

LignoBoost: A successful relay

Hans Theliander
Entrepreneur
Thore Berntsson
Networker



The LignoBoost Process is an innovation that originates from research conducted by Hans Theliander, Professor in chemical and biological engineering related to forest products at Chalmers. It is also a result from successful interaction between researchers at Chalmers and different actors within a large industry, institute and academic consortia.

It all started with an industry driven project that was investigating the possibilities of filtering lignin extracted from black liquor. Lignin is one of the most abundant organic polymers on Earth. With its high content of non-fossil organic carbon it is a potential energy source much cheaper than oil and with great potential for being used in carbon fibre production or as other chemical compounds. In addition; one of the large bottlenecks in the pulp and paper production is often the recovery boiler, and if lignin is removed from the black liquor, the recover boiler's efficiency is increased with a larger overall production as a result. The objective of the project was to produce lignin with better quality and thus increase its value, but the project was struggling with filtering. Hans Theliander, well-known in the field of filtration, was contacted and after a short while, the research group at Chalmers had managed to set up a functioning lab process, which led to the idea of a

novel process solution.

Thore Berntsson, Professor at Heat and Power Technology at Chalmers, was at that time analysing the pulp processes (the Kraft pulp process) and could by a system analysis approach conclude that there was an energy surplus in the process, available to use for energy production or for extracting lignin. Hans Theliander contacted Bäckhammar, a pulp and paper mill in mid Sweden, in order to test their lab scale process on site. *"It worked perfectly!"* He says, and smiles.

The scale-up

The next step was to test the technology in a pilot scale plant. *"Usually such plants are hard to get data from, unless you as a researcher take an active part in the construction"*, Hans Theliander says. Thanks to their good relations with industry, the researchers manage to get access to different kinds of infrastructure and during one month in 2004 the research team managed to produce five tons of high quality lignin to an incredibly low cost. *"We showed how easy it was"*, Hans Theliander says, and continues: *"And together with Thore Berntsson's work it was obvious that this was highly integrating and fully possible to integrate in the normal Kraft pulp process."*



Making Science Useful

Roles: Seven types of roles are identified in relation to making science useful. The roles are developed from different activities for diffusion and utilisation, carried out by one or a group of researchers, or by an entire part of the organisation. The roles are; researcher, educator, advisor, debater, entrepreneur, infrastructure developer and networker. These roles are in general intuitive but develop differently, based on personal characteristics, area of research, the recipients of results within the area, and by different local traditions of how to work with utilisation.

More information: This framework is developed by Staffan Jacobsson, Eugenia Perez Vico, Chalmers University of Technology, Hans Hellsmark, SP Technical Research Institute of Sweden and Merle Jacob, Lund University. For more detailed information, please contact Eugenia Perez Vico (eugenia.perez@chalmers.se) or Hans Hellsmark (hans.hellsmark@sp.se).

In the subsequent demonstration phase, the research institute Innventia took over the main responsibility, with Hans Theliander assisting in the technical development. Patent applications covering the technology and the processes were filed and a company was formed. Further demonstration was undertaken in 2007 and it was shown that the process concept worked in full scale. In June 2008, the spin-off company, including the IPR, was acquired by the multi-national capital goods supplier Valmet Power AB. A successful commercialisation process had come to an end and a new technology was established on a market, nine years after the first experimental test. Today the LignoBoost technology is applied at one pulp and paper factory in USA and the second plant is under construction.

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