

UPM Tervasaari

ENVIRONMENTAL AND SOCIETAL RESPONSIBILITY 2018



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

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

The Tervasaari mill's industrial landfill in Suikki was in use throughout 2018. The closure of the Kalatonlahti landfill went ahead as planned during 2018.

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.



UPM Tervasaari 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

Production Capacity	300,000 t/a	
Employees	317	
Products	Label release liners (Base) UPM Honey™ UPM Honey™ Plus UPM Honey™ Biocoat UPM Honey™ Recycled UPM Golden™ UPM Golden™ Biocoat UPM Golden™ Recycled	UPM Brilliant™ UPM Brilliant™ Pro UPM Brilliant™ Biocoat UPM Brilliant™ Duo UPM Topaz™ Duo UPM Crema™ Duo
Certificates	EMAS (EU Eco-Management and Audit Scheme) ISO 14001 – Environmental Management System ISO 9001 – Quality Management System ISO 22000 – Food Safety Management System OHSAS 18001 – Occupational Health and Safety System PEFC™ – Programme for the Endorsement of Forest Certification FSC® – Forest Stewardship Council	
	The certificates can be found using the Certificate Finder tool at www.upm.com/responsibility	



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



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

Review of year 2018

In 2018, UPM continued to invest in the label business and projects for new growth, in which the Tervasaari paper mill plays a significant role. We achieved good results in the areas of safety at work and environmental management. We continued to make progress on several new sustainable development projects.

UPM is overhauling paper machine 2 at the Nordland mill in Dörpen, Germany, converting it from fine paper production to label release liner production. Due to the additional capacity that this creates, UPM Specialty Papers can now expand its product range to include more special label release liners and new areas of application. In particular, Tervasaari's paper machine 5 is intended to have a significant role in this expansion.

In recent years, UPM has run a Step Change in Safety programme to further improve safety at work. Workplace safety has been a focus point at Tervasaari for a long time, with all indicators showing improved results. In 2018, we improved on the previous lost time accident frequency and achieved a record-breaking accident-free period that continued into 2019. Within the external workforce, there were no work-related accidents during the year that resulted in sick leave. In 2018, we began preparations at Tervasaari for updating our occupational safety management system (the OHSAS 18001 standard) to the new ISO 45001 system.

We continued our company-wide Clean Run campaign to further improve the management of environmental issues. In 2018, Tervasaari did not receive any environmental reports from stakeholders related to the operation of the mill. In 2018, we set an internal target for reducing the effluent wastewater volume generated through paper production, and we achieved this target. Our operations continued to be evaluated by both environmental authorities and independent external product safety and environmental specialists in 2018.

In 2018, Tervasaari continued to work on new sustainable development projects, e.g. introducing label release liners containing recycled fibre to the market. At the end of 2018, UPM Specialty Papers and the label release liners

containing recycled fibre produced at Tervasaari reached the final round of a global sustainable development competition organised in Chicago. The release liners containing recycled fibre are produced from siliconised label release liners that are recovered from customers, which are then processed into high-quality recycled fibre. The recycled label release liners have the same technical properties as the traditional product, and they meet the required criteria for food products.

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

Material efficiency and the ecodesign of products form part of the sustainable development programme at Tervasaari. Some 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 use less raw materials. The material efficiency of the product's entire value chain has also been improved, and, for example, the CO₂ emissions from the transportation chain have been reduced. UPM Specialty Papers is committed to developing packaging materials from renewable raw materials for the food supply chain. These materials ensure that food remains intact and minimise food loss in the production and storage chain.

UPM's Biofore – Beyond Fossils strategy is all about seizing the unlimited opportunities of 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.




Pentti Putkinen,
General Manager


Harri Hiltunen,
Manager, UPM Environment & Responsibility

Responsibility figures 2018

Waste



0%

to landfill

Taxes



The facility's tax contributions are approximately

12 million euros

Property taxes: 0.4 million euros
Estimated municipal tax on personnel wages: 2.6 million euros
Estimated corporate income tax: 8.7 million euros based on the number of employees*

* The share of this sum received by the municipalities is approximately 30% distributed on the basis of municipality-specific business and forest ratios for each municipality.

Consumption impact*

The local consumption impact of the mill is approximately

12 million euros

The consumption impact throughout the whole of Finland is

18 million euros

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

Air



Decrease in fluidised bed boiler emissions after investment in scrubbers

SO₂ 75%

Particulates 99%



Energy

Biomass-based fuel makes up

52%

of fuel used



Water



Biological oxygen demand level entering water systems

17%

lower than in 2017

Chemical oxygen demand

14%

lower than in 2017

Safety



The lost time accident frequency (LTAF) resulting in sick leave has improved from 2009

85%

Number of safety observations and reports of dangerous situations (including environmental and product safety observations) filed by Tervasaari employees in 2018

1,598



Local co-operation

109

primary school pupils and supporters participated in the Local Waters project

Health



Amount contributed to employee exercise and culture programmes

60,000 euros

Supply chain



99%

of raw materials by value are sourced from suppliers who have accepted the UPM Supplier and Third-Party Code (excluding wood)

Employment



UPM Tervasaari locally employs

317

 internal employees

240

 indirect employees

60

 summer employees and interns

Certified fibre



80%

of fibre used in paper production was FSC- or PEFC-certified (average at UPM Specialty Papers mills)

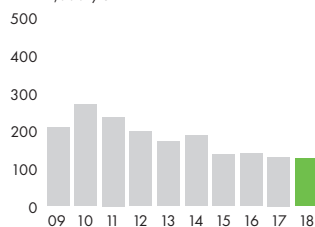
Air



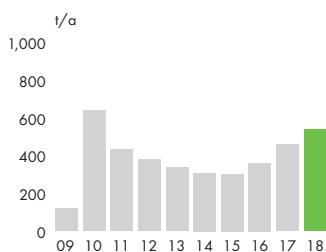
In recent years, industry in the Valkeakoski region has undergone dramatic changes that have resulted in a decrease in airborne emissions. Air quality monitoring in Valkeakoski has therefore been discontinued as of 31 December 2015.

Airborne emissions from the Tervasaari mill remained below 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 SO₂ and particulate emissions. In 2018, NO_x emissions from the fluidised bed boiler slightly exceeded internal airborne emissions targets due to technical combustion issues.

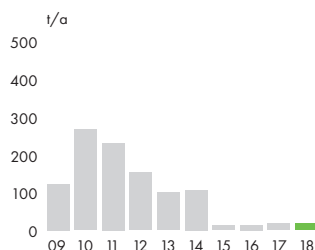
Carbon dioxide (fossil-fuel-derived), CO₂
1,000 t/a



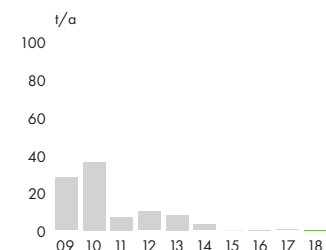
Nitrogen oxides, NO_x



Sulphur dioxide, SO₂



Particulates



Waste



Tervasaari is actively involved in UPM's Zero Waste project. One of the project's aims is to eliminate all solid waste taken to landfill by 2018, by improving the sorting and recycling of waste. Tervasaari had already achieved this by the end of 2016. No waste was taken from Tervasaari to industrial landfills in 2017.

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 2018, we continued to collaborate with various research institutes and operatives in order 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 2018, 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. Practically all waste produced in 2018 was recovered.

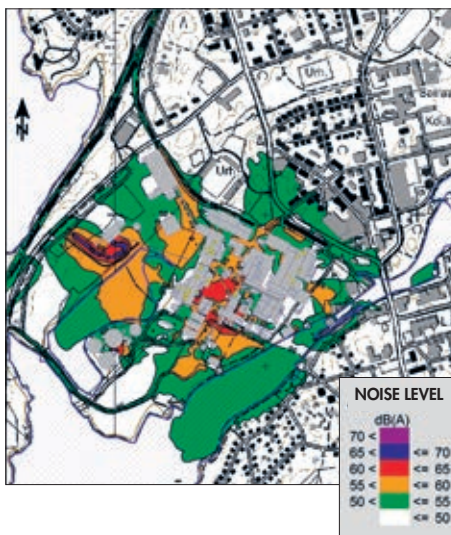
Leachates from the Kalatonlahti and Suikki landfills are processed at Tervasaari's biological effluent treatment plant.

Noise

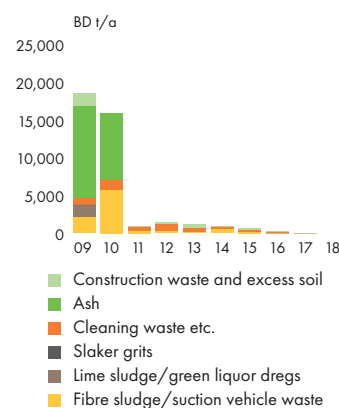


The annual noise measurements required by the Tervasaari environmental permit were conducted in 2018. The measurement results have been reported to the environmental protection authorities of Valkeakoski and the Pirkanmaa Centre for Economic Development, Transport and the Environment.

Noise propagation was modelled using SoundPLAN software and the Nordic noise prediction method for road, railway and industry noise. The average daytime sound level (LAeq7-22) for the UPM Tervasaari mill in summer 2014 is indicative of the state of affairs.



Solid waste taken to landfill



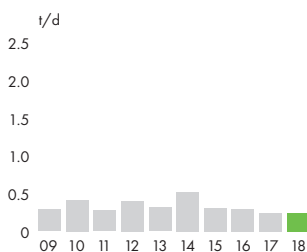
Water

In 2018, we set an internal target to reduce the amount of effluents generated in paper production. The effluent volume treated at the Tervasaari effluent treatment plant decreased by approximately 8% from the previous year. Simultaneously, effluent COD emissions decreased by 17% and BOD emissions by 14%.

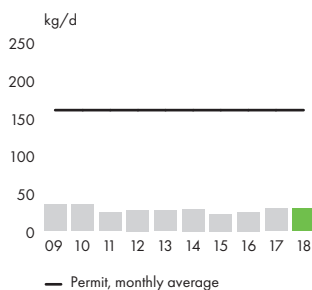
Repeated from last year, a controlled stream of warm process water was directed to the mill's effluent treatment plant during the coldest time of the year to keep the temperature of the effluents processed at the biological treatment plant at a sufficient level. The treatment plant functioned flawlessly throughout the year and all the measurements rela-

ted to effluent emissions remained well below the permit limits. In addition, the internal effluent levels remained below the target limits set for 2018.

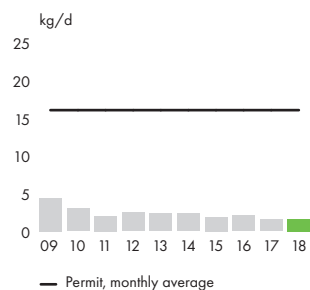
Total suspended solids, TSS



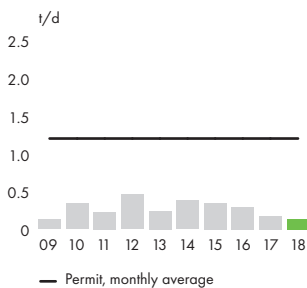
Nitrogen, N



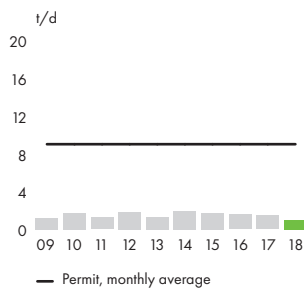
Phosphorus, P



Biological oxygen demand, BOD₇



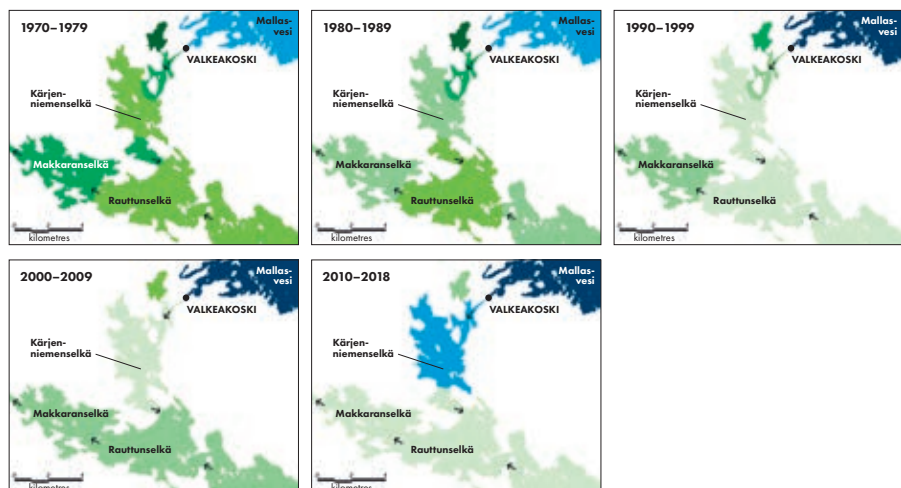
Chemical oxygen demand, COD



In the long term, the eutrophy level in the Valkeakoski area has decreased significantly due to the reduction of the point source load. This can be seen in the decrease in average phosphorus concentration below Valkeakoski. Currently, the phosphorus concentration there is already lower than in Rauttunselkä and Makkaran selkä, where the higher eutrophy level is sustained by nonpoint source pollution (Source: KVVY Tutkimus Oy).

The average phosphorus concentration of surface water in August

- 10–15 µg/l
- 15–20 µg/l
- 20–25 µg/l
- 25–30 µg/l
- 30–35 µg/l
- 35–40 µg/l
- >40 µg/l
- Direction of water flow



Societal responsibility

Collaboration with local communities

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

Understanding the impact that we have is an essential component of our success in business. In many locations, we are a significant employer, taxpayer and partner to local entrepreneurs, making positive contributions to the local economy. We apply several precautionary measures to mitigate and remedy potential adverse environmental and social impacts on our surrounding communities.

Tax contributions

Due to our corporate and operational structure, we mainly report and pay our corporate income taxes in the countries of production and in the countries where innovations are being developed. In addition to the taxes we pay on income, our various production inputs and outputs are also subject to taxation. Taxes are paid in accordance with the local tax legislation and regulations of the country in question.

In 2018, UPM (Group) paid approximately 283 million euros (251 million in 2017) in total in corporate income taxes and real estate taxes.

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 also have a significant local impact. Furthermore, the purchasing power of UPM employees and subcontractors maintains and enhances the vitality of the community.

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 monetary contributions, products, materials or employee volunteering. Local sponsorship comprises of target-oriented, long-term involvement in the community where UPM operates. Our focus is on activities and projects that are relevant to our business, support innovation and sustainability, or promote local vitality and wellbeing. The projects must also be clearly linked to the various United Nations Sustainable Development Goals (SDGs) that we actively promote. The four areas of focus of the Biofore Share and Care programme are reading and learning, engaging with communities, responsible water use and boosting bioinnovations.

The Local Waters project

Tervasaari has been actively involved in UPM's Local Waters project, where schools near UPM's Finnish mills had the opportunity to study and monitor local waters with donated instruments. Local rotary clubs collaborated on this project by acting as liaisons with the schools.

Responsible sourcing

UPM is committed to responsible sourcing practices throughout the entire supply chain. We work closely with our suppliers to ensure that they understand and meet all of the company's requirements for sustainability and responsibility.

UPM requires its suppliers to comply with the UPM Supplier and Third Party Code. This Code defines the minimum responsibility requirements for suppliers on matters such as 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 the 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.

Suppliers' environmental and social performance is tracked through regular data collection and analysis. Based on the annual risk assessments, we select the suppliers whose performance we want to study more closely. If any



non-conformity is found, the supplier is obligated to take corrective actions. We actively keep track of the results of these actions and are ready to support our suppliers with our knowledge in order to help them enhance their performance.

Safety

UPM aims to be the industry leader in occupational health and safety matters. Our target is zero fatal and serious accidents. Safety is fully integrated into our daily activities and is not considered secondary to any other consideration. We strive to reduce and eliminate accidents under our control through continuous improvement and effective risk management.

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 complemented by job-specific safety inductions and work permits.

Supervisors accruing new knowledge

In 2018, the mill's supervisors partici-



"Bring your child to work" day was immensely popular at Tervasaari. The children got to see and feel the kinds of paper produced at their parents' workplace.

parted in the "Supervisors as the leaders of the emotional atmosphere" training session. In this practical training session, they picked up new knowledge and skills for solving the typical challenges of leadership. With this training session, we wanted to improve our supervisors' abilities to lift the working atmosphere for teams and create enthusiasm and trust.

Employing youth

The Tervasaari mill offered summer and internship positions to approximately 60 young people and students studying in the field. We received positive feedback from these employees. The positive elements reported by the employees included involvement in the work community, interesting tasks and the safety culture. In 2018, we launched our apprenticeship programme, which kicked off with 13 new professionals at the beginning of 2019.

Bring your child to work day

Tervasaari participated for the first time in the national "Bring your child to work" day devised by the Ombudsman for Children. On Friday 23 November 2019, we were visited by 52 of our employees' primary school children. At first, we taught the children about paper production in an informal way, and they got to familiarise themselves with samples of pulp and end products. Afterwards, the

children got to visit the paper machine control room and the factory hall. At the end of the day, the children extinguished "flames" made from plywood under the guidance of mill fire service workers.

We learned many things at Safety at Work week

UPM has an annual global Safety at Work week. The Tervasaari personnel arranged many activities for this week. Themes for the week included safe tools, ergonomics, exercise, first aid, traffic safety and safety at home.

The Tervasaari mill fire service

The Tervasaari mill fire service boasts over one hundred years of fire safety and protection work and development in Valkeakoski.

In addition to fire safety, the Tervasaari mill fire service is currently active in many other safety service areas, such as ensuring safety for work at heights, as well as training employees on different topics surrounding workplace safety.

The mill fire service employees are professionals in different fields and also qualified for fire service.

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. In 2017, the Tervasaari mill fire service moved into new, more suitable premises at the Tervasaari mill site, having previously been located further away from the site.

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	Paper	300,000 t
Raw materials	Pulp Chemicals	See UPM Corporate Environmental and Societal Responsibility Statement for more information
Energy	Biomass-based and fossil fuels Purchased energy	Biomass-based 52.4%, fossil 47.6% See UPM Corporate Environmental and Societal Responsibility Statement for more information
Airborne emissions	Particulates Sulphur dioxide, SO ₂ Nitrogen oxides, NO _x Fossil CO ₂	0.3 t 18.3 t 538.4 t 127,082 t
Water intake	Process and cooling water	10,391,395 m ³
Emissions to water	Clean cooling water Process effluent BOD ₇ COD _{Cr} Solids Phosphorus Nitrogen	5,833,974 m ³ 4,660,080 m ³ 49.2 t 361 t 87.4 t 0.6 t 10.8 t
Waste	Landfill waste Recovered waste – Metal waste – Ash – Energy waste – Others Interim storage Hazardous waste	0 t 430 t 8,377 t 164 t 62 t 0 t 98.9 t
Size of mill area		73 ha



Performance against targets in 2018

TARGETS	ACHIEVED	COMMENTS
The most significant actions for improving safety and protecting the environment in 2018 were:		
1 Preventing environmental non-compliance and achieving the Clean Run objectives: COD < 1.7 t/d; BOD ₇ < 0.3 t/d, N < 29 kg/d ja P < 2.5 kg/d	Yes	The treatment plant has been reliable. Emissions have been controlled. No Clean Run non-compliance in categories 3, 4 and 5.
2 Airborne emissions; fluidised bed boiler – NO _x < 200 mg/m ³ (n) – SO ₂ < 20 mg/m ³ (n) – Particulates < 5 mg/m ³ (n)	No Yes Yes	NO _x emissions slightly exceeded internal targets for airborne emissions due to technical combustion issues. Other airborne emissions were significantly lower than the established targets.
3 Reducing water consumption, the loss of solids and the amount of solid waste: – Water consumption 8.2 m ³ /t – Solids losses 0.62% – Improving the sorting of waste to be incinerated – 0 t/a of taxable waste taken to landfill	No Yes Yes Yes	– On average, specific effluent consumption exceeded the target. – The target was met for solids losses. – Sorting of the different types of waste produced by the mill was improved. – No taxable waste was taken to landfill.
4 Increasing opportunities for ash recovery: Aim to recover 100% of fly ash	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: Improving the quality of fuel by increasing recycled wood burning by 50,000 MWh compared to the 2017 level	No	Increasing the use of recycled wood was not possible in energy production due to the impurities in the raw material.

Targets for 2019

TARGETS
1 Preventing environmental non-compliance and achieving the Clean Run objectives: COD < 1.7 t/d; BOD ₇ < 0.3 t/d, N < 29 kg/d ja P < 2.5 kg/d
2 Airborne emissions; fluidised bed boiler – NO _x < 200 mg/m ³ (n) – SO ₂ < 20 mg/m ³ (n) – Particulates < 5 mg/m ³ (n)
3 Reducing water consumption, the loss of solids and the amount of solid waste: – Water consumption 8.2 m ³ /t – Solids losses 0.62% – Improving the sorting of waste to be incinerated – 0 t/a of taxable waste taken to landfill
4 Increasing opportunities for recovery of ash: – Aim to recover 100% of fly ash – Participation in at least one Tuhkatie project or other ash recovery project
5 Improving energy efficiency: Decreasing the use of natural gas by 50,000 MWh compared to the level for 2018



Validation statement

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

UPM Tervasaari

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