The Biofore Company UPM

ENVIRONMENTAL
performance in 2015

UPM Changshu

Through the renewing of the bio and forest industries, UPM is building a sustainable future across six business areas: UPM Biorefining, UPM Energy, UPM Raflatac, UPM Paper Asia, UPM Paper Europe and North America and UPM Plywood. Our products are made of renewable raw materials and are recyclable. We serve our customers worldwide. The group employs around 19,600 people and its annual sales are approximately EUR 10 billion. UPM shares are listed on NASDAQ OMX Helsinki. UPM – The Biofore Company – www.upm.com

UPM Changshu

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

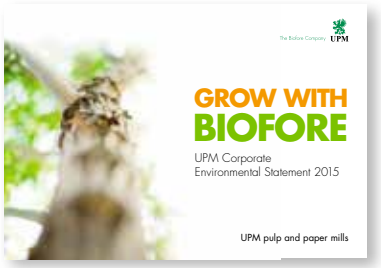
Founded in 1995, the mill started its operation in early 1999. The mill produces wood-free paper with two production lines. Pulp, which is used as raw material is exclusively sourced from sustainably managed forests. Calcium carbonate is used as a filler of paper and kaolin is additionally applied for coated paper as a pigment.

The Mill's third paper machine (PM3) completed its installation and started trial run by late 2015. PM3 produces wood-free and specialty paper.

The mill is also equipped with auxiliary facilities including an in-house thermal power plant, a fresh water plant and a waste water treatment plant. These facilities supply electricity, steam and fresh water for paper-making and purify the waste water and other wastes from the process. 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. UPM Raflatac label plant is excluded in the scope of this report.

Production capacity	1,400,000 tonnes including PM3 new capacity		
Personnel	748 employees		
Products	Office Paper Products:		Graphic Paper Products:
	UPM Jetset	UPM Office	UPM Finesse Classic Matt
	UPM Copykid	SOHO	UPM Finesse Classic Gloss
	UPM Yes	Horizon	UPM Fine
	Future	Excellent	
Certificates	EMAS – EU Eco-Management and Audit Scheme ISO 14001 – Environmental Management System Standard ISO 9001 – Quality Management System Standard OHSAS 18001 – Occupational Health and Safety System Standard PEFC™ Chain of Custody – Programme for the Endorsement of Forest Certification FSC® Chain of Custody – Forest Stewardship Council Certificate for Measurement Assurance of Jiangsu Province *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 Labelling for copy paper		



UPM Changshu paper mill Environmental performance in 2015 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 2015. 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 2017.

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Environmental year 2015

The year of 2015 is again a successful year of the mill with a milestone of the smooth start-up of the third paper machine (PM3) production line in November. The new paper machine is made by Voith, Germany and with most advanced technologies. With a minimum level of water consumption and high resource efficiency, the new machine will bring the mill a variety of competitive advantages not only in the market position but also in its environmental performance.

A six-million US dollar investment was implemented simultaneously for further promoting the mill waste water treatment plant's performance. A number of modifications were carried out at the mill waste water treatment plant (WWTP). It has been proven that the upgraded WWTP was performing very well during the new paper machine start-up phase and all the year-round as well.

The mill boiler flue-gas treatment system has been running good after being re-built in late summer 2014. This advanced purification system has significantly reduced the emissions of sulphur dioxide, nitrogen oxides and particulates. There was only one-hour record of particulate emission concentration exceeding the permit limit slightly due to malfunction in power supply of the electrostatic precipitator.

Most of the mill environmental parameters were within the optimum ranges indicated in the Best Available Techniques (EU BAT BREF 2014), however the further reduction for electricity and water usage is still expected.

Pollutant permits for new production lines were granted by authority a few years ago and are still valid currently after PM3 start-up.

No environmental related complaint was received from any of the external parties or individuals in 2015.

Environmental Monitoring

The following environmental monitoring activities are carried out in the mill area

A. Yangtze River water quality nearby the mill: bi-monthly test by Changshu Water Bureau
B. Measurement of mill waste water
   – pH, COD, TSS, BOD_5, P, N, NH_4-N: daily by mill laboratory
   – flow, pH, COD and NH_4-N: continuously by on-line meters
   – pH, TSS, BOD_5, P, N, AOX, colour: monthly by third party
   – all above data quarterly tested by authority
C. Air (mill boiler stack)
   – SO_2, NOx, particulates and CO: continuous measurement
   – Sampling of SO_2, NOx, and particulates: quarterly by authority
D. Continuous measurement of air quality in Changshu city centre by authority
E. Quarterly test of mill border noise by third party
F. Monthly site inspections by local authority

王志强

Mr. Steven Wang
Mill EHS Director

Mr. Pentti Putkinen
Mill General Manager

Air

UPM Changshu power plant is a combined heat and power (CHP) plant. It is equipped with two coal-fuelled boilers rated at 241t/h each and four gas boilers rated at 56 t/h each. The power plant produces electricity and steam for paper production. The coal-fuelled boiler's flue-gas is purified through processes of denitrification, desulphurization and particulate removal.

After the flue-gas purification system upgrade, the amount of sulphur dioxide emission in 2015 was remarkably reduced to 147t from 702t and the nitrogen oxides was also dropped to 334t from 520t, compared to previous year.

On September 29th, particulates emission was noticed exceeding the permitted limit slightly in a short period. The deviation was caused by the malfunction of one electrostatic precipitator's power supply. The power was restored within 15 minutes and the preventive action was taken immediately.

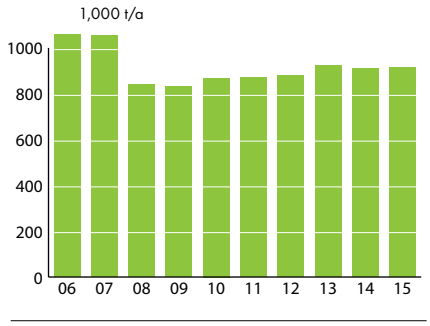
Air pollutants emissions for an industrial enterprise are limited both by the total volume and unit concentration specified in the tables below by the local and national authorities.

Air Pollutant Emission Permits 2015

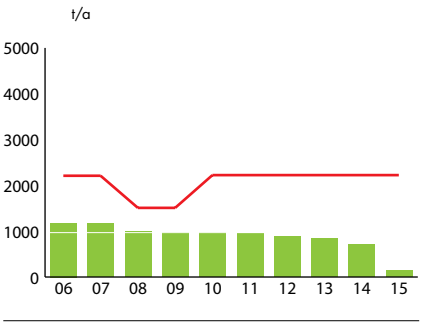
Item	Quantity (t/a)	Concentration* (mg/nm^3)
Sulphur dioxide, SO_2	2,238	50
Particulates	554	20
Nitrogen oxides, NOx	Not defined	100

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

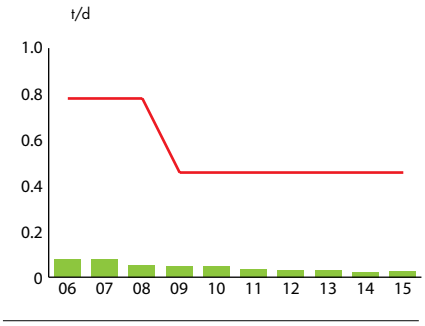
FOSSIL CARBON DIOXIDE, CO_2



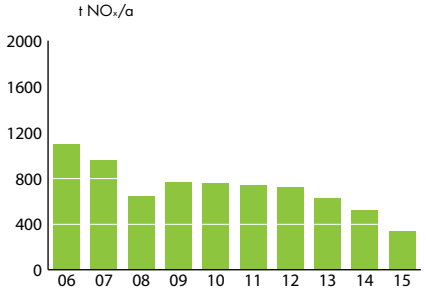
SULPHUR DIOXIDE, SO_2



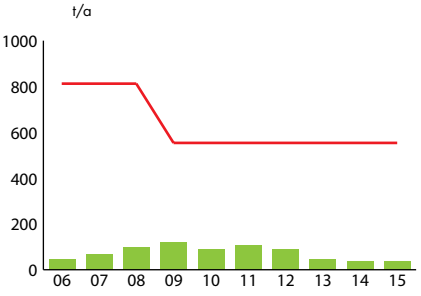
BIOLOGICAL OXYGEN DEMAND, BOD_5



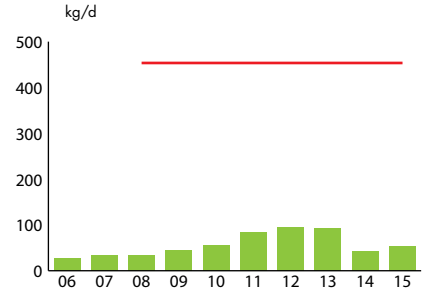
NITROGEN DIOXIDE, NO_x



PARTICULATES



TOTAL NITROGEN, TN



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

— Permit limit

Water

The mill waste water treatment plant (WWTP) was running well in 2015 and all parameters in the purified waste water were clearly below the permit limits.

In order to further improve mill WWTP performance, a comprehensive upgrade plan was made and implemented. The modifications have been focused on the following areas.
– Expansion of aeration and filtration capacity
– Introduction of a new anoxic process for nitrogen removal
– Rebuilt of the spill basin

The new aeration basin and the anoxic pond are constructed for dual purpose. This means that the aeration process can be easily shifted into the anoxic process if needed. The pipeline tie-in between the existing system and the expanded facilities was made in the summer of 2015. The trial run has shown that all indicators in each stage of

the effluent processes have reached the targeted levels. For example, the total nitrogen removal rate achieved 75%.

As a summery, the upgraded WWTP offers the plant operations a unique flexibility to achieve the best quality of the treated waste water.

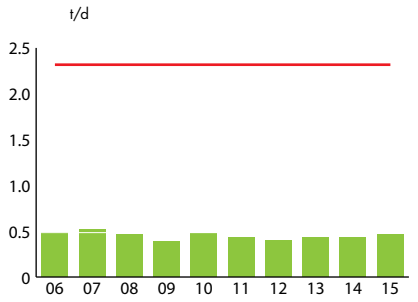
The limits of both the quantity and the concentration of the water pollutants of an industrial enterprise is mandatorily set by the local or national authorities (quantity: by local permit; concentration: by table 3 in "Discharge Standard of Water Pollutants for Pulp & Paper Industry", standard code GB3544-2008. Table 3 is in China the strictest limit that is only applicable to Tai-lake basin, an area of 36,900 square kilo meters within Yangtze River delta).

Water Pollutant Discharge Permits 2015

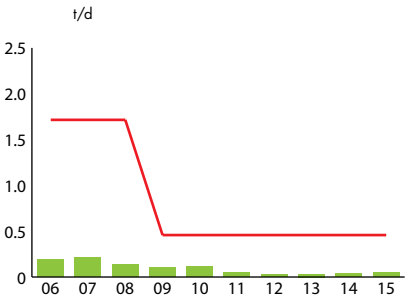
Item	Quantity (t/a)	Concentration* (mg/l)
Chemical oxygen demand, CODcr	834.0	50
Total suspended solid, TSS	166.7	10
Ammonia nitrogen, NH_4-N	83.3	5
Total nitrogen, TN	not defined	10
Total phosphorus, TP	8.3	0.5

**hourly limit values*

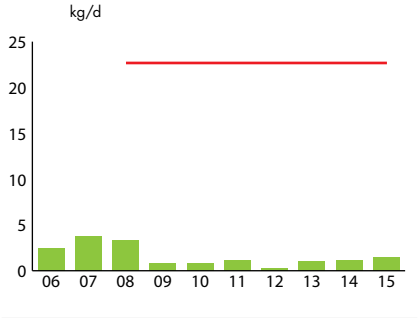
CHEMICAL OXYGEN DEMAND, CODcr



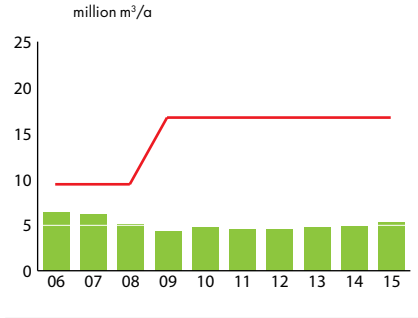
TOTAL SUSPENDED SOLIDS, TSS



TOTAL PHOSPHORUS, TP



EFFLUENT FLOW



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

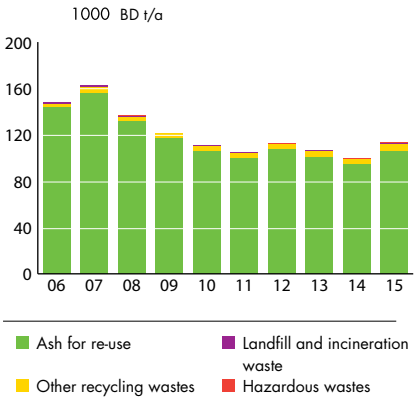
— Permit limit

Waste

Mill solid wastes are mainly boiler ashes, packing wastes and maintenance wastes. The total annual amount of the waste in 2015 was 112,949 t, of which 99% were recycled or reused. For example, the ashes are reused as raw materials for cement industry. Non-recyclable industrial waste is disposed by landfill. Landfill site is located 10 km south-east of the mill. The site is owned and operated by Changshu city government. Since February 2014, the burnable non-hazardous waste from the mill was incinerated in an external power plant instead of landfilled. There was also a small amount of hazardous wastes which were treated by qualified environmental companies in compliance with the relevant laws and regulations.

Effluent sludge is incinerated in mill boilers as biofuel so it is excluded from waste statistics.

SOLID WASTE



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

Environmental parameters 2015

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 Other	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)	36 t 147 t 334 t 916,000 t
Water intake	Process and cooling water including power plant use Municipal water	9,030,000 m^3 191,000 m^3
Discharges to water	Clean cooling water Process effluent volume BOD_5 CODcr Solids Phosphorus, P Nitrogen, N	237,000 m^3 5,280,000 m^3 9.8 t 168 t 17.9 t 0.5 t 19.2 t
Waste to landfill *	Construction and production wastes	560 t
Waste for incineration	Energy waste	360 t
Waste to recycle *	Boiler ash Wood waste Waste paper and board Metal Other recycling waste	105,400 t 850 t 3,530 t 2,040 t 110 t
Hazardous waste		108 t
Size of mill area		184.5 ha

** Dry weights*

Li Tao, water plant operator is checking at the aeration-anoxic ponds

Performance against the targets in 2015

TARGET	ACHIEVEMENT	COMMENTS
1) Clean Run observations		
– encourage employees to report Clean Run observations (≥50 reports/year)	Yes	Target fulfilled by improving peoples' environmental awareness
2) PM3 effluent smoothly handled		
– WWTP expansion project completed timely and emergency plan ready for taking over the new waste water from PM3	Yes	WWTP modification completed timely and is performing well
3) Air protection		
– Ensure coal fired boiler emission concentrations meeting the new limits		
NO_x < 100mg/nm^3	Yes	No emission deviations for SO_2 and NO_x
SO_2 < 50 mg/nm^3	Yes	
Particulates < 20mg/nm^3	No	One hour deviation recorded for particulates concentration
4) Mill-wide energy and water saving versus 2014 results		Electricity usage by per ton of paper remained the same and the water saving target was not reached due to lack of power savings from PM1 & PM2 and start-up phase of PM3
– Electricity reduction 0.5% per unit product	No	
– Steam reduction by 1% per unit product	Yes	
– Water usage reduction 0.1m^3 per unit product	No	

Year 2016 targets

TARGET	DEPARTMENT RESPONSIBLE
1) Clean Run deviations – Category 5 = 0 – Category 4 = 0 – Category 3 ≤ 2	All operational departments
2) Clean Run observations – encourage employees to report Clean Run observations(≥ 60 reports /year)	All operational departments
3) PM3 operation optimization – following the start-up curve and reaching the water and energy consumption targets	PM3 manager
4) Mill waste handling – fully implement waste handling instructions and improve waste collection facilities	Environmental manager
5) Mill-wide energy and water saving versus 2015 results – Electricity reduction 0.5% per unit product – Steam reduction by 0.5% per unit product – Water usage reduction 0.2m^3 per unit product	Paper production managers

EMAS
Verified environmental management
REG.NO. FI - 000058

VERIFICATION DECISION

As the accredited verifier (FI-V-0001), Inspecta Sertifiointi Oy has examined the environmental management system and the information of UPM Changshu Environmental Performance 2015 report and of UPM Corporate Environmental statement 2015. On the basis of this examination, the environmental verifier has herewith confirmed on 2016-04-07 that the environmental management system, this UPM Changshu Environmental Performance report and the information regarding UPM Changshu of UPM Corporate Environmental statement are in compliance with the requirements of the EMAS Regulation (EC) no. 1221/2009.

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UPM leads the integration of bio and forest industries into a sustainable future. Biofore stands for innovation, responsibility and efficiency.
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