ENVIRONMENTAL
performance in 2016

UPM Kymi

The UPM Kymi mill is located in Kouvola, by the river Kymijoki.

UPM Kymi

The UPM Kymi mill in Kuusankoski, Kouvola, Finland consists of a paper and pulp mill. The Kymi production plants form a modern integrated mill site that produces coated and uncoated fine paper and bleached birch and softwood pulp.
In 2016, Kymi employed approximately 700 people.

The paper mill is divided into two production units. Paper machine 8 and the coater form a production line that produces coated fine paper. The high-quality printing paper is delivered in reels and sheets. Paper machine 9 produces uncoated fine paper on reels and in sheets to be used as printing paper, forms and envelopes as well as copier/printer paper.

The pulp mill's two fibre lines produce bleached softwood and birch pulp. A sawdust digester is used to cook sawdust pulp that is added to the birch pulp.

The production plants receive the heat energy and most of the electricity they need from the pulp mill's energy production and Kymin Voima Oy's biofuel power plant located on the mill site. Schaefer Kalk Finland Oy's PCC plant is also located on the mill site.

Kymin Voima Oy's biofuel power plant and the PCC plant are not included in the scope of this report.

Production capacity	800 000 t Coated and uncoated fine paper 760 000 t Birch and pine pulp
Personnel	700
Products	Printing papers: UPM Finesse (gloss, premium silk, silk, matt), UPM Fine Office papers: UPM PreLaser, UPM PrePersonal, UPM Form, UPM Letter, UPM Letter Insert, UPM Office (multifunction, copy/print), New Future (multi, laser), Yes, KymLux (Business, Classic, Premium), KymUltra Digi papers: UPM Digi Fine, UPM Digi Fine Pro Special papers: UPM Jetlabel Pulp: UPM Betula, UPM Conifer Thermal energy and electricity
Residuess	Tall oil, turpentine
Certificates	EMAS – EU Eco-Management and Audit Scheme ISO 9001 – Quality Management System Standard ISO 14001 – Environmental Management System Standard ETJ+ – Energy Efficiency System OHSAS 18001 – Occupational Health and Safety System Standard PEFC™ - Programme for the Endorsement of Forest Certification FSC® - Forest Stewardship Council ISO 22000 – Food Safety Standard All certificates can be found from UPM's Certificate Finder (available at www.upm.com/responsibility)
Enviromental labels	EU Ecolabel UPM pulp products have the approval for use in EU Ecolabel and Nordic Ecolabel paper products.

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 Specialty Papers, UPM Paper ENA and UPM Plywood. Our products are made of renewable raw materials and are recyclable. We serve our customers worldwide. The group employs around 19,300 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

UPM Kymi Environmental Performance 2016 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 2016. 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 2018.

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For more information on FSC products, please visit http://fi.fsc.org

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

Environmental year 2016

In paper products, the market situation was slightly better in 2016 than in the previous year. The production volume of the paper mill increased by approximately 1% year-on-year. The pulp mill achieved a new annual production record. After the commissioning of the new drying machine, an increasing portion of the pulp produced at the Kymi site was distributed to the export market.

Obligations related to environmental protection were covered systematically in compliance with the environmental permit. All mill emissions complied with the permit conditions.

We were able to reduce our environmental load to some extent. The integrated mill site's environmental objectives included maintaining compliance with the Clean Run programme launched in 2011, reducing abnormal emissions, ensuring efficient flow of information and use of the Clean Run programme, increasing environmental awareness among employees, decreasing water consumption and solid losses, increasing the reuse of process waste and reducing the amount of solid waste sent to landfill sites.

The paper mill's Safety and Environmental Manager Hanna Eklund (left) and the pulp mill's Environmental Manager Päivi Hyvärinen note that environmental reviews have been arranged once a week during the pulp and paper mill morning meetings.

Ten secondary schools in the Kouvola region will receive a backpack containing water testing equipment. UPM and the Rotarians are together managing the collaboration with the schools, and guidance on the use of the testing equipment has been provided by UPM personnel responsible for environmental matters at the Kymi site. Kymintehdas school (pictured) was the first to receive a water testing backpack in December.

The Clean Run programme was part of the Kymi mill site's normal operations in 2016. All abnormal emissions were recorded with the One Safety tool and their underlying causes were studied. The Kymi mill site has not exceeded any of its environmental permit limit values since the launch of the Clean Run programme.

An environmental review was arranged once a week during the pulp and paper mill morning meetings to review environmental issues and the events of the previous week in more detail. Waste sorting training specifically aimed at maintenance personnel was organised in 2016.

The Kymi site also continued the waste reuse development project in co-operation with external partners. The objective of the

project is to continue to find new ways of reusing process waste and use them to improve the waste reuse rate.

The main environmental investment made in 2016 consisted of the construction of effluent cooling towers to increase the reliability of the effluent treatment plant.

The decision on the implementation of the KYMI870 investment project was obtained in the summer. The project aims to increase the annual production volume of the pulp mill to 870,000 tonnes, while improving cost efficiency and environmental performance. The project comprises upgrades in wood handling, the birch fibre line and the recovery plant, as well as waste water treatment. The new machinery will be connected to the process during the mill shut-down planned for the autumn of 2017.

Five pieces of stakeholder feedback were received over the course of the year. All of the feedback concerned unpleasant odours, which were caused by malodorous gases being released to the surrounding area due to equipment malfunctions.

Towards the end of 2016, the 'Local waters' school project was launched in Kouvola as a collaborative effort between UPM Kymi and the Kouvola Rotary Clubs. The project is part of the curriculum approved by the Finnish National Board of Education in which topics related to environmental education and sustainability are included in a number of different subjects. The goal of the project is to generate more interest in the natural sciences and especially water-related themes among pupils in primary education. UPM has donated equipment required for studying water to the schools involved in the project. The pupils will use it to measure water quality and report their results to the national register managed by the Finnish Environment Institute. Backpacks containing water testing equipment will be donated to 10 secondary schools in the Kouvola region.

UPM and the Rotarians manage the collaboration with the schools together, and guidance on the use of the testing equipment has been provided by UPM personnel responsible for environmental matters at the Kymi site.

Markku Laaksonen,
General Manager,
Kymi pulp mill

Päivi Hyvärinen,
Environmental Manager,
Kymi pulp mill

Matti Laaksonen,
General Manager,
Kymi paper mill

Hanna Eklund,
Safety and Environmental Manager,
Kymi paper mill

Following the commissioning of the new drying machine, an increased portion of the pulp produced at the Kymi site has been distributed to the export market.

Air and noise

The mill met all environmental permit limits for air emissions.

Total NOx emissions reported in tonnes increased slightly compared to the previous year, while NOx emissions per one tonne of pulp produced decreased by over 3% year-on-year.

It was also recorded that 99.9% of weak malodorous gases and 100% of strong malodorous gases were recovered and burned.

The increase in product volume has placed more strain on the recovery of malodorous gases and led to the temporary occurrence of unpleasant odours during process disturbances. This issue has been taken into consideration during the planning stages of the KYMI870 project, and improvements will be made to both the process and the recovery system during the planned shut-down (due to the connection of machinery) in 2017.

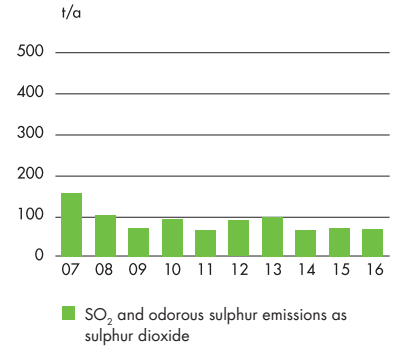
However, TRS emissions at the Kouvola City Environmental Services' measuring station in central Kuusankoski still remained very low. The average hourly TRS content only exceeded the level of 5 micrograms/m^3 during 0.09% of the total hours in 2016.

CO_2 emissions increased year-on-year because the auxiliary boiler was used to generate energy for the paper mill from natural gas. CO_2 consumed by the PCC plant was no longer deducted from the CO emission figures for 2016.

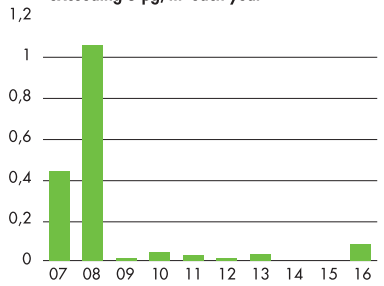
Vapours containing chlorine dioxide spread to the immediate vicinity of the mill due to process disturbances during the start-up following the maintenance shut-down in October.

The pulp mill's airborne emissions complied with the current BAT BREF documentation in all respects.

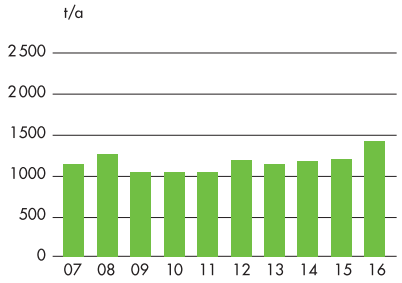
Gaseous sulphur emissions (*



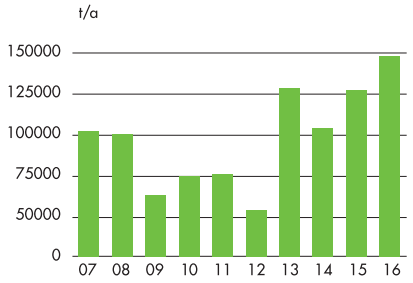
Percentual share of hourly average TRS values exceeding 5 µg/m^3 each year



Nitrogen oxides, NO_2 (*



Fossil carbon dioxide (*PCC-related carbon dioxide decreased until 2012



* Includes Kymin Voima Oy's emissions with regard to the energy consumed by Kymi.

Waste

The total amount of waste produced in 2016 was approximately 24,500 tonnes. The waste sent to landfill sites (the municipal and Lamminmäki landfills) amounted to 7700 tonnes of the total. Approximately 7650 tonnes of waste was taken to the Lamminmäki landfill as dry matter. The amount of waste sent to landfill sites increased from the previous year due to the need to deposit more green liquor dregs at the landfill. The total amount of green liquor dregs increased by over 12% compared to the previous year due to the increased production volume of the pulp mill.

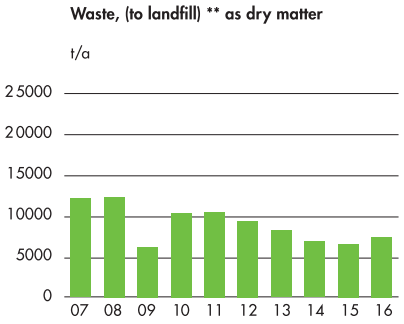
In 2015, over 2600 tonnes of green liquor dregs was used in structures needed for closing down the Sulento landfill site. In 2016, the demand for green liquor dregs for closing the Sulento landfill only amounted to 257 tonnes. Furthermore, 1566 tonnes of green liquor dregs was combusted in the Kymin Voima Oy boiler during test runs. Nevertheless, green liquor dregs produced in the recovery process still formed the most significant waste component taken to the Lamminmäki landfill. No viable solution has been found for continuously recycling green liquor dregs, but one of the mill's key objectives is to find permanent recycling options in the future.

A total of 16,260 tonnes of wastewater sludge was combusted in the Kymin Voima Oy boiler.

Approximately 4700 tonnes of ash was reused in 2016. As before, ash created during bioenergy production was delivered for granulation, after which it was applied to forests owned by UPM. The idea is to recycle nutrients brought to the mill in the wood back into the forest. Other reuse applications included binding green liquor dregs used in structures at the Lamminmäki landfill and the structures needed for closing down the Sulento landfill site. In addition, fly and bottom ash was temporarily stored at the Kymi mill site in 2016.

Approximately 1700 tonnes of bark and wood waste was delivered for reuse as culture medium raw material in 2016.

UPM's Zero Solids Waste project started in 2015 and continued in 2016. The project's long-term goal is to find reuse applications for all of the mill's process waste types by 2030. The plan is to not send anything to landfill at that time, as all of the materials can be reused.



** Includes Kymin Voima Oy's ash corresponding to the energy used by Kymi.

Ash created during bioenergy production was delivered for granulation, after which it was applied to forests owned by UPM.

Water

The performance of the biological treatment plant was good. The reduction rates indicating the efficiency of the treatment plant were 99% for biological oxygen demand (BOD) and 73% for chemical oxygen demand (COD). The solids reduction rate was 97%. The effluent load to the river remained below all the environmental permit limits throughout the year.

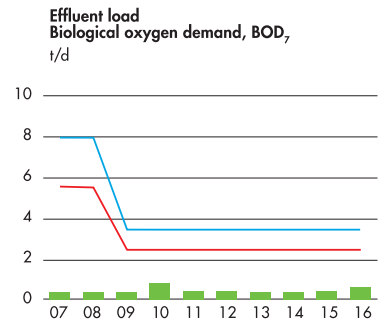
The COD and adsorbable organic halogen (AOX) loads (t/d) increased slightly from the previous year, as the production level of the pulp mill increased by over 20% compared to 2015. The pulp mill achieved a new annual production record in 2016. The specific COD load decreased compared to the previous year, while the specific AOX load increased slightly. The nitrogen and phosphorus loads remained at the level of the previous year. The amount of solids from the biological treatment plant remained low, as in the previous years, due to the good sedimentation of the sludge and steady operation of the treatment plant. The paper mill's solids loss remained at the same level compared to the previous year. The goal is to further decrease the amount of solids being released from the paper mill to the treatment plant.

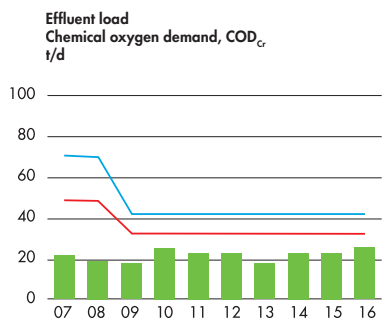
In 2016, the Kymi mill site used a total of 88 million cubic metres (m^3) of water. Water consumption at the integrated mill site increased by approximately 6% year-on-year due to the significant increase in the pulp mill's production volume compared to the previous year. Specific effluent consumption per tonne of paper produced remained at almost the same level as in the previous year.

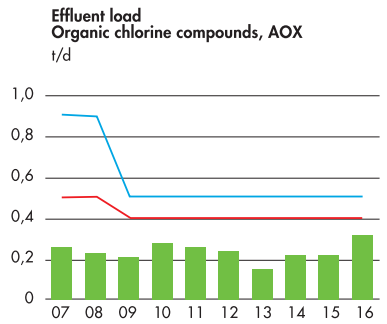
The pulp mill's water consumption per tonne of pulp produced decreased from the previous year. The amount of water per tonne was reduced by the commissioning of the cooling towers in the summer, after which raw water was no longer used for cooling the effluent. Furthermore, the production level remained steady and high, which also affected water use at the pulp mill. Nevertheless, the results achieved by both the pulp and paper mill remain below the upper limit specified for effluent in the BAT (EU Best Available Techniques) reference.

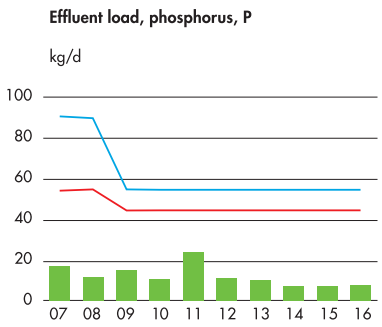
In summary, the effluent load of the pulp and paper mills remained at or below the BAT BREF limit throughout 2016.

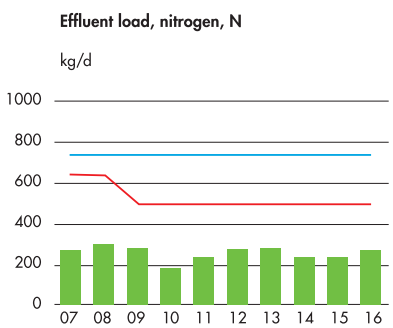
Effluent cooling towers were commissioned in the summer of 2016 to improve the cooling capacity for wastewater, the effluent treatment process and the operational reliability of the effluent treatment plant as a whole.

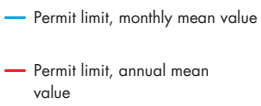












An external audit was performed in October on the entire management system of the pulp mill. Auditor Elina Viitala from Inspecta (front) inspected documents together with laboratory attendant Riia Hämäläinen at the process laboratory.

Effluent cooling towers were commissioned in the summer of 2016 to improve the cooling capacity for wastewater, the effluent treatment process and the operational reliability of the effluent treatment plant as a whole.

Environmental indicators 2016

The environmental indicators in the table are based on the total pulp and paper production volumes of the pulp and paper mill. The figures for production and the consumption of raw materials and energy are reported as integers at group level in the Corporate Environmental Statement for UPM's pulp and paper mills 2016.

Production capacity	Coated and uncoated fine paper Pulp	800,000 t 760,000 t
Raw materials	Wood Purchased pulp Chemicals	Please refer to the UPM Corporate Environmental Statement for information
Energy	Biofuels Fossil fuels	Biofuels 88% Fossil fuels 12% (incl. natural gas used for drying in the paper machine)
Air emissions	Sulphur, SO_2 Nitrogen oxides, NOx Carbon dioxide, CO_2 (fossil) Particulates	74.4 t (SO_2 and malodorous sulphur emissions as sulphur dioxide) 1431 t 148,344 t 70.3 t
Water intake	Process and cooling water	88,203,533 m^3
Emissions to water	Cooling water Effluent Chemical oxygen demand, COD_{Cr} Biological oxygen demand, BOD_7 Adsorbable organically bound halogens, AOX Phosphorus, P Nitrogen, N	49,008,312 m^3 39,195,221 m^3 9260 t 134.1 t 116.7 t 2.19 t 96.3 t
Waste	Waste to landfill (as dry matter): Green liquor dregs Sludge Lime, lime sludge Mixed waste Process waste	 6964 t 312 t 333 t 69 t 4 t
	Recycled waste (as dry matter): Ash Green liquor dregs Lime sludge Bark and wood waste Cores and wrapping Waste paper and cardboard Metal Combustible waste Concrete and asphalt waste Biowaste Other waste	 4744 t 1824 t 323 t 1718 t 3986 t 74 t 471 t 487 t 686 t 21 t 18 t
	Temporarily stored waste intended for reuse (as dry matter): Ash	 2204 t
	Hazardous waste	227 t
Mill area		250 hectares

The figures include Kymin Voima Oy's waste and emissions with regard to the energy consumed by the Kymi site.

Achievement of objectives in 2016

OBJECTIVES AND INDICATORS	ACHIEVED	COMMENTS
Minimising environmental non-conformances: 0 cases in classes 3 to 5	No	No permit limits exceeded, but one case of Class 3 chlorine dioxide emission into air.
Processing time of Clean Run notifications <3 months	Yes	Systematically discussed in morning meetings. In total, 244 Clean Run notifications were made at the pulp mill and 142 at the paper mill.
Efficient use of the Clean Run programme	Yes	Internal alarm limits calibrated. Abnormal emissions recorded and discussed in morning meetings.
Solid waste to landfill <12.5 kg of dry matter/tonne of pulp		Yes Actual value approx. 10 kg of dry matter/tonne of pulp.
Increasing the reuse of waste: Increasing the reuse rate by 10% compared to the 2015 level	No	Actual value approx. 9%.
COD from pulp <100 t/d	Yes	Steady production and efficient washing.
Reducing solids losses from pulp and paper	Partly	The pulp mill's solids loss decreased, actual value approx. 7 kg/tonne of pulp. The paper mill's solids loss remained at the same level as in the previous year.
Reducing water consumption at the pulp mill: 10% reduction compared to the 2015 level	Yes	Actual value approx. 13%. Good, steady production. Effluent cooling towers commissioned in summer 2016.
Water consumption at the paper mill <10 m^3/tonne	No	Water consumption remained at the same level.
CO_2 emissions <100 kg/tonne of pulp	Yes	Gas consumption reduced by maximal operation without disturbances.
Arranging environmental training for the employees	Yes	Employees received training on topics such as safety, the environmental management system and energy efficiency. Waste sorting training designed for maintenance personnel was also organised.

EMAS
Todennettu ympäristöasioiden hallinta
REG.NO. FI - 000058

DECISION ON THE VERIFICATION OF THE UPDATED ENVIRONMENTAL STATEMENT

Accredited verifier Inspecta Sertifiointi Oy (FI-V-0001) audited in 2016 the UPM Kymi Environmental Management System and the updated information in the UPM Kymi Environmental Performance in 2016 report, as well as the updates made to the UPM Corporate Environmental Statement 2015, insofar as the updated information concerns UPM Kymi. On the basis of this audit, it was stated on 4 April 2017 that the UPM Kymi Environmental Management System, the updated information in this Environmental Performance report and the updated information concerning UPM Kymi in the UPM Corporate Environmental Statement all comply with the requirements of the EU Eco-Management and Audit Scheme (EMAS) Regulation (EC) number 1221/2009.

The pulp mill's objectives for 2017

OBJECTIVES AND INDICATORS	SCHEDULE	UNITS' RESPONSIBILITIES
Reducing abnormal emissions: 0 cases in classes 3 to 5	2017	Steady operation of the treatment plant and control of air emissions.
Processing time of Clean Run notifications <2 months	2017	Systematic discussion in morning meetings.
Setting internal alarm limits in accordance with the current production level	2017	Calibration of internal alarm limits.
Reducing odour emissions	2017	Monitoring the recovery of vapours, avoiding excessive use of bleaching chemicals.
Solid waste to landfill <12.5 kg of dry matter/ tonne of pulp	2017	Continuing to find reuse applications for green liquor dregs and ash. Continuing the test runs with green liquor dregs at Kymin Voima.
Reducing water consumption at the pulp mill Goal: <41.5 m^3/tonne of pulp	Q4/2017	Improving washing performance on the birch line as part of the KYMI870 project. Checking the water balance.
CO_2 emissions at the pulp mill Goal: <100 kg of CO_2/tonne of pulp	2017	Minimising unplanned shut-downs.
COD emissions at the pulp mill Goal: <12.5 kg/tonne of pulp	Q4/2017	Improving washing performance on the birch line as part of the KYMI870 project.
Goal for AOX emissions: <0.16 kg/tonne of pulp	Q4/2017	Improving washing performance on the birch line as part of the KYMI870 project.
Goal for SO_2 + TRS emissions: <0.1 kg of sulphur/ tonne of pulp	2017	Minimising unplanned shut-downs.
Goal for NOx emissions: <1.55 kg/tonne of pulp	2017	Minimising unplanned shut-downs.

The paper mill's objectives for 2017

OBJECTIVES AND INDICATORS	SCHEDULE	UNITS' RESPONSIBILITIES
No abnormal emissions (classes 3 to 5)	2017	Raising awareness.
Solid production waste to landfill = 0 tonnes	2017	Improving the sorting of waste.
Reducing water consumption at the paper mill, <10 m^3/tonne of paper	2017	Improving line-specific monitoring.
Solids loss at the paper mill, <10 kg/tonne of paper	2017	Improving line-specific monitoring.

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