

Europe's paper makes hope to slash energy bill

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Europe's paper makers hope to slash energy bill

By Sylvia Pfeifer



Paper production at Finland's Stora Enso, the world's biggest producer

The art of making paper is among the oldest industrial processes in the world, yet technology innovation has come at a slow pace over the past century. The last industry game-changer was 21 years ago, with the introduction of the shoe press to squeeze out excess water. Before that, you have to go back to 1929 when the recovery boiler was developed.

Today, however, the industry thinks it could be close to a true breakthrough. Researchers in a laboratory at Eindhoven University of Technology in the Netherlands are working on a process using solvents produced by plants that could radically change how paper is made and transform the competitiveness of the pulp and paper industry.

"In the past, the focus [in the industry] was on making current techniques more efficient, not on breakthrough technologies," says Marco Mensink, deputy director-general at the Confederation of European Paper Industries (Cepi), a trade association.

Making paper is an energy-intensive business. Companies either grind woodchips mechanically to separate the fibres or cook them with chemicals to remove lignin, which binds the fibres together. The wood pulp is then diluted and the resulting mixture pushed through a slit into a machine that squeezes out the water and dries the sheets.

Paper is the fourth biggest consumer of energy among all industrial sectors, according to the International Energy Agency. It is also fourth largest industrial emitter of carbon dioxide, producing 237m tonnes in 2011. Of the total, China accounted for 91m tonnes, North America 56m tonnes and Europe (OECD countries) 36m tonnes.

In March 2011, the European Commission set a challenging target of reducing carbon dioxide emissions by 80 per cent by 2050. In November 2011, the paper industry launched its own 2050 road map, which analysed how to achieve this target.

As part of this plan, Cepi set up two teams made up of scientists, industry executives, suppliers and outsiders such as [Tata Steel](#) to come up with concepts to achieve its aims. A common knowledge base was set up to share ideas, but Mr Mensink says a lot of effort was put into ensuring "the legal side of things" was done properly, including the protection of intellectual property rights and non-disclosure agreements.

The project challenged the teams to be as creative and imaginative as possible while focusing on technologies and solutions for all mills, old and new, large and small, in northern and southern Europe, and for all types of paper. Each team came up with four ideas and a winner was picked last year.

The winning proposal would allow the industry to do away with grinding and cooking. Instead, it would use naturally-occurring substances called "deep eutectic solvents" – which are produced by plants in times of drought or frost – to dissolve wood and separate out the lignin. The solvents could also be used to recover cellulose from waste and dissolve ink residues in recovered paper.

If the proposal can be made commercial, it could reduce the capital costs of pulp mills by half and "maybe" cut their operational costs by two-thirds, says Mr Mensink.

Were the entire industry to adopt the process for pulping it could also reduce fossil carbon dioxide emissions by a fifth compared with 2011 levels and cut energy use by 40 per cent by 2050.

According to Teresa Presas, director-general of Cepi, policy makers once thought low carbon targets could be met with existing technology and behavioural change. "That is wrong. Breakthrough technologies are needed."

It will not be easy, however. At the moment, the concept is proven and promising at lab-scale but not tested either at pilot or industrial scale.

"The experience with carbon capture and storage and other new technologies for renewables has shown that applying breakthrough technologies in the field is not easy and requires a – sometimes disproportionate – amount of money," concedes Ms Presas.

Securing funding and getting the right policies in place to support the winning proposal as well as the other seven concepts will be crucial. One so far untapped source of funding would be revenues from the EU Emissions Trading Scheme, according to Cepi. The funds are so far unused, apart from some money being channelled into projects looking at carbon capture and storage.

In terms of the winning proposal, Cepi is working with scientists at Eindhoven to expand the team with industry funding. It also has the backing of a group of companies led by Stora Enso, the Finnish paper maker. The company says it is optimistic about the technology but cautions that "substantial amounts of laboratory time are still required before we can even think of a first real pilot project".

The aim, says Mr Mensink, is to be in a position for the technology to come to market at an industrial scale within the next 15 years.

European companies may already be relatively green compared with counterparts in less regulated countries but if the technology does take off, its cost competitiveness could prompt the rest of the world to follow suit.

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