



GROW WITH BIOFORE

UPM Corporate
Environmental Statement 2015

UPM pulp and paper mills

About this report

EMAS reporting at UPM pulp and paper mills

All of UPM's European pulp and paper mills as well as the Fray Bentos pulp mill in Uruguay and the Changshu paper mill in China are registered with the EU Eco-Management and Audit Scheme (EMAS), a voluntary environmental management system for companies and other organisations to improve, evaluate and report on their environmental performance on an annual basis.

This UPM Corporate Environmental Statement together with the Environmental Performance reports of each mill of UPM comprise the global EMAS statement of UPM Corporate.

Information within the corporate part concerning the sites mentioned here as well as the information used for calculation of UPM Corporate level EMAS core indicators has been assessed and verified by the respective national EMAS auditor.

The final UPM Corporate level EMAS core indicators have been verified by Inspecta Sertifiointi Oy, the coordinating auditor of the corporate registration. The corporate part is checked and updated annually. The UPM Corporate Environmental Statement with mill supplements are available at www.upm.com. The next global EMAS statement will be published in the spring of 2017.

Corporate responsibility reporting at UPM

At UPM, the environmental and corporate responsibility reporting is integrated with the company's annual reporting. The UPM Annual Report 2015 follows the framework and indicators of the Global Reporting Initiative's (GRI) reporting guidelines G4 and meets the requirements of the core option. For the Annual Report and GRI content index table, please order a printed copy of the report or visit www.upm.com/responsibility.

Scope of the report

This statement forms the corporate part of the environmental statement, which has been verified in accordance with the EU's Eco-Management and Audit Scheme (EMAS). The following sites are included in the EMAS scope:

- UPM Augsburg
- UPM Caledonian
- UPM Changshu
- UPM Chapelle Darblay
- UPM Ettringen
- UPM Fray Bentos
- UPM Hürth
- UPM Jämsä River Mills
- UPM Kaukas
- UPM Kymi
- UPM Nordland
- UPM Pietarsaari
- UPM Plattling
- UPM Rauma
- UPM Schongau
- UPM Schwedt
- UPM Shotton
- UPM Steyrmühl
- UPM Tervasaari

Corporate registration number: FI-000058

Information about sites without EMAS registration

The non-European sites UPM Blandin and UPM Madison are not EMAS registered. The information concerning these sites has not been assessed or verified.

UPM

Through the renewing of the bio and forest industries, UPM is building a sustainable future across six business areas: UPM Biorefining, UPM Energy, UPM Raflatac, UPM Paper Asia, UPM Paper Europe and North America and UPM Plywood. Our products are made of renewable raw materials and are recyclable. We serve our customers worldwide. The group employs around 19,600 people and its annual sales are approximately EUR 10 billion. UPM shares are listed on NASDAQ OMX Helsinki.

UPM – The Biofore Company –
www.upm.com

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Committing to think big in circular-economy in 2016

Dear reader,

The experiences and achievements of the past year have strengthened our resolve and commitment to be the frontrunner in sustainability and circular economy in our industry. Our efforts have been noticed widely – in early 2016 UPM got an invitation to join the UN Global Compact Lead as one of the top 50 most responsible corporations in the world. UPM is the only forest industry company to be invited. In 2016 we have already set new long-term goals for the company's sustainable development regarding environmental, social and economic responsibility.

Our environmental goals are in line with our Biofore strategy's emphasis on circular economy and resource efficiency. One example of the commitments we have made is using only recycled nutrients in our effluent treatment plants by the year 2030. Replacing industrially produced nutrients with recycled nutrients is an important step in taking better care of our nutrient resources globally – much neglected thus far and becoming more and more important as the global population grows.

A big challenge we are taking on strong this year is transforming into a zero solid waste company globally by 2030. The target is that from 2030 on UPM will not produce any waste to landfills. UPM already has zero solid waste mills in Germany and Austria and is working hard to implement the policy in Finland by the end of 2018. The material formerly deposited to landfills will be recycled and put to good use elsewhere – in energy production or innovative new products, such as fly ash based Cinerit, used in construction.

UPM also celebrated the grand opening of paper machine 3 at the Changshu mill in China on 12 April. The mill site's environmen-

tal performance and employee safety is top of the line and the new paper machine's revolutionary swing technology makes it possible to produce both specialty papers and label materials.

We are currently building a new condensing turbine at Shotton mill in the United Kingdom. The new turbine will be in use early 2017. After that 70 percent of the energy produced at the mill site will be bio-mass based and mill's carbon footprint will be reduced by approximately 27%.

Our 160 million euro investment at Kymi pulp mill in Finland, started in 2014, has been brought to a successful conclusion. The annual pulp production capacity has increased by 170,000 tonnes to a total of 700,000 tonnes.

In 2016 we continue our efforts to improve our environmental performance with innovative new solutions and a strong commitment to improving global employee safety and strong economic performance. Read more about how we share best practices and manage environmental operations at our pulp and paper mills in this EMAS statement. We welcome your feedback and look forward to our continued co-operation and a bright future together.



Bernd Eikens
Executive Vice President
UPM Paper Asia

Anssi Klinga
Senior Vice President
UPM Pulp

Winfried Schaur
Executive Vice President
UPM Paper ENA

UPM in brief

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Products 7

While a new reel is placed, Hubert Wiesbeck, working at UPM Plattling PM 11, operates the primary winder. UPM Plattling in Germany produces high-quality reel and cut-size papers for magazines and catalogues.



UPM – The Biofore Company

UPM integrates bio and forest industries and builds a sustainable future across six business areas: UPM Biorefining (pulp, timber and biofuels), UPM Energy, UPM Raflatac, UPM Paper Asia, UPM Paper ENA (Europe and North America) and UPM Plywood. Other operations include Wood Sourcing and Forestry and UPM Biocomposites and UPM Biochemicals business units.

In 2015, UPM's sales totalled EUR 10.1 billion. UPM has production plants in 13 countries and a global sales network. UPM employs approximately 19,600 employees worldwide.

Corporate responsibility is an integral part of all our operations and is seen as a source of competitive advantage. UPM is strongly committed to continuous improvement in economic, social and environmental performance.

Pulp

UPM is a reliable supplier of high-quality chemical pulp for global customers in a wide range of growing end-use areas

including tissue, board and speciality papers, as well as printing and writing papers.

UPM's wide product range includes northern softwood and hardwood pulp made of spruce, pine and birch, and plantation-based eucalyptus pulp.

UPM's annual chemical pulp production capacity is 3.5 million tonnes from four modern and efficient pulp mills in Finland and Uruguay. All pulp mills are more than self-sufficient in energy supply and significant producers of bioenergy for the national electricity grids. Sustainable wood sourcing and plantation operations form the basis of UPM's pulp business.

Paper

UPM offers a wide range of papers including magazine papers and newsprint as well as fine and speciality papers. The customers are mainly publishers and printers as well as merchants and paper converters.



Magazine papers and newsprint are used in magazines, newspapers, newspaper supplements, printed advertising materials and catalogues. Fine paper is used in applications such as direct advertising products, magazines and copier and non-impact printing. UPM's range of speciality papers includes face and release papers for label materials and various packaging papers.

UPM is the world's leading producer of graphic papers. UPM's combined annual paper production capacity is 11 million tonnes.

In paper production UPM uses mostly bioenergy and over one third of fibre raw material is recycled fibre.

PROFILES OF UPM PULP AND PAPER MILLS

Mill site	Country	Certification							Paper machines	Paper grades	Chemical pulp grades	On-site pulping		Effluent treatment plant	Power plant and/or boiler	Fuels	
		EMAS	ISO 14001	ISO 9001	ISO 50001	OHSAS 18001	PEFC™	FSC®				Mechanical pulping	Deinking			renewable	fossil
Augsburg	Germany	x	x	x	x	x	x	x	2	LWC, SC	–	x	x	municipal	x	–	x
Blandin	USA	–	x	x	–	x	x	x	2	LWC	–	x	–	municipal	x	x	x
Caledonian	Great Britain	x	x	x	–	x	x	x	1	LWC	–	x	–	municipal	x	x	x
Changshu	China	x	x	x	–	x	x	x	3	fine (WFU, WFC)	–	–	–	own	x	x	x
Chapelle Darblay	France	x	x	x	x	x	x	x	1	newsprint	–	–	x	own	x	x	x
Étringen	Germany	x	x	x	x	x	x	x	1	SC	–	x	x	own	x	–	x
Fray Bentos	Uruguay	x	x	x	x	x	x	x	–	–	eucalyptus pulp	–	–	own	x	x	x
Hürth	Germany	x	x	x	x	x	x	x	1	newsprint	–	–	x	external	external	–	x
Jämsä River Mills	Finland	x	x	x	–	2)	x	x	6	SC, LWC, MFS, newsprint, label, packaging	–	x	x	own	x	x	x
Kaukas ¹⁾	Finland	x	x	x ⁴⁾	–	2)	x	x	1	LWC	softwood and birch pulp	x	–	own	x	x	x
Kymi ¹⁾	Finland	x	x	x ⁴⁾	–	x	x	x	2	fine (WFU, WFC)	softwood and birch pulp	–	–	own	x	x	x
Madison	USA	–	x	–	–	–	x	x	1	SC	–	x	–	municipal	x	–	x
Nordland	Germany	x	x	x	x	x	x	x	4	fine (WFU, WFC)	–	–	–	own	x	–	x
Pietarsaari ¹⁾	Finland	x	x	x	–	x	x	x	–	–	softwood and birch pulp	–	–	own	x	x	x
Plattling	Germany	x	x	x	x	x	x	x	3	SC, LWC	–	x	x	own	external	–	x
Rauma	Finland	x	x	x	–	x	x	x	3	LWC, SC	–	x	–	joint ³⁾	x	x	x
Schongau	Germany	x	x	x	x	x	x	x	3	SC, newsprint	–	x	x	own	x	x	x
Schwedt	Germany	x	x	x	x	x	x	x	1	newsprint	–	–	x	own	x	x	x
Shotton	Great Britain	x	x	x	–	2)	x	x	1	newsprint	–	–	x	own	x	x	x
Steyrermühl ¹⁾	Austria	x	x	x	–	x	x	x	2	SC, newsprint	–	x	x	own	x	x	x
Tervasaari	Finland	x	x	x	–	2)	x	x	2	label	–	–	–	own	x	x	x

¹⁾ Information about other production units on-site in the mill's supplement.

²⁾ OHSAS system in place, but not certified.

³⁾ Joint with Metsä Fibre's Rauma mill and Rauma Town.

⁴⁾ ISO 9001 not certified for the pulp mill.

LWC: light-weight coated paper

SC: supercalendered paper

WFC/WFU: woodfree coated/woodfree uncoated

MFS: machine-finished specialities

Numbers of personnel and capacity can be found in the mill supplements (available at www.upm.com/responsibility).

All certificates can be found from UPM's Certificate Finder (available at www.upm.com/responsibility).

Safe, recyclable products from renewable raw materials

The main raw material for all UPM’s pulp and paper products is wood – a renewable natural resource. Paper can easily be recycled and used again. UPM uses significant amounts of recovered paper as raw material.

The choice of raw material used in paper production is based on the requirements of the end product. The production of different grades is optimised as much as possible according to the availability of raw materials in close proximity to UPM mills. Fresh wood is a natural raw material for grades made, for example, in Finland, and recycled fibre is used at the central European mills.

Typical end uses of UPM pulp and papers

Product group	Examples of end uses
Chemical pulp	Household and toilet papers, napkins, handkerchief tissue, consumer packages, labels, graphic papers
Magazine papers	Magazines, advertising material, catalogues
Newsprint	Newspapers, newspaper inserts, supplements
Fine papers	Office papers, magazines, books, advertising material
Speciality papers	Face and release papers for self-adhesive labels, envelope papers

Product safety

All UPM pulp products are elemental chlorine free (ECF) or total chlorine free (TCF) and UPM paper products are manufactured from elemental chlorine free (ECF) or total chlorine free (TCF) pulps.

They also fulfil the requirements of the European Packaging and Packaging Waste Directive 94/62/EC and its amendment Directive 2004/12/EC.

Product safety is the single most important responsibility-related concern for UPM’s customers. To support its paper customers, UPM created a new Product Safety Profile in 2014. It is a unique tool to ensure that UPM’s customers receive all relevant product information in one concise resource. The document includes basic facts on product composition, product certificates, regulations related to product compliance and other possible measures taken to ensure that the product is safe.

The UPM Restricted Substance List (UPM RSL) was updated in 2013, and its implementation started in 2014. The UPM RSL includes nearly 6,000 substances that are either restricted or prohibited.

Environmental product declarations

UPM provides environmental product declarations for pulp and paper. The data is presented as annual averages for a paper machine line or pulp mill.



Paper Profile is an environmental product declaration scheme developed and provided by leading paper producers (www.paperprofile.com). It covers key environmental aspects related to pulp and paper production including product composition and emissions, wood procurement and environmental management. Paper Profiles are available for all UPM paper machine lines.

Furthermore, UPM publishes detailed Carbon Footprint information about its pulp and paper products. The information is provided together with the Paper Profiles and the Pulp product declarations.

Environmental labels

UPM pulp and paper products fulfil the criteria for most of the internationally recognised eco-labels. UPM customers have thus the possibility of using a number of different eco-labels. Criteria for these labels can focus on one part of the supply chain only (for example FSC® and PEFC™ forest certification), or span a range of criteria from raw materials and the production process to the final product (for example the EU Ecolabel).

Please see the respective mill supplement for up-to-date information about availability of environmental labels.

All certificates can be found from UPM’s Certificate Finder (available at www.upm.com/responsibility).

Environmental performance

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All process water is treated in mechanical and biological effluent treatment plants before being released into watercourses.



Environmental targets show direction

UPM is committed to sustainable development. Responsibility and a holistic approach to environmental issues are key building blocks of UPM's safe and responsible business operations and product development.

Based on a materiality assessment, UPM has established a series of responsibility principles and determined targets and performance indicators to monitor how these principles are translated into action.

In terms of environmental responsibility, the key focus areas are sustainable products, the climate, the use of forests and water, and the reduction of waste.

UPM's environmental key areas and principles and current Group-level performance in relation to the relevant targets can be seen in the table below.

The annual target-setting of UPM's pulp and paper mills is published in the mill supplements. The mill-level targets reflect



UPM's long-term targets at a local level. In addition, the mill-level targets focus on the specific local development areas.

GROUP-LEVEL ENVIRONMENTAL TARGETS

Key area of responsibility	2030 target ¹⁾	2015 results
PRODUCT STEWARDSHIP Taking care of the entire lifecycle	<ul style="list-style-type: none"> Environmental Management Systems in 100% use (<i>continuous</i>) Environmental Product Declarations for all products (<i>continuous</i>)²⁾ All applicable products eco-labelled by 2030 	<ul style="list-style-type: none"> All production sites have a certified environmental management system in place, except the new biorefinery. Environmental declarations are available for all relevant UPM products. The share of ecolabelled products was 77% (76% in 2014).
WASTE Promoting material efficiency and circular economy – reduce, reuse and recycle	<ul style="list-style-type: none"> No process waste to landfills or to incineration without energy recovery by 2030 	<ul style="list-style-type: none"> Over 90% of UPM's total process waste was recycled or recovered.
CLIMATE Creating climate solutions and working towards carbon neutrality	<ul style="list-style-type: none"> Fossil CO₂ emissions from own combustion and purchased electricity (Scope 1 and 2) reduced 30% by 2030 Maximise the business benefits of greenhouse gas claims (<i>continuous</i>) Acidifying flue gases (NO_x/SO₂) reduced 20% by 2030³⁾ 	<ul style="list-style-type: none"> Despite improvements in fuel mix and energy efficiency, actions have not compensated for the increased level caused by the Myllykoski acquisition in 2011 and increased CO₂ factors for purchased power. UPM sold greenhouse gas claims worth of 0.5 m CO₂ tonnes. Without sales UPM's reported emissions (Scope 1 and 2) would have been over 7% lower. 20% reduction achieved since 2008 for the UPM average product.
WATER Using water responsibly	<ul style="list-style-type: none"> Effluent load (COD) reduced 40% by 2030³⁾ Wastewater volume reduced 30% by 2030³⁾ 100% of nutrients used at effluent treatment from recycled resources by 2030 	<ul style="list-style-type: none"> 29% reduction achieved since 2008 for the UPM average product. 11% reduction in wastewater achieved since 2008 for the UPM average product. Project will be started in 2016.
FORESTS AND BIODIVERSITY Ensuring sustainable land use and keeping forests full of life	<ul style="list-style-type: none"> 100% coverage of chains of custody (<i>continuous</i>) All fibre certified by 2030 	<ul style="list-style-type: none"> Coverage is 100%. The certified fibre share increased to 84%.

1) Environmental targets: from 2008 levels

2) Includes paper, timber, plywood, pulp and label

3) Numerical targets relevant for pulp and paper production

Pulp

The modernisation of the UPM Pietarsaari pulp mill was completed in 2014 and the UPM Kymi pulp mill expansion investment was completed in 2015. Investments included improvements of waste water treatment, bleaching processes and energy efficiency.

Fibre sources

In 2015, 84% of wood was sourced from PEFC or FSC certified forests with the remainder coming from controlled sources.

Energy

UPM's pulps mills are more than self-sufficient in energy usage, providing surplus heat and electricity for the integrated paper mill or to external parties. The share of renewable energy decreased slightly from 95% to 93% in 2015, but is still on a very good level. Fossil fuels are needed mainly for start-up of the boilers.

Air

Compared to last year, most air emissions stayed on a quite stable level.

Improvements were achieved for the emission of total reduced sulphur (TRS). The replacement of the old malodorous gas boiler at Kaukas pulp mill in 2014 and a number of additional

measures in 2015 improved the situation at Kaukas significantly.

Water

The waste water volume per tonne of paper decreased by 16% over the last ten years, but remained on a rather stable level in recent years.

Parameters for the effluent load, like COD and AOX, also decreased significantly over the last ten years by 41% and 59%, respectively. And also from 2014 to 2015 improvements of some percentage points have been realized.

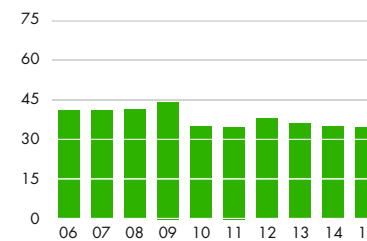
Investments with an impact on the effluent load have been made in 2012 at UPM Kymi and in 2013 at UPM Pietarsaari. Optimisation work is currently ongoing at all mills.

Waste

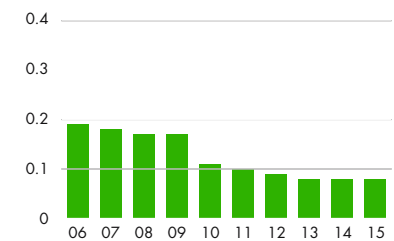
The waste recycling rate remained with 69% on the level of 2015. However, the landfill waste per tonne of chemical pulp slightly increased compared to last year. One reason was that as a temporary measure waste water sludge from UPM Fray Bentos could not be used in the recovery boiler, but had to be landfilled.

Green liquor dregs are the most relevant waste fraction for landfill waste. Reuse options are difficult to find, but research is continuing in this area.

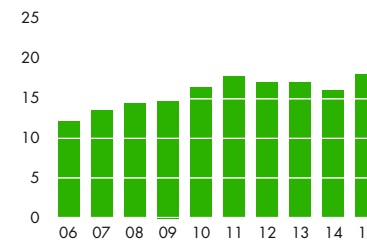
PROCESS WASTE WATER VOLUMES PER TONNE OF CHEMICAL PULP m³/t



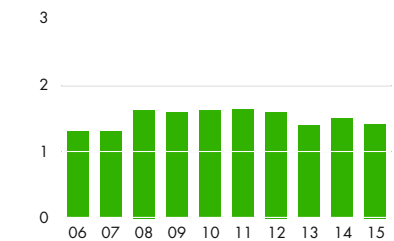
AOX LOAD PER TONNE OF BLEACHED CHEMICAL PULP kg/t



LANDFILL WASTE PER TONNE OF CHEMICAL PULP kg/t



NO_x PER TONNE OF CHEMICAL PULP kg/t



Read more at www.upmpulp.com

Paper

In 2015, 34% of all fibre used in UPM's paper production was recycled fibre. 84% of the virgin wood fibre was sourced from PEFC or FSC certified forests, the remainder came from controlled sources.

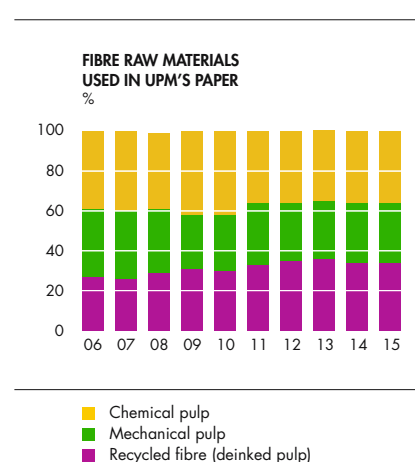
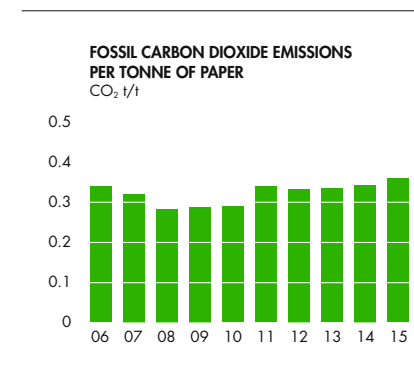
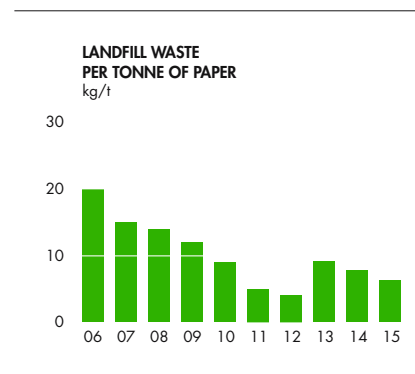
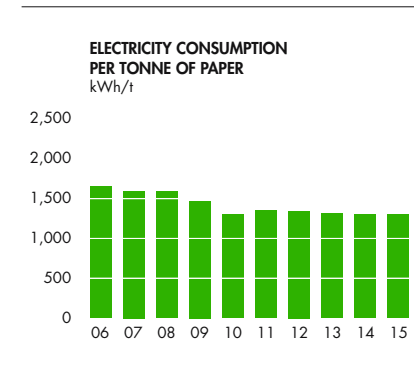
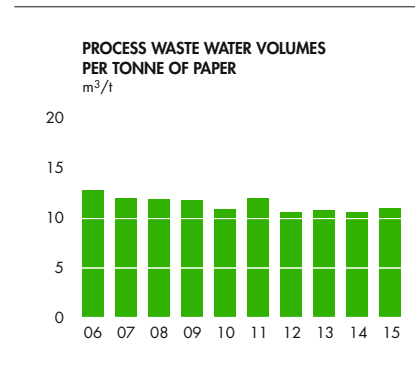
For most environmental indicators, the performance of UPM's paper mills remained on a quite stable level compared to last year. However, significant reductions could be achieved for acidifying flue gases and landfilled solid waste.

Water

During the last ten years, the COD load (chemical oxygen demand) per tonne of paper has decreased by 24%, and process waste water volume per tonne of paper by 16%.

In 2013, UPM invested in the effluent treatment at UPM Nordland and UPM Plattling. The optimization work continued in 2014, thus reducing the effluent load further.

As the waste water volume and COD load is already on a rather low level, further improvements of the volumes per tonne of product are getting more and more challenging. Compared to 2014 the water-related parameters stayed on a comparable level in 2015.



SUPPLIER ASSESSMENTS AND REQUIREMENTS

UPM requires its suppliers to apply the principles of UPM's Code of Conduct and the criteria concerning social and environmental responsibility. These supplier requirements are defined in the UPM Supplier Code, and suppliers are qualified against these requirements. UPM is also carrying out risk assessments at supplier level. Supplier audits are initiated based on identified risks or gaps in supplier performance. The current focus of supplier audits is on social responsibility issues.

Air

Emissions of NO_x per tonne of paper could be reduced by 9% compared to 2014 and specific SO₂ emissions even by over 40%. This reduction in 2015 was mainly achieved due to a EUR 12 million investment in a new combustion gas purification system at UPM Changshu's combined heat and power plant in 2014.

In 2015 emissions of fossil CO₂ per tonne of paper increased slightly compared to 2014, mainly due to closure of four paper machines having a high share of renewable energy. However, since 1990 the fossil CO₂ per tonne of paper decreased by approximately 21%. The acquisition of paper mills with a high percentage of fossil fuel usage significantly increased emissions in 2001 and 2011. Big improvement steps were made through investments in biofuel-based energy generation. Continuous improvement of energy efficiency also reduces fossil CO₂ and other air emissions.

A new combined heat and power (CHP) plant at the UPM Schongau mill in Germany started up at the end of 2014. It increased the self-generation of electricity from currently 45% to 70%, thus increasing the mill's direct CO₂ emissions and at the same time decreasing the emissions related to purchased electricity.

Energy

The electricity consumption per tonne of paper remained rather stable compared to 2014, but has decreased by almost 20% during the last ten years.

Waste

The amount of landfilled waste per tonne of paper was reduced by approximately 15% in 2015. During the last ten years the amount of landfilled waste per tonne of paper has decreased by even 65%. Ash results from energy generation and is the biggest waste fraction for UPM's paper mills

However, from 2012 to 2013 the amount of landfilled waste increased significantly. The reason was that former recycling possibilities for ash ceased at UPM Shotton. Starting from 2014, new methods of recycling were established, with further options still being investigated.

Overall for UPM's paper mills in 2015, over 90% of waste was recycled or recovered.

Read more at
www.upmpaper.com

CLEAN RUN

Clean Run aims to improve the environmental impact of all UPM operations. The goal is to significantly improve the current level of environmental performance and awareness, including better risk management.

The campaign has been visible in the pulp and paper mills since 2011, and has become a proactive way of managing environmental operations at mills. Systematic reporting and follow-up of environmental deviations, including reporting of environmental observations, are in active use at all pulp and paper mills. Company-wide guidelines for producing reports according to five defined categories have been implemented. The five categories range from 1 (minor) to 5 (severe). Together with improved information sharing, Clean Run audits have helped to identify development issues and related best practices. With all of the actions taken, the "Clean Run Way of Thinking" is starting to become part of daily routines.

In 2015, no serious environmental incidents occurred at UPM's pulp and paper mills. However, several minor temporary deviations from permit limits did arise. Those were immediately reported to authorities and corrective measures were taken to prevent similar situations from occurring again.

BEST AVAILABLE TECHNIQUES

Industry-specific reference documents are developed by the European IPPC Bureau. The document for the pulp and paper industry has been updated, and the conclusions were published by the EU Commission in September 2014. The BAT conclusions are now the reference for setting permit conditions for installations covered by the EU's Industrial Emissions Directive. The implementation period is four years. UPM is benchmarking its production lines against the BAT values.

Environmental parameters 2015

Core indicators

UPM PAPER MILLS

Production	Scope: all UPM paper mills 9,700,000 t		Scope: EMAS-registered mills 9,200,000 t	
	Total amount per year	Indicator per tonne of paper	Total amount per year	Indicator per tonne of paper
Energy efficiency				
Electricity consumption	12,300 GWh	1,300 kWh/t	11,300 GWh	1,200 kWh/t
Steam consumption	11,700 GWh	1,200 kWh/t	10,900 GWh	1,200 kWh/t
Own energy generation	56% renewable share		60% renewable share	
Purchased energy	36% renewable share		38% renewable share	
Material efficiency				
Chemical pulp	2,290,000 t	240 kg/t	2,200,000 t	240 kg/t
Mechanical pulp	1,990,000 t	200 kg/t	1,730,000 t	190 kg/t
Recycled fibre pulp	2,230,000 t	230 kg/t	2,230,000 t	240 kg/t
Minerals	2,380,000 t	240 kg/t	2,220,000 t	240 kg/t
Binder	264,000 t	27 kg/t	248,000 t	27 kg/t
Water				
Water intake	247,000,000 m ³	25 m ³ /t	218,000,000 m ³	24 m ³ /t
Process waste water	106,000,000 m ³	11 m ³ /t	95,100,000 m ³	10 m ³ /t
COD ¹⁾	31,200 t	3 kg/t	30,300 t	3 kg/t
TSS	3,200 t	0.3 kg/t	3,200 t	0.3 kg/t
Waste²⁾				
Waste, total	1,060,000 t	110 kg/t	998,000 t	110 kg/t
of which:				
ash ³⁾	580,000 t	59 kg/t	571,000 t	62 kg/t
sludges	310,000 t	32 kg/t	293,000 t	32 kg/t
wood residues	99,800 t	10 kg/t	67,900 t	7 kg/t
deinking residues ⁴⁾	19,600 t	2 kg/t	19,600 t	2 kg/t
others	48,900 t	5 kg/t	46,700 t	5 kg/t
Recycling rate	94%		85%	
Hazardous waste	2,300 t	0.2 kg/t	2,300 t	0.2 kg/t
Emissions				
CO ₂ fossil	3,480,000 t	360 kg/t	3,310,000 t	360 kg/t
NO _x , as NO ₂	4,000 t	0.4 kg/t	3,600 t	0.4 kg/t
SO ₂	1,000 t	0.1 kg/t	970 t	0.1 kg/t
Particulates	83 t	0.01 kg/t	72 t	0.01 kg/t

Core indicators

UPM CHEMICAL PULP MILLS

Production	Scope: all UPM pulp mills 3,200,000 t	
	Total amount per year	Indicator per tonne of chemical pulp
Energy efficiency		
Electricity consumption	1,900 GWh	580 kWh/t
Steam consumption	9,200 GWh	2,800 kWh/t
Own energy generation	93% renewable share	
Purchased energy	all energy is generated internally	
Material efficiency		
Wood	14,400,000 m ³	4 m ³ /t
Process chemicals ⁵⁾	404,000 t	120 kg/t
Water		
Water intake	197,000,000 m ³	61 m ³ /t
Process waste water	112,000,000 m ³	35 m ³ /t
COD	33,400 t	10 kg/t
TSS	1,400 t	0.4 kg/t
AOX	240 t	0.1 kg/t
Waste²⁾		
Waste, total	163,000 t	50 kg/t
of which:		
sludges	23,800 t	7 kg/t
green liquor dregs	47,500 t	15 kg/t
wood residues	73,800 t	23 kg/t
lime	4,300 t	1 kg/t
others	12,500 t	4 kg/t
Recycling rate	63%	
Hazardous waste	290 t	0.1 kg/t
Emissions		
CO ₂ fossil	264,000 t	82 kg/t
NO _x , as NO ₂	4,600 t	1 kg/t
SO ₂	360 t	0.1 kg/t
Particulates	530 t	0.2 kg/t
TRS	85 t	0.03 kg/t

- 1) COD not measured in Madison
- 2) Reported in dry tonnes
- 3) Including ash, which is considered as hazardous waste in the UK
- 4) Non-fibrous residues, e.g. CDs, plastic
- 5) Main chemicals used: oxygen gas, sodium hydroxide, sodium chlorite or chlorate, sulphuric acid, limestone, hydrogen peroxide

For the core indicators of 2014, please see last year's environmental statement.

For indicator for biodiversity, please see the mill supplements where information about the mill area is included.

All mill supplements are available at www.upm.com/responsibility.

Environmental management

UPM Forestal Oriental's employees working at the nursery located in Paysandú, Uruguay. This modern nursery specialises in *Eucalyptus dunnii* with an annual production capacity of over 20 million cuttings.



Environmental management based on continuous improvement

At UPM, environmental management is guided by our corporate values – trust and be trusted, achieve together and renew with courage – as well as by our Code of Conduct¹⁾ and Environmental Rules²⁾.

Integrated management systems

The mills' certified management systems are the practical tools used for environmental management. These systems embrace the principles of continuous improvement by target setting and monitoring of the implementation. All mills work with integrated management systems, which include quality management, environmental protection and health and safety issues. All mills have obtained certification to ISO standard 14001 for environmental management systems. Additionally, quality as well as health and safety issues are included in the mills' management systems and at many mills such systems are certified to the ISO 9001 standard and OHSAS 18001 specification. The Chain of Custody system for monitoring the origin of wood is also part of the mills' integrated management systems.

Competencies, responsibilities and procedures relating to quality, environment or occupational health and safety are described in the mills' management manual and the accompanying process and work instructions documentation. Internal audits and management review are carried out at the mills in accordance with the requirements of the standards. Existing

warning and protection systems, compliance with relevant legal and statutory requirements and the control of measuring equipment are all firmly integrated in the mills' management systems.

Organisation

The mills are responsible for ensuring that external obligations are met and that targets established internally are reached. The mills' environmental managers or management appointee act as experts and handle practical aspects, development, co-ordination of environmental matters and reporting. The Vice President, UPM Environment and Responsibility, is responsible for Group-wide environmental issues.

Environmental issues are part of the day-to-day work of the entire personnel. Environmental competence is essential and respective training is organised with, for example, regular training for chemical handling, safety and risk management or general introduction for new employees.

Indirect environmental impact arising, for example, from raw material procurement and transportation are also taken into consideration. The mills co-operate with the functions responsible for these issues within the Group.

¹⁾ Read more at www.upm.com/responsibility.

²⁾ See more on page 35.

Carolin Bock, Technology & Quality Process Engineer at UPM Hürth, is producing a lab-size paper sheet with a strainer. This is a routine quality measurement process in the lab, checking the whiteness of the DIP pulp, ash content and dryness of the paper to be delivered.



Continuous improvement process

Environmental management is based on continuous identification of the environmental impact of the operations. Environmental impact are a starting point for annual target-setting and development of detailed environmental programmes with measures, schedules and responsibilities. Implementation of targets is monitored regularly.

In addition to the specific targets outlined by the individual mills, the Group sets common long-term goals that apply to all sites, such as increasing the proportion of certified wood, decreasing water consumption and increasing the reuse of waste.

Management of environmental risks

All mills take specific actions to prevent environmental hazards. Environmental risk assessments have been carried out to identify potential risks. The most significant risks at the pulp and paper mills relate to process malfunctions and to the transportation, storage and handling of chemicals at the mills.

The results of the risk assessments are documented at the mills. This data is updated if any changes are made to the process. To reduce the identified risks, the mills provide guidance and training and carry out process modifications and investments when needed.

In the event of accidents or emergencies, the mills take precautions to prevent or mitigate the harmful environmental impact. Most mill sites have their own fire department or fire crews who are trained in such a way that they are also able to intervene in case of chemical accidents.

The mills' effluent treatment plants are equipped with a containment basin to deal with process malfunctions and chemical accidents. The water contained in these basins, can be cleaned in a controlled manner without jeopardising the treatment plant's operation.

Environmental communication

In accordance with our corporate values, UPM informs stakeholders about its environmental activities openly and actively.



The aim is to ensure a rapid and accurate flow of information to the Group's personnel, residents in the mill locations and other stakeholders. Separate guidelines have been drawn up for exceptional situations.

Cross-departmental safety discussions at UPM Changshu. From left to right, Qian Guofeng, He Mingxia, Mao Xiaoming, and Sheng Lili.



Manufacture of pulp and paper

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Bleaching operator Jarkko Juntunen (left) and cooking operator Johan Lindqvist manufacture pulp on the softwood fibre line at Pietarsaari pulp mill in Finland. In addition to process efficiency, environmental aspects and economical use of the process are essential components of their daily work.



From wood fibres to pulp and paper

The raw materials used in papermaking are mechanical and chemical pulp made from fresh wood fibre and recycled fibre pulp. In addition to fibre raw materials, the process requires water, and some paper grades require mineral fillers, coating pigments and binders. Different process chemicals are used during pulp processing and to improve the paper's runnability on the paper machine and the quality of the end products.

The process flowchart and descriptions on the following pages present the main stages of pulp and paper manufacture.

Manufacture of mechanical pulp

Debarking

Mechanical pulp is produced from fresh spruce logs. The logs are passed through a debarking drum; the bark is burned in a bark boiler to produce electricity and heat, or otherwise reused. Chips produced as by-products at sawmills are also used.

Manufacture of mechanical pulp

Wood fibres are separated from each other by mechanical pressure. Frictional forces transform the mechanical effort into heat, which softens the lignin acting as a binder between the wood fibres and thus breaks the interfibre bonds.

In the manufacturing process of *refiner mechanical pulp*, wood is chipped and the chips are refined into pulp in refiners. In thermomechanical pulping (TMP), pressure and heat are used to speed up the separation of the fibres, and part of the heat generated is recovered and used for paper drying.

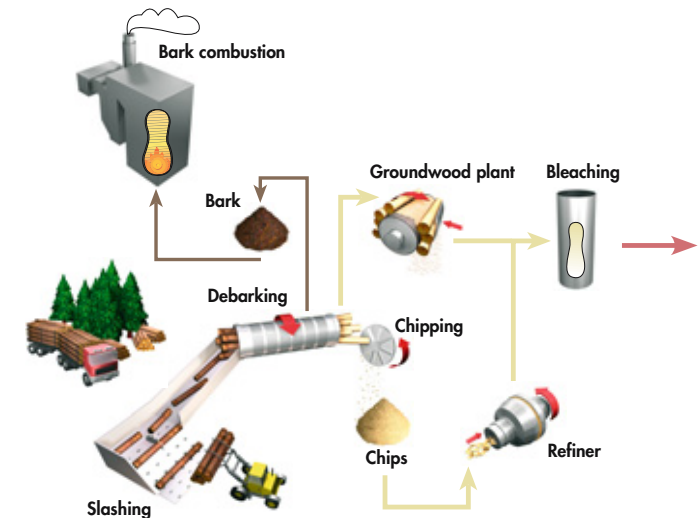
In the manufacture of *groundwood pulp*, entire spruce logs are pressed against a rotating grindstone. Pressure and heat may be used to boost the grinding process.

As lignin is still present in the finished mechanical pulp, wood pulp yield in mechanical pulp production is twice the yield obtained in the chemical pulping process. However, mechanical pulp production requires a lot of electricity.

Bleaching

Mechanical pulps are bleached using hydrogen peroxide or dithionite. Furthermore, auxiliary chemicals are used in bleaching to regulate the

Pine, spruce, birch and eucalyptus are the raw materials used for the production of sulphate pulp. The debarked wood is chipped and screened before the pulp cooking process. The picture shows the pine, spruce and birch chip stores at the UPM Kymi pulp mill in Finland.



acidity of the process and to ensure the desired effect of the bleaching chemicals.

Properties of mechanical pulp

Mechanical pulp is used in the manufacture of printing papers on account of its economic advantages and its optical characteristics. It is used in products that are not archived, because the lignin, i.e. the binder contained in the pulp, turns yellow due to the effect of UV light.



Manufacture of chemical pulp

Pulps prepared from different tree species have different properties. Long fibre softwood pulp is used to increase the paper's strength and to improve its runnability on the paper machine. Short fibre hardwood pulp improves the paper's printing properties. Bleached chemical pulp preserves its properties and its brightness even when printed products are archived for a long period.

Debarking

Pine, spruce, birch and eucalyptus are the raw materials used for the production of sulphate pulp. The pulp preparation process begins with the debarking of the logs in the debarking drum. The bark is burned in a bark boiler to produce electricity and heat.

Chipping

The debarked wood is chipped and screened. Additionally, chips produced from slabs and sticks and created as sawmill by-products are used.

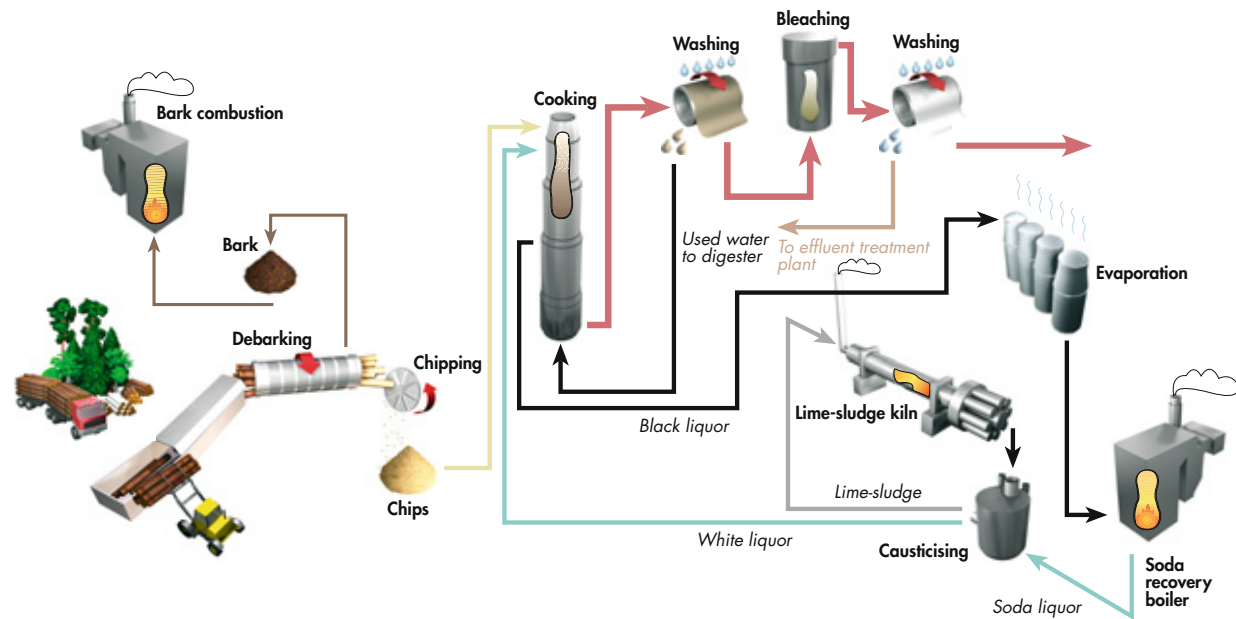
Cooking

In the manufacture of chemical pulp, wood fibres are separated from each other by dissolving the lignin, i.e. the substance acting as a binder between fibres, by means of chemicals and heat.

In the *sulphate* process, chips are cooked in a liquor containing sodium hydroxide and sodium sulphate as chemical agents. This mixture is called white liquor. During the cooking, about half of the wood raw material is dissolved in the cooking liquor. For this reason, the yield is only about half of that obtained in mechanical pulping.

Washing

The cooked pulp is washed with hot water. The used waters are directed in a counterflow direction to the digester to be used as washing waters. The washing water leaves the digester in the form of diluted black liquor containing the dissolved wood and the used cooking chemicals and enters the evaporation stage.



Bleaching

After cooking, sulphate pulp is brown. It is then bleached in a multistage process. The bleaching agents used at UPM's mills are oxygen, hydrogen peroxide, chlorine dioxide and ozone. The washing waters from the bleaching stages, after the oxygen stage, are pumped to the effluent treatment plant.

Evaporation

In evaporation, water is removed from the black liquor in several stages, so that the resulting high concentration black liquor contains only about one-fifth water.

Soda recovery boiler

Black liquor is burned in the soda recovery boiler to recover energy in the

form of heat and electricity. The chemical pulp mill produces energy not only for its own needs but also for the paper mill. From the soda recovery boiler, the cooking chemicals are recovered as soda liquor.

Causticising

In causticising, the sodium carbonate contained in the soda liquor is reconverted into sodium hydroxide by means of burned lime. In this way, the soda liquor is reconverted into white liquor. Causticising transforms the burned lime into calcium carbonate, i.e. lime-sludge.

Lime-sludge kiln

The lime-sludge is separated from the white liquor and washed and reconverted into burned lime in the lime-sludge kiln.

Manufacture of recycled fibre pulp

Pulping

The production of recycled fibre pulp begins by processing the recovered paper in a drum pulper, in which the stock is diluted to form a pulp-water slurry. Plastic, metal and other impurities contained in recovered paper are removed by screening and reused when possible or taken to a landfill. When using old corrugated cardboard for the production of speciality papers no further process steps are needed. When using recovered graphic paper for the production of new graphic paper the following process steps are needed to produce so-called deinked pulp.

Flotation

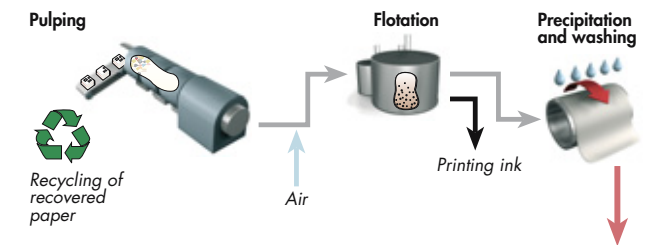
In flotation, soap is added and air is blown into the pulp/water mixture to remove the printing ink. The hydrophobic printing ink particles adhere to the ascending air bubbles, and the foam formed on the surface is removed.

Screening and washing

After the flotation, the pulp is screened to remove any remaining impurities. Finally the pulp is washed.

Deinking residues

About 70–80 percent of the recovered paper delivered to the mills can be used to produce new paper. Losses are mainly so-called deinking sludge from the flotation process (too short and brittle fibres, pigments and printing inks). The fibrous sludge generated is dried and burned at the mill's power plants to produce electricity and heat, or dispatched to be used in other applications.



Manufacture of paper

Paper stock

Fibres (mechanical, chemical and/or deinked pulp), fillers and additives are mixed to form a slurry consisting of more than 99 percent water.

Wire section

The pulp slurry is spread on the wire, i.e. the plastic fabric on which the paper web is formed as the water drains away through it by means of suction. A dry matter content of about 20 percent is achieved at the wire section.

Press section

The wet paper web is pressed between felts and rolls to obtain a dry matter content of some 45 percent.

Dryer section

In final drying, a dry matter content of 90 to 95 percent is achieved by dewatering the web through evaporation using hot cylinders. The heat used for drying is recovered and the water vapour is discharged into the air. The "plume" emitted from the exhaust stacks of a paper mill consists of this water vapour.

Coating, calendering and finishing

The quality and properties of paper can be finished on a calender placed either on or off the machine and/or by coating the paper. The calender smooths the surface of the paper by passing it once or several times through a series of nips. Paper can be coated several times. The coater unit is used for applying a coating colour, after which the paper web is dried. The machine or parent reel is cut into smaller rolls that are more suitable for further processing, or into sheets.

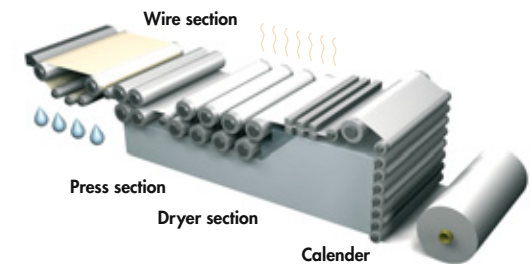
Mechanical pulp

Chemical pulp

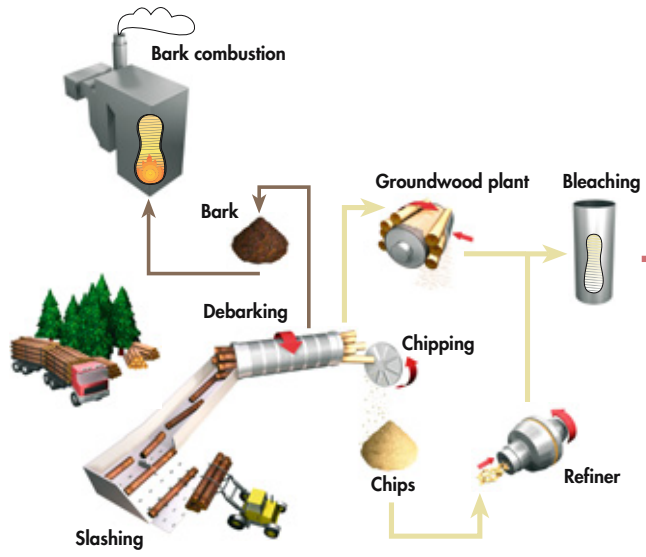
Deinked pulp



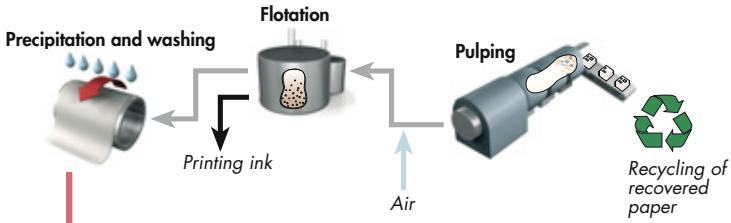
Pigments



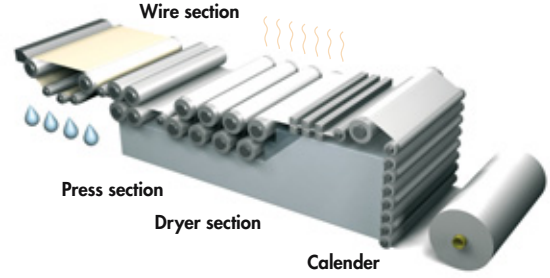
Manufacture of mechanical pulp



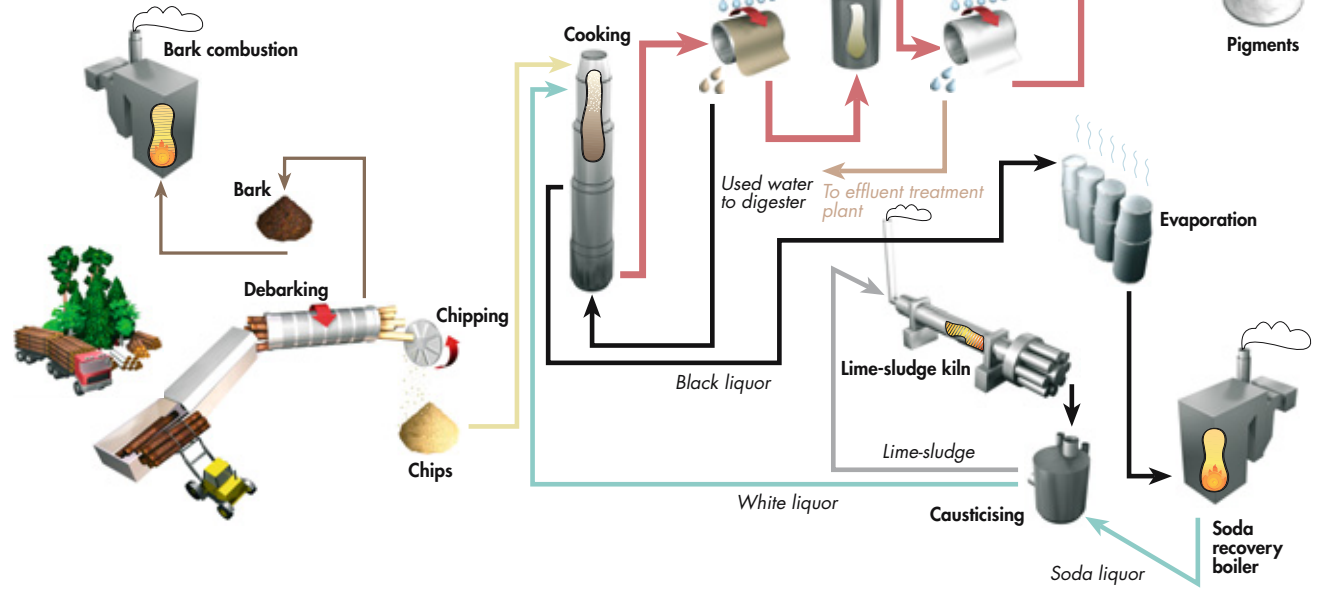
Manufacture of deinked pulp



Manufacture of paper



Manufacture of chemical pulp



Effluent treatment principle at an activated sludge treatment plant

Incoming waste water

The substances present in pulp and paper mill effluents are mainly derived from wood (including lignin, starch, alcohols and nutrients). Additionally, the effluents contain different process chemicals and adjuvants (coating pigments, fillers and binders). Some of these substances are in a solid state, others in a colloidal or diluted form. Only small amounts of nutrients (nitrogen and phosphorus) are present in the mills' effluents compared to, for example, municipal effluents.

Primary clarification

At the preclarification stage, solid particles settle to the bottom of the basin, from where they are removed. At this stage, the effluent solid content decreases by 60 to 95 percent.

Nutrients

To function properly, the microbes in the aeration basin need nutrients, especially nitrogen (N) and phosphorus (P). This is why urea and phosphoric acid are added to the water.

Neutralisation

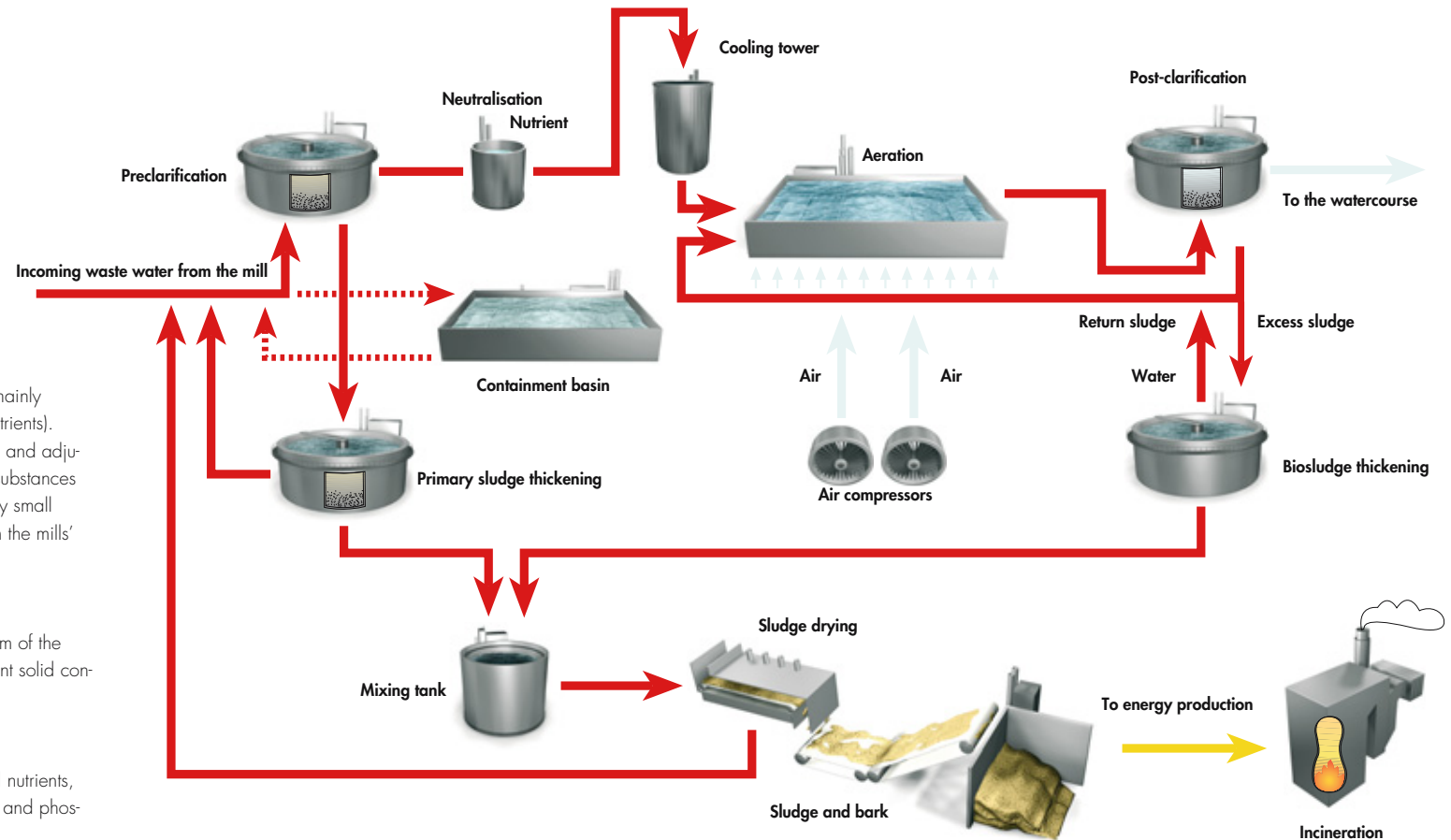
Before entering the aeration basin, the effluent is neutralised. For this, the water's pH level is adjusted to a level ranging from 6 to 8 by adding lime, sulphuric acid or sodium hydroxide when needed.

Cooling

The aeration basin's microbes work best at temperatures ranging from 35 to 37°C. If the water temperature is any higher, cooling is required.

Aeration

In the aeration basin of a biological treatment plant, nature's own microbes and protozoa feed on the organic matter dissolved in the effluent. As a result, the amount of biomass increases. This process requires oxygen, which is pumped into the aeration basin using compressors.



Secondary clarification

At the post-clarification stage, the biosludge settles to the bottom of the basin. Most of this sludge is returned to the aeration basin. The excess sludge is pumped to the biosludge thickener and the treated water is discharged into the watercourse.

Excess sludge

The excess sludge thickens in the biosludge thickener, from where it is pumped to sludge dewatering presses. The water from the biosludge thickener is returned to the aeration basin.

Containment basin

In exceptional situations, preclarified waste water can be directed to a separate containment basin and pumped back for treatment after normal conditions have been restored.

Sludge drying

The primary sludge from preclarification and the excess sludge from post-clarification are mixed in a mixing tank and the mixture is pressed as dry as possible with the help of screw or belt filter presses. The dried sludge is then incinerated at the power plant.

Raw materials, energy and logistics

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UPM verifies that all wood raw material supplied to its mills is sustainably sourced, legally logged and procured in accordance with the requirements of international forest certification schemes.



Knowing that wood originates from a sustainable source



Wood is UPM's most important raw material. UPM is committed to sustainable forest management and monitors the origin of wood to ensure it is sustainably and legally sourced. Certified chain of custody systems have been implemented in all UPM's mills.

At UPM pulp and paper mills, wood is used for the manufacture of chemical and mechanical pulp. UPM's Wood Sourcing and Forestry is responsible for the supply of wood to these mills. UPM is committed to forest management and harvesting practices based on the internationally accepted principles of sustainable forest management.

UPM's wood fibre is sourced mainly from private forests and company-owned forests and plantations in Northern Europe, USA and Uruguay. Forest certification, chain of custody, origin of wood tracking systems and UPM's global biodiversity programme are just some of the many tools UPM uses to safeguard sustainable and legal wood sourcing.

Origin of wood

UPM monitors the origin of wood it receives and has set strict requirements on its suppliers for the delivery of sustainable and legal wood fibre. These requirements are implemented through a variety of tools. Two good examples are the chain of custody systems and the tracing system for wood in Russia and the Baltic countries, which requires that all deliveries be accompanied by a statement of origin showing a map grid reference for the location of the logging area. UPM carries



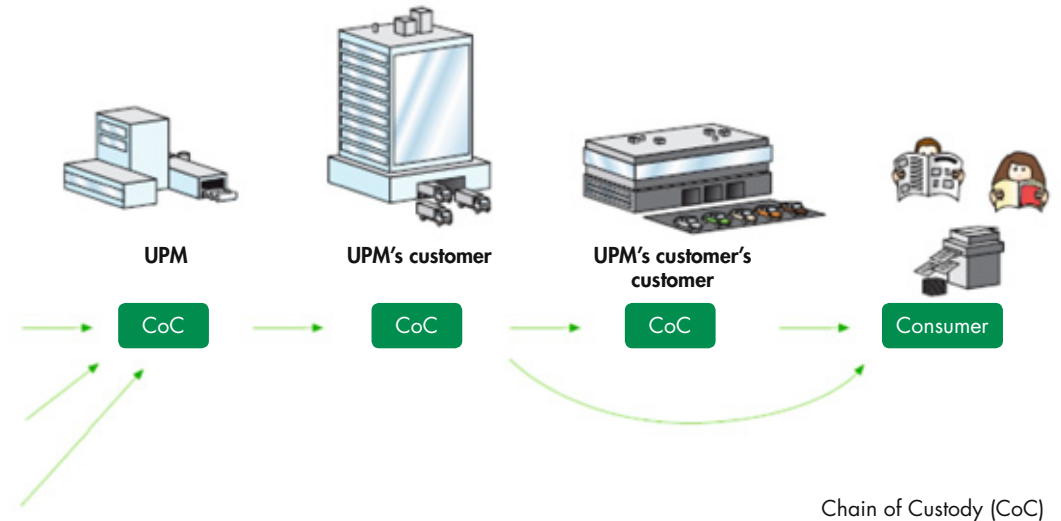
out supplier audits and logging site checks to ensure that suppliers' operations meet UPM's requirements.

Forest certification

All of UPM's forests are certified according to a credible, internationally recognised forest certification scheme, namely PEFC™ or FSC®. The certificate provides independent third-party verification of the quality of forest management in relation to the criteria of a local sustainable forest management standard.

Chain of custody

All UPM's wood sourcing organisations and pulp and paper mills have third-party verified chain of custody systems according to the two main international standards – PEFC™ and/or FSC®. Chain of custody is a tool that enables the monitoring and reporting of the volumes of certified wood supplied to the mills. This information along with product labelling is a valuable tool for verifying sustainable and legal forestry practices to customers and other stakeholders. Chain of custody requirements also ensure that non-certified wood originates from controlled sources.



Biodiversity

UPM manages its forests with a view to enhancing biological diversity, natural ecosystems and the carbon storage, and operates according to the principles of sustainable forest management.

UPM has developed a global biodiversity programme for company forests. The programme aims to maintain and increase biodiversity in forests as well as promote best practices in sustainable forestry. The programme identifies six key elements important for forest biodiversity: native tree species, forest structure, deadwood, water resources, valuable habitats and natural forests. UPM has set a global target for each key element that will be implemented through country level targets and local action plans.

UPM has long term co-operation with a number of organisations such as IUCN, Finnish Association for Nature Conservation and BirdLife.

Learn more about sustainable forestry at
www.upm.com/responsibility
www.upmforestlife.com
www.upmplantationlife.com

A balance between fresh wood and recovered paper

The basic raw material for paper is wood, a renewable resource. The finished product is recyclable; fibres in paper products can be reused several times to make new paper. In fact, over one third of UPM's fibre raw material is recycled fibre. And UPM is the world's largest user of recovered paper for graphic papers.

Papermaking starts with fibres – either fresh wood fibres in the form of chemical and mechanical pulp or recycled fibres obtained from recovered paper. The availability of raw material and paper's quality requirements largely determines the type and proportions of the different fibres used.

Fresh wood

UPM procures fresh wood for the production of mechanical and chemical pulp. Mechanical pulp – refined or ground-wood – is usually produced at the respective paper mill site. Sawmill residues and small diameter logs, e.g. from forest thinnings, are used for mechanical pulp processing. All of UPM's pulp mills in Finland and Uruguay produce chemical pulp.

Chemical pulp is also sourced from external pulp suppliers. All chemical pulp suppliers are required to comply with UPM's pulp supplier requirements including tracing the origin of wood and sustainable forestry. Pulp suppliers also have to supply information on the environmental performance of their



operations on a yearly basis. In addition, UPM regularly monitors and audits its pulp suppliers.

Recovered paper

UPM is the world's largest user of recovered paper for the production of graphic papers, consuming about three million tonnes of recovered fibre annually.

UPM uses recovered paper at its European mills, which are located in highly populated regions. This ensures that recovered paper is available in sufficient amounts close to the paper mills. Due to transportation distances, a high level of recovered paper use is not economically and ecologically favourable in regions with small populations. For example, UPM's Finnish paper mill Kaipola is already using almost all the recovered graphic paper available in Finland.

Wood fibres can be reused several times before they are no longer suitable for paper production. UPM utilises mainly graphic recovered paper from household collections, e.g. newspapers, magazines, catalogues and advertising supplements.



Handling and storage of loose paper for recycling. We use recovered paper at our European mills that are located in highly populated regions. The qualities of the product being produced and the location of the mill determine the use of recycled fibre.

Additives and chemicals used in pulp and paper production



Mineral fillers, coating pigments and binders are important raw materials for paper. Furthermore, chemicals are needed in stock preparation and bleaching as well as in process management.

All stages of the papermaking process require certain additives – from raw material preparation to the formation of the paper web to the coating of the finished paper sheet.

In chemical pulping, chips are cooked in a liquor containing sodium hydroxide and sodium sulphide as chemical agents. The bleaching agents used at UPM's mills are oxygen, hydrogen peroxide, chlorine dioxide and ozone.

It is an ongoing task to fully optimise the use of chemicals. Responsible action is required from all suppliers of raw materials, goods and services with regards to both environmental and social issues. These issues are carefully assessed during the supplier selection process.

UPM has launched the UPM Restricted Substance List (UPM RSL) to ensure that our products are safe and clean. The UPM RSL was updated in 2013, and its implementation started in 2014. UPM RSL includes nearly 6,000 substances that are either restricted or prohibited.

EU enhances the safe use of biocides by implementing a Biocidal Products Regulation (BPR). Existing active biocide substances are evaluated under BRP. Only approved biocides

PIGMENTS AND ADDITIVES USED AT UPM PULP AND PAPER MILLS

Category	Products	Use
Pigments	Kaolin, ground calcium carbonate (GCC), talc, precipitated calcium carbonate (PCC) produced from lime and carbon dioxide	<ul style="list-style-type: none"> As mineral fillers to fill the cavities between the individual fibres in order to improve printability and to reduce the amount of fibre needed As coating pigments applied to the surface of the paper web in order to improve printability and the paper's optical properties Part of the pigments in paper are recovered together with the fibres
Binders	Starch derived from cereals or potato, synthetic latex	<ul style="list-style-type: none"> Make the coating pigment adhere to the paper surface Keep the surface strength of the paper
Chemical pulping agents	Cooking chemicals: sodium hydroxide, sodium sulphide bleaching chemicals: oxygen, hydrogen peroxide, chlorine dioxide and ozone	<ul style="list-style-type: none"> Sodium hydroxide and sodium sulphide are recovered and reused in the process No chlorine gas is used at UPM
Deinking agents	Fatty acid, caustic soda and water glass	<ul style="list-style-type: none"> Used for deinking recovered paper
Bleaching agents	Hydrogen peroxide and sodium dithionite or hydrosulphite	<ul style="list-style-type: none"> Used for bleaching mechanical and recycled fibre pulp
Further additives	Alum	<ul style="list-style-type: none"> To prevent impurities from forming deposits To make fibres and pigments bond together
	Retention, fixing and anti-foaming agents	<ul style="list-style-type: none"> To keep the process clean To ensure runnability and dewatering To help web formation (support fibres and fines to be retained on the wire)
	Slime control agents, e.g. biocides	<ul style="list-style-type: none"> Necessary for the nearly closed-loop water circuits To prevent microbial growth in pipes and tanks, to improve runnability and paper quality
	Optical brighteners, dyes and chelating agents	<ul style="list-style-type: none"> Product quality critical chemicals Used only at ppm level

or biocides included in the review programme can be placed on the market in the EU.

Read more about product safety at www.upm.com/responsibility.

Focus on energy efficiency and renewable biomass-based fuels

UPM is a major energy generator. Most of the electrical and thermal energy is used for mechanical pulp and paper production. UPM favours the use of renewable and other fossil CO₂-free energy sources as well as of natural gas and strives to improve its energy efficiency.

UPM's pulp and paper mills use electrical and thermal energy. Mill operations that require the most electricity are those involved in the manufacture of mechanical pulp, paper machines and water and stock pumping. Thermal energy is needed to maintain process temperatures and to dry the paper.

At all pulp and almost all paper mills, steam and electricity are generated simultaneously by combined heat and power (CHP) plants. At some mills, all or part of the energy is produced by external power plant companies. In the case of Finnish mills, UPM is a shareholder in these power plant companies. Electricity is also obtained from the company's own hydropower plants and, additionally, in Finland from associated companies. The balance of the electricity needed is procured from regional electricity markets.

Power generation methods vary from country to country. The UPM portfolio includes mill site CHP, wind power, hydro, nuclear and thermal sources. UPM is a shareholder in a power company that has a stake in nuclear power plants in Finland.

Low-carbon energy sources dominate

Due to a high self-sufficiency rate in energy, UPM has been able to focus on energy solutions that produce less fossil carbon dioxide. Where possible, fossil fuels are substituted by renewable fuels. Where fossil fuels are needed, natural gas is the first choice, dependent upon availability in the region. More than half of the fuels used by UPM are fossil CO₂-free biomass-based fuels. In 2004, the EU directive for CO₂ emissions trading came into force in the EU. All European mills belonging to UPM have the relevant permit as granted by national authorities for the 2013–2020 period. UPM Business Areas are responsible for their EU CO₂ allowances and UPM Energy is assisting in operations of emissions trading.

CHP plants burn renewable fuels like bark, forest residues, fibre residues and solid residues from deinking and effluent treatment plants. Additionally, fossil fuels like natural gas or



light fuel oil are used at CHP plants and steam boilers. Coal is used as an energy source only in mills where there is no other alternative fuel source. Chemical pulp mills combust biomass-based waste liquor – black liquor – that is formed during the pulping process.

Part of the heat resulting from production processes is recovered by means of heat exchangers and reused. At the mills producing thermomechanical pulp (TMP), part of the electricity needed can be recovered as steam and this covers a large part of the mill's steam needs.

The multi-fuel boilers are mostly modern and efficient fluidised bed boilers that are particularly well suited for burning wood-based fuels. The high pressure and temperature at the boilers ensure efficient energy production. The modern combustion and cleaning technologies result in low specific emissions.

At UPM's pulp and paper mills, internal technical energy audits have been carried out to improve energy efficiency. The mills have identified areas where energy could be saved and used more effectively. Many measures have been implemented, but major changes are usually made in connection with other investments, such as paper machine line modernisations.

Global logistics operations

The transportation of raw materials and finished products places a load on the environment. The impacts can be reduced through sensible routing and by favouring rail and sea transportation and low-emission fuels.

Each year UPM's mills receive several million tonnes of raw materials, additives and operational supplies. Delivering end-products to customers also results in a high traffic volume. Furthermore, solid waste needs to be transported to recovery

and disposal facilities. UPM uses road, rail or sea transport – depending on distance, connection and delivery time.

Logistics' sub-contractors are required to comply with UPM's Cargo Handling Manual which includes instructions for cargo handling, storage, transportation and occupational health and safety.

Most of UPM's haulage is handled by long-term contract partners. Emissions arising from transportation can be influenced through the choice of fuel and by switching to rail and sea transport as much as possible. Total emissions can also

be reduced by ensuring that capacity is fully utilised and by balancing outbound and inbound deliveries.

UPM Rauma paper mill in Finland is located by the sea. Loading paper rolls to a ship at Rauma harbour requires special know-how from the logistics partners, many of them having a long term contract with UPM. All logistics sub-contractors are required to comply with UPM's Cargo Handling Manual which includes instructions for cargo handling, storage, transportation, and occupational health and safety.



Environmental impact

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UPM Schongau is sited on a bend on the Lech river in the Southern German town of Schongau. The site was founded in 1887. In 1962, one of the world's first flotation deinking systems was commissioned there. This processing technology was a major breakthrough for the recycling of used graphic paper into new printing paper.



Operations affect the environment in numerous ways

All UPM's operations impact the environment both directly and indirectly. Forest management influences landscape, forest structure and biodiversity. Production processes release emissions into watercourses and into the air. Solid waste is generated at the production facilities and noise and odour need to be managed. Indirect impacts arise mainly from transportation and the procurement of raw materials, chemicals, fuels and power.

The main environmental load from paper and pulp manufacture is to air and water.

UPM's mills have successfully implemented measures to reduce air and water emissions. Improved effluent treatment has enhanced the quality of cleaned waste water. Airborne emissions have been reduced by the use of low-sulphur fuels, changes in energy generation methods and environmental investments.

Environmental impact assessments are carried out at each site. An overview about key environmental aspects and their environmental impact can be seen in the following table. UPM regards all environmental aspects as substantial. At the mill sites, special emphasis is placed on the environmental aspects of water, air, energy, waste and local phenomena such as noise or odour. Emergency situations, for which crisis management procedures are in place, are also taken into consideration. The mills' environmental targets cover all areas where there is currently need for action or potential for improvement.

Key environmental aspect	Main environmental impact	Measures
Wood raw materials	Use of the forest ecosystem (biodiversity, products and services from forest ecosystems, land use aspects); Indirect environmental impact by chemical pulp suppliers.	Use of wood from certified sustainable forestry (chain-of-custody verification); assessment of chemical pulp suppliers.
Chemicals	Indirect environmental impact by suppliers; pollution due to inappropriate handling or storage.	Supplier audits; requirement for certified environmental management systems; choice of environmentally sound products.
Fossil fuels	Use of finite resources; climate change.	Co-generation of heat and power; maximise use of renewable fuels; efficient energy use.
Airborne emissions from power plants	Acidification of the soil (NO _x , SO ₂); air pollution (particles); climate change (from CO ₂ from fossil fuels).	Compliance with limit values*; continuous improvement; use of renewable fuels and natural gas; emission trading.
Emissions to water	Eutrophication (nitrogen, phosphorus); oxygen demand (COD, BOD); adsorbable organic compounds (AOX) for chemical pulp mills.	Compliance with limit values*; continuous improvement; modern elementary chlorine-free chemical pulp production.
Solid waste to landfills	Use of landfill sites and municipal waste incineration plants.	Increase or maintain high recovery quota.
Noise	Adverse effects on personnel and local area.	Compliance with limit values*; continuous improvement.
Odours	Adverse effects on local area.	Optimised operation of production facilities and effluent treatment plants.
Transport	Indirect environmental impact (energy consumption; airborne emissions; noise).	Use of appropriate means of transport; dual-purpose transport; electric fork lift trucks.
Products	Environmentally sound disposal after use.	Recycling (recovered paper processing).
Soil	Acidification of the soil by airborne and water emissions; risk of pollution by landfill sites or by chemicals and oil-containing equipment.	Best practices for the storage and handling of chemicals; compliance with landfill permits and legislation (landfill insulation; gas collection and treatment, leachate water treatment).

* The purpose of limits for waste water load, airborne emissions and noise specified in the operation permits is to prevent any significant environmental impact.

Air emissions stem from energy generation

The majority of airborne emissions from pulp and paper mills result from energy generation. The choice of fuels, combustion technology and flue gas purification are ways to reduce these emissions.

UPM's versatile set-up of cost-competitive, low-emission energy includes, among others, hydropower generation. The major part of electricity generated by UPM is free of CO₂ emissions from fossil fuel.



Quantity and quality of air emissions depend on the amount of steam produced at power plants or boilers, on the operating rate of the paper machines and the fuels used. More than 65% of fuels used by UPM's power plants are biomass-based fuels that are free from fossil CO₂ emissions. Boilers using biomass-based fuels, oil and coal are equipped with filter systems. Compliance with permit limits is continually measured

at all power plants and the reliability of these measurements is verified by a third party. Results and emission calculations are reported to the relevant authorities. Possible TRS (total reduced sulphur) emissions from chemical pulp mills are usually caused by shutdowns and start-ups.



Possible air emissions	Source	Reduction measure
Carbon dioxide, sulphur dioxide, nitrogen oxides, small amounts of particles and organic compounds	Energy generation at power plants; emission parameter depends on used fuels	<ul style="list-style-type: none"> • Minimised by efficient purification, by the choice of fuels and by controlling the combustion conditions in the boilers
Odour from malodorous sulphur compounds TRS (total reduced sulphur)	Chemical pulp production	<ul style="list-style-type: none"> • Reduced by collecting and burning
Odour from decomposing of organic substances	Closed-circuit water systems (e.g. through high temperature and anaerobic conditions)	<ul style="list-style-type: none"> • Measures taken at mill sites when needed
Noise	Production facilities, e.g. wood handling, debarking, suction pumps	<ul style="list-style-type: none"> • Controlled at the source or along its propagation • Minimised at the stage when new equipment is being acquired and new facilities constructed • Older plants systematically refitted with sound insulation systems

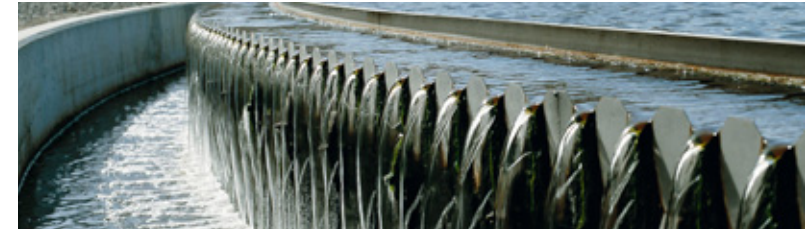
Responsible use of water

Only a small portion of the water used in production leaves the process as effluent and has to be replaced with fresh water. All effluents are cleaned before being released into watercourses.

Water is an essential resource for pulp and paper production and is also needed for cooling machinery. In production it is used as a diluting agent and transport medium. Fibres, fillers and additives have to be strongly diluted in order to form a smooth sheet of high quality paper. Compounds from wood fibres dissolve during manufacturing and a small proportion of the chemicals and other raw materials used in the process remain in the water. Cooling water is not contaminated at all and can be discharged directly into the river or used in production.

Water reduction is an ongoing target for all UPM mills. Using less water also means using less electricity, chemicals and thermal energy. Process water is used several times and only a small portion of the water ends up as effluent, which has to be replaced with fresh water. The fresh water is purified water from rivers and lakes or groundwater taken from wells. A small quantity of water is used for steam production at the power plants and purified in order to meet stringent purity requirements.

Effluent quality of water is regularly monitored and reviewed. In the papermaking process, water consumption has already been significantly reduced, and today it is nearly half of what it was 15 years ago.

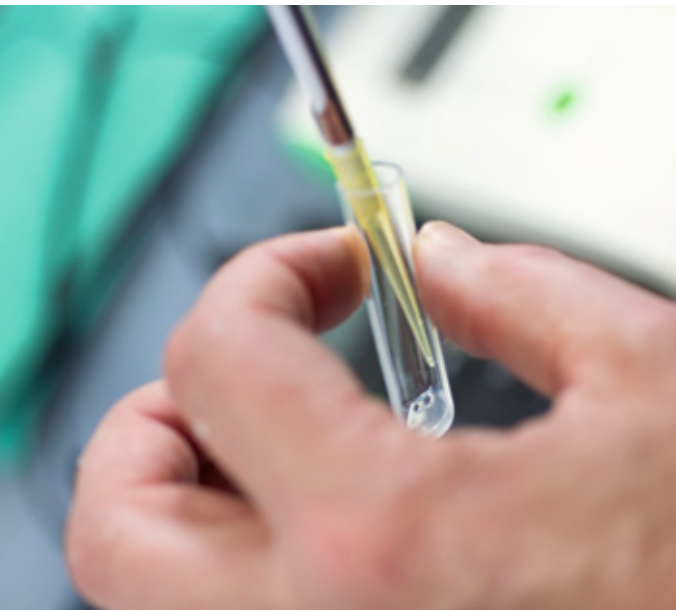


Improving waste water treatment plants

All waste water is treated in mechanical and biological effluent treatment plants before being released into watercourses. Most mills have their own effluent treatment plants or the waste water is led to a municipal or external effluent treatment plant. The biological treatment stage is an excellent controller of waste water quality, because the organisms in the biological treatment stage are sensitive to harmful compounds. Biological treatment also removes harmful compounds from waste water.

Emission levels in waste waters are regularly monitored and reviewed, both internally and by relevant authorities. In some regions, the potential harmful effects of effluent on fish and other aquatic organisms are also assessed by conducting comprehensive receiving water studies.

Learn more about water management at www.upm.com/responsibility.



Yesterday's waste is today's raw material

Reducing the amount of solid waste and increasing reuse are key objectives at all UPM mills.

Materials that have been sorted from co-mingled waste at the UPM Shotton paper mill's Materials Recovery Facility (MRF) in the UK, including mixed paper and cardboard, which shows that excellent quality can be achieved by the MRF.



All UPM's mills have made efforts to reduce the volume of solid waste and to improve handling by sorting the waste at source. A large part of the process waste is utilised either as raw material or in energy generation. The volume of solid waste taken to landfill sites has decreased significantly over the past years as a result of higher efficiency in production processes and increased opportunities for reuse. UPM is constantly developing new reuse opportunities.

Landfill sites for depositing solid waste account for the most significant environmental impact in waste management. The environmental impact from mill landfill sites are being monitored in accordance with permits and regulations issued by the relevant authorities.



Main waste fractions	Source	Usage or disposal
Ash	Power plants	<ul style="list-style-type: none"> • Most of the ash utilised in the cement and brick industry, in earthwork operations or as a fertiliser • The remainder is taken to landfills
Organic process waste such as bark and fibre residues and fibre sludge	Wood and recovered paper processing, effluent treatment	<ul style="list-style-type: none"> • Mainly used as fuel by mill power plants • Fibrous residues which are not incinerated are reused, for example, composted or used in soil construction
Other process waste such as coating colour waste and green liquor dregs	Coating of paper, chemical pulping	<ul style="list-style-type: none"> • Large proportion reused, e.g. in the construction industry and in soil improvement • The rest is mainly landfilled
Other solid waste	Recovered paper processing, packaging of incoming materials (mainly metal, board or plastic waste)	<ul style="list-style-type: none"> • Sorted and utilised whenever possible • Non-usable waste fractions taken to landfill sites or municipal waste incineration plants
Hazardous wastes	Maintenance (mainly oil or oil contaminated equipment)	<ul style="list-style-type: none"> • Forwarded to licensed hazardous waste treatment facilities • Compliance with relevant statutory requirements documented

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Sami Koivuluoma (on the left) and Janne Kautiainen ensuring that everything is working fine on the pulp drying line at Pietarsaari pulp mill in Finland.



Environmental rules

UPM Paper ENA

The **UPM Code of Conduct** has recognised environmental practices to be an important focus area for long term sustainable business. The UPM Paper ENA environmental rules must be complied with by all Paper ENA units and by their employees. These environmental rules will also be implemented in all new investments and production units acquired in the future.

Competitiveness in quality and cost are important considerations in the development of UPM Paper's products and their production processes. These considerations must not conflict with **UPM's Environmental Principles**. All UPM Paper ENA units shall carry out their business in compliance with all applicable legal requirements, codes of practice and other guidelines as a minimum standard, implementing best practice in environmental matters throughout the company.

Sustainable Sourcing

UPM requires that its suppliers comply with local legislation and statutory regulations. UPM expects continuous progress in its suppliers' environmental performance. All environmentally significant suppliers must be systematically and regularly assessed for environmental responsibility by UPM Sourcing. The environmental risks shall be evaluated and corrective measures taken based on potential risks. In all purchasing practices **UPM's Rules for Forestry and Wood Sourcing Activities, UPM Pulp Supplier Requirements and UPM Supplier Code** shall be complied with.

UPM is a frontrunner in the implementation of methods for tracing the origin of wood, and accepts only legally and sustainably sourced wood fibre. UPM does not source wood from protected areas where harvesting is prohibited by the authorities, or from any other area harvested contrary to the authorities' instructions. UPM expects suppliers to demonstrate a commitment to promoting biodiversity.

UPM promotes good forest practices through forest certification and recognises and utilises all credible forest certification schemes as described in **UPM Forest Certification Rules**.

UPM procures chemical pulp from its own mills, partially owned mills and external pulp mills. Partially owned and external mills shall meet the same principles concerning wood procurement and production processes as the company's own operations. Only elemental chlorine-free and totally chlorine-free bleached chemical pulp are produced and used at UPM mills.

UPM promotes the use of recovered paper and shall take into account the quality, environmental and economic aspects of fibre use. Both primary fibre and recycled fibre are essential raw materials for UPM papers.

Energy efficiency

UPM aims to reduce its impact on climate change in energy production, procurement and use. This shall be ensured by promoting and investing in energy efficiency to reduce our carbon footprint. Internal energy audits are conducted regularly in all UPM pulp and paper mills, to identify opportunities for improved energy efficiency, to benchmark performance and to provide information for mill and company target-setting. The mills shall take corrective measures and implement targets based on the audit results.

Minimising the environmental loads and impacts of production

One of the key focus areas of all the mills and R&D is production efficiency improvements by reducing the waste and energy to produce high quality paper. Minimising the environmental impacts of production shall be achieved by reducing emissions into the air and water, reducing process water use and the total amount of process waste generated, as well as reducing the amount of waste to landfill. A lifecycle approach is used to assess the environmental impacts of UPM paper products.

All pulp and paper mills report key environmental parameters on a regular basis. Deviations from environmental permit limit values are reported on a monthly basis. The environmental performance of the pulp and paper mills is benchmarked annually and compared to the performance levels defined in the **European BAT Reference Document**. The results of benchmarking as well as the regulatory conditions are the basis for annual target setting and also for environmental technology investment decisions. All the mills must have an environmental management system certified to ISO 14001.

Environmental quality of products

All UPM paper grades are recyclable and non-toxic to the environment and human health. The chemical composition of the products shall be monitored on a regular basis by UPM R&D in order to ensure that there are no hazardous substances arising from minerals or other materials used, which exceed the established limit values. This evaluation can also be done based on reliable supplier's certificates, where available. UPM strives to continually reduce the environmental impacts of its paper products and of the overall value chain over the lifecycle.

Controlling the impacts of logistics

The environmental impacts of logistics shall be controlled by encouraging the use of eco-efficient modes of transport and by careful planning of routes and optimising capacity utilisation. Only reliable logistics partners are chosen. The UPM Supplier Code shall be obeyed by all UPM units and functions involved.

Environmental communication

UPM has positioned itself as the Biofore Company which leads the integration of bio and forest industries into a new, sustainable and innovation-driven future. Biofore stands for sustainable solutions and excellent environmental performance. UPM's Code of Conduct and corporate values (trust and be trusted, achieve together and renew with courage) are applied in all our operations, including external and internal communications. Stakeholders and the public must promptly receive accurate information on UPM's environmental performance.

Organisation for environmental matters

Environment shall be an integral part of everyday operations in the mills, functions and sales companies. Environmental performance and continuous improvement are recognised as competitive factors and are key elements in the divisions' strategy, target-setting and action plans.

The management personnel of UPM Paper ENA take an active stand on

environmental performance and support the mills towards advanced environmental management. The mills shall implement the **UPM Environmental Strategy** by means of environmental management systems. Environmental target-setting is done both at the Group and mill levels.

UPM Environment team gives input to target-setting and decision-making at the corporate and mill level, and gives operational network support to mills, functions and sales companies.

Managers at UPM must ensure that all relevant employees are trained in environmental matters and are able to assess the environmental load of various work tasks and develop a sense of responsibility for the environment.

UPM Paper Asia

The **UPM Code of Conduct** has recognized environmental practices to be an important focus area for long term sustainable business. The UPM Paper ASIA environmental rules must be complied with by all Paper ASIA units and by their employees. These environmental rules will also be implemented in all new investments and production units acquired in the future.

Competitiveness in quality and cost are important considerations in the development of UPM Paper's products and their production processes. These considerations must not conflict with **UPM's Environmental Principles**. All UPM Paper ASIA units shall carry out their business in compliance with all applicable legal requirements, codes of practice and other guidelines as a minimum standard, implementing best practice in environmental matters throughout the company.

Sustainable Sourcing

UPM requires that its suppliers comply with local legislation and statutory regulations. UPM expects continuous progress in its suppliers' environmental performance. All environmentally significant suppliers must be systematically and regularly assessed for environmental responsibility by UPM Sourcing. The environmental risks shall be evaluated and corrective measures taken based on potential risks. In all purchasing practices **UPM's Rules for Forestry and Wood Sourcing Activities, UPM Pulp Supplier Requirements and UPM Supplier Code** shall be complied with.

UPM is a frontrunner in implementation of methods for tracing the origin of wood and accepts only legally and sustainably sourced wood fibre. UPM does not source wood from protected areas where harvesting is prohibited by the authorities, or from any other area harvested contrary to the authorities' instructions. UPM expects suppliers to demonstrate a commitment to promoting biodiversity.

UPM promotes good forest practices through forest certification and recognises and utilises all credible forest certification schemes as described in **UPM Forest Certification Rules**.

UPM procures chemical pulp from its own mills, partially owned mills and external pulp mills. Partially owned and external mills shall meet the same principles concerning wood procurement and production processes as the company's own operations. Only elemental chlorine-free and totally

chlorine-free bleached chemical pulp are produced and used at UPM mills.

UPM promotes the use of recovered paper and shall take into account the quality, environmental and economic aspects of fibre use. Both primary fibre and recycled fibre are essential raw materials for UPM papers.

Energy efficiency

UPM aims to reduce its impact on climate change in energy production, procurement and use. This shall be ensured by promoting and investing in energy efficiency to reduce our carbon footprint. Internal energy audits are conducted regularly in all UPM pulp and paper mills, to identify opportunities for improved energy efficiency, to benchmark performance, and to provide information for mill and company target-setting. The mills shall take corrective measures and implement targets based on the audit results.

Minimizing the environmental loads and impacts of production

One of the key focus areas of all the mills and R&D is production efficiency improvements by reducing the waste and energy to produce high quality paper. Minimizing the environmental impacts of production shall be achieved by reducing emissions to air and water, reducing process water use and total amount of process waste generated, as well as reducing the amount of waste to landfill. A lifecycle approach is used to assess the environmental impacts of UPM paper products.

All pulp and paper mills report key environmental parameters on a regular basis. Deviations from environmental permit limit values are reported on a monthly basis. The environmental performance of the pulp and paper mills is benchmarked annually and compared to the performance levels defined in the **European BAT Reference Document**. The results of benchmarking as well as the regulatory conditions are the basis for annual target setting and also for environmental technology investment decisions. All the mills must have an environmental management system certified to ISO 14001.

Environmental quality of products

All UPM paper grades are recyclable and non-toxic to the environment and human health. The chemical composition of the products shall be monitored on a regular basis by UPM R&D in order to ensure that there are no hazardous substances, arising from minerals or other materials used, exceeding the established limit values. This evaluation can also be done based on reliable supplier's certificates, where available. UPM strives to continually reduce the environmental impacts of its paper products and of the overall value chain over the lifecycle.

Controlling the impacts of logistics

The environmental impacts of logistics shall be controlled by encouraging the use of eco-efficient modes of transport and by careful planning of routes and optimizing capacity utilization. Only reliable logistics partners are chosen. The UPM Supplier Code shall be obeyed by all UPM units and functions involved.

Environmental communication

UPM has positioned itself as the Biofore Company which leads the integration of bio and forest industries into a new, sustainable and innovation-driven future. Biofore stands for sustainable solutions and excellent environmental performance. UPM's Code of Conduct and corporate values (trust and be trusted, achieve together, and renew with courage) are applied in

all our operations including external and internal communications. Stakeholders and the public must promptly receive accurate information on UPM's environmental performance.

Organization for environmental matters

Environment shall be an integral part of everyday operations in the mills, functions and sales companies. Environmental performance and continuous improvement are recognized as competitive factors and are key elements in the divisions' strategy, target-setting and action plans.

The management personnel of UPM Paper ASIA take an active stand on environmental performance and support the mills towards advanced environmental management. The mills shall implement the **UPM Environmental Strategy** by means of environmental management systems. Environmental target-setting is done both at the Group and the mill levels.

UPM Environmental team gives input to target-setting and decision-making at the corporate and mill level, and gives operational network support to mills, functions and sales companies.

Managers at UPM must ensure that all relevant employees are trained in environmental matters and are able to assess the environmental load of various work tasks and develop a sense of responsibility for the environment.

UPM Pulp

The UPM Code of Conduct sets forth baseline standards for all company operations and the behaviour expected of every individual at UPM. It also recognises environmental practices as an important focus area for long-term sustainable business. The Code is supplemented as needed by more detailed rules and guidelines. These UPM Pulp Environmental Rules must be observed by all UPM Pulp Business units and their employees. They shall also apply to all new investments and production units acquired in the future.

All UPM Pulp Business units shall carry out their business in compliance with all applicable legal requirements and other guidelines as a minimum standard, consistently implementing best environmental practices. UPM's environmental responsibility agenda is based on key areas of responsibility set forth in **UPM's Environmental Principles**.

Sustainable Sourcing

UPM requires its suppliers to comply with local legislation and statutory regulations. All suppliers are expected to implement a policy of continuous improvement in environmental performance. All environmentally significant suppliers shall be systematically audited for environmental responsibility by UPM. Environmental risks shall be evaluated and corrective actions taken as deemed necessary. In all purchasing, **UPM Wood Sourcing and Forestry Rules and UPM Supplier Code** shall apply.

UPM is strict in its policy of accepting only legally and sustainably sourced wood fibre. UPM promotes good forest practices through forest certification. The company recognises and applies all authenticated forest certification schemes, as described in **UPM Forest Certification Guidelines**.

Energy efficiency

UPM aims to reduce its impact on climate change in energy production and consumption. This shall be ensured by promoting and investing in energy

efficiency. Internal energy audits shall be conducted regularly at all UPM mills to identify opportunities for improving energy efficiency, to benchmark performance, and to provide information for mill-specific and company-wide target-setting. Individual mills shall take corrective action and revise their targets based on the audit results.

Minimising the environmental loads and impacts of production

As defined by UPM's Environmental Principles and **related targets**, all mills shall focus on improving their production efficiency and minimising the impacts of production. This shall be achieved by reducing emissions and effluents, reducing process water consumption and the total volume of process waste generated, as well as reducing the amount of landfill. A lifecycle approach is used to analyse the environmental impacts of UPM pulp products. The pulp produced at UPM mills consists exclusively of elemental chlorine-free and totally chlorine-free bleached chemical pulps.

All pulp mills shall report their key environmental parameters on a regular basis. Any deviations from environmental permit limit values are to be reported on a monthly basis. The environmental performance of each mill is benchmarked annually and compared to levels defined in the **European BAT Reference Document**. The results of this benchmarking as well as regulatory frameworks and UPM Pulp Business environmental targets shall together form the basis for each mill's annual target setting. All mills shall have an ISO 14001 and EMAS-certified environmental management system in place.

Environmental quality of products

All UPM pulp grades are recyclable and non-toxic to the environment and human health. The chemical composition of the products shall be monitored on a regular basis in order to ensure that there are no hazardous substances exceeding the established limit values. This evaluation can also be performed based on reliable certificates from suppliers, where available.

Controlling the impacts of logistics

The environmental impacts of logistics shall be controlled by encouraging the use of eco-efficient modes of transport, by careful planning of routes, and by optimising capacity utilisation. Only reliable logistics partners are to be chosen. The **UPM Supplier Code** shall apply.

Organisation of environmental affairs

Environmental affairs shall be an integral part of everyday operations. Environmental performance and continuous improvement are recognised as competitive factors and key elements in the strategy, target-setting and action plans of UPM Pulp Business.

The managers of UPM Pulp Business shall take an active stand on environmental performance and support the mills in advancing their environmental management. The mills shall implement the **UPM Environmental Strategy** by maintaining an efficient environmental management system. Environmental targets shall be defined both for the entire Pulp Business and for individual mills.

The **UPM Environment & Responsibility** organisation provides input in target-setting and decision-making at the Pulp Business and mill level, and gives operational network support to individual mills.

Managers at UPM shall ensure that all relevant employees are trained to develop a sense of responsibility in environmental affairs and be able to assess the environmental load of various work tasks.

Glossary

Activated sludge process

A three-stage biological effluent treatment method.

AOX, Adsorbable organic halogen compounds

AOX represents the total amount of chlorine bound to organic compounds in waste water. Such compounds occur naturally, but are also formed in conjunction with the bleaching of chemical pulp. AOX should be limited to a level where it has minimum environmental impacts.

BAT, Best available techniques

The best available technology that allows for solutions that are technically, economically and environmentally the most efficient and advanced.

BOD, Biological oxygen demand

COD, Chemical oxygen demand

The effluent, or waste water of pulp and paper mills includes organic substances which consume oxygen during biodegradation. Low oxygen content in fresh and sea water can have an adverse effect on plant and animal life. BOD refers to the amount of oxygen consumed in the biological decomposition of organic compounds. COD refers to the amount of oxygen consumed in the complete chemical oxidation of organic compounds.

CO₂, Carbon dioxide

Combustion product of carbon. Fossil carbon dioxide emissions arise from fossil fuels like coal, oil and petrol.

CHP, Combined heat and power technology

Combined heat and power (CHP) production (or cogeneration) is when both electricity and heat are produced at a thermal power plant. The heat is used, for example, in industry or district heating, or as process steam.

Chain of Custody (COC)

An unbroken trail of documentation to guarantee the identity and integrity of the data used as, for example, in demonstrating the origin of wood.

Chemical pulp

Generic name for wood-based fibres separated from each other by "cooking" wood chips or plants in hot alkaline or acidic solutions of various chemicals.

Deinking

The process whereby the ink and impurities are removed from recovered paper. Deinked pulp: see recycled fibre pulp.

EMAS, Eco-Management and Audit Scheme

Voluntary environmental management system for companies and other organisations to improve, evaluate and report on their environmental performance on an annual basis. The environmental review is approved by a third-party accredited EMAS verifier.

Forest certification

An independent review process that determines whether a forest is managed in a responsible manner. There are two global forest certification schemes: FSC® (Forest Stewardship Council®) and PEFC™ (Programme for the Endorsement of Forest Certification).

Graphic recovered paper

Mainly white paper collected from households, e.g. newspapers, magazines, catalogues and copy paper.

ISO 9001

Quality management system standard published by the International Organisation for Standardisation (ISO). This is a voluntary, international and third-party certified system.

ISO 14001

Environmental management system standard published by the International Organisation for Standardisation (ISO). This is a voluntary, international and third-party certified system.

ISO 50001

Energy management system standard published by the International Organisation for Standardisation (ISO). This is a voluntary, international and third-party certified system.

Mechanical pulp

Generic name for wood-based fibres separated from each other mechanically.

N, Nitrogen

P, Phosphorus

N and P are chemical elements essential for plant and animal life. Both substances occur naturally in wood and are often added as a nutrient in biological treatment plants. Excessive levels released into watercourses can cause nutrient enrichment, i.e., eutrophication, which accelerates the growth of algae and other vegetation.

NO_x, Nitrogen oxides

These gases are produced during combustion. In moist air, nitrogen oxides can form nitric acid which, in turn, is precipitated as "acid rain". This nitrogen-containing rain also has a fertilising effect, i.e. eutrophication.

OHSAS 18001

Specifications for an Occupational Health and Safety Management System.

Recycled fibre pulp

Fibres and fillers retrieved from recovered paper. If the recovered paper is deinked, the processed pulp is also called deinked pulp.

SO₂, Sulphur dioxide

This gas is generated by burning sulphur-containing fuels. On contact with moist air, SO₂ forms sulphuric acid, which contributes to "acid rain" and acidification.

Sustainable forest management

In the long term, a sustainably managed forest means that it is not harvested more than it grows. Sustainably managed forests maintain their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil (now and in the future), relevant ecological, economic and social functions, at local, national and global levels without damaging other ecosystems.

TRS, Total reduced sulphur

Reduced sulphur compounds that usually cause odour problems and that are released, for example, during chemical pulp production.

TSS

TSS are solid materials, including organic and inorganic, that are suspended in the water.



Validation statement

As accredited or licensed environmental verifiers,

- BSI (UK-V-0002) for Caledonian
- DNV GL Business Assurance Finland Oy Ab (FI-V-0002) for Rauma
- ECOCERT (FR-V-0010) for Chapelle Darblay
- Inspecta Sertifiointi Oy (FI-V-0001) for Changshu, Fray Bentos, Jämsä River Mills, Kaukas, Kymi, Pietarsaari and Tervasaari
- NQA (UK-V-0012) for Shotton
- TÜV AUSTRIA (A-V-0008) for Steyermühl
- TÜV NORD CERT Umweltgutachter GmbH (DE-V-0263) for Augsburg, Ettringen, Hürth, Nordland, Plattling, Schongau and Schwedt

have examined the environmental management system of each mill mentioned above, the information contained in the Environmental Performance Reports, the information in the corporate part as far as it concerns the respective mill as well as the information used for calculation of the UPM Corporate level EMAS core indicators. Following these examinations and examination of the UPM Corporate Environmental Statement 2015 on 01/06/2016 Inspecta Sertifiointi Oy, as coordinating environmental verifier of this common EMAS validation, herewith confirms, that the environmental management systems and this UPM Corporate Environmental Statement 2015 together with the Environmental Performance 2015 reports comply with the requirements of the EU's EMAS regulation (EC) No. 1221/2009.

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