The Biofore Company

UPM

UPM Changshu

Environmental and societal responsibility 2017

UPM Changshu

UPM Changshu paper mill, a subsidiary of UPM -Kymmene Corporation, is situated in the Changshu Economic & Technological Development Zone against the south bank of the Yangtze River, approximately 90 km west of Shanghai.

Founded in 1995, the mill started its operation in early 1999. Currently, the mill has three paper machines producing both wood-free fine papers and specialty papers. Pulp, used as the main raw material for paper-making, is exclusively sourced from sustainably managed forests. In addition, in fine paper production, calcium carbonate is used as a filler for paper and kaolin is applied to coated papers as a pigment. In specialty paper production, filler is not used.

The mill is also equipped with auxiliary facilities including an in-house thermal power plant, a fresh water plant and a wastewater treatment plant. These facilities supply electricity, steam and fresh water for paper-making and purify the wastewater and other wastes from the production processes. Water used for paper production is taken from and discharged after purification to the Yangtze River.

In addition to the paper mill, UPM Changshu site accommodates other two UPM units, UPM Asia R&D Centre and UPM Raflatac label plant. The UPM Raflatac label plant is excluded from the scope of this report.

UPM Changshu Environmental and Societal Responsibility 2017 is a supplement to the Corporate Environmental Statement of UPM's pulp and paper mills (available at www.upm.com) and provides mill-specific environmental performance data and trends for the year 2017. The annually updated mill supplements and the UPM Corporate Environmental Statement together form the joint EMAS Statement of UPM Corporation. The next Corporate Environmental Statement and also this supplement will be published in 2019.

UPM leads the forest-based bioindustry into a sustainable, innovation-driven and exciting future across six business areas: UPM Biorefining, UPM Energy, UPM Raflatac, UPM Specialty Papers, UPM Paper ENA and UPM Plywood. UPM provides sustainable and safe solutions to the growing global consumer demand. Products are made of renewable and recyclable materials. The group employs around 19,100 people worldwide and its annual sales are approximately EUR 10 billion. UPM shares are listed on NASDAQ OMX Helsinki. UPM - The Biofore Company - www.upm.com

Production capacity	1,400,000 tonnes			
Personnel	1146 excluding global function staffs			
Products	Office Paper Products: UPM Jetset UPM Copykid Yes Future	 UPM Office SOHO Horizon Excellent Print	Graphic Paper Products: UPM Finesse Classic Matt UPM Finesse Classic Gloss UPM Fine	Specialty Paper Products: UPM Blue UPM Brilliant
Cerfiticates	EMAS – EU Eco-Management and Audit Scheme ISO 14001 – Environmental Management System ISO 9001 – Quality Management System OHSAS 18001 – Occupational Health and Safety System FSC® Chain of Custody – Forest Stewardship Council® Certificate for Measurement Assurance of Jiangsu Province PEFC™ Chain of Custody – Programme for the Endorsement of Forest Certification China Work Safety Certification level II All certificates can be found from UPM's Certificate Finder (available at www.upm.com/responsibility) >Principles and Performance > Certificate finder			
Environmental labels	China Green Label for copy paper Singapore Green Label for copy paper			
Awards	China Water Efficiency Frontrunner in 2017			

FSC www.fsc.org FSC® C014719
The mark of responsible forestry
For FSC products, visit www.fsc.org

PEFC PEFC/02-31-80
Promoting Sustainable Forest Management
www.pefc.org
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Cert. No.: 05508P1054001R1M

国家环境友好企业 China Environment Friendly Enterprise

Review of year 2017

In 2017, the mill has made environmental improvements in many aspects, including mainly fulfilling the Clean Run target with zero environmental deviations despite of the increased complexity of operations and the tightened discharge permits from the authority. At the same time, a variety of research and development activities were undertaken in an effort to make further improvements.

Improved results in 2017
One of the main achievements of 2017 was the reduction of air pollutant boiler emissions by 30% for sulfur dioxide (SO_2) and 11% for nitrogen oxides (NOx) compared with 2016. Performance of the wastewater treatment plant (WWTP) were also improved significantly during 2017. Pollutant concentrations in discharged wastewater were controlled at a level clearly below the permit limits all of the year. In addition, specific water consumption decreased 0.2m^3 per tonne of paper.

Continuous development and investment
Most of the mill's environmental parameters were within the optimum ranges as defined by Best Available Techniques (EU BAT BREF 2014). However, despite the positive results, new efforts have been planned to further reduce water and energy use. The "More with Biofore in China" programme (previously named as "Clean and Resource Efficient Paper-making") - which was launched in late 2016 - will significantly help realise resource efficiency and emission reduction targets. The programme, which will last two to three years, aims to evaluate and implement cutting-edge technologies that can help reduce water consumption, improve energy efficiency, reduce emissions and comprehensively utilise solid waste. The aim is to establish a "clean and efficient papermaking" model. Parts of this programme is already being implemented.

As part of the "More with Biofore in China" programme, in 2017 the mill decided to invest significantly to further upgrade the existing coal-fueled boiler flue-gas treatment system. The goal of this investment is to reach super-clean emission levels which means that the pollutant concentrations, after modification, will be lower than 50mg/nm^3 for NOx, 35mg/nm^3 for SO_2 and 10mg/nm^3 for particles. This goal is to complete this project by the end of 2018.

A further investment was made for paper machine vacuum system rebuilt aiming to create energy savings. By utilising this newly invested facilities, a 30 gigawatt hour (GWh) energy saving and subsequently a reduction in carbon emissions is expected.

In addition, a number of research projects and on-site trials were carried out to achieve water reduction and solid waste reuse.

Awards and Recognitions
The mill has been recognized by the Chinese government as a "China water efficiency front runner" in both Jiangsu Province and all of China; UPM is the first and only company to obtain the highest recognition in Jiangsu province. The mill also received the Environmental Company award from the Changshu Economic & Development Zone. Feedbacks are all positive from the mill's nearest villages through regular environmental dialogues.

Environmental Monitoring
The following environmental monitoring activities are performed in the mill area:

A. Bi-monthly test to evaluate the Yangtze River water quality nearby the mill by Changshu Water Resource Bureau
B. Measurement of mill wastewater
   – pH, COD, TSS, BOD_5, P, N, NH_4-N (Daily by mill laboratory)
   – flow, pH, COD and NH_4-N (24h-7d/w non-stop by on-line meters)
   – pH, COD, TSS, BOD_5, P, N, NH_4-N, AOX, and colour (Monthly by third party)
   – All data above are quarterly tested by the authority
   – Mill area rainwater is sample-tested by third party during the dry and rainy seasons
C. Air (mill boiler stack)
   – SO_2, NOx, particulates and CO (24h-7d/w non-stop measurement)
   – SO_2, NOx, and particulates (Quarterly sample-tested by authority)
D. Quarterly test were carried out for mill border noise by a third party
E. Monthly site inspections are conducted by the local authority

Mr. Steven Wang
Mill EHS Director

Mr. Jukka Saarelainen
Mill General Manager

Responsibility figures 2017

Certified Fibre

81% of fibre

used in paper production were FSC® or PEFC™ certified. UPM is targeting 100% certified fibre by 2030.

Community

145 UPM volunteers

provided environmental, safety and health info sharing for about

500 students

and

160 local citizens

our social welfare activities covered thousands of citizens in 2017.

Waste

98% mill solid wastes

are reused or recycled. Effluent sludge reuse trial as construction material continues.

Air

Mill air emission reduced

30% for SO_2

and

11% for NO_x

respectively in 2017 compared with 2016. There was also a 3% carbon emission reduction.

Energy

Mill total energy consumption was

2% cut

in 2017, which was mainly contributed by mill overall energy efficiency improvement.

Employment

1,370 direct employees

and 420 indirect (suppliers) employees are working at the UPM Changshu mill site. In addition, there were 50 interns temperorily working at the mill.

Safety

50% decrease of LTA*

was achieved at paper mill over the past 10 years.
*LTA: Lost Time Accident

Supply chain

100% of raw materials

spend qualified against UPM Supplier and Third Party Code.

Health

Annual health check covered

100% mill employees

and zero occupational illness was reported in 2017.

Water

There were

12% of COD reduction

and

10% of wastewater flow cut

in 2017 comparing with 2016.

Taxes

Annual contribution to China government was

39 million USD

including:
- State taxes (Corporate income tax paid by UPM China)
- Local taxes (Real estate tax, Land use tax, Stamp duty and Local levies)
- Customs duty on imported materials and equipment
- Individual income tax and social security contributions for UPM China employees
(indirect contributions through employment)

Air

UPM Changshu power plant is a combined heat and power (CHP) plant. It is equipped with two coal-fueled boilers rated at 241t/h each and four gas boilers rated at 56t/h each. The power plant produces electricity and steam for paper production. In supplement to its in-house capacity, external electricity and steam are occasionally purchased to cover any shortages. The gas boilers are only used for producing steam during the overhaul of the coal-fueled boilers.

The coal-fueled boiler's flue-gas is purified through denitrification, desulphurization and particulate removal processes. In 2017, this flue-gas treatment system ran without any air emission deviations over the year. After further modifications are completed, it is expected that the boiler can reach one of the lowest emission levels in China.

In China, local and national authorities limit air pollutant emissions for industrial enterprises by the total volume and unit concentration, as specified in the table below. The Changshu mill's air pollutants emission quota was cut significantly in late 2016; the new limits are based on the mill existing boilers' capacity and authority permit limits of pollutant concentration.

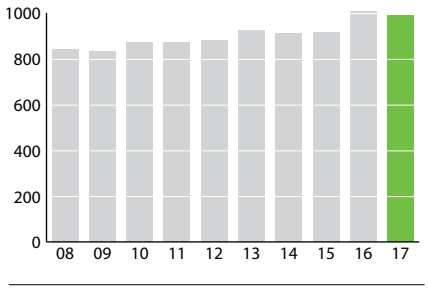
AIR POLLUTANT EMISSION PERMITS 2017

Item	Quantity (t/a)	Concentration* (mg/nm^3)
Sulphur dioxide, SO_2	221.88	50
Particulates	90.16	20
Nitrogen oxides, NOx	456.37	100

**hourly limit values specified by national standard GB13223-2011 for thermal power plant emissions*

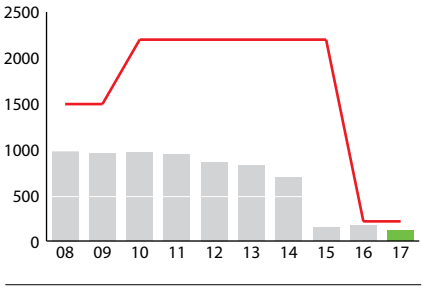
FOSSIL CARBON DIOXIDE, CO_2

1,000 t/a



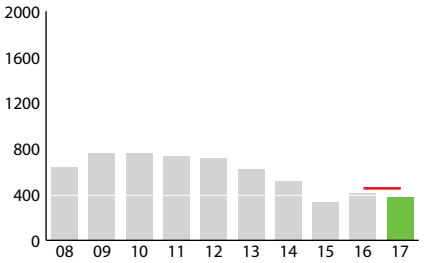
SULPHUR DIOXIDE, SO_2

t/a



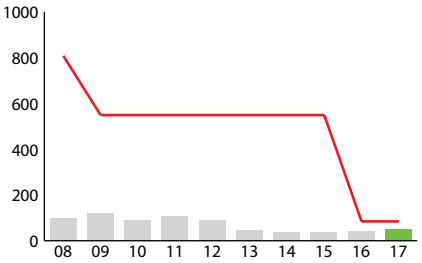
NITROGEN DIOXIDE, NO_x

t NO_x/a



PARTICULATES

t/a



Permit limit

Remark1: Above measurements are done according to Chinese standards which are derived from ISO standards, but they might not be fully comparable.
Remark2: NOx are monitored by measuring NO and calculated into NO_2

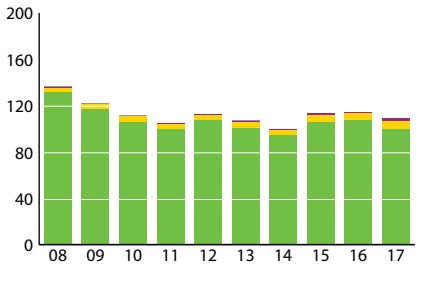
Waste

Solid wastes from the mill are mainly derived from boiler ashes, waste packaging, maintenance wastes and a small amount of non-recyclable waste. Waste is 98% recycled or reused. Non-recyclable waste is disposed by incineration or into a landfill field located 30km west of the mill. The site is rented and operated by a private company with legal license. The combustible non-hazardous waste from the mill is incinerated in an external power plant. A small amount of hazardous waste is treated by qualified environmental companies in compliance with relevant laws and regulations. Effluent sludge is incinerated in mill boilers as biofuel so it is excluded from waste statistics.

The mill has put great efforts to reduce process waste in 2017. The first trial for the reuse of waste water sludge as construction material was carried out with promising results.

SOLID WASTE

1000 BD t/a



Ash for re-use
Landfill and incineration waste
Other recycling wastes
Hazardous wastes

Remark3: The weights included in the figures are dry weights.

Water

The mill's wastewater treatment plant (WWTP) designed capacity is 26,400m³/d. The processes mainly consist of pre-sedimentation, bio-activated sludge stage, anoxic denitrification and finally the disc filtration process. The performance of the WWTP has been excellent over the year.

In 2017, a focus on the WWTP was to look for a long-term solution for eliminating effluent foaming that caused a slight increase in COD emissions in 2016. A variety of experiments were performed to find the most efficient way to remove the foaming material. A decision was made to invest also in a foaming elimination facilities, which will be installed in 2018. Meanwhile, several new tests for water reduction at the paper machine side and the reuse of purified wastewater were carried out with internal and external expert support. The first round of tests showed positive results, however, further tests are needed in the coming years for settling specific technical issues.

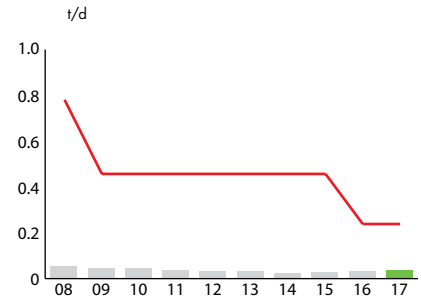
Limits for both the quantity and the concentration of the water pollutants for industrial enterprises are set by the local or national authorities (quantity: local permit; concentration: by table 3 in "Discharge Standard of Water Pollutants for Pulp & Paper Industry", standard code GB3544-2008. The table below shows the strictest limit in China currently. The mill's water pollutant emission quota has been reviewed in late 2016 based on the mill existing production capacity and permitted limits of pollutant concentrations.

WATER POLLUTANT DISCHARGE PERMITS 2017

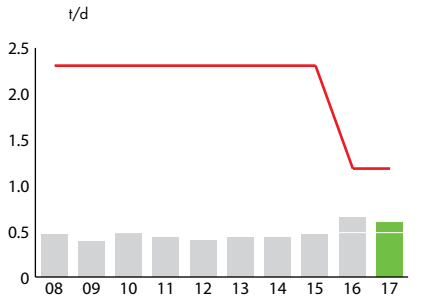
Item	Quantity (t/a)	Concentration* (mg/l)
Chemical oxygen demand, CODcr	417.56	50
Total suspended solid, TSS	83.52	10
Ammonia nitrogen, NH_4-N	41.76	5
Total nitrogen, TN	83.52	10
Total phosphorus, TP	4.18	0.5

**hourly average values*

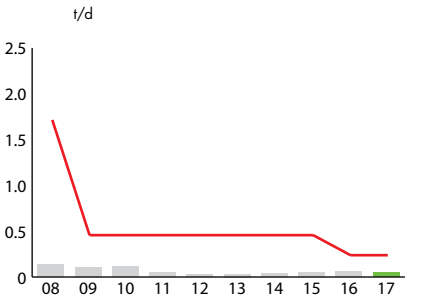
BIOLOGICAL OXYGEN DEMAND, BOD_5



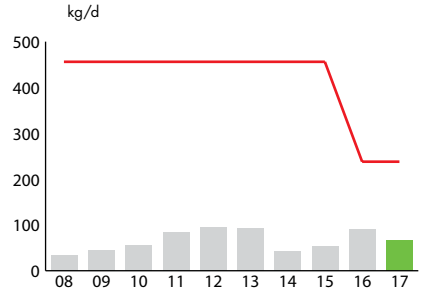
CHEMICAL OXYGEN DEMAND, CODcr



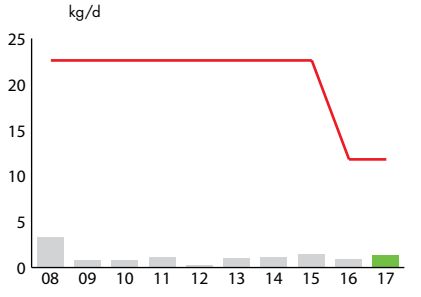
TOTAL SUSPENDED SOLIDS, TSS



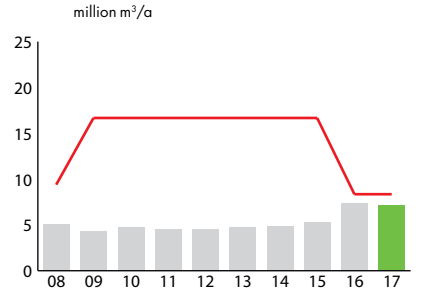
TOTAL NITROGEN, TN



TOTAL PHOSPHORUS, TP



EFFLUENT VOLUME



Remark1: Above measurements are done according to Chinese standards which are derived from ISO standards, but they might not be fully comparable.

— Permit limit

UPM Societal Responsibility

UPM places emphasis on economic, social and environmental responsibility in its daily operations, and aims to be a leader in sustainable development. UPM Changshu Paper Mill attaches great importance to social responsibility.

The new UPM Code of Conduct, revised in 2016, forms the framework for all company operations and sets out standards of behaviour for all UPM employees.

Occupational health and safety

The UPM Changshu Paper Mill is committed to developing a world-class safety culture and being a safe, fair and responsible employer. Safety is the priority of our daily work, and is put in the first place in any UPM Changshu Social Responsibility circumstances any time. All UPM employees, suppliers, contractors and visitors are required to strictly comply with UPM safety standards. Rigorous management and trainings are conducted to avoid accidents and to provide a safe working environment.

In 2017, UPM paid extra attention to six of the thirteen UPM safety standards. The six standards have been chosen for closer examination because they are the most relevant in preventing serious accidents. The six high risk safety standards form the "UPM Life Saving Standards", including "Risk Assessment", "Permit to work", "Mobile equipment and cranes", "Working at height", "Lock out – Tag-out", and "Confined spaces". The UPM Life Saving Standards aim to enhance employee's safety awareness; we expect full compliance with the standards in all situations and taking the right action to prevent serious accidents.

In 2017, UPM was certified as level II, the second highest safety standard level issued by provincial government. In 2017, UPM was awarded as the "Top Employer in China" for the sixth time. This is a recognition of UPM's long-term commitment to developing a safe and inspiring working environment in which people can participate and grow as professionals.

UPM focuses on long-term career development, emphasizing performance and employee engagement. The smooth two way communication stimulates staff professionalism, 38% of employees in China have worked for UPM for more than 10 years, while more than 5% of employees in China have been with the company for more than 20 year.

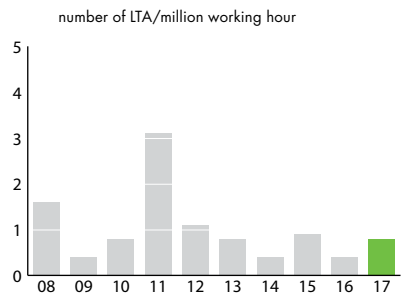
Contribution to local society

Building and maintaining good relations with local communities close to our operations are essential for ensuring our business success. Our environmental volunteer teams co-operate with the local government as well as local communities and schools in an effort to improve people's environmental awareness.

The "Green Future" project is a partnership between the Changshu Environmental Bureau, Changshu Education Bureau and UPM to support interactive education programs. "Green Future" aims to provide environmental education in order to evoke students' sense of shared responsibility from an early age, include habits that advance energy saving and environment protection. Since the program was established in 2010, more than 135 UPM volunteers have been working with 55 local schools in Changshu city, Shanghai and Jiangxi province. The program has been effective and well received by students, teachers and parents. The program has also been recognized by the Changshu government and local media.

"Green lifestyle" information sharing has been another volunteer campaign organized by UPM and Changshu Environment Bureau for several years.

LOST TIME ACCIDENT (LTA) FREQUENCY



Remark: figures including sub-contractors worked for UPM paper production but excluding other on-site and off-site service contractors

LIFESAVING STANDARDS LOGO

SUPPLIER MANAGEMENT INFORMATION	
Total number of contracted suppliers	185
Direct raw material suppliers	58
Other material and service suppliers	118
Transportation service providers	9
Number of suppliers been audited on-site in 2017	16
Number of suppliers to be audited in 2018	14

Activities have been held in many local communities to encourage people to take action in order to protect the environment. During the past four years' time, more than 3,500 local citizens in different communities in Changshu city have received our training and support.

Other departments and clubs also organized volunteer activities for social activities that promote public good, such as "Light up the blue sky" activity caring for autistic children, and "UPM public welfare campaign & Changshu City orientation". Both programs aim to make a contribution to the environmental protection and social welfare in Changshu.

In 2017, UPM and World Wildlife Fund (WWF) co-organized the "Green Me" campaign in China. A series of events were held throughout the year to encourage people to make a sustainable choice and as a result expand market demand for responsible paper products in China. At the end of the year, UPM was recognized with the "Forest Partnership" certificate by WWF.

In 2017, UPM introduced "Responsible Fibre" into China, guarantees that the product meets the industry's most demanding environmental and social responsibility criteria verified by a third party, and adds more value for the products.

Promoting sustainable economic development

UPM promotes responsible practices throughout the value chain and is active in finding sustainable solutions in co-operation with its customers, suppliers and partners. Creating value for society both as a responsible corporate citizen and through our products is an essential part of the Biofore Strategy.

UPM 's compliance with laws and regulations – in particular, competition and anticorruption laws – lays a solid foundation for us as a trusted business partner, and our responsible and ethical practices create long-term value for both UPM and its stakeholders.

At the end of 2017, UPM Changshu Mill had 1,369 employees (global functions included), 50 trainees, as well as 116 on-site contractor, including IT services, security, catering, cleaning personnel which work 8 hours per day.

Supplier audits are an integral part of responsible sourcing. UPM requires its supplier to adhere to the UPM Supplier Code and Third Party Code that defines the minimum compliance requirements for suppliers in terms of responsibility including environmental impact, human rights, labour practices, health and safety, and product safety. Suppliers' environmental and social performance is monitored through regular data collection and analysis.

Responsible Fiber logo

Nordic Origin logo

"Light up the blue sky" activity caring for autistic children

Environmental Parameters 2017

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 Statement.

Production capacity	Wood-free and specialty paper	1,400,000 t
Raw materials and additives	Pulp Fillers and coating pigments Chemicals for paper production Others	See UPM Corporate Environmental Statement for more information
Energy	Fossil and biogenic fuels Purchased power	Fossil 99%, biogenic 1% See UPM Corporate Environmental Statement for more information
Emissions to air	Particulates Sulphur dioxide, as SO_2 Nitrogen oxide, as NO_x Carbon dioxide, as CO_2 (fossil)*	52 t 119 t 372 t 989,812 t
Water intake	Process and cooling water including power plant use Municipal water	10,856,194 m^3 285,919 m^3
Discharges to water	Clean cooling water Process effluent volume BOD_5 CODcr Solids Phosphorus, P Nitrogen, N	237,250 m^3 7,111,681 m^3 12 t 210 t 19 t 0.5 t 23 t
Waste to landfill**	Construction and process wastes including 2100t from dormitory renovation	2,214 t
Waste for incineration	Domestic waste	798 t
Waste to recycle**	Boiler ash Wood waste Waste paper and board Metal Other recycling waste	99,574 t 224 t 3,448 t 2,008 t 836 t
Hazardous waste		115 t
Size of mill area		184.5 ha

* *CO_2 consumed for PCC production was not deducted from this figure*
** *Dry weights*

Performance against the targets in 2017

TARGET	ACHIEVEMENT	COMMENTS
1 Clean Run deviations		Actual results
– Category 5 = 0	Yes	0
– Category 4 = 0	Yes	0
– Category 3 ≤ 1	Yes	0
2 Clean Run observations ≥ 100 reports /year		
– Encourage employees to report Clean Run observations	Yes	107 observations reported
3 Wastewater		
– Foaming mechanism study and long-term solution proposal	Yes	Solution is proposed and investment decision is made already
4 Mill-wide energy and water saving 2017		
– Electricity reduction 1% per unit product	No	Electricity and heat reduction targets were not realized due to PM1 and PM2 lower runnability
– Steam reduction by 0.5% per unit product	No	
– Water usage reduction 0.2m³ per unit product	Yes	Water saving 0.23m³ per ton of paper reached

Year 2018 targets

TARGET	DEPARTMENT RESPONSIBLE
1 Clean Run deviations – Category 5 = 0 – Category 4 = 0 – Category 3 = 0	All
2 Clean Run observations ≥ 120 reports /year – Encourage employees to report Clean Run observations	All
3 Coal-fueled boilers' super-clean emission modification project implemented timely	Project manager
4 Mill-wide energy and water saving versus 2017 results – Electricity reduction 0.5% per unit product – Steam reduction by 0.5% per unit product – Water usage reduction 0.3m³ per tonne product	Paper production managers

EMAS
Verified environmental management
REG.NO. FI - 000058

REVALIDATION STATEMENT

As an accredited environmental verifier (FI-V-0001), Inspecta Sertifiointi Oy has examined the environmental management system and updated UPM Changshu mill Environmental and Societal Responsibility 2017 report as well as the information concerning UPM Changshu mill in the Updated UPM Corporate Environmental Statement 2017. On the basis of this examination, the environmental verifier has herewith confirmed on 2018-03-27 that the environmental management system, the updated UPM Changshu mill Environmental and Societal Responsibility report and the information concerning UPM Changshu mill in the Updated UPM Corporate Environmental Statement are in compliance with the requirements of the EMAS Regulation (EC) No 1221/2009.

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