PULP DIRECT

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UPM PULP • CUSTOMER NEWSLETTER

The Biofore Company UPM

THE POSITIVE IMPRESSION OF PULP

It's very likely you encounter products made from pulp several times a day. But what is the true environmental impact of these wood-based products? UPM and the Finnish Environment Institute SYKE embarked on a pioneering study to find out.

Concrete information on the benefits that a forest yields in addition to wood raw material has now become available for the first time based on models created by third parties. These benefits, known as ecosystem services, are essential to all life on Earth.

A typical responsibly managed forested area in Finland roughly the size of a tennis court takes about a tree's life cycle to grow enough wood to produce a tonne of pulp. Over this period the forest provides the broadest and most plentiful range of ecosystem services, explains UPM's **Timo Lehesvirta**, Director, Forest Global.

"Forests are by far the most sensible commercial use of land when it comes to ecosystem services and environmental impacts."

Unlike traditional assessments that often focus only on the negative impacts of human actions, the study of ecosystem services also considered positive opportunities. The variables measured in the pilot project were selected to reflect the most vital global issues: clean water, climate change, biodiversity and use of natural resources.

Petteri Vihervaara, a Senior Researcher specialising in ecosystem services at SYKE, explains that the wellbeing of people, societies and the environment are closely intertwined.

"Global businesses should also consider the global picture when determining the scope of their responsibility strategies. There are many ways to manufacture the same wood-based products, and the crucial question is who can produce them more sustainably."

Both UPM and SYKE view this co-project as a starting point.

"This was the initial step in comprehensively understanding the impact of the whole forest industry value chain," Lehesvirta says.

The ultimate goal is to give industrial customers and consumers alike a simple but accurate guide for making decisions.

"It will then be up to buyers to arrange their preferences according to what they want to emphasise. For example, you might be concerned about climate change, or you may focus on products that sustain biodiversity. Or maybe you are seeking an optimised solution that covers all aspects of sustainability," Vihervaara explains.

SERVICES PROVIDED FROM A FORESTED AREA REQUIRED TO GROW WOOD RAW MATERIAL FOR A TONNE OF PULP.

EVERYTHING counts in corporate responsibility

Megatrends such as climate change, digitalisation, resource scarcity, demographic movements, urbanisation and global economic power shifts have affected our business and the pulp and paper industries as a whole over the past decades. Our corporate responsibility involves finding answers to these environmental, economic and social challenges.

Introduced in 2009, UPM's Biofore strategy aims to integrate the bio and forest industries into a sustainable future. This means versatile use of recyclable and renewable wood biomass, combined with innovation, efficiency and responsibility.

Biofore forms the backbone of UPM's responsibility thinking. Making more out of less is crucial for resource efficiency, and a major source of cost-effectiveness and competitiveness. "We view corporate responsibility not only in terms of our own operations but also of the whole value chain from the forests and plantations to the people who use pulp-based products. We are always seeking new sustainable solutions together with our customers, suppliers and partners," says **Päivi Salpakivi-Salomaa**, Vice President for Environment and Responsibility at UPM.

SUSTAINABLE USE OF RESOURCES

Responsible forest and plantation management is an integral part of our business. We work with wood suppliers who take good care of their forests and recognise the importance of biodiversity.

We only use controlled and legal wood, and we monitor and verify the origin of this raw material and wood supply chains. Most of the wood that UPM uses falls under international forest certification schemes.

We source most of our wood in Finland from sustainably managed, private or state-owned commercial forest, and from UPM's own forest holdings.

All wood for our Fray Bentos pulp mill in Uruguay comes from well-managed local eucalyptus plantations, with 70% sourced from UPM's own forest plantations and the rest from long-term partners. Our Fomento programme in Uruguay encourages local private landowners to diversify their land use through sustainable plantation forestry.

Wood is a renewable – but not infinite – resource, so UPM plants over 50 million new trees each year under responsible forest management plans spanning up to 50 years.

A pulp mill **brings life** to the whole area. Often **communities and businesses have grown** around the operations over the years.

43,000+
DIRECT AND INDIRECT JOBS CREATED BY UPM IN FINLAND AND URUGUAY

-70%
LOST-TIME ACCIDENT FREQUENCY IN TWO YEARS

ENVIRONMENTALLY EFFICIENT MANUFACTURING

As a large industrial facility, a pulp mill has an impact on the surrounding environment. It takes dedication, expertise, continuous monitoring and the best available technologies to mitigate that impact.

UPM pulp manufacturing units now use less wood, water, energy and chemicals to produce a tonne of pulp than ten years ago. Most of the water, chemicals and other raw materials are recycled into the pulp-making process or used to generate bioenergy. All wastewater is treated before discharging it to watercourses, and effluent levels are constantly monitored both internally and by the competent authorities.

We continue to prefer non-fossil fuels and we invest in new combustion and purification technology to reduce airborne emissions.

All of our pulp mills generate more energy and heat than they consume. The surplus is sold as CO_2-neutral electric power and heat to the national grid and other external parties. In fact, UPM is the second largest generator of biomass-based electricity in Europe.

RESPONSIBILITY FOR AND BY THE PEOPLE

Even the most sophisticated technology doesn't guarantee sustainable operations. People do.

Our pulp makers have the motivation, knowledge and skills to further improve the environmental performance of their mills. They make it possible to reach our ambitious production and responsibility goals.

We also take our responsibility for our people seriously. Our programme to build the company's safety culture and improve accident prevention helped to reduce the lost time accident frequency by 70% over a two-year period. This step change has led to a permanent improvement in our safety performance and culture that nowadays covers everyone working and visiting UPM premises.

JOBS AND OPPORTUNITIES FOR COMMUNITIES

As a community member that affects the surrounding society in many ways, UPM plays an active role in the local economy as an employer and business partner.

A pulp mill brings life to the whole area. Often communities and businesses have grown up around these operations over the years. UPM provides more than 43,000 jobs directly and indirectly throughout the forest industry value chain in Finland and Uruguay.

The UPM Foundation in Uruguay was established in 2006 to promote long-term development in rural areas through co-operation with local communities, organisations and institutes, focusing on education, training and entrepreneurship. These programmes have already affected the lives of more than 300,000 people.

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TRANSPARENCY BRINGS A COMPETITIVE EDGE

By ensuring transparency in all operations, we show that responsibility brings business benefits. According to McKinsey & Company, Bloomberg and Osmosis Investment Management, the most resource-efficient large public companies have outperformed global benchmark indices by an average of more than 5% per year over the past eight years.

UPM's products and operations comply with the most widely accepted and credible certification schemes, standards and relevant third-party ecolabels worldwide. We make information on responsibility performance easily available – from the level of the individual product and mill all the way to corporate level.

This consistent and transparent work on corporate responsibility has also been recognised. UPM is currently ranked among the most sustainable companies according to many reputable listings, such as the Dow Jones Sustainability Indices, the Climate Disclosure Leadership Index and the United Nations Global Compact LEAD.

PULP – THE BIOMATERIAL OF THE FUTURE

Pulp is a raw material used to make goods that you encounter on numerous occasions every day. Besides paper, board and tissue products, pulp is used in such applications as pharmaceutical products, foodstuffs, fabrics, and biocomposites.

Made of renewable wood raw material, pulp-based products are a responsible choice. They are widely recyclable and mostly biodegradable. What's more, products made from pulp can be used to replace non-renewable materials and products.

Even this is only half the story. The side streams and residues of pulp making have proven a rich source of new opportunities. Lignin, turpentine and tall oil can be processed into next generation products: biomaterials and biochemicals, and advanced renewable fuels. Pulp is not only an established raw material for everyday products, but also a super bioproduct of the future. ●

NEW **RECOGNITION** FOR UPM RESPONSIBILITY

UPM has accepted a special invitation to join the **United Nations Global Compact LEAD** as the first forest industry enterprise and also the first Finnish company.

Global Compact LEAD is a leadership platform within the United Nations Global Compact that promotes the integration of sustainability into business strategies.

"Joining LEAD will be a great opportunity for us to stay abreast of developments in the industry, and to generate and implement advanced corporate sustainability practices together with other sustainability leaders and committed stakeholders," says **Pirkko Harrela**, Executive Vice President, Stakeholder Relations at UPM.

UN GLOBAL COMPACT Global Compact LEAD

UPM RANKED AMONG THE MOST SUSTAINABLE CORPORATIONS

The Canadian-based media and research company Corporate Knights has ranked UPM 25th in its list of the top 100 most sustainable corporations. UPM is the only company in the Paper and Forest Products category.

The Global 100 Index relies on twelve quantitative sustainability indicators, including revenue generated per unit of energy consumed, ratio of CEO to average worker pay, and percentage of taxes paid.

"Driving top performance is clearly linked to sustainability for UPM. Our vision is captured in one word: Biofore. This means that UPM integrates the bio and forest industries to build a new, sustainable and innovation-driven future," says **Päivi Salpakivi-Salomaa**, Vice President of Environment and Responsibility at UPM. ●

A **LOCAL BUSINESS** PERSPECTIVE

Transport contractor veteran and proud entrepreneur Aki Sammalisto has nearly 20 years of experience in trucking.

Aki Sammalisto's company began working with UPM in 2010, and now its fleet of 20 trucks is almost entirely dedicated to hauling woodchips, sawdust and bark on routes running through all of the pulp mills and several other UPM production units in Finland.

"UPM has been a good business partner for us. Our relationship with them is frank, straightforward and personal. I guess we have been lucky to have such competent people working with us on their side."

Sammalisto is also a member of the UPM subcontractor occupational safety committee. He explains that his company had to undergo a rigorous responsibility evaluation – and passed it with flying colours.

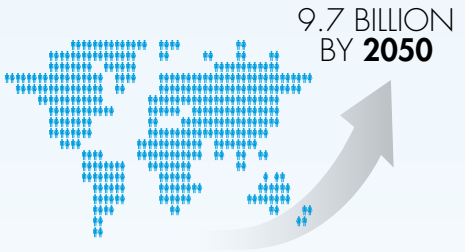
"UPM makes sure that its partners are working to minimise their environmental impacts. For example, we optimise our operations by eliminating unnecessary runs and emissions."

Sammalisto also acknowledges UPM's unique approach to the safety of its subcontractors.

"There are no exceptions. Safety is the number one priority for everybody, whether working at or visiting UPM mills," he explains.

THE **NEXT** ECONOMY

The bioeconomy shows major potential for battling many global issues caused by population growth and rising income levels, such as natural resource scarcity and climate change. But is it worth the hype?



World population is projected to reach 9.7 billion by 2050, and demand is rising rapidly for alternative ways of producing food, sourcing materials and generating energy. The bioeconomy will play a key role in replacing fossil fuels and non-renewable raw materials on a large scale.

John Bell is Director of the Bioeconomy Directorate at the European Commission's Directorate-General for Research and Innovation. He insists that we need to take full advantage of the business opportunities that will emerge when converting to a sustainable economy.

"We are putting a lot of effort into further developing bio-based products. We are also supporting new demonstration and flagship biorefineries, and enabling bio-based products to reach the marketplace," Bell says.

One solution has been under our noses all along. A modern pulp mill is a biorefinery that makes pulp from renewable forest biomass. The mill process is also an abundant source of bio-based materials, chemicals and fuels, and of green energy.

For example, a small Finnish company has managed to apply a new technology for manufacturing strong yarn from cellulose. Fabric made from this yarn has a considerably smaller environmental footprint than cotton or plastic. Another great example is the Lappeenranta biorefinery that produces UPM BioVerno at the company's Kaukas mill site. This wood-based, advanced renewable diesel fuel is made from crude tall oil, a residue of pulp manufacturing.

What bioeconomy?

The bioeconomy includes all production from renewable land-based and marine natural resources, including forests, crops, fish, animals and micro-organisms.

WORKING **TOGETHER**

As China's largest manufacturer of sanitary pads, nappies and tissue paper, Hengan International Group Company Limited invests heavily in sustainable development.

Hengan CEO **Xu Lianjie** insists that any business that fails to comply with environmental requirements, lacks competitiveness or supplies low quality products will be driven out of the Chinese market sooner or later.

"We wouldn't be where we are today without our integrity, innovation, corporate culture and social responsibility. And without the support of our partners."

UPM has been supplying pulp to Hengan since 2009. Mr Xu stresses that the collaboration between these two companies is perfectly in line with Hengan's own corporate philosophy of "pursuing health and growing together".

"I think the help that UPM has provided in raising customer awareness of sustainable development is even more valuable than their products and technical service," he says.

The active dialogue between Hengan and UPM will continue to emphasise environmental issues, safety and sustainable growth.

FROM THE EDITOR

Made from renewable, recyclable and biodegradable wood raw material, pulp, paper and board are bio-based products that remain sustainable throughout their life cycle. They lie at the core of the bioeconomy that is considered to have major potential for combating many global megatrends, such as natural resource scarcity and climate change.

We all use products made from pulp, often all day long and quite unreflectively. These everyday products are used in hygiene, nutrition, information, healthcare, work, wellbeing, luxury, and many other aspects of life. Produced responsibly throughout the value chain from forest to end-product, this can create many benefits for people and the environment. Our joint pilot study with the Finnish Environmental Institute on the impacts of manufacturing one tonne of pulp sought to demonstrate some of the positive impacts arising from the forest.

The bioeconomy creates many positive opportunities for companies in the pulp and paper business. We can create a mutually beneficial, effective and responsible supply chain. Let's continue this work together.

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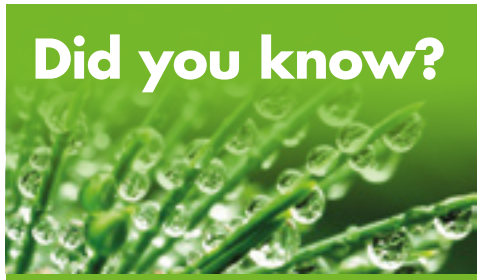
Did you know?



UPM has developed GrowDex®, a cellulose-based hydrogel for 3D cell culturing and other biomedical applications. GrowDex® is highly biocompatible with human cells and tissues – but with no material of human or animal origin. The benefits of 3D cell culture techniques include opportunities for discovering models and treatments for serious diseases.

Visit **www.upmbiochemicals.com/growdex** for further details.

LARGER LOADS IMPROVE EFFICIENCY AND BENEFIT THE ENVIRONMENT

The average size of UPM wood and wood chip loads in Finland has grown since a new road transport regulation increased the maximum vehicle combination weight from 60 to 76 tonnes. UPM's transport contractors have been eager to take advantage of this change. Larger loads improve transport efficiency and reduce fuel consumption per unit of payload, cutting carbon dioxide emissions.

Transport volumes and distances have remained at a stable level, and research shows that increased total weights have not damaged roads any more than regular traffic.

HIGH CAPACITY TRANSPORT (HCT) VEHICLES GATHER RESEARCH DATA

UPM is one of the first Finnish companies piloting the use of HCT vehicles. The first special HCT timber truck permit was granted to UPM contractor Orpe Kuljetus Oy. The combination vehicle of weight not exceeding 94 tonnes is part of a research project coordinated by the Finnish Forest Industries Federation and Metsäteho Oy. UPM also uses the services of Speed Oy Ltd, which holds a special permit for HCT container lorries.

Research data collected from HCT vehicles will enable the Finnish authorities to determine how new vehicle technology could improve wood logistics in the Northern periphery of Europe in a safe, efficient and environmentally sustainable manner.

The High Capacity Transport (HCT) timber truck of Orpe Kuljetus Oy transports wood between UPM mills and harbour terminals in Finland.

THE **WORLD'S MOST CLOSELY MONITORED PULP MILL** PROVES ONE OF THE BEST

The findings of an environmental impact assessment confirm that there are no signs of environmental impacts on the Uruguay River from operations of the UPM Fray Bentos pulp mill.

For over a decade Uruguayan environmental authorities and UPM have continuously monitored the environmental performance of UPM Fray Bentos with the aid of several independent researchers and environmental experts.

"At no point in the programme have we ever found any evidence that pulp mill effluent has any environmental impact on the water quality or biology of Río Uruguay since the mill began operating in 2007," says biologist **Jukka Tana**, who has been part of the research group since the very beginning of the work.

Between 2005 and 2007 the research group completed baseline studies of the water quality and biology of Río Uruguay, analysing the river as the receiving waters for mill effluent. This analysis work has continued as a permanent monitoring programme since the start-up of the mill.

COMPREHENSIVE RESEARCH

The research work includes studies of water quality, sediment, plankton and fish communities.

"We have also recruited local fishermen to keep records of their fish catches. The fish community and population structure has remained unchanged in all three study areas, and the fish caught have been found to be in good condition."

Tana says the monitoring programme has been one of the most comprehensive research undertakings ever conducted in the field of pulp mill emission studies.

"Our findings have shown that even our preliminary environmental assessment and modelling prepared in 2003 was correct in its expectations that the mill would have no impact on the river," he concludes.

CONTROLLING MILL EMISSIONS

In addition to external independent environmental monitoring, the environmental performance of the pulp mill is also continuously monitored by UPM specialists.

Gervasio González, the mill's environmental manager, explains that river monitoring is the most important, but not the only element of this work: "Besides effluent discharges to the river, we also analyse emissions to the air and waste generation close to the mill." The findings of UPM's monitoring programme are also communicated to the public.

In 2012 UPM Fray Bentos became the first non-European mill to be certified under the voluntary EU Eco-Management and Audit Scheme (EMAS), which promotes legal compliance and mitigation of local environmental impacts.

The cumulative environmental data from eight years of operation demonstrate that UPM Fray Bentos is one of the best performing pulp mills in the world. ●

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