

UPM Kaukas

ENVIRONMENTAL AND SOCIETAL RESPONSIBILITY 2018



UPM Kaukas

The mills of UPM Kaukas sit on the shores of Lake Saimaa in Lappeenranta, Finland. The mill site houses a pulp and paper mill, a biorefinery and a sawmill. UPM's largest R&D centre, the wood sourcing management of UPM Forest and the Lappeenranta forest service office are also based at Kaukas. The Kaukas mills form a unique integrated bio-forestry unit that produces pulp, magazine paper, sawn timber, biofuels and energy from renewable raw materials. In addition to UPM's mills, the site houses a biomass power plant operated by Kaukaan Voima Oy, which produces heat and electricity for the mills and the neighbouring community. Around 80% of the energy produced by Kaukaan Voima is generated using renewable biomass.

Having several mills operating in the same area offers many benefits, and an integrated mill site enables effective control of environmental issues. The short distances between the mills facilitate co-operation, decrease the need for transport and allow effluents to be treated by a shared biological treatment plant. Sustainably sourced raw wood material, the integrated mill's high level of energy self-sufficiency and the recycling of by-products into raw materials are the cornerstones of our operation. This EMAS report covers the environmental aspects of the Kaukas pulp and paper mills, and the social responsibility of the entire integrated unit.



Production capacity	305,000 tonnes of coated magazine paper 770,000 tonnes of softwood and birch pulp 510,000 cubic metres of pine and spruce timber 100,000 tonnes of renewable diesel and naphtha
Personnel	Paper mill 245, pulp mill 311, sawmill 134, biorefinery 84, UPM Forest 30 and NERC 153. Overall, there are around 1000 people working at UPM Kaukas in Lappeenranta.
Products	Magazine papers: (MWC, LWC): UPM Star, UPM Valor, UPM Ultra Pulp: UPM Betula, UPM Conifer and UPM Conifer Reinforcement Biofuels: UPM BioVerno diesel and UPM BioVerno naphtha Biomedical products: GrowDex® Sawn timber: UPM Timber, UPM Plus Residues: pitch oil, turpentine and tall oil
Bioenergy	Heat 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 PEFC™ Programme for the Endorsement of Forest Certification FSC® Forest Stewardship Council® OHSAS 18001 – Occupational Health and Safety System ISCC EU International Sustainability and Carbon Certification ISCC PLUS International Sustainability and Carbon Certification RSB EU RED Roundtable on Sustainable Biomaterials RSB low ILUC risk (Roundtable on Sustainable Biomaterials Finland's national sustainability scheme ISO 22000 – Food Safety Management System
	All certificates can be found from UPM's Certificate Finder (available at www.upm.com/responsibility)
Environmental labels	UPM pulp products have the approval for use in EU Ecolabel and Nordic Ecolabel paper products. EU Ecolabel FI/11/001 for paper products About PEFC products: www.pefc.org About FSC products: fi.fsc.org



UPM Kaukas 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



The mark of responsible forestry

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



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



EU Ecolabel : FI/011/001

Review of year 2018

UPM's current target is zero accidents. In 2018, there were three lost time accidents at the pulp mill and one at the paper mill. The number of accidents at the Kaukas mills halved in comparison to the previous year. As a preventive safety measure, all staff and contractors are responsible for submitting hazardous situation reports and safety observations that are reviewed daily, and any corrective measures are taken immediately. In addition, safety talks and safety walks are organized. The objectives for preventive measures were met successfully.

In 2018, the environmental impact of the UPM Kaukas integrated mill remained relatively unchanged, as it has been since the turn of the millennium. The operation achieved high material efficiency and by-products were utilized effectively. The capacity of the pulp mill was upgraded during the maintenance and investment shutdown in the spring. The production of pulp was negatively affected by the weather early in the year and the long shutdown, while the production of paper increased. The environmental permit for Kaukas came into force at the end of October. There were no significant changes compared to the previous permit. Operations in accordance with the new permit partially began at the start of November, with some activities starting later as previously agreed with the authorities.

On the whole, the operations of the Kaukas mills were compliant with the environmental permit and the BAT document published in 2014. There were 20 stakeholder feedback notices, 16 of which concerned odours. Under normal conditions, odours were well under control and malodorous gases were burnt without issue. Unpleasant odours are still produced in exceptional circumstances. Odours from waste water treatment have been reduced as a result of refitting the balancing reservoir early in the year and changes to the process at the waste water treatment plant.

The pulp mill and paper mill shared the environmental objectives of improving energy efficiency and reducing their carbon dioxide emissions from fossil fuels and water consumption. As separate objectives, the pulp mill specifically aimed to reduce water contamination and the paper mill aimed to improve material efficiency.

The requirements for the energy efficiency objective were met on the whole. Compared to the previous year, more

fossil fuels were used to ensure steam production, which in turn increased carbon dioxide emissions. The waste water volume per tonne of product was reduced at both the paper mill and the pulp mill. The material efficiency of the paper mill is monitored based on the amount of solids in the water reaching the waste water treatment plant, and in 2018, effluents were reduced by 20% compared to the previous year. All coating colour sludge was utilized, and none needed to be taken to a landfill.

Action plans will be prepared this year to ensure that the paper mill and the pulp mill reach the environmental targets UPM has set for itself for 2030. Some measures have already been implemented. In the autumn of 2018, a trial run of recycled nutrients was completed successfully at the waste water treatment plant, and the recycled nutrients produced by the nearby composting station were introduced into regular use at the start of 2019. These will replace some of the synthetic nutrients used by the treatment plant. The objective for 2030 is

to only use recycled nutrients. The paper mill produced less waste water in 2018 than in the previous year, but the volume is still above the BAT target level. In 2019, investments will be made at the paper mill to reduce water consumption, allowing the mill to reach the BAT target level and move towards the target for 2030.

Responsibility is an essential aspect of UPM operations. UPM Kaukas is a leading employer and source of tax revenue. Communities and business have been able to grow around the mill site. Some 2300 workers from external contractors took part in the maintenance shutdown in the spring of 2018. The focus of UPM's sponsorship activities is supporting the vitality of the mill towns. Through various activities, Kaukas is involved in projects that support youth learning, reading, physical exercise and sport. Study visits, mill visits and a presence at events are used to educate young people on sustainable development, working life and society. In addition, forest trips are organized for schoolchildren.



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Environmental Manager

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Responsibility figures 2018

Water

Organic halogen compound emissions were

17%

lower than in the previous year.

The volume of waste water was

14%

lower than in the previous year.
Recycled nutrients are now in regular use at the waste water treatment plant after a trial run.

Taxes

Mill's local tax impact approx

EUR 36 million

Real estate tax EUR 0.8 million,
Estimate of tax on salaries EUR 8.4 million
Estimate of corporate income tax EUR 26.6 million based on the number of employees*.

*Approximately 30% of corporate income tax goes to municipalities, which is split between each municipality according to their share of business activities and forests operations.

Air

Particulate matter emissions were

13%

lower than in the previous year.
The odour problem at the waste water treatment plant was solved.

Supply chain

99%

of raw materials spend qualified against UPM Supplier and Third Party Code (wood not included).

Waste

46%

less waste was taken to landfill compared to the previous year. No waste was taken to landfills from the paper mill. The mixed waste centre at the Tuosa landfill was closed.



Certified fibre

80%

of fibre used in paper production was FSC and/or PEFC certified. UPM's target is to use only certified fiber by 2030.

Safety



There were four lost time accidents at Kaukas, a

50%

reduction compared to the previous year.

Community



We provided

50

internships for students in vocational upper secondary education. UPM actively collaborated with schools and educational institutions.

Health



The number of users at the gym at the mill workers' sports club Kaukaan Lyly increased by

40%

compared to the previous year. All Kaukas employees and their family members are entitled to a Lyly membership.



Energy

Biofuels account for

88%

of fuel used.

Renewable raw material



Over 5 million cubic metres

of wood are refined by Kaukas into useful products each year. This process provides work and income to harvesting machine operators, log truck operators, forest workers and other forestry professionals, as well as income from wood sales to forest owners.

Employment



UPM Kaukas directly employed

974 staff and 180 summer employees.

The indirect impact on local employment was approximately 1,020 people.

Furthermore, an average of 565 workers from contractors worked at the site daily.



Consumption impact*

Mill's consumption impact in region approx.

EUR 49 million

in Finland approx. EUR 100 million.

*Direct and indirect employees' private consumption of commodities through net income.

Air



Atmospheric emissions at Kaukas complied with the permit conditions except for August, when the processing of strong malodorous gases fell below the monthly limit. An equipment malfunction resulted in some of the strong malodorous gases reaching the chimney stack unprocessed.

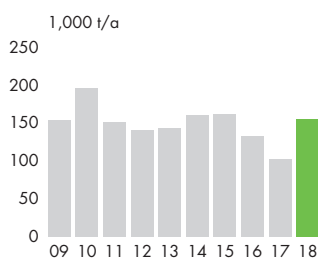
The amounts of sulphur dioxide (SO₂) and particulate (TSP) were reduced, but the amounts of malodorous sulphur compounds (TRS) and nitrogen oxides (NO_x) increased. The TRS emissions include compounds from the pulp mill chimney stacks, isolated emissions and emissions caused by equipment failure. Isolated emissions come from sources that are not included in the processing of malodorous gases, and emissions caused by equipment failure are exceptional circumstances where malodorous gases are released into the air unprocessed. Compared to the previous year, the amount of isolated emissions was reduced while the emissions caused by

equipment failures increased. Malodorous gases created during the pulp production process were recovered and burnt at a rate of 99% for weak gases and 97% for strong gases. The use of liquefied natural gas to support energy production and burning processes increased compared to the previous year, resulting in increased carbon dioxide emissions from fossil fuels. All atmospheric emissions from the pulp mill were within BAT levels.

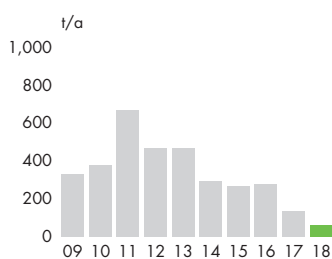
The production capacity of the pulp mill was upgraded as part of the spring investment. Among other things, the recovery boiler's dust extraction was improved and its conditions were optimized.

The total annual airborne emissions from the UPM Kaukas pulp mill and power production unit are presented in the following graphs. These figures also include UPM's share of the total emissions from Kaukaan Voima.

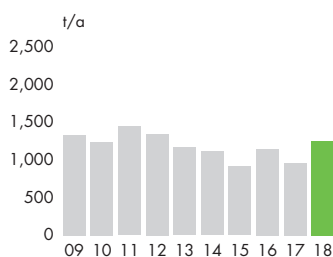
Fossil carbon dioxide, CO₂



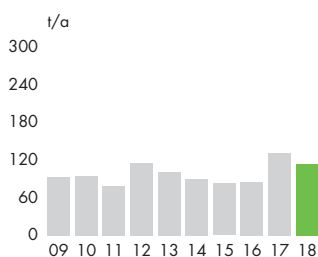
Sulphur dioxide, SO₂



Nitrogen oxides, NO_x



Particulates, TSP



In addition to UPM Kaukas emissions, the emissions to air include the share of the energy used by the integrated mill from Kaukaan Voima.

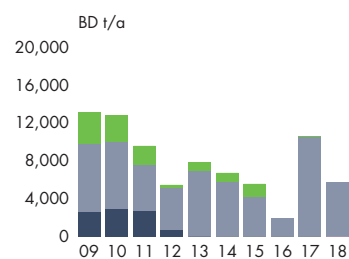
Waste



Approximately 23,600 tonnes of waste dry matter was produced. This was made up of approximately 21,700 tonnes of process waste and 1,900 tonnes of recyclable waste produced during operations. These figures also include UPM's share of the waste produced at Kaukaan Voima. The amount of waste taken to the Tuosa landfill was 5,800 tonnes, a reduction of 4,800 tonnes compared to the previous year. Green liquor dregs from the chemical circulation of pulp made up the largest proportion of landfill waste.

More than 76% of the waste produced was reused. Green liquor dregs and power plant ash were used when closing the mixed waste centre at the Tuosa landfill. In addition, bottom ash was used for earth construction, sandy bark was used as a raw material and an aerating agent in compost, and lime and lime sludge sections were used as soil stabilizers.

Waste taken to Tuosa



- Ash
- Others
- Green liquor dregs
- Coating colour sludge

The tonnes in the graph are given as dry weights.

Water



The Kaukas mill consumed a total of 86 million cubic metres of water for the manufacture of pulp and paper. 40% was process water and the rest was used for cooling. The amount of waste water was reduced by 14% compared to the previous year. The pulp mill adopted real-time water balance calculations, which makes it easier to monitor the amount of water consumed per tonne of product.

The emissions into waterways were at the BAT level for pulp production but exceeded the BAT level for paper production. In 2019, investment will be made at the paper mill to reduce water consumption to the BAT level. Emissions into the lake increased for biochemical oxygen demand (BOD) and nutrients (nitrogen, N; sulphur, P) and decreased for chemical oxygen demand (COD), total suspended solids (TSS) and adsorbable organic halogen compounds (AOX).



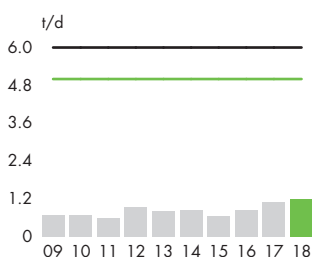
The treatment plant's operation in 2018 is reported in terms of its treatment efficiency, i.e. the reduction of various substances. The reduction rate was 99% for BOD, 75% for COD and 95% for solids.

In a trial run completed at the waste water treatment plant in autumn, synthetic nutrients were partially replaced with recycled nutrients, a by-product of the nearby composting station. The trial was successful and recycled nutrients were

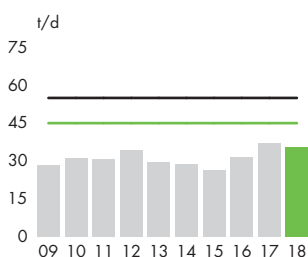
introduced into regular use at the start of 2019.

Early in the year, solids that had accumulated in the balancing reservoir at the treatment plant were removed by dredging. The treatment plant processes were modified to prevent the accumulation of solids in the reservoir. These measures reduced the odours released by the plant into the nearby area and enhanced plant operations.

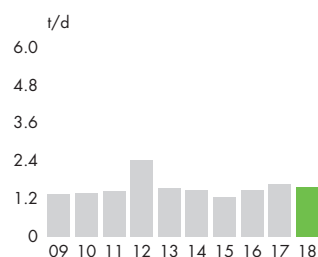
Biological oxygen demand, BOD,



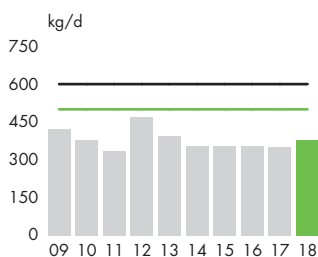
Chemical oxygen demand, COD



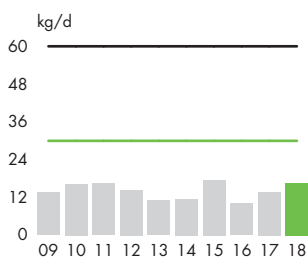
Solids, TSS



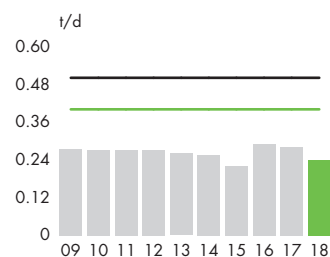
Typpi, N



Phosphorus, P



Adsorbable organic halogen compounds, AOX



— Monthly limit
— Annual permit

Societal responsibility

No compromises on safety

Occupational, process and environmental safety are integral to our daily activities and considered second to none. Our current target is to have zero accidents. We strive to reduce and eliminate accidents under our control through continuous improvement and effective risk management. We actively use our One Safety reporting tool to report hazardous situations. We require all UPM employees and contractors to report any environmental and safety observations. We provide our staff with continuous safety training. In the past year, we have organized monthly safety card training, eight hot work training courses and twelve evacuation drills for our staff.

Some 2300 workers from external contractors took part in the maintenance shutdown in the spring. There were no lost time accidents during the shutdown. Over the course of the year, there were four lost time accidents at the mill site, which is half as many as in the previous year.

Employee wellbeing is the key to success

Kaukaan Lyly, the sports club for Kaukas employees, had a busy year. The club's activities were significantly focused and improved. New equipment was procured for the gym and the ball game hall. The selection of fitness classes was expanded with fitness boxing and Zumba sessions, among others. The number of users at the Lyly gym grew by a third from the previous year to almost 27,000. The children's summer Olympics, the family day and the children's Christmas party were attended by 451 Kaukas employees. 70 people attended the summer theatre fundraiser. There was active participation in the orienteering, ice hockey and rowing groups. In addition to the sports clubs offered, Kaukas employees are given a balance of EUR 100 on their ePass, which they can use on fitness and culture activities.

While forests and trees are a source of work for all Kaukas employees, some also use them to relax, exercise and gather food. We held a photography contest for our employees, with the subject What Forests Mean to Me. Many photographs and stories were shared, and the winner was a picture of resin.



Introducing young people to working life and society

Our aim is to inform young people of jobs in the forest industry and encourage them to study process technology and pursue careers in the field. Groups of schoolchildren and students frequently visited our mills. As part of the Process Day in autumn, we offered all students in their ninth year of education in the area the opportunity to learn about operations at the Kaukas mills. We participated in events organized by local educational institutions, such as the DuuniDay contact event at Lappeenranta University of Technology, the Kesäksi Duuniin recruitment exhibition and the Töihin recruitment event at Saimaa Vocational College Sampo.

Our forest ambassadors continued their work. The UPM ambassadors are forestry professionals who visit students in their eighth and ninth years of education to tell them about the opportunities for work and study related to forests, as well as innovations in the forestry industry. Guest lectures in the region's schools and educational institutions are a staple of UPM Kaukas activities.

Sponsored by companies, the Me & My City learning environment is aimed at students in their sixth year of education to teach them about working life and entrepreneurship. The learning environment is a game where children pretend to apply for jobs and work in their given role. In the learning environment, UPM

offers the roles of a paper engineer and a biofuel researcher.

Community involvement

We support sustainable development and promote the financial and mental wellbeing of the communities around us by participating in numerous community projects as a company. The UPM Biofore Share and Care sponsor programme focus areas include, for example, learning to read and write and the vitality of local communities in the mill towns.





In autumn, around 400 students in their sixth year of education from eight different schools in Lappeenranta took part in forest trips sponsored by UPM, where they learnt about the growth and care of forests and wood products. In the forest, the children planted spruce seedlings. Forest trips were also organized for children in day care.

UPM Kaukas works with many local associations and societies that promote physical exercise, sport, reading and



learning activities for children and young people. Among other things, they organized break time exercises for schoolchildren and free sports introduction events for children at weekends. Suomen Meripelastusseura Etelä-Saimaa ry, a long-term partner, named their rescue boat in honour of UPM Kaukas.

Additional value for the region

We bring significant wealth to the region of South Karelia, the positive effects of which manifest in many ways. We generate a significant amount of tax revenue. In 2018, the UPM group paid a total of approximately EUR 283 million in corporate income tax and property tax.

The mills' operations also benefit the local community 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. The various mills use over five million cubic metres of wood, most of which is sourced from nearby areas. In addition to forest owners, this provides work and a livelihood to harvesters and log truck operators, forest workers and other forestry professionals.

With about one thousand employees in 2018, UPM Kaukas is the largest private employer in Lappeenranta. We hired 180 summer employees, mostly from



local educational institutions. Over the course of the year, we also offered 50 student internships and commissioned 14 theses.

The average age of Kaukas employees is relatively high, and we continued to recruit new staff to replace retiring employees through apprenticeship training programmes. In total, 63 students participated in apprenticeship programmes at the sawmill, paper mill and pulp mill.

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	Magazine paper	305,000 t
	Pulp	770,000 t
	– Softwood pulp	440,000 t
	– Birch pulp	330,000 t
Raw materials	Wood, cooking chemicals, bleaching chemicals, filler and coating pigments, paper manufacturing pigments	See UPM Corporate Environmental and Societal Responsibility Statement for more information
Energy	Biofuels	88%
	Fossil fuels	12%
	Purchased electricity	See UPM Corporate Environmental and Societal Responsibility Statement for more information
Emissions to air include UPM's share of Kaukaan Voima's emissions	Fossil carbon dioxide, CO ₂	155,271 t
	Nitrogen oxides, NO _x	1,247 t
	Sulphur dioxide, SO ₂	62 t
	Particulates, TSP	114 t
	Malodorous sulphur compounds, TRS	43 t
Water intake	Process and cooling water	86.4 milj. m ³
Discharges to water	Effluent	34.6 milj. m ³
	BOD ₇	416 t
	COD	12,936 t
	Solids, TSS	559 t
	Phosphorus, P	6 t
	Nitrogen, N	137 t
	Adsorbable organic halogen compounds, AOX	85 t
Waste	Waste to landfill	5,763 t
	– Green liquor dregs	5,758 t
	– Mixed waste	5 t
	Reused waste	17,794 t
	– Debarking reject sand and stones	404 t
	– Green liquor dregs and lime	7,059 t
	– Ash from the lime kiln's electrostatic precipitator	1,530 t
	– Ash from the powerplant	6,905 t
	– Recycled cardboard and paper	953 t
	– Metals	703 t
	– Other individually collected waste	240 t
	Intermediate storage	0 t
Hazardous waste	596 t	
Size of mill area		200 ha



Performance against targets in 2018

TARGET	ACHIEVEMENT	COMMENTS
A safe place to work — zero lost time accidents at work	No	There was one lost time accident at the paper mill and three at the pulp mill.
Preventive safety and environmental measures — observations and hazardous situation reports Paper mill > 500 Pulp mill > 500 — safety walks and talks Paper mill > 460 Pulp mill > 600	Yes	Preventive safety measures were successfully implemented. There were 610 observations and reports at the paper mill and 1094 at the pulp mill. There were 493 safety talks and walks organized at the paper mill and 1,287 at the pulp mill.
Paper mill material efficiency — Fibre waste < 9 tonnes per day — Coating colour sludge waste < 1.0 tonnes per day	Yes	The paper mill used materials efficiently, and both the fibre and coating colour sludge waste volumes remained lower than the target values.
Reducing specific emissions from the previous year at the pulp mill — COD and AOX kg/Adt < 2017	Partly	COD emissions increased and AOX emissions decreased.
Reducing effluent volumes Pulp: < 2017 achieved Paper: < 2017 achieved	Yes	The objective for reducing waste water was achieved by both the pulp mill and the paper mill.
Reducing fossil carbon dioxide emissions — Decreased consumption of natural gas	No	The amount of carbon dioxide emissions from fossil fuels increased compared to the previous year.
Improving energy efficiency — Pulp: ensuring energy self-sufficiency — Paper: reducing the specific consumption of energy	Partly	The pulp mill was energy self-sufficient. The paper mill slightly increased its specific consumption of electricity but reduced its consumption of steam.
Drawing up a noise control plan	Yes	The plan was implemented.

Targets for 2019

TARGET(S)	SCHEDULE	MEASURES
Zero accidents	2019	LTAF (accident frequency) 0.
Active preventive safety and environmental activities	2019	Safety and environmental observations: pulp 1,000, paper 675. Safety walks and talks: pulp 1,080, paper 420.
Paper mill material efficiency	2019	Fibre waste < 7 t/d.
Reducing the specific emissions of the pulp mill compared to the previous year	2019	COD and AOX kg/Adt < 2018
Reducing effluent volumes	2019	Pulp: < the 2018 level. Paper: < 18 cubic metres/t.
Reducing carbon dioxide emissions from fossil fuels	2019	Reduce the consumption of natural gas.
Improving energy efficiency	2019	Pulp: secure energy self-sufficiency. Paper: reduce specific consumption of energy.
Secure operations in accordance with the environmental permit that entered into force in 2018.	2019	Reporting and monitoring were updated to comply with the permit. Separate reports produced according to the schedule.



Validation statement

As accredited environmental verifier (FI-V-0001), Inspecta Sertifiointi Oy has examined the environmental management system and the information of UPM Kaukas 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 2019-04-02 that the environmental management system, this UPM Kaukas Environmental and Societal Responsibility report and the information concerning UPM Kaukas 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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