

Environmental performance in 2016





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UPM has set 34 extensive targets of responsibility by the year 2030. Certain areas of importance have been specified to achieve these targets. One focus span is developing further recycling and material efficiency. What comes to landfill sites and combustion – no solid waste of any kind is to be taken to the landfill site or combusted without generating energy – as in Pietarsaari pulp mill and Alholma sawmill too. Photos in this publication show operations relating to the recycling business of the pulp mill and Alholma sawmill. In the cover photo, wood handling inspections are being carried out by an external auditor. **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 2016 in developing and enhancing the county vision. This means also maintaining active contact with stakeholder groups. The aims of active contact are good local relations and a constant supply of local wood.

Besides company personnel and contractors, other important stakeholders in 2016 were forest owners, local politicians, municipal councils, local residents and students and other actors in the mill complex.

	Pulp mill	Alholma sawmill
Production capacity	800,000 t	250,000 m ³
Personnel	298 and functions 10	61
Products	UPM Conifer UPM Conifer TCF UPM Conifer Thin UPM Betula UPM Betula TCF	pine and spruce sawn goods
Other products	steam, electricity, bark and turpentine	chips, sawdust and bark
Residuals	tall oil	
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® ISO 22000 – Food Safety Management System <i>All certificates can be found in UPM's Certificate Finder (available at www.upm.com/responsibility)</i>	
Environmental labels	All pulp types have been approved for use in papers bearing the EU Ecolabel and Swan trademark.	



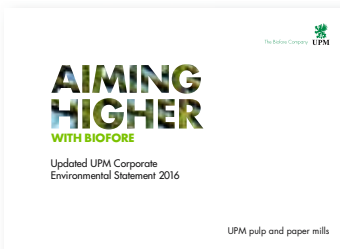
The mark of responsible forestry

More of FSC products, www.fsc.org



Alholma sawmill

More of PEFC products, www.pefc.org



UPM Pietarsaari Environmental Performance in 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 form the joint EMAS Statement of the UPM Corporation. The next Corporate Environmental Statement and next supplement will be published in 2018.

Year-long cooperation produced two major logistical advances in 2016: refurbishment of the Harbour road and electrification of the railway from Pännäinen to Alholma. The first load of wood by electric locomotive arrived into Alholma in February 2017. Planning of the Pännäinen railway triangle is on schedule. The implementation of this triangle will shorten rail transportation distances to Alholma from the south by over 100 km. Plans were implemented for a second refurbishment of the Harbour road and for the junction between the highway 8 and the Harbour road near Kolppi.

As well as the economic benefits, all the logistical solutions have positive effects on the environment when comparing, for instance, emissions from electric and diesel engines. Once implemented the Pännäinen triangle will further reduce carbon dioxide emissions in wood transportation.

Establishing relations with stakeholders of UPM Forest, the pulp mill and the sawmill could be mentioned mill visits made by local town and municipal councillors, environmental officers and those holding equivalent positions in church parishes about the properties of the forest.

The biggest single event in 2016 was the forest day for students from Pietarsaari High School. Students were introduced to and became acquainted with the forest, its diversity in terms of usage and treatment – in theory and in practice – initially in the classroom and then outdoors in the Joutsen camping area. Students spent some of the day assembling bird houses and took part in the nationwide "Million Bird Houses" campaign.

This environmental report covers environmental matters concerning the UPM Pietarsaari pulp mill and the Alholma sawmill in 2016. Environmental matters pertaining to UPM Forest are covered in the UPM Forest environmental statement.

2016 was a good year at the pulp mill both economically and in terms of productivity. Pulp demands remained constant. As at other UPM pulp mills, the Tonnes of Trust programme was in use at the Pietarsaari pulp mill. The main aim is to have the right pulp dispatched to the right end-user without compromising environmental protection, occupational health and safety and production efficiency. This means smooth running operations at the pulp mill without any unscheduled stops – which would put strain on the environment.

The goals of Alholma sawmill were achieved in terms of maximising production operations. Energy efficiency of the lumber kilns continued to improve. The transition to LED lighting continued along the production line. In the light of the effective waste sorting operations, the goal is for all types of waste to be recycled.

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.

Besides the increase of the productions, the common environmental goals of the pulp mill are to reduce the strain placed on the environment and to keep emissions below the statutory permitted levels.



Kari Saari
Environmental Manager



Veikko Petäjästä
General Manager of the Pulp Mill
and Mill Complex



Mika Åby
Director, Alholma Sawmill

Achievement of environmental goals in 2016

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

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

Opportunities for further development of the pulp mill will be ensured by the 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 (2015). Even nutrient discharge levels were lower although production levels were slightly higher than in 2015. Discharges into the sea – calculated in terms of specific discharges – were clearly on the BAT level (BAT ref 2014).

Emissions into the air in 2016 were in line with levels from previous years. 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 2016.

Pulp mill

The pulp mill recorded 93 environmental deviations (in 2016) which were handled. This figure was slightly above that for the previous year. Deviations are classified into levels of 1–5. No deviations at levels 3, 4 or 5 occurred in 2016.

Optimising operations continued at the effluent treatment plant. As a result of optimising nutrients, the nutrient discharge level was lower than in 2015.





The pulp mill recovery island is one of the best recycling processes in industry. Chemicals for cooking are handled and used over and over again in pulp production.

Recycling of solid waste proved successful. About 1,200 wet tonnes of green lye acquired was utilised as chalk for the removal of sulphur.

UPM received 23 complaints in 2016 mainly about noise and smells. In 2016 the common operational system was certified for pulp business operations. A new certification was also gained – the ISO 22000 certification for Food Safety Management System.

Alholma sawmill

The sawmill achieved its goals for 2016 – non-stop operations throughout the year except for a two-week service shutdown in July and a one-week service shutdown at New Year. Production levels exceeded the 2015 levels.

Optimising drying operations was very successful. Energy efficiency improved in the lumber kilns by recoating the lumber kiln walls and closely inspecting the condition of the doors.

In 2016 there was also a decrease in electrical energy used per cubic metre of sawn timber produced (compared with 2015). Electrical consumption at the sawmill fell by 2.27kWh in terms of cubic metres of sawn timber produced.

Waste levels also fell by 0.11 kg per cubic metre of sawn timber produced. Special attention was given to the prevention of idling on the production line. The transition to LED lighting continued in the production hall. Oil containers with basins and special wells to separate oil from water were constructed to the maintenance contractors.



Every component of the wood entering the mill complex at Alholma is used. The logs are used for the production of sawn goods. Residual wood raw materials from sawing operations are chipped and used in pulp production. The bark is used to generate energy at Alholmens Kraft power station. The sawmill is ideally located with regard to the pulp mill, the power station and the harbour; as a result, the short transportation distances minimise the strain on the environment. From those short, internal transportations, environmental emissions hardly set in. About 30% of lumber are shipped from harbour and transported by sea to customers, including Algeria, Morocco and Egypt. Most of the lumber are sold in Finland and transported to customers by car transportations. Railway transportations are estimated to increase after the electrification of railway and especially after the implementation of the Pännäinen railway triangle.

Logging waste and bark from logs and fibre woods are used as fuels by Alholmens Kraft to produce electricity and district heating.



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 generating energy.

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

Emission levels were at the same level as in 2015. The emission of acidic gases ($\text{SO}_2 + \text{NO}_x$) was at the same level as in 2015 – although, by contrast, the amount of NO_x was greater and the amount of SO_2 smaller in 2016.

Start-ups and shutdowns relating to planned and unplanned stoppages caused some minor instances of malodours in areas close to the mill.

Permit levels were not exceeded.

Emissions of carbon dioxide per pulp tonne produced rose marginally but remained below the internal target 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, 99.7%.

The combustion of malodorous gases in the recovery boiler was successful throughout the year, as shown by a high utilisation coefficient. As a result of smell 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 1.4% of the operation time, which was slightly higher than the 2015 figure of 1.2%.

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, Larsmo.

* BAT = Best Available Techniques

Emissions into the air from pulp production in 2016

	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	104	6	11	1,107	
Lime kiln	10	4	1	55	
Reserve burner (torch)		33			
Bleaching plant 1					1.7
Bleaching plant 2					1.7
Fugitive emissions			18		
Total	114	43	30	1,162	3.4

Destruction of malodorous gases, % of time

	2014	2015	2016
Combustion in recovery boiler	98.1	98.8	98.6
Combustion in reserve burner (torch)	1.2	0.9	1
Transfer to smoke stack	0.7	0.3	0.4

Sand containing bark, which originate from exfoliating the fiber wood, are composted by a local entrepreneur and used as substrate in landscaping.

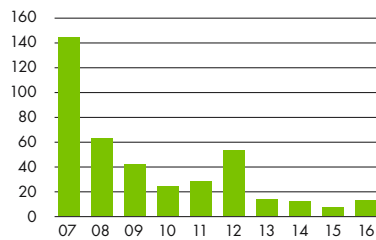


Impurities in the air remained well below the specified permit guideline levels – except for airborne particles (PM10). The latter exceeded the permitted level of $50 \mu\text{g S}/\text{m}^3$ on 15 days – 35 is the maximum number of days when the permitted level may be exceeded.

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

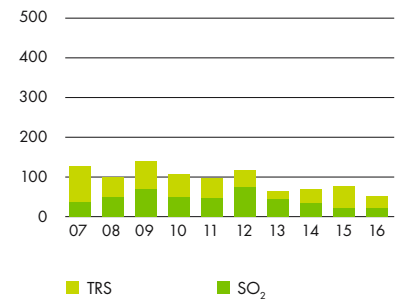
Emissions of malodorous sulphur compounds ($10 \mu\text{g S}/\text{m}^3$) remained below the average daily permit level at both surveillance points. The highest average daily levels of malodorous sulphur compounds recorded were $3.7 \mu\text{g S}/\text{m}^3$ near the town centre in October and $1.8 \mu\text{g S}/\text{m}^3$ in Vikarholmen in July. The highest average hourly levels recorded were $15.4 \mu\text{g S}/\text{m}^3$ near the town centre in October and $17 \mu\text{g S}/\text{m}^3$ in Vikarholmen in June.

Development of specific fossil carbon dioxide emissions at the pietarsaari mill
% (2005 = 100)



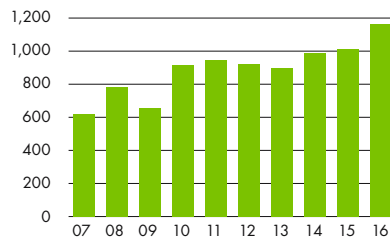
Gaseous sulphur compounds

t/a



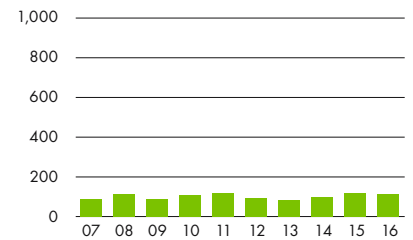
Nitrogen oxides, NO₂

t/a



Particles

t/a



Organic matter emanating from the wood during the cooking process is combusted in the recovery boiler and used to produce steam and electricity.

Here, Sakari Kinnunen is cleaning one of the black liquor spraying ports of the recovery boiler.



Inspecta auditors scrutinise the various operations systems of each department and check that these systems correspond to the operational guidelines.



Water

Untreated water sourcing

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

Total untreated water consumption at the pulp mill and sawmill in 2016 was 57,018,447 m³, of which less than 50% was used for cooling operations while the rest served as process water at the pulp mill. The amount of untreated water used at the Alholma sawmill was 35,000 m³, i.e. less than 0.1%.

Discharges into the sea

For continuously improving the operations, the new internal targets were set in 2014 for pulp mill's wastewater loadings.

Optimisation of the effluent treatment plant resulted in fewer nutrient discharges,

Effluent loads in 2016

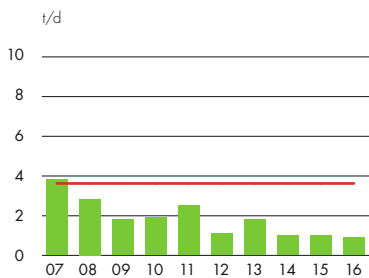
	Annual average 2016	Target (pulp mill share) 2016	Permitted level (annual average)
COD, t/d	37	35	60
BOD ₇ , t/d	0.9	1.0	3.6
Nitrogen, kg/d	236	400	700
Phosphorus, kg/d	24	35	55
AOX, t/d	0.23	0.20	0.5
Solid particles, t/d	1.1	1.5	no restrictions posed

nitrogen and phosphorus, than in 2015. Hence, discharge levels stayed below internal target levels. Discharges of solid particles almost halved in number. AOX levels were higher than for the previous year and exceeded the internal target level due to changes in the operational

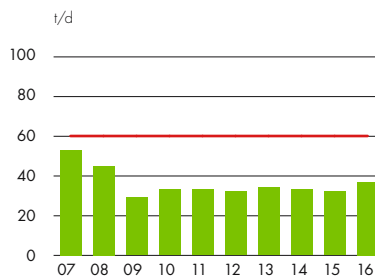
structure at the bleaching department. The COD level in wastewater also exceeded the internal target level.

The overall total waste water flow exceeded the internal target level as a result of higher coolant water streaming.

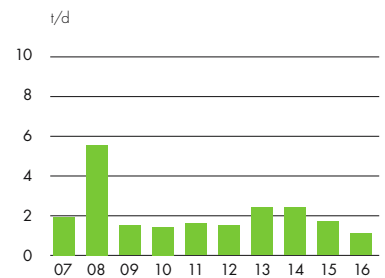
Biological oxygen consumption, BOD₇



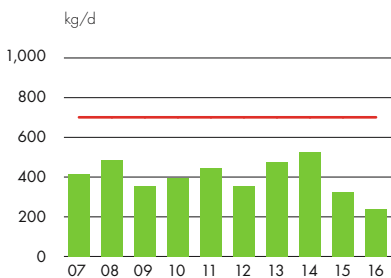
Chemical oxygen consumption, COD



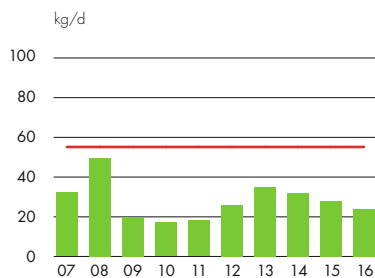
Solid particles, TSS



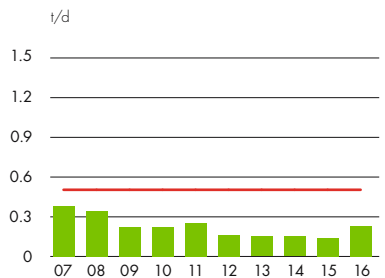
Nitrogen, N



Phosphorus, P



Organic chlorine compounds, AOX



— Permit limit

This chalk rock is used in the circulation of chalk – numerous times – in the recovery island before emerging from the process as chalk fraction bi-products for use in farming operations.



Waste

The UPM Pietarsaari landfill site is located in the mill complex. Solid waste in 2016 amounted to 18,693 t – about the same level as in 2015.

Closing operations continued in the northern section of the landfill site by shaping the next part of the area to be covered over. The next stage of the closure will be implemented in 2017.

Total waste amounts continued to decrease at the landfill site. Total waste bound for the landfill site amounted to 6,746 tonnes (over 99% of which was green lye sludge) – 710 tonnes less than in 2015.

4,461 tonnes of waste was put in temporary storage for recycling later. All waste is expressed in dry waste tonnes.

35.1 tonnes of hazardous waste was transferred elsewhere for processing; this included about 25.4 tonnes of lubricants and grease for recycling purposes.

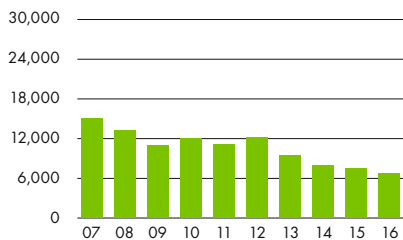
Solid waste (dry weight, t/a)

	To landfill site	For temporary storage	For recycling
Chalk and lime		247	289
Green lye sludge	6,683		551
Twig rejects		1,700	
Sand containing bark		134	290
Tree and bark waste		785	630
Paper and cardboard for recycling			
Energy waste			66
Sludge		7	
Cable and metal scraps			517
Cleaning waste	2		9
Construction waste and soil materials	61	1,588	5,134
Ashes			
Total solid waste 2016	6,746	4,461	7,486
Total solid waste 2015	7,456	1,785	8,355

Waste for recycling is sorted at specific points in the mill complex in accordance with the waste management programme for temporary storage and recycling purposes.

Waste for landfill site

dry weight, t/a





Environmental parameters 2016

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 2016 environmental report for UPM pulp and paper mills. The figures in the table are compared with those from 2013–2015. 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 99.70% Fossil fuels 0.30%
	Purchased energy	See UPM Corporate Environmental Statement for more information
Emissions into the air	Solid particles	114 t
	Sulphur dioxide, SO ₂	43 t
	Malodorous sulphur compounds, TRS (S)	30 t
	Nitrogen oxides, NO ₂	1,162 t
	Carbon dioxide, CO ₂ (fossil)	6,755 t
Untreated water	Fresh water for process and cooling	57,018,447 m ³
	– Sawmill share	35,000 m ³
Discharges into the sea	Cooling and rain water	30,959,887 m ³
	Cleaned discharged water	26,797,767 m ³
	Biological oxygen consumption, BOD ₇	313 t
	Chemical oxygen consumption, COD _{cr}	13,563 t
	Solid particles, TSS	384 t
	Total phosphorus, P _{tot}	9 t
	Total nitrogen, N _{tot}	86 t
	Organic chlorine compounds, AOX	85 t
Solid waste for landfill site (abs. dry)	Green lye sludge	6,683 t
	Construction waste and earth materials	61 t
	Other waste	2 t
	Total	6,746 t
Waste for recycling	Chalk	289 t
	Green lye sludge	551 t
	Metal waste	517 t
	Sand containing bark	290 t
	Wood and bark waste	630 t
	Energy waste	66 t
	Cleaning waste	9 t
	Construction waste and earth materials	5,134 t
	Total	7,486 t
	For temporary storage	Twig rejects
Chalk		247 t
Asphalt		594 t
Wood and bark waste		785 t
Construction waste and earth materials		994 t
Sludge		7 t
Sand containing bark		134 t
Total		4,461 t
Hazardous waste		35.1 t
Mill area		210 ha

Priority areas in environmental protection

- Converting solid waste into products and advancing recycling operations 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 2017

Pulp mill

- The Clean Run programme will continue. The target is no deviations above level 2.
- 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 green lye sludge.
- Closing of the second phase of the northern section of the landfill site.
- Based on the Energy Conservation Contract, the implementation of the development programme for saving energy will continue.

Alholma sawmill

- Reduction of energy consumption
 - Optimising the planning operations of lumber drying
 - Repairing and adding lightning automatism
 - Sealing and going through doors at lumber kilns
 - Repairing the air flues and spoilers
 - Changing the lightning in production rooms
 - Reduction of idling on the lines
- Reduction of waste
 - Efficient separation of waste
 - Separation of waste -guidance in contractors' information sessions
 - Sealing the sawmill's hydraulics rooms in case of oil leaks



Revalidation statement

As an accredited environmental verifier (FI-V-0001), Inspecta Sertifiointii Oy has examined the environmental management system and updated UPM Pietarsaari Environmental Performance 2016 report as well as the information concerning UPM Pietarsaari in the Updated UPM Corporate Environmental Statement 2016. On the basis of this examination, the environmental verifier has herewith confirmed on 2017-04-04 that the environmental management system, the updated UPM Pietarsaari Environmental Performance report and the information concerning UPM Pietarsaari in the Updated UPM Corporate Environmental Statement are in compliance with the requirements of the EMAS Regulation (EC) No 1221/2009.

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