



MOHN MEDIA

2017 ENVIRONMENTAL
COMPANY PROFILE

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EDITORIAL

Dear Readers,

When you’ve been doing something for nearly 30 years, things become routine at some point – don’t they? To be honest, no, they don’t. At least not when it comes to our Environmental Company Profile. Even though this is the 27th time we are presenting this company profile to provide information about our environmental impact, it is by no means business as usual for us.

And this is less because the underlying conditions – such as the legal requirements – can continuously change. Instead, the reason for this is that, each year, we learn a little bit more about how to further optimize existing processes or even replace them with better ones, allowing us to work in a way that better conserves resources. For example, let’s look at our use of recycled paper: We were able to further increase our use of recycled paper, which, of course, resulted in decreasing our use of fresh fiber paper at

the same time. You can find out more about why paper recycling is so crucial in this year’s special topic.

If our customers prefer to use fresh fiber paper, we continue to rely on raw materials derived from certified sustainable forestry practices. The result? Only seven percent of printed paper lacks a sustainability label that meets Blue Angel, FSC or PEFC criteria.

Examples like these are proof positive that we have been hard at work making additional progress on aligning our business and environmental goals. Nevertheless, there is still more work to be done, and we will continue to work to improve our environmental efforts. In this issue, find out for yourself where we currently stand. For more information, please do not hesitate to contact our team in the Environmental Department.



THE GLOBAL DEMAND FOR PAPER IS GROWING:
According to WWF estimates, we use 450 million tons of paper every year.

LESS IS MORE: Compared to a kilogram of copying paper made from fresh fibers, a kilogram of recycled paper saves up to 2.2 kilograms of wood (German Federal Environment Agency).

CONSERVING RESOURCES

Paper Recycling: A Valuable Life Cycle

Paper is a valuable raw material – and not just for us as a printing company. That is why this year's company balance will spotlight the issue of how we can handle this raw material responsibly and sustainably.

In spite of the progress being made on digitization, the demand for paper worldwide is still increasing in nearly all aspects of our lives. According to the WWF, the current demand for paper globally is currently around 450 million tons per year. One of the largest consumers of paper is Germany. According to figures from the German Pulp and Paper Association (VDP), Germany consumed 20.5 million tons of graphic and sanitary paper products and packaging material in 2016. According to the German Federal Environment Agency, this means that every German consumes an average of some 250 kilograms of paper every year – almost five times as much as the global average, just 57 kilograms per capita. This makes Germany the

world's fourth largest consumer of paper worldwide. If nothing else, this high level of paper consumption is a sign of prosperity: Reading books, newspapers and magazines is an everyday activity, as is sending and receiving goods and, of course, using various types of sanitary paper products. If countries with high population figures were to consume a similar amount of paper to Germany, this would have a massive impact on forests as the point of origin for the most important raw material for paper products – wood – as well as water and energy consumption. An increase in industrial wood harvesting would further limit forests as a key CO₂ store – with consequences for the global climate.

FORESTS AS CLIMATE PROTECTION: Trees capture the greenhouse gas CO₂ from the atmosphere. A 25-meter spruce captures around 1,800 kilograms (Bavarian Regional Ministry for Forests and Forestry).

PAPER PRODUCTION IN GERMANY

As with consumption, Germany also holds a leading position when it comes to the quantity of paper produced. In 2017, just under 23 million tons of paper, cardboard and paperboard were produced (source: VPD Facts on paper 2017). This places the German paper industry number one in Europe and number four worldwide, behind China, the US and Japan.

Production is divided into three main categories:

- Paper and board for packaging (around 51%)
- Graphic paper (around 38%)
- Sanitary and household paper (around 7%)

In addition to fresh wood fibers, fibers from waste paper, known as secondary fibers, are also used. More than 17 million tons of waste paper was collected and delivered for further production in Germany in 2017 (source: VDP Facts on paper 2017). This corresponds to a waste paper usage rate as a proportion to overall domestic paper production of around 75 percent. In 1990, this rate was just 50 percent (source: VDP). However, breaking this figure down into individual paper types reveals a more differentiated picture of the situation. While the recycling rate for packaging paper has been 100 percent for years now, the recycling rate for sanitary paper has withered – likely due to a lack of acceptance by customers. While this rate was 68 percent in 1996, it was just 48 percent in 2017 according to figures from the German Pulp and Paper Association. The recycling rate for graphic paper has remained steady at 30 percent for several years (source: VerbraucherService Bayern). Here, too, customers have reservations when it comes to the quality of the fibers used and the degree of whiteness when increasing the amount of recycled fibers.

PAPER RECYCLING

Processing waste paper to manufacture high-quality recycled paper on a large scale is only possible if the concept of recycling is firmly established and the public is willing to separately dispose of different kinds of waste, not to mention that access to waste paper containers must be available. Using waste

paper as a raw material for paper manufacturing significantly reduces the environmental aspects that crop up as a result of manufacturing paper using fresh fibers. The huge demand for paper can no longer be satiated by fresh fiber alone if we want to protect the forests that remain intact against further damage.

ENVIRONMENTAL ASPECTS

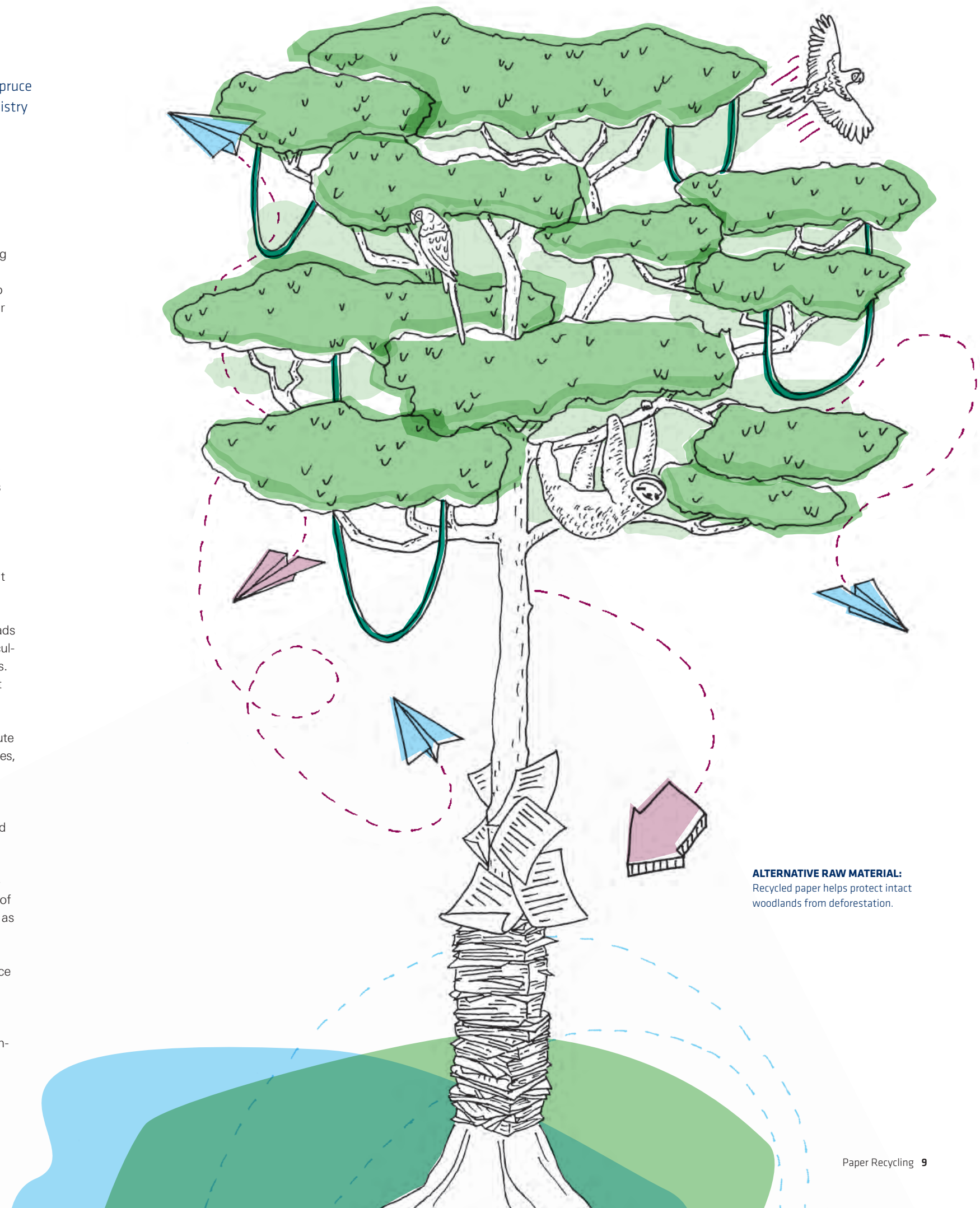
FRESH FIBER PAPER

Manufacturing paper using fresh fiber places significant pressure on the environment because it uses considerable amounts of wood, energy, water and chemicals.

Half of the timber felled commercially worldwide is used for paper manufacturing, with some 20 percent of this coming from jungles (source: GEO). In many countries with large jungles, such as Brazil and Indonesia, this immense demand for wood often leads to massive deforestation and the formation of monoculture plantations with similar trees, usually eucalyptus. In the process, many plants and animals that cannot survive without the protection of these native trees must face the destruction of their basis for survival. Furthermore, these monoculture plantations contribute to climate change. This is because, compared to jungles, they have a much smaller capacity to store CO₂.

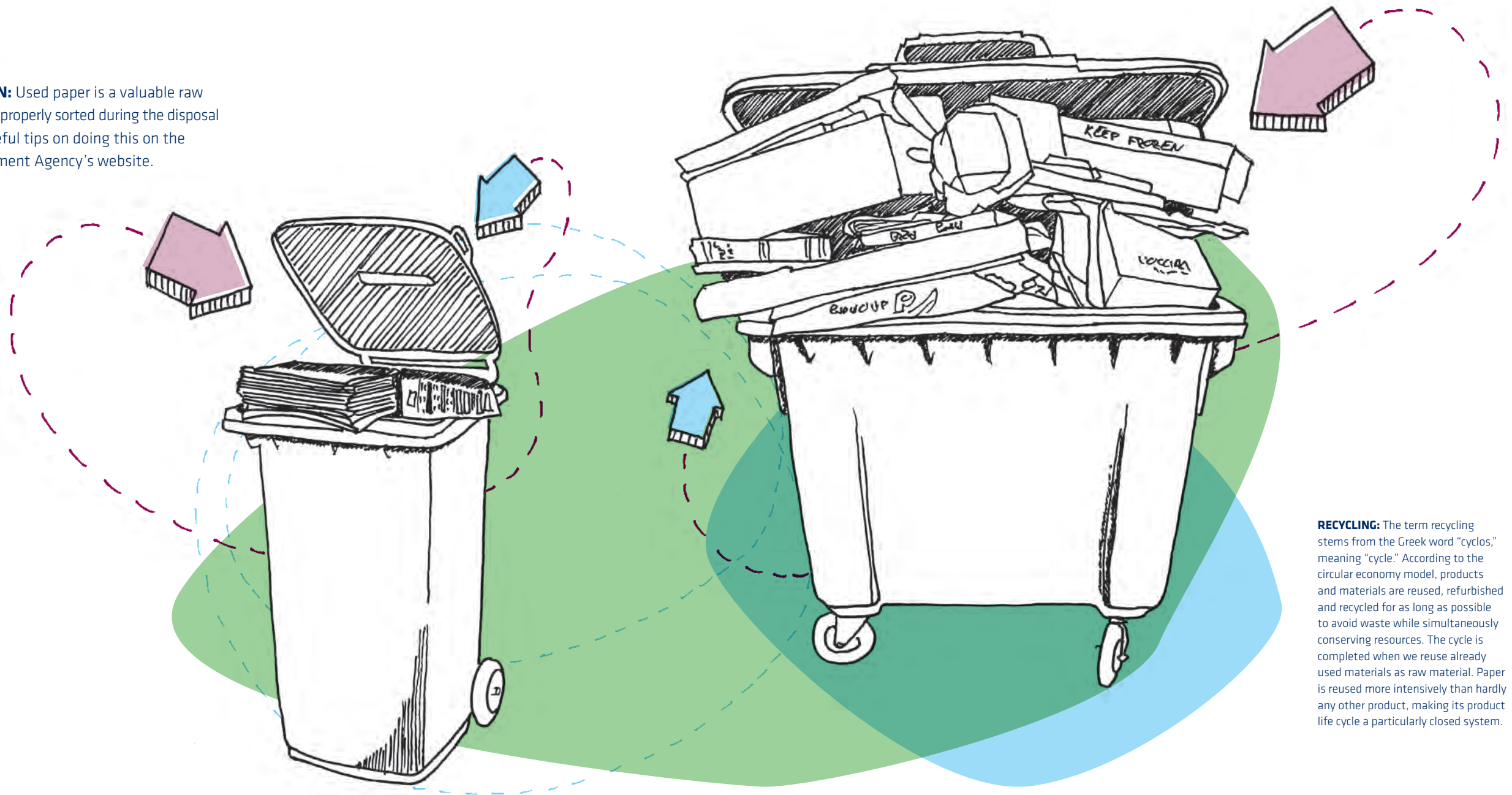
Pulp manufacture also has a significant environmental impact. An enormous amount of energy and water is needed to harvest fresh fibers from wood composites. In fact, after the metal and chemical industry, the paper industry is the third largest consumer of energy in Germany: Manufacturing a ton of fresh fiber paper takes the same amount of energy as it does to produce a ton of steel (source: GEO).

Because Germany for the most part does not produce pulp as a primary material itself but imports up to 80 percent of it from other countries, including up to a quarter from Brazil, the impact caused by long transport routes must also be included in the environmental balance sheet (source: GEO).



ALTERNATIVE RAW MATERIAL:
Recycled paper helps protect intact woodlands from deforestation.

FOR THE RECYCLING BIN: Used paper is a valuable raw material that needs to be properly sorted during the disposal process. You can find useful tips on doing this on the German Federal Environment Agency's website.



RECYCLING: The term recycling stems from the Greek word "cyclos," meaning "cycle." According to the circular economy model, products and materials are reused, refurbished and recycled for as long as possible to avoid waste while simultaneously conserving resources. The cycle is completed when we reuse already used materials as raw material. Paper is reused more intensively than hardly any other product, making its product life cycle a particularly closed system.

RECYCLED PAPER

The environmental advantages of recycled paper compared to fresh fiber production are obvious for all the aspects discussed above. Using secondary fibers eliminates the environmentally damaging production of pulp. Manufacturing recycled paper uses 60 percent less energy and up to 70 percent less water. Manufacturing one kilogram of recycled paper takes two kilowatt hours of energy and 15 liters of water, whereas manufacturing the same amount of fresh fiber paper takes five kilowatt hours of energy and 50 liters of water (source: German Federal Environment Agency). In addition, recycled paper accumulates less waste, and the reduced amount of energy used means lower CO₂ emissions.

Paper fibers can be recycled more than once. In fact, they can be recycled up to six times. However, the

length of the fibers is shortened in each round of recycling, and their bonds within the paper molding diminish. As such, the fiber pulp is admixed to fresh fiber in lower quantities, especially with graphic paper, to increase paper strength.

Recycled paper also poses advantages for transport. Because waste paper largely comes from Germany, transport routes to paper plants are much shorter, making it much more environmentally compatible than fresh fiber production.

THE RECYCLING PROCESS

To use waste paper from newspapers, magazines and packaging to manufacture new paper, it needs

to be collected and correctly sorted as comprehensively as possible. Mixing waste paper with other materials like general waste, plastic or glass contaminates the paper fibers, compromising the recycling process as a whole. After collecting it from the various public, commercial and private collection bins, the waste paper is then laboriously measured and sorted. The more than 3,000 original paper types of varying quality is ultimately sorted into 65 types of waster paper according to European standards (source: VDP). At the same time, extraneous material like staples, CDs and product samples are removed. The waste paper is then finely chopped in pulpers – large churning vats – and water is added. This breaks down the individual fibers and sieves are used to filter out additional extraneous material.

When manufacturing high-quality, light-colored printing paper, the residual color needs to be removed from the fiber pulp in a process called de-inking. We use caustic soda and anionic surfactants (soap) to detach the color particles from the fibers. Air bubbles drive these particles to the surface, where they are then skimmed off. The fiber pulp is then bleached with oxygen and hydrogen peroxide if needed, before being processed into new paper in the paper machine.

As mentioned above, this recycling process diminishes the quality of the fibers, in particular with regard to their ability to attach to one another, particularly because, in most cases, the fibers undergo multiple recycling and de-inking processes. As a result, it is necessary to mix in fresh fiber when manufacturing new paper.

*"We use it for our daily hygiene. We learn to write on it and have been using it for centuries to spread culture, knowledge and information. We use it to decorate our living spaces, package our food and drink, and it can even be used for textiles. And we throw it away multiple times a day: **PAPER.**" (Pro Regenwald)*

MOHN MEDIA

As one of Europe's leading printing companies, Mohn Media professes its special responsibility for protecting the environment and natural resources in its corporate principles. In addition to economic success, environmental protection is the top goal of the company's policies. It is against this backdrop that Mohn Media has made the economical and responsible handling of paper as a printing substrate a significant priority in terms of environmental management.

Its certifications under the FSC (since 2013) and PEFC (since 2008) standards form the basis for this intensified use of fresh fiber paper where the raw material – wood – was harvested using sustainably managed and strictly controlled forestry practices to protect forests. Together with recycled paper, this paper makes up the vast majority of the paper – around 93 percent – processed at Mohn Media.

Mohn Media's high environmental production standards have allowed it to use the prestigious "Blue Angel" ecolabel for numerous product groups. In addition to high standards for the entire production process, the Blue Angel ecolabel requires 100-percent use of recycled paper following strict criteria. This means that only paper awarded with the Blue Angel ecolabel may be used in print production.

Mohn Media joined the Industrial Alliance for the Sustainable Use of Paper (IPR) in 1998. The Alliance

is a coalition of numerous corporations with the aim of promoting acceptance of recycled paper among the public in the face of widespread prejudice. Member companies include Otto, Lufthansa, Sony and paper manufacturers Steinbeis and Schönfelder.

This demonstrates that corporate commitment to increasing the use of recycled paper is not limited to implementation in their own production processes. Instead, the Alliance as a whole serves as a point of contact for representatives from the business, political and societal spheres. Through various national campaigns, the IPR has striven since its founding to "lift recycled paper from its niche environmental market, to encourage entire sectors to switch to recycled paper, to overcome prejudices and position the Blue Angel as a guidepost for sustainable paper sourcing."

USE OF RECYCLED PAPER AT MOHN MEDIA

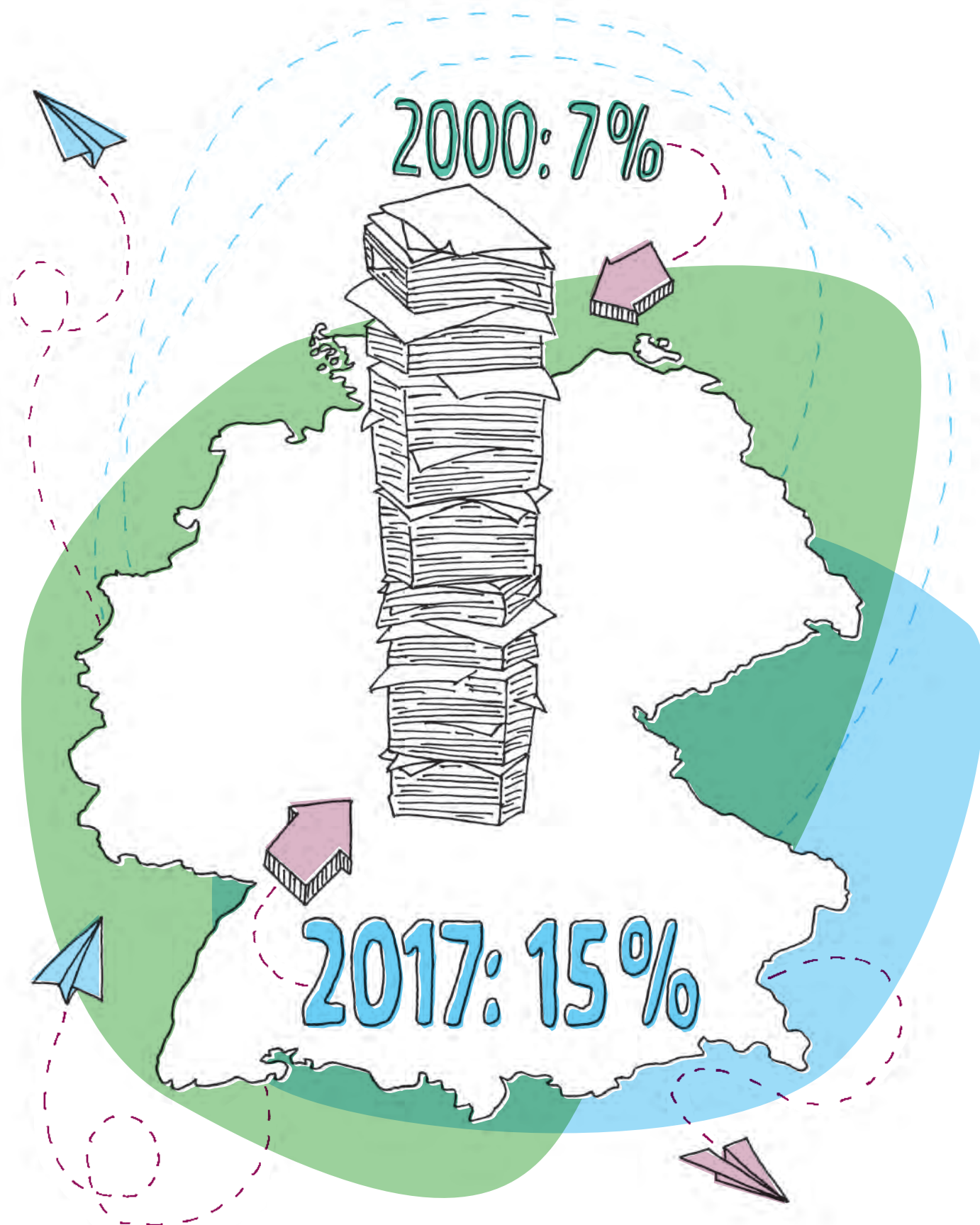
The amount of paper printed at Mohn Media every year has continually grown as a result of the increased production volume over the past few years. At the same time, the percentage of recycled paper compared to the total quantity of paper processed has steadily increased. This is clear from the figures presented in the environmental reports from the past five years. For example, the quantity of printed paper (sheets and rolls together) in 2013 was 492,056 tons with recycled material making up just under 34 percent. In the reporting period (2017) for this report, 542,857 tons – or ten percent more – paper was printed than five years ago, but the amount of recycled material rose to 41.7 percent.

PAPER QUANTITY

2017	41.7%	542,857 tons
2016	38.1%	524,032 tons
2015	35.7%	523,624 tons
2014	35.2%	514,131 tons
2013	33.9%	492,056 tons

■ Paper quantity
■ Percent recycled





JOINT SUCCESS: The Industrial Alliance for the Sustainable Use of Paper, an alliance of notable companies and key partners from the non-business sector, has significantly increased the acceptance of recycled paper. For example, the market share of office paper with the Blue Angel ecolabel has increased from seven percent in 2000 to 15 percent in 2017.

"It is now generally accepted knowledge that paper with the Blue Angel ecolabel meets the highest environmental standards and stands for top quality. Compared to fresh fiber paper, its manufacture saves at least 70 percent more water and 60 percent more energy. Not to mention that recycled paper reduces pressure from forests and promotes the preservation of biological diversity." (Bayerischer Rundfunk)

MARKET ENGAGEMENT

The Industrial Alliance for the Sustainable Use of Paper

The Industrial Alliance for the Sustainable Use of Paper (IPR) was founded in 2000 to combat what was at the time a significant image and acceptance problem for recycled paper.

As an economic alliance of 24 notable companies from different industries with important partners from beyond the business sector, IPR is a powerful joint venture lobbying for the use of recycled paper. Its partners include the German Federal Environment Ministry, the German Federal Environment Agency, all the local umbrella organizations, the German Association of University Professors and Lecturers and the German Nature and Biodiversity Conservation Union.

The initiative's stated goal is to position paper with the Blue Angel ecolabel as a symbol of a sustainable economy and motivate businesses and public administrations to switch to recycled paper. Through national projects and campaigns, since its founding the IPR has succeeded in lifting recycled paper from its niche environmental market, overcoming prejudices and encouraging entire sectors to switch to recycled paper.

In the "Paper Atlas" the IPR publishes each year, local communities and universities compete to see who can achieve the highest rates of recycled paper usage. Already, 80 percent of all German cities are making their paper consumption transparent and

have increased the amount of recycled paper they are using by more than 20 percent within ten years. Thanks to its huge popularity, the Paper Atlas has established itself as strong benchmark for sustainable paper procurement.

The "CEOs Show Their True Colors" campaign also motivates companies to switch to Blue Angel paper. More than 100 CEOs from the German business world have already personally committed to using recycled paper. Their public commitment has truly boosted the image of recycled paper and has gradually become a permanent part of companies' sustainability activities.

As a key driver and moderator of the issue, the IPR has succeeded in continually increasing acceptance of recycled paper. For example, the market share of office paper with the Blue Angel ecolabel has now increased from seven percent in 2000 to 15 percent. Today, recycled paper is considered a high-quality, modern product that significantly contributes to climate and resource protection and specifically promotes sustainable action and a circular economy.

For more information visit www.papiernetz.de

FACTS AND FIGURES

The 2017 Environmental Company Profile

The 2017 Environmental Company Profile celebrates the 27th annual profile in a row – and of course presents a detailed overview of our environmental impact, making clear the areas in which we have improved upon compared to previous years and where we can still improve.

In the 2017 financial year, the **production quantity** increased by 5.9 percent to 14.99 billion square meters of printed surface area, not least due to the significant increase in the production of brochures and action print. We also succeeded in increasing the quantity of total print items produced by 12.3 percent compared to the previous year. The main contributors to this were brochures, with 3.3 billion products (+11.9 percent) and action print products at 1.7 billion products (+17.9 percent). By contrast, the number of copies of printed books (-4.5 percent), magazines and catalogs (-1 percent) and the production of telephone directories (-6.7 percent) has fallen.

RAW, AUXILIARY AND OPERATING MATERIALS

The increase in production for printed products meant more raw materials had to be used than the year before. A total of 572,906 tons were used, representing an increase of 2.4 percent. 95.4 percent of these raw materials were allotted to printed paper. Of the 546,645 tons of paper and cardboard, 93 percent was

sourced from certified sustainable forestry practices or manufactured from recycled fibers. Only a total seven percent of printed paper lacked a sustainability label that meets Blue Angel, FSC or PEFC criteria.

The use of recycled paper increased by a further 11 percent to 230,047 tons. The amount of ink and varnish used increased by eight percent to a total of 12,251 tons. At the same time, the use of additional production materials such as cardboards, covering materials and shipping material was further reduced.

Postpress follows the printing process, where printed sheets are made into the end products customers ordered. Depending on the degree of in-house production, various **auxiliary materials** like binding materials, silicone and adhesives are needed. The amount used decreased by three percent to 2,781 tons. This was due to yet another fall in production for elaborately manufactured print products like books, magazines/catalogs and telephone directories. Quantitatively speaking, the largest portion of auxiliary materials was once again made up by adhesives, with 1,432 tons (-5.5 percent) being consumed, and

silicone oil at 832 tons (-18.3 percent). Silicone oils and emulsions are used to improve paper web processing during postpress. 81.5 tons (+50.3 percent) of metal filament was needed to staple and spiral bind magazines, catalogs and brochures.

Operating materials form yet another group of materials used in the printing and finishing process. Unlike raw and auxiliary materials, they are not directly part of the final product. Nevertheless, without them printing and processing would not be possible. The most important materials that fall under this category are printing plates, cleaning agents, solvents and lubricants. All told, the significant increase in production meant 23.2 percent more operating materials were needed than in 2016. As such, the number of aluminum printing plates used increased by 1.8 percent to 344,229, corresponding to a material quantity of 582.9 tons. Quantitatively speaking, at 1,888 tons, salts, lyes and acids make up the lion's share of operating materials used to recycle our well water into process water and dampening solution.

The amount of water needed by the company and the attached energy center is sourced from the company's own wells on the premises. Depending on the way the water will be used, it is made into coolant or humidifying water or used to provide hot water and air conditioning. Our consumption of processed **fresh water** increased by 15 percent to 293,073 cubic meters.

Energy sources and fuels are also among the operating materials used. Consumption of electrical energy sank by 0.5 percent to 122.3 million kilowatt hours compared to the previous year, while the total printed surface area – representing Mohn Media's overall production – increased by 5.9 percent to nearly 15 billion square meters during the same period. Extensive optimization to the energy center meant

that the amount of energy generated increased. As a result, only 0.43 million kilowatt hours needed to be purchased from the grid (previous year: 9.2 million kilowatt hours). In the roll plant, old machinery was replaced by a new, energy-optimized offset printing press, which allowed us to reduce the amount of natural gas used in the dryers and thermal afterburning units by three percent to 5.3 million cubic meters. The amount of fuel used by company vehicles, including the company fire department and commuter shuttles, increased by 6.5 percent to 162.1 tons, while the use of gas-operated forklift trucks increased by 4.3 percent to 87.4 tons.

The lower amount of energy used in production is reflected in the **air emissions** for 2017. For example, emissions of the greenhouse gas carbon dioxide decreased by 6.5 percent to 140,110 tons, and sulfur dioxide emissions were even reduced by a whopping 62.3 percent to 4.4 tons thanks to the significant decrease in the amount of grid power purchased this year. Nitrogen oxide emissions decreased by seven percent, while particle emissions sank by 25 percent.

The increased production quantities led to more scrap and residual material in the **waste balance**. The total amount of different types of waste was 88,949 tons (+4.8 percent), and more than 99 percent of that could be reallocated for recycling purposes. Only 823 tons of hazardous types of waste was generated, of which 57 tons could be used for recycling.

Waste water from the offset printing process had only a low level of pollution, which meant that it could be released into the city of Gütersloh's sewage treatment plant without any pre-treatment needed. Similar to fresh water consumption, the total amount increased by 15.6 percent to 119,360 cubic meters.

FACTS AND FIGURES

The Company Balance Sheet

As usual, our Company Balance Sheet, with its comparative values in relation to the previous year, provides clearly arranged information using absolute figures about the number of products we produced in the 2017 financial year, and the amounts of raw, auxiliary and operating materials as well as energy were needed, and the emissions and waste produced in the process.

INPUT	2016	2017	CHANGE IN %
Raw materials (t)	559,283.21	572,905.87	2.4
Copying paper	74.07	68.21	-7.9
Cut-size paper	36,441.73	36,758.42	0.9
Reel paper	487,590.02	507,020.42	4.0
Cardboard	4,836.05	2,798.24	-42.1
Covering material/Laminate	86.58	80.75	-6.7
Packaging/Shipping	18,910.78	13,928.49	-26.3
Ink/Varnish	11,343.98	12,251.34	8.0
Auxiliary materials (t)	2,867.15	2,781.35	-3.0
Glue	1,514.85	1,432.12	-5.5
Fabric	81.52	87.55	7.4
Stamping foil	1.39	1.30	-6.5
Metals/Wire	54.20	81.47	50.3
Underlay sheets	2.01	1.52	-24.6
Backliners/Crepe	48.36	44.76	-7.5
Silicone	1,018.64	832.05	-18.3
Other	146.17	300.59	105.6

Total operating materials (t)	3,079.35	3,794.31	23.2
Operating materials minus hazardous materials (t)	640.35	692.96	8.2
Cleaning agents	24.31	24.91	2.5
Lubricants	9.77	11.55	18.2
Other	7.40	17.56	137.3
Diverse printing materials	8.48	9.47	11.8
Printing plates	544.84	582.86	7.0
Offset blankets	22.24	23.34	5.0
Offset blanket washing fleece	23.31	23.26	-0.2

Hazardous operating materials (t)	2,438.99	3,101.35	27.2
Water treatment	1,295.35	1,887.94	45.7
Developers	31.95	31.95	0.0
Cleaning agents	377.20	393.16	4.2
Isopropanol/Dampening solution additive	734.49	788.29	7.3

Energy consumption			
Electricity (in millions of kWh)	121.71	122.29	0.5
Natural gas (in millions of m³)	5.46	5.29	-3.0
Fuels (t)	152.10	162.05	6.5
Propellant gas (t)	83.82	87.40	4.3

Fresh water (m³)	255,174	293,073	14.9
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OUTPUT	2016	2017	CHANGE IN %
Products (in millions)			
Books	30.57	29.19	-4.5
Magazines/Catalogs	602.10	595.82	-1.0
Action Print	1,434.02	1,716.47	19.7
Brochures	2,977.28	3,332.98	11.9
Telephone directories	43.72	40.79	-6.7
Printed surface area (in billions of m²)	14.16	14.99	5.9

Accumulated waste (t)			
Waste for recycling	84,086.65	88,126.14	4.8
of which hazardous waste for recycling	54.33	57.22	5.3
Hazardous waste for disposal	714.10	765.74	7.2

Waste water (m³)	103,293	119,360	15.6
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Air emissions (t)			
CO ₂	150,063.70	140,110.47	-6.6
CO	73.99	70.37	-4.9
SO ₂	11.65	4.39	-62.3
NO _x	176.56	164.19	-7.0
Particulate matter	3.84	2.88	-25.0
CH ₄	250.32	236.34	-5.6
NMVOC	13.76	13.18	-4.2
Total HC	264.08	249.52	-5.5

KEY ENVIRONMENTAL INDICATORS

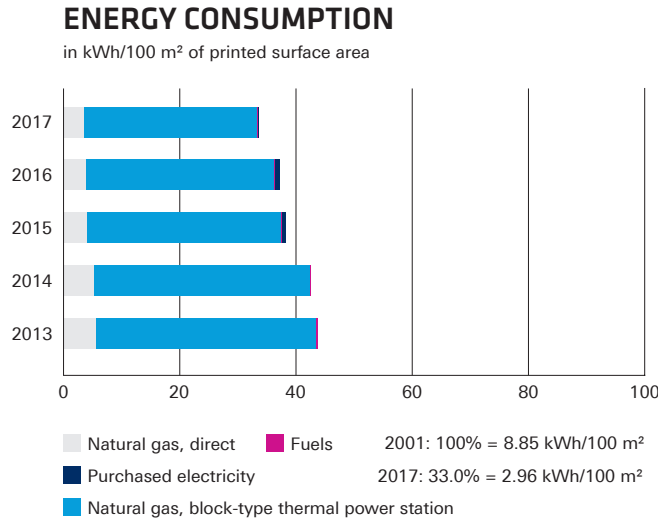
Eco-Controlling 2017

In addition to our Company Balance Sheet, we have provided a five-year environmental controlling comparison of our production, consumption and emissions figures.

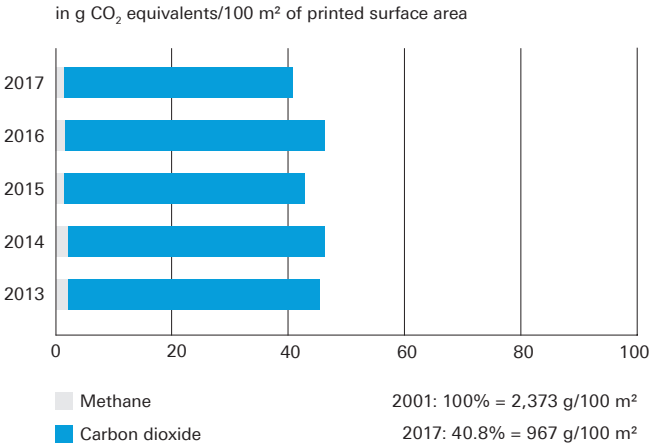
For years now, the key indicator system Mohn Media uses has enabled us to isolate the most important environmental data involved in our production processes from the annual fluctuations in production and compare them year on year. To that end, we use the nine environmental parameters we observe per 100 square meters of surface area of printed paper. In order to be able to provide a uniform point of reference, we have used the figures from the 2001 financial year to represent a value of 100 percent. This has allowed us to visualize the trends for each indicator over the past five years and measure the impact of the measures and improvement efforts being taken.

The most important environmentally-relevant industrial indicators are taken from energy consumption and the resulting emissions. At 2.96 kilowatt hours per 100 square meters of printed surface, our **energy consumption** in 2017 decreased by a further 0.28 kilowatt hours. We were able to supply up to 99.6 percent of our demand for energy in the form of electrical energy, heat and cold using our highly efficient gas turbine heat and power plant, using natural gas as its primary energy source as much as possible. Just 0.4 percent of our energy consumption needed to be purchased from the public energy grid.

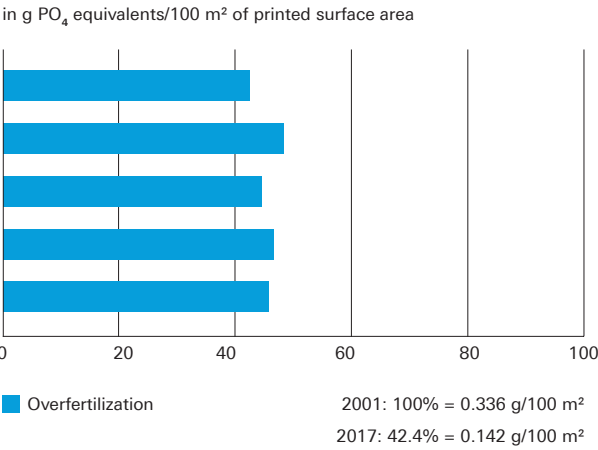
The **greenhouse gas effect** – expressed in kilograms of CO₂ equivalents – describes the impact of harmful gases like carbon dioxide and methane on the atmosphere. At 967 grams per 100 square meters, the greenhouse gas effect caused by Mohn Media's energy consumption was 11.8 percent lower than the previous year's value. The decline was caused by the higher overall quantity of printed paper surface and the significantly lower amount of energy purchased from the grid.



GREENHOUSE EFFECT



OVERFERTILIZATION

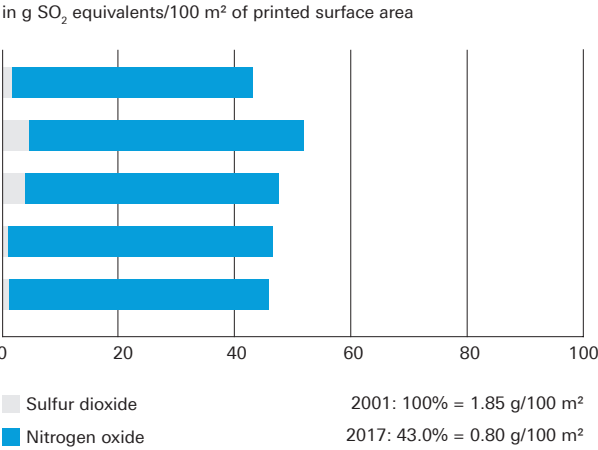


In addition, the emissions indicators for traditional incineration processes like **overfertilization** and acidification are showing a clear decline in these values. Overfertilization describes the potential for the input of trace elements like nitrogen and phosphorous to lead to the overfertilization (eutrophication) of soil and water. This is expressed using the phosphate equivalent indicator. In 2017, this decreased by 12.2 percent to 0.142 grams per 100 square meters.

The term **acidification** covers the effects of sulfur dioxide and nitrogen oxide emissions from incineration processes. Acidification is measured using sulfur dioxide equivalents. Thanks to the low amount of power taken from the public grid, this value decreased by 16.7 percent.

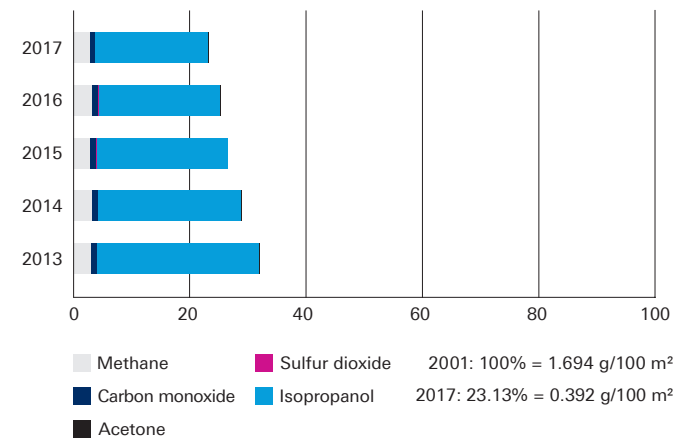
The fifth and final energy-related indicator is **summer smog potential**. In addition to the energy-related emissions involved in the production process at Mohn Media, the process emissions from the use of acetone as a solvent and iso propanol as a dampening solution are responsible for the formation of summer smog. The consistent decline in the use of isopropanol during the printing process and the substitution of acetone as a solvent has meant that, despite the increase in production quantities, the summer smog potential – measured in ethylene equivalents – has decreased by a further 8.3 percent.

ACIDIFICATION



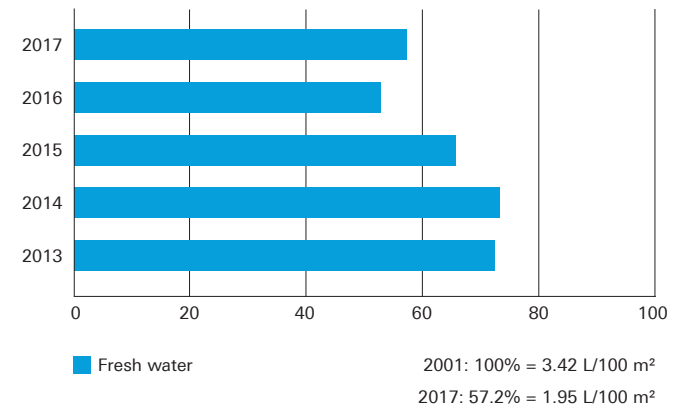
SUMMER SMOG

in g ethylene equivalents/100 m² of printed surface area



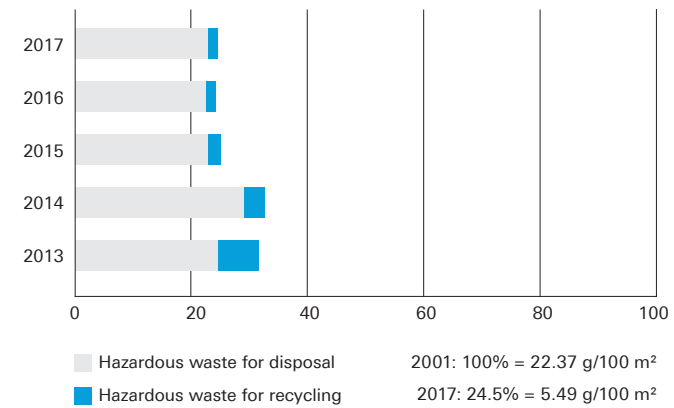
WATER CONSUMPTION

in l/100 m² of printed surface area



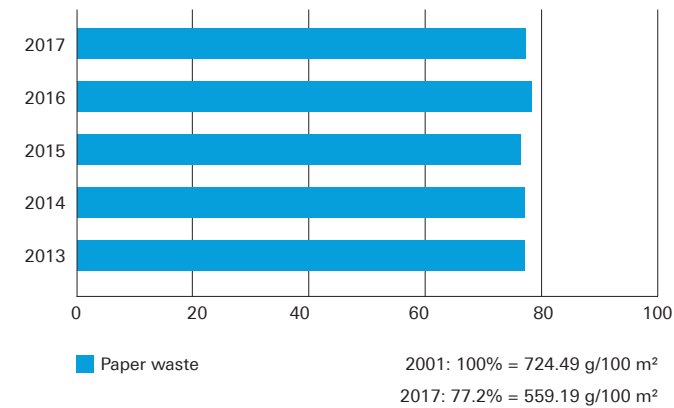
WASTE AND HAZARDOUS MATERIALS

in g/100 m² of printed surface area



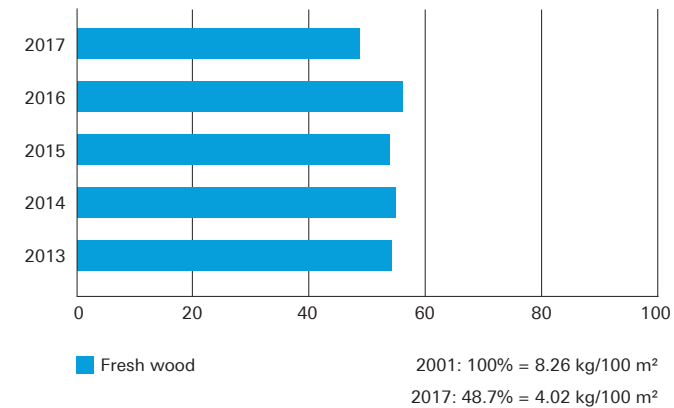
PAPER WASTE

in g/100 m² of printed surface area



WOOD CONSUMPTION

in kg/100 m² of printed surface area



The indicators for **wood consumption** and the use of certified fresh fiber paper are important criteria for us in terms of acting sustainably when it comes to paper as a raw material and forests as a resource. The amount of paper certified under the FSC and PEFC sustainability criteria reached nearly 94 percent in the 2017 financial year. After all, the more waste paper is

included in the system, the less fresh wood need be felled to product printed paper and the more sustainable our handling of forests as a resource can be rated. We were also able to increase our use of recycled paper, which this year made up nearly 42 percent of our overall paper consumption. This also caused a further decrease in the use of fresh wood in our products.

The four other environmental indicators relevant to the printing industry represent how the materials needed for production and the waste situation in the production process are handled. **Water consumption** was almost completely covered by our own wells on the premises. The well water treated in our energy center is primarily used for humidification and re-humidification during paper web processing, for coolants, air conditioning and plumbing. At 1.95 liters per 100 square meters of printed surface, 0.15 liters more was needed this year compared to last year.

the printing and postpress process generates a not insignificant amount of production waste. However, nearly all of it can be used for recycling. The figures for both the **waste and hazardous materials** and paper waste used for recycling indicators have taken divergent paths.

While the group containing hazardous waste for disposal and recycling saw a slight increase by 0.06 grams, the **amount of paper waste** decreased by 17.6 grams per 100 square meters of paper surface.

Comparison of Financial Years

	2013	2014	2015	2016	2017
Products (in millions of units)	4,443.0	4,551.0	4,858.1	5,087.7	5,715.3
Books	40.13	68.27	71.22	30.57	29.19
Magazines/Catalogs	558.04	571.04	561.32	602.10	595.82
Action Print	1,172.57	1,200.07	1,280.77	1,434.02	1,716.47
Brochures	2,603.67	2,643.06	2,900.08	2,977.28	3,332.98
Telephone directories	68.60	68.60	44.71	43.72	40.79
Sum of printed surface (in billions of m²)	14.10	14.20	14.50	14.20	14.99
Raw materials (t)	519,808.46	542,553.96	552,025.23	559,283.21	572,905.87
Cut-size paper	63.75	75.79	63.07	74.07	68.21
Book end paper/Special paper	1,436.25	1,025.35	1,115.01	1,780.71	1,712.23
Sheet paper	35,947.38	32,431.05	34,872.70	35,811.42	34,729.50
Reel paper	458,600.02	478,143.57	486,031.99	487,590.02	507,020.42
Cardboard	4,515.60	4,517.50	4,204.03	4,836.05	2,798.24
Covering material/Laminate	93.39	110.32	79.13	86.58	80.75
Packaging/Shipping	12,757.22	13,481.02	12,958.02	18,910.78	13,928.49
Ink/Varnish	10,322.07	10,238.05	11,096.88	11,343.98	12,251.34
Auxiliary material (t)	2,809.02	2,699.27	2,759.07	2,867.15	2,781.35
Adhesives	1,449.74	1,416.70	1,517.48	1,514.85	1,432.12
Cloth	22.42	35.56	92.30	81.52	87.55
Stamping foil	1.57	2.17	1.51	1.39	1.30
Metals/Wire	39.44	39.72	54.47	54.20	81.47
Underlay sheets	1.93	2.25	2.11	2.01	1.52
Backliners/Crepe	50.39	48.57	40.24	48.36	44.76
Silicone	1,240.07	1,150.07	1,047.11	1,018.64	832.05
Other	3.47	4.22	3.85	146.17	300.59
Operating material (t)	595.47	607.07	615.35	640.35	692.96
Cleaning agents	38.34	34.67	25.97	24.31	24.91
Lubricants	10.36	33.05	9.12	9.77	11.55
Other	4.77	5.10	4.83	7.40	17.56
Diverse printing materials	19.51	19.97	8.12	8.48	9.47
Printing plates	479.52	472.08	519.72	544.84	582.86
Offset blankets	23.41	21.51	25.95	22.24	23.34
Wash fleece	19.56	20.68	21.64	23.31	23.26
Fresh water (m³)	348,447	354,353	325,548	255,174	293,073

	2013	2014	2015	2016	2017
Hazardous materials (t)	2,704.73	3,409.12	2,973.79	2,438.99	3,101.35
Water treatment	1,528.14	2,257.40	1,788.57	1,295.35	1,887.94
Developers/Fixing agents	38.25	38.70	40.95	31.95	31.95
Cleaning agents	347.22	348.36	366.51	377.20	393.16
Isopropanol/Dampening solution additive	791.12	764.67	777.77	734.49	788.29
Energy consumption					
Electricity (kWh million)	129.50	118.70	124.06	121.71	122.29
Natural gas (m³ million)	7.93	7.22	5.88	5.46	5.29
Fuels (t)	165.82	181.39	187.41	152.10	162.05
Propellant gas (t)	80.76	79.88	85.44	83.82	87.40
Waste for recycling (t)	82,515.33	83,085.29	84,744.38	84,086.65	88,126.14
Paper/Cardboard	78,590.17	79,151.10	80,344.34	80,265.03	83,844.32
Wood	1,808.82	2,886.16	1,814.62	958.99	1,609.19
Printing plates	461.65	459.12	534.51	535.79	557.56
Scrap	340.09	235.10	699.50	802.85	727.03
Other	1,314.61	353.82	1,351.42	1,523.99	1,388.04
Hazardous waste for recycling (t)	220.64	114.40	69.68	54.33	57.22
Solvent/Washing liquid	137.20	89.90	0.00	0.00	0.00
Other	83.44	24.50	69.68	54.33	57.22
Hazardous waste for disposal (t)	776.28	922.10	741.68	714.10	765.74
Developers/Fixing agents	36.49	35.24	36.14	31.96	32.10
Waste ink	125.07	135.39	142.78	147.02	144.79
Solvent/Washing liquid	556.93	601.12	521.09	501.16	525.91
Other	57.80	150.35	41.67	33.96	62.94
Waste water (m³)	142,606	144,677	130,862	103,293	119,360
Air emissions (t)					
CO ₂	145,024.45	148,419.72	142,887.37	150,063.70	140,110.47
CO	72.25	72.57	71.16	73.99	70.37
SO ₂	2.72	2.60	10.63	11.65	4.39
NO _x	166.25	170.11	167.09	176.56	164.19
Particulate matter	2.25	2.64	3.79	3.84	2.88
CH ₄	245.06	253.12	240.04	250.32	236.34
NM VOC	13.47	13.55	13.22	13.76	13.18
Total HC	258.53	266.66	253.27	264.08	249.52

IMPRINT

Title

2017 Environmental Operating Report

Publisher

Mohn Media Mohndruck GmbH
Carl-Bertelsmann-Strasse 161M
33311 Gütersloh
Germany
www.mohnmedia.de

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Design and layout

TERRITORY CTR GmbH
Cover photo: Mohn Media Mohndruck GmbH

Also available in addition to this
Environmental Company Profile:
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