Wood and its substitutes; wood as a source of energy

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WOOD – the main “product/input” of the forestry and one of the most important natural raw materials used in different branches of the economy.
How/where to use wood in the context of the climate change?
Wood consumption in Poland
2007

Total consumption of roundwood = 37.6 M m³
of which:
- 94% industry
- 5% energy
- 1% other (agriculture, gardening)

Roundwood:
- industrial wood:
  - 99% industry
  - 1% energy
- fuelwood:
  - 55% industry
  - 45% energy
Poland in EU acc. to production 2006

- **ROUNDWOOD** – 31.9 M m³
- **SAWNWOOD** – 3.3 M m³
- **WOOD-BASED PANELS** – 6.7 M m³
- **WOOD PULP** – 1.1 M tons
- **PAPER AND PAPERBOARD** – 2.7 M tons
- **FURNITURE** – 5 bn €
- **FLOORING** – 50 M m²
In recent years two remarkable trends have been visible on the global and also on the Polish market:

- strong competition between wood and “non-wood” materials,
- increase in importance of wood as an energy carrier.
I. Wood has to compete with non-wood substitutes
• Wood - an environmentally friendly raw material at any stage: silviculture, timber harvesting, processing, production waste generation, use and disposal of wood products.

• According to SWOT (+LCA) analysis industries based on wood have an advantage over other industries. This concerns particularly:
  - renewable and extensive raw material base,
  - energy-consumption in the course of manufacturing process,
  - application range,
  - ease of recycling,
  - health.

• The advantages of the forest-timber sector are particularly visible in comparison with the plastics, aluminium, steel and cement sectors.
• **Substitution** becomes a universal and inevitable phenomenon as a result of technological advancement and ever-growing societal needs.

• It is remarkable that at the same time:
  - substitution is a positive process allowing saving valuable natural raw materials, incl. wood;
  - substitution is negative, as in many cases production, use, and disposal of non-wood products are harmful to the environment.

• **A paradox**: manufacture of non-wood substitutes is accompanied by higher social costs related to contamination of the natural environment than in the case of wood products but frequently it uses positive associations with ecological wood products.
The main areas where increased substitution of wood raw materials and wood materials is observed are:

- construction (structures, windows, doors, flooring),
- transport (sleepers), and
- packaging.

The raw materials (materials) which compete with wood first of all are:

- plastics (packaging, windows, doors, furniture),
- aluminium (windows, construction elements in the building industry, transport and furniture),
- steel (construction of bearing structures: bridges, houses, etc.),
- cement (as above).
Substitution for wood in Poland

Windows

Doors

Sleepers

Furniture

The beginning of the 20th century
Currently

NON-WOOD MATERIALS
Building industry – the main place of wood application (strictly connected with assortment and building technologies applied)

- In Poland:
  - wooden construction elements are mostly applied in single-family housing, in pavilion-type buildings, as well as in the construction of summerhouses and garden sheds; whereas practically they are not applied in multifamily housing, public buildings, administration-office buildings or shopping-centers,
  - prefabricated wood building industry is not very popular (10% of all single-family houses),
  - the share of wooden floors in Poland amounts to about 30%, whilst in Western Europe 6% (textile floors – 38%, ceramic tile and stone floors - over 29%).
Increased substitution of wood by non-wood materials in the furniture industry:

- particularly: office furniture or furniture designed for public utility buildings, although the scale of this substitution has not undermined the dominant position of wooden furniture in Poland yet, both in terms of production and consumption;
- in the furniture industry, substitution has a limited range; wood is matched by no other material in the manufacture of furniture for sitting rooms, sleeping rooms or children rooms while in the case of garden, kitchen, bathroom, shop or office furniture the use of wood substitutes can be very extensive.
IN THE FUTURE:

• To secure its position in highly competitive markets, to prevent substitution and to create new markets, **the wood sector should better recognize consumer needs and seek new ways of their satisfaction.**

• This can be achieved:
  
  → through novel technological solutions improving the quality of wood products,

  → through intensified and attractive promotion campaign for wood and its products carried out by representatives of the entire forest-wood sector.
II. Wood – a source of energy
### Primary energy production and consumption in Poland

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<th>2002</th>
<th>2006</th>
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<tr>
<td><strong>Indigenous production of primary energy</strong></td>
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<tr>
<td>Hard coal</td>
<td>73,9</td>
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<td>Lignite</td>
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<td>Crude oil</td>
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<td>Natural gas</td>
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<td>5,0</td>
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<tr>
<td>Other</td>
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<td>7,0</td>
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<tr>
<td><strong>Total consumption of primary energy</strong></td>
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<td></td>
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<tr>
<td>Hard coal</td>
<td>50,3</td>
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<td>Lignite</td>
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</tr>
<tr>
<td>Other</td>
<td>4,1</td>
<td>5,5</td>
</tr>
</tbody>
</table>

%  
87%  
89%  
87%  
62%  
64%  
62%

Source: Central Statistical Office 2007
In Poland consumption of wood biomass as an energy carrier results from current energy policy harmonized with EU policy.

• Due to Poland’s location and land form (with limited use of water or wind energy) the adopted direction of the development of the renewable energy sector assumes the use of available sources of wood biomass which, at least in the short term, is considered a faster and cheaper way of fulfilling international commitments.

• At the same time, Poland’s economic policy states that wood consumption for energy production should not cause shortages in wood supply for manufacturing purposes (due to the significance of wood industries, particularly the furniture industry, for the national economy).
Energy production from renewable sources in Poland:

- 6.5% of the total energy production,
- 5% of its consumption (2006),
- indicative quantitative targets set by the EU - 7.5% by 2010.
Production of renewable energy in Poland
2006

Total: 5.0 M toe
(ton of oil equivalent)
of which:
from biomass – 4.6 M toe
Wood consumption in Poland 2007

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Wood for energy in Poland - estimation, 2005

- Fuelwood: 1.4 M m³
- Pulpwood: 0.4 M m³
- Wood from trees outside the forest: 0.6 M m³
- Wood from fast-growing trees: 0.6 M m³
- Industrial wood waste (solid): 2.0 M m³
  of which: internal use: 1.9 M m³
- Bark (from the industry): 1.3 M m³
- Used wood: 0.2 M m³

Total: 6.5 M m³

2005, GUS and estimation by the Wood Technology Institute Poznań
Due to a high and still growing demand of the wood processing industry, particularly wood-based panels industry, for wood, Poland will look for biomass energy during the next years but only as a complementary source of energy.

According to the legal regulations, the share of „biomass from agriculture” (wood from fast-growing trees, other short rotation plants, straw etc.) in the biomass consumption structure for energy purposes should achieve 5% in 2008, 25% in 2010 and 100% in 2015.
Conclusions
Wood is a raw material which is very important for the economy and moreover it is environmentally friendly and renewable.

For the development of the timber market it is essential that offered products are better tailored to society needs, e.g. through improvement of their properties, so they become competitive to their non-wood substitutes.
The need to look for new energy sources, including renewable energy carriers, has caused increased interest in wood biomass. However it seems that in the long run the use of wood, particularly high-quality wood, as a material and not as fuel should be its priority application.

Contrary to the wishes of the wood sector professionals, wood has not so positive image in society and economy as it deserves. Therefore, it is essential that the whole forest-wood sector undertakes promotion actions to improve the situation.
Attention was drawn to the weight of this issue during the 3rd Ministerial Conference on the Protection of Forests in Europe, Lisbon, June 1998, by entering in the General Declaration a commitment for:

„taking action to stimulate and promote the sound use of wood and other forest based products as environmentally friendly and renewable resources”
Tackle Climate Change: Use more wood
Thank you!