumption in Finland

Conclusions from the society's perspective

- Society (politics) has a number of interests to increase wood energy use
 - Some of the incentives are global, some national
 - This trend is likely to increase, rather than decrease
- Finland will use increasingly wood for energy
- It will use policy measures to promote this
- Piggyback these trends, rather than try to hinder it!

Industries perspectives

CEPI & Finnish Forest Industr. Feder. View

- ❑ Pulp & paper industry generates 13 times more employment and creates 8 times more added value than just burning the wood for energy
 - direct wood first to pulp & paper
 - then recycle and use for energy
- ❑ However, is the situation as clear? (more on this later)
- ❑ Utilize forest residues, side streams and waste to increase energy production (biofuels, electricity, heat) → biorefineries
- ❑ **No** policy measures, which increase competition (prices) of wood resources and production costs

Small-and-Medium Scale Wood Products Industry

- Keen on increasing wood energy production
- Lobby for feed-in-tariff and other policy measures to promote wood energy production

Wood Using Energy Industry

Pöyry (2007) estimate of the number of new wood using energy facilities and the demand for woodfuel in Finland in 2007-2020

	Number	Demand 2006 GWh	Demand 2020 GWh
District heating plants	40	7 100	21 540
Industry power and steam plants	26	20 800	33 530
Total	66	27 900	55 070

Source: Pöyry (2007) Puupolttoaineiden kysyntä ja tarjonta Suomessa vuonna 2020

Industry Perspectives: Conclusions

- Everybody is keen on increasing wood energy production
- However, there are some conflicts in views as to:
 - how this should be done
 - what policy measures should be used

What are the Economic and Employment Impacts if Wood is Used for Pulp and Paper or Energy?

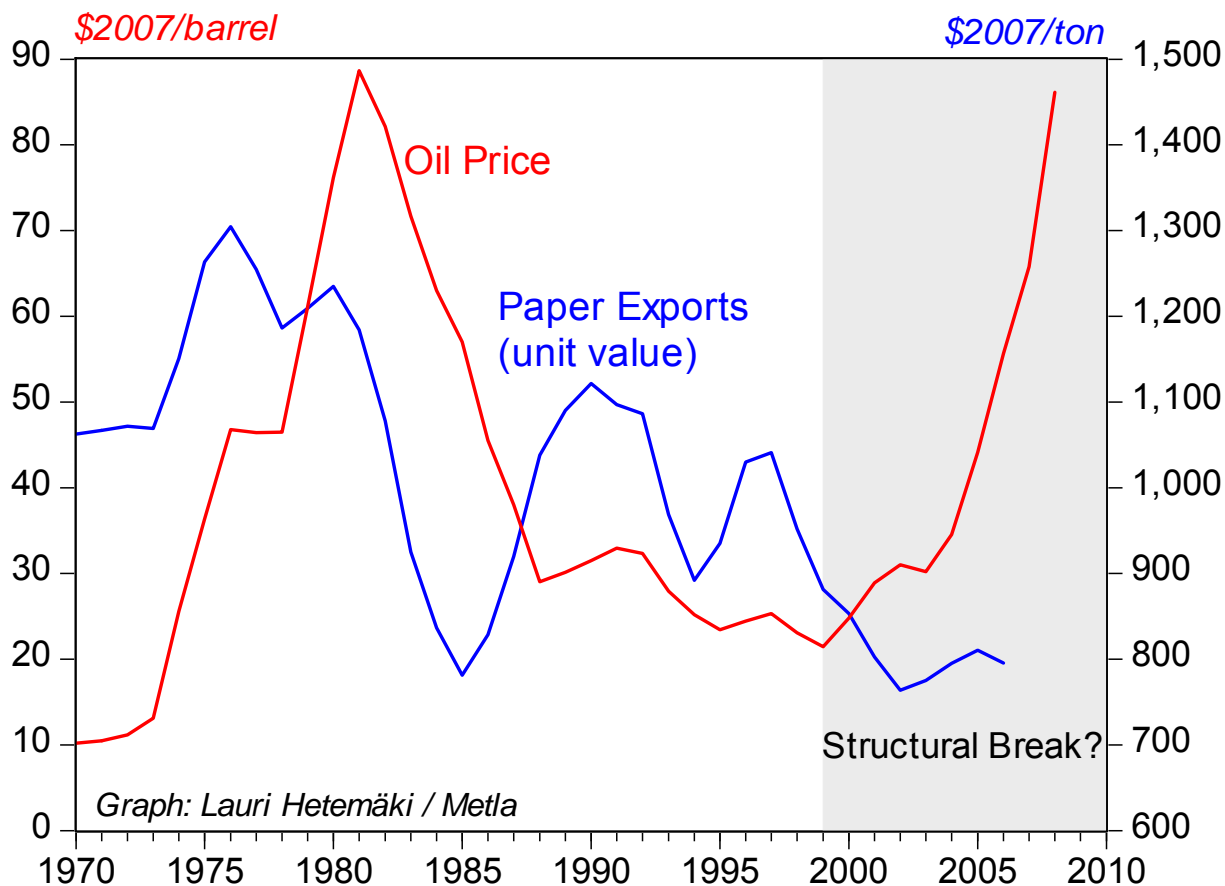
CEPI Study 2007

- CEPI study (Pöyry & McKinsey) comparing the value added and employment impacts of pulp & paper and energy industry has been widely cited and influential
- Pulp & paper industry generates 13 times more employment and creates 8 times more added value than burning the wood for energy
- Study based on aggregate data for 27 countries (EU25 + Swizerland & Norway)
- The details of the methodology of the study have not been published → difficult to assess

The study results may be questioned, at least in Finland, and as a basis for future outlook

- In Finland in 2006, pulp & paper industry value added and employment was 5 (13) and 3 (8) times to that of energy sector that could use wood as raw-material (mainly co-generation of power and district heat)
- Future outlook:
Paper prices & employment are stagnating /declining,
but energy sector prices & employment increasing
→ p & p sector impacts likely to decrease
→ energy sector impacts likely to increase

Oil Price and Finnish Printing and Writing Paper Exports Unit Value 1970 - 2007



Graph: Lauri Hetemäki / Metla

Note! Values three year moving averages

→ continue...

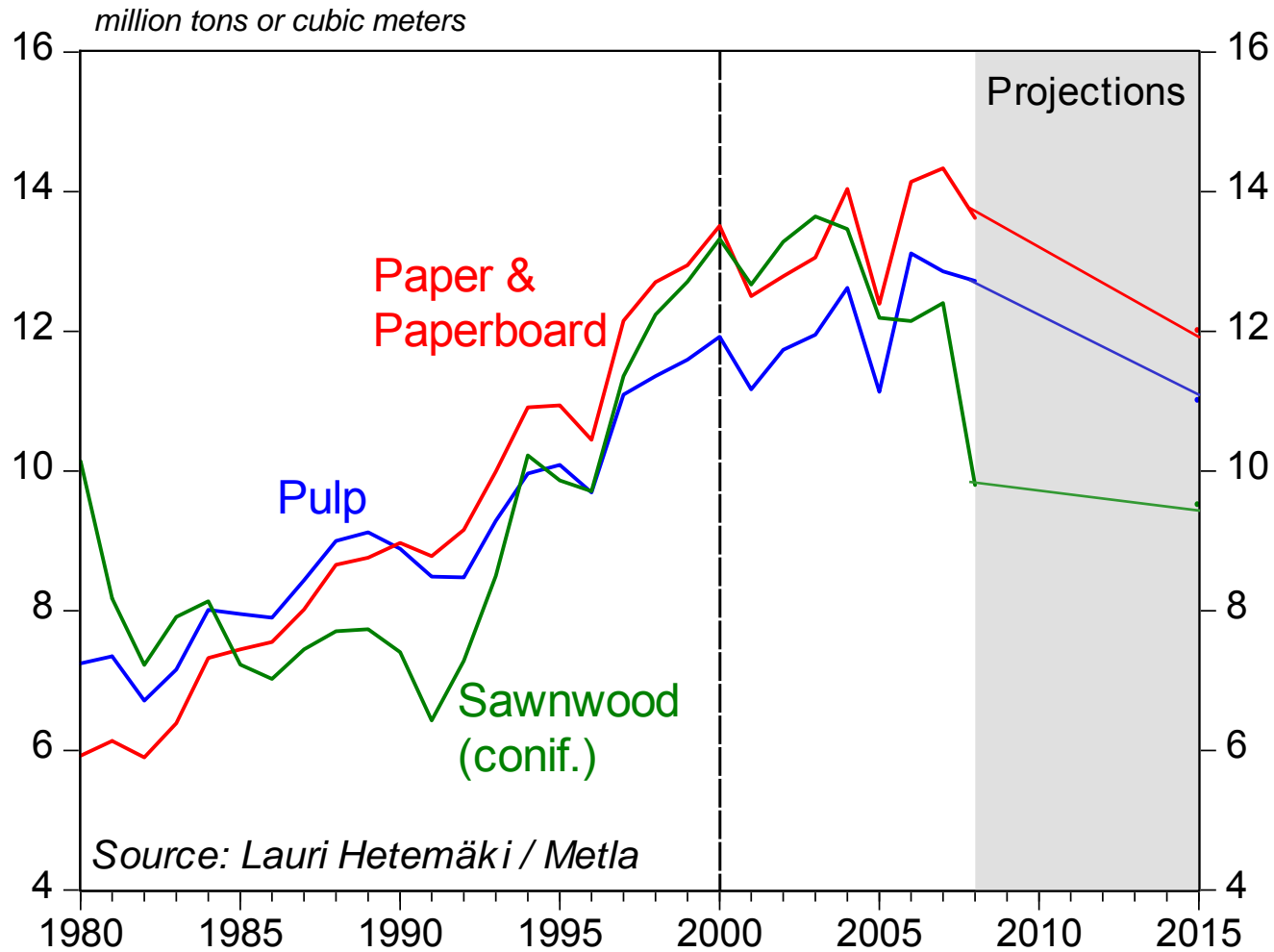
- "Use wood first for p & p, then recycle and use for energy"
- It may make sense e.g. in West Europe, but is this an economically and environmentally sound option for Finland?
- That is, first to export paper (West Europe, Asia, USA), and then to import the recycled paper back to Finland

P & P vs. Energy Impacts: Conclusions

- The value added and employment generation of wood in pulp & paper sector vs. energy sector depends on a number of factors, and varies geographically
- In Finland (in 2006), the impacts were in favor of p & p, but significantly less than has been stated (CEPI study)
- In Finland, the policy and market fundamentals seem to enhance the energy sector economic impacts relative to pulp & paper sector
- Some forest products may even become cheaper than the value of their energy content!
- In Finland, using imported recycled paper for energy is unlikely to make economic & environmental sense

WOOD FOR ENERGY & PULP IN FINLAND: OUTLOOK

Forest Products Production in Finland 1980-2008 and Outlook for 2015



*2008 figures are estimated based on the data for the first 6 months

Forest Industry Production in Finland and outlook for 2015

	1995	2006	2008*	2015p
Pulp	10.1	13.1	12.7	11
Paper & Paperboard	10.9	14.1	13.6	12
Sawnwood (conif.9)	9.9	12.2	9.8	9.5

* Figures estimated based on the data for the first 6 months of the year.
Units = million tons or cubic meters

Factors & assumptions behind the outlook:

- already announced capacity cuts
- assumptions about the market- and relative competitiveness development
- no new greenfield capacity investments are made
- process improvements increase production less than in the past (as the age structure of the capacity gets older, it is increasingly difficult to retain similar productivity improvements as in the past)

Note! Even though precise numbers are given for 2015, they should be interpreted only as indicative

Impacts to Wood Consumption

- ❑ Pulp industry's wood consumption (pulpwood + chips) for *current products* would decline by estimated 5 million cubic meters by 2015 compared to 2006
(assuming capacity cuts are equal in mechanical & chemical pulp)
- ❑ Sawnwood industry's wood consumption (logs) for *current products* would decline by estimated 6 million cubic meters by 2015 compared to 2006
- Wood fiber demand for *current products* would decline by **11 million cubic meters by 2015 compared to 2006**
- This would imply a wood consumption level of 1997, or an amount equal to 70% of the wood imports from Russia in 2006
- ❑ If this outlook realized, it would enhance the possibilities to use wood fiber for energy and new forest products

"Conceivable" wood energy demand in Finland in 2020

(2006 figures in red & italics)

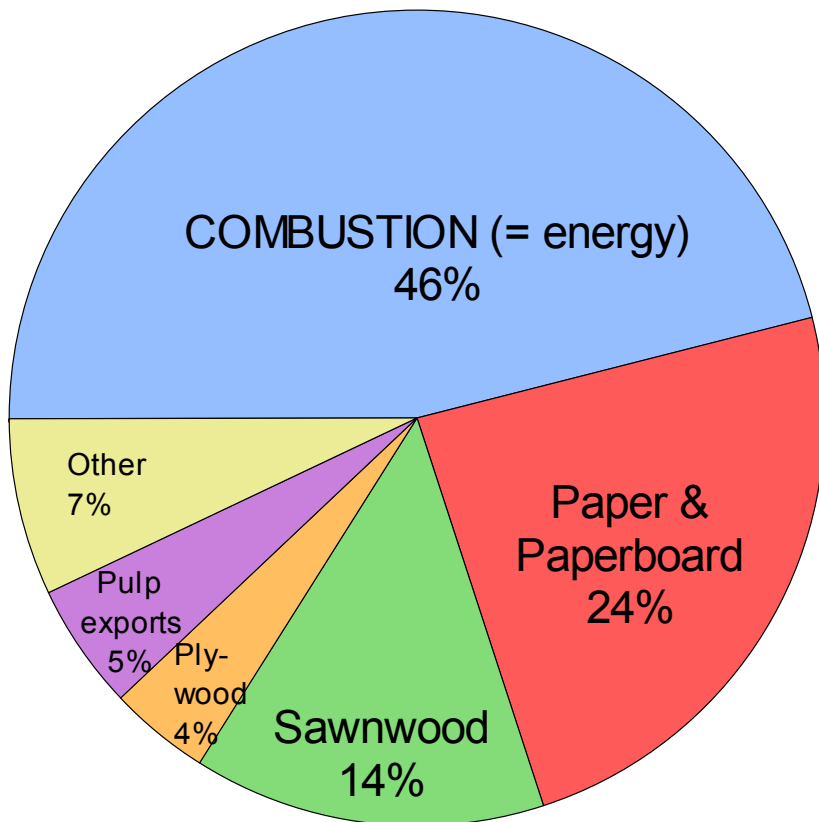
	Forest Industry	Power and heat industry	Small size dwellings	Total
Energy content TWh	42* <i>42</i>	67** <i>28</i>	23.5*** <i>13</i>	132.5 <i>83</i>
Wood consumption mill.cm ³	(15)**** <i>15</i>	30 <i>14.8</i>	9,1 <i>6.1</i>	39,1 <i>(54,1)</i> <i>20,9 (35,9)</i>
Raw-material	black liquor, bark	bark, chips, sawdust, forest residues, stumps, pellets, etc.	firewood, forest residues, pellets, etc.	

Assumptions:

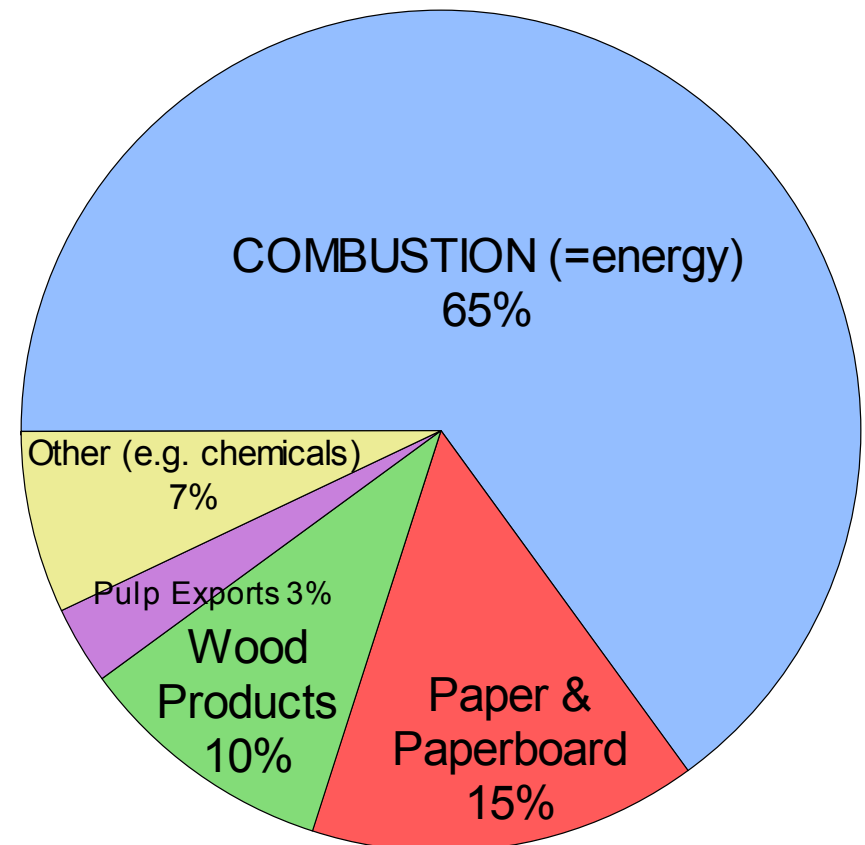
- * pulp production related energy production declines the same amount as energy efficiency and biorefinery production increases it
- ** capacity doubles & energy efficiency increases 20% from 2006 to 2020
- *** consumption increases 50% from 2000 to 2020 and energy efficiency increases 20% from 2000 to 2020
- **** 45% of pulp industry wood consumption ends to energy (0.45 x 33.4 =15)

Wood Consumption Shares in Finland in 2004 and "Conceivable" Outlook for 2020

2004



2020



Conclusions

- The use of wood for energy will grow significantly in Finland
- The use of wood for current forest products will decrease in Finland
- Valued added & employment impacts of wood based energy sector is likely to increase in Finland relative to pulp & paper industry
- Energy sector and forest sector become ever more integrated
- This is an opportunity also for the pulp & paper industry

Thank you!