

Biofore

UPM'S STAKEHOLDER MAGAZINE 1/2014



POWER FROM THE WOODS



WOOD-BASED RAW MATERIAL

100%

UPM is currently building the world's first commercial scale biorefinery producing renewable diesel in Lappeenranta, Finland.

The fuel is called UPM BioVerno, and unlike traditional biofuels, it is made entirely of non-edible raw materials, namely residues from pulp production.

UPM BioVerno is a low-emission renewable diesel that is well suited for all diesel engines. A responsible and innovative alternative.

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BIOFORE IS
THE UPM-KYMMENE
CORPORATION'S
GLOBAL STAKEHOLDER
MAGAZINE



UPM – The Biofore Company

UPM combines bio and forest industries. We are building a sustainable future in six business areas.

In 2013, UPM's sales amounted to EUR 10.1 billion. UPM has production plants in 14 countries and a worldwide sales network. UPM employs around 21,000 people. UPM's shares are listed on NASDAQ OMX Helsinki. By the end of 2013, the company had 94,568 shareholders.

See the forest for the trees

– and you will be able to see far!

Some five years ago we came up with the term Biofore, which aptly crystallises UPM's role in combining the bio and forest industries. The potential of an innovation-driven bio and forest industry is more relevant today than ever before, as the world needs new, renewable energy- and resource-efficient materials and solutions.

The need for natural beauty and aesthetics is just as important, and in the forests that's all we can see. We can see far into the future!

One of UPM's three core values is "renew with courage". It presents a positive challenge, both at the level of the entire company and to each of us personally.

Renewal refers to re-evaluating routine operating models, practices and views; it is open-mindedness and willingness to look for new opportunities through open interaction with others. And through listening to others.

Here at UPM this principle is applied in many ways. For example, in how the experts in our various business areas create innovations together: they combine different skills, expertise and technologies in an encouraging environment.

The same method can work just as well in the interaction between companies and educational institutions, and why not also between countries and entire nations? Real development and learning never occurs on its own or in isolation – it's not a coincidence that another one of our core values is "achieve together".

In fact, none of the achievements showcased in this magazine could have taken place without those two prerequisites: productive cooperation and bold renewal.

Elisa Nilsson
Vice President,
Brand and Communications, UPM



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Novel ideas

Openness is the first thing you notice when you step inside UPM's new office building, Biofore House. All unnecessary obstacles to communication and open interaction have been removed, and the new spacious atrium, bathed by natural light, connects the building's six floors. And what's even more important, it connects people!

Each and every detail of the new Biofore House has been designed to promote seamless cooperation between the experts from all of our business areas. In this place, nobody stays hidden with their ideas because the spatial solutions encourage all to work and innovate together. We can state with good reason that the Biofore strategy is alive and well in the architecture of our new office building.

Biofore House is primarily a place of work but it also embodies our "More with Biofore" principle; our promise of resource efficiency and innovativeness that create added value. The building has been designed and built according to international LEED standards.

You can see UPM's wood and composite products used throughout the building, both in the interior and exterior spaces. All electricity used in the building is green energy, produced from biomass by UPM. Running costs are another example of the building's energy efficiency; they are lower by as much as a third than the previous office building.

Biofore House is a concrete example of a novel idea!

Biofore House has been designed by Helin & Co Architects. It was inaugurated on 6 February 2014.



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04 NOVEL IDEAS

The open architecture of Biofore House, our new office building, encourages people to work together and provides inspiration for novel ideas. The Biofore House is an excellent example of ecological building, and it utilises UPM's materials extensively and creatively.

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Biofuel production holds a great deal of potential for growth and profitable business, says Chris Malins, ICCT's Fuels Programme Lead. For him, forest industry companies have the advantage in biofuel markets.



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The Biofore Concept Car was unveiled at the Geneva International Motor Show in March. Majority of its parts that would traditionally be made from plastics have been replaced with UPM's renewable biomaterials. It is an excellent representation of UPM's Biofore strategy based on use of renewable raw materials.



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Jussi Pesonen, UPM President and CEO, believes that only companies able to efficiently leverage raw materials, energy and water will prove successful among tough competition. UPM intends to remain one of the sector's pioneers in resource efficiency.

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UPM has established itself on the global pulp market. The best prospects are in China, where the increasing production of tissue paper, in particular, is boosting the demand for pulp. In the Asian market, the company has also acquired new customers in South Korea, Indonesia, Taiwan and Vietnam.



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The Biofore Concept Car presented at the Geneva International Motor Show has a green core: UPM Formi biocomposite and formable UPM Grada wood material.

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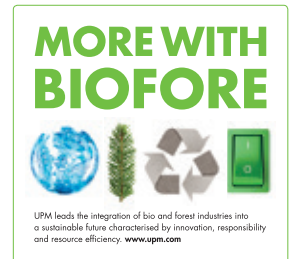
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Capital Market Day in London offered an opportunity to meet with UPM's management team members and to hear more about the company's strategy, economic development and business activities.



EDITOR-IN-CHIEF
Elisa Nilsson

EDITORIAL STAFF
Annukka Angeria, Asta Halme, Markku Herrala, Klaus Kohler, Anneli Kunnas, Monica Krabbe, Marika Nygård, Sini Paloheimo, Päivi Salpakivi-Salomaa, Vivian Wang, Antti Ylitalo

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PunaMusta Oy,
Joensuu

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UPM-KYMMENE CORPORATION
PO Box 380
FI-00101 Helsinki
Finland
Tel. +358 (0)204 15 111

www.upm.com



In 2013, UPM's environmental protection costs were a total of EUR

134 million.

UPM's energy bill went down by EUR 6.1 million, thanks to the energy-saving investments implemented last year.

Energy consumption dropped by 138,000 MWh and carbon dioxide emissions by

32,000 tonnes.

Today

36%

of all fibre raw material used in UPM's paper production is recycled fibre.

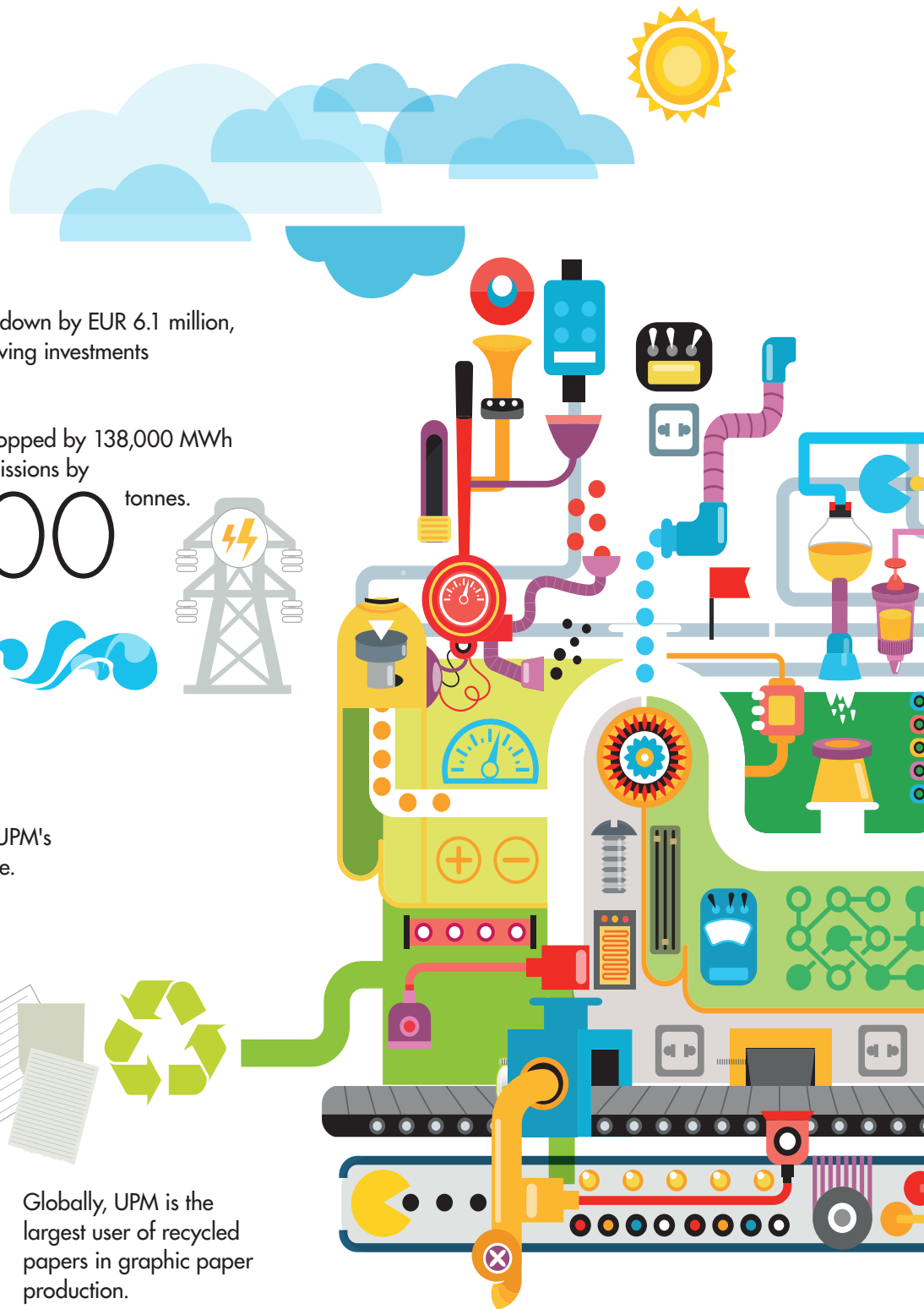
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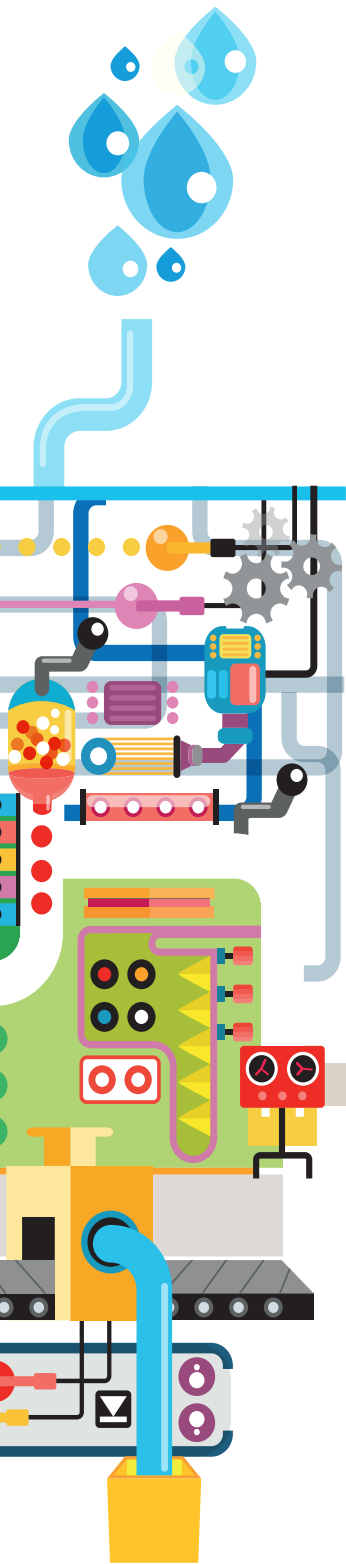
3.5

million tonnes of recycled paper in 2013.



Globally, UPM is the largest user of recycled papers in graphic paper production.





RESOURCE EFFICIENCY IS KEY



In 2013, our environment-related investments were EUR **29** million.

Improvements in production processes help UPM's Steyrermühl mill in Austria save EUR 1.1 million a year. The mill has 14 projects in the works aimed at improving material efficiency.

UPM's goal is to achieve a 15% decrease in the quantity of waste water by 2020, and a 20% decrease in the consumption of chemical oxygen in pulp and paper production, compared to the level in 2008. This project is proceeding so well that the goal for 2020 was revised and increased in 2012.

We want to use our renewable raw materials, energy and water efficiently.

Resource-efficient companies fare better than average





Among tough competition, success comes to companies who are able to leverage raw materials, energy and water efficiently, says UPM's President and CEO Jussi Pesonen. UPM intends to remain one of the sector's pioneers in resource efficiency, he continues.

UPM has a long history of improving material efficiency. In recent years, however, the company has paid even more attention to its raw material, energy and water consumption.

Efficient utilisation of resources is a core principle of UPM's Biofore strategy.

"Wood is an important raw material to us, and we want to ensure we use our renewable raw materials, energy and water efficiently. What we use, we use efficiently and responsibly," CEO **Jussi Pesonen** says.



Fibre-related business will also continue to be a core business area at UPM in the future.

According to Pesonen, international research indicates that listed companies who have managed to improve their utilisation of raw materials, energy and water achieve better than average results in stock index comparisons.

"For companies it is becoming increasingly critical to be cost efficient to do well in a competitive market."

PESONEN POINTS OUT that over the last decade UPM has been able to achieve significant savings in the consumption of energy and water, and in decreasing the quantities of waste produced.

"As an example, UPM's paper mills have cut down their use of water by a third, and their electricity by 10%. Likewise, the amount of waste taken to landfills has fallen by 65%."

The added benefit of these actions is that, in addition to being environmentally friendly, they also bring cost savings.

"UPM's production plants use substantial amounts of energy, and energy is expensive. The company has saved millions of euros through various energy-saving and research programmes and internal energy efficiency campaigns," adds Pesonen.

Another factor benefiting the environment is that the energy used by UPM is mostly generated from biomass. In Finland, its proportion is 84%, and 67% in the rest of the world.

Pesonen explains that recent years have seen major changes in the development of sustainable forestry and in monitoring the origins of timber.

"This means that 80% of the wood we use today originates from certified forests."

UPM'S EFFORTS to improve energy efficiency proceed as intensively as before. UPM also aims



UPM RAFLATAC

UPM Raflatac runs modern self-adhesive laminate factories and a broad distribution network composed of sales offices and slitting and distribution terminals. A well-functioning organisation has enabled the company to reorganise its operations and improve its efficiency in 2013, without affecting product selection, services or customer deliveries.

Over the last few years, Raflatac has extended its service and production network in Eastern European, Latin American and Asian emerging markets, established new slitting and distribution terminals, and invested in new technologies. Raflatac has strived to make its production and supply chains as efficient in emerging markets as they are in mature markets.

to reduce the quantity of solid landfill waste by 40%, and the quantity of waste water by 15% by 2020.

"We will continue to look for versatile and innovative ways to utilise every fibre of the wood biomass we use as raw material," he emphasises.

UPM has developed many energy-efficient production technology and logistics innovations in recent years. The principle of resource efficiency has also led to innovations involving the replacement of non-renewable materials with renewable ones.

"Fibre-related activities will continue to be a core business area at UPM in the future. In the long run, current business activities will be complemented by innovatively engineered products."

MANY NEW PRODUCTS are made of by-products and waste generated during normal production processes. One example of UPM's new innovative products is the new wood-based renewable diesel UPM BioVerno. Other products worth mentioning are UPM ProFi and UPM Formi composite products, and Cinerit, a new building material made of fly ash that is generated as a by-product of biomass burning.

"Our research and development programmes and development of business activities aim to produce new technologies and products. New growth opportunities are created by biofuels, biocomposites and biochemicals, for example."

Pesonen believes that the demand for products made of renewable raw materials is going to gather momentum in the next 10 years. Many sectors are busily looking for sustainable alternatives that can help to cut down the use of non-renewable materials such as plastics. Pesonen thinks there will also be demand for new characteristics associated with these products, such as lightness or strength.

"This trend is about resource efficiency, too. UPM is well positioned for success in this world." ◉

UPM ENERGY

UPM is the owner or co-owner of four hydropower plants operating on the Kokemäenjoki River in Finland, three of which have been under UPM's management since 2013. Improvement in cooperation between the owners has boosted the production of all the power plants. By coordinating and regulating the operation of the hydropower plants, UPM creates benefits for all of the power plant owners.

UPM has recently carried out systematic renovations of its hydropower plants, and the next phase will be the renovation and modernisation of the Harjavalta hydropower plant on the Kokemäenjoki River. The renovations will increase the power plant's generation capacity and improve its efficiency, regulation and environmental safety. The project is scheduled for completion by the end of 2017, and it will significantly increase the production of renewable energy in Finland.

INVESTING IN RESOURCE EFFICIENCY

UPM carefully follows all environmental regulations, and has, in fact, established much stricter internal regulations than those required nationally. The improvement of environmental performance is included in the Group's investment programme. The goal is to promote efficient and responsible use of energy, water and raw materials.

In 2013, the company's environmental investments totalled EUR 29 million. The single most significant investment was the renewal of UPM's Pietarsaari pulp mill's biological effluent treatment plant. Last year the company's environmental protection costs were a total of EUR 134 million. This sum mainly includes the costs from waste water treatment and waste management.



UPM BIOREFINING

The UPM Biorefining business area covers the production of pulp, renewable diesel, sawn timber and energy. It is able to efficiently utilise UPM's common wood raw material supply chain and to refine the waste into new business that creates added value. Pulp mills' recovery boilers produce renewable energy and electricity from biomass.

Production processes also generate residues, such as crude tall oil, that will be used as raw material in the production of the renewable UPM BioVerno at the biorefinery currently being built at Lappeenranta. Sawmills have a central role in the wood supply chain because their by-products are utilised in pulp and energy production.

ENERGY EFFICIENCY

UPM is constantly reducing its carbon footprint and enhancing the energy efficiency of its activities. This is possible thanks to the versatile energy sources and zero-emissions energy technology used by the company. Of the fuel consumed by UPM, the share of biomass-based fuel is 84% in Finland and 67% globally. The company is the second largest producer of biomass-based electricity in Europe. In addition, UPM has made significant investments in renewable energy since 2000.

Currently, the largest ongoing projects are the construction of a combined heat and power plant at UPM's Schongau mill in Germany and the modernisation of the company's own hydro-power plants in Finland. Investments in the generation of biomass-based power and heat at production facilities have more than doubled the capacity of these facilities.

In 2013, UPM's Korkeakoski sawmill commissioned a new bioheat plant. The plant improves the sawmill's energy efficiency in an environmentally friendly manner by utilising the waste bark generated by the sawmill. In the last few years, UPM has developed resource-efficient innovations in the fields of production technology and logistics.

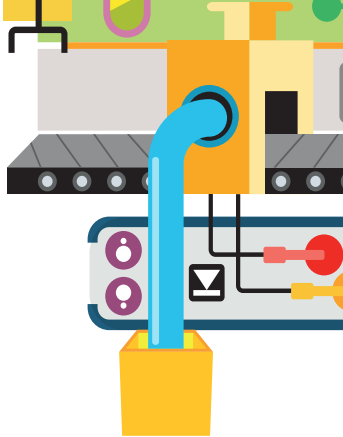


PROCUREMENT

UPM is the world's largest user of waste paper in graphic paper production. In 2013, the company's production facilities consumed approximately 3.5 million tonnes of waste paper. UPM procures its waste paper from Europe.

The most significant suppliers are municipalities, waste management companies and printing companies. Recycling of paper requires an efficient local recycling infrastructure and national recycling schemes. By concentrating on procurement from local companies operating near production facilities, UPM can optimise its waste paper value chain. This reduces costs and the environmental impacts of transport.

UPM treats some of the procured waste paper at its own sorting facilities, located near UPM's Shotton mill in the UK, Steyrmühl mill in Austria and Chapelle Darblay mill in France.



UPM has developed many energy-efficient production technology and logistics innovations in recent years.

USE OF WASTE AS A MATERIAL

UPM's production facilities maximise reuse of materials and minimise waste generated in production. Almost all organic waste generated in production, such as bark and logging residue and fibre-rich solids generated in the deinking and water treatment processes, are utilised in energy production at mills.

Of the solid waste produced by UPM, the majority is ash created during bioenergy production. A fairly large amount of all waste is utilised as filling material in earthworks. Presently, around 90% of UPM's production waste is reused or recycled.

Waste can also be reused in the production of new products. One example of this is the second generation biodiesel UPM BioVerno made from crude tall oil, a residue of pulp production. UPM ProFi wood plastic composite products are made from paper and plastic that form a manufacturing surplus from self-adhesive label stock production.



CLEAN RUN

Since 2011, UPM's pulp and paper mills have participated in the Clean Run campaign, which aims to improve the environmental performance of production facilities by promoting awareness of environmental issues. Last year, the campaign also expanded to other UPM business areas.

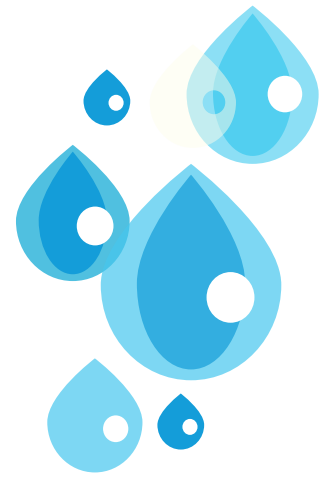
Environmental challenges are different for each business area, but faster reporting, learning from others and recognising problems as early as possible are common objectives for all business units. For example, in Wood Sourcing and Forestry, the campaign focuses on continuous monitoring, meticulous reporting of observations and systematic follow-up on corrective measures.

At UPM's Raflatac mill in Scarborough, UK, the objectives and principles of the Clean Run campaign are implemented by organising regular safety walks. During the walks, teams check their own responsibility area, identify the areas requiring improvement or immediate actions, and share best practice.

UPM PAPER ENA

At UPM's production facilities, material efficiency has been a priority for a long time, but there is always room for improvement. UPM's Steyrmühl paper mill in Austria generates total savings of around EUR 1.1 million per year thanks to improvements made to the production process. For example, the mill has reduced its use of chemicals in production. Savings are also generated by decreasing the use of process water and the amount of suspended matter. The improvements are part of the material efficiency programme launched by the Paper business area in 2011. "The material efficiency programme has proved successful, thanks to the commitment and smooth co-operation demonstrated by the personnel at UPM's Steyrmühl mill. We have already achieved a lot, but we still have some ideas for further improvement," says the mill's General Manager **Matthias Scharre**.

The project working group consists of different production process experts. On the basis of improvement ideas, 14 projects have already been implemented at the mill. The Steyrmühl mill has also shared its ideas and results with other UPM mills.



RESPONSIBLE USE OF WATER

Production of pulp, paper and hydro-power requires large amounts of water. All of UPM's major production facilities are located in areas with plenty of water. Despite this, it is important that the facilities use water in a responsible manner – in terms of both quantity and quality.

UPM aims to minimise the impacts of its use of water on local waterways and to protect the natural circulation of water in forests. All UPM pulp and paper mills are equipped with mechanical and biological wastewater treatment plants.

In 2011, a material efficiency programme was launched at all UPM paper mills. The objectives of the programme are to decrease the use of process water and the amount of suspended matter in wastewater. In the Pulp business area, decreasing the consumption of process water is a strategic development project.

Last year, UPM completed its project aiming at improving the production processes at the mills. The project also produced a second generation pulp production process where the amount of process water used per tonne of pulp is smaller than at present. UPM's newest mill in Fray Bentos, Uruguay, is among the best in the world in terms of water consumption.

UPM aims at reducing the amount of wastewater generated by 15% in 2020 and the level of chemical oxygen demand in paper production by 20% from the 2008 level. The project has progressed so well that the target for 2020 was tightened in 2012.

UPM BioVerno hits the road

Road tests of the new UPM BioVerno diesel produced good results, as expected. Production of the wood-based fuel will begin in Lappeenranta this summer.

UPM's biorefinery project took a major step forwards as road tests of the UPM BioVerno diesel were completed at the beginning of the year.

The tests showed that the second generation renewable diesel developed by UPM works just as well as regular diesel. The only difference is that the innovative diesel significantly reduces

greenhouse gas emissions compared to fossil fuels.

"The results of the road tests were similar to the results of the previous engine and vehicle tests. UPM BioVerno is fit for use," summarises UPM researcher **Ville Vauhkonen** who is responsible for the vehicle testing.

The road tests that began in May 2013 were performed by researchers from the VTT Technical Research Centre of Finland. The test cars included four new Volkswagen Golf 1.6 TDIs.

Two of the cars ran on a fuel blend that included 20% UPM BioVerno and 80% fossil diesel. Regular diesel was used in two of the cars for comparison purposes.

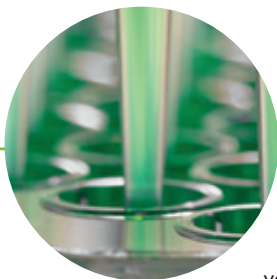
Before the road tests, VTT researchers measured the fuel consumption and exhaust gas emissions of the cars in laboratory conditions.

APPROXIMATELY 20 experienced test drivers from VTT participated in the road tests and kept a meticulous log of the distance driven, routes taken, outdoor temperature and when they refuelled.

"The goal was to keep the test drives of the four cars as similar as possible. Test drives were performed in varying conditions: we drove short distances in the city and longer distances outside the city in both summer and winter weather," says **Juhani Laurikko**,



FROM DECISION TO PRODUCT



2006

2008

UPM set its sights on becoming a major player in the wood-based biofuel sector. The company examined various manufacturing technologies and whether it was possible to use residues and by-products from its production plants. The most interesting raw material proved to be crude tall oil, a residue of pulp production. UPM faced a long and demanding R&D process as a similar wood-based biofuel had not been developed before.

UPM invested in small-scale test and laboratory equipment in Lappeenranta and began systematically building up the know-how required to refine hydrocarbons. The company did not have to reinvent the wheel, and existing competence was used in R&D.

The greatest insights were related to applying and combining existing technology and know-how. Technology and a profitable business model were developed side by side from the outset. Over the years, dozens of people from around the Group have been involved in the R&D work.

Principal Scientist from VTT.

After the test drives, the fuel consumption and exhaust gas emission measurements were repeated.

"The engines of the test cars worked excellently in all conditions," Laurikko says.

UPM and VTT will continue road testing once the production of UPM BioVerno has begun in Lappeenranta. The next tests will be performed on buses in the Helsinki Metropolitan Area.

In addition to performing the road tests, VTT is testing how UPM BioVerno affects the different parts of a car fuel system. Parts made of metal, plastic, rubber and silicone will be exposed to the renewable diesel for several months in laboratory conditions.

"The purpose of the test is to ensure that the fuel does not have adverse effects on other materials, such as the rubber gaskets," Laurikko says. ◦

UPM BioVerno is a high quality second generation renewable diesel made from crude tall oil, a residue of pulp production. The difference between first generation biofuels and UPM's renewable diesel is that the raw materials used by UPM do not contain food crops.

The quality and properties of UPM BioVerno are first class. The fuel is similar to mineral diesel, and it is fully compatible

with current diesel engines and the fuel distribution network.

UPM BioVerno meets the requirements of standard EN 590. Its benefits include a low sulphur and aromatic concentration and a high cetane number (an indicator of the ignition quality of diesel fuel). The fuel can be mixed and used in all mixing ratios (0–100%).



2012 UPM decided to build the world's first commercial scale wood-based biorefinery in Lappeenranta. The majority of the crude tall oil used by the plant comes from Finnish pulp mills, including many UPM mills such as the adjacent Kaukas pulp mill.

2014



The production capacity of the biorefinery will be 100,000 tonnes, or 120 million litres, of renewable diesel per year. Production is scheduled to begin in the summer of 2014, but development will not end there. As well as fine-tuning the product and business model, UPM will focus on optimising the production process.

UPM will be the world's first commercial scale manufacturer of wood-based biofuel when the production of renewable UPM BioVerno diesel begins in Lappeenranta in summer 2014.



Sustainably available waste
and residues could potentially
replace 16% of Europe's road
transport fuel by 2030.

This amount is equivalent to
37 million tonnes of oil per year.

Driven by



potential



TEXT ANTTI YLITALO PHOTOGRAPHY GETTY IMAGES, MIQUEL GONZALEZ


There are many ways to get attention and **Chris Malins** possesses a few good ones. When he sits in a meeting area in Amsterdam's RAI Convention Centre, the first thing you notice is his distinctive hair style. He has long hair dyed blue, which certainly makes him a recognisable character in the world of biofuels. But more importantly it's the recent research that he and his team participated in that really draws attention to Malins and what he has to say.

At the end of February, Malins and his team at the International Council on Clean Transportation (ICCT), published a study on the potential of advance biofuels, entitled Wasted: Europe's Untapped Resource.

The paper, based on research done by Chris's team at the International Council on Clean Transportation (ICCT)

together with the National Non-Food Crops Centre (NNFCC) in England, raised a few eyebrows by stating that wastes and residues could potentially supply 16% of Europe's road transport fuel in 2030. And this could be achieved using only sustainably available wastes and residues within the European Union. Despite the big numbers illustrated by the report, Malins keeps a cautious outlook.

"This 16% figure, even if it's a conservative estimate, has to be understood as a technical potential. At 16%, 10% or even 2% numbers, you're still talking about a big industrial roll-out, a big deployment of new technology and a lot of economic opportunity for Europe, and some significant carbon savings, too," he says.



300,000 additional jobs could be created thanks to advanced biofuels by 2030.

Chris Malins currently leads the International Council on Clean Transportation's (ICCT) Fuels Program from London. The ICCT plays an important role in Europe as it provides scientific research to regulators such as the European Commission. Malins' team focuses on the sustainability of biofuels, especially the commercialisation of advanced biofuels and indirect effects of biofuel production. The team also looks into lifecycle analysis of fossil fuel production and possible opportunities to adopt new fuel standards.

Downward CO₂ emissions

Road transport is one of the few industry sectors where carbon dioxide emissions have risen greatly in recent years. According to the European Commission the transport sector is well on its way to becoming the European Union's biggest source of CO₂ by 2030. If advanced biofuels reach their calculated potential, the CO₂ savings could range from 60% to 85% in most cases and thus make a significant contribution to the EU's climate targets.

"I think the advanced biofuel industry has potential, but we also have to be realistic. I don't think it's realistic to look into having 100% of fuel from biomass, but I think it's realistic that it's a part of a spectrum of options that you need to bring together in order to achieve targets for decarbonisation," Malins estimates.

Potential for aggressive growth

The potential for growth and profitable biofuels business is there. Based on Malins' report, up to EUR 15 billion of additional revenues could flow to the rural economy annually and 300,000 additional jobs could be created by 2030.

"There is no reason why growth in production of cellulosic biofuels, and especially cellulosic biofuels from waste and residues, can't be quite aggressive up to 2030. What is needed for that to happen is to have appropriate policy framework in place and confidence for the stakeholders that everything is being produced sustainably," Malins says.

"At the end of the day oil is big money. Technology that can replace any significant fraction of oil has massive economic implications. There will be a success for the first companies that can really get successful at producing these advanced fuels at an acceptable price."

Malins sees that forestry companies have advantages when entering this biofuels market. He also calls for cooperation between various stakeholders.

"A company that understands forests, sustainability and forest management has enormous advantages compared to new market entries on a variety of levels. I think companies that get ahead of the curve, who have answers to sustainability questions ready and who are working with the environmental community and regulators rather than against them, are genuinely going to have the advantage."

Ghost of first generation biofuels

Advanced biofuels, which are also called second generation biofuels, are liquid, high quality transportation fuels that are produced from inedible bio-based raw materials. The first generation biofuels, which are produced from e.g. starch, sugars or vegetable oils, have had an issue with 'fuel vs. food'. Since most of first generation biofuels are produced from food crops the rise in demand for biofuels has led to crops being diverted away from the food market and thus increasing global food prices. This has led to some reputation issues also with the second generation biofuels,

Potential CO₂ savings
could range
from 60% to 85%.



The transport sector is on its way to becoming the EU's biggest source of CO₂ by 2030.

In 2030 about 220 million tonnes of cellulosic material could be available annually.

even if they would not use raw materials suitable for food.

“It’s fair to say that because of the first generation biofuels there’s a lot of backlash now. But I don’t think that has to be inherited by an advanced industry,” Malins says.

“With advanced biofuels there’s an opportunity for companies not just to profit, but to create more jobs, to push more money to the rural economy without doing it through high food prices. With more of a focus on these resources, which are underutilised and low value at the moment, it can be much more of a win-win proposition.”

Advanced biofuels are still very much in the early stages and people have different views and even definitions for them.

“I think the ball is still pretty much in play on advanced biofuels,” he says.

Long and winding road ahead

Despite all the promise that can be seen, it’s not only smooth driving in the future. In Europe, technology is now mature enough to enable us to start the production of advanced biofuels.

Still, uncertainty around biofuel policy past 2020 is slowing down the sector from reaching its full potential. Another big question, especially for smaller entries to the market, is financing.

“Big companies, that have the capacity to invest internally, have a real advantage. Still everyone’s going to have to justify quite significant capital expenditures.

“So, the real challenge is having a combination of policy measures and support that gives confi-

Europeans generate approximately 900 million tonnes of waste paper, food, wood and plant material each year.

dence both to the public that things are done in the right way and to investors that there's a real market here and that it's going to be persistent."

Also choosing the right technology will be the key to success.

"Having watched biofuels for some time already, you shouldn't assume that the technology is going to be a big success until it has jumped through that hurdle of commercial production. That's the big question for the next five years."

And if we look a bit further into the future? How does Europe power its automotive industry in 2030?

"I think it's a genuinely open question at the moment. I would say that ethanol is not going to be the molecular choice even if some of the ethanol production technologies maybe are cheaper than synthetic fuel technologies. Companies like UPM, who are looking at synthetic fuel technologies, are going to have the advantage in the medium term. I certainly expect to see these cellulosic waste and residues to synthetic fuels technologies being important.

"But there's also a raft of other options available. Maybe significant roll-out of biogas in heavy duty vehicles for instance, but this could really go either way."

When talking about the focus of the industry in the next few years, efficiency is the key.

"I think it's a given that the companies should continue research and development, and making sure that these technologies are scaling properly and that you are achieving efficiencies. This is going to be important both financially and from the sustainability point of view." ◉

JOBS GALORE

The new report, *Wasted: Europe's Untapped Resource*, unveils the great employment potential of the advanced biofuel industry. **David Turley**, Lead Consultant for the National Non-Food Crops Centre (NNFCC), led the economic analysis of the research.

Based on the calculations, if investors realised the maximum technical potential of advanced biofuels derived from such feedstock, up to EUR 15 billion annually could flow into Europe's rural economy. This would mean that the industry at full capacity could create up to 300,000 jobs by 2030.

According to Turley up to 133,000 permanent jobs could be created in feedstock collection and transport. On top of that a further 162,000 temporary workers would be needed to construct biofuel plants and another 13,000 permanent jobs would be needed to operate these plants.

"Running a plant does not require a large staff compliment, but there will be a large number of temporary jobs created during construction. Those are very high-tech jobs that require a lot of engineering and other expertise," Turley says.

The employment estimates only show the direct jobs from feedstock collection, transport and processing. Additionally, there would be further indirect employment through machinery and fuel suppliers as well as other industries, which would make a much larger overall impact in the European Union.

"Even with more conservative sourcing, reflecting capacity for production of 2% of Europe's transport fuel demand, over 40,000 jobs and up to EUR 2.4 billion in net revenues could be secured by the agricultural and forestry sectors," Turley says.

The advanced biofuels business is highly dependent on access to a cheap and reliable supply of feedstock. This has a direct link to jobs that could be created.

"There will be different potentials for employment in the various parts of Europe. There are large areas of forests in Scandinavia, for example, that are well-suited for collection of forest residues. In Southern and Eastern parts of Europe labour costs will be lower and these areas may have an advantage in developing feedstock hubs," Turley estimates.





TEXT MATTI REMES
PHOTOGRAPHY SEILO RISTIMÄKI, UPM

of the UPM Fray Bentos mill from the previous 1.1 million to 1.2 million tonnes.

OVER THE PAST three years, UPM has more than quintupled its pulp sales in China and the rest of the Asia-Pacific region. According to Wiklund, China has become the most important single-country market for UPM pulp sales in a short period of time.

In the Asian market, the company has also acquired new customers in South Korea, Indonesia, Taiwan and Vietnam.

Growth in China's pulp market

UPM has established itself on the global pulp market. The best prospects are in China where the increasing production of tissue paper, in particular, is boosting the demand for pulp.

UPM began developing its pulp sales and technical customer service organisation in selected markets in 2009. The past five years have seen a gradual shift from almost exclusively supplying UPM's own paper mills to becoming a major player in the global pulp markets – serving customers operating in the growing end-use segments such as tissue and speciality papers as well as packaging board.

"UPM is not one of the biggest companies in the field, but we are known as a stable and reliable supplier. That is exactly what we have been aiming at," says **Tomas Wiklund**, Vice President, Sales and Marketing, UPM Pulp.

Last year UPM's pulp production amounted to approximately 3.2 million tonnes, of which almost two thirds or 1.9 million tonnes were sold to external customers. The global pulp market was approximately 55 million tonnes.

IN 2013 UPM's external pulp deliveries grew 19% compared to the previous year. There was an increase in deliveries to both China and Europe.

"This year we are targeting further growth in our external sales and also studying some new markets to achieve continued growth."

Wiklund believes that pulp sales volumes can be further increased in years to come.

Achieving this goal will be supported by the investment in the Kymi pulp mill, announced in February, which will increase the mill's annual production capacity by 170,000 tonnes.

Further production increase is possible through smaller investments designed to prevent bottlenecks at UPM's other pulp mills, like the work currently ongoing at the Pietarsaari mill. Last October the government of Uruguay granted UPM permission to increase the annual pulp production

"Our aim is to focus on specific markets and build extensive sales and customer service networks in these markets. There is no point in trying to cover every geographical area in the world."

Despite the current focus on Europe and China, UPM actively follows the development of other market areas. According to Wiklund, interesting areas include Southeast Asia, the Middle East and North Africa.

"The growth percentage of the pulp market in Turkey is the same as in China, but volumes are naturally much smaller."

WIKLUND ESTIMATES that the demand for pulp in China will continue its rapid growth for years to come.

"Our customers are constantly investing in new production capacity. The biggest growth is taking place in the production of tissue paper. Packaging material mills are also being built in China."

It has been estimated that the demand for tissue paper will grow annually by approximately 7% in China over

the next 5–10 years. This growth will be stimulated by urbanisation and the improving purchasing power of consumers.

In the production of printing and writing papers, the Chinese market is saturated, much like the European and North American markets.

UPM is prepared for an increase in the demand for pulp in China and will be able to increase its pulp supply in the next couple of years. The majority of the pulp imported to China by UPM comes from the Fray Bentos mill.

According to Wiklund, the key to the company's success is cost efficiency, which must be incorporated into the entire supply chain from forests to mills and the transport of finished products.

"Having a local presence and maintaining direct contact with customers are both important in the pulp business. We must be as close to the customer as possible in the markets we focus on and in China this sets us apart from our competition."

UPM's sales and technical customer service network covers the most important market areas in China and Europe.

UPM's office in Shanghai, China is near the production plants of many of the company's local customers, so it can respond rapidly to customer needs.

"At best, UPM can solve a customer's production-related problem on the same day."

The research and development centre located in Changshu is an excellent addition to UPM's presence in China. Technical analyses and research are performed in Changshu as part of UPM's global R&D network.

According to Wiklund, today's customers expect improved quality in pulp products. There is also an increasing interest in products manufactured in line with the principles of sustainable development. ◊

Over the past three years,
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the Asia-Pacific region.

COOPERATION OPENS UP NEW MARKETS

UPM and Canadian pulp manufacturer Canfor Pulp entered into a sales and marketing cooperation agreement at the beginning of January 2014.

As a result of the agreement, UPM's pulp sales network will represent and co-market Canfor Pulp products in Europe and China and the Canadian company will represent and co-market UPM Pulp products in North America and Japan.

The agreement will initially cover a sales volume of approximately 1 million tonnes.

Tomas Wiklund, Vice President, Sales and Marketing, UPM Pulp, says that launching the cooperation is a strategically important step for UPM.

"This is a unique business activity that is entirely new to us. The existing sales channels of Canfor Pulp open up new markets for UPM in North America and Japan. This cooperation is also unique in the industry which makes it even more exciting."

The cooperation will provide customers with a broader product portfolio. UPM and Canfor Pulp will jointly offer six different grades of market pulp that come from eight mills on three continents.

According to Wiklund, the product portfolios of the two companies supplement each other perfectly. Customers will have access to a variety of northern softwood pulps, birch pulp, eucalyptus pulp and mechanical pulp. Both companies also provide their customers with excellent technical service.



GREEN STAR

The Biofore Concept Car presented at the Geneva Motor Show has a green heart.

OF THE SHOW



The majority of components in the Biofore Concept Car that are traditionally made of plastic are replaced by renewable UPM Formi biocomposite and thermoformable UPM Grada wood material. The car is fuelled by wood-based renewable UPM BioVerno diesel. The car is a joint production between UPM and Helsinki Metropolia University of Applied Sciences.

While visiting the Geneva International Motor Show **Jussi Pesonen**, UPM's President and CEO, described the car as an excellent opportunity to showcase the company's Biofore strategy and the uses of the new materials.

"The Biofore Concept Car combines the development paths of our new products, like biocomposites and biofuels, which linked us to the automotive industry in the first place. This car is an interesting example of how different areas can be combined into one product," says Pesonen.



Materials used in the car and their applications

UPM FORMI:

Composite material made of pulp and plastic. Up to 50% of the UPM Formi raw materials are renewable.

Use in the car:

Front mask, side skirts, dashboard, door panels and interior panels.

UPM GRADA

Wood material that can be formed with heat and pressure.

Use in the car:

Passenger compartment floor, centre console, display panel cover and door panels.

UPM RAFLATAC

The automotive industry uses self-adhesive label materials, for example, on various components, spare parts and windscreens. Safety markings, warnings, serial numbers and type numbers, and use instructions can be printed on the material.

Use in the car:

Spare parts, engine bay, interior and exterior finishing etc.

UPM BIOVERNO

Wood-based renewable diesel fuel that can be used in all diesel-powered cars. Manufactured from crude tall oil, a residue of pulp production. Significantly reduces greenhouse gas emissions compared to fossil fuels.

Use in the car:

As fuel.





Biomaterials are used, for example, in the body and the lining of the car.

"UPM Grada and Formi products have great chances for success in the ecosystem linked to the automotive industry," says Pesonen.

UPM's new materials result from strong investment in R&D and the company's expertise on pulp utilisation. UPM's annual R&D expenditure is EUR 80 million, 80% of which is invested in New Businesses.

Elisa Nilsson, UPM's Vice President of Brand and Communications, states that bold renewal of the company and the entire forest industry, is at the core of Biofore thinking.

"The car is a fine representative of our transformation – a process that is strongly supported by our different business areas. The aim of the project is to demonstrate the potential of our new and innovative bio-based materials. For example, UPM BioVerno has attracted a lot of interest here at the Motor Show."

Students of industrial design and automotive and mechanical engineering from the Helsinki Metropolia University of Applied Sciences were responsible for designing and building the car from start to finish. A total of around 50 students participated in the four-year project. In addition to Metropolia and UPM, several partner companies and the Finnish Funding Agency for Technology and Innovation also participated in the cooperation.



BIOCOMPOSITES – AN ECOLOGICAL ALTERNATIVE

The Biofore Concept Car received a lot of praise at the Geneva International Motor Show from both automotive industry professionals and Motor Show visitors.

Juuso Kontinen, UPM's Vice President of Biochemicals, was happy with the interest generated by the car.

"Our materials function very well in the car, and they can introduce an ecological dimension into car manufacturing. If a component is manufactured from biocomposite instead of plastic, the carbon footprint can decrease by 60%. This is a remarkable achievement."

UPM Formi biocomposite is used, for example, in the front mask, side skirts and door panels. Thanks to the lightweight and durable materials, the car weighs 150 kg less than vehicles of a comparable size, which also means reduced fuel consumption.

"With this concept car, we have been able to demonstrate to the automotive industry that the new biocomposite materials are already in production and commercially available. Even though this is a concept car, it could just as well be commercially produced."

Automotive and mechanical engineer **Oscar Nissin** did his graduate work on the concept car and knows the stages involved throughout the car's manufacture.

"UPM's new materials behave very similar to their traditional counterparts. The materials are a well-functioning and ecological alternative for the automotive industry."



In good company

Among the giants of the automotive industry, the Biofore Concept Car was in good company in Geneva. The latest models from the industry's major players were displayed right next to the exhibition stand of Metropolia, which was responsible for building the car.

In addition to the new materials, industry leaders were interested in the car's design. People from Ferrari's design department visited the Metropolia student's exhibition area a number of times to take a closer look at the car. **Juha Tuomola**, a student who was in charge of the car's interior and exterior design, explains that the aim was to create an ecological city car with good visibility in traffic. Tuomola is happy with the result and feedback given to him. His goal is one day to become a designer at an Italian car manufacturing company.

"Car designers must be visionaries, as it will take years before the products will be introduced to the markets. This car does not resemble anything on the market, and in that sense the design is very successful."

Irish auto journalist **Kevin Fenix** was also impressed with the car.

"First of all, the design of the car is very successful. It looks appealing and attractive, and the glass roof brings in light. The car's seats are comfortable and its size is perfect for city traffic.

"In addition, the wood lining of the car gives a sophisticated look & feel.

The colour is very natural, which is good in my opinion. The car's finish is beautiful. Overall, I think that the car is very successful."

According to Elisa Nilsson, the cooperation with the young talents has also been an important experience for UPM.

"For the students, this has been an excellent opportunity to demonstrate their skills and cooperate closely with UPM. We, on the other hand, have enjoyed seeing how strongly they have committed to the project."

A model of sustainability

A perfect example of sustainable development: automotive industry professionals are interested in UPM's development work. **Harald Braun** from Mercedes-Benz remarks that building a concept car is a perfect way to take new steps towards sustainable development.

"The industry needs research like this in order to demonstrate how sustainability can be incorporated into car design.

"What is interesting about this development is to investigate how much of the materials from the first cars that are manufactured using biomaterials can be recycled and used in manufacturing of subsequent cars. It is impossible to achieve a 100% recycling rate, but the challenge is to figure out how close to this target we can get."

Braun remarks that sustainable development is becoming an increas-

ingly more important factor affecting consumers' purchase decisions.

"After that come ecological and economic factors, which must be in balance. Meeting all the requirements of sustainable development in transport will be the next big challenge of our time."

The adventures of the Biofore Concept Car in Geneva continued after the Motor Show. The car was on display at the UN's Geneva headquarters for the International Day of Forests, the theme of which was the green economy and the innovative use of forest fibres. Ambassador **Päivi Kairamo** from the Permanent Mission of Finland in Geneva spoke at the event and stated that the Biofore Concept Car is an excellent example of cooperation between an industry and a university.

"It combines an innovative approach with the aim to make it possible to manufacture cars in a more sustainable and resource-efficient manner in the future," said Kairamo. The Biofore Concept Car will be inspected and registered to be a street legal vehicle in Finland. ◊



UPM'S NEW MATERIALS BEHAVE IN A VERY SIMILAR WAY TO THEIR TRADITIONAL COUNTERPARTS.

THE MATERIALS ARE A WELL-FUNCTIONING AND ECOLOGICAL ALTERNATIVES FOR THE AUTOMOTIVE INDUSTRY.

THE INDUSTRY NEEDS RESEARCH LIKE THIS IN ORDER TO DEMONSTRATE HOW SUSTAINABILITY CAN BE INCORPORATED INTO CAR DESIGN.

HARALD BRAUN, MERCEDES-BENZ



Chefkoch: Germany's biggest cooking website becomes a magazine



With more than 250,000 recipes and about 13 million visitors, Chefkoch.de is the food website with the widest coverage across Europe. However, Chefkoch.de has become much more! Chefkoch.de has a broad range of communications channels beyond its successful webpages. In addition it has a popular Twitter account, mobile app and a Facebook page. In October 2013, Gruner + Jahr published the first edition of the Chefkoch magazine with an initial print run of 150,000 copies. This transformation built not only an additional extension of the brand but also a bridge into the offline world. Within a short space of time, Chefkoch already ranks as one of the most respected cooking magazines, presenting the 50 most popular and best rated online-recipes on a monthly basis.

The creation of the magazine, which balances perfectly between online and offline, is relatively unique. In comparison to Chefkoch.de the magazine offers several advantages:

“Despite its countless benefits, the online platform also suffers a disadvantage: more than 250,000 recipes make the offer confusing. The volume of data is simply too big for just getting inspiration. The magazine delivers this function perfectly by means of the recipes taken from Chefkoch.de. In doing so we trust our online community, this is Germany's taste,” says **Jan Spielhagen**, Chief Editor at Chefkoch.

“According to a seasonal or regional motto, for instance, we present the most popular recipes in Germany in a clearly arranged way – every month. Thereby, we provide orientation

for the reader in a direct comparison to the huge online selection. The dishes are cooked by professional chefs, upgraded with tips and tricks by the editorial team as well as the chefs, and put in the limelight in an appetizing way.”

The creation of such a balanced offer of delicious recipes and meeting its readers’ wishes and needs results in a peerless magazine.

Moreover, Spielhagen sees a further important advantage in the visual world of the magazine: “Food photography plays an essential role in this segment. Nicely and, above all, delicately shot it provides an additional source of inspiration. This is not possible the same way online.”

Triumphal march of an online recipe: How a dish conquers a magazine

The editorial design of the magazine credibly and emotionally conveys a heartfelt passion for creative recipes and tasty dishes, which can mostly be cooked without great effort.

“If a dish was clicked and rated more than 1.9 million times, then it has to be good,” says Spielhagen full of enthusiasm.

“We pass the trust in these results on to our readers. This is what is so special about the brand as well as one of its success factors at the same time.”

He adds:

“It is not surprising that since the first issue, Chefkoch has been able to assert itself in a highly competitive segment with a circulation of more than 100,000 copies and that we have increased the originally planned number of issues of 10 up to 12 per year.”

Spielhagen also demonstrates that the Chefkoch team is not resting on its laurels either. “We are already working on first ideas. But I cannot tell you much yet,” he adds.

In addition the mobile version of Chefkoch.de, which is ranked among the 10 strongest mobile websites in Germany, is consistently integrated and utilised within the magazine. Through the integration of QR codes to every recipe, further added value is created.

“When you go shopping on Saturday morning and see people looking closely at their mobile phones, it’s probably because they have downloaded a list of ingredients on Chefkoch.de or are checking it online in order to find the next product on the list,” says Jan Spielhagen with a smile.



We trust
our online
community;
this is
Germany's
taste,
says Jan
Spielhagen,
Chief Editor
at Chefkoch.

Together with the extremely positive feedback from the Chefkoch magazine readers via Facebook or Instagram, this true integration of print and online is well and truly proven.

Print vs. Online: Everything for the sake of the environment

The concept of Chefkoch is a prime example of successful and integrated 360° communications. But in addition to its tasty dishes and successful communication methods, the publishing house, as well as the magazine, remains committed to its responsibility in respect of its paper usage.

Readers are increasingly better informed about environmental issues and actively ask for information. Therefore the right paper choice is a crucial factor for the Chefkoch magazine. Gruner + Jahr has already been campaigning on the responsible use of wood fibre for several years, and now uses exclusively certified paper for its publications.

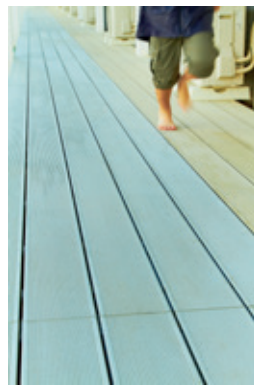
For Chief Editor Jan Spielhagen it was an affair of the heart to go for a certified paper. After already having gained positive experience with UPM paper with other GEO family magazines, the choice was not difficult: opacity, sound, colour development, haptics and what quality the paper suggests are important decision criteria for Spielhagen.

For the reader there are conscious and unconscious quality criteria concerning paper. With magazines, the feel of a printed magazine can create a subconscious response from the reader.

“We utilise exclusively UPM Ultra Matt G for Chefkoch,” says Spielhagen. The use of certified paper for Chefkoch is furthermore an indispensable criterion due to the readers’ distinctive online affinity.

“I do not want to take the risk of a negative comment in the forum of Chefkoch.de owing to the use of non-certified paper,” Spielhagen continues.

At Chefkoch, the offline and online world have been combined and are no longer independent of each other. All channels are being integrated and provide clear added value for the user, whether on the computer at home, via the mobile app on the road or when searching for new recipes in the printed edition. All of this has clearly served up Chefkoch.de as the most delectable brand. ◉



SHIGERU BAN AWARDED THE PRITZKER ARCHITECTURE PRIZE

Japanese architect Shigeru Ban has been awarded the esteemed Pritzker Architecture Prize, meant for a living architect whose work is consistent and significant, contributing to humanity through the art of architecture. UPM and Shigeru Ban have cooperated on several design projects since 2007.

The Pritzker jury praised Ban's experimental approach to materials. He uses materials such as bamboo, fabric, paper, and composites made of recycled paper fibre and plastics. Ban has used UPM ProFi products in many of his projects. In 2011,

wanting to help the victims of Japan's earthquake, he launched a building project in the city of Onagawa. The external walkways and terraces of the houses were built of UPM ProFi Deck composite planks.

In 2007, Shigeru Ban used UPM ProFi to design a pavilion for Artek, seen at the Milan Triennale design show. He also designed a temporary bridge over the Gardon River in the South of France, comprised of 281 four-inch cardboard tubes and steps made of UPM ProFi Deck terrace planks.



New technology for biomass-based fuels production

Together Fortum, UPM and Valmet have started to develop a new technology able to produce advanced, highly refined fuels based on lignocellulose.

The aim of the LignoCat project, which is scheduled to run for five years, is to develop and commercialise a catalytic pyrolysis technology suitable for refining bio oil.

The project is working on an integrated technology that can be used to produce highly refined biofuels for transport purposes. These fuels could replace fossil fuels, thus generating new business for the joint venture member companies. Other end products of the project are, for example, transport fuels or bioliquids of a higher degree of refining. UPM's experience in biofuels is a key part of the project.

The LignoCat project is funded by the Finnish Funding Agency for Technology and Innovation (Tekes). Should the project prove successful, it will launch a new sustainable product that can achieve significant reductions in carbon monoxide emissions from traffic and heating, and therefore help to reach the national and international goals of cutting greenhouse gas emissions.

INVESTMENTS

UPM has invested over EUR 160 million in its Kymi pulp mill to strengthen its position in the growing end-use regions of the global pulp market. Thanks to this investment, the Kymi mill's annual production capacity increased by 170,000 tonnes, reaching 700,000 tonnes of bleached softwood and birch pulp.

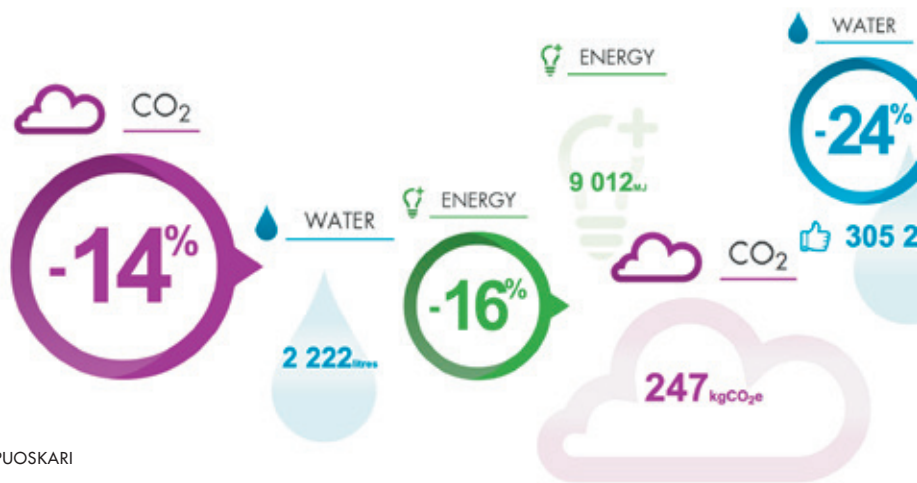
UPM has also implemented a third production line investment project at its Changshu mill in China. The China investment boosts the company's leading position as a competitive producer of high quality products in the global adhesive material market. The mill's new machine will be completed by the end of 2015.



INDONESIA

UPM Rafflatac invited adhesive material manufacturers and brand owners to the launch event of its FSC® and PEFC™ certified adhesive products in Jakarta.

"The certification of products and their chain of custody is a significant step forward for us," explains Jouni Komulainen, General Manager of UPM Rafflatac Southeast Asia.



TEXT VESA PUOSKARI

Reducing environmental impact through lifecycle assessment

Unilever and UPM Rafflatac have worked in partnership to create a model for assessing the environmental impact of packaging labels throughout the label lifecycle.

Lifecycle assessment (LCA) allows Unilever to determine the environmental impact of packaging labels throughout the value chain, from raw materials through to consumer use and waste disposal.

The direct impact of Unilever's production is fairly small and a large part of the company's environmental footprint comes from the raw materials they source.

"Our aim is to find new ways of reducing the impact on the environment in close cooperation with our raw material suppliers. This also improves our own environmental performance," says **Dave Hall**, Global Procurement Manager of Decoration Feedstock at **Unilever**.

Unilever's strategy entails doubling the size of their business while significantly reducing their environmental footprint by 2020. Cutting greenhouse gas emissions and significantly reducing water consumption and the volume of waste produced are part of the strategy.

"LCA allows us to look at the value chain as a whole. Using this approach, we can identify areas that have the greatest impact on the environment, then devise strategies to mitigate this impact."

Jan Hasselblatt, Director of Global Accounts and Brand Relations, **UPM**

Rafflatac, points out that the jointly devised LCA model is the most extensive model created in the industry. It covers raw material sourcing, transport, label manufacturing, printing and waste disposal.

ONE OF THE WORLD'S leading printing companies also participated in the project. From the point of view of the environment, the most significant factors in the printing process are the number of stages involved, the solvents used and the amount of energy expended during each stage.

"This project is a unique example of how a label supplier, printing company and leading product brand can cooperate to develop sustainable label solutions," says Hasselblatt.

UPM Rafflatac has provided Unilever with data about the environmental impact of label products. This data will help Unilever develop its label design and source materials sustainably. The data will also improve the competitiveness of the company and significantly benefit its business.

"We strongly believe in a sustainable supply chain. In order for us to be able to create a globally functional recycling chain, all the members of the chain must cooperate. Having as much data as possible about the environmental impact of the materials we use will facilitate how we source materials in the future," Hall states.

UPM PLYWOOD BRIDGES THE GOLDEN HORN

TEXT ARTTU TOLONEN PHOTOGRAPHY PERI

DREAMS OF BRIDGING the Golden Horn in Istanbul go back centuries. **Leonardo da Vinci** made drawings for a bridge in 1502, but it took the world hundreds of years to catch up with him, in this and many other areas.

Now four bridges span Golden Horn (Haliç), one of the most legendary bays in the world, with the newest joining historic old Istanbul to the city's modern, European-influenced districts. The new Haliç Subway Bridge is an important part of an urban transport system expansion programme designed to cope with the city's increasing traffic volumes and it contains two 950-metre subway tracks.

IT IS A COMBINATION of a cable-stayed bridge and swing bridge.

Its abutments are 450 metres in length and their concrete moulds were made using UPM plywood.

"We use UPM Plywood because it helps the customer trust us. We are confident that possible difficulties on site are minimised by the use of a reliable supplier like UPM Plywood," says **Ali Ismet Aydin**, Regional Sales Manager at PERI and Sales Engineer for the bridge project.

"Project contractor Astaldi-Gülermak JV was very satisfied."

PERI chose UPM Plywood for the project thanks to the ease with which it achieves strength properties when designing the statics of formwork.

"UPM plywood is a reliable material. It is also available with FSC certification and always comes with the appropriate guarantees," continues Ali Ismet Aydin.

UPM Plywood introduced formwork plywood to the Turkish construction sector back in the 1970s and it has been the quality standard for many large scale projects since then. Among them over Golden Horn was the new Galata Bridge, completed in 1994. Then came the Haliç motorway expansion in 1998 and now the subway bridge.

"It gives me great pleasure to say that all modern bridges over Istanbul's famous Golden Horn bay used UPM plywood," says **Onur Önal**, Sales Manager at UPM Turkey.

"We are proud that a formwork expert like PERI chooses to rely on UPM as a plywood supplier in important projects like this." ◉





THE MAGNIFICENT
HALIÇ SUBWAY BRIDGE
IN ISTANBUL WAS
CONSTRUCTED WITH THE
HELP OF UPM PLYWOOD
– AS WERE ALL MODERN
BRIDGES OVER
ISTANBUL'S FAMOUS
GOLDEN HORN BAY.



NEW UPM GRADA LAUNCHES

This year, design products made of UPM Grada were presented in the La Triennale design museum's EcoDesign exhibit in Milan.

At the beginning of April, the exhibit showcased design that makes sustainable development visible throughout the products' entire life-cycle. Ecology has been taken into account in everything, from material choices, production and use of the products, to their recycling and possible disposal.

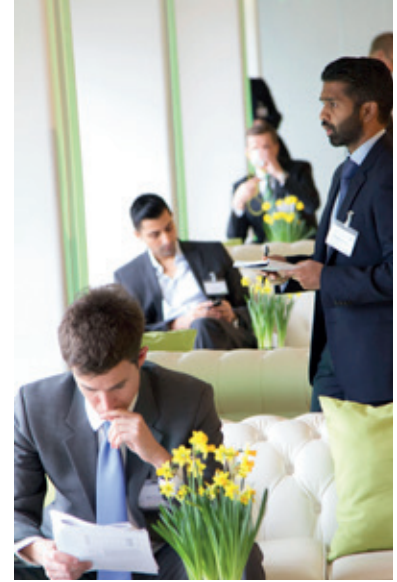
UPM Grada products have been created by top Finnish designers, such as **Eero Aarnio**, **Harri Koskinen** and **Kristiina Lassus**. They have used innovative wooden material to make a range of products, including chairs, shelves, room dividers and interior decoration items.

In the future, UPM Grada will also be seen in products by the Finnish furniture manufacturer Isku. UPM Plywood and Isku have signed a partnership agreement for the use of UPM Grada and WISA birch plywood. Isku is going to start using UPM Grada in all form-pressed products and components manufactured at its Lahti factory.



Appealing growth on the horizon

UPM's strategic course was presented during Capital Markets Day



UPM's strong market position and competitive production facilities ensure UPM is well placed to further improve its financial performance and continue renewing its structures. **Jussi Pesonen**, UPM's President and CEO, outlined the company's prospects at the Capital Markets Day event in London in March.

"During the last five years, we have been able to successfully transform UPM from an integrated paper manufacturer into a Biofore company with six separate business areas. Today we have a strong market position and competitive production facilities in all of our business areas," Pesonen said at the event geared towards investors and analysts.

He trusts UPM's steady outlook and attractive growth plans.

"Our short term profitability programme is proceeding excellently and we estimate we will achieve EUR 200 million in cost savings by the end of this year. The company's growth programme is advancing at the same time; it aims to obtain a EUR 200 million increase in EBITDA over the next three years. Recently announced investments in Changshu and Kymi take us closer to this target."

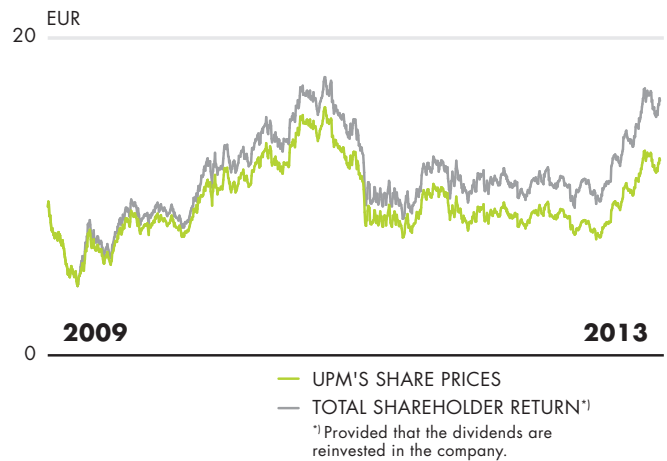
Elina Kalatie, from Nordea, has followed the forestry industry as an analyst for six months and is familiar with the sector's strategic growth areas, as well as new products and materials in their new form.

In her opinion, Capital Markets Day offers a great package about the development and strategy of the company. In addition to future potential, her work also involves looking at the financial risks taken by companies.

UPM's new shift in the change programme sparked a lively debate among the attendees of Capital Markets Day.

"We have succeeded in raising a wide interest. We were happy to receive such a broad range of questions," says IR Manager **Johan Lindh**.

UPM's share prices from 2009 to 2013 and total shareholder return*



WHAT DOES A **MORE ECOLOGICAL** SOUNDSCAPE SOUND LIKE?



It sounds good. Literally. Genelec M-series active speakers use UPM Formi biocomposite, which is manufactured from pure polymers and pulp. It is a superior material, not only ecologically but also in terms of cost efficiency and acoustic properties.

How does the biocomposite enhance the acoustic characteristics of active speakers?

UPM Formi allows for thicker injection moulding than plastic materials, thus quickly cushioning the internal vibrations of the material. Music lovers can hear the result – in clear audio.

UPM Formi is a pleasure for the other senses as well: it enables designs that are pleasing to the eye, and its satin-like surface feels nice to the touch. Unsurprisingly, the popularity of UPM Formi as an ecological choice of material for consumer goods and furniture continues to grow.

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