

Environmental performance in 2016



UPM Shotton



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 Specialty Papers, UPM Paper ENA and UPM Plywood. Our products are made of renewable raw materials and are recyclable. We serve our customers worldwide. The group employs around 19,300 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 Shotton

The mill is situated on the Dee estuary in Flintshire, North Wales. The Dee Estuary is a designated Special Protection Area one of the 112 listed Natura 2000 sites in Wales. The mill site is about 10 miles from Chester and 25 miles from Liverpool.

The mill began production with one newsprint line in 1985. The fibre was supplied by an energy intensive thermo-mechanical pulp mill which used pulpwood, straight from the forest, as its principal raw material.

A second newsprint line was added in 1989 together with the first of three recycled fibre production plants.

Today only one paper machine operates and uses 100% recycled fibre. The principal raw material is now sorted, recovered graphic papers, mainly from domestic waste collections.

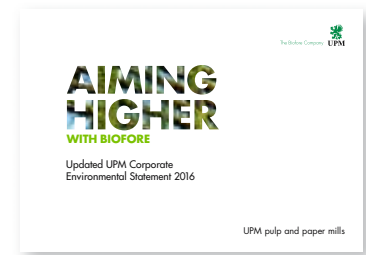
There have been several other large environmental investments over the last 28 years and the operations on site continue to develop.

The effluent treatment plant was rebuilt with activated sludge technology to deliver dramatic improvements in waste water quality despite increases in production

Waste sludge from the recycled fibre production plants is burnt in a combined heat and power (CHP) plant on site along with other renewable fuels to provide most of the site's thermal energy and approximately a third of its electricity demand

A Material Recovery and Recycling Facility (MRRF) was constructed and started operation on the site in April 2011. This plant sorts the recyclable material from co-mingled domestic waste collections and delivers high quality recovered paper raw materials to the recycled fibre production plants.

Production capacity	Up to 266,700 tonnes per annum
Personnel	182
Products	Standard Newsprint
Certificates	EMAS – EU Eco-Management and Audit Scheme ISO 14001 – Environmental Management System Standard ISO 9001 – Quality Management System Standard PEFC™ Chain of Custody – Programme for the Endorsement of Forest Certification FSC® Chain of Custody – Forest Stewardship Council® <i>All certificates can be found from UPM's Certificate Finder (available at www.upm.com/responsibility)</i>
Environmental labels	EU Ecolabel
Awards	Investors in People Standard



UPM Shotton Environmental performance in 2016 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 2016. 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 2018.



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EU Ecolabel : FI/037/001

Environmental year 2016

At UPM Shotton our commitment to sustainable development is reflected in our Mill Vision 'to be the front runner in creating value from renewable and recyclable materials'.

2016 was the first complete year since the closure of PM1, RCF1 and 2 and Boiler 1 and gives an indication of the new levels of performance.

The mill has also developed through the year with the commissioning of a 50MW solar park which, although owned by a third party, is directly connected to the mill and used for its daylight power needs. For many parts of the day the mill operated with 100% renewable energy.

UPM also invested in the mill; in November the new Low Pressure Condensing Turbine was commissioned. The new asset used waste steam from the power plant – made available since the closure of PM1 – to generate additional renewable electricity.

The site operates under an environmental permit (EP) issued by the environmental regulator, Natural Resources Wales (NRW). The mill remains part of the UK pulp and paper sector where permit conditions will be varied to reflect recent changes in the sector regulations and technical guidance.

There were no breaches of the environmental permit in 2016.

The mill environmental targets were mostly achieved. The total energy consumed on site was lower than 2015 and the percentage of 'green' energy used was higher. The quantity of water used was lower than 2015 as was the amount of chemicals used. However, the total amount of waste sent to landfill was

also higher than in 2015. This has been a challenging area but at the end of the year new recyclable outlets for boiler ash were developed which should realise an improvement in during 2017.

Challenging targets have been set to further reduce the total site environmental impact in 2017 when compared to 2016.



Andrew Bronnert,
Head of Energy & Operational Support



David Ingham,
General Manager

Air

The CHP plant has the largest impact on the air emissions. Smaller back-up boilers on site only run during the winter months or during unplanned CHP plant shuts.

The 2016 fossil CO₂ emissions were lower than 2015 due a full years operation without PM1 since the closure.

The emissions were well within permit limits as indicated in the tables below.

Emissions from the combined heat and power plant in 2016

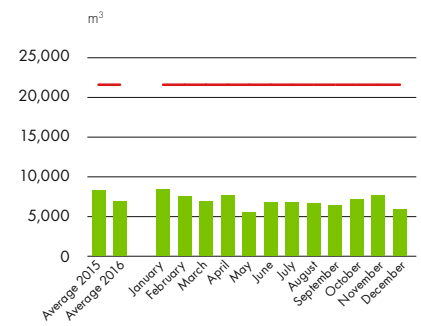
Continuous measurements	Limit mg/m ³	Mean mg/m ³
Carbon monoxide (CO)	50	32.64
Nitrous oxides (NO _x)	200	152.75
Sulphur dioxide (SO ₂)	50	3.71
Particulates	10	0.16
Total organic carbon (TOC)	10	0.89
Hydrogen chloride (HCl)	10	2.18

Periodic measurements (twice per annum)	Limit mg/m ³	Mean mg/m ³
Mercury	0.05	0.00350
Cadmium & thallium	0.05	0.0109
Tin, arsenic, lead, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.350
HF	2	0.03
Dioxins/furans (ITEQ)	0.1 x 10 ⁻⁶	0.00850 x 10 ⁻⁶

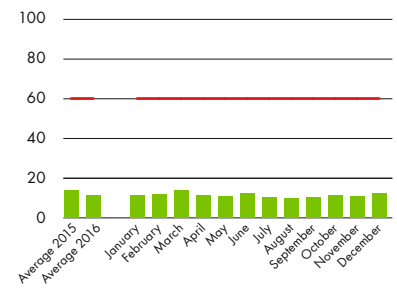
Water

Fresh water consumption is constantly monitored and measured in all parts of the site. Process water is often re-used several times before being discharged to the effluent treatment plant. The target in 2016 was to further reduce the water consumption which was achieved.

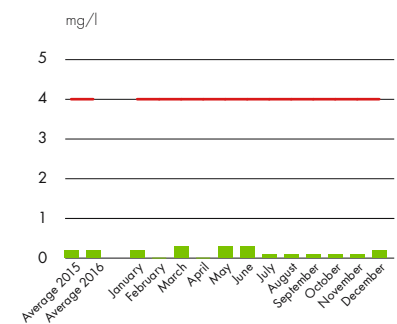
Daily final effluent discharge volume



Total solids concentration in final effluent



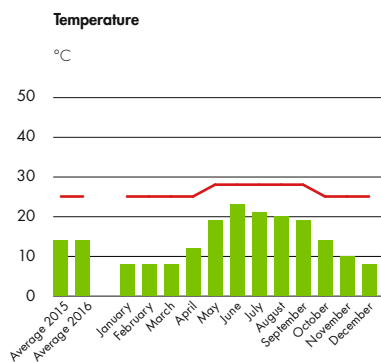
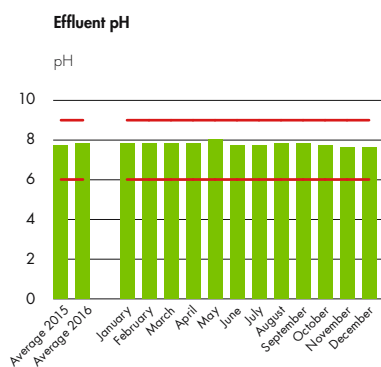
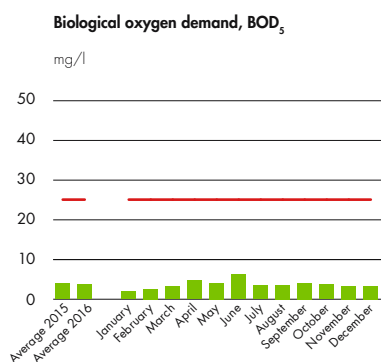
Nitrogen, N



Waste

The final effluent discharge remained well within consent limits throughout the year, as shown in the trends below. The operation of the effluent treatment plant was stable and coped well with the closure of a production line.

The mills overall waste production reduced in 2016 due to the line closure. However, the % of waste sent to landfill increased as the boiler ash is generally landfilled and this volume remained constant in 2016 compared to 2015. MRRF residues were reprocessed as a refused derived fuel for combustion on other sites and other boiler ash was reprocessed into cement.



— Limit value



Environmental parameters 2016

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.

Production capacity	Paper	Up to 266,700 t
Raw materials and additives	Recovered paper Co-mingled recyclates Process chemicals Operating supplies	See UPM Corporate Environmental Statement for more information
Energy	Biomass fuels Fossil fuels Electricity	93.5% 6.5% See UPM Corporate Environmental Statement for more information
Emissions to air	Sulphur dioxide, SO _x Nitrogen oxides, NO _x Carbon dioxide, CO ₂ (fossil) Particulates	6.4 t 263.3 t 11,133 t 0.26 t
Water intake	Industrial*	3,742,435 m ³
Discharges to water	Chemical oxygen demand, COD Biological oxygen demand, BOD ₅ Total suspended solids, TSS Effluent volume	222 t 16.6 t 31 t 2,579,950 m ³
Waste**	Landfill Sludge Fly ash*** Bottom ash*** Metal Recovery rate Hazardous waste	30,437 t 5,706 t 19,788 t 5,214 t 2,424 t 44.3% 7 t
Size of mill area		62 ha



* Including potable water used on site.

** All waste tonnages are stated as dry weight and exclude wastes generated from the MRRF plant. Recovery rate is calculated on a bone-dry basis.

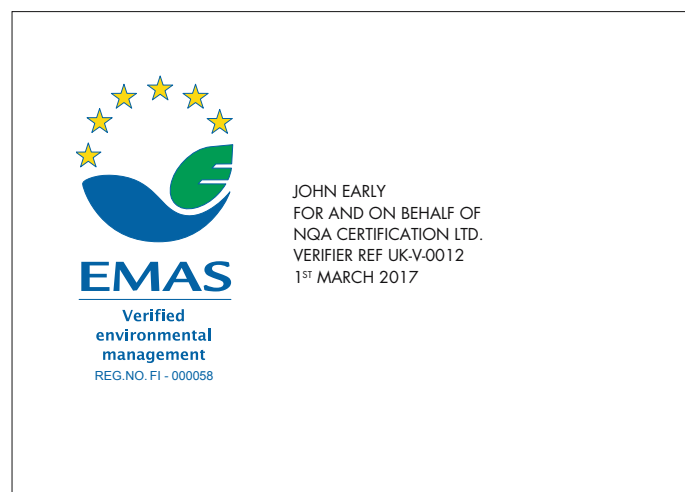
*** These ashes are consider hazardous in the UK.

Performance against targets in 2016

Targets and measures	Deadline	Target achieved?
Energy		
Reduce total electrical energy consumption – target less than 2015 level	12/2016	Achieved
Increase % 'Green' electrical energy consumption – target more than 2015 level	12/2016	Achieved
Water Conservation		
Reduce total water consumption – target less than 2015 level	12/2016	Achieved
Use of Resources		
Reduce waste to landfill – target to decrease % waste to landfill less than 2015	12/2016	Not achieved
Reduce Chemical consumption – target decrease in total chemical consumption less than 2015	12/2016	Achieved

Environmental targets 2017

Targets and measures	Deadline	Plan
Energy		
Reduce total electrical energy consumption – target less than 2016 level	12/2017	Energy improvement programme PM tonnage increase
Increase % 'Green' electrical energy consumption – target more than 2016 level	12/2017	Condensing turbine and solar power output increase
Water Conservation		
Reduce total water consumption – target less than 2016 level	12/2017	Condensing turbine operation. Water management improvement
Use of Resources		
Reduce waste to landfill – target to decrease waste to landfill less than 2016	12/2017	Boiler fly ash to recycling end-uses



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