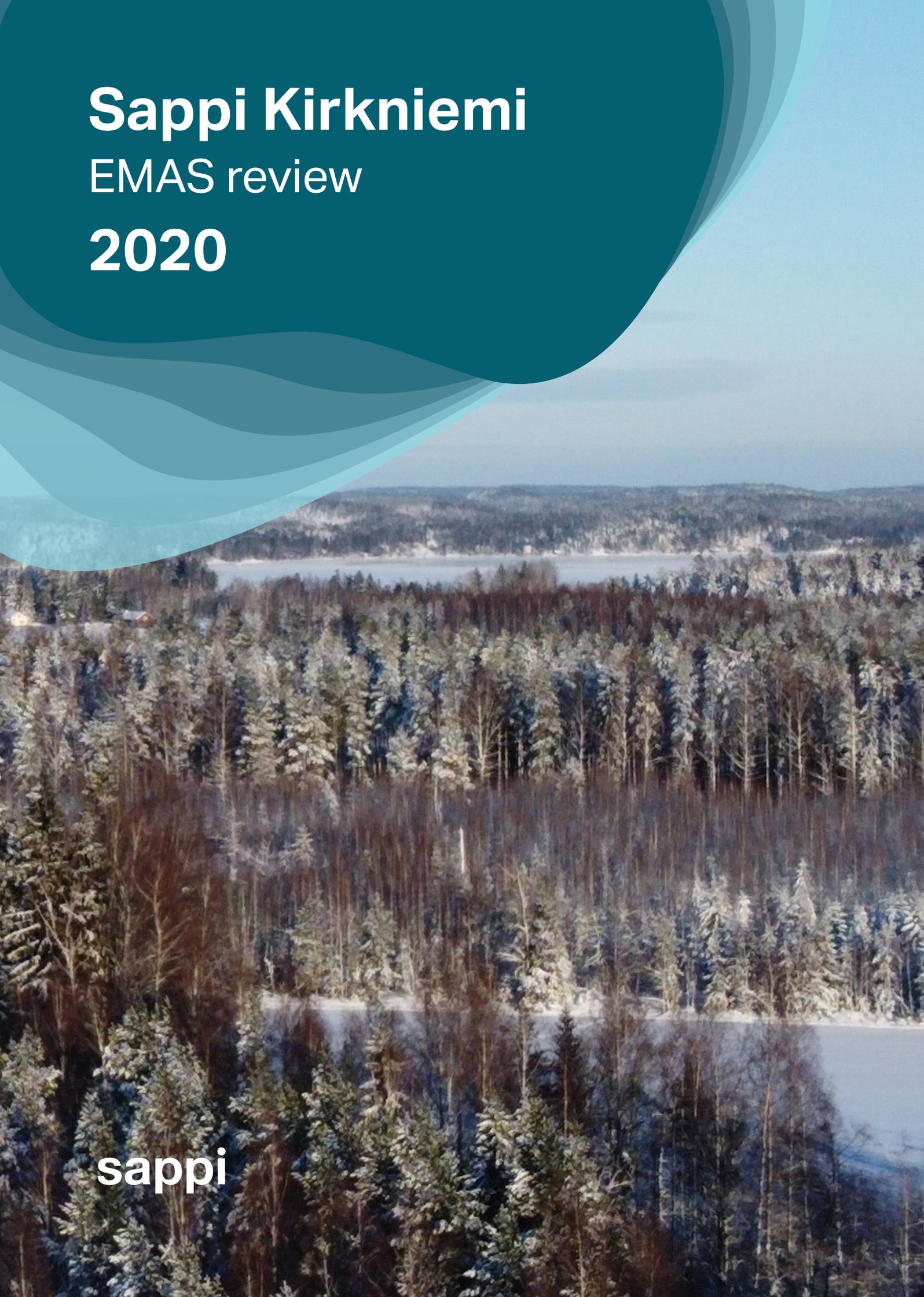


# Sappi Kirkniemi

## EMAS review

### 2020

sappi

An aerial photograph of a vast, snow-covered forest. The trees are densely packed and their branches are heavily laden with snow, creating a textured, white landscape. In the distance, a calm lake reflects the sky, and the horizon shows rolling hills under a clear, light blue sky. The overall scene is serene and wintry.

# Foreword



**Sustainable development** calls for responsible action in the management of environmental issues and in the use of natural resources, as well as social responsibilities balanced with healthy financial performance. Our aim is to continuously improve environmental efficiency throughout the value chain.

In the mill's strategy defined in 2019 until 2025, reducing the mill's carbon dioxide emissions is a key goal. In 2021, we will investigate potential investments to replace coal with biofuel as the primary fuel in boiler 5 at the Kirkiemi power plant by 2024. The investment would significantly reduce the mill's carbon dioxide emissions.

The coronavirus pandemic affected Kirkiemi in various ways. Lower demand for our products caused production standstills, and repeated production start-ups and shutdowns caused challenges in many areas. During the year, we were forced to

lay off our employees, for the first time in the mill's history. To reduce contact, we changed many working and operating methods. We were able to successfully combat coronavirus in productive cooperation. Even though protecting safety and health required hard work from all of us throughout the year, we also continued to develop the mill's operations and products and improve our environmental efficiency. Improving our competitiveness calls for continuous work, as only the most competitive can survive in the challenging market situation.

This review supplements the broader 2018 EMAS statement, and it offers an up-to-date view of our mill's operations and impacts. Open interaction and close cooperation with you is important to us.

March 2021

**Martti Savelainen**  
Mill Director



# Environmental activities in 2020

## In 2020, environmental activities focused on the management of water loads and the surveys required by the mill's environmental permit process.

The Supreme Administrative Court issued its decision on the paper mill's permit case in April, returning it for processing at the Regional State Administrative Agency to conduct a Natura assessment. The Natura assessment primarily concerns the mill's solid matter emissions and their potential impact on freshwater pearl mussel populations in Mustionjoki. An external consultant will conduct the Natura assessment, and it and its requirements were negotiated with the authorities during 2020. The Natura assessment will be completed in early 2021.

## An exceptional year

Due to uneven production, the year was also challenging in terms of environmental protection. During the first part of the year, the production was interrupted due to strikes and a lockout and, starting from April, decreases in demand due to the coronavirus pandemic caused production standstills. Key figures related to the consumption of water, the effluent flow and material efficiency decreased, and their targets were not reached. In 2020, the material loss was 2.0% of production, exceeding the target level of 1.4%.

A project was set up to investigate opportunities to reduce solid matter loads from the mill's treatment plant to the lake. As a result of the project's activities, we will invest in the procurement of an online total phosphorus analyser at the effluent treatment plant in 2021. The online analyser, combined with other online data, enables an even better optimisation of the treatment plant's tertiary phase operating mode.

Waste utilisation chains worked well, and 99.3% of all waste was utilised. As a separate irregular waste fraction, 251 tons of track ballast and 186 tons of railway sleepers were delivered

out of the mill area during a railway renovation project. The waste fractions were delivered to operators holding an appropriate environmental permit.

The volume of mixed waste was slightly higher than targeted at 85 tons. This increase resulted from an investment project carried out at the beginning of the year, generating an irregular volume of mixed waste. During the year, we specified our practices to address the perspective of environmental protection in investment projects.

## Improved energy efficiency as part of development

Sappi Kirkiniemi is part of the national energy efficiency agreement. The total target for energy savings, extending to 2025, is 7.5%. Energy savings have followed the target level.

The management of energy efficiency is a natural part of all development projects, and its improvement is a built-in feature in the mill's daily activities. A person responsible for energy efficiency has been appointed for every department, and the engagement of

the entire personnel is important. In addition to equipment procurement and investments, energy efficiency is addressed in the development of process operating methods and products, as well as in the development of quality parameters for intermediate products.

The mill has the ISO 50001 certificate as an indication of a systematic improvement of energy efficiency.

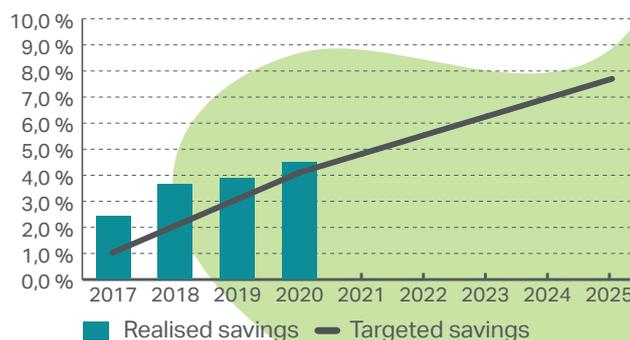
## Management of environmental risks and competence of the personnel

An accidental emission took place during the production start-up following a mill-wide standstill in April, in which unusually light-coloured pigment-containing effluent was released into Osuniemenlahti. The operation of the treatment plant's biological phase had slowed due to low organic loads and process cooling, and pigment-containing water conducted to the treatment plant during the start-up phase passed through the entire treatment

Solid matter loss at the effluent treatment plant, %



Fulfilment of energy efficiency savings  
% total energy consumption, cumulative



plant process, reaching discharged water. After immediate contact and an investigation of the situation, an incident report was submitted to the authorities. The authorities approved the report and the measures taken.

Effluent load management is a specific focus point during mill-wide standstills. Apart from the accidental emission in April, emissions were at the level set in the environmental permit, showing a decrease from 2019.

The mill-wide environmental risk assessment is up to date. It was updated in 2020 as a result of the secondary basin for EDTA (chelating agent) and in conjunction with the planning of an investment project. No significant new environmental risks were identified in assessments.

The mill personnel were trained to prepare for emergencies in accordance with training plans included in the rescue plan. Everyone working in the mill area is required to have an occupational safety card, and 128 employees have

completed first aid training (23% of the personnel). The mill's fire brigade carried out drills in accordance with the practices of the Länsi-Uusimaa Department for Rescue Services. Due to the coronavirus situation, drills had to be reduced, and some drills were carried out remotely.

The theme of the annual drill defined by the Finnish Safety and Chemicals Agency (Tukes) for chemical accidents was hydrogen peroxide and associated risks. In 2020, "Environmental protection in investment activities" training was held for the mill's planning department, with 13 people participating. A total of 23 managerial employees participated in two-part chemical training held by an external trainer.

### Cooperation with stakeholders

Due to the coronavirus pandemic, the annual meeting with the mill's neighbours was not held at the mill in 2020. The mill

received feedback from one neighbour concerning commuting by bicycle and occurred near-miss incidents. The entire personnel were notified of the feedback in the SARA safety information system and by issuing a safety briefing for traffic safety and safe commuting.

The mill's neighbours were notified of potential noise caused by rock drilling carried out in the mill area. The purpose of drilling was to support weathered boulders that had separated from bedrock, presenting a hazard.

The EU Ecolabel is an indication to our customers and consumers that the product meets strict environmental requirements. Criteria for the EU Ecolabel changed, and a new label had to be applied for by the end of 2019. The label was granted for Kirkniemi products in 2020 in accordance with the new criteria. In June, the ISEGA certificate for direct food contact was granted for papers manufactured in paper machine line 3 in Kirkniemi.



Target	Key figure and target value	Status
<b>Chain of Custody management</b>	Share of certified woodfibre > 85%	88.1%
<b>Improvement of raw material efficiency and water management</b>	Solid material loss at the effluent treatment plant < 14 kg/t Effluent flow < 9.4 m <sup>3</sup> /t	20.3 kg/t 11.0 m <sup>3</sup> /t
<b>Improved energy efficiency: Savings objectives for 2017–2025 in accordance with the target programme</b>	Energy savings: electricity, heat, fuel > 18.3 GWh	11.0 GWh
<b>Efficient waste sorting and utilisation</b>	Utilisation rate > 99% Mixed waste < 60 t/a	99.3% 85 t
<b>Effluent impact management</b>	Effluent emissions in accordance with BAT, excl. solids in effluent Solids in effluent < 0.8 kg/t	Yes 0.75
<b>Good management of environmental risks: Identification of risks, analysis of non-conformity, and preventive measures</b>	0 unexplained non-conformities causing disturbance at the effluent treatment plant	pcs
<b>No severe incidental releases</b>	0 incidental releases	pcs
<b>Compliance with environmental permit limits: Levels below the annual and monthly averages (in brackets) of emissions into watercourses set out in permit limits</b>	COD <sub>Cr</sub> < 4,500 kg/d (6,000) Phosphorus < 7 kg/d (9) Nitrogen < 100 kg/d (130)	2,498 kg/d 2.7 kg/d 33 kg/d
<b>Air emissions from the power plant in compliance with the permit limits</b>	Emissions < permit limits	No, see page 5

# Compliance with permit conditions in 2020

The mill's loads on watercourses have been in accordance with the environmental permit. In April, the Supreme Administrative Court issued its decision on the paper mill's environmental permit case. According to the decision and the statement issued by the Centre for Economic Development, Transport and the Environment of Uusimaa, the mill's supervisory authority, the mill has followed a new monthly permit limit (7,000 kg/day) for the chemical oxygen

demand (COD<sub>Cr</sub>) since May 2020. New annual permit limits for COD<sub>Cr</sub> and solid matter will enter into force at the beginning of 2021.

The power plant's emissions to air decreased clearly at an annual level with regard to all emission parameters. Emissions have been in accordance with permit conditions, apart from the following non-conformities, in which emissions from boiler K5 deviated from the threshold values set in permit conditions:

- the hourly average was exceeded 33 times with regard to nitrogen oxides (NO<sub>x</sub>) and seven times with regard to sulphur dioxide (SO<sub>2</sub>)
- the daily average was exceeded on five days with regard to NO<sub>x</sub> and on one day with regard to SO<sub>2</sub>

The aforementioned excesses resulted from boiler start-ups and disruptions in fuel and ammonia supply. The 2020 annual reports have been sent to the authorities in the Environmental Administration's database in accordance with the permit conditions.

## Emissions to watercourses vs. permit limits in 2020

Emission parameter	Unit	Permit limit, monthly average	Permit limit, annual average	Realised annual average in 2020	Note
<b>COD<sub>Cr</sub></b>	kg/d	6,000 / 7,000*	4,500	2,498	No excess
<b>Total phosphorus</b>	kg/d	9	7	2,7	No excess
<b>Total nitrogen</b>	kg/d	130	100	33	No excess

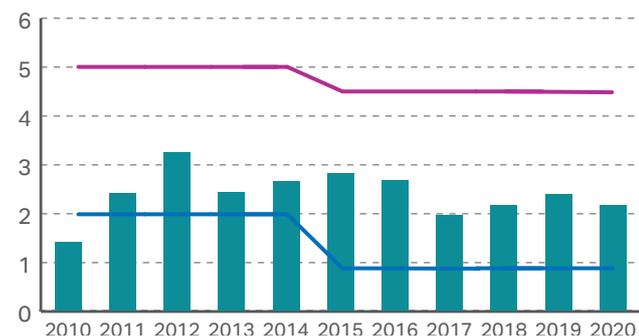
\* The monthly permit limit of 7,000 kg/day entered into force in May 2020

Emissions to water decreased from 2019 and have been in accordance with the BAT emission levels in the pulp and paper industry, apart from solids contained by effluent. The content of solids in

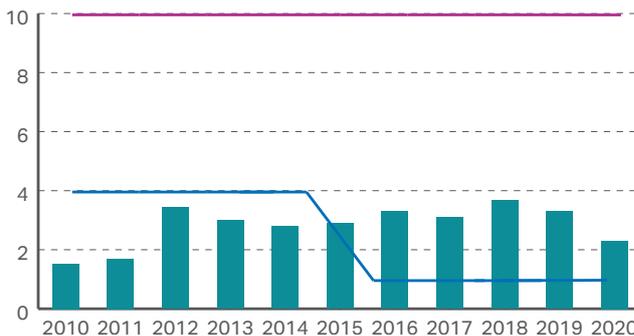
effluent increases during the chemical mixing phase at the effluent treatment plant when the removal of phosphorus, the substance which consumes oxygen from effluent, and nitrogen is boosted

to ensure that levels are below the strict environmental permit limits. This is referred to as a cross-effect.

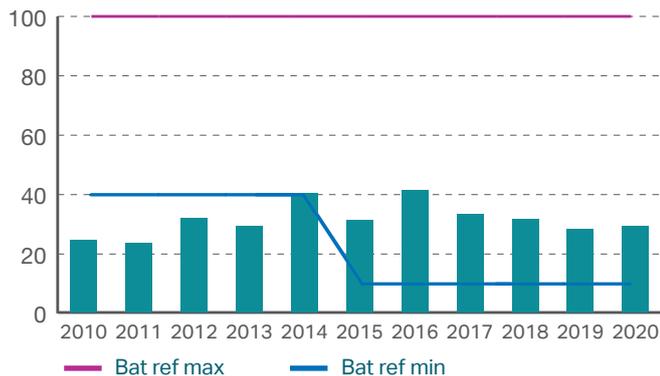
### COD<sub>Cr</sub> specific, kg/t of paper



### Phosphorus specific, g/t of paper



### Nitrogen specific, g/t of paper



### Sulphur dioxide and nitrogen oxide emissions to air, t/a



# Environmental goals for 2021

The mill's environmental goals have been set for a three-year period (2019–2021). The goals are monitored annually. If necessary, they will be changed in accordance with the principle of continuous improvement.

Our aim is to continuously improve environmental efficiency throughout the value chain. In the mill's strategy defined in 2019 until 2025, reducing the mill's carbon dioxide emissions is a key goal.

In 2021, we will investigate potential investments to replace coal with biofuel as the primary fuel in boiler 5 at the Kirkniemi power plant by 2024.

The energy efficiency target has been updated to be 12.8 GWh in 2021 in accordance with the targets set in the energy efficiency agreement. The effluent target has been set to be in line with new permit conditions. Otherwise, annual goals will remain as set for the three-year period.

Environmental goals are based on the mill's environmental policy and environmental aspects. The goals can be measured, and their achievement is monitored regularly.

Target	Key figure/indicator	Target value
<b>Chain of Custody management</b>	Share of certified woodfibre	> 85%
<b>Improvement of raw material efficiency and water management</b>	Solid matter loss at the effluent treatment plant Effluent flow	< 14 kg/t < 9,4 m <sup>3</sup> /t
<b>Improved energy efficiency: Savings objectives for 2017–2025 in accordance with the target programme</b>	Energy savings: electricity, heat, fuel	12,8 GWh
<b>Efficient waste sorting and utilisation</b>	Utilisation rate Mixed waste	> 99% < 60 t/a
<b>Effluent impact management</b>	Effluent emissions in accordance with BAT, excl. solids in effluent Solids in effluent released to watercourses	Yes < 0,8 kg/t
<b>Good management of environmental risks: Identification of risks, analysis of non-conformity, and preventive measures</b>	Number of unexplained non-conformities causing disturbance at the effluent treatment plant	0 pcs
<b>No severe incidental releases</b>	Number of incidental releases	0 pcs
<b>Compliance with environmental permit limits: Levels below the annual and monthly averages (in brackets) of emissions into watercourses set out in permit limits</b>	COD <sub>Cr</sub> Phosphorus Nitrogen Total suspended solids (TSS)	< 5,400 kg/d (7,000) < 7 kg/d (9) < 100 kg/d (130) 0,8 kg/t
<b>Air emissions from the power plant in compliance with the permit limits</b>	Emissions vs. permit conditions	In accordance with permit conditions

# Environmental key figures 2018–2020

	2018		2019		2020	
	Total per year	Key figure per tonne of paper	Total per year	Key figure per tonne of paper	Total per year	Key figure per tonne of paper
<b>Production, paper, t</b>	611,841	-	581 252	-	414 843	-
<b>Raw materials<sup>1)</sup></b>						
<b>Chemical pulp, t</b>	110,000	179 kg/t	101,000	174 kg/t	73,000	177 kg/t
<b>Mekaaninen massa, t</b>	211,000	345 kg/t	205,000	353 kg/t	146,000	353 kg/t
<b>Pigments, t</b>	246,000	402 kg/t	232,000	399 kg/t	165,000	399 kg/t
<b>Binders, t</b>	23,000	38 kg/t	22,000	38 kg/t	16,000	39 kg/t
<b>Additives, t</b>	13,000	21 kg/t	11,000	19 kg/t	8,300	20 kg/t
<b>Power plant fuels</b>						
<b>Fossil, GWh</b>	752	-	777	-	504	-
<b>Biofuels, GWh</b>	203	-	206	-	179	-
<b>Energy consumption in production</b>						
<b>Electricity, GWh</b>	852	1.39 MWh/t	843 <sup>2)</sup>	1.45 MWh/t	631	1.52 MWh/t
<b>Renewable electricity, GWh</b>		-	90 <sup>3)</sup>	-	49	-
<b>Heat, GWh</b>	590	0.96 MWh/t	559	0.96 MWh/t	419	1.01 MWh/t
<b>Renewable heat, GWh</b>		-	130 <sup>3)</sup>	-	122	-
<b>Natural gas to the coating process, GWh</b>	83	0.14 MWh/t	85	0.15 MWh/t	61	0.15 MWh/t
<b>Heating of buildings, GWh</b>	67	-	61	-	48	-
<b>Emissions into the air, mill and power plant</b>						
<b>Sulphur dioxide, SO<sub>2</sub>, t</b>	145	0.24 kg/t	164	0.28 kg/t	100	0.24 kg/t
<b>Nitrogen oxides, as NO<sub>2</sub>, t</b>	255	0.42 kg/t	249	0.43 kg/t	190	0.46 kg/t
<b>Particulates, t</b>	0.8	0.001 kg/t	4.7	0.008 kg/t	0.7	0.002 kg/t
<b>Fossil CO<sub>2</sub>, t</b>	260,607	426 kg/t	259,889	447 kg/t	176,940	427 kg/t
<b>Water consumption, process and cooling water, m<sup>3</sup></b>	26,380,000	43.3 m <sup>3</sup> /t	24,394,000	42.0 m <sup>3</sup> /t	21,286,000	50.8 m <sup>3</sup> /t
<b>Discharges to watercourses</b>						
<b>Pure cooling water, m<sup>3</sup></b>	20,712,000	33.9 m <sup>3</sup> /t	18,903,000	32.5 m <sup>3</sup> /t	16,538,000	39.4 m <sup>3</sup> /t
<b>Process effluent, m<sup>3</sup></b>	5,457,000	8.9 m <sup>3</sup> /t	5,277,000	9.1 m <sup>3</sup> /t	4,615,000	11.0 m <sup>3</sup> /t
<b>BOD<sub>7</sub>, t<sup>4)</sup></b>	57	0.09 kg/t	86	0.15 kg/t	43	0.10 kg/t
<b>COD<sub>Cr</sub>, t<sup>5)</sup></b>	1,328	2.2kg/t	1,393	2.4 kg/t	912	2.2 kg/t
<b>Phosphorus, P, t</b>	2.25	3.7 g/t	1.9	3.3 g/t	0,97	2.3 g/t
<b>Nitrogen, N, t</b>	19.2	31 g/t	16.3	28 g/t	12,2	29 g/t
<b>Solids, t</b>	442	0.72 kg/t	474	0.82 kg/t	315	0.75 kg/t
<b>Waste<sup>1)</sup></b>						
<b>Total, t</b>	68,396	112 kg/t	63,215	109 kg/t	43,036	104 kg/t
<b>Utilisation rate, %</b>	99.9	-	99.9	-	99.3	-
<b>Bark and treatment plant sludge into energy, t</b>	39,150	64 kg/t	33,940	58 kg/t	22,700	55 kg/t
<b>Ash, t</b>	27,640	45 kg/t	27,760	48 kg/t	18,600	45 kg/t
<b>Landfill waste, t</b>	17	0.03 kg/t	51	0.09 kg/t	4	0.01 kg/t
<b>Other regular waste, t</b>	1,530	2.5 kg/t	1,420	2.4 kg/t	1,246	3.0 kg/t
<b>Hazardous waste, t</b>	54	0.09 kg/t	43	0.07 kg/t	494	1.19 kg/t
<b>Size of the mill area, ha</b>	112	-	112	-	112	-
<b>Size of the impermeable area, ha</b>	42	-	42	-	42	-
<b>Size of the nature conservation area, ha</b>	70	-	70	-	70	-

1) Raw materials and waste indicated in dry weight

2) Calculation changed: Electricity consumption includes electricity consumed at the power plant

3) Consumption of renewable electricity and heat reported starting from 2019

4) Biological oxygen demand

5) Chemical oxygen demand



Sappi is the leading global provider of sustainable woodfibre products and solutions, in the fields of dissolving pulp, printing papers, packaging and speciality papers, casting and release papers, biomaterials and bioenergy. As a company that relies on renewable natural resources, sustainability is at our core.

Sappi Europe mills hold chain-of-custody certification under the FSC® (Forest Stewardship Council®)<sup>1)</sup> and/or PEFC (Programme for the Endorsement of Forest Certification)<sup>2)</sup> schemes. Our papers are produced in mills accredited with ISO 9001, ISO 14001, ISO 50001 and ISO 45001 certification. We have EMAS registration at five of our ten mills in Europe.

Sappi Europe SA is a division of Sappi Limited (JSE), headquartered in Johannesburg, South Africa, with 12,500 employees and 19 production facilities on three continents in nine countries, 37 sales offices globally, and customers in over 150 countries around the world. Learn more about Sappi at [www.sappi.com](http://www.sappi.com).

As an accredited environmental verifier (FI-V-0001), Inspecta Certification has examined the information of the environmental management system and 2020 EMAS review of Sappi Finland Operations Oy, Kirkniemi mill. Following this examination, on 26 March 2021 the environmental verifier has herewith confirmed that both the environmental management system and the Finnish environmental review are in compliance with the requirements of the EMAS Regulation (EC) No. 1221/2009. The verification concerns only the version in Finnish.

The EMAS (EU Eco-Management and Audit Scheme) statement of the Kirkniemi paper mill is published in Finnish and in English. The EMAS statement and annual reviews are available in PDF format on the Sappi website at [www.sappi.com](http://www.sappi.com). Please send any feedback and questions to the Environmental Manager via email to [Jenni.Kukkonen@sappi.com](mailto:Jenni.Kukkonen@sappi.com) or by calling +358 10 464 2116.

### **Sappi Europe**

Kirkniemi Mill  
Pikkukyläntie 8  
08800 Lohja  
Tel. +358 10 464 2999  
[www.sappi.com](http://www.sappi.com)

<sup>1)</sup> FSC® C015022

<sup>2)</sup> PEFC/07-32-76

