UPM BIOFORE
BEYOND FOSSILS

UPM Tervasaari

ENVIRONMENTAL AND SOCIETAL RESPONSIBILITY 2021



UPM Tervasaari

The Tervasaari mill is located in the town centre of Valkeakoski, Finland, at the end of the canal between the Mallasvesi and Vanajavesi lakes. The mill is located right next to a populated area, so careful attention must be paid to environmental issues during everyday operations.

The Tervasaari mill integrate consists of two paper machines, a power plant, a hydropower plant and a biological effluent treatment plant. Several businesses also operate onsite as tenants. The environmental load of these tenants' effluent emissions is included in this report's data.

The heat required by the Tervasaari mill is produced by the mill's own power plant, and approximately one fifth of the required electricity is produced at the mill. Heat is also sold to external users as district heating and steam.

The Tervasaari mill's industrial landfill in Suikki was in use through the whole of 2021. The closure of the Kalatonlahti landfill went ahead as planned in 2021.

UPM Tervasaari is a centre of expertise for label papers, with a strong focus on the development of both existing paper grades and new products.

Production capacity	300,000 t/year	
Employees	290	
Products	UPM Brilliant™ UPM Brilliant™ Forte UPM Brilliant™ Pro UPM Honey™ UPM Honey™ Plus UPM Honey ™ Plus Recycled UPM Golden™	UPM Golden™ Forte UPM Golden™ Recycled Forte UPM Brilliant™ Duo UPM Crema™ Duo UPM Topaz™ duo UPM SCK™ Plus UPM SCK™
Certificates	EMAS – EU Eco-Management and Audit Scheme ISO 14001 – Environmental Management System ISO 9001 – Quality Management System ISO 22000 – Food Safety Management System ISO 45001 – Occupational Health and Safety System PEFC, Programme for the Endorsement of Forest Certification FSC® – Forest Stewardship Council The certificates can be found with the Certificate Finder tool at www.upm.com/responsibility	

UPM Tervasaari Environmental and Societal Responsibility 2021 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 2021. 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 Updated UPM Corporate Environmental Statement and also this supplement will be published in 2023.

UPM delivers renewable and responsible solutions and innovate for a future beyond fossils across six business areas: UPM Fibres, UPM Energy, UPM Raflatac, UPM Specialty Papers, UPM Communication Papers and UPM Plywood. As the industry leader in responsibility, we are committed to the UN Business Ambition for 1.5°C and the science-based targets to mitigate climate change. We employ 17,000 people worldwide and our annual sales are approximately EUR 9.8 billion. Our shares are listed on Nasdaq Helsinki Ltd.
UPM Biofore – Beyond fossils.
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Review of the year 2021

In 2021, demand for UPM Specialty Papers' self-adhesive label materials and specialty paper products increased. We achieved good results at Tervasaari in the management of environmental issues and occupational safety. The implementation of the sustainable development strategy is continuing at our mill: We offer new and responsible solutions which, among other things, have to do with product safety, material efficiency and the ecodesign of products, and we innovate alternatives to the solutions of the fossil economy.

Demand for self-adhesive label materials and speciality paper products increased due to the growth in online sales and changes in consumer behaviour caused by the pandemic. The introduction of a second paper machine at the UPM Nordland mill in March 2020 brought additional capacity for specialty paper production. Due to the additional capacity that this creates, UPM Specialty Papers can now further strengthen its service capability for customers and expand its product range in label base papers and new areas of end use. Tervasaari's paper machines also play a significant role in this expansion.

UPM has long focused on the continuous improvement of safety at work through its Step Change in Safety programme, and major efforts have been made at Tervasaari to improve occupational safety. UPM Specialty Papers Tervasaari's safety performance matched the record level achieved in 2020. There were no serious accidents during 2021. Within the external workforce, there were also no work-related accidents during the year that resulted in sick leave. At Tervasaari, we strive to improve safety through various safety measures and projects.

We continued our company-wide Clean Run campaign to further improve the management of environmental issues. In 2021, we received only one noise report. Our operations continued to be evaluated by both environmental authorities and independent external product safety and environmental specialists in 2021.

Customer enquiries regarding our products were mainly related to product safety, the origin of wood raw materials, forest certification, the amount of recycled fibre used in paper and various management systems. In recent customer enquiries, the origin of wood has been one of the most popular topics. Product safety is especially important in the case of label and packaging papers used by the food industry. UPM papers are safe to use throughout their whole lifecycle, and papers approved for food use can be used in direct contact with dry and non-fatty foods.

We continued our research on how to recover fly ash and other industrial sidestreams by using new technologies.

In 2021, the mills of UPM Specialty Papers continued the material efficiency project in the food industry launched by Motiva in 2019, in which we commit to following various kinds of material efficiency operations within our own activities.

Material efficiency and the ecodesign of products form a part of the sustainable development programme at Tervasaari. Examples of material efficiency include minimising raw material losses and ensuring production efficiency. Furthermore, in the production of paper products, the impact of the product on the whole value chain must be considered as comprehensively as possible. UPM Specialty Papers is developing new, lighter label and packaging products which allow raw materials to be saved. The material efficiency of the product's entire value chain is also improved, and, for example, the CO_2 emissions from the transportation chain are reduced. UPM Specialty Papers is committed to developing packaging materials from renewable raw materials for the food supply chain. These materials ensure the shelf life of food and minimise food loss in the production and storage chain.

UPM's Biofore – Beyond Fossils strategy is all about seizing the unlimited opportunities of the bioeconomy. We deliver renewable and responsible solutions and innovate for a future beyond fossils. All of this is an integral part of the sustainable development strategy at Tervasaari.

Tomi Hytönen
Mill Manager

Ville Juutinen
HSE Manager

UPM Tervasaari

Contribution to UN Sustainable Development Goals in 2021

Taxes

The facility's tax contributions are approximately

EUR 14 million

Property taxes: EUR 0.4 million.
Estimated municipal taxes on personnel salaries: EUR 2.7 million.
Estimated corporate income tax: EUR 11.2 million based on the number of employees*

* Municipalities receive approximately 30% of this amount, which is further allocated to each municipality according to its business activity factor and forest factor

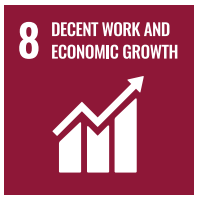
Air

Fluidised bed boiler emissions after the purification unit investment decreased by

SO_2 99%

CO_2 35%

Particulates 99%



Health

Support for the personnel for practising exercise and culture

EUR 101,500

Energy

The share of biomass-based fuels

55%

of fuels used

Water

Use of recycled nutrients in the biological treatment plant

30.8%

the chemical oxygen demand was 3% lower than in 2020

The biological oxygen demand was 3% lower than in 2020

Certified fibre

82%

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

Consumption impact*

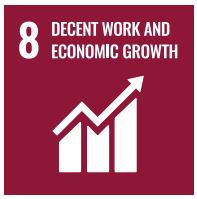
The mill's local consumption impact in the region is approximately

EUR 11 million

The consumption impact in the whole of Finland is approximately

EUR 17 million

* Private consumption of commodities generated through the net income of internal and indirect employees



Occupational safety

The lost time accident frequency rate leading to absences (LTAF) has improved since 2012 by

85%

Safety and environmental observations, hazard situation reports, safety inspections and discussions logged by the personnel at Tervasaari in 2021

1,018

We worked

363 days

safely in 2021

Supply chain

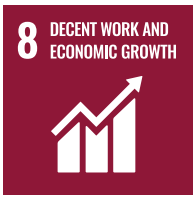
96%

of raw material spent by value was from suppliers who have accepted UPM's Supplier and Third Party Code (excluding wood suppliers)

Waste

0%

Share of landfill waste



Employment

UPM Tervasaari directly employs

290 people

Indirect local employment impact around

216 people

Number of summer employees

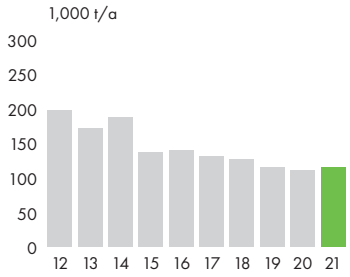
40 people

Air

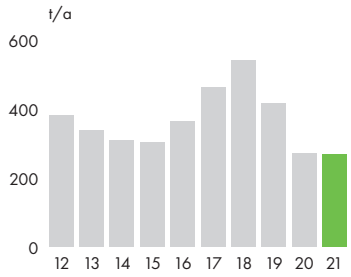
In recent years, the industry in the Valkeakoski city region has undergone dramatic changes that have resulted in a decrease in airborne emissions. Community air monitoring in Valkeakoski was therefore discontinued on 31.12.2015.

Airborne emissions from the Tervasaari mill remained below the permitted limits throughout the year. The fluidised bed boiler's flue gas purification unit, commissioned at the end of 2014, has helped to dramatically reduce the mill's SO_2 and particulate emissions. For air emissions in 2021, NO_x emissions from the plant remained at the same level because the K3 natural gas boiler was not in use.

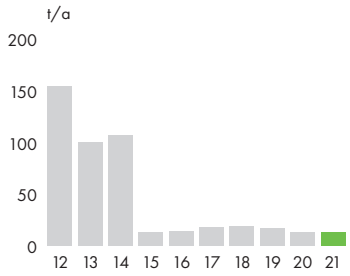
Fossil carbon dioxide, CO_2



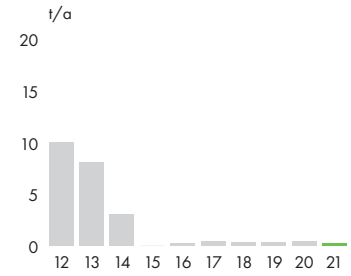
Nitrogen oxides, NO_x



Sulphur dioxide, SO_2



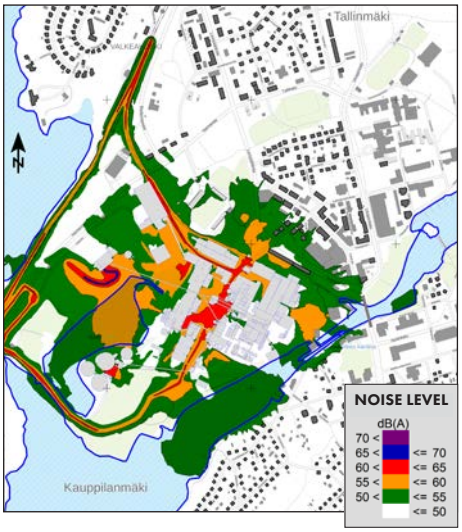
Particulates



Noise

The annual noise measurements required by the Tervasaari environmental permit were conducted in 2021. The measurement results have been reported to the environmental protection authorities of Valkeakoski and the Pirkanmaa Centre for Economic Development, Transport and the Environment.

Calculation of noise propagation was done using SoundPLAN software and the Nordic noise calculation method for road, railway and industry noise. The situation describes the average daytime sound level (LAeq7-22) of process noise, heavy traffic and rail traffic at the Tervasaari mill in the summer of 2019.



Waste

The mills of UPM Specialty Papers joined a food industry material efficiency campaign launched by Motiva in 2019. As part of the campaign, we commit to implementing various material efficiency efforts in our business.

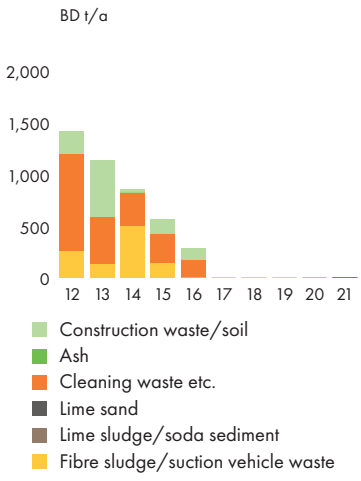
Tervasaari has been actively involved in UPM's Zero Solid Waste project. One of the project's aims is to eliminate all solid waste taken to landfill by improving the sorting and recycling of waste. Tervasaari already achieved this by the end of 2016.

We have set ourselves the permanent goal of recovering all fractions from UPM Tervasaari and not taking any production waste to the Suikki landfill. In 2021, we continued to collaborate with various research institutes and other operators to ensure the recovery of waste, and we aim to develop new methods to ensure the recovery of industrial by-products. However, the Suikki industrial landfill can continue to be used as an interim storage area for materials being directed to recovery, if necessary.

In 2021, fly ash and fluidised bed boiler bottom ash were used in the closure of UPM's Kalatonlahti landfill. We were able to keep the proportion of recovered waste at a high level through improved sorting practices. Essentially all waste produced in 2021 was recovered.

Filtration water from the Kalatonlahti and Suikki landfills is processed at Tervasaari's biological effluent treatment plant.

Solid waste taken to the landfill



Water

6 CLEAN WATER AND SANITATION

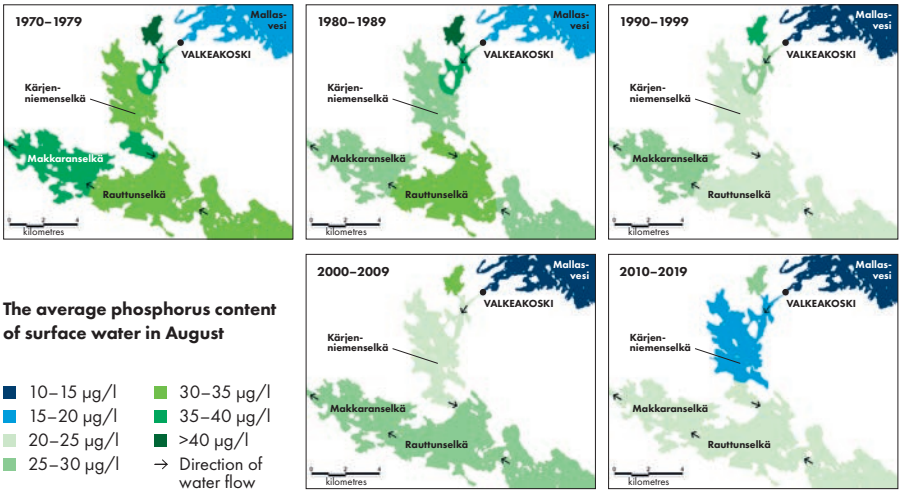
During 2021, we managed to keep the amount of wastewater created in paper production at the level of the previous year.

The efficient use of nutrients used at the purification plant affected the BOD_7 and COD contents of the wastewater going out. The BOD_7 and COD emissions decreased compared to the previous year.

All the measurements related to effluent emissions remained well below the permit limits. The level of wastewater pollution remained clearly below the internal environmental targets set for 2021. We did not, however, reach the internal target level for nitrogen pollution.

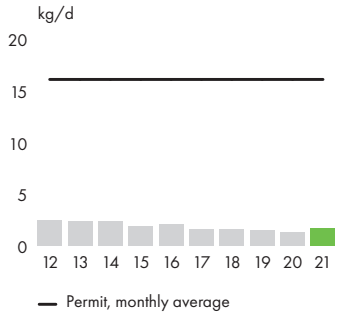
As was the case during the previous year, a controlled stream of warm process water was directed to the mill's effluent purification plant during the coldest time of the year to keep the temperature of the wastewater processed at the biological purification plant at an optimal level with regard to the conditions and to keep microbial activity vital.

In January 2021, we started using recycled nutrients in the biological treatment plant. During the year, 30.8% of the nutrients used were recycled nutrients.

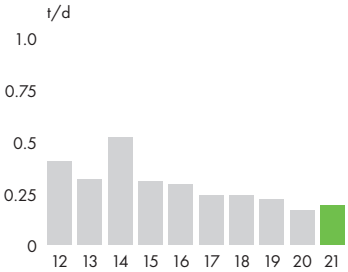


In the long term, the eutrophication level in the Valkeakoski area has decreased significantly due to the reduction in the point source load. This can be seen in the decrease in the average phosphorus content below Valkeakoski. Currently, the phosphorus contents there are already lower than in Rauttunselkä and Makkaranselkä, where the higher eutrophication level is sustained by scattered loading (Source: KVVY Tutkimus Oy).

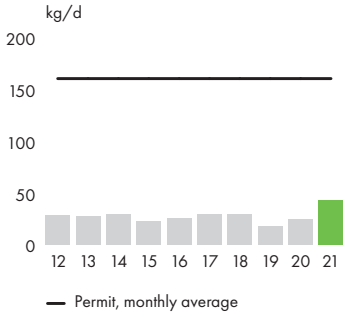
Phosphorus, P



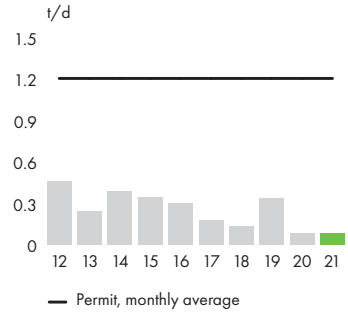
Total suspended solids, TSS



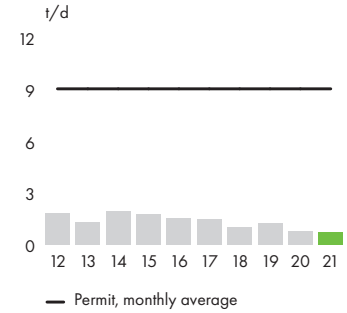
Nitrogen, N



Biological oxygen demand, BOD_7



Chemical oxygen demand, COD



Management of crises and exceptional situations

The Tervasaari mill management and the safety organisation are responsible for the prevention of exceptional situations and the operational management of crises and exceptional situations. The Tervasaari mill has guidelines and rescue and firefighting plans for exceptional situations.

The Mill Manager heads the management of exceptional situations. Mill experts support the Mill Manager in this by providing their own specific expertise. In the event of a major exceptional situation, these experts form the mill's crisis management team, which is responsible for the operational management of the situation. A major exceptional situation is an unforeseen chain of events that proceeds rapidly and has a significant impact on operations. Exceptional situations include serious accidents and hazardous situations (large fires, explosions and chemical and traffic accidents on the mill site), environmental damage, serious work-related accidents, cybersecurity threats and information attacks.

The operations of the mill safety organisation cover expert tasks regarding occupational safety, mill guarding, firefighting and rescue operations, and the control of hazardous substances. Drills related to exceptional situations are an important part of the preventative safety work. Firefighting and rescue operations are always led by the rescue authorities.

Societal responsibility

Collaboration with local communities
A well-functioning dialogue and collaboration with stakeholders is key to our success. We are committed to enhancing the vitality of the communities around our sites by actively engaging with all parties involved.

Understanding our impact on the communities around us is essential to the success of our business. In many locations, we are a significant employer, taxpayer and partner to local entrepreneurs, making positive contributions to the local economy.

Safety
UPM aims to be the industry leader in occupational health and safety matters. Our target is to avoid serious and fatal accidents completely. We strive to reduce and eliminate accidents through continuous improvements and effective risk management. In 2021 we came close to the mill's record of a period without absence due to accidents.

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 set. For example, before entering UPM's production sites, contractors participate in UPM's general safety training and supplementary job-specific safety training.

Tervasaari mill employees regularly take part in safety training, such as safety standard training, occupational safety card training, hot work licence training and first aid training. The personnel is encouraged to record incident reports and safety observations in OneSafety and to carry out safety and clean-up rounds at the mill.

In addition to fire safety, the Tervasaari mill fire service is active in many other safety service areas, such as ensuring safety for work at heights, as well as training employees on different topics. The Tervasaari mill fire service is a contracted fire service in the Pirkanmaa region and is therefore an integral part of the local fire and rescue services organisation.

The Tervasaari mill fire brigade trains weekly and also organises drills for the personnel. In 2021, evacuation drills were organised in different parts of the mill. The picture shows the preparation for a smoke diving exercise, which included the search and rescue of a victim.

The Biofore Share and Care programme
We support sustainable development and promote the financial and mental well-being of the communities around us by participating in numerous community projects as a company. Our work in this arena is clearly connected to our Biofore Strategy and responsibility targets.

UPM's Biofore Share and Care programme is supported through sponsorships and donations. The support can be a monetary contribution, products, materials or concrete work in projects agreed upon locally. Our focus is on activities and projects that are related to our business, support innovation and sustainable development or promote local vitality and well-being.

Around 40 summer workers were recruited for Tervasaari in the summer of 2021. For the second summer in a row, the coronavirus situation had its impact on the summer work experience, but with the help of e-learning opportunities and smaller orientation groups, the summer workers were able to get up to speed. In a summer worker survey, we received positive feedback about the good working atmosphere, the warm welcome to the team and the varied and challenging tasks.

Health and well-being at work
Matters related to occupational health and safety and well-being at work are regularly discussed in working groups, such as the occupational safety steering group, the occupational protection committee and the well-being at work group. These groups include representatives from the Tervasaari mill and the occupational health care. The well-being at work programme for employees aims to support the individual's ability to work,

At UPM Tervasaari mill, safety rounds were actively carried out, for example, during maintenance shutdowns of paper machines.

to strengthen the work capacity by promoting collaborative work and to encourage employees to participate in in activities such as UPM's fitness training courses. The Tervasaari mill has its own gym that employees can use free of charge. UPM also supports the employees' exercise and cultural activities.

During the coronavirus pandemic, the Tervasaari mill has taken a number of protective measures to prevent the spread of the coronavirus. The personnel's commitment to the new practices is commendable. UPM has also supported the protection of its personnel from the virus during their time off by distributing single-use face masks and coronavirus quick test kits to them on a monthly basis.

Personnel development

We encourage our employees to develop their professional skills by arranging several training and coaching events every year. The special theme for 2021 was well-being and resilience. In 2021, the Tervasaari mill was running apprenticeship training for a vocational qualification in the process industry. During the autumn of 2021, students were busy completing their exams.

In UPM's annual employee survey, good supervisors, freedom of self expression at work and safety were perceived as positive things. The 2022 action plan is based on team work, development and positive feedback.

Tax impact

The tax revenue generated by UPM's operations has a significant societal impact. We pay corporate income taxes in the countries where we create added value and generate profits resulting from that. Due to our corporate and operational structure, we mainly report and pay corporate income taxes in the countries of production and in the countries where innovations are being developed. In addition to income taxes, many of our inputs and outputs are subject to tax. Taxes are paid in accordance with the local tax decrees and regulations.

In 2021, UPM's corporate income taxes and property taxes were approximately EUR 306 million in total (EUR 178 million in 2020).

Our mills support local economies in many ways, e.g., through the municipal share of corporate taxes and property taxes. In addition, the municipal taxes and social security contributions that the employees pay from their wages have a significant local impact. The purchasing power of UPM's employees and subcontractors maintains and enhances the vitality of local communities.

Responsible sourcing

UPM is committed to responsible procurement practices throughout the procurement chain. We work closely with our suppliers to ensure that they understand and meet all of the company's requirements for sustainable development and responsibility. UPM requires its suppliers to comply with the UPM Supplier Code and Third Party Code that defines suppliers' minimum requirements in terms of responsibility with regard to matters such as environmental impact, human rights, labour practices, health and safety, product safety and zero tolerance to bribery.

Environmental parameters

The key figures related to production, as well as raw material and energy consumption, are published as aggregated figures at a group level in the UPM Corporate Environmental and Social Responsibility Statement.

		2019	2020	**2021**
Production capacity	Paper	300,000 t	300,000 t	300,000 t
Raw materials	Pulp Chemicals	See the Corporate Environmental and Social Responsibility Statement		
Energy	Biomass-based fuels Fossil fuels Purchased energy[1]	55% 45%	55% 45%	55% 45%
Emissions to air	Particles Sulphur dioxide, SO_2 Nitrogen oxides, NO_x Fossil CO_2 Fossil CO_2 (purchased, scope 2)	0.3 t 17.0 t 412.9 t 115,146 t	0.4 t 13.1 t 287.2 t 110,190 t	0.2 t 12.7 t 285.1 t 115,000 t 26,000 t
Water use	Process and cooling water	9,475,225 m^3	10,372,244 m^3	11,052,148 m^3
Discharges into water	Clean cooling water Process effluent BOD_7 COD_{Cr} Solids Phosphorus Nitrogen	5,334,998 m^3 4,164,960 m^3 122.1 t 458.5 t 79.2 t 0.5 t 6.7 t	6,126,915 m^3 4,245,329 m^3 29.8 t 274.8 t 59.8 t 0.5 t 8.8 t	6,457,717 m^3 4,594,431 m^3 29.2 t 265.7 t 70.3 t 0.6 t 15.7 t
Waste[2]	Landfill waste Recovered waste – Metal waste – Ash – Incinerated wood and packaging waste – Others Interim storage	0 t 389 t 6,665 t 1,066 t 0 t	0 t 261 t 7,201 t 751 t 0 t	0 t 261 t 7,525 t 658 t 279 t 0 t
	Hazardous waste[3]	140.2 t	102.6 t	194.1 t
Land use	Total amount of land use Area impermeable to water Area directed towards nature conservation	90 ha	110 ha 43 ha 67 ha	110 ha 43 ha 67 ha

1) See the Group's Corporate Environmental and Societal Responsibility Statement for more information (e.g. energy indicators)
2) Waste amounts given as dry weight
3) Hazardous waste stated as total weight

Performance against targets in 2021

TARGETS	ACHIEVEMENT	COMMENT
The most significant measures for improving safety and protecting the environment in 2021 were:		
1 Preventing environmental deviations and achieving the Clean Run objectives: COD < 1.5 t/d; BOD_7 < 0.3 t/d, N < 29 kg/d and P < 2.3 kg/d	Partially	The purification plant has operated reliably. Emissions below the internal target, except for nitrogen. No Clean Run deviations in categories 3, 4 and 5
2 Airborne emissions; fluidised bed boiler		
– NO_x < 200mg/m^3(n)	Yes	Emissions into the air were lower than the established targets.
– SO_2 < 10 mg/m^3(n)	Yes	
– Particulates < 0mg/m^3(n)	Yes	
3 Reducing water consumption, the loss of solids and the amount of solid waste:		
Water consumption 8.2 m^3/t	No	On average, typical effluent consumption exceeded the target, although Tervasaari was able to reduce wastewater volumes.
Solids losses 0.60%	Yes	The target was met for solids losses.
Improving the sorting of waste to be incinerated	Yes	Sorting of the different types of waste produced by the mill was improved.
0 t/a of taxable waste taken to landfill	Yes	No taxable waste was taken to landfill.
4 Increasing opportunities for ash recovery: Aim to recover 100% of fly ash Participation in one or more ash road projects or other recovery project	Yes	The fluidised bed boiler's sand recycling worked outstandingly, which significantly reduced the amount of bottom ash removed from the system. Fly ash was recovered according to plan.
5 Improving energy efficiency:		
– Reducing CO_2 emissions by 7% compared to the 2020 level	No	We failed to reduce emissions due to the cold winter.
– Paper machine energy efficiency audits	Yes	Internal audits were carried out.

Targets for 2022

TARGETS
1 Preventing environmental deviations and achieving the Clean Run objectives: COD < 1.5 t/d; BOD_7 < 0.3 t/d, N < 29 kg/d and P < 2.3 kg/d Active optimisation of nutrients
2 Airborne emissions; fluidised bed boiler – NO_x < 200mg/m^3(n) – SO_2 < 10 mg/m^3(n) – Particulates 0 mg/m^3(n) Optimisation of the combustion conditions of the boiler and the functioning of the flue gas purification unit
3 Reducing water consumption, the loss of solids and the amount of solid waste: Water consumption 8.2 m^3/t Solids losses 0.60% Improving the sorting of waste to be incinerated 0 t/a of taxable waste taken to landfill
4 Increasing opportunities for ash recovery: Aim to recover 100% of fly ash Participation in at least one ash road project or other recovery project
5 Improving energy efficiency: Reducing CO_2 emissions by 7% compared to the 2021 level Paper machine energy efficiency audits

EMAS
Verified environmental management
REG.NO. FI - 000058

Validation Statement

As an accredited environmental verifier (FI-V-0001), Inspecta Sertifiointi Oy has examined the environmental management system and the UPM Tervasaari Environmental and Societal Responsibility Statement 2021 as well as the information concerning UPM Tervasaari in the Updated UPM Group Environmental and Societal Responsibility Report 2021.

On the basis of the inspection, it was found on 13 April 2022 that the environmental system, this UPM Tervasaari Environmental and Social Responsibility Report 2021 and the updated information concerning UPM Tervasaari in the UPM Corporate Environmental and Social Responsibility Report 2021 are in compliance with the requirements of the EU's EMAS Regulation (EC) No. 1221/2009.

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6/2022