Wood Plastic Composites (WPC)
Markets in North America, Japan and Europe
with emphasis on Germany

Short Version of the nova Study

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nova-Institut GmbH, September 2005, Update 2006

Wood plastic composites (WPC) are a new material group that presently is developing dynamically worldwide with large growth rates. WPC are thermoplastically processible composites made from the renewable resource wood, mostly synthetic plastics and additives. A typical WPC product for example is an extruded profile for a veranda decking, consisting of 70% wood flour, 25% polyethylene or polypropylene and 5% additives such as bonding agents, UV protection additives and colour pigments.

A generally accepted German term could not be established so far. The literal translation of WPC is: Holz-Kunststoff-Verbundwerkstoffe.

North America has a leading position in the field of WPC production and use, in 2005 about 700,000 tons were sold on the market here.

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<th>Japan</th>
<th>Europe</th>
<th>Germany</th>
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<td>2005</td>
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<td>10,000</td>
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Figure: Annual WPC production in selected countries (in t) (nova 2005, simplified)

The most important sales market in North America is the decking sector, i.e. deckings for exterior applications such as verandas, terraces or exterior staircases, where WPC are mainly replacing boiler pressure-impregnated real wood. The annual growth rates are considerable, the 1 million tons mark should be exceeded soon. With amazement, the classic wood and plastics industry watches a new material group grow that mainly consists of the renewable resource wood.

While there are detailed market studies available for North America, the data situation for the next important WPC markets Asia and Europe is rather meagre. In Europe, experts estimate the current WPC production at about 30,000 t/year.
The study on hand for the first time provides detailed facts on the German WPC market. Against the background of the present dynamics, however, this can only be a first interim result, a snapshot. The study contains statements on the market volume, the most important applications, manufacturers and actors. The crucial results are:

• In the year of 2004, about 5,000 tons of WPC were produced.
• For the year of 2005, a doubling of the production volume to 10,000 tons of WPC is expected.
• Particularly for wood material manufacturers, WPC is a hot topic, everyone is observing the development, many are in the starting blocks.
• Meanwhile there are at least 17 companies in Germany manufacturing WPC granulates and products. At the moment substantial investments are made and capacities expanded.
• Other than in North America, the range of applications is more diversified in Germany. Just as in the USA, decking profiles for the exterior are produced by means of extrusion. But other fields of application such as the automotive and furniture industry are also targeted by the manufacturers. Here mainly polypropylene as matrix and injection moulding as technology play an important role.
• Many things are developed and tested – it remains open in which sector the main fields of application will have arisen in five years.

In the field of WPC, special chances and obstacles result from the „marriage“ of wood and plastics technology:

• The plastics industry for the most part is not concerned with the primary material wood and its quality fluctuations, dust and humidity problems. Compared to plastics, however, wood raw materials have the advantage of being cheaper.
• The wood industry is not familiar with the production of WPC on extruders, the standard machine of the plastics industry, and, compared to the production of wood board materials, WPC production is slow and expensive.
• So with WPC, both industries are breaking new ground.

Also with regard to the materials, the advantages of WPC compared to wood and plastics are highly diverse:

• Compared to solid wood products and common wood materials, WPC have the following particular advantages: The material’s unrestricted formability and the higher humidity resistance as well as, resulting from this, the weathering resistance without post-treatment.

These advantages have to be balanced against higher production costs.

• Compared to synthetic plastics, WPC can be interesting due to their potentially lower price, their haptics, their nature image and some modified technical properties (higher stiffness, significantly lower thermic expansion coefficient). Particularly the price of WPC with a high wood content of 60 to 90% is only little dependent on the rising mineral oil prices.
Especially in times of rising oil prices, WPC do have an interesting potential for being used in many fields of application.

Companies from all industries that are using wood or plastics as material, should take this potential into consideration. Interesting perspectives open up also for the German mechanical engineering sector and the manufacturers of additives. From the marketing especially of by-products of chip-removing processes such as in saw mills, in the planer industry and processing of solid wood, an additional value added for the production of WPC arises for the wood industry.

It doesn`t happen every day that a new low cost and versatile mass material appears on the market. From our point of view, it constitutes a challenge to accompany, ensure and accelerate the market introduction and establishment of WPC in an appropriate way by standardisation, quality management, practical research, political-legal framework conditions and cooperation with the actors (formation of an association).

The study shall help the new material attract the attention of industry and politics.

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Title of the study:

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Technical properties – Fields of application – Prices – Markets – Actors
Supported by the Fachagentur Nachwachsende Rohstoffe e.V. (Agency of Renewable Resources, FNR) (www.fnr.de) with funds of the Federal Ministry of Food, Agriculture and Consumer Protection (BMVEL) (project number 22009204)

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The full study is in German language available from the Agency of Renewable Resources, FNR (printed version) and from nova-Institut (PDF version) at: www.renewable-resources.de (menu item: nova publications) and www.wpc-kongress.de.