

UPM Pietarsaari

ENVIRONMENTAL AND SOCIETAL RESPONSIBILITY 2018



UPM Pietarsaari

The UPM Pietarsaari mill integrate consists of the Pietarsaari pulp mill, the Alholma sawmill and the UPM Forest Ostrobothnia office. The mills are located in the UPM industrial estate in Alholma, Finland, alongside BillerudKorsnäs Finland, Walki and Alholmens Kraft.

The mill site contains a versatile array of forest-based bioindustry. At the site, wood from adjacent areas is processed into sawn timber, pulp, paper, paper products and energy. UPM Forest is responsible for procuring wood for the pulp mill and sawmill, and for their on-site measurement processes. Logs are sawn at the Alholma sawmill and pulpwood, sawdust and wood chips are pulped. A portion of the pulp is delivered to the BillerudKorsnäs paper mill for kraft paper manufacturing. The Walki factory further processes some of the kraft paper to make different packaging materials. Bark and other wood residues are used by the Alholmens Kraft power plant to generate electricity, steam and district heating.

This EMAS report covers the environmental performance of the UPM Pietarsaari pulp mill and the Alholma sawmill. Social responsibility for the entire mill integrate is examined.



	Pulp mill	Alholma sawmill
Production capacity	800,000 t	280,000 m ³
Employees	305	67
Products	Softwood pulps: UPM Conifer UPM Conifer TCF UPM Conifer Thin Birch pulps: UPM Betula UPM Betula TCF	Pine and spruce timber, woodchips, sawdust and bark
Side-products and residues	By-products and residues: tall oil, turpentine, lime and green liquor dregs Bioenergy: thermal energy and electricity	
Certificates	EMAS – EU Eco-Management and Audit Scheme ISO 14001 – Environmental Management System ETJ+ – Energy Efficiency System ISO 9001 – Quality Management System ISO 22000 – Food Safety Management System OHSAS 18001 – Occupational Health and Safety Management System 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	EU Ecolabel	



UPM UPM Pietarsaari Environmental and Societal Responsibility 2018 is a supplement to the Corporate Environmental and Societal Responsibility Statement of UPM's pulp and paper mills (available at www.upm.com) and provides mill-specific environmental and societal performance data and trends for the year 2018. The annually updated mill supplements and the UPM Corporate Environmental and Societal Responsibility Statement together form the joint EMAS Statement of UPM Corporation. The next UPM Corporate Environmental and Societal Responsibility Statement and also this supplement will be published in 2020.

We deliver renewable and responsible solutions and innovate for a future beyond fossils across six business areas: UPM Biorefining, UPM Energy, UPM Raflatac, UPM Specialty Papers, UPM Communication Papers and UPM Plywood. We employ around 19,000 people worldwide and our annual sales are approximately EUR 10.5 billion. Our shares are listed on Nasdaq Helsinki Ltd. UPM Biofore – Beyond fossils. www.upm.com



For more information about FSC certification visit www.fsc.org



Alholma sawmill

For more information about PEFC certification visit www.pefc.org

Review of year 2018

Pulp mill

The pulp mill had an excellent financial year, and the demand for pulp remained at a good level. One of the mill's central long-term environmental objectives is to increase production volumes without increasing the environmental load. An excellent level of cleaning efficiency was reached, thanks to the running of the water treatment plant being optimised. Operation of the plant is stable, and the plant is not sensitive to variations in waste water loads.

In 2018, the mill site's waste water volumes remained at a level similar to the previous year's. The optimisation of the water treatment plant's operation continued. Optimising the nutrient feed rate reduced nutrient emissions compared to the previous year, and the stable operation of the treatment plant reduced biological oxygen demand (BOD). Calculated as specific emissions, the effluent released into the sea was clearly at the BAT level specified in 2014 (BAT ref. 2014). Airborne emissions remained in line with previous years. Calculated as specific emissions, airborne emissions were clearly at the BAT level specified in 2014 (BAT ref. 2014).

Eighty-three environmental observations were logged at the pulp mill, all of which were dealt with and remedied over the course of the year. The number of environmental observations decreased slightly compared to the previous year. Deviations are classified on a scale of one to five. Due to production levels, the permitted daily limits for airborne emissions were exceeded on five occasions in 2018. The emissions were sulphur dioxide emissions and total reduced sulphur (TRS) emissions.

Solid waste was successfully utilised with over 2,800 tonnes of green liquor dregs reused. UPM has set a target for no solid waste to be sent to landfill or burnt without energy recovery after 2030.

The work to promote a circular economy continues, and the aim is to reintroduce operational sidestreams into the material cycle.

During the year, we received environment-related feedback on eight occasions, mainly concerning noise- and odour-related disturbances. The number of instances of feedback decreased compared to the previous year.

Safety as a part of professional competence

Safety is an integral part of our everyday activities and the professional competence of our employees. We strive to reduce and eliminate accidents that are under our control through continuous improvement, effective risk management and preventive safety work. In 2018, the employees of the pulp mill and sawmill were responsible for 1,085 safety walks and discussions and 930 safety observations and incident reports. There were no lost time accidents at the pulp mill during the year.

Alholma sawmill

The Alholma sawmill performed well financially and environmentally. Production efficiency was good, which made it possible to further reduce the consumption of heat and electricity per cubic metre of sawn timber produced.

A new drying channel which uses individualised energy measurement was introduced in August 2018. In 2019, energy measurements will also be extended to older drying units.

The local Centre for Economic Development, Transport and the Environment carried out a comprehensive periodic inspection at Alholma in May 2018 to monitor compliance with its environmental permit. No deviations were identified during the inspection. The Alholma sawmill did not receive any environmental feedback or reports on deviations from external stakeholders in 2018.

Local collaboration takes many forms

We are committed to promoting the vitality of the communities near our facility through active collaboration and open dialogue with different stakeholders, as well as through different sponsorship projects. Our focus is on activities and projects that are relevant to our business, support innovation and sustainability, or promote local vitality and wellbeing. In 2018, we pledged almost EUR 70,000 to support these projects in the Pietarsaari area. The majority of the sponsorship money was used to support sport and culture, and education for children and young people.



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Environmental Manager

Simon Fagerudd
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General Manager,
Integrate and Pulp Mill

Mika Åby
Mika Åby
Director, Alholma Sawmill

Responsibility figures 2018

Air



Fossil carbon dioxide emissions have reduced by

61%

per tonne of pulp produced compared to 2009

Water



Emissions causing biological oxygen demand (BOD₇) have reduced by

74%

compared to 2009

Nitrogen emissions contributing to eutrophication have reduced by

60%

compared to 2009

Supply chain



86%

of raw materials spend (excl. wood) qualified against the UPM Supplier and Third Party Code.

Certified wood



Proportion of certified fibre in pulp production

88%

The proportion of PEFC- and/or FSC-certified fibre in pulp production. UPM's goal is to be using only certified fibre by 2030.

Safety



0

lost time accidents

Our personnel were responsible for

1,085

safety walks and discussions

930

safety observations and incident reports at the pulp mill and sawmill

Local collaboration



We sponsored projects promoting local vitality and wellbeing with a total sum of

EUR 70,000



Energy

The proportion of renewable fuels in energy generation is over

99%

Consumption impact

Generated through the private consumption of commodities from internal and indirect employees' net wages.

The local consumption impact of the mill integrate is approximately

EUR **15** million

The consumption impact throughout the whole of Finland is approximately

EUR **28** million

Waste



62%

of the waste generated at the pulp mill during the year was placed in intermediate storage or utilised directly

Health

We supported the wellbeing of employees at the pulp mill and sawmill with

EUR **100,000**



Taxes



The mill integrate's impact on taxes was approximately

EUR **14** million

Real estate taxes of EUR 0.5 million

Estimated municipal taxes on personnel wages of EUR 2.7 million

Estimated corporate income tax of EUR 10.6 million based on the number of employees*

*Approximately 30% of this goes to municipalities, which is split between each municipality according to their share of business activities and forest operations

Employment



The mill integrate directly employed

389 people

81 summer employees

The indirect local impact on employment is about

360 people

Average length of employment contracts at the pulp mill

24 years

4 people

joined the pulp mill apprenticeship programme to become process industry professionals



As in previous years, the pulp mill had an excess of electricity generation due solely to the energy recovered from the burning of black liquor. The excess electricity was sold back to the grid through UPM Energy.

The pulp mill and sawmill delivered bark and wood residues from the debarking of logs and pulpwood to Alholmens Kraft for use as fuel. Measured by their specific emission factors, airborne emissions were at a good BAT level. The specific emissions fell below the permit conditions. Airborne emissions remained in line with previous years. Acidifying gas emissions (SO₂ + NO_x) were slightly higher than in 2017 because of the annual maintenance shutdown. The mill ramp-ups and shutdowns related to planned and unplanned stoppages caused some odour issues in the vicinity of the mill. Due to a low production rate, the daily concentration limit for gaseous sulphur compounds was exceeded on five occasions at the recovery boiler.

One of the pulp mill's long-term objectives is to become a carbon-neutral mill. Accordingly, direct and indirect fossil CO₂ emissions have been systematically reduced at the mill. The objective is in line with the group's responsibility targets for 2030.

The portion of renewable fuels used in pulp production remained high at 99.5%.

In pulp production, the fossil CO₂ emissions per tonne of pulp produced were at about the same level as in previous years and remained below the target level. Fossil CO₂ emissions per pulp tonne produced were reduced by approximately 61% compared to the initial level in 2009.

The burning of odorous gases in the recovery boiler was successful with a good time-benefit ratio. Due to equipment failures, strong odorous gases had to be burnt in the emergency burner at times. Strong odorous gases were bypassed through back-up systems for 2.3% of the operating time.

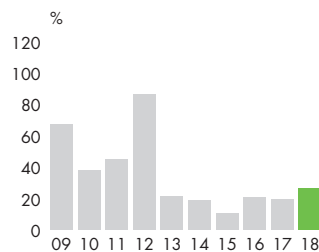
AIRBORNE EMISSIONS FROM PULP PRODUCTION IN 2018

	Solids t/a	Sulphur dioxide t SO ₂ /a	TRS t S/a	Nitrogen oxides t NO _x /a	Chlorine compounds t Cl/a
Recovery boiler	101	37	11	979	
Lime-sludge kiln	4	4	0.3	58	
Odorous gas emergency burner (flare)		90			
Bleaching 1					1.80
Bleaching 2					0.03
Fugitive emissions			14		
Total amount	105	131	25	1,037	1.8

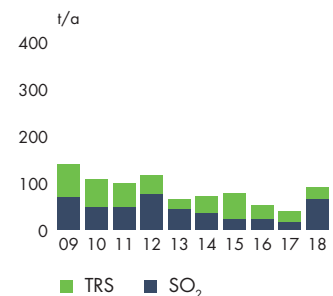
ODOROUS GAS DISPOSAL, % of time

	2015	2016	2017	2018
Burnt in the recovery boiler	98.8	98.6	99.0	97.7
Burnt in the emergency burner (flare)	0.9	1.0	0.7	1.9
Bypass to the smokestack	0.3	0.4	0.3	0.4

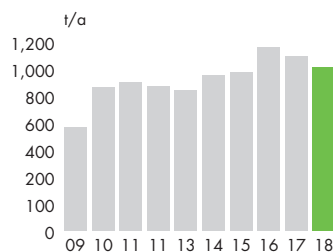
Development of the fossil CO₂-specific emissions at the Pietarsaari mill (2008 = 100)



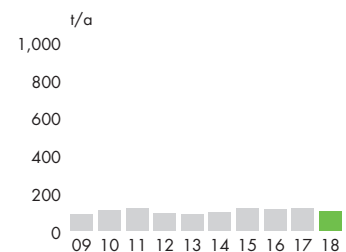
Gaseous sulphur compounds



Nitrogen oxides, NO_x



Particulates



Water



Raw water supply

Lake Luodonjärvi provides raw water for the UPM Pietarsaari mill. In 2018, the pulp mill and sawmill consumed approximately 62,617,920 m³ of raw water. Less than half of the raw water was used for cooling, and the rest was used as process water for the pulp mill. The Alholma sawmill consumed around 35,000 m³, less than 0.1% of the total.

Effluent released into the sea

Internal targets were set in 2014 for the pulp mill's effluent load, to ensure that operations were continuously improved.

The permit-regulated waste water emissions stayed almost identical to the previous year, even though production increased slightly. In 2018, all waste water emissions were clearly under the limits specified in the environmental permit.

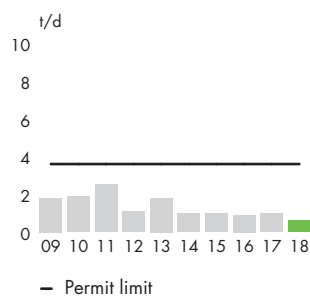
Optimisation of the waste water treatment plant kept the nutrient emissions of nitrogen and phosphorus below the internal target levels. The eutrophication of the immediate sea area in Pietarsaari is sensitive to phosphorus, which is why particular effort was made to reduce phosphorus effluent without affecting the efficiency of waste water treatment. Compared to the 2009 reference level, the phosphorus effluent per tonne of pulp produced has been reduced by around 13%. Emissions causing biological oxygen demand (BOD₅) have reduced by 74% and nitrogen emissions by 60% compared to 2009. In 2018, the emission level of waste water decreased compared to the previous year. The solids content of waste water was slightly above the internal target level due to a drop in the temperature of the aeration tank caused by the annual maintenance shutdown.

The waste water COD emissions of the pulp mill per tonne of pulp produced have been reduced by 34% compared to the 2008 level. The target for 2030 is to reduce the figure by 40%.

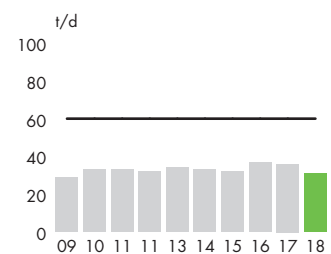
TOTAL LOAD COMPARED TO PERMIT CONDITIONS 2018

	Annual average compared to permit conditions 2018	Target (pulp mill's portion) 2018	Permit condition, annual average
COD, t/d	31	35	60
BOD ₅ , t/d	0.6	1.0	3.6
Nitrogen, kg/d	178	400	700
Phosphorus, kg/d	22	35	55
AOX, t/d	0.19	0.20	0,5
Solids, t/d	1.0	1.5	no permit condition

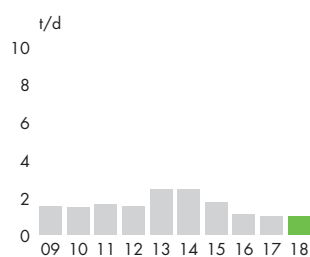
Biological oxygen demand, BOD₅



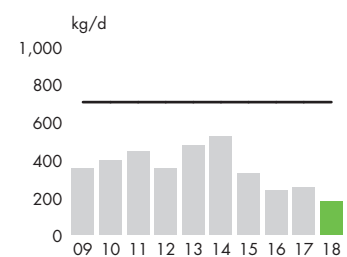
Chemical oxygen demand, COD



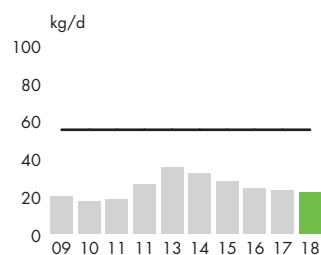
Total suspended solids, TSS



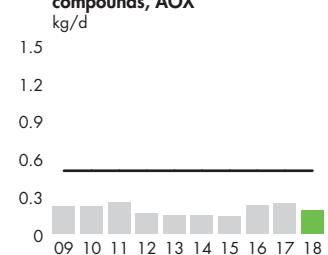
Nitrogen, N



Phosphorus, P



Absorbable organic halogen compounds, AOX



Waste and side-products

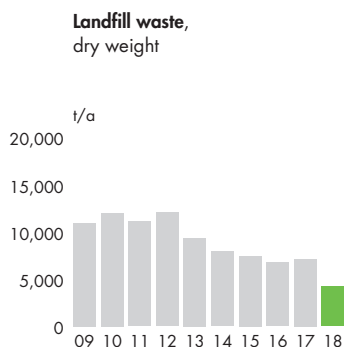


The UPM Pietarsaari landfill is located on the industrial estate. In 2018, a total of 11,045 tonnes of solid waste were generated. 62% of the waste generated over the year was placed in intermediate storage or utilised directly.

A total of 4,215 tonnes of pulp mill and sawmill waste was placed in the landfill, of which more than 99% was green liquor dregs. The amount of landfill waste was reduced by 2,900 tonnes compared to the previous year. The work to utilise green liquor dregs continues. One of the circular economy objectives is to utilise all sidestreams and stop the generation of landfill waste by the end of 2030. The amount of landfill waste generated per tonne of pulp produced has been reduced by 69.5% from the 2008 level.

Waste components weighing 2,758 tonnes were placed in intermediate storage for later use. All waste amounts are stated in dry matter tonnes.

A total of 64.9 tonnes of hazardous waste was delivered elsewhere for processing. Approximately 40.3 tonnes of the hazardous waste (waste oils, lubricants etc.) were channelled for reuse.



SOLID WASTE AND SIDE-PRODUCTS (dry weight, t/a)

	Land-fill	Intermediate storage	Re-use	Side-products
Lime and lime mud		259		312
Green liquor dregs	4,140			2,814
Plastic waste			1	
Debarking reject sand				
Wood and bark residue		1,271	1,611	
Energy waste			79	
Sludge		5		
Cable and metal waste			80	
Asphalt		913		
Construction waste and soil	75	310	151	
Total solid waste in 2018	4,215	2,758	5,047	
Total solid waste in 2017	7,135	693	9,773	

Societal responsibility

Well-functioning dialogue with stakeholders is key to our success. We are committed to promoting the vitality of the communities near our facility through active collaboration and open dialogue with different stakeholders, as well as through different sponsorship projects.

Local collaboration takes many forms

By participating in a large number of collaborative projects, UPM supports sustainability and promotes the financial and mental wellbeing of local communities. Our work in this arena is clearly connected to our Biofore Strategy and responsibility targets. It is co-ordinated under the umbrella of our Biofore Share and Care programme.

The Biofore Share and Care programme comprises three forms of support: sponsorships, donations and employee volunteering. The support can be in the form of monetary contributions, products, materials or work in locally agreed projects. Our focus is on activities and projects that are relevant to our business, support innovation and sustainability, or promote local vitality and wellbeing. In 2018, we pledged almost EUR 70,000 to support these projects in the Pietarsaari area. The majority of the sponsorship money was used to support sport and culture, and education for children and young people. One of our annual sponsorship projects is the Wisamatte mathematics contest designed to support pupils in learning mathematics. The contest is organised for sixth- and ninth-grade pupils in the Pietarsaari area. In the summer of 2018, we donated over 200 logs for building rafts at the Ostrobothnia Scouts' district camp. We also contributed to making the centre of Pietarsaari more welcoming by providing the sawn timber needed for building new pavilions in the market square. During the year, we participated in 20 different sports-related sponsoring projects.

We invest in the future by actively collaborating with local educational institutions. Our aim is to inform young people about jobs in our field and to encourage them to study and pursue careers in the forest industry. In 2018, we provided summer jobs for 81 people, and four people started their studies in the pulp mill's two-year process industry apprenticeship programme.



In September, pupils from the primary schools in Pietarsaari participated in forestry excursions held in co-operation with the Finnish Forest Association. During the autumn, we also visited a forest with eighth-grade pupils from Oxhamn school. Furthermore, our employees actively participated in the Finnish Forest Industries Federation's forest ambassador campaign, which was designed to inform pupils in grades seven to nine about the forest industry and the job opportunities it provides.

Maintaining a dialogue with other stakeholders, such as customers, forest owners, decision-makers, authorities and the media, is also important to us. Over the course of the year, we organised several stakeholder meetings and mill site visits which attracted around 300 participants.

Local impact on taxes

Tax revenue generated by UPM's business operations is an essential part of our social impact. UPM pays corporate income taxes in the countries where we create added value and generate profit. In 2018, UPM (Group) paid approximately EUR 283 million (EUR 251 million in 2017) in total in corporate income taxes and real estate taxes. The mills' operations also benefit local communities in many ways. Real estate taxes and the municipal share of corporate income taxes paid by UPM support the local economy. In addition, the taxes and social security contributions that UPM employees pay on their wages have a significant local impact. Furthermore, the purchasing power of UPM employ-

ees and subcontractors maintains and enhances the vitality of local communities. Our impact on local tax contributions is approximately EUR 14 million in the Pietarsaari area and the consumption impact of the mill integrate is approximately EUR 15 million. In 2018, we employed a total of 749 people directly and indirectly.

Safety

Our goal at UPM is to be the industry leader in health and safety. Our target is zero fatal and serious accidents. There were no lost time accidents at the pulp mill in 2018. We pledged slightly over EUR 100,000 to promote the wellbeing of employees working at the pulp mill and the Alholma sawmill.

Safety is fully integrated into our daily activities and is not seen as secondary to any other consideration. We strive to reduce and eliminate accidents under our control through continuous improvement, effective risk management and preventive safety work. In 2018, the employees of the pulp mill and sawmill were responsible for 1,085 safety walks and discussions and 930 safety observations and incident reports.

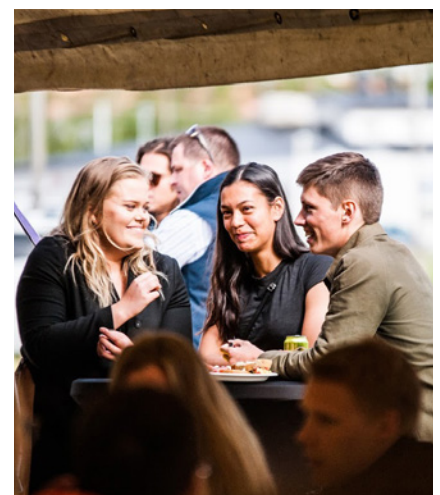
Our employees, as well as business partners and their employees, are required to adopt safe work practices and to comply with the rules and standards that we have established. Before accessing UPM production sites, contractors participate in UPM safety training, which presents and demonstrates the basic safety requirements. This is complement-

ed by job-specific safety inductions and work permits.

Responsible sourcing

We require all suppliers to uphold the UPM Supplier and Third Party Code, which lays out our minimum requirements for corporate responsibility relating to environmental impact, human rights, labour practices, health and safety, product safety, corruption and bribery.

UPM's target is to have 100% of raw material spend and 80% of all spend qualified against UPM Supplier and Third Party Code by 2030 (Qualified spend). In 2018, 94% of UPM's raw material spend and 83% of all spend was qualified against the UPM Supplier and Third Party Code. At the Pietarsaari mill site, 86% of raw material spend (excl. wood) was qualified against the UPM Supplier and Third Party Code.



Environmental parameters 2018

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 and Societal Responsibility Statement.

Production capacity	Sawn timber Pulp	250,000 m ³ 800,000 Adt
Raw materials and chemicals	Timber Pulping and bleaching chemicals Others	See UPM Corporate Environmental and Societal Responsibility Statement for more information
Energy	Biofuels and fossil fuels Purchased energy	Biofuels 99,54% See UPM Corporate Environmental and Societal Responsibility Statement for more information
Airborne emissions	Particulates Sulphur dioxide, SO ₂ Odorous sulphur compounds, TRS (S) Nitrogen oxides, NO ₂ Carbon dioxide, CO ₂ (fossil)	105 t 131 t 25 t 1,037 t 8,101 t
Water intake	Process and cooling water	62,617,920 m ³
Discharges to the sea	Cooling and drainage water Cleaned waste water Biological oxygen demand, BOD ₇ Chemical oxygen demand, COD _{Cr} Total suspended solids, TSS Total phosphorus, P _{tot} Total nitrogen, N _{tot} Absorbable organic halogen compounds, AOX	27,429,619 m ³ 32,271,599 m ³ 232 t 12,571 t 347 t 8 t 47 t 68 t
Waste and side-products*	Side-products – Lime – Green liquor dregs Solid landfill waste (abs. dry) – Green liquor dregs – Construction waste and soil – Other waste – Total Recyclable waste – Metal waste – Wood and bark residue – Energy waste – Construction waste and soil – Total Temporarily stored waste intended for reuse – Branch rejects – Lime – Asphalt – Wood and bark residue – Construction waste and soil – Sludge – Debarking reject sand – Total Hazardous waste	 312 t 2,814 t 4,140 t 75 t 0 t 4,215 t 80 t 1,611 t 79 t 151 t 5,047 t 0 t 259 t 913 t 1,271 t 310 t 5 0 2,758 t 64.9 t
Size of mill area		210 ha

* Waste reported as dry weight



Performance against targets in 2018

TARGET	ACHIEVED	COMMENTS	
Pulp mill	Clean Run environmental observations, class 3–5 deviations: zero.	No	Due to a low production rate, the recovery boiler was not used at its maximum load capacity. This made it more difficult to control the burning process.
	Reduction of landfill waste	Yes	The utilisation of green liquor dregs decreased the amount of landfill waste. No organic waste was placed in the landfill.
	The energy conservation agreement development programme's execution	Yes	The pulp mill generated more electricity than it used, as in previous years.
Alholma sawmill	Comprehensive use of ecolabelled timber (FSC & PEFC) in sales.	Yes	The FSC credit was utilised to the fullest.
	More effective waste sorting and waste amount reduction.	No	The amount of waste increased slightly due to the demolition work performed as part of the drying kiln upgrade project.
	Standardising guidelines for waste sorting as well as the markings on waste skips on the Pietarsaari mill site.	Yes	The contractor's new skips and markings in use in 2019.
	Reduction of energy (electricity and heat) consumption.	Yes	Energy consumption in 2018 was smaller per cubic metre of sawn timber.

Targets for 2019

TARGET
Pulp mill
Clean Run environmental observations, class 3–5 deviations: zero.
Reduction of landfill waste – Study continues on solid waste utilisation. – The emphasis on the utilisation of green liquor dregs.
The energy conservation agreement development programme is still underway.
Alholma sawmill
Develop energy measurement
Reduce energy consumption
Reduce amount of waste



Validation statement

As accredited environmental verifier (FI-V-0001), Inspecta Sertifiointi Oy has examined the environmental management system and the information of UPM Pietarsaari Environmental and Societal Responsibility 2018 report and of UPM Corporate Environmental and Societal Responsibility Statement 2018.

On the basis of this examination, the environmental verifier has herewith confirmed on 2019-04-01 that the environmental management system, this UPM Pietarsaari Environmental and Societal Responsibility report and the information concerning UPM Pietarsaari of UPM Corporate Environmental and Societal Responsibility Statement are in compliance with the requirements of the EMAS Regulation (EC) No 1221/2009.

We reduce the world's reliance on fossil-based materials by developing renewable and responsible products and solutions in all our businesses. **UPM Biofore – Beyond fossils.**



www.upm.com

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