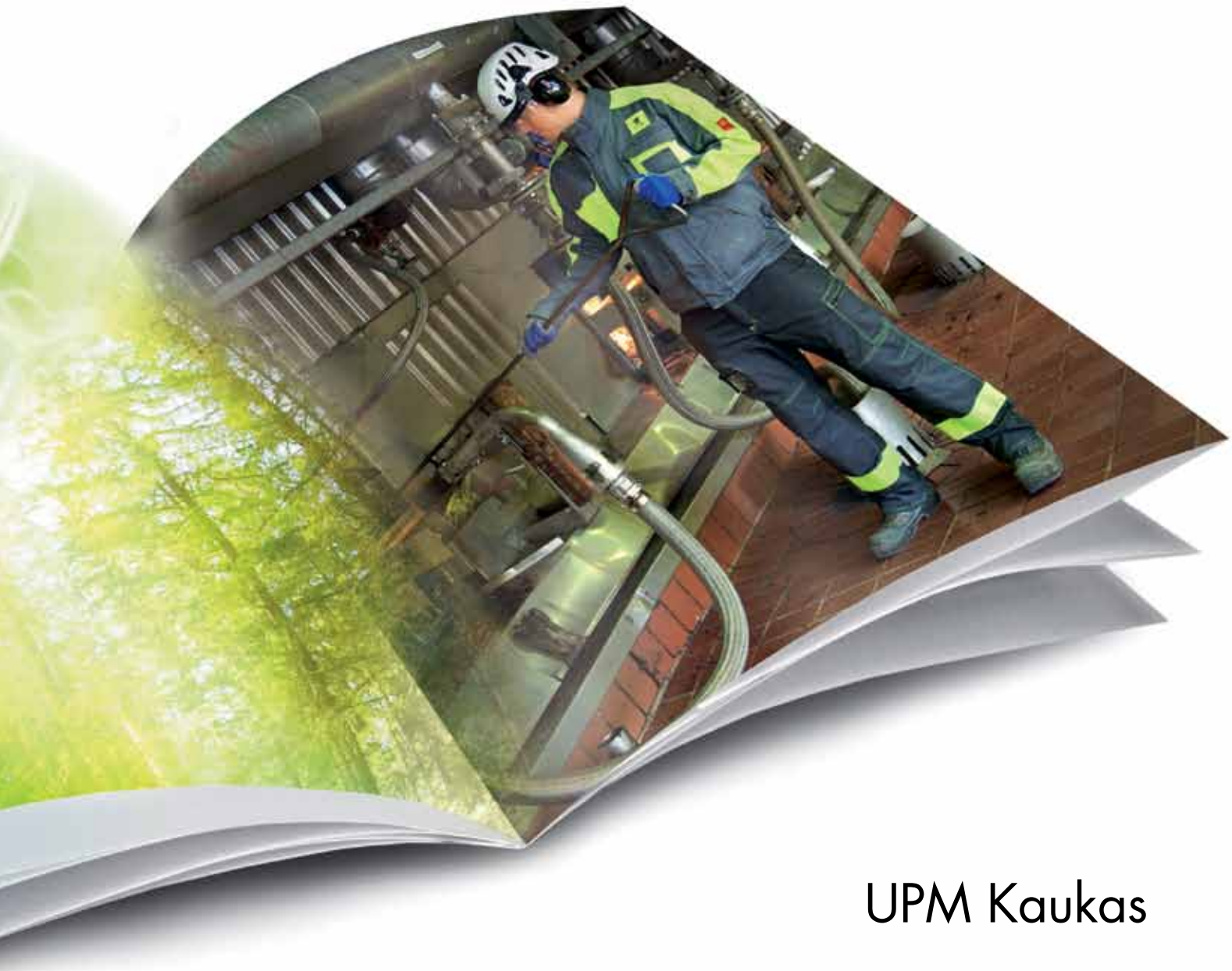
The Biofore Company UPM

ENVIRONMENTAL
performance in 2014



UPM Kaukas

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 20,000 people and its annual sales are approximately EUR 10 billion. UPM shares are listed on NASDAQ OMX Helsinki.
UPM – The Biofore Company – www.upm.fi

UPM Kaukas Mills

UPM Kaukas mills are located on the shores of Lake Saimaa in the city of Lappeenranta in South-East Finland. The mill area is home to a pulp and paper mill, a biorefinery, a sawmill, a biofuel power plant (Kaukaan Voima Oy) and UPM's Northern Europe research and development centre.

The pulp mill produces bleached softwood and birch pulp. The paper mill manufactures coated magazine paper. The Kaukas sawmill produces sawn pine and spruce timber for the construction and joinery industries. UPM's first biorefinery to produce renewable diesel was completed in Kaukas towards the end of 2014, and commercial production started in January 2015.

Kaukaan Voima Oy's biofuel power plant generates heat and electricity for the Kaukas mills and the power company Lappeenrannan Energia Oy. 80% of the energy produced by Kaukaan Voima is generated using renewable biofuels.

The integrated mill site enables the efficient use of wood-based raw materials, energy production and logistics. The Kaukas mills operate under a shared environmental permit, which includes permits for wastewater treatment, waste management and landfill operations. The EMAS scheme covers the Kaukas pulp and paper mills.

Production capacity	314 000 tonnes coated magazine paper 740 000 tonnes softwood and harwood pulp 530 000 m³ of sawn redwood and whitewood
Personnel	Paper mill 309, pulp mill 174, mill services 175, common operations 14. Approximately 1,200 employees work for the UPM mills and joint services at the Kaukas mill site.
Products	Magazine paper: (MWC, LWC): UPM Star, UPM Valor, UPM Ultra,UPM Cote Pulp: UPM Betula, UPM Conifer, UPM Conifer Reinforcement Sawn timber: UPM Timber, UPM Plus
Certificates	EMAS – EU Eco-Management and Audit Scheme) ISO 14001 – Environmental Management System Standard ISO 9001 – Quality Management System Standard PEFC™ Chain of Custody - Programme for the Endorsement of Forest Certification FSC® Chain of Custody - Forest Stewardship Council ® *All certificates can be found from UPM's Certificate Finder (available at www.upm.com/responsibility)*
Environmental labels	UPM pulp products have the approval for use in EU Ecolabel and Nordic Ecolabel paper products. Papers are awarded with EU Ecolabel

UPM Kaukas Environmental Performance in 2014 is a supplement to the Corporate Environmental Statement of UPM's pulp and paper mills (available at www.upm.com) and provides mill-specific environmental performance data and trends for the year 2014. The annually updated mill supplements and the UPM Corporate Environmental Statement together form the joint EMAS Statement of UPM Corporation. The next Corporate Environmental Statement and also this supplement will be published in 2016.

FSC
www.fsc.org
FSC® C014719
The mark of responsible forestry

For FSC products, visit http://fi.fsc.org

PEFC™
PEFC/02-31-80
Promoting Sustainable Forest Management
www.pefc.org

For PEFC products, visit www.pefc.fi

EU Ecolabel
www.ecolabel.eu
FI/11/001

Environmental year 2014

On average, the environmental impact of the UPM Kaukas integrated mill site stayed at the same level since 2000. Most water and air emission categories were slightly lower than the previous year. Both pulp and paper production volumes fell slightly in comparison with the previous year. An application for a new environmental permit for the integrated mill site was submitted towards the end of 2013, but no decision was made in 2014. A new biorefinery that manufactures renewable diesel out of tall oil was completed at the integrated mill site in 2014. The biorefinery has a separate environmental permit.

Overall emissions remained below the limits of the environmental permit. The only deviation from the limits of the environmental permit was a long-standing odour problem that started with the maintenance shutdown in spring and was confirmed as a breach of permit limits during the annual inspection by the South-East Finland Centre for Economic Development, Transport and the Environment. The odour problems occurred due to various reasons, and continued through the summer when failed equipment was repaired and modifications were carried out in the automation control system. Control of the odour situation was gradually regained in the autumn.

The integrated mill site's environmental objectives for the year included reduction of the amount of landfill waste, reduction of water consumption in pulp and paper production, reduction of abnormal emissions, and analysis of the odour situation in various units and departments. The objectives were challenging, and not all of them could be met. The amount of waste deposited at the Tuosa landfill for final disposal decreased from the previous year, and there was a considerable decrease in the number of exceptional situations where the internal limits defined earlier were exceeded. Contrary to expectations, however, water consumption increased, partly due to the discontinuous production runs. An odour analysis was completed in the form of a master's thesis that also included a measuring model for isolated emissions and odour emissions caused by equipment failure.

More feedback was received from nearby areas than usual, with 30 of the cases relating to odours. Two were connected to an individual incident in which the tailboard of a subcontractor's vehicle carrying process waste accidentally opened during transportation and approximately three cubic metres of green liquor dregs were spilled on a public road. Two vehicles drove into the dregs before the situation was detected.

Pulp mill

The production levels of the pulp mill were normal and remained below the two previous record years. The annual maintenance shutdown took place in the spring and had a long and challenging start. Various problems were encountered in different departments, most of them relating to pulp dryers. The emission levels of the pulp mill are stable when the factory runs at a steady, unchanging speed for which the mill is designed. Exceptional situations have an impact on emission levels.

One of the main environmental objectives of the pulp mill was to reduce abnormal emissions by improving summertime temperature control of the treatment plant and through more reliable treatment of malodorous gases. Temperature control was improved via an investment in new cooling aerators, and as a result, the level of nitrogen emissions to the lake decreased. Reliability of the treatment of malodorous gases improved after the recovery boiler investment project was completed, but not all deviations could be eliminated, and the number of days with odour problems was high.

Paper mill

The paper mill operated following the market situation in 2014. Consequently, a number of short shutdowns took place.

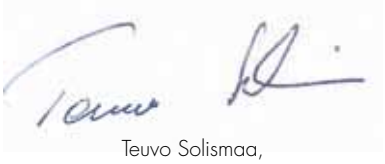
For several years, the paper mill has had internal targets for emissions of solids to the wastewater treatment plant, various types of process waste and the consumption of process water.

In 2014, the average daily volume of emissions of solids to the wastewater treatment plant was 16.6 tonnes per day, down 1% from the previous year (16.8 tonnes per day in 2013). The target level of 12.6 tonnes was, however, exceeded. Solids emissions are caused by problems with the operation of the paper machines and discontinuous production runs.

The target value set for the consumption of process water is 15 m^3 per tonne of paper produced. This objective was not achieved; on the contrary, the use of water increased by approximately 8% from the previous year. The debarking plant's water consumption level was on a par with 2013 levels.

Target levels for coating colour sludge and fibre sludge generated in the process were 6.0 and 2.2 tonnes per day, respectively. The amount of colour sludge was down 9% from the previous year, but still exceeded the objective by 0.4 tonnes per day. No coating colour sludge, however, was deposited to the landfill for final disposal, as all of it could now be reused. A new system for the recovery of coating colour sludge will be deployed in spring 2015, and the internal utilisation rate of colour sludge is expected to improve considerably. The target level set for fibre sludge was achieved by a generous margin as the amount decreased by 50% from the previous year. Thanks to changes made in the process, the amount of fibre sludge process waste has decreased considerably. New reuse applications have also been introduced.

Ikea, the world's largest furniture retailer, awarded the UPM Kaukas paper mill the Tulip Award in the sustainability category for the second year in a row. The award was granted on account of excellent innovation ability, energy efficiency, utilisation of renewable sources of energy and best-in-class sustainability reporting.



Teuvo Solismaa,
General Manager, Kaukas

Minna Maunus-Tiihonen,
Environmental Manager

Air

The Kaukas mill site's sulphur dioxide (SO_2), nitrogen oxide (NO_x) and particulate (TSP) emissions to air decreased from the previous year. This was mainly the result of lower pulp production volumes, and, in the case of sulphur dioxide, because there were fewer situations calling for the use of the secondary burner of the malodorous gas boiler. Emissions of malodorous sulphur compounds (TRS) increased. The 2014 TRS figure is considerably higher compared to previous years, as, for the first time, the figure now also includes isolated emissions and emissions caused by equipment malfunctions that are not measured by the continuously operating monitoring systems. A master's thesis on isolated emissions and emissions caused by equipment failure was completed in 2014. As a result, a new calculation model for isolated emissions and emissions in case of equipment failure was also created. TRS emissions through the mill's flues decreased from the previous year, but several equipment failures occurred, and feedback concerning the odours was received from nearby areas on several occasions. The treatment of strong malodorous gases was improved by investing in a new burner in the recovery boiler. In terms of carbon dioxide emissions, no significant change occurred. Fossil carbon dioxide emissions increased from the previous year, as situations in which the mill had to resort to burning natural gas as an auxiliary fuel increased. Malodorous gases were recovered and burnt 99% (weak malodorous gases) and 99.8% (strong malodorous gases) of the time. The graphs show the total emissions to air from pulp and energy production at the Kaukas integrated mill site, including UPM's share of Kaukaan Voima's emissions.

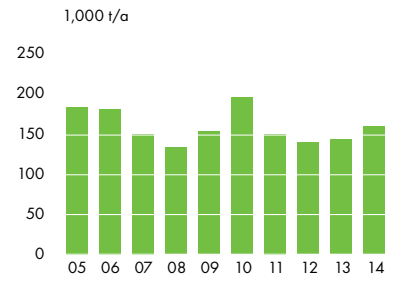
All emissions to air from the pulp mill were within the reference values of the BAT document published in autumn 2014.

The greatest environmental challenge of the Kaukas mill remained unchanged in 2014: malodorous sulphur compound emissions. The new malodorous gas burner improved the reliability of the treatment of strong malodorous gases, and a master's thesis commissioned by the mill identified isolated emissions that can be prevented in the future to further improve the odour situation at the site. Sources of odour were identified and addressed in connection with investigations of equipment failure, and work continues on this front.

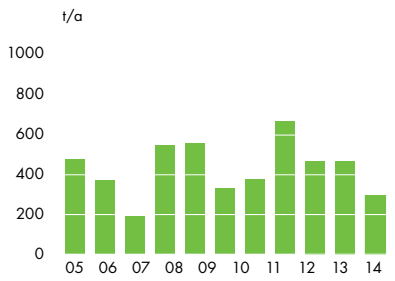
Water

The Kaukas mill used a total of 82 million cubic metres of water in 2014. 47% of this was process water, which was treated at the biological effluent treatment plant before discharge. Water consumption decreased from the previous year, mainly because of lower pulp production levels, but also because of the reduced need for cooling water at the treatment plant. For the first time, temperature control at the wastewater treatment plant now mainly relied on the new cooling aerators. Water cooling was only used during the hottest

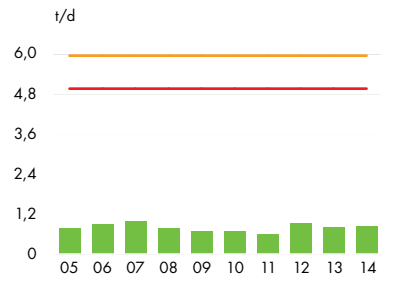
FOSSIL CARBON DIOXIDE, CO_2



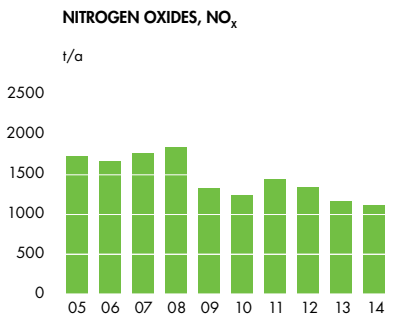
SULPHUR DIOXIDE, SO_2



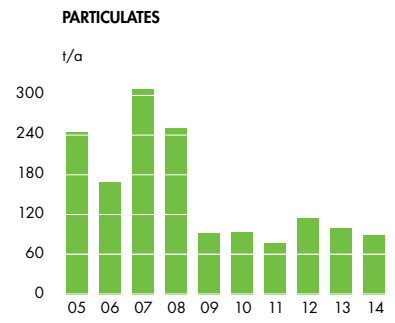
BIOLOGICAL OXYGEN DEMAND, BOD,



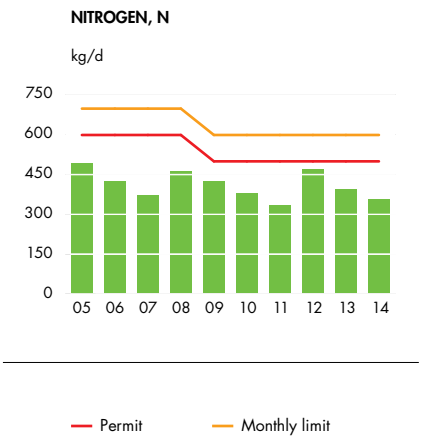
NITROGEN OXIDES, NO_x



PARTICULATES



NITROGEN, N



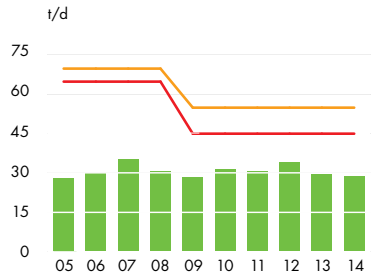
days of the summer in July and August.

Effluent load to the lake remained unchanged from the previous year in terms of biological oxygen demand (BOD), halogenated organic compounds (AOX) and, in nutrition emissions, phosphorus (P). Chemical oxygen demand (COD), solids emissions and nitrogen emissions (N) decreased. All emissions were below the permit limits during the entire year. The effluent loads of both pulp and paper production remained within the limits specified in the BAT document published in the autumn.

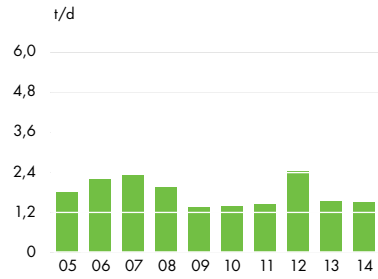
The performance of the biological treatment plant was good. Summertime temperature control was primarily based on the new surface aerators, and water cooling was only needed during the hottest days of the summer. The treatment plant's load has stabilised during the past few years and, even in exceptional situations, the abnormal emissions are directed to the treatment plant in a more controlled way than they were previously. The treatment plant's operation is reported in terms of its treatment efficiency on various substances. This is called reduction. The plant's treatment efficiency and chemical (COD) and biological oxygen demand (BOD) have been stable over the past few years. Its BOD reduction value was 98%, while the COD reduction value was 82%. The solids reduction rate was 95%.

Water consumption targets remained elusive: water consumption increased in both pulp and paper production. The principal reasons for the increased consumption of water were the discontinuous production runs of the paper factory and the difficulties encountered when starting up the pulp mill after the maintenance shutdown. In the long run the objective is to keep reducing water consumption. Achieving significant changes in consumption levels will, however, require new investments.

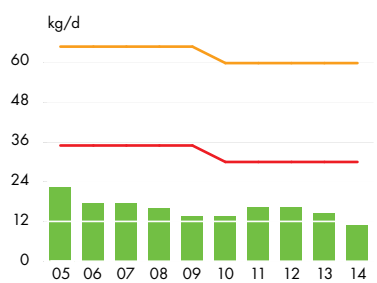
CHEMICAL OXYGEN DEMAND, COD



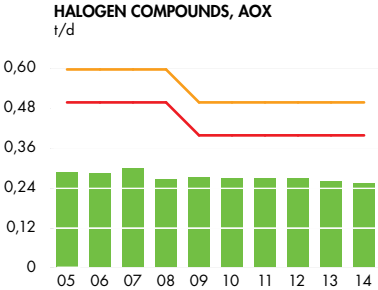
TOTAL SUSPENDED SOLIDS, TSS



PHOSPHORUS, P



ADSORBABLE ORGANIC HALOGEN COMPOUNDS, AOX

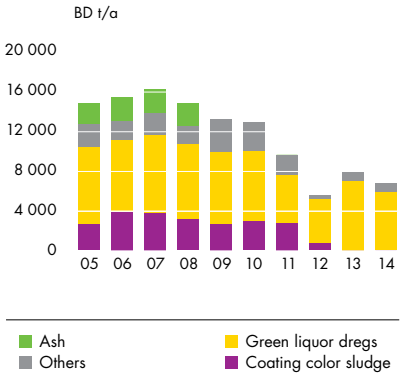


Waste

The Kaukas mill produced approximately 42,000 tonnes of dry solid waste in 2014. Of this, 6,745 tonnes of waste was deposited at the Tuosa landfill for final disposal – down 14% from the previous year. The remainder was reused or stored for reuse later. At present, green liquor dregs form the biggest waste category deposited at the landfill. Green liquor dregs are a by-product of the chemical circulation of the pulp mill, and when the production levels of pulp change, the amount of green liquor dregs also changes. Only a few reuse applications exist for green liquor dregs, but some of the dregs could be mixed with ash and used in earth construction (field base), as in previous years.

In 2014, a total of 29,800 tonnes of process waste was reused or stored for reuse. Reuse applications included energy production (sludge from wastewater treatment plant and fibre sludge), replacement of virgin materials with process waste in landfill closure work (coating colour sludge), earth construction (bottom ash, fly ash and green liquor dregs), compost raw material and aeration material (debarking reject sand) and materials used for fibre products (fibre sludge). Collaboration with third parties to find new reuse applications was continued.

WASTE TO TUOSA LANDFILL



The weights included in the figure are dry weights.

Environmental parameters 2014

The figures related to production as well as raw material and energy consumption are published as aggregated figures on group level in the UPM Corporate Environmental Statement.

Production capacity	Magazine paper Pulp - Softwood pulp - Hardwood pulp	610,000 t 750,000 t 420,000 t 330,000 t
Raw materials	Wood, cooking chemicals, bleaching chemicals, filler and coating pigments, pigments in paper	See UPM Corporate Environmental Statement for more information
Energy	Biofuels Fossil fuels Purchased electricity	85% 15% See UPM Corporate Environmental Statement for more information
Air emissions, including UPM's share of Kaukaan Voima emissions	Fossil carbon dioxide, CO_2 Nitrogen oxides, NO_x Sulphur dioxide, SO_2 Dust particles Total reduced sulphur, TRS	160,132 t 1,110 t 292 t 90 t 86 t
Water consumption	Process and cooling water	81,8 million cubic metres
Emissions to water	Cooling water Effluent BOD_7 COD Solids Phosphorus, P Nitrogen, N Adsorbable organic halogen compounds, AOX	43.0 million cubic metres 38.8 million cubic metres 286 t 9,945 t 518 t 4.0 t 123 t 93 t
Waste*	Waste to landfill - Green liquor dregs - Mixed waste Reused waste - Cleaned wood waste - Green liquor dregs and lime - Coating colour sludge - Fibre sludge - Sludge from effluent treatment plant - Lime kiln ash - Fly ash and bottom ash - Recyclable carbon and paper - Metals - Other Intermediate storage - Fibre sludge - Lime kiln ash - Sludge from effluent treatment plant - Coating color sludge - Ash	6,745 t 5,808 t 937 t 30,860 t 431 t 5,382 t 4,166 t 137 t 8,263 t 170 t 7,683 t 448 t 684 t 194 t 8,042 t 39 t 582 t 3,995 t 1,050 t 2,376 t
Hazardous waste		101 t
Mill area		200 ha

The figures include the calculated share of Kaukas biofuel power plant emissions.
** Dry weight*

Performance against targets in 2014

TARGETS	ACHIEVEMENT	COMMENTS
Reduction of abnormal emissions - Class 2: < 273 cases	Yes	Number of class 2 deviations: 178. The number of abnormal emissions was reduced successfully in both the pulp and the paper mill.
- Classes 3 to 5: 0 cases	No	Number of class 3 deviations: 1 (long-standing odour problem to environment).
Analysis of and calculation model for isolated odour emissions	Yes	For the first time in 2014, isolated emissions and emissions caused by equipment failure are reported according to the new model.
Reduction of the amount of landfill waste. Waste deposited to the landfill for final disposal: < 7,850 tonnes of dry matter	Yes	Waste deposited to landfill for final disposal: 6,745 tonnes.
Reduction of process water consumption - Paper mill's objective: 15 m^3/t - Pulp mill's objective: 40 m^3/t	No	Water consumption increased; the objective was not achieved.

Environmental targets 2015

TARGETS AND INDICATORS	SCHEDULE	RESPONSIBILITIES BY DEPARTMENT
Reduction of abnormal emissions - Classes 3 to 5: 0 cases	2015	Improved control of abnormal odour emissions.
Preparations for prohibition of depositing organic waste to landfill - Updating of waste guidelines - Updating of waste collection point signs and markings - Waste-sorting control measures	2015	Preparation of guidelines and training programmes is the responsibility of employees in charge of the environment. Department-specific monitoring.
Reduction of process water consumption	2015	Paper mill's objective: 15 m^3/t Pulp mill's objective: 40 m^3/t
Updating of signs, markings and safety basins in areas where container and barrel chemicals are used to new standards.	2015	Employees in charge of the use of chemicals.

VALIDATION STATEMENT:

As an accredited environmental verifier (FI-V-0001), Inspecta Sertifiointi Oy has examined the environmental management system and the information of UPM Kaukas Environmental Performance 2014 report and of UPM Corporate Environmental statement 2014. On the basis of this examination, the environmental verifier has herewith confirmed on 2015-03-31 that the environmental management system, this UPM Kaukas Environmental Performance report and the information concerning UPM Kaukas of UPM Corporate Environmental statement are in compliance with the requirements of the EMAS Regulation (EC) No 1221/2009.

UPM-Kymmene Corporation
Kaukas
Kaukaantie 16
FI–53200 Lappeenranta, Finland
Tel. +358 2041 5161

For further information, please contact:
Minna Maunus-Tiihonen
Environmental Manager
Tel. +358 0000 0000
minna.maunus-tiihonen@upm.com

Antti Ratia
Communications Manager
Tel. +358 0000 0000
antti.ratia@upm.com

UPM

www.upm.com

04/2015