

Empirical research on wood flows in Poland



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Structure of the presentation:

1. About wood market in Poland
2. Sources and reliability of information on wood supply and use
3. Wood flows in Poland – different approach
4. Main empirical research concerning wood flows
5. Wood for energy production – lack of info
6. New initiative in relation to the wood market analysis

Forest sector in Poland (2006)

Forest area	→	9.0 M ha
Forest cover	→	28.9 %
Growing stock of standing wood	→	1.8 b m ³
Removals:		
total	→	32.4 M m ³
rank in EU-25	→	5 (behind: - France, - Germany, - Sweden, - Finland)

Organisational structure of the timber market in Poland



Wood market in Poland – main trends

- **Economic boom thanks to: accession to the EU and acceleration of foreign direct investments inflow**
- **Increase of production and export of wood products** (there was a decline in the last year due to PLN to EURO exchange rates)
- **High dependence of the Polish wood industry on national timber resources**
- **Good economic situation of the wood and furniture industries in recent years and increasing needs of the energy sector lead to a shortage on the timber market and to an extreme increase of the demand for research on actual/potential supply of wood from various sources.**

Sources of information on the wood market

- ❑ **Discrepancies between info on: SUPPLY (relatively better information in some cases, e.g. roundwood P, I,X) and USE (worse situation – no data available; excl. use of wood in panels and pulp industries).**
- ❑ **Main sources: Polish Central Statistical Office (Główny Urząd Statystyczny – GUS) and General Directorate of the State Forests National Forest Holding**
- ❑ **Other sources: empirical research**

WOOD FLOWS IN POLAND

- ◆ **Traditional approach** (roundwood as a fundament – e.g. ITD studies, output of COST 44)
- ◆ **Wood from different sources and in diff. form** (residues, wood waste, recovered wood, e.g. ITD research, [Mantau, 2005])

Wood flows – traditional approach

- ▣ **SUPPLY:**
 - Roundwood: P, I, E (data from the State Forests, Central Statistical Office)
 - Logging residues: P (State Forests)
- ▣ **USE (material):**
 - 1) **panels and pulp industries** - amount of wood used in production (data from producers – relatively easy to obtain),
 - 2) **sawmilling industry** – (only fragmented data possible to obtain);
main problems:
 - number of companies,
 - amount of sawnwood production,
 - raw material used in the production,
 - amount of wood waste.

Case: Sawmill industry – determination of wood use

The only solution - comparison of:

- amount resulting from sawn wood production and raw material productivity rate,
- domestic supply of assortments of wood useful for sawn wood production (e.g. 97% of the total removals of “large-size wood for general use”, 100% of „medium-size wood - logs”/pit wood, 20% of the “medium-size wood for industrial processing”) and raw material productivity,

+ data (interview) from the largest producers.

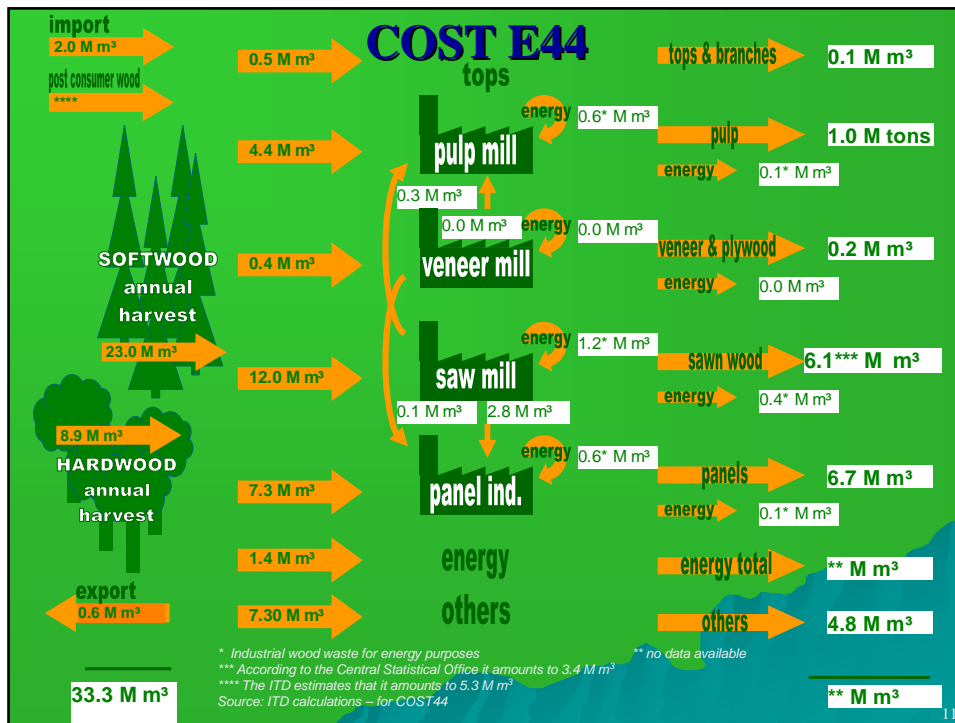
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Production and consumption of roundwood in Poland

(2005, 1000 m³)

	Removals	Export	Import	Consumption
Roundwood	31 945	604	2 045	33 386
Industrial roundwood	28 531	558	2 009	29 982
• <i>coniferous</i>	21 357	506	887	21 738
• <i>non-coniferous</i>	7 174	52	1 122	8 244
Fuelwood	3 414	46	36	3 404

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NATIONAL WOOD RESOURCE BALANCES WORKSHOP
Geneva, 31 March – 1 April 2008

Wood flows in Poland - Supply (2005, 1000 m³)

- Supply from the forest & wood biomass from outside the forest:

Industrial Roundwood – (P+I-X)	28 982
max difference unreported in JFSQ	1 194 (?)
Fuelwood – (P+I-X)	3 404
Bark – (P)	0 (?)
Used logging residues (P)	227
Wood biomass outside the forest (P)	636
- Supply by-products:

Chips, particles & wood residues (P+I-X)	3 916 (GUS)
Pulp production co-products (black liquor etc.) (P),	1 888 (tonne)
Bark (P)	1400 (additional, acc.ITD)
- Supply recovered wood (P) 31 (?)
- Supply processed fuel wood (P+I-X) 17(?)

SUPPLY TOTAL 41 294 (?)
[Mantau, 2007 and ITD Poznan]

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Other sources of biomass in Poland

(2005)

1000 m ³		Purposes	
	Total	industry	energy
Chips from forestry	227	227	-
Wood from fast-growing trees	700	120	580
Wood from trees outside the forest	545	-	545
Industrial wood waste	7210*	3942	3268
Bark (from the industry)	1400	140	1260
Used wood	6270*	-	251

* also composite wood materials/products

ITD estimation

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Use of wood – Poland (2005, 1000 m³)

Material use:

Sawmilling industry	17 500
Panels industry	9 837 (?)
Pulp industry	3 847 (?)
Processed wood fuel industry	333 (?)
Other physical utilisation	987 (?)

Energy use:

Power and heat	2 885
Industrial internal use	4 800
Private households	525 (?)
Undifferentiated energy use	14 076 (?)

USE TOTAL

54 790 (?)

ITD, [Mantau, 2005]

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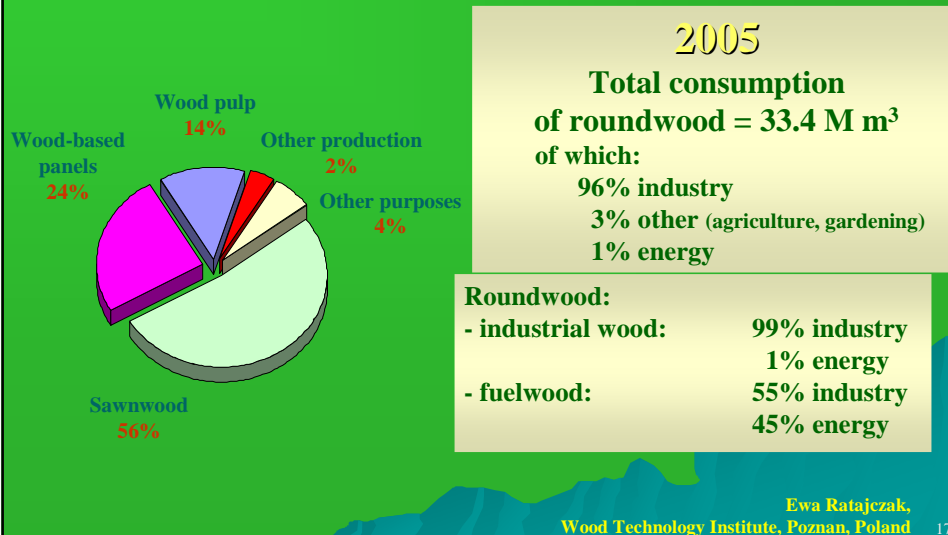
Main empirical research concerning wood flows in Poland

- 1) **Forecast of the demand for wood raw material till 2013 in Poland regarding its main consumption types** (2007, prepared by ITD in co-operation with the Forestry Research Institute for General Directorate of the State Forests)
- 2) **Model indices of use of wood materials at various stages of processing and in different application areas** (run by the ITD Poznan 2004-2006, financed by the Ministry of Science)
- 3) **Market in industrial wood waste from the Polish wood industry** (2002-2003 study carried on by ITD for Ekofundusz; 2007 - analysis of sawmilling wood waste prepared by ITD for the German panels producer)
- 4) **Used wood in Poland** (2002-2003, scientific project run by ITD, financed by the Ministry of Science)

Ad.1) Demand for wood raw material in Poland regarding its main consumption types (2007)

- ◆ **SUPPLY of wood:**
 - roundwood removals by assortments (State Forests)
 - roundwood import/export (GUS)
 - industrial wood waste (a derivative of wood consumption and material productivity in wood industries)
- ◆ **USE of wood:**
 - wood materials production (sawnwood, panels, pulp, other)
 - amount of wood use in certain type of production:
 - data from companies and/or
 - raw material structure of wood materials (wood „from the forest” and industrial wood waste) and average indices of raw material/material productivity
 - energy purposes needs – only in general.

Consumption of roundwood in Poland



Ad. 2) Model indices of use of wood materials at various stages of processing and in different application areas (2004-2006)

The main idea - a system of wood material consumption models which refer to the concept of inputs/outputs in industry branches (a set of net material intensity indices determined for all specified wood products and for the production conditions in Poland).

Model material structures were determined for 196 products arranged into 17 groups and 60 subgroups.

The indices take into consideration:

- o material properties,
- o raw material structure in finished products,
- o suitability of materials and wood products for different applications.

◆ **The consumption of wood materials was calculated in two ways:**

1. as **indirect consumption**, i.e. the consumption of materials in the production of finished goods (which then are used in a particular field domestically or abroad),
2. as **final consumption**, i.e. the consumption of materials in finished products which have been purchased (and „consumed”) by domestic users.

◆ **Results of the research:**

In 2004 in Poland approx. 17 Mm³ of wood materials were used in the production of wood products (indirect consumption), incl.: over 11 Mm³ of solid materials and 6 Mm³ of wood-based materials.

Final consumption of wood materials - 9 Mm³, which meant that around 8 M m³ of wood materials were exported (in the form of various products).

The biggest user of wood materials:

- construction industry (6 – 5 Mm³),
- households (2 Mm³),
- commerce (and stock management - 1 Mm³).

Till 2010 the consumption of wood materials in Poland should increase by 18-20%.

Ad. 3) Market in industrial wood waste from the Polish wood industry (2000-2003; 2007)

- ◆ Thus far there is **no complete and clear national wood waste record system** in Poland. Also neither producer chambers nor associations carry out such analyses. Therefore there is no possibility of taking simple inventory of wood waste.
- ◆ The only possible methodological solution/approach is to employ the **index method**.
- ◆ **Main sources of information:**
 - direct survey in companies,
 - data of the Polish Central Statistical Office (concerning amount of business entities, material productivity indices, removals etc.)
 - knowledge possessed by experts in wood processing and material management.
- ◆ **Main results**

Estimated supply and use of industrial wood waste in Poland (2002, 1 M m³)

◆ Supply of industrial wood waste

- total 7.5, incl.:
 - from solid wood 4.6
 - from wood-based materials 1.5
 - from bark 1.2

Main sources:

- sawmilling industry 82%
- panels 10%
- furniture 6%

◆ Use of industrial wood waste

- total 7.5, incl.:
 - production purposes (material) 3.6
 - energy production 3.7
 - other 0.2

Ad. 4) Recovered wood in Poland, 2003

Theoretical basis - product life-cycle analysis

Products taken into account: used wood products such as: wooden garden products, construction work equipment, buildings, joinery, flooring, furniture, interior design items, packaging, pallets, railway sleepers, posts, stands, piles, etc.

Specifications adopted for determination of the base service life and/or turnover rates for wood products:

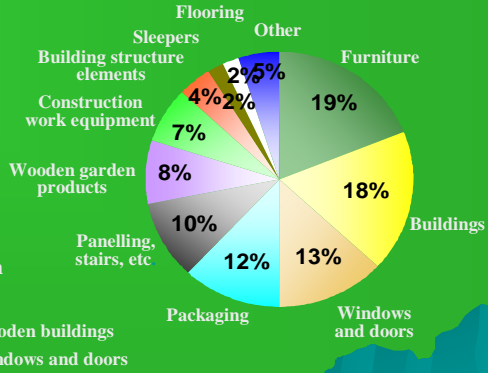
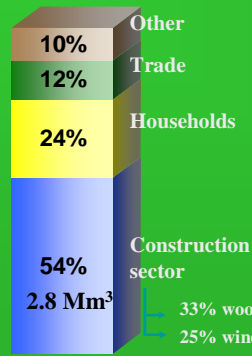
- properties of the material used in production of finished wood products (solid wood, engineered wood),
- product wear-and-tear for specific user groups (individual and collective consumers),
- places of final use that affect wood features and quality (external factors such as moisture and temperature),
- protection methods (no protection, surface and deep protection).

Sources of recovered wood in Poland, 2002

By sectors

5 M m³

By products



33% wooden buildings
25% windows and doors

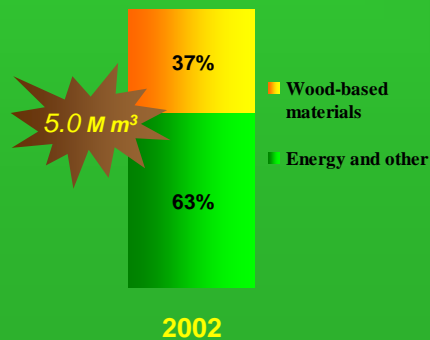
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Potential application of recovered wood in Poland 2002-2015

The characteristics of wood waste: • the form of the wood, • levels of non-wood materials content (including toxic materials) • susceptibility to separation etc., led to qualification of waste wood produced in Poland each year as suitable for industrial or other purposes.



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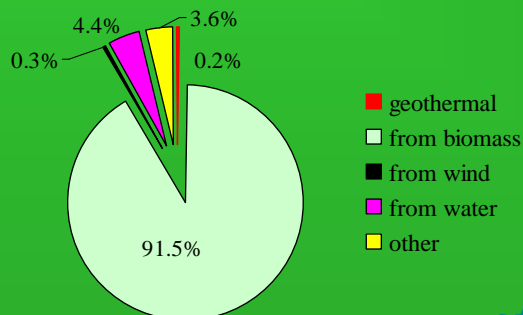
POLAND – Wood for energy

• General remarks:

- Information on wood/biomass supply/use extremely important in recent years,
- Lack of comprehensive and reliable information,
- The only way - estimation on the basis of different fragmented information

Production of renewable energy in Poland (2005)

The share of renewable energy (241 GWh) in the total production of energy amounts to **5.4%** and in the consumption of energy to **4.6%**



Total: 4.3 M toe
(ton of oil equivalent)
of which: from biomass – 3.9 M toe

Wood supply for energy – different info

- ◆ **COST 44** (ITD estimation)
 - ❖ fuelwood 1.4 M m³
 - ❖ industrial wood waste 3.0 M m³, of which:
 - internal use 2.4 M m³
 - external use 0.6 M m³
- ◆ **ITD – sources of biomass**
 - ❖ fuelwood 1.4 M m³
 - ❖ wood from fast-growing trees 0.6 M m³
 - ❖ wood from trees outside the forest 0.6 M m³
 - ❖ industrial wood waste* 3.3 M m³
 - ❖ bark 1.4 M m³
 - ❖ used wood * 0.3 M m³
- ◆ **JWEE (ITD)**
 - ❖ wood for commercial (heat and electricity) 2.7 M m³
 - ❖ wood for direct energy use 4.5 M m³
 - industry 4.3 M m³
 - wood industries 4.3 M m³
 - other (?)
 - households 0.2 M m³
 - agriculture 0.08 M m³
 - services (?)

* also composite wood products

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New initiative in relation to the wood flows analysis

2008 - Application (through the Ministry of the Environment Forestry Department to the National Fund for Environmental Protection and Water Management) for financing of a research project called „**Wood resources in Poland and their material and energy use – diagnosis and forecast**”.

Goal of the proposal – diagnosis (based on empirical research) of wood biomass sources and lines its production and energy use in Poland together with forecasts for 2010, 2015 and 2020.

Main assumptions for the future in the case of wood use in Poland:

- material use priority,
- energy use – taking into consideration the necessity of achieving rates of the share of renewable energy in the country's energy balance which are assumed in the Polish energy policy.

Envisaged methods: questionnaires, index method, desk research, expert method (using experiences at an international scale).

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Planned scope of research on wood supply and use (1)

◆ **SUPPLY-** sources of wood biomass:

- industrial roundwood, fuelwood, residues from forestry, felling remnants (including: branches, stumpwood, bark), wood from afforestation areas, wood from fast-growing trees,
- industrial wood waste (from primary and secondary wood processing, including bark),
- used/recovered wood,
- pulp production co-products (black liquor, tall oil etc.),
- wood fuel products (pellets, briquettes, charcoal).

◆ **USE:**

(2)

Material:

- ◆ sawmilling, panels, pulp and other industries
- ◆ for the production of wood fuel products (pellets, briquettes, biofuel),

Energy production by:

- ◆ power industry (heat and electric energy),
- ◆ industries (heat and electric energy), including: wood industries, other industries,
- ◆ other fields and branches of economy (households, agriculture, service).

Conclusions:

1. Poland is a country with a great potential of wood reserves at the European scale and one of the main European producers of many wood materials and products (especially of wood-based panels, furniture and flooring).
2. Due to Poland's obligation to increase the share of renewable energy in the total energy balance, as well as good economic conditions, recent years have shown a shortage of roundwood on the market. This leads to an extreme increase in the significance of knowledge about actual/potential supply of wood from various sources and in different forms.

**3. One might hope
that international co-operation
and exchange of research findings in the field
(as well as technological solutions)
will facilitate and speed up the process.**



Thank you!