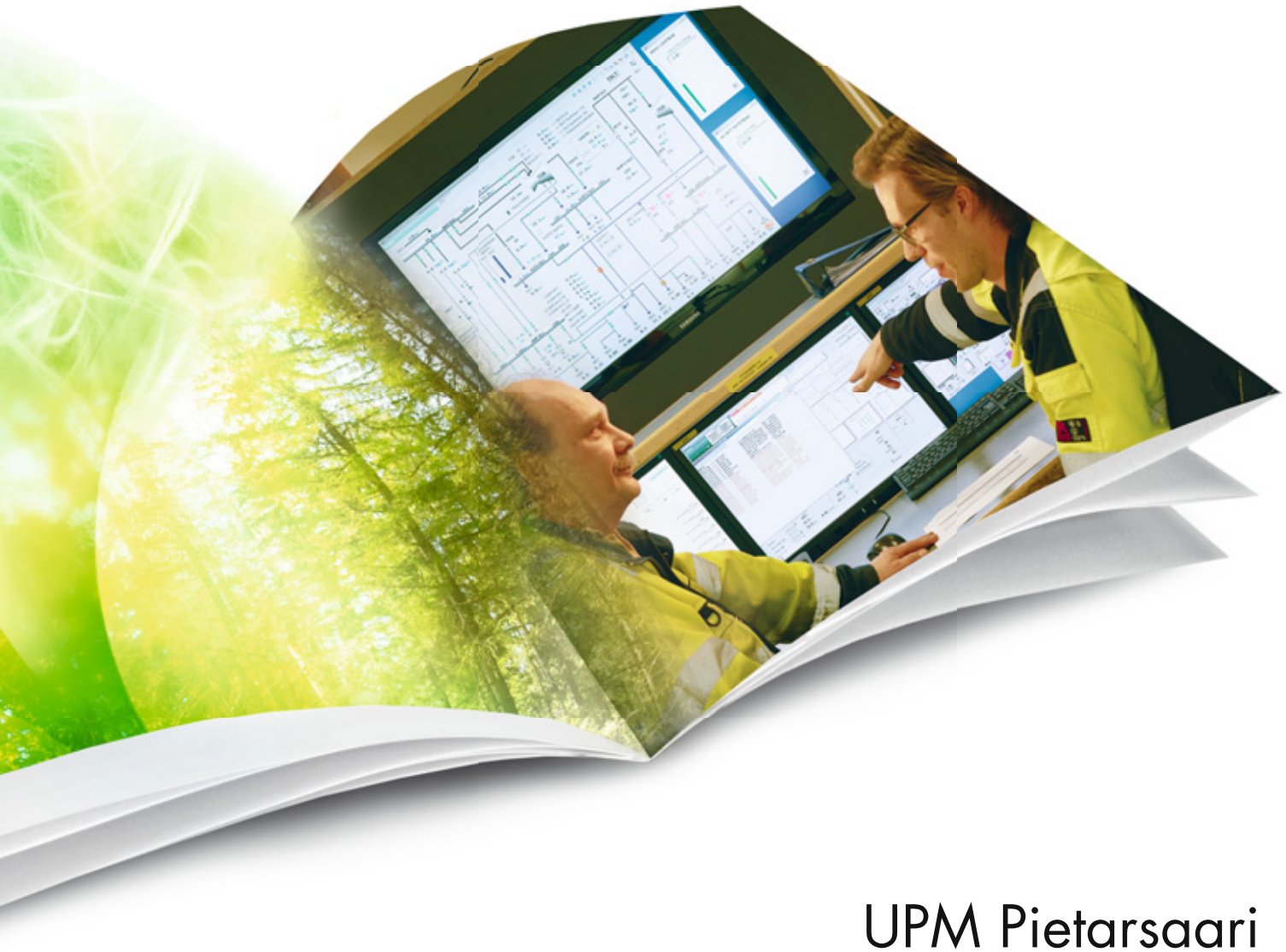
The Biofore Company UPM

ENVIRONMENTAL Performance in 2015



UPM Pietarsaari

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

UPM Pietarsaari pulp mill activities date back to 1935. Apart from optimising production and efficiency, the core objective in the development of the mill and processes has been the reduction of further strain on the environment. The biggest investment since 2000 – the recovery line (2004) – was constructed using the best available techniques (BAT). The same principle was applied in building the new effluent treatment plant which began operations three years ago. BAT principles are also used in renewing individual devices and equipment. All photos in this report have been taken in places where BAT principles have been applied at the pulp mill and Alholma Sawmill.

Cover: The recovery island is an extensive recycling plant where chemicals are recycled over and over again. Lauri Mattila has worked as a senior supervisor at the power plant ever since it began operations. Teppo Parkkinen who works at the recovery island represents the new generation of mill workers. Also his goals at the power plant are to maximise energy efficiency and minimise environmental strain. **Photos:** Pertti Puranen

UPM Pietarsaari

The UPM Pietarsaari complex comprises the Pietarsaari pulp mill, Alholma sawmill and UPM Forest Ostrobothnia office. These units are located in the UPM mill complex at Alholma along with BillerudKorsnäs Finland, Walki and Alholmens Kraft.

UPM Forest is responsible for wood procurement to, and mill monitoring at, the Pietarsaari pulp mill and the Alholma sawmill. The logs are sawn at Alholma Sawmill. Pulp is produced from the fibre wood, chips and sawdust. Some of the pulp produced is sold to the BillerudKorsnäs paper mill to produce kraft paper. Some of this kraft paper is sold to the Walki factory for processing materials for various industries such as the packaging industry. Bark and other residual wood are used at Alholmens Kraft for the production of electricity, steam and district heating.

The pulp mill, the sawmill and UPM Forest continued to work closely throughout 2015 in developing and enhancing the county vision. This means also maintaining active contact with stake holder groups. The aims of active contact are good local relations and a constant supply of local wood. Besides forest owners and contractors other important stake holders are other actors in the mill complex, residents in neighbouring municipalities and key companies, municipal councils and politicians. The most noticeable event involving certain stake holder groups took place at the Kaustinen trotting event in July.

Common logistical projects with local politicians, the Pietarsaari town council and local businesses have born fruit: dredging of the shipping route was celebrated in September; refurbishing

	Pulp mill	Alholma sawmill
Production capacity	800,000 t	250,000 m³
Personnel	290 and functions 20	62
Products	UPM Conifer UPM Conifer TCF UPM Conifer Thin UPM Betula UPM Betula TCF	pine and spruce sawn goods
Other products **Residuals**	steam, electricity, bark and turpentine tall oil	chips, sawdust and bark
Certificates	EMAS – EU Eco-Management and Audit Scheme ISO 14001 – Environmental Management System Standard EES+ Energy Efficiency Management System ISO 9001 – Quality Management System Standard OHSAS 18001 – Occupational Health and Safety System Standard: UPM Pietarsaari PEFC™ Chain of Custody – Programme for the Endorsement of Forest Certification FSC® Chain of Custody – Forest Stewardship Council® *All certificates can be found in UPM's Certificate Finder (available at www.upm.com/responsibility)*	
Environmental labels	All pulp types have been approved for use in papers bearing the EU Ecolabel and Swan trademark.	

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Alholma sawmill

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UPM Pietarsaari Environmental Performance in 2015 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 2015. The annually updated mill supplements and the UPM Corporate Environmental Statement form the joint EMAS Statement of the UPM Corporation. The next Corporate Environmental Statement and next supplement will be published in 2017.

the road to the harbour on Pohjantie as far as the Larsmo road will be completed in 2016; electrification began on the railway branch line between Pännäinen and Alholma which will be finished at the end of 2016. UPM is responsible for providing electricity to this line within the Pietarsaari mill complex. As a result of effective cooperation the Traffic Authority has granted funding for planning the refurbishing of the harbour road from Kolppi to Pietarsaari. A significant enterprise, which is well on course, for UPM and, for instance, the harbour is the Pännäinen railway triangle. Funding was granted for planning this project in 2016. The implementation of this triangle would reduce the distance of rail transportation from the south to Alholma by over 100 km. This would be a considerable benefit to the mill in terms of the transportation of wood from the south. Effective railway communications are also essential to the future of the harbour.

As well as the economic effects, all the logistical solutions have continued to have positive effects on the environment when comparing, for instance, emissions from electric and diesel engines.

This environmental report covers environmental matters concerning the UPM Pietarsaari pulp mill and the Alholma sawmill in 2015. Environmental matters pertaining to UPM Forest are covered in the UPM Forest environmental statement.

Pine and birch pulp are produced at the UPM Pietarsaari pulp mill. Sawdust pulp, which is combined to produce pine and birch pulp, is cooked in the sawdust boiler.

2015 was a good year at the pulp mill both economically and in terms of productivity. Pulp demands were constant. The biggest single development was the improved quality of bales in drying machine 1. This was achieved by renewing devices and equipment on the baling line.

As at other UPM pulp mills, the Tonnes of Trust programme was introduced at the Pietarsaari pulp mill. The goal is to have the right pulp despatched to the right end-user in the context of environmental protection, economic performance and occupational health and safety. This means smooth running operations at the pulp mill without any unscheduled stops – which would put strain on the environment. Tonnes of Trust is also a positive project with respect to the environment.

The goals of Alholma Sawmill were achieved in terms of maximising production operations. Energy efficiency of the lumber kilns also improved. Workers were very happy with new LED lighting along the sawmill production line. Effective waste sorting operations in 2015 will continue to improve.

The UPM Pietarsaari pulp mill and Alholma sawmill are responsible for their own environmental issues. These are coordinated and monitored by the UPM Pietarsaari Environmental Manager.

The common environmental goals of the pulp mill and sawmill are to reduce the strain placed on the environment and to keep emissions below the statutory permitted levels.

Kari Saari
Environmental Manager

Veikko Petäjistö
General Manager of
the Pulp Mill and Mill Complex

Mika Åby
Director, Alholma Sawmill

Environmental year 2015
– achievement of goals

The most important long-term goal for the pulp mill is the increase in production levels without placing further strain on the environment.

The purification efficiency level at the effluent treatment plant is excellent. Plant operations are running smoothly with no hint of difficulty in the varying loads of waste water.

Opportunities for further development for the pulp mill will be ensured by the new effluent treatment plant in compliance with the mill's long-term environmental goals.

Effluent discharge volumes from the pulp mill were at the same levels as for the previous year (2014). Even nutrient discharge levels were lower although production levels were slightly higher than in 2014. Discharges into the sea – calculated in terms of specific discharges – were clearly on the BAT level (BAT ref 2014).

Emissions into the air in 2015 were in line with levels from previous years even though somewhat higher than in 2014. Volumes of emissions into the air – calculated in terms of specific emissions – were clearly on the BAT level (BAT ref 2014).

All environmental permit levels were fulfilled in 2015.

Pulp mill

In 2011 UPM introduced the on-going Clean Run programme in order to improve and develop environmental performance. The Clean Run programme is described in greater detail in the UPM Environmental Report 2015.

The pulp mill experienced 85 environmental deviations (in 2015). This figure is below that for the previous year. Deviations are classified into levels of 1–5. No deviations at levels 3, 4 or 5 occurred in 2015.

The recovery boiler has three feed pumps which feed water into the boiler. At the front section is a steam-powered water feed pump which is used in the event of disruptions for safe and smooth downtime operations of the boiler. In normal situations water for the boiler is fed from the two electrically operated water feed pumps.

Environmental risk assessments are carried out on a departmental basis.

Optimising measures continued in terms of running the effluent treatment plant.

Recycling of solid waste proved highly successful: 42,000 tonnes of waste were utilised for various purposes. The amount was considerably higher than in previous years. The most significant event was the first stage of closing the northern section of the landfill site – located in the mill complex – where approx. 32,000 tonnes of waste were utilised.

Four complaints were made in 2015 to the mill in terms of noise and smell disturbances.

The energy efficiency systems (EES+) was certified in 2015.

Alholma sawmill

The sawmill's goal of maximising production was achieved: only a two-week shutdown in the summer and a one-week shutdown after Christmas.

The intensification operations succeeded as planned. Production at the sawmill was balanced effectively by the drying capacity. Energy efficiency in the lumber kilns was improved in terms of fill levels and fill compactness.

The updated energy-saving LED lighting in the sawmill has been well received. Special attention was paid to the sorting of waste in conjunction with projects being carried out over the year. Environmental issues were of prime importance when selecting and introducing sub-contractors onto the mill premises.

In addition to best available techniques (BAT) in the sticking machine at Alholma Sawmill, lighting is maintained by an energy-efficient LED lighting system. Mika Vähäkangas is responsible for plant operations during his shift.

The aeration basin (left) and the Lapakko sedimentation basin of the effluent treatment plant. Waste water from the Pietarsaari mill complex is purified by means of active sludge, which has emerged in the wood industry process, for the effective purification of waste water.

Air

As in previous years, the pulp mill had a surplus of electricity solely from energy obtained from the combustion of black liquor. The surplus electricity was sold to the electricity network via UPM Energy.

The pulp mill and sawmill sold bark from debarked wood and wood-based waste to Alholmens Kraft for converting into energy.

Emissions into the air measured with the specific emission coefficients were good according to BAT* standards. The emissions remained below the permitted levels when converted into specific emissions.

Emission levels for 2015 were slightly higher than those for the previous year.

Uptimes and downtimes relating to planned and unplanned shutdowns caused some minor instances of malodours in areas close to the mill.

During normal operations permit levels were not exceeded.

Emissions of fossil nitrogen oxide per pulp tonne produced fell marginally and were below the permitted level.

The long-term goal is to achieve a 'carbon dioxide neutral' pulp mill. The percentage of biofuels during pulp production was still very high, 99.96%.

The combustion of malodorous gases in the recovery boiler was successful throughout the year with a high utilisation coefficient. As a result of disturbances strong odorous gases had to be channelled into the reserve burner from time to time.

Strong odorous gases were channelled via the reserve burner 1.2% of the running time. The corresponding level for 2014 was 1.9%. Thus, the 2015 figure is slightly lower.

Air quality in the Pietarsaari region

Local air quality is continuously monitored at two surveillance points: one is located in Pietarsaari near the town centre, the other in Vikarholmen, Luoto. Impurities in the air remained well below the specified permit guideline levels – except for airborne particles (PM10). The latter exceeded the permitted value of 50 µg/m^3 on 17 days (the maximum permitted amount is 35 days).

* BAT = Best Available Techniques

EMISSIONS INTO THE AIR FROM PULP PRODUCTION IN 2015

	Solid particles t/a	Sulphur dioxide t SO_2/a	TRS t S/a	Nitrogen oxides t NO_2/a	Chlorine compounds t Cl/a
Recovery boiler	108	69	5	954	
Lime kiln	11	2	2	53	
Reserve burner (torch)		38			
Bleaching plant 1					1.2
Bleaching plant 2					1.0
Fugitive emissions			16		
Total	119	109	23	1,007	2.2

DESTRUCTION OF MALODOROUS GASES, % of time

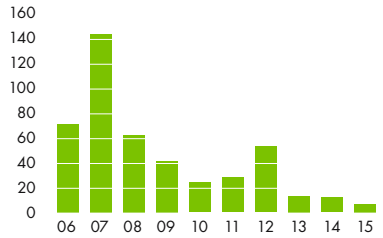
	2013	2014	2015
Combustion in recovery boiler	99	98.1	98.8
Combustion in reserve burner (torch)	0.8	1.2	0.9
Transfer to smoke stack	0.2	0.7	0.3

Traffic-related levels of nitrogen oxide were quite high, as in previous years.

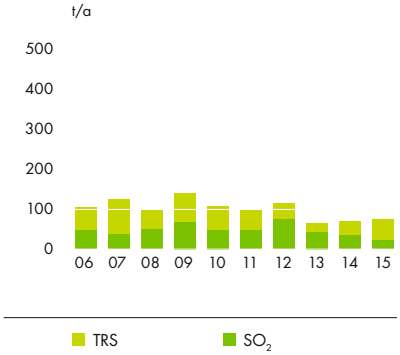
Emissions of malodorous sulphur compounds (10 µg S/m^3) remained below the daily permit value at both surveillance points. The highest average daily levels of malodorous sulphur compounds recorded were 1.7 µg S/m^3 near the town centre in December and 4.3 µg S/m^3 in Vikarholmen in February.

The highest average hourly levels recorded were 8.4 µg S/m^3 near the town centre in September and 43.7 g S/m^3 in Vikarholmen in June.

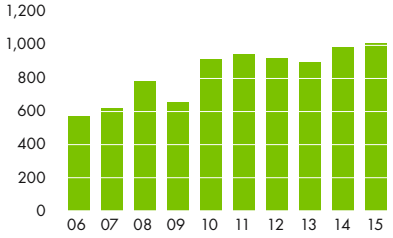
DEVELOPMENT OF SPECIFIC FOSSIL CARBON DIOXIDE EMISSIONS AT THE PIETARSAARI MILL
% (2005 = 100)



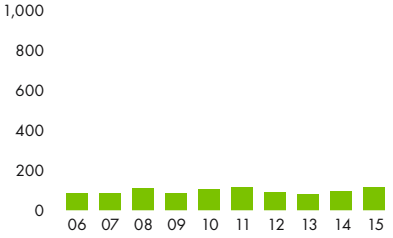
GASEOUS SULPHUR COMPOUNDS
t/a



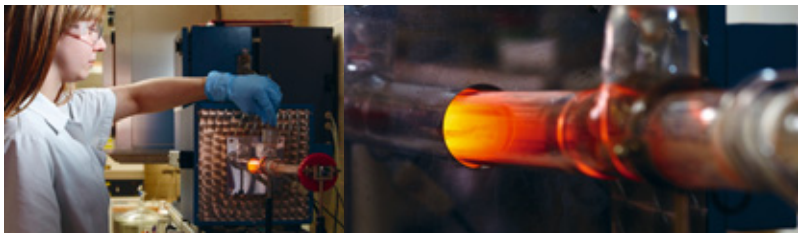
NITROGEN OXIDES, NO_2
t/a



PARTICLES
t/a



Ilkka Mänttäri monitors production and operations at the lime kiln. The fuel in the lime-kiln is exhaustless pitch oil – a bi-product of tall oil.



Laboratorian assistant, Taija Surmo-Aho calculates the amount of organic chlorine from pulp and waste water by using an OX gauge.

Water

Untreated water sourcing

UPM Pietarsaari acquires untreated water for mill operations from the Luoto Lake.

Total untreated water consumption at the pulp mill and sawmill was approximately 52,408,000 m^3, of which less than 50% was used for cooling operations while the rest served as process water at the pulp mill. The percentage of untreated water used at the Alholma sawmill was 35,000 m^3, i.e. less than 0.1%.

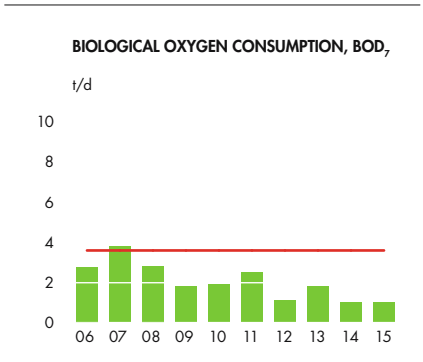
Discharges into the sea

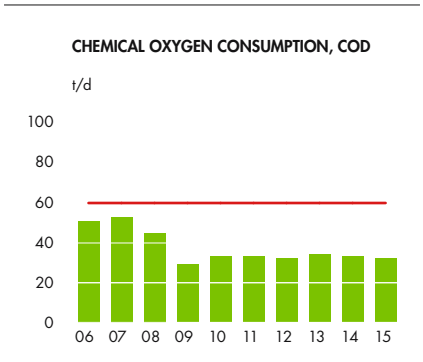
Quantitative levels of waste water from the mill continued to fall. In 2015 new internal targets were set for waste water from the pulp mill for continuous improvement of operations. At no point were permit levels exceeded in 2015.

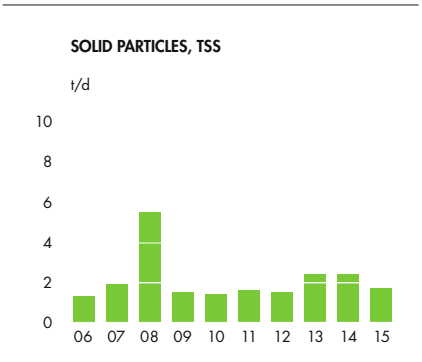
The amount of waste water from the mill area in 2015 was slightly lower than in 2014. Nitrogen discharges fell considerably. Solid particles were slightly above internal target levels. Other discharges were below internal target levels.

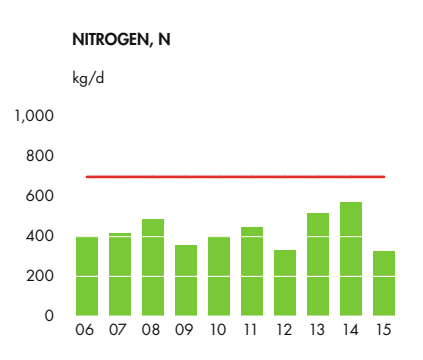
EFFLUENT LOADS IN 2015

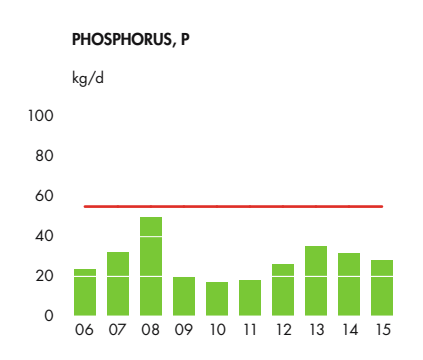
	Annual average 2015	Target (pulp mill share) 2015	Permitted level (annual average)
COD, t/d	32	35	60
BOD_7, t/d	1.0	1.0	3.6
Nitrogen, kg/d	323	400	700
Phosphorus, kg/d	28	35	55
AOX, t/d	0.14	0.20	0.5
Solid particles, t/d	1.7	1.5	no restrictions posed

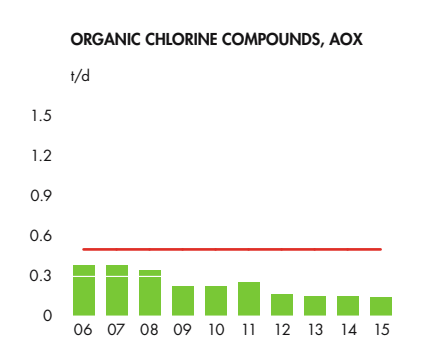












Permit limit

Waste

The UPM Pietarsaari landfill site is located in the mill complex. Solid waste in 2015 amounted to 17,752 t – about 1,700 t more than for the previous year. This increase was due to the demolition of old concrete constructions which were fully utilised during the course of the year. The first stage of closing the north section of the landfill site took place. The next stage of closure is planned for 2017.

31,998 tonnes of crushed construction waste was utilised during stage one of the closure process. 20,235 tonnes of fly ash and ground ash from Ab Alholmens Kraft Oy were used for styling the closed section and also as the base installation for a bentonite carpet. 11,763 tonnes of organic waste fractions were used in constructing a level for plant cultivation and a system for handling gases emanating from the landfill site area.

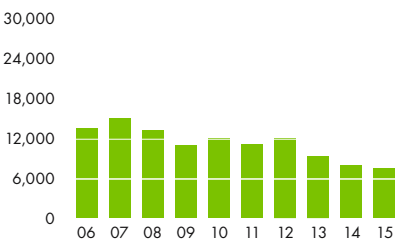
Total amounts of waste continued to decrease at the landfill site.

Other waste fractions were utilised more effectively than before: 6,514 tonnes of waste temporarily stored in previous years and 6,894 tonnes of landfill waste. All waste is expressed in dry waste tonnes.

77.1 tonnes of hazardous waste were transferred elsewhere for processing, including about 61.3 tonnes of lubricants and grease for recycling purposes.

WASTE FOR LANDFILL SITE

dry weight, t/a



SOLID WASTE (dry weight, t/a)

	To landfill site	For temporary storage	For recycling
Combusted chalk and lime			704
Green lye sludge	7,289		
Twig rejects		790	
Sand containing bark			447
Tree and bark waste		82	459
Paper and cardboard for recycling			5
Energy waste			80
Sludge	1		41
Cable and metal scraps			875
Cleaning waste	15		167
Construction waste and soil materials	156	927	5,714
Total solid waste 2015	7,461	1,799	8,492
Total solid waste 2014	7,919	3,340	4,812

The post-sedimentation basin is located beyond the effluent treatment plant. The last solid substances from the purified waste water sink to the bottom of the post-sedimentation basin where they are dredged up when required. The purified waste water is then channelled via a surveillance point into the sea.

Environmental parameters 2015

The environmental parameters in the table below are based on the total production of pulp at the UPM Pietarsaari pulp mill and sawn goods at the Alholma sawmill. Parameters for production and consumption of raw materials and energy are expressed in total figures in the 2015 environmental report for UPM pulp and paper mills. The figures in the table are compared with those from 2013–2014. Figures for the paper mill are also included in the figures for previous years.

Production capacity	Sawn goods	250,000 m^3
	Pulp	800,000 Adt
Raw materials and chemicals	Wood	See UPM Corporate Environmental Statement for more information
	Cooking and bleaching chemicals	
	Others	
Energy	Biofuels and fossil fuels	Biofuels 99.96%
		Fossil fuels 0.04%
	Purchased energy	See UPM Corporate Environmental Statement for more information
Emissions into the air	Solid particles	119 t
	Sulphur dioxide, SO_2	109 t
	Malodorous sulphur compounds, TRS (S)	23 t
	Nitrogen oxides, NO_2	1,007 t
	Carbon dioxide, CO_2 (fossil)	3,305 t
Untreated water	Fresh water for process and cooling	52,407,790 m^3
	– Sawmill share	35,000 m^3
Discharges into the sea	Cooling and rain water	25,368,447 m^3
	Cleaned discharged water	29,856,052 m^3
	Biological oxygen consumption, BOD_7	355 t
	Chemical oxygen consumption, COD_{cr}	11,702 t
	Solid particles, TSS	637 t
	Total phosphorus, P_{tot}	10.1 t
	Total nitrogen, N_{tot}	118.1 t
	Organic chlorine compounds, AOX	51 t
Solid waste for landfill site *(abs. dry)*	Green lye sludge	7,289 t
	Construction waste and earth materials	156 t
	Other waste	16 t
	Total	7,461 t
Waste for recycling	Chalk	704 t
	Paper and carton	5 t
	Metal waste	875 t
	Sand containing bark	447 t
	Wood and bark waste	459 t
	Energy waste	80 t
	Construction waste and earth materials	5,714 t
	Cleaning waste	167 t
	Dredging sludge	41 t
	Total	8,492 t
For temporary storage	Twig rejects	790 t
	Asphalt	579 t
	Wood and bark waste	82 t
	Construction waste and earth materials	348 t
	Total	1,799 t
Hazardous waste		77.1 t
Mill area		210 ha

Priority areas in environmental protection

- Converting solid waste into products and advancing the circulation economy as a Zero solid waste project. The goal is to phase out waste transportation to the landfill site over the next few years.
- Improvement of energy efficiency at the mill will continue in compliance with the energy-saving agreement.

Goals for 2015

PULP MILL

- The Clean Run programme will continue. The target is no deviations above level 2.
- The successful start-up of the One safety database.
- The reduction of waste for the landfill site
  - Surveys on the recycling of solid waste will continue.
  - Special emphasis will be placed on the recycling of organic waste.
- Preparations for the second phase of closing the northern section of the landfill site.
- Implementation of the development programme for saving energy will continue.

ALHOLMA SAWMILL

- Fully exploiting FSC and PEFC certifications in the sales of sawn goods
- The reduction of waste amounts and increased efficiency in waste sorting
- Establishing waste sorting directions and signs for common use throughout the Pietarsaari mill complex
- The reduction of (electricity and heat) energy consumption

EMAS
Verified environmental management
REG.NO. FI - 000058

DECLARATION OF APPROVAL

Accredited verifier Inspecta Sertifiointi Oy (FIN-V-001) has audited the UPM Pietarsaari environmental management system and the Environmental Performance report for 2015 along with information regarding the environmental report for UPM paper and pulp mills for 2015. On the basis of this audit, it was stated on 6 April 2016 that the Environmental Management System of UPM Pietarsaari 2015 and the updated information of the EMAS Statement 2015 comply with the requirements of the EU's EMAS Regulation (EEC) No. 1221/2009.

MORE WITH BIOFORE

UPM leads the integration of bio and forest industries into a sustainable future. Biofore stands for innovation, responsibility and efficiency.
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UPM

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