



Marabu Environmental Report

2014 – Bietigheim-Bissingen Site
Creative Colours

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SAVE PAPER - THINK BEFORE YOU PRINT

Foreword by Management

We combine business success with environmental protection, safety and social responsibility.

When companies began manufacturing drawing materials and art paints in the 19th century, they had to consider a host of issues: energy requirements, waste water treatment, waste disposal, and the prevention and removal of dust – issues that are still relevant today. Even back then, manufacturers were subject to regulatory requirements and regular monitoring – but they were not as significant as environmental protection and workplace safety are today.

Over the last two decades, we as a manufacturer of printing inks have increased our awareness of the need to conserve resources and reduce harmful emissions.

More than ever before, we have incorporated this approach into our corporate planning procedures and our business processes. We see this as our responsibility to our fellow citizens and the environment.

We are proud of our long tradition as a chemical company in southern Germany – in the heart of Europe – and of our long-term commitment to corporate social responsibility. Which is why, we would like to give you an insight into our production facilities in Tamm and Bietigheim-Bissingen. Our customers, employees and neighbours support and value our philosophy: to deliver eco-friendly, high-quality products made in Germany.

Following the publication of our first environmental report in 2010, we are pleased to present the second edition, informing you about Marabu's environmental footprint.



Rolf Simon

Dr. Roland Stählin

York Boeder (CEO)

About our Company

Marabu Germany has an impressive track record as the driver of innovative, made-to-measure products within a growing international group.

More than 150 years of Marabu: that means more than 150 years of commitment to production in Germany. The management and owners will continue to support the development and manufacture of products in Germany.

The Stuttgart region, famous for innovation, was and remains the base for our international business. Today, more than 500 employees in 15 countries around the world help us achieve annual sales of around 80 million euros.

“Throughout its long lifetime, Marabu has always successfully adapted to changing market conditions and other key factors by developing the right solutions” - Rolf Simon

Our innovative products and made-to-measure solutions for screen, pad and digital printing come from our main production plant at Tamm. Since 2004, our water-based inks and paints for arts and crafts have been manufactured at and distributed from our new plant in Bietigheim-Bissingen.



Paraguay Plant

Our latest factories, in Charleston, USA (since 2007), and in Paraguay (since 2012), make us truly

international. Together, these four facilities supply the global market with Marabu printing inks, arts and craft paints and liquid coatings – a portfolio comprising over 17,000 formulations.

Our self-imposed standards and certifications to ISO 14001, 9001 and OHSAS 18001* set the benchmarks for our best-practice based approach. Highest-quality products, first-class technical support, hands-on customer training, collaboration in a true spirit of partnership, and exceptional environmental awareness are the cornerstones of our success.

As a manufacturing company, we aim to achieve the right balance between maximum profitability and minimum environmental impact. For us, that is the meaning of sustainability.

From left to right:

Plant for Creative Colors, Bietigheim-Bissingen (Germany)

Plant for Printing Inks, Tamm (Germany)

Plant for Liquid Coatings, Charleston (USA)

* OHSAS = Occupational Health and Safety Assessment Series, Occupational Safety Managementsystem in worldwide 80 countries.



Our Environmental Policy – Nine Guiding Principles

For the sake of future generations, it's essential to always count the cost.

In our day-to-day operations, we often have to make compromises in order to achieve short-term goals. Yet our long-term objective is clear: to protect and conserve our natural environment and its essential resources – air, water and soil. In the interests of future generations, we cannot afford a “profit at any price” attitude.

- 1.** We accept our responsibility for safety and environmental protection, as a company in the chemical industry. All our employees comply with relevant national and international legislation and principles of environmental law.
- 2.** We voluntarily abstain from using highly toxic or hazardous substances. Wherever possible, we use less harmful substitutes.
- 3.** We develop cutting-edge products geared to reducing emissions in production and processing.
- 4.** Responsible, moderate consumption of natural resources such as energy and raw materials is a given for Marabu. We prioritise renewable energies over finite resources just as we do wood from sustainable forestry. We are committed to meeting FSC standards.
- 5.** Corporate social responsibility, including environmental protection, is an integral part of our business philosophy and practices.
- 6.** We strive to continuously improve our environmental management and environmental performance.
- 7.** We invest in state-of-the-art plants and equipment even in uncertain market conditions on an ongoing basis.
- 8.** We participate in and pro-actively contribute to chemical industry associations on quality, health and safety and environmental protection issues. For Marabu, this is a key element of our comprehensive commitment to our employees and the environment.
- 9.** We expect suppliers to meet the same high standards that we impose on ourselves.

Organisational Structure – Integration of Environmental Protection

Environmental protection and hazardous materials management have been an established part of the business for over 20 years.

This ensures maximum reliability and compliance across the entire value chain and continuous improvement.

We have appointed designated officers for all tasks required by statute, including workplace safety, hazardous materials and data protection. These complement the hierarchy of responsibility and integrated management system. In addition, since 1990, we have nominated a designated officer for environmental protection and hazardous materials. In terms of our organisational structure, environmental protection is part of the central Quality Environment Safety department.

Marabu’s management system, which combines quality, environmental protection and occupational health and safety, is mandatory for all employees and is accessible at all times on the Intranet in the form of the Marabu Management Handbook. From this year, all employees at certified facilities have access to the MMH.



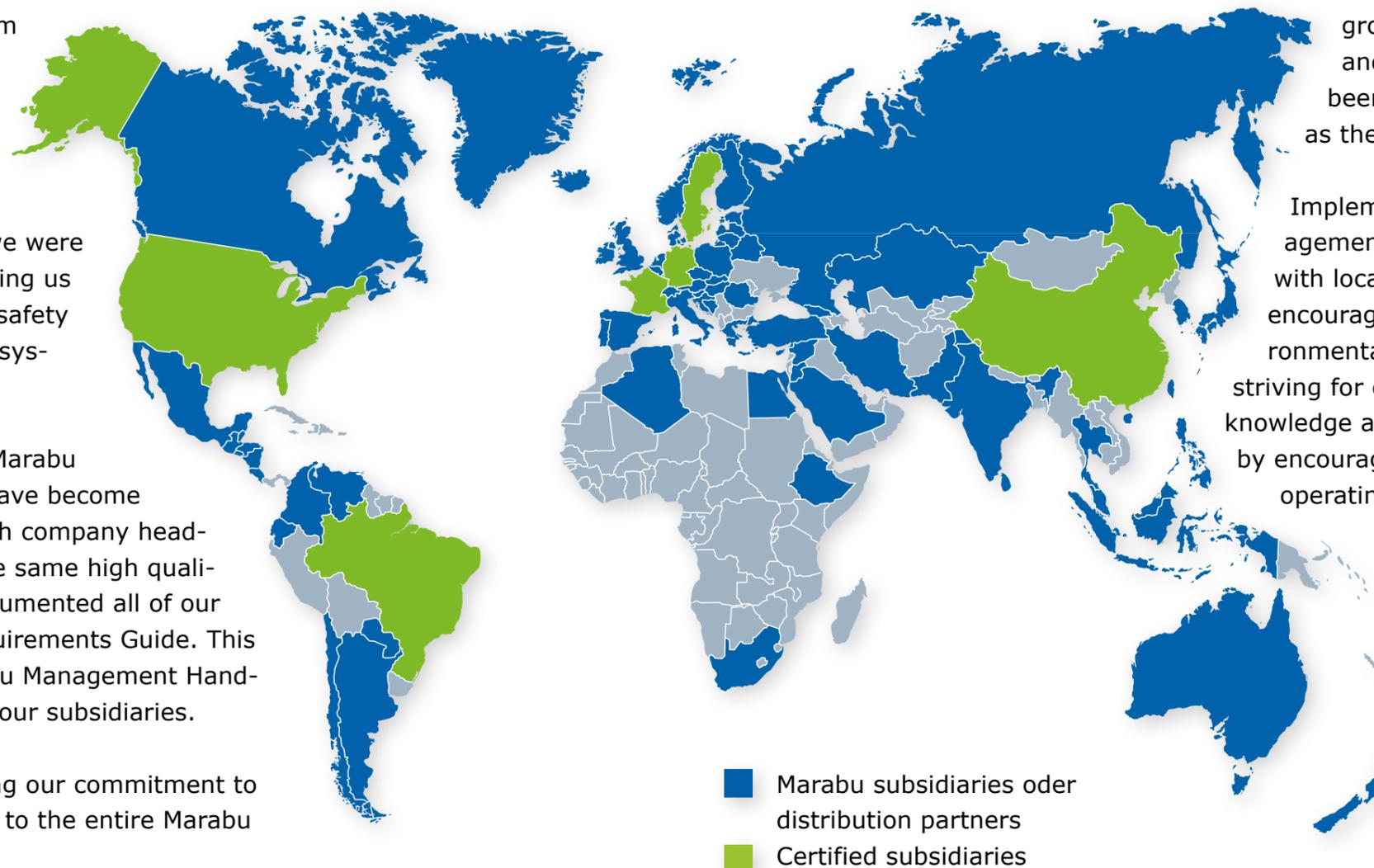
The Marabu-Team for Quality, Environment and Safety.

Our Commitment Knows no Bounds

Our main production facilities in Tamm and Bietigheim-Bissingen have been certified to ISO 9001 since 1995, and to ISO 14001 since 2003, representing our simultaneous commitment to quality and corporate environmental protection. In 2012, we were also certified to OSHAS 18001, enabling us to integrate occupational health and safety issues into the Marabu management system.

In 2010, we restructured the entire Marabu group. As a result, our subsidiaries have become more and more tightly integrated with company headquarters. To ensure that we apply the same high quality standards worldwide, we have documented all of our core processes in a binding QES Requirements Guide. This guide is available online in the Marabu Management Handbook in the national languages of all our subsidiaries.

We have followed this up by extending our commitment to quality and environmental protection to the entire Marabu

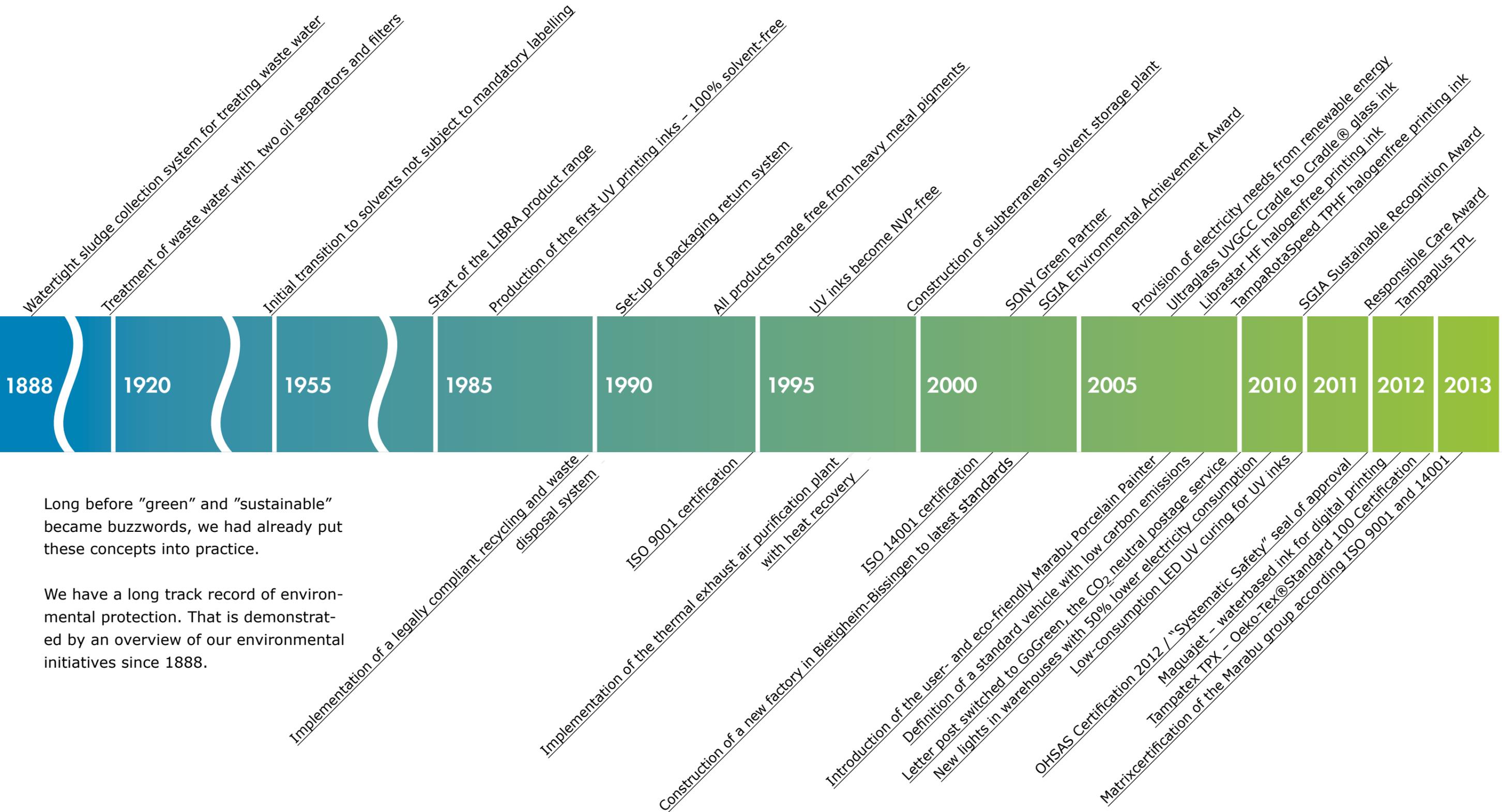


group. Our subsidiaries in Sweden, North and South America and China have now been certified to the same ISO standards as the main production facilities in Germany.

Implementing a global environmental management system ensures that we comply with locally applicable legal requirements, and encourages us to actively examine the environmental footprint of each company location, striving for continuous improvement. We share our knowledge and experience with our partners, thereby encouraging them to take responsibility for operating in a sustainable way.

As diverse as the global Marabu group may be, we all belong to a company with a proud history and a clear focus on top-quality products, manufactured under fair conditions.

Timeline – Environmental Awareness From Then to Now



From Raw Material to Product (and Beyond)

Inks and paints come in solid, paste or fluid form. They are a mixture of several components: colorants, binders, solvents or water and additives. Almost all our art and craft

inks and paints are water-based and dry solely by means evaporation. It is a long way from feedstock to end product. At Marabu, we ensure each step is eco-friendly.

Production Raw Material

Colourants Binders Additives Solvents/Water

Extraction

Storage

Paint Manufacturing



Mixing

Homogenisation

Filling

Paint Application

Application

Drying

Research + Development + Procurement = the Environmental Filter

Marabu ensures exceptional quality and product safety throughout the entire manufacturing process.

agreement was signed between company management and employees on the use of and protection from hazardous materials. Along with our strict blacklist of substances, this has the effect of an "environmental filter".

Not all inks are created equal.

Before a new product is ready to be manufactured and marketed – in fact, even while it is being developed – it undergoes a series of rigorous quality, health and safety tests. It must satisfy all legal, customer, and internal requirements.

To ensure top-quality products that comply with all applicable standards, we exercise great care in the selection of all our raw materials. Material safety data sheets are reviewed carefully and conscientiously by our product safety department. In 2004, an

In addition, all Marabu products comply with the [EuPIA exclusion list for printing inks and related products](#). All of these initiatives are voluntary. We avoid using so many raw materials – more than the EuPIA list – because we firmly believe in accepting responsibility, even beyond the scope of regulatory requirements. This is underscored by the key role that product safety plays in our company. The majority of our products are water-based, rendering solvents unnecessary.

Ongoing tests using the latest equipment in our in-house print centre ensure consistently high quality.



Production – Focus on Environmental Awareness

Man is a product of his environment. For this reason, our new building – on a green-field site only 2 km from our headquarters with views over the countryside – has been designed for end-to-end sustainability.

At our 10,000 m² site in Bietigheim-Bissingen we manufacture products that enable our customers bring their creative ideas to life.

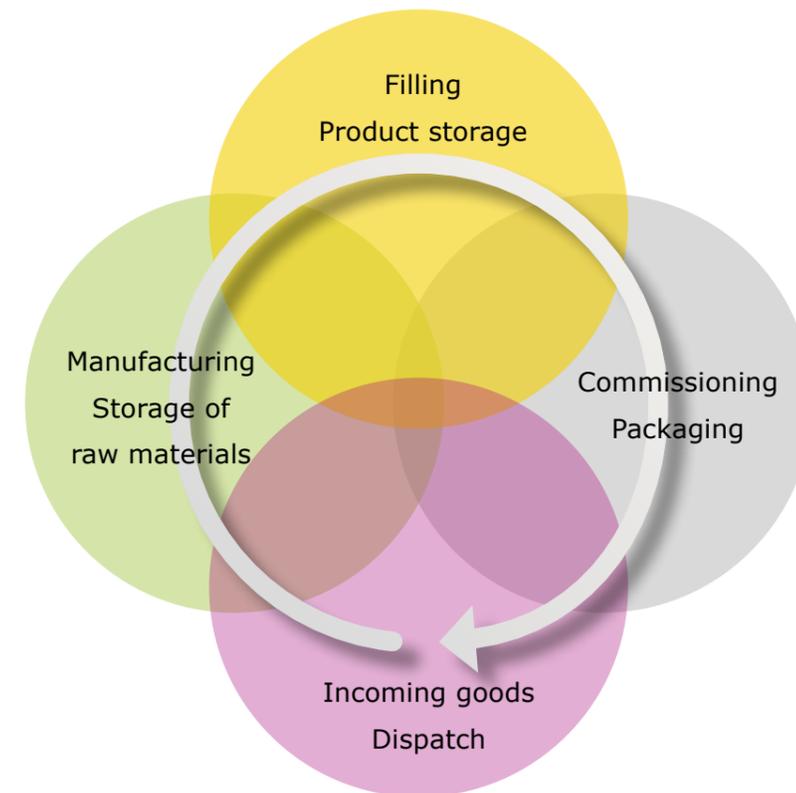
Constructed in just two years, and opened in 2004, our Creative Colours art and craft products factory is located in an industrial area in Bietigheim-Bissingen. This facility houses the production, marketing and distribution of a multitude of items for consumers – items great and small, from A to Z.

People are part of the natural environment. And that calls for responsible production in accordance with the precautionary principle. We aim to prevent or minimise any emissions from the production process that may be harmful to employees or the environment. In line with this goal, our plant is state-of-the-art. We continuously invest in the latest technology, going above and beyond the standards required by legislation.

The site

Our new facility reflects the latest standards and industry best practices. For the first time, thanks to a modular design, all departments are situated under one roof: R & D, Production and Logistics.

Our efficient, compact approach was inspired by nature. When planning and constructing

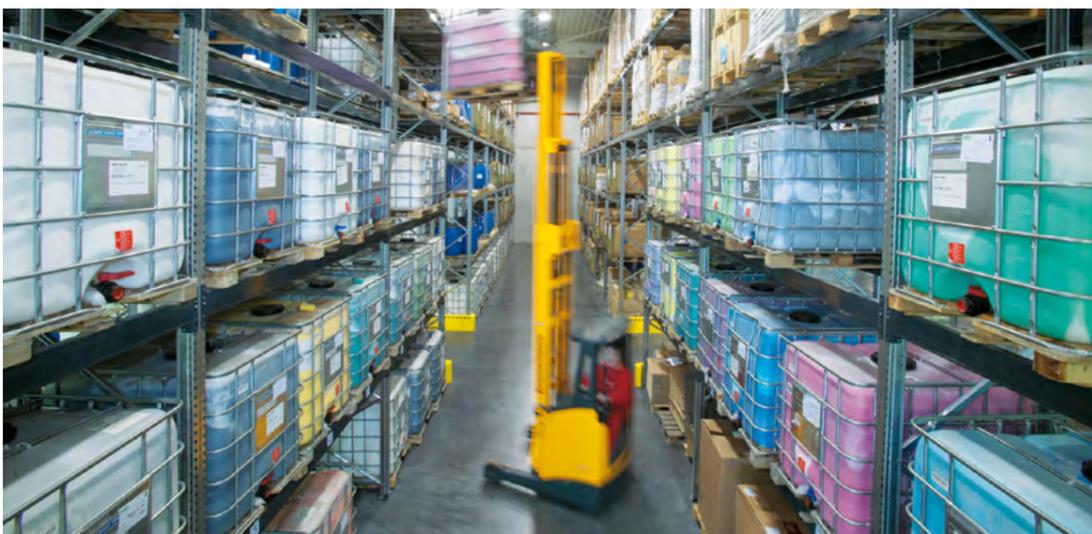


our state-of-the-art new building, we took the opportunity to locate all departments on one level – and we introduced a layout that mirrors the production cycle, from incoming goods to dispatch.

This keeps movements within the factory to a minimum. Automated conveyor belts transport containers, while low-emission electric-powered industrial trucks carry goods around the site. A separate storage facility for hazardous substances, complying with all safety requirements, is located outside the main building.

To minimise the environmental impact of the asphalt roof, we have covered the entire surface with shrubs and plants. In addition, parking for employees and visitors, the technical service and equipment room, staff facilities and canteen are located on the floor below the production area. Only 56 per cent of our 18,000 m² site is covered by buildings.

This enables the factory to blend in with its surroundings. In conjunction with a landscaped lake, this space provides a habitat for a variety of species (including birds and fish) – while giving our employees a more pleasant place to work.



The production and storage facilities are designed based on the latest knowledge and criteria – increasing efficiency and saving space.

When it comes to exhaust air, waste water and waste materials, Marabu has one clear goal: to continuously improve its protection of both people and the environment.

Exhaust Air

Clean, unpolluted air is one of the most fundamental human needs, and we must ensure that in industrial countries, it does not become a luxury. For this reason, we make every effort to monitor the quality of our exhaust air.

Exhaust air from our production equipment is captured by a highly accurate extraction system, keeping the release of pigment dust into the atmosphere to a minimum. As we do not use any solvents in the production process, the exhaust air does not contain any volatile organic compounds (as defined in section 31 of the German Federal Ordinance on Waste Incineration and Co-Incineration (BlmSchV))

Waste and Recycling

Systematic forward planning, aided by a computer-based forecasting system, enables us to calculate the exact quantities of raw materials that we will require in advance. In addition, our recipes and processes are subject to continuous improvement, which also helps to minimise waste.

In 2012, we took another significant step forward in our efforts to avoid creating waste. We can now predict the precise inventory levels required for finished items, preventing the generation of refuse from out-of-date stock.

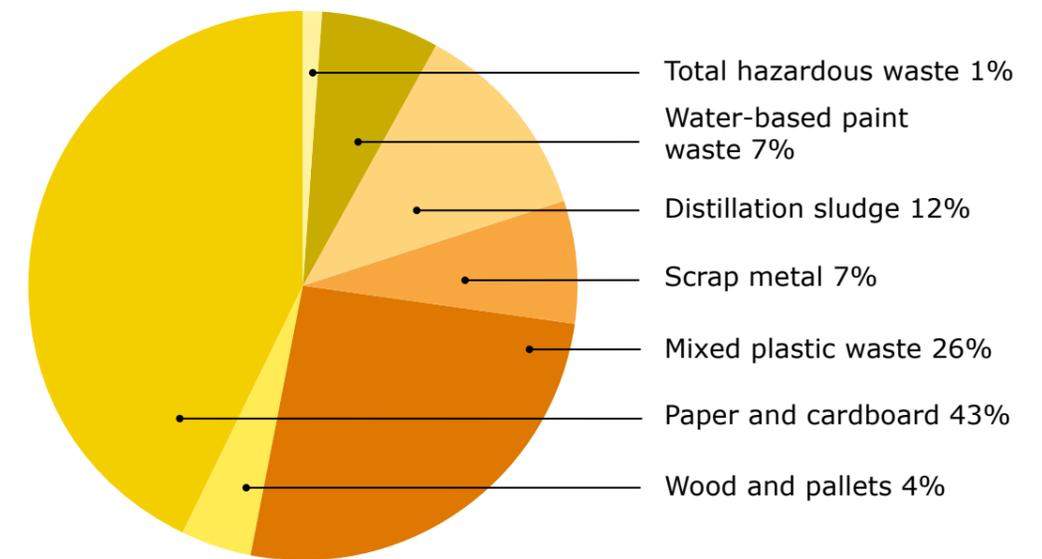
Our production and R & D departments in Bietigheim-Bissingen and Tamm use a rental system for print wipes. This protects the environment by preventing waste: the cloths are collected, washed and returned for re-use. As a result of this system, we were able to cut the amount of refuse created by disposable cloth wipes over the past five years. In 2012, a reduction of around 91 per cent from 9.6 metric tonnes to 0.85 was achieved across the entire company.

As our partner is located in the region, emissions from transportation are low.

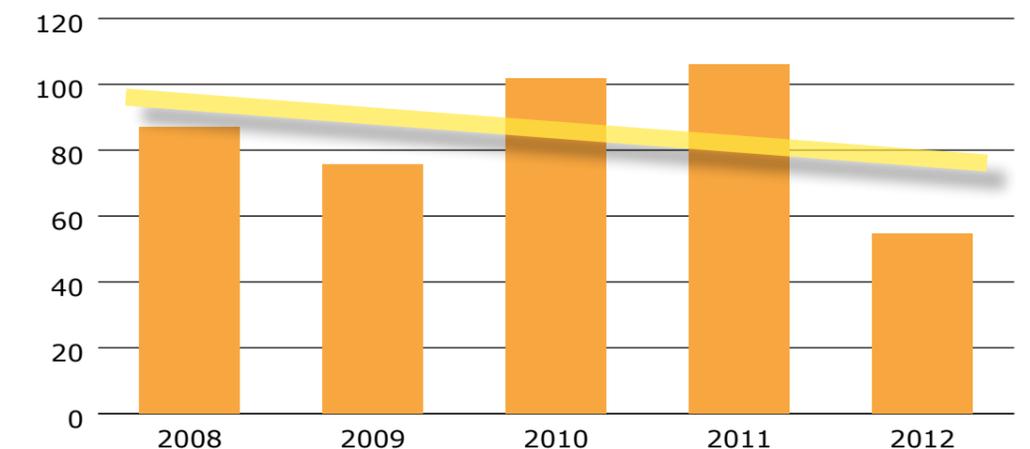
We regard systematic separation of waste, recycling, use of certified waste disposal companies and reduction of the total amount of waste as key responsibilities – and these are part of our daily routine.

We dispose of all waste in line with the German Waste Avoidance, Recycling and Disposal Act (KrWG). It is either treated thermally to produce heat or the materials are recycled. Only in exceptional cases where this is not possible is it disposed of.

Breakdown of waste in per cent in 2012



Annual total of all waste in metric tons since 2008



Pigment dust is extracted from the batch container from above using an advanced exhaust treatment system.

Inspection parameters	Limit	Year inspection carried out by govt agency	
		2010	2012
pH level at 20°C	6.0 – 9.5	6.8	6.7
AOX* [mg/l]	1	<0.04	0.06
Barium [mg/l]	2	0.04	0.048
Lead [mg/l]	0.5	On exclusion list – not in waste water	
Cadmium [mg/l]	0.1	<0.01	0.008
Chrome (CrIII and CrIV) [mg/l]	0.5	<0.01	0.008
Cobalt [mg/l]	1	Same as for lead and cadmium	
Copper [mg/l]	0.5	< 0.01	< 0.01
Nickel [mg/l]	0.5	0.01	0.07
Zinc [mg/l]	2	0.02	<0.01
Iron (mg/l)	20	5,6	3,8

Waste water quality in 2010 and 2012

* AOX = adsorbable organic halogens. This is a measurement for the amount of organic halogen compounds in water.

Eco-friendly since 1988: in the sensitive area of waste water treatment in particular, the environment reaps the rewards of our extensive experience.

For many years, an external testing organisation has regularly monitored our waste water, demonstrating that all thresholds have been met – and that in fact, we are well below the limits. Our treated water has a very low level of contaminants. As a result, the intervals between the tests mandated by regulatory bodies have now been extended. In 2011, the water agency did not take any samples of our waste water.

The absolute volume of waste water released from the treatment system is dependent on the number of batches of inks and paints produced that year and the associated cleaning needs for the mixing containers and machines. Over the last five years, an average of 700 m³ of waste water was discharged per year.

We use fresh water for our water-based inks and paints and for the last stage of rinsing our mixing containers. The sharp increase in our fresh water consumption in 2010 can be attributed to water damage.

Cleaning

With an annual output of 500-600 tonnes, we need large amounts of mixing containers – and it takes an ingenious system to make cleaning all the containers as eco-friendly as possible. Containers needing cleaning undergo an eco-friendly process.

This involves no chemicals, very little fresh water, and does not require heating water. For rinsing, we recycle water that we have already used. Only the final rinse involves fresh water, which is then fed into the cycle as used water. Finally, water that can no longer be used is diverted to our own treatment plant.

Waste Water

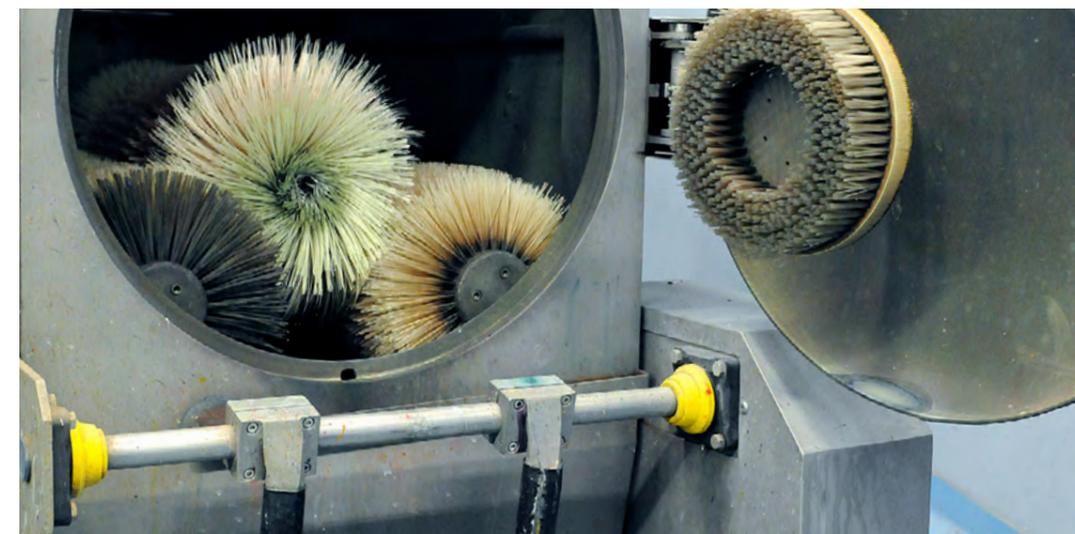
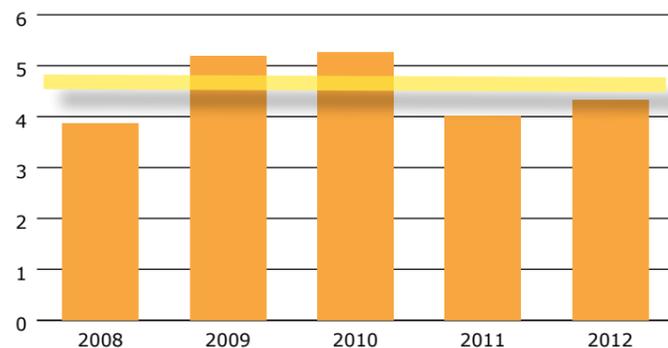
Until the 1960s, waste water treatment was of minor importance to German politics or society – but this was not the case at Marabu. Back in 1888, we already had our own sludge collection system, while we installed oil separators and filters in 1920. Today, we treat our waste water in our own state-of-the-art sewage treatment plant, which is subject to regular internal and external monitoring. All procedures are documented in our waste water operations log book.

The sewage plant performs three functions:

1. collect waste water in a reservoir;
2. remove solid waste and neutralise water in the reactor; and
3. compress the resulting sludge.

This complex process ensures even water quality that can be treated by the local utility without any problem. At the same time, it reduces sludge to a minimum.

Volume of fresh water (l) consumed per kilogram of paint produced between 2008 and 2012



The batch containers are cleaned in the washing machine using only cold water.

tricity consumption. At the same time, this reduces the load peaks that cause air compression production to consume so much energy. To save even more electricity, we switched off compressors over the weekend and adjusted the network pressure: reducing the pressure by 1 bar lowers energy consumption by approximately 6 - 10 per cent.

Noise and Odour Emissions

A wide variety of sounds and odours are part of life today.

Industrial noise emissions are limited by statute and are increasingly becoming an important consideration, not least for the immediate environment, for example their effects on residents and fauna. Our factory site is deliberately located in an industrial zone, which is some distance from residential areas.

Marabu meets all noise-related requirements: 70 db during the day and night. (refer to the German Technical Instructions on Noise (TA-Lärm)).

Noise and noise protection are also critical factors for employees. With this in mind, a perforated ceiling has been installed in the production and filling areas, providing noise insulation.

People react differently to different odours. Every day, we work with a range of chemicals and mixtures with a wide variety of odours – odours that, for many people, are highly unpleasant. Even though Marabu is not directly surrounded by dwellings, we make especial effort to keep odours from ink production to a minimum, to prevent them from becoming a nuisance to residents.

Incidents with Relevance to Environmental Protection

Serious accidents and environmental disasters stick in people's memories. They are detrimental to our health and destroy valuable biotopes and habitats for flora and fauna.

Our highest priority is to prevent environmental disasters and to be fully prepared to respond to any accidents. In the period covered by this report, no environmentally relevant incidents occurred – proof that our strategy is working.

All the initiatives documented here illustrate Marabu's eco-friendly philosophy in producing first-class products with ongoing minimisation of environmental impacts.

Closed systems, sound-absorbing ceilings and other preventive measures reduce emissions of every kind – liquids, solids, gases and sound.

Deploying the very latest technology minimises the risk of negatively impacting the environment. Even if a problem occurs, despite all precautions, we are well equipped to respond thanks to our emergency containers.



Products – No Greenwashing, We Keep our Promises

When we develop and manufacture our inks and paints, minimising environmental and health impact is a priority. That's because art and crafts should be a fun, carefree activity for people of all ages. This commitment has a long tradition at Marabu. The majority of our products are water-based and do not contain any solvents. That is not just better for people, but also for the environment – across the entire ecosystem.

Environmental accolade – in 2012 Marabu received the Responsible Care Award for resource efficiency in recognition of its commitment to green manufacturing.

Regulatory Requirements and Voluntary Initiatives

We comply with all relevant health and safety and environmental standards and guidelines.

Since 1987, we have not used heavy-metal pigments hazardous to human health and the environment, such as lead, cadmium, mercury or chrome VI; or other substances such as polychlorinated biphenyl (PCB), chlorofluorocarbons (CFCs), pentachlorophenol (PCP) or dioxins. This was based on a voluntary agreement by the mineral paints industry association, before EN 71 entered into force. We have taken this a step further with our internal agreement on the use of and protection against hazardous materials. Our strict exclusion list means that we abstain from using more potentially harmful substances than are on the EuPIA list. We comply with all safety requirements in the German Chemicals Act (ChemG).



Responsible Care[®]
OUR COMMITMENT TO SUSTAINABILITY

Since 1998, Marabu has voluntarily participated in the global Responsible Care[®] Initiative, a comprehensive programme which commits the chemical industry to high health, safety and environmental standards. We proactively implement the principles of this initiative.

In 2012, Marabu received the Responsible Care Award for its efficient use of resources. The panel of judges praised Marabu for its holistic approach that sets an outstanding example.

Marabu's product development, procurement, production preparation, manufacturing and delivery processes were analysed in detail, to see which resources could be used more efficiently.



Our product management team ensures that the water-based paints we develop are user- and eco-friendly and comply with the EN 71 standard for toys.

All of the products that we market as toys comply with the requirements of directive [2009/48/EC](#) on the safety of toys and the restrictions relevant to toys in annex XVII of the REACH* regulation, including limits on phthalate content.

REACH requires the registration of chemical substances only. All Marabu products involve mixtures of substances, which do not need to be registered. But even though we are not obliged to register our products, we still have a duty to report if and how the substances we use in our raw materials were (pre-) registered by their manufacturers or importers. At present, all our feedstocks meet (pre-) registration requirements. We have written confirmation of this from all our suppliers.

Eco-friendly Products

We comply with all relevant regulations and manufacture top-quality products as part of our corporate philosophy – because we believe that, above all, play should be fun.

mara by Marabu

The mara by Marabu range, launched in 2013, is an outstanding example of this approach. It was developed to foster children's creativity, and includes finger, arts and crafts, window and fabric paints. The basic products are complemented by a glitter paint pen and various sets of accessories. All paints in the mara by Marabu range are water-based and comply with the European safety standard EN 71:1994, Parts 3 and 7, which imposes strict limits in relation to the bioavailability and migration of substances. The preservatives and pigments in the finger paints derive from the cosmetics industry, and are especially developed for contact with human skin.

* [EG Nr. 1907/2006 REACH](#) = Registration, Evaluation, Authorization and Restriction of Chemicals.

The new mara by Marabu paint range provides children with endless hours of fun.



Marabu Porcelain, Marabu Glass and Relief Pastes

Our glass and porcelain paints and relief pastes are further examples of our commitment to reduce emissions across the entire product lifecycle. Since 2011, these three products have provided dishwasher-safe and light-fast glass and porcelain decoration without oven fixation.

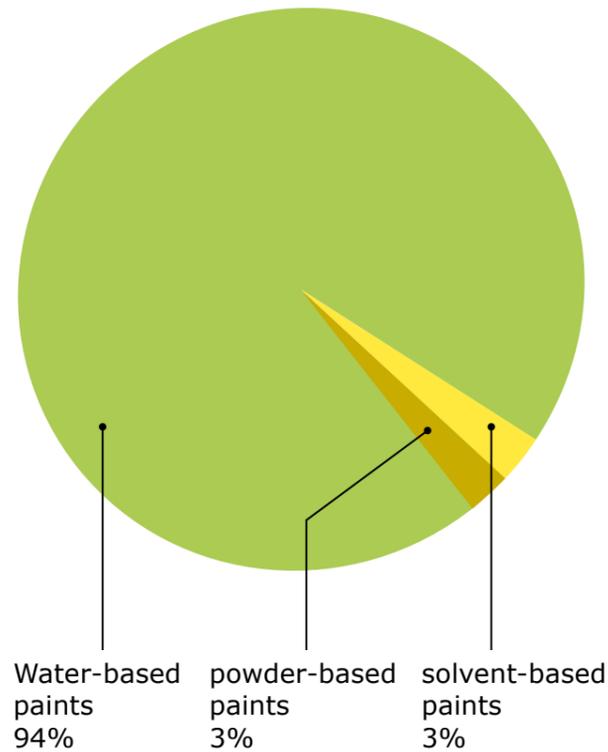
At the same time, they offer useful and eco-friendly qualities: they are water-based, odour-free and saliva-resistant, in line with the German standard DIN V 53160-1. By eliminating oven fixation, we have also simplified application, and saved around 230 g of CO₂ emissions** each time the paints are used.

Marabu's outstanding knowledge and passion for innovation influences every product – benefiting customers and the environment alike.

** 30 min. in a medium-sized electric oven, efficiency rating A, and maximum consumption of 0.8 kWh under the EnVKV, the German regulation that sets energy consumption limits for household appliances and European directive 2002/40/EC Attachment 3, using electricity from a mix of sources, produces CO₂ emissions of 575 g/kWh (data from German Federal Environment Agency (Umweltbundesamt)), 2009.



Breakdown of paints produced in 2012 (in per cent)



The vast majority (94 per cent) of our products are water-based. In addition, our powder paints are designed for use with water. Only a fraction of our total production volume is solvent-based.

Creative fun with brightly coloured paints, complete with an easy-use dropper closure and robust packaging to avoid breakage.

Product Packaging

We seek to enhance the eco-friendliness of our packaging just as we do our products. The latest example of this is our decision to replace glass tubing with standard glass for our 15 ml containers. Glass tubing is extremely delicate and was designed as a specialist product for the pharmaceutical industry. Its fragile nature makes it highly prone to breakages during production, filling, packaging, transportation and use. As a result, it was not ideal for our arts and crafts product packaging.

Since we switched to significantly stronger standard cast glass in early 2013, glass breakages during filling and transportation have become very rare. This reduces our resource consumption, as we no longer need to use disposable plastic trays to protect the empty containers during transportation; we simply place a layer of corrugated card between them.

For our 1,000 ml PE bottles, another of our product packaging items, we were able to reduce the amount of materials used. We have cut material consumption by around a third to a weight of only 55 g per unit.

We also reviewed the flat-pack boxes we use to ship glass containers in units of five or six to our retail partners. The boxes are now plain, instead of being printed on all sides. Leaving them plain enables us to cut costs and reduce the environmental impact. It also ensures that no cardboard is wasted following product changes.

We select all our packaging and filler materials in line with defined recycling criteria. Since 1994, Marabu has participated in a system for recycling product and transportation packaging, meeting the requirements of German legislation on reducing and recovering packaging.

*FSC = Forest Stewardship Council. FSC is a worldwide not-for-profit organisation that certifies sustainable forestry and wood products throughout the product chain in line with defined international standards.

Always one step ahead in the green game, thanks to efficient use of materials in packaging and certification as an FSC retailer.

Externally Sourced Products – Wooden Items from Certified Sustainable Forestry

Our responsibility to run our business sustainably does not stop at our factory gates. It is also reflected in the careful selection of the products we buy.

We play our part in promoting sustainable forestry. The wooden products that we source externally are a prime example. At present, we are the only manufacturer of paints and inks for arts and crafts to purchase all of its wood accessories from FSC*-certified forestry and wood processing companies. This we guarantee with our status as an FSC-certified retailer. Marabu has been listed in the database of FSC-certified businesses since November 2013.



The team from TÜV testing (seated) with the Marabu delegation at the internal FSC audit in November 2013.

FSC certificate and our externally sourced wood products.



Logistics – We Deliver the Goods

Transport Packaging

All our containers and packaging have been optimised for shipping our products to customers. Our factory in Bietigheim-Bissingen has the latest packing stations. In conjunction with specially trained staff, this ensures that every customer order receives the best possible packaging. The plastic wrap that we use to cover our containers and pallet boxes is phthalate-free*.

We have now moved to a thinner stretch wrap with improved stretch at break and consequently, better elastic recovery. As a result, we have been able to significantly reduce our wrap consumption.

At Marabu, our aim is to avoid using plastic wherever possible. We have successfully put this into practice by replacing the plastic trays for transporting our basic acrylic tubes with brown corrugated cardboard.

Transportation

Marabu exports around 50 per cent of its printing inks outside Germany to customers in 50 countries, covering almost all the continents. The result: every day, we comply with a vast number of country-specific regulations, in terms of transport, packaging and labelling. Less than 1 per cent of cases result in complaints.

Our products are delivered to customers by an external logistics provider. Since 2001, there have been no accidents while transporting our products, across all means of transport.

*Phthalates are used as plasticisers, to make plastic more pliable. According to the German Federal Environment Agency (Umweltbundesamt) they may pose risks for reproductive health. The most commonly used phthalate is di-2-ethyl-hexyl-phthalate, or DEHP.

Our delivery items are labelled according to the relevant regulations. We ensure that shipping containers and lorries are loaded properly and securely to minimise damage during transport – preventing delayed deliveries for our customers and potential damage to the environment from chemical leaks.

We aim to find the shortest route with the best mode of transport, to avoid unnecessary emissions. This can be clearly seen in the proportion of goods distributed via the various modes of transport from the Creative Colours factory in 2012. Around 96 per cent of our products were delivered by road, 4 per cent by sea and only less than 0.05 per cent by air. For Marabu, airplanes – a high-emission means of transport – are an exception rather than a rule. Delivery by sea produces the lowest emissions: 80 per cent fewer CO₂ emissions per tonne and kilometre than by road – and 98.4 per cent less than by air**.

However, it is not possible to increase the amount of goods transported by ship, given the location of our customers and the longer delivery times involved with sea travel. Lorries dominate our European deliveries, and

share – with rail – deliveries to and from ships. In Europe, the maximum distances for transport are mostly around 2,700 km. Goods are delivered to other continents – Asia, Australia and North and South America – by ship.

Web Shop

Selected Marabu inks and paints for arts and crafts have been available in our web shop since January 2013. Creativity never sleeps – which is why we have made it possible to purchase items from the Colour your Dreams range and attractive product sets day and night.

Within Germany, all packages are mailed to customers via DHL's GoGreen service, guaranteeing carbon-neutral shipping.



Marabu exports around 50 per cent of its products outside Germany, by road, sea or air. We are a truly global company.

** Calculated according to the German Chemicals Industry Association's (VCI) Guideline for Calculation of CO₂ emissions from logistics in the chemical industry. Published on 6 June 2010.
Values: Lorry: 65 gCO₂/tkm
Ship: 13 gCO₂/tkm
Airplane: 801 gCO₂/tkm

Management, Staff and Administration – A Green Team

Small improvement – big effect. Reduced fuel consumption saves thousands liters of fuel, and tons of CO₂.

Marabu is completely committed to environmental protection and the use of renewable resources – from management right down to every last employee.

Employee Transportation

Personal transport for employees is an inefficient use of resources, and has a negative impact on climate change. For an international company like Marabu, however, it is unavoidable: it is part of our core business. Marabu has introduced a range of initiatives in this area to improve our performance.

As for employees who are entitled to a company car, we introduced a new corporate policy in 2013. Our new standard vehicle is a low-consumption and low-emission car – off-road vehicles, soft-tops and sports cars are not permitted. With a consumption of just 4.8 litres of diesel per 100 km (according to the manufacturer’s specifications) and CO₂ emissions of only 120 g/km, it is the ideal, environmentally friendly fleet vehicle in our view.

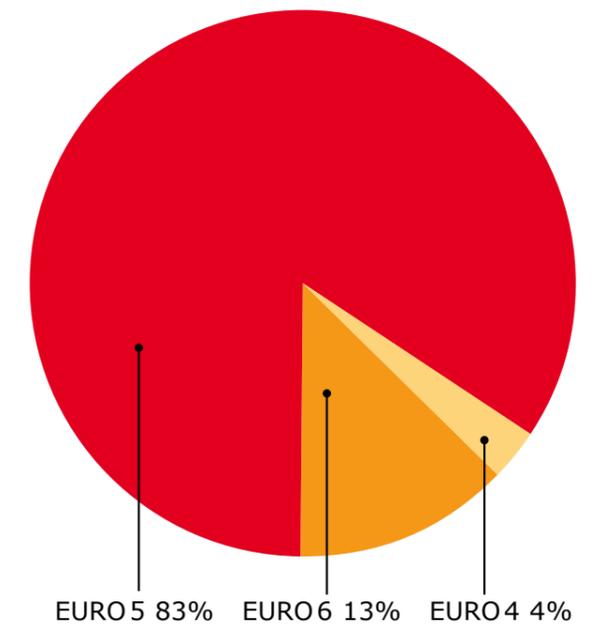
Exhaust and emission limits for passenger cars throughout Europe are defined by the Euro emission standard. Marabu employs the latest technology and regularly upgrades the fleet – currently to meet the most stringent Euro 6 standard, requiring very low emissions. By law, this standard does not come into effect for new vehicles until January 2015. More than two-thirds of all our

vehicles are now classified as low-emission according to Euro 5, and 13 per cent already meet the requirements of Euro 6*.

Fuel consumption is another key issue in addition to emissions. Since 2005, we have reduced the consumption of all our vehicles. Currently, our fleet uses around 6.17 litres of fuel per 100 km – a decrease of 0.4 litres per 100 km in the last 3 years. Given the fleet’s total annual mileage of about 2 million kilometres, this corresponds to a saving of about 7,400 litres of petrol and diesel. In terms of carbon dioxide emissions, this represents a reduction of about 18.5 metric tonnes**.

Both our decision to buy fleet vehicles with new, fuel-efficient engines, and our employees’ prudent, environmentally friendly driving style are making a difference.

Fleet emission categories according to European directive 715/2007/EC



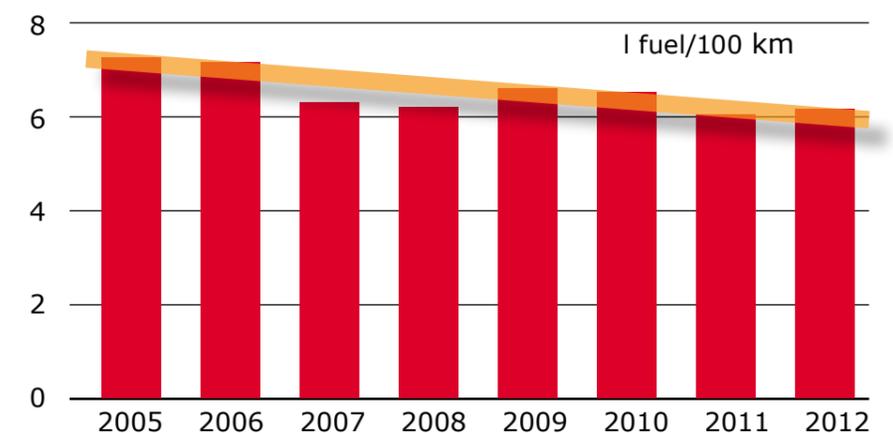
Diesel Sprinter with eco-friendly BlueEFFICIENCY feature.



*Euro 6:
 For diesel engines: nitric oxide emissions: 80 mg/km
 Fine particulate matter emissions: 4.5 mg/km
 For petrol engines: nitric oxide emissions: 60 mg/km
 Fine particulate matter emissions: 4.5 mg/km

** Calculation based on data from DEKRA Automobil GmbH

Average fuel consumption of Marabu fleet



Eco-Friendly Office

At Marabu, an eco-friendly office is not just about adding a few pot plants here and there.

Computers and Laptops

In Germany, computers and telecommunications equipment account for around 10 per cent of total electricity consumption*.

In 2013, we will be updating all of our data processing resources in light of a green IT strategy. Modern computer systems are not only easier to use; they give us the opportunity to significantly reduce the amount of energy required in this area of our business.

Solid state drives (SSD) are among the new energy-efficient technologies to have emerged. They deliver far higher performance than conventional hard disk drives (HDD). Computers equipped with SSDs can be switched off for short periods, and booted up again in seconds. This makes employees more flexible and means they can save

energy by shutting down their devices when they take a break.

Moreover, solid state drives do not require cooling, nor a motor to rotate the disks. This accelerates data access and processing. It also means that the drive switches more rapidly to idle mode, in which it consumes considerably less power. And because SSDs don't have moving parts, they have a longer useful life and experience fewer outages. They even produce less waste than conventional HDDs.

To save energy and improve the efficiency of rechargeable batteries, Marabu has also introduced a brand-new processor architecture. The power management system integrated into the chips can adapt power distribution dynamically, reducing overall consumption. This extends battery life by up to 50 per cent**, which means batteries need to be recharged less frequently.

The green IT policies defined in our 2013 environmental programme also apply to the

Conserving resources and using renewable materials is a company-wide goal implemented by all employees, whether they work in an office or at a Marabu production plant.

office applications run on our desktop PCs. Against this background, Marabu has decided to only purchase computers that have 80 Plus certification and meet the requirements of the new Energy Star 5.2 standard.

These two standards ensure that energy is distributed throughout the system as efficiently as possible – both at full load or in idle mode. The power supply controls the incoming power flows in accordance with load, and no more than 10 per cent of the power is lost as heat. Moreover, the PC housings contain at least 10 per cent recycled plastic.

Paper and Postage

For internal purposes, all our employees print on 100 per cent recycled paper. This paper has been recognised under the German Blue Angel scheme as an eco-friendly product. We followed a rigorous selection process in choosing the product's manufacturer, who operates (as we do) according to ISO certified management systems 9001 and 14001. In addition, from 2010, we will be introducing FSC-certified (FSC Mix®) paper and envelopes for all correspondence with customers, brochures and other purposes. This is backed by the credibility of the international, independent Forest Stewardship Council (FSC).

Although paper is made from a renewable raw material, our aim is still to use as little as possible company-wide because Paper manufacturing is extremely resource-intensive.

* 2010 Environmental Report by the German Federal Ministry for the Environment

** Rani N. Borkar, General Manager of the Intel Architecture Group

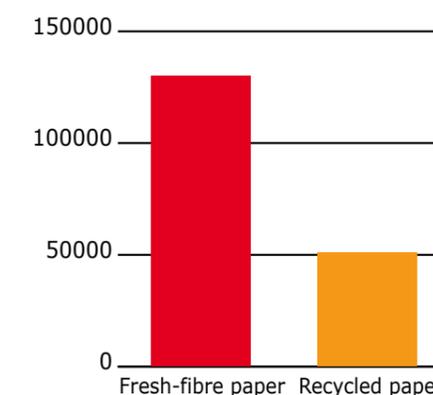
New energy-saving laptops replace the old desktop-computers (on the right).



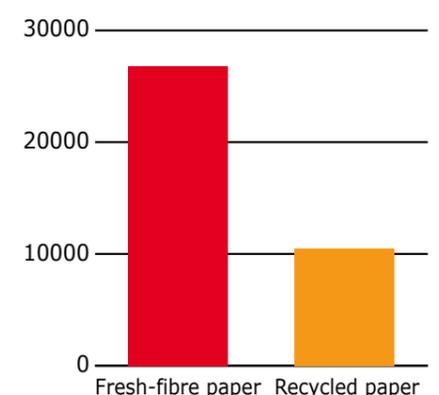
Water and electricity savings achieved by using recycled paper, based on 2012 paper consumption

The amount of recycled paper we used in 2012 equates to saving 80,000 litres of water and 16,000 kWh of electricity during manufacturing. And better still, not a single tree needed to be cut down.

Wasser (l)



Strom (kwh)





Since October 2010, we have sent our entire letter post with "GoGreen" – the carbon-neutral service provided by our postal partner, Deutsche Post DHL. Carbon dioxide emissions are going to be compensated in reforestation projects all over the world.

The request "save paper - think before you print" is attached to all our e-mails, appealing to readers to avoid printing unnecessarily.

Comparison chart
Resources used for the production of 500 sheets of office paper DIN A 4

	Recycled Paper	Fresh-fibre Paper
Wood resources	2,8 kg Used Paper	7,5 kg Wood
Energy	10,5 kWh	26,8 kWh
Water	51,1 l	130,2 l
CO ₂ -Emission	2,2 kg	2,6 kg

A simple act that makes a huge difference: all the paper we use is recycled.

Ink and Toner Cartridges

Marabu has a central box for collecting empty toner cartridges which cannot be sent to refill services for re-use. Because toner cartridges can generally be used multiple times and shouldn't simply be thrown away, Marabu has decided to take part in the Sammeldrache.de collection initiative. Employees can hand in anything from empty ink cartridges used at home to outdated mobile phones.

At Sammeldrache.de, these consumables are exchanged for green tokens that can be redeemed to support various causes, such as local schools. All of the tokens that Marabu collects are given to the primary school in Tamm Hohenstange. The school can exchange the tokens as it sees fit.

There are around 600 rewards to choose from, all of which help children to learn about sports, creativity, biology and chemistry in a fun way.

Marabu is currently in 270th place, out of more than 4,000 participating companies.

Hohenstange primary school can look forward to receiving a valuable, high-quality reward in autumn 2013.

Canteen

1 gram of fat is enough to contaminate 1,000 litres of drinking water. To prevent waste water containing fat from entering the groundwater, the waste water from our canteen passes through a grease trap, before being drained into the public sewer system. The grease trap operates to the principle of gravity, dividing 99 per cent of fats and oils from used water.

Marabu supports vegetarianism by offering additional meal options without meat and fish.



By participating in a rewards system for the collection of spent toner cartridges, Marabu supports Hohenstange primary school, setting a valuable example for the next generation.

Efficient Use of Energy and Resources

Marabu provides tailor-made solutions, produced using only CO₂-neutral hydroelectricity.

Because we are a manufacturing company based in Germany, we have a key role in consuming resources responsibly and sustainably. Compared to other industrial countries, Germany has relatively few natural resources. That makes it essential that we consume resources efficiently, and avoid waste.

The area with the greatest potential for savings is and will remain material and resource consumption. On average, for manufacturing companies, 60 per cent of the gross value of output is attributable to the cost of input materials.

Our energy supplier, Badenova, produces all its electricity from hydropower.

Marabu has implemented a number of projects to promote sustainable use of feedstocks, utilities and other materials, as well as energy, which are outlined below.

Electricity

Marabu was using CO₂-neutral electricity long before CO₂ reduction and climate change became subjects of widespread public discussion.

Since 2007, Marabu has exclusively used eco-power from renewable resources. This cuts annual CO₂ emissions by an average 450 tonnes (and, across the whole company, by almost 2,000 tonnes). The aim is not just to reduce CO₂ emissions, but also to increase the company's energy efficiency generally. In short, to cut energy consumption continuously and sustainably.

To monitor these performance indicators, the Quality Environment Safety department deploys an environmental accounting instrument. The key metrics are the overall electricity consumption and consumption per kilogram of ink produced.

Over the last five years, we have successfully reduced our total electricity consumption. However, this positive development is not reflected in the ratio of consumption to output.

The decrease in the quantities of items produced resulted in a slight upward trend, for which we were not able to fully compensate. We expect the modernisation of our factory lighting, planned for early 2014, to further reduce both our absolute and output-specific electricity consumption.

Gas

For heating, we employ a modern condensing boiler powered by gas, a more environmentally friendly fuel than oil. With an efficiency of 90 - 95 per cent, thanks to its ability to extract additional heat by condensing water vapour, and low-emission combustion, it has made a positive impact on our profitability and eco footprint.

The reduction in harmful emissions includes:

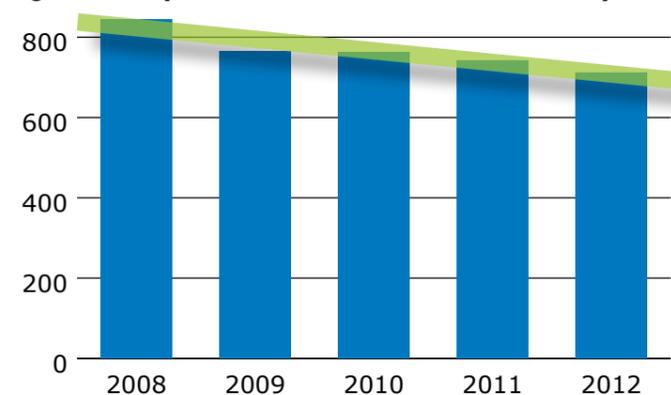
- approximately 39 per cent lower greenhouse-gas CO₂ emissions
- 100 per cent elimination of SO₂, which is responsible for the creation of acid rain
- 66 per cent lower particulate emissions (both fine and coarse), compared to the conventional method of generating heat from oil*.

Our mean annual gas consumption – another key indicator for monitoring environmental performance – has remained constant at around 765,000 kWh for the last five years. Our building is designed for maximum energy efficiency, and our gas consumption varies depending on the weather conditions.

* This estimate of the emissions from various energy sources produced in generating thermal energy is based on the Öko-Institut Freiburg's GEMIS database.



Electricity consumption at the Bietigheim-Bissingen factory from 2008 to 2012 (1000 kWh/year)



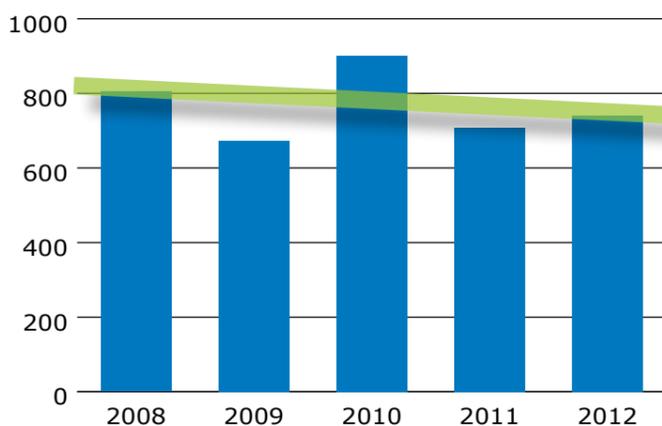
The increased consumption in 2010 and 2012 reflects the long cold winters in those years*. Depending on the temperature outside, more gas may be required to provide additional heating for the factory and buildings.

Carbon Dioxide Emissions and Carbon Footprint

The total amount of CO₂ emitted is directly related to our annual gas consumption. For each kWh of thermal energy produced from gas, an average of 245 g of CO₂ is generated**. The mean annual figure for CO₂ emissions between 2008 and 2012 was 189 metric tons.

*Statistical analysis by the German weather forecasting service (DWD): heating was required for 272 days in 2010, 216 days in 2011, and 252 days in 2012, due to temperatures below 15 degrees Celsius. The heating season is regarded as beginning and ending when temperatures are below or above 15 degrees Celsius for 5 consecutive days, respectively.

Gas consumption [1000 kWh/year]



Carbon dioxide and the greenhouse effect.

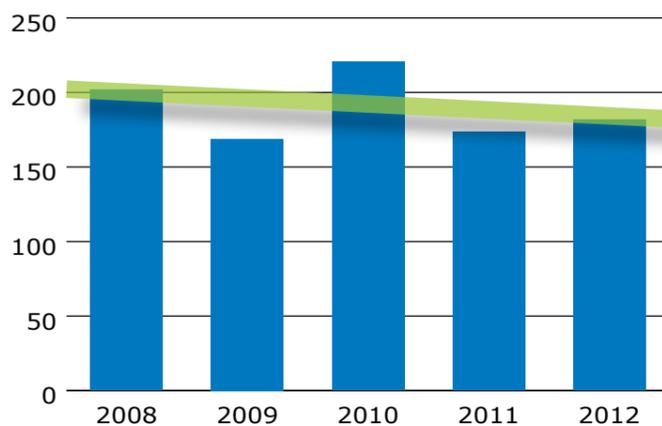
Large amounts of the long-lived greenhouse gas CO₂ are produced as part of the natural carbon cycle. Since the start of industrialisation, human activity has produced additional CO₂ through the burning of fossil fuels. Along with other greenhouse gases, it is thought to contribute to global warming by preventing heat from the Earth being radiated into the stratosphere – with serious negative consequences.

Scientists believe that a drastic reduction in anthropogenic greenhouse gases is required to avoid further global warming.

“The German government is committed to reducing the nation’s greenhouse gas emissions by 40 per cent by 2020, by 55 per cent by 2030, by 70 per cent by 2040 and by 80-95 per cent by 2050 (with 1990 levels as the baseline).”
(Source: German Federal Environment Ministry, 1 May 2013)

**The amount of CO₂ generated during the production of thermal energy from gas was calculated using data from the Öko-Institut Freiburg’s GEMIS database. (251 g/kWh of CO₂ equivalent, according to the UNFCCC calculation method for equivalents.

CO₂ emissions [t/year]



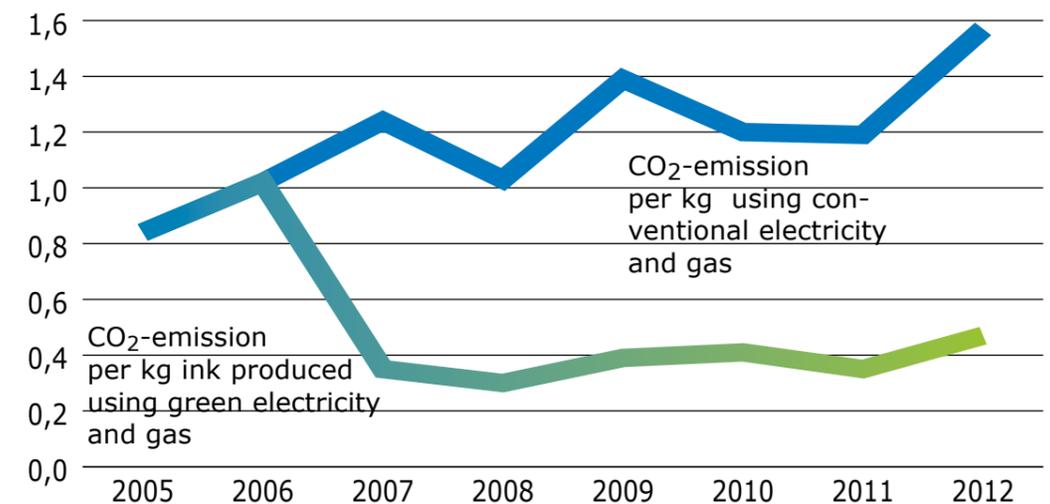
Since the building was constructed in 2004, we have not taken any significant steps to reduce our use of thermal energy. There is currently no urgent need to do so as our power consumption remains a relatively low 74 kWh/m² per year.

The product carbon footprints (PCF) for our goods are not only a key internal metric for our environmental performance. They are

attracting greater interest among our environmentally conscious customers.

Our analysis revealed that between 350 and 470 g of CO₂ is emitted per kg of paint and ink produced, depending on the production volume and the annual gas consumption. By using electricity from hydropower, we avoid generating any further carbon emissions.

Product Carbon Footprint [kg] per kilogram of ink produced – impact of switch to CO₂-neutral green electricity



Condensing gas boiler



Environmental Performance

The Marabu Green Development Index visualizes all our environmental KPIs – an at-a-glance summary of our environmental performance.

To gain visibility into all environmental indicators and our environmental performance, Marabu calculates six key indicators and records them in the Marabu Green Development Index (MGDI). This enables the data to be represented in the form of an eco-grid, providing a clear overview in seconds. To calculate the key indicators, pre-defined weightings are assigned to the various factors.

“Environmental commitment” incorporates all data relating to our ISO certifications, voluntary commitments, and any complaints from government agencies and private individuals.

The “Product Carbon Footprint” expresses in figures all CO₂-equivalent emissions by Marabu facilities due to the consumption of electricity and gas relative to the quantity of ink produced. 2005 is the baseline year (100

per cent). A 100 per cent reduction in CO₂ emissions would be required to achieve the maximum 10 points.

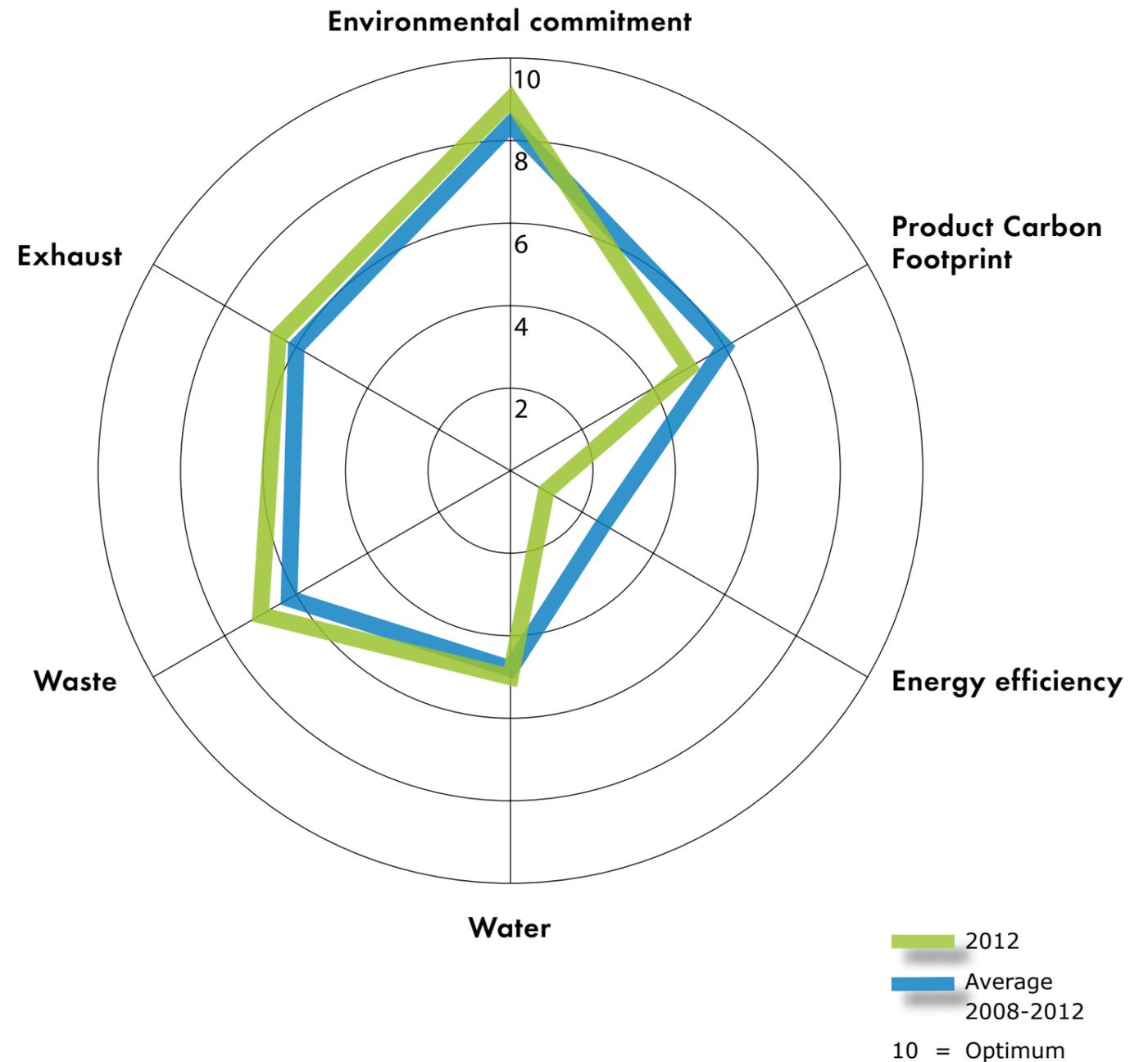
“Energy efficiency” indicates electricity consumption in kilowatt hours per kilogram of ink produced.

The calculation of the “Water” indicator is only based on the fresh water consumption.

To make our our “Waste” key indicator a more accurate gauge of our performance, we compare the total waste generated with the quantity of ink produced. We do not differentiate between waste that can be recycled and waste for which disposal facilities are required.

The “Exhaust” indicator is calculated from exhaust gas measurements taken in accordance with air quality regulations. These figures are then multiplied by the operating hours and the mass flow of exhaust air.

Our records of the average figures for the last 5 years provide the statistical basis for accurate information about our environmental performance in the reporting period.



Input/Output Analysis

Input

The input materials comprise anything delivered or provided to the company during the year. With around 1,100 different creative paint formulars, there is no small number of feedstocks. For the purpose of clarity, the raw materials have been combined into categories.

		2008	2009	2010	2011	2012
Energy						
Electricity	[kWh]	844.034	764.176	762.346	741.175	712.091
Natural gas	[kWh]	804.450	672.791	900.589	708.004	741.097
Total energy consumption	[kWh]	1.648.484	1.436.967	1.662.935	1.449.179	1.453.188
Materials						
Fresh water	[m ³]	2560	2245	2844	2017,4	1674
Binders and resins	[t]	230,0	173,0	218,0	197,0	131,0
Solvents	[t]	18,0	9,0	11,0	13,0	8,0
Pigments	[t]	47,1	29,3	31,4	28,9	21,2
Filler	[t]	82,0	53,6	63,7	64,2	48,4
Auxiliaries	[t]	42,5	38,8	38,3	34,0	30,3
Bronzes und glitter	[t]	1,8	0,8	1,3	1,2	0,6
Packaging	[t]	45,2	45,4	47,8	51,8	44,4

All figures have been rounded to the nearest decimal place. Where figures are based on measurements, we have used maximum rather than average values.

n.a. = Figures not available

* = the volume of waste is significantly lower than the volume of fresh water used – large amounts of water become part of our water-based products. All measurements for waste water are taken in the sewage plant.

Output

Output comprises all emissions produced by the company. Strict national and international thresholds apply to these amounts, which are precisely measured and recorded by Marabu. The table includes all types of emissions: gases, solids, fluids and noise.

		2008	2009	2010	2011	2012
Emissions - gaseous						
CO ₂ -equivalent	[t]	201,9	168,9	220,6	173,5	181,6
From it:						
NO _x	[t]	0,16	0,13	0,18	0,14	0,15
CH ₄	[t]	0,80	0,67	0,90	0,71	0,74
Dust	[t]	0,008	0,007	0,009	0,007	0,007
Emissions - solid						
Hazardous waste						
Paint sludge	[t]	4,5	0,6	4,3	0,0	0,8
Other	[t]	n.a.	0,6	2,2	n.a.	n.a.
Total amount of hazardous waste	[t]	4,5	1,2	6,5	0,0	0,8
Other waste						
Old paints	[t]	n.a.	2,4	8,9	0,1	0,0
Sewage sludge	[t]	17,8	6,5	12,4	12,7	6,4
Waterbased inks	[t]	n.a.	n.a.	7,6	3,2	0,5
Pigment dust	[t]	n.a.	n.a.	0,4	n.a.	n.a.
Mixed residual waste	[t]	21,7	14,0	17,3	23,6	14,1
Paper and cardboard	[t]	33,1	31,3	42,7	42,0	23,9
Wood and Pallets	[t]	9,2	6,8	5,6	4,9	2,1
Scrap	[t]	0,5	0,4	n.v.	3,5	3,7
Containers without hazardous substances	[t]	n.a.	6,5	0,4	14,5	3,7
Other	[t]	n.a.	1,4	0,0	1,2	0,1
Total amount of other waste	[t]	64,5	60,4	66,1	89,7	47,6
Emissions - fluid						
Waste water*	[m ³]	489	385	1237	995,5	399,5
Emissions - noise						
All thresholds in the TA-Lärm for mixed-use areas we met.						
Products						
Total	[t]	662,03	432,74	539,81	502,44	387,71

Environmental Programme

Our annual environmental programme lists all key milestones relating to environmental activities for our both sites.

We identify potential areas of improvement using a relevance matrix, which is updated every year – and which forms a basis for these activities. We set deadlines and assign responsibilities to ensure that all relevant employees involved have a document that provides concrete targets and goals.

No.	Associated process	Goal	Activity	Schedule	Bemerkungen	Status
1.	1.09 Legal compliance and pursuit of the legal regimes	Documentation of delegated entrepreneurial duties, mainly in production	Establish a register of rights and duties for each foreman	From Q1/2013		1
2.	1.01 Company strategy/company policy	IOS 14001:2009 certification of Marabu China and USA	Develop guideline for the entire Marabu Group on the specific requirements that ISO certified facilities need to meet, conduct audits and training on site	Q3/2013	In correlation with dot 3	1
3.	1.01 Company strategy/company policy	Introduce a binding global Marabu Management Handbook describing facility-specific environmental processes	Purchase a new MM handbook from ConSense for Marabu Group	From Q1/2013	Consense IMS-Enterprise	1
4.	1.01 Company strategy/company policy	2013 Environmental Report	New edition of the Environmental Report	Q2/2013		1
5.	5.01 IT resource Provisioning	Green IT	Take environmental impacts such as power consumption into account when purchasing new computers and monitors		e.g. Purchasing of equipment with accolades like "energy star"	1
6.	5.09 Build/convert and maintain buildings	Refurbish and extend the facility in Tamm	Reduce energy costs for heating and cooling the building	From Q4/2013		0
7.	4.02 Procurement of raw materials/auxiliaries and supplies	Select suppliers in accordance with sustainability criteria	Develop a list of questions for suppliers relating to their compliance with environmental and safety standards	Q3/2013		0
8.	2.01 K and 2.03 D Product management	Apply for eco-certification for selected inks	- Select the potential certification - Check ingredients against the certification regulations - Investigate the costs - Where relevant, submit an application	From Q1/2013	Digital: Maquajet DA-E	1
9.	2.04 Development of new products D	Develop a water-soluble auxiliary	Draft an application for funding from the German Environmental Foundation (Deutsche Umweltstiftung)	Q1/2013		0
10.	2.03 ff. Product management, printing inks	Replace solvents with water in production	Develop and market water-based inks for digital printing	2013 ff.	Carry over from 2012	1

0 = not started, 1 = in progress, 2 = don

Memberships of Associations



Our Partners – For First-Class, Eco-Friendly Products

For Marabu, forming partnerships is pivotal to ensuring that our products truly reflect customer demand. Partnerships also allow us to implement shared visions and inno-

ventions. There is a little bit of partnership in each Marabu product. And our “environment” is among the most important.



List of Acronyms

w	Per cent
°C	Degrees Celsius
AG	Public limited company
BImSchV	German Federal Ordinance on Waste Incineration and Co-Incineration
CFC	Chlorofluorocarbon
Chrome V / III	Pronounced: Chrome Six / Three
CO₂	Carbon dioxide
DIN	German Institute for Standardization
EG	European Community
EN	European Norm
ERP	Enterprise Resource Planning
EuPIA	The European Printing Ink Association
FSC	Forest Stewardship Council
g	Gram
GmbH & Co. KG	Limited partnership
h	Hour
HF	Halogen-free
ISO	International Organisation for Standardisation
kg	Kilogram

km	Kilometre
kWh	Kilowatt hour
l	Litre
LED	light-emitting diode
m²	Square metre
m³	Cubic metre
MMH	Marabu management handbook
OHSAS	Occupational Health and Safety Assessment Series
PCB	Polychlorinated Biphenyl
PCF	product carbon footprint
PCP	Pentachlorophenol
PVC	Polyvinylchloride
RoHS	Restriction of Hazardous Substances
SO₂	Sulphur dioxide
t	Tonne
tkm	Tonne kilometre
UV	ultraviolet light, with a wavelength between 100 nm and 400 nm
VbF	German Ordinance on Flammable Liquids
VOC	Volatile Organic Compounds

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