



**MARABU
ENVIRON
MENTAL
REPORT
2022**



York Boeder
CEO



Rolf Simon
Central Services,
Executive Committee

MARABU GROUP IS TAKING RESPONSIBILITY AND TAKING ACTION

As a manufacturer of printing inks and paints (Creative Colours) for artists, how do we practice environmental protection on a day-to-day basis? What obstacles do we have to overcome, and what significance does the increasingly important issue of sustainability have for a mid-size business with global operations?

At Marabu, we have been tackling these questions for a long time. As an ink manufacturer, we are a member of the chemicals industry, and therefore bear significant responsibilities related to the environment and health and safety, both within our company and at our customers' organisations. We have long gone beyond what is mandated by legislation and regulations – this is integral to our company philosophy and embedded within our daily business activities. As a vendor of premium products, we are committed to the further development and reformulation of top-quality inks while conserving resources to the greatest degree possible, across all our business segments.

We regard ourselves as pioneers: by proactively addressing environmental protection, occupational health and safety, resource conservation and sustainability, we have secured a special niche position within the competitive international marketplace. Over recent decades, the Marabu Group has made great progress in terms of environmental management. Key achievements have included systematic waste and recycling management, the installation of a state-of-the-art waste water treatment plant, and the use of "green" electricity. More recently, we have seen our attention turning to new, exciting areas, such as carefully targeted energy management, resource efficiency and conscious efforts to cut our carbon emissions.

In summer 2021, we achieved a further milestone: Marabu Germany became officially climate-neutral. This not only sends out an important signal, it also goes hand in hand with a commitment to achieve even more in terms of climate and environmental protection. We are certain to embrace further fresh ideas in the future, prompted by our own conscience and our defined objectives, as well as external influences, such as the UN's 17 Sustainable Development Goals, the EU's Green Deal and regional legislation. We are proud that our proactive approach conserves natural resources and contributes to safeguarding our environment.

We hope the readers of this fourth environmental report find it an interesting and informative read.

Yours sincerely,

York Boeder
CEO

Rolf Simon
Central Services, Executive Committee

MARABU PRODUCTS

Screen Printing Inks Pad Printing Inks

Digital Printing Inks

Liquid Coatings

Creative Colours



CONTENTS

THE COMPANY	6
PROJECT GREEN and climate neutrality	10
Marabu in the context of politics and industry associations	12
The guiding principles behind our environmental policy	15
A GLOBAL COMMITMENT	18
Marabu Tamm	20 ■
Marabu Bietigheim-Bissingen	32 ■
Marabu Latin Europe	42 ■
Marabu North Europe	48 ■
Marabu South America	54 ■
Marabu North America	60 ■
Marabu Asia	66 ■

MARABU HAS STOOD FOR HIGH-QUALITY MADE-IN-GERMANY INKS FOR OVER 160 YEARS

Knowing your origins is the foundation – knowing your destination is the spur!

Our long-term, sustainable approach to business and our global competitiveness ensure the success of our multinational company.

Marabu offers premium-quality, user-friendly products across all business units. We are a leader in both inks for specialist printing processes and paints for crafts and hobbies. We employ 520 staff worldwide, have a portfolio comprising more than 20,000 products, and generate annual sales revenues of over 100 million euros. Since April 2021, the Marabu Group has been a wholly owned subsidiary of Teikoku Printing Inks Mfg., Ltd., Tokyo, that also posts annual sales revenues of approximately 100 million euros, primarily with screen-printing inks.

As an ink manufacturer, our decision-makers addressed ecological issues at a very early stage. A look at our company's history reveals, for instance, that we had to comply with regulations imposed by government agencies as early as 1888.

Our green milestones:

Carl Albert Martz opened a paint and materials business in Stuttgart in 1859, with a portfolio of high-quality paints and inks. In addition to trading in these products, he was interested in their in-house development and production. In 1888, Albert Martz Junior assumed responsibility for the business and, on the eve of the 20th century, introduced new items, including watercolours and pastels for artists. The construction of a new building brought in new regulatory requirements regarding waste water – which had to be directed to a special mud collector and not simply discharged onto an unpaved city pathway.

In 1919, the company relocated to its current site in Tamm, allowing further growth. Here, the enterprise made a casein emulsion paint, known as Tamma, and oil paints. Again, strict regulatory requirements were imposed to protect water resources, and energy supply issues needed to be addressed. At the time, the company had to secure its own power. Until 1940, electricity was generated by a portable engine fuelled

by coal. Later, Marabu extended production to drawing implements, which created a high volume of wood waste. As a result, Dr Eduard Martz, the head of the company and the third generation of the founding family, converted electricity generation to wood gas. This remained the source behind the power supply until 1953.

1952 marked the beginning of the era of screen-printing inks: in 1961, manufacture of the MARAPID ink range was modified to make use of non-hazardous solvents, without compromising product attributes. 1985 saw the launch of the non-hazardous LIBRA product portfolio, followed by the first 100% solvent-free UV-curable screen-printing inks in 1985. In 2008, Marabu cooperated with the EPEA, an international research and consulting institute, to present UVGCC, a 100% biodegradable ink for glass substrates, designed around the cradle-to-cradle principle. In 2012, the company unveiled Maqua® Jet, a water-based ink for digital printing methods, and pad printing ink Tampa® Tex TPX (which received certification to the OEKO-Tex® Standard 100 in 2013).

We are also committed to safeguarding the health and safety of users of our paints and inks for professional and amateur artists. 80% of our Creative Colours are water-based, and for children we offer two products for finger painting and handicrafts that comply with the EU Toy Safety Directive.

The product offering has been expanded over the years, and there has been an increase in the volume of manufacturing and storage needs, leading to growing demand for space.

Despite new buildings and extensions in Tamm, the site reached its limits. To resolve the issue, Marabu constructed a state-of-the-art building in Bietigheim-Bissingen, three kilometres away, in 2004. Today, it houses our Creative Colours operations.

Our long-established efforts to improve environmental protection and safeguard employee health and safety have garnered many prizes and awards. We have, for instance, received the SGIA Award on multiple occasions, and the Responsible Care Award from the European chemicals industry.

<p>Beginning of production of low-hazard LIBRA line</p>  <p>1985</p>	<p>Production of first UV-curable inks, 100% solvent-free</p> <p>1987</p>	<p>Establishment of waste and recycling management</p>  <p>1990</p>	<p>Introduction of packaging returns system</p>  <p>1991</p>	<p>Discontinuation of heavy-metal pigments</p> <p>1994</p>	<p>Tamm certified to ISO 9001</p>  <p>1995</p>	<p>Elimination of NVPs from UV inks</p>  <p>1997</p>	<p>Incineration of exhaust-air solvents with heat recovery</p>  <p>1998</p>	<p>Upgrade to underground solvent tank</p>  <p>2000</p>	<p>SONY Green Partner</p> <p>Tamm certified to ISO 14001</p>  <p>2003</p>	<p>New state-of-the-art production facility in Bietigheim-Bissingen</p> <p>SGIA Environmental Award</p> <p>Thermographic survey in Tamm</p> <p>2004</p>	<p>Bietigheim-Bissingen certified to ISO 9001 ISO 14001</p>  <p>2005</p>	<p>Energy-efficiency upgrade of Tamm office building</p>  <p>2006</p>
<p>Electricity supply converted to carbon-neutral renewables (Bietigheim and Tamm)</p>  <p>2007</p>	<p>Ultra Glass UVGCC (cradle-to-cradle ink for glass)</p>  <p>2008</p>	<p>Updated company car policy, definition of low-carbon-emission reference vehicle</p> <p>2009</p>	<p>Publication of first environmental report</p>  <p>2010</p>	<p>Development of UV inks for LED UV dryers</p> <p>Responsible Care Award</p>  <p>2011</p>	<p>Tamm and Bietigheim certified to OHSAS 18001</p> <p>Maqua® Jet – water-based digital printing ink</p>  <p>2012</p>	<p>Tampatex TPX – OEKO-TEX® Standard 100 certification</p> <p>New online management handbook and global guide</p> <p>FSC certification for Bietigheim-Bissingen</p>  <p>2013</p>	<p>ISO 9001 certification for France</p> <p>ISO 9001, ISO 14001 certification for USA</p> <p>ISO 9001, ISO 14001 certification for China</p>  <p>2014</p>	<p>ISO 9001, ISO 14001 certification for Sweden</p> <p>ISO 9001, ISO 14001 certification for Brazil</p>  <p>SGIA – Sustainability Recognition Award</p> <p>2015</p>	<p>First CDP CO₂ report submitted</p> <p>First energy audit at Tamm plant and Bietigheim-Bissingen plant (5 Dec)</p>  <p>2016</p>	<p>Step-by-step implementation of energy monitoring system in Tamm</p> <p>OEKO-TEX® certification</p>  <p>2017</p>	<p>Climate neutrality</p>  <p>Process cooling system with ambient air cooling</p>  <p>2021</p>	



ENVIRONMENTAL PROTECTION MEANS TAKING RESPONSIBILITY AND TAKING ACTION

In our everyday lives, we are directly aware of the changes taking place in our global environment. Catastrophic forest fires, floods and droughts all underline that only a transformation in all relevant areas of our western lifestyles and changes to the way we do business can contribute to safeguarding our natural world.

In a history stretching back more than 160 years, Marabu has addressed ecological issues from the very outset. Our unwavering commitment to all aspects of corporate environmental protection,

and the development and manufacture of low-emission products, are a solid basis for tackling the challenges that lie ahead.

However, the challenges today are greater than ever before. We must and will convert to a form of business that is fundamentally sustainable in a relatively short space of time. The focus is on reducing greenhouse gases and promoting a circular economy. Marabu is facing up to these tasks, and tackling them in all relevant areas of its business.

AVERAGE TEMPERATURES ARE RISING
EXTREME WEATHER EVENTS ARE INCREASING
Fresh water IS BECOMING SCARCE
BIODIVERSITY is being lost
NATURAL RESOURCES ARE FINITE

PROJECT GREEN AND CLIMATE NEUTRALITY

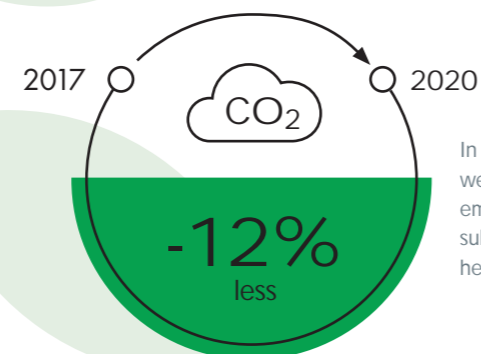
In 2020, the executive management approved “PROJECT GREEN”, the embodiment of a new climate strategy. The aim is for Marabu to emit 25% less CO₂ in relationship to production volume by 2030 compared with 2020. And despite harnessing the latest technologies, such as electric vehicles, and the installation of state-of-the-art manufacturing equipment, this goal can only be achieved by, for example, forgoing non-essential business travel and shipments of goods by air. Since July 2021, carbon emissions from our operations in Tamm and



Bietigheim-Bissingen have been offset via ClimatePartner. As a result, we are able to offer climate-neutral products. This success is both a motivation and an obligation to further reduce carbon emissions requiring offset mechanisms. Until this is possible, we shall financially support three independently evaluated carbon offset projects in Brazil and China, and the global Plastic Bank project.

A key means of achieving our aims is investment. The development of new, primarily water-based products, and products based on renewable raw materials, is a central focus of our future strategy. Funds for repairs and the purchase of new plant and equipment are only approved where these contribute to reaching our ecological goals.

This internal strategy underlines our transformation into a sustainable business. It is reflected in our corporate policies that are binding for all subsidiaries worldwide. We are combining viable business operations with a fundamental new direction for our subsidiaries. In this way, we are playing our part in achieving the goals of the 2015 Paris Agreement, namely to keep global warming significantly below 2°C in comparison with the pre-industrial era. In the past four years, aggregate carbon emissions from all the sites covered by this report were cut by 12% – from 1662 t (Scope 1 + 2)* in 2017 to 1469 t in 2020 – but we want to achieve more – the Earth needs more!



In the last four years, we cut carbon emissions from all subsidiaries named here by 12%

PROJECT GREEN

OUR THREE CAREFULLY CHOSEN CARBON OFFSET PROJECTS

Forest conservation in Portel, Brazil

Through our subsidiary in Sao Bernardo do Campo, we feel a special connection to this country. The Amazonian rainforest is the planet’s green lungs. It stores huge amounts of carbon, stabilises the world climate and is home to 10% of all species of flora and fauna. Our forest conservation project secures the Ribeirinhos, one of the poorest indigenous peoples of the Amazonas, a regular income through the allocation of land rights, and prevents the annual logging of around 3000 hectares of rainforest for agricultural use, such as soya cultivation.

Biogas in Haikou, China

Our subsidiary in Shanghai decided to support the southern island province of Hainan by means of a biogas project in the city of Haikou. The 20 districts of Haikou are agricultural in nature, and each smallholding farmer typically has a couple of pigs. Liquid manure, dung and other waste is placed in fully enclosed biogas tanks with 8 m³ capacity. The gas produced is piped directly to the cooking stoves. This obviates the need to chop firewood and prevents the release of methane from the open pits previously used for manure and waste.

Plastic bank worldwide

We believe the protection of oceans is one of our most urgent global tasks. They store a quarter of atmospheric carbon and 93% of the heat generated by the greenhouse effect. They are therefore one of the most important ways of slowing down climate change. More than 8 million tonnes of plastic waste end up in the world’s waters every year. People in Haiti, Indonesia, Brazil and the Philippines pick up plastic refuse and take it to local collection centres where they receive resources, such as clean water and food, or money for school fees, in return.



Forest conservation in Portel, Brazil, climatepartner.com/1086



Biogas in Haikou, China, climatepartner.com/1237



Combating plastic waste in oceans, climatepartner.com/1087

*Scope explanation, see P. 72

MARABU IN THE CONTEXT OF POLITICS AND INDUSTRIAL ASSOCIATIONS

Marabu's ecological objectives are subject to changes over time. They are aligned not just with our own aspirations and our customers' requirements, but also with legislation and the worldwide sustainable development aims of the United Nations. The UN's Agenda 2030 is a sustainability strategy comprising 17 sustainable development goals (SDGs). These are directed at governments, but businesses, too, are expected to contribute to their achievement. Not all 17 SDGs are relevant to Marabu, only a subset. As a member of the VDL (The German Association of the Paint and Printing Ink Industry), we are committed to the five industry aims agreed at the annual general meeting in May 2020.

The five VDL industry aims for sustainable development – our compass

GOAL 3 Health and well-being



To guarantee a healthy life and promote well-being for all people of any age “through the substitution of hazardous materials in paints and printing inks”

Marabu undertook a commitment in 2003 to no longer use input materials that are carcinogenic, mutagenic or reprotoxic (CMR), or categorised as hazard class 1 according to the CLP regulation. For digital printing inks, we will be making greater use of water-based systems that have no VOC1 emissions, and of inks suitable for food packaging. For our Creative Colours, we are developing a product with a large proportion of natural raw materials.

GOAL 4 High-quality education



To guarantee inclusive, equal education opportunities across all disciplines, and to enable lifelong learning “by promoting initial training and ongoing skills development in the paint and printing ink industry”

The recruitment and retention of skilled workers and new, young employees is a key issue for Marabu. Marabu offers young people training in many areas, and maintains close relations with universities and vocational colleges.

Our employees evolve their skills by attending task-specific courses within the scope of an annual training plan. Additionally, for production workers we created the Marabu Academy, with weekly 30–45-minute training modules. Currently, we are establishing an internal IT Academy for the delivery of skills development and online training courses, including content on environment-related occupational health and safety, and legal certainty.

GOAL 9 Innovation and infrastructure



“The promotion of research and development for sustainable products and processes” – to build a stable, eco-friendly infrastructure with space for sustainable innovations in manufacturing technology and formulations

The future belongs to businesses that offer sustainable products made by resource- and energy-efficient means. By developing sustainable products and implementing efficient manufacturing and application processes, we are safeguarding our competitiveness and strengthening Germany's position as an industrial base.

Our products are of high quality, and provide coatings that contribute to the longevity of objects. The use of high-quality inks protects materials against premature wear.

Goal 12 Responsible consumption



To ensure sustainable patterns of consumption and production through “analysis of the ecological footprint of paints and printing inks” across the entire lifecycle

Identifying and reducing the environmental impact of our printing inks and Creative Colours has long been a key aspect of our development work. If you consider a printing ink from its development to its disposal, environmental impacts can be observed at various stages. We assess them in their entirety through lifecycle analysis. When comparing and evaluating types of ink it is important to take a holistic view that considers all factors. Only then can you draw conclusions.

The term “water-based”, for instance, implies a high degree of eco-friendliness; at the same time, “vegetable-oil-based systems”, on account of their high proportion of renewable raw materials, could be seen in an even more positive light. However, these products require significantly more energy input for the drying process than their alternatives. If you consider the whole picture in full then some products emerge as less eco-friendly than first assumed.

The substrate, too, can have an ecological impact: drying a water-based ink on plastic or metal requires markedly more energy than is the case with materials such as corrugated card.

Considered critically, there is no single print technology or method that is a universally eco-friendly solution. The best solution can only be found when all relevant factors for the specific process and/or product are taken into account during any analysis and subsequent evaluation (cf. wirsindfarbe.de 2022).

By looking at the entire picture, we work with our customers to apply the best possible ink system with the smallest possible ecological footprint.

GOAL 13 Climate protection measures



To take steps to combat climate change and its impact by “increasing energy efficiency in the paint and printing ink industry”

Marabu has been climate neutral at its main sites in Tamm and Bietigheim-Bissingen since July 2021. Since Marabu has sourced its electricity from renewables since 2007, we generate zero Scope 2 emissions. The next challenge will be to significantly reduce Scope 1 and 3 carbon emissions, and not just to use offset mechanisms. To this end, we have developed a road map that lays down all measures for the next 10 years.

MARABU AND THE EUROPEAN GREEN DEAL

The European Green Deal

The "European Green Deal" was introduced by the European Commission under Ursula von der Leyen. It foresees reducing greenhouse gas emissions within the EU to zero by 2050, making Europe the world's first climate-neutral continent. The goal is to create a sustainable European Union based on a growth strategy that turns Europe into an advanced, resource-efficient circular economy. Further goals include preventing any further loss in biodiversity and ceasing pollution.

The EU defined 50 policy areas, and plans to implement changes by means of various action plans, e.g. for the circular economy, or the zero pollution action plan of May 2021 that proposes to make air, water and soil free of pollution with the Zero Pollution Vision 2050.

As a maker of printing inks, we will be especially affected by this action plan. The EU's aim is to define 30 individual measures by 2024, in particular to address industrial emissions, steps to improve indoor air quality, drinking water, an ocean strategy (including microplastics) and disposal of waste water into the local sewage system. It remains to be seen what direct requirements our European production sites, products and our customers will face that go beyond current environmental standards.

Our Product Safety department is the prime mover of the corresponding discussions and is actively involved in European industrial associations, working towards a Europe that is free from pollution, in line with the EU's plans. When we as a society succeed in this endeavour, and we can play our part, then we do so gladly and with complete conviction.

OUR ENVIRONMENTAL POLICY – GUIDING PRINCIPLES

Our overriding goal is to protect the natural world against harmful impacts on air, water and soil. We believe humanity's most urgent task is to address climate change and its effects. Our "PROJECT GREEN" contributes to reducing atmospheric greenhouse gases. Wherever possible, we make all efforts to support the achievement of the UN's 17 Sustainable Development Goals.

1. Responsibility

Safeguarding human life and the environment is integral to all relevant business processes. We oblige all our employees to comply fully with all relevant duties and policies.

2. Products

We develop state-of-the-art products with low emissions across their entire lifecycle. We prioritise water-based systems and the use of renewable materials.

3. Use of hazardous materials

We choose all our raw materials with the greatest care. Where technically feasible, we avoid the use of hazardous substances that require special safety precautions. Wherever possible, we employ less harmful substitutes that pose much lower health risks.

4. Resource efficiency

Responsible consumption of raw materials and energy-efficient production processes help conserve primary natural resources while improving the cost-efficiency of our business. We focus on the circular economy and believe the use of inks is no obstacle to recycling printed substrates.

We prioritise renewable and in-house generated energy. Externally sourced wood is exclusively from sustainable forestry. Operations at our two main sites are entirely carbon-neutral, and the role of carbon offsets is being continuously reduced.

5. Assessment and improvement

We continuously assess our environmental management practices and outcomes, in terms of opportunities, risks and quantifiable key performance indicators. This enables us to identify potential improvements and initiate corresponding action.

6. Investment

Our investment decisions contribute to achieving our environmental goals. Efficient, state-of-the-art plant and equipment, and advanced IT systems, reduce energy demand.

7. Communications and transparency

We engage in open dialogue, both internally and externally. The knowledge and experience of all employees play a key role in continuous improvement. We promote the training and ongoing skills development of our staff. We take account of the requirements of stakeholder groups and respond transparently. Our commitment to health and safety, and to the environment, is reflected by our active participation in chemical industry associations.

THE PATH TO CERTIFICATION – AN EXEMPLARY APPROACH

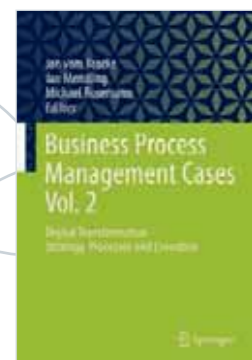


The implementation of many legal requirements, directives from regulatory bodies, and voluntary measures across all areas of the business led almost automatically to the initial certification of our main plant in Tamm according to ISO 14001 in 2003. Our self-imposed commitment to continuous improvement of environmental protection means that we constantly critically review our own activities.

Relevant statutory requirements or voluntary internal directives related to the environment are described for the corresponding processes, and are defined more precisely in process and work instructions (company policies). In this way, they are incorporated into our day-to-day operations.

From 2012 onwards, quality management, environmental protection and workplace health and safety requirements have also been applied to core processes of our subsidiaries. Our exemplary approach is of textbook character, and was described in a chapter of "Business Process Management Cases Vol. 2" published by Springer in 2021, a book that presents real-world case studies.

In 2013, we introduced a directive with global validity, with eleven site-specific versions in the local language. These are online, and therefore accessible to all employees. This guarantees consistently high quality and pioneering environmental protection standards worldwide.



Where can the book be purchased?

Business Process Management Cases Vol. 2 is available from the online store of Springer publishing: <https://link.springer.com/book/10.1007/978-3-662-63047-1>
 Relevant chapter: https://doi.org/10.1007/978-3-662-63047-1_19
 Business Process Management Cases Vol. 2 ISBN: 978-3-662-63047-1

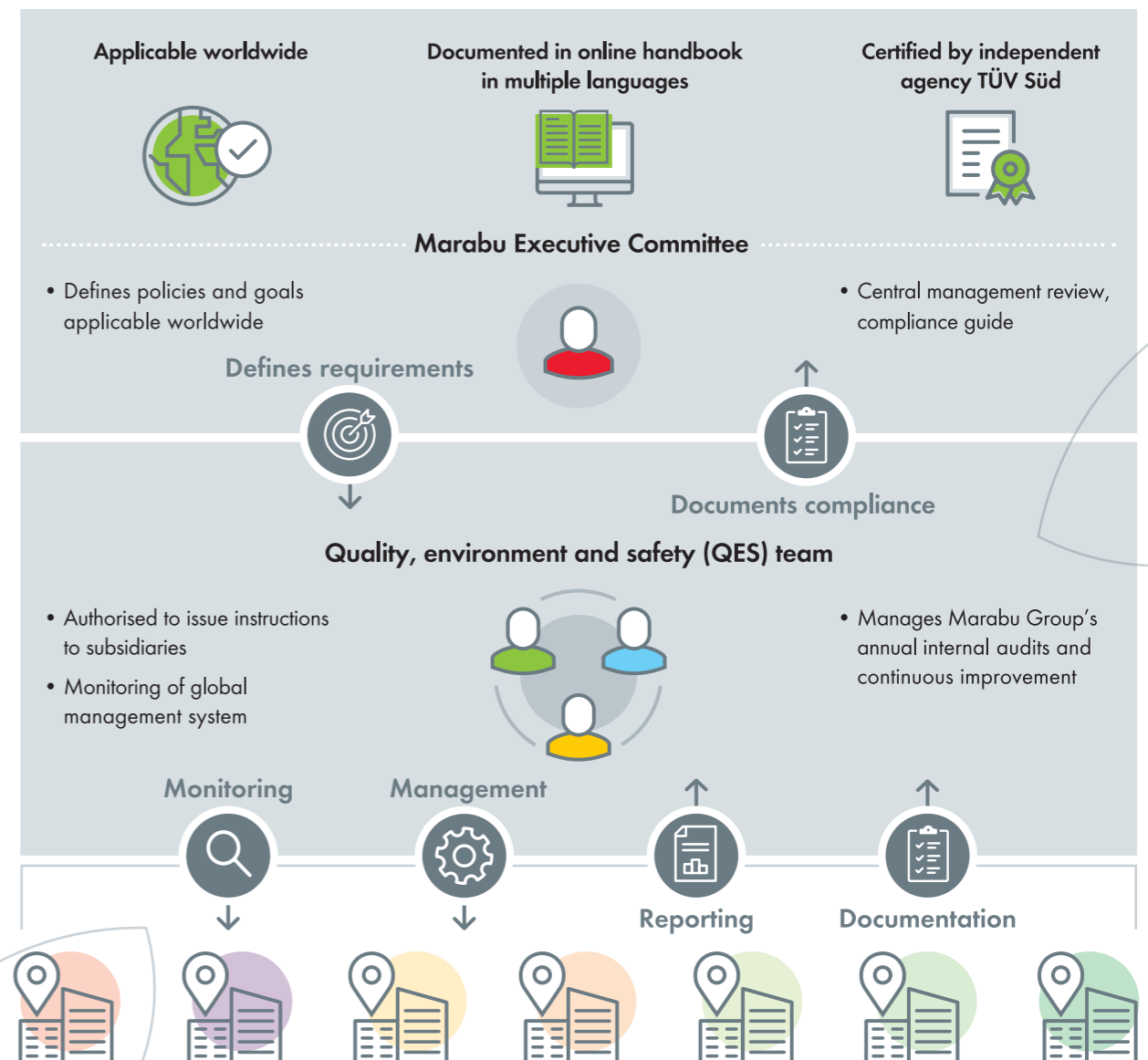
Chapter on Marabu's success story:

Cee K., Bruns I., Schachermeier A., Kaiser L.F. (2021) Adoption of Globally Unified Process Standards: The Case of the Production Company Marabu.
 In: vom Brocke J., Mendling J., Rosemann M. (eds) Business Process Management Cases Vol. 2 Digital Transformation – Strategy, Processes and Execution (pp. 249-259). Springer, Berlin, Heidelberg.

THE MARABU MANAGEMENT SYSTEM

Our Marabu Group global management system is monitored and certified on the basis of a matrix. The senior management at our headquarters in Tamm defines key parameters, such as quality and environmental policies, and the annual goals for all sites, and verifies their compliance by means of an annual management review. The quality, environment and safety team assists subsidiaries with the adjustment of core processes in line with requirements defined by the parent company, and is responsible for the central planning of the entire management system and the continuous

improvement process. Internal audits and KPIs are employed to measure the system's progress. The matrix has the advantage that individual sites are subject to spot checks by the accredited certification body, and typically a check or re-certification audit is performed every two to three years, depending on the standard, and the size and environmental relevance of the site. The exceptions are the headquarters, where the management system is verified every year, and China due to national regulations.



CO₂

A GLOBAL COMMITMENT

INKS ARE OUR PASSION – SUSTAINABILITY OUR GOAL

THE COMPANY

Environmental protection, occupational health and safety, resource conservation, the circular economy, supply chain tracking and tracing, logistics, knowledge transfer and awareness raising are all key ways of strengthening sustainability within an organisation. Marabu Group has long set very high standards in this area. The objectives we have defined in our quality and environmental management system go beyond statutory requirements, and continue to be expanded and enhanced. The Environment, Quality and Safety department oversees all relevant activities at international sites, and offers advice and assistance. The team also supports all sites during their annual audits. The following chapters are dedicated to the individual Marabu company locations and not only describe what has been achieved, but also the current situation of each subsidiary within its sales territory.

99
TÜV audits
worldwide since 1995

Around 212 tonnes
of materials that can be
reused are collected annually
at all Marabu sites

19,297.2 tonnes
German and Scandinavian sites
have cut their emissions through the use
of green electricity since 2007



Marabu



263

Total employees at site

TAMM

SCREEN PRINTING INKS | PAD PRINTING INKS |
DIGITAL PRINTING INKS | LIQUID COATINGS



Research and
Development



Production:
Printing Inks



Logistics



Administration



Product Management



Marketing



Distribution/Sales



Custom formulations



Customer service

Certifications



ISO 9001



ISO 14001

Marabu GmbH & Co. KG,
printing ink production plant and company headquarters

MARABU TAMM – AWARDED SILVER

To make chemical products and protect the environment – surely that is a contradiction in terms? To an extent, it is. But we are working systematically to create “greener” products and manufacturing methods, to reduce waste, to conserve energy and natural resources, and to employ resources that are renewable.

At the same time, effectively protecting the environment is also about protecting human health generally, as high-quality air, earth and water, and less noise, are the basis for a healthy living environment.

Marabu, as a maker of inks, is a chemicals company that must comply with many statutory requirements overseen by regulatory authorities. Fulfilling these directives often calls for significant investment. But it ensures an intact environment and safeguards our own health.

Ultimately, environmental protection is a task for us all, one that requires all individuals and all institutions to pull together. And only those companies that are truly sustainable will survive. Major multinationals employ standardised ratings to compare their corporate social responsibility (CSR) and progress in terms of environmental performance, such as reducing greenhouse gas emissions.



A high-profile customer requires Marabu to voluntarily publish its greenhouse gas emissions, plus data on wood and water consumption, via CDP on a yearly basis. The Carbon Disclosure Project was established in London in 2000 with the aim of determining companies’ climate risks, plus their mitigation goals and strategies, by means of standardised questionnaires. The CDP now manages the largest database of its kind, with reports received from 9600 enterprises, including the majority of DAX-listed companies. Worldwide, 317 enterprises have succeeded in qualifying for category A, the best of all (there are a total of six, from A to F), including 19 from Germany.

In 2020, Marabu Holding was placed in category D, a middle ranking. On account of our efforts in 2021 to further cut carbon emissions, we are optimistic that we will be promoted to a higher category.

EcoVadis, the leading provider of universal sustainability ratings, awarded Marabu a silver medal in 2019 and 2020 for its efforts in this field (Silver Sustainability Rating). This marks us as one of the best 25% of companies to be evaluated by EcoVadis. The results of our CSR assessment, including the categories Environment, Labour & Human Rights, Ethics, and Sustainable Procurement, plus the overall rating can, following approval, be viewed by our customers.



ENERGY SAVINGS – A MARATHON NOT A SPRINT

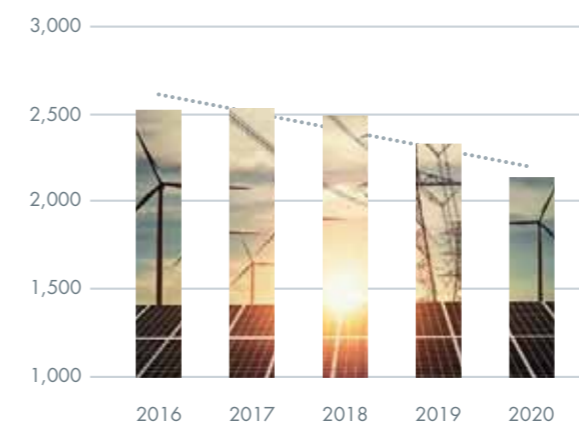
Over the last few decades, there has been growing scientific evidence that natural and human-generated greenhouse gases are driving global warming. Against this backdrop, we decided in 2007 to source our electricity exclusively from renewable sources, i.e. green electricity, generated by wind, solar and hydro-power. Additionally, we continuously seek to lower our absolute and specific electricity use per kg of manufactured ink through a variety of measures. In a company that has been operating for decades, energy efficiency is very much a marathon, not a sprint – and a task we consciously address, as the results speak for themselves. Through diverse technical and organisational measures, we have succeeded in cutting our specific energy consumption from 1.29 kWh/kg manufactured ink in 2005 to

0.76 kWh in 2020. This is a fall of 41%, and in 2020 we witnessed a further reduction in power consumption.

To cool our production processes, four individual legacy cooling units were replaced by a single state-of-the-art 300 kW system with ambient air cooling, i.e. that is able to harness the low outdoor temperatures during the colder months of the year. And the system also boasts other energy-saving features, such as a speed-adjustable fan that operates in accordance with the outlet temperature of the cooling water, and with a condensation temperature that adjusts to ambient air. The savings achieved in comparison with a system without these features is approx. 150,000 kWh to 200,000 kWh annually.



Electricity consumption in MWh/year



Electricity demand in kWh per kg of manufactured ink

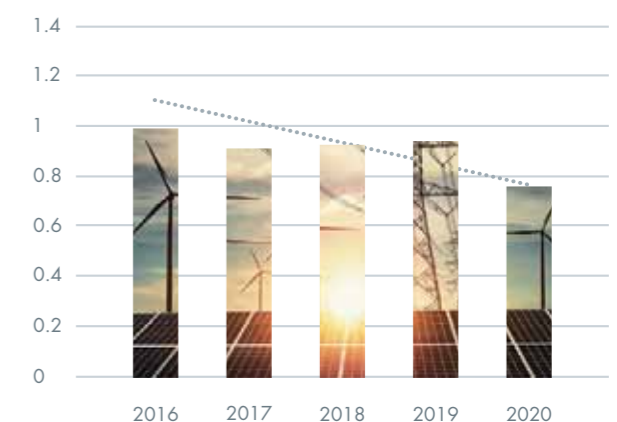




Image above: Refrigeration system for cooling processes in production (2021). Image to left: exhaust air scrubbing system with heat recovery

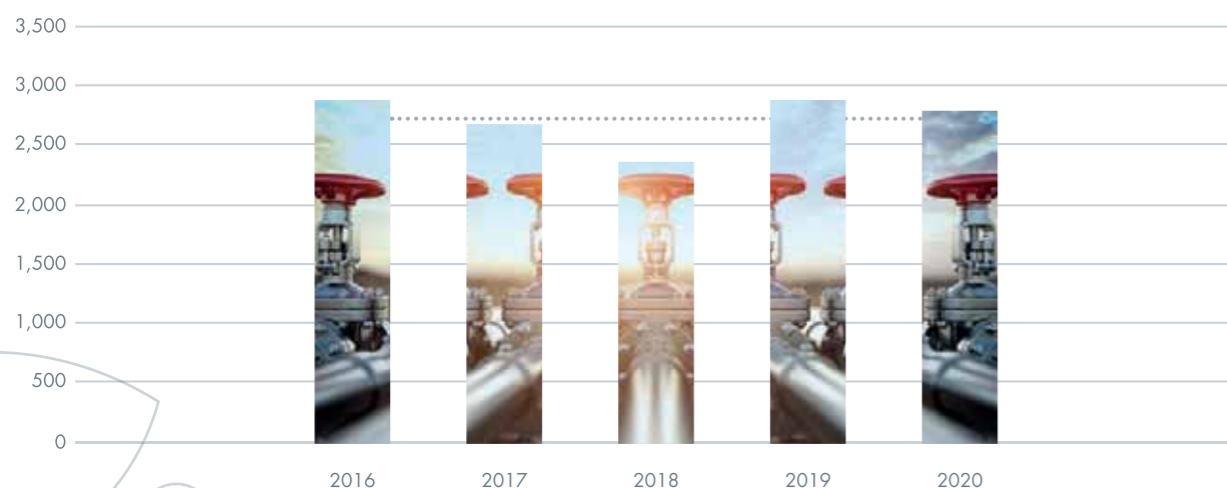


Marabu (in Sachsenheim) in 2018 and 237 in 2020 – and our gas consumption reflects this development. We can only achieve a step change in heating energy consumption by completely upgrading or by fully insulating the buildings yet to be modernised. Alternatively, we could consider a new heating system, but any such proposals would need to take our decarbonisation plans into account.

The five buildings at the site in Tamm are the result of various construction projects over the last 50 years, and are connected to a central gas-fired heating system. The amount of gas required has been fairly static for many years, and is a direct function of the number of cold days requiring active heating in any given calendar year. Germany's National Meteorological Service (DWD) recorded 219 such days at the weather station closest to

In addition to heating, we require gas for the afterburner system (thermal oxidizer). This system is responsible for 16% of gas consumption, corresponding to approximately 400 MWh annually. At temperatures of some 600° C, it almost completely oxidises volatile solvents in the air extracted from production areas. The waste heat recovered from this process is employed for the in-house distillation plant and to dry production containers.

Gas consumption in MWh/year



CLIMATE NEUTRALITY – THE SCOPE VALUE IS THE MEASURE OF ALL THINGS

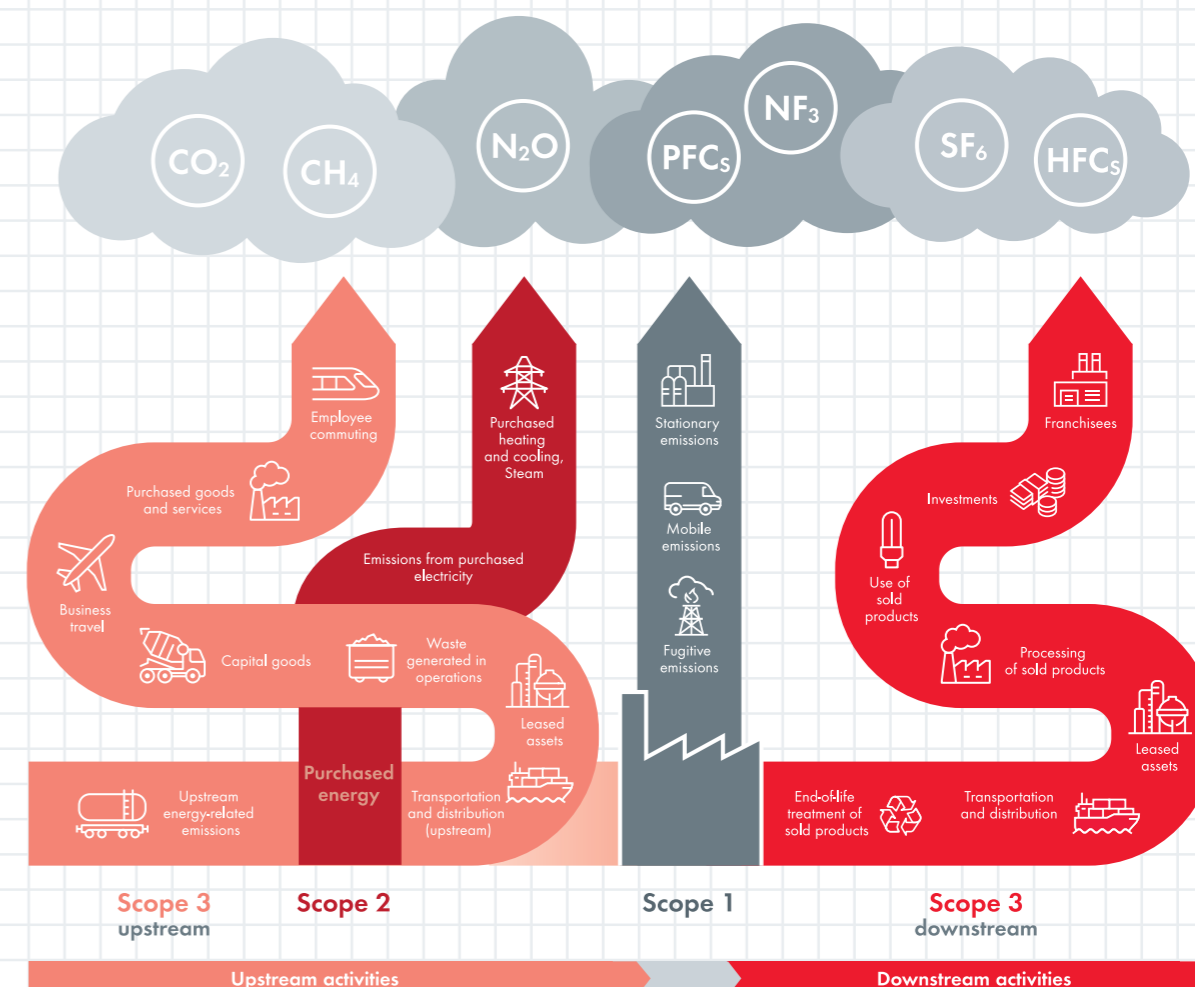
In-depth analysis of our consumption patterns and of the energy-saving measures implemented, plus the conviction that it is essential, despite growing production volumes, to further shrink our climate footprint, led to the decision to offset our remaining CO₂ emissions – and to therefore make our main sites in Tamm and Bietigheim-Bissingen climate-neutral from July 2021.

scientific data, broken down into Scope 1, Scope 2* and Scope *3, from the production of our raw materials to the delivery of our products – demonstrated that emissions from upstream and downstream value chain activities (Scope 3) are 14 times higher than our Scope 1 value, yet are far more difficult to reduce as we have fewer means of influencing them.

To help us with this endeavour, we sought the advice and support of ClimatePartner. Investigation of all our CO₂ emissions – according to international standards and using reliable

Marabu's Scope 1 value includes carbon dioxide produced by the combustion of gas, and fuel for company vehicles.

Greenhouse Gas Protocol emission categories (scopes)



*Scope explanation, see P. 72



By enhancing the heating system, and purchasing only electric or at least hybrid vehicles, we can considerably lower our Scope 1 value. There are already 10 electric charging points available at our site in Tamm.

Our use of CO₂-free green electricity results in zero Scope 2 emissions. Nevertheless, we considerably lowered electricity consumption in recent years by switching completely to LED lighting, introducing shorter stirring times in ink production, deactivating unnecessary equipment during periods when there is no production, and purchasing low-consumption equipment and devices. Moreover, we generate our own electricity via a photovoltaic array and produce hot water via solar panels.

To lower our large Scope 3 volume, we are using less packaging material and are investigating the increased use of recycled materials.

Where possible, we avoid shipping goods by air and keep business travel to a minimum. We are in favour of targeted working from home on the part of staff, as the pandemic has shown that the use of digital channels has a positive impact on emissions. In Baden-Württemberg in 2020, emissions in the transport sector fell by 18% (cf. statistik-bw.de 2021), and we also expect the next assessment of our Scope 3 emissions to show a marked decline in the volume attributable to transport. The company also supports campaigns such as Stadtradeln, a climate-friendly competition to see who can use their bicycles the most in 21 days. Marabu bikers rode to second place in Tamm in July 2021, completing almost 6,000 kilometres and saving 857 kg of CO₂. These types of activities underline our shared desire to help protect our environment.

AVOIDING OR USING WASTE RATHER THAN DISPOSAL

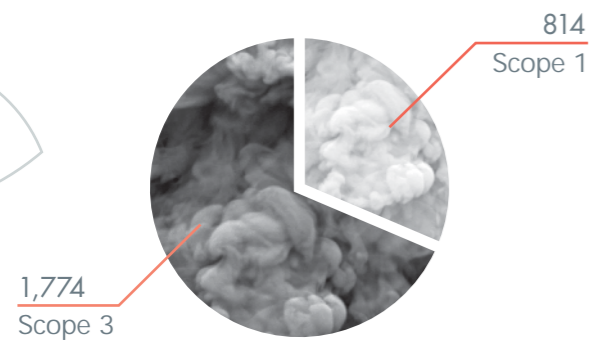
Marabu implemented effective waste management processes at a very early stage. From the outset, there has been a clear focus on avoidance, and on segregating waste for recycling – leaving just a small amount of general household waste. We regard waste as a resource, and an independent expert assessment in accordance with applicable legislation on commercial waste (Gewerbeabfall-VO) showed that we segregated 97.5% of all waste in 2020. This exceptionally high rate prompted our recycling and disposal partner to nominate Marabu for a sustainability certificate.

In cooperation with the Fraunhofer Institute, the following figures were identified for waste either recycled as a material or used to generate heat:

- A saving in primary raw materials of 181.4 tonnes
- Energy generation and savings of 1,506.9 MWh
- CO₂-equivalent savings of 172.8 tonnes calculated and recorded in a sustainability certificate

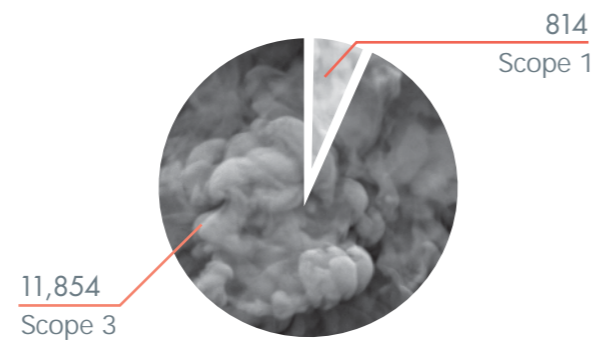
However, waste avoidance is even more important than recycling. We therefore, for instance, distil and reuse cleaning solvents. The origin of our ink waste is documented in detail via our ERP system, providing visibility into the sources and allowing us to identify potential improvements to prevent waste from being generated.

Scope 1, 2 and 3 in t/year not including materials and logistics



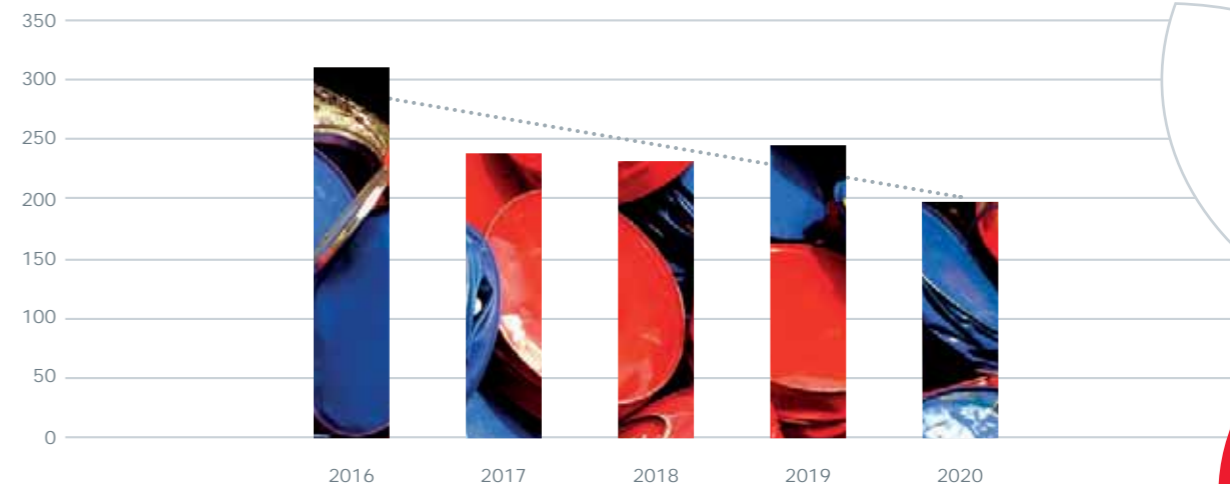
Scope 3 emissions, such as employee commutes, business travel, upstream gas and electricity, disposal of waste and other materials, canteen

Scope 1, 2, 3 in t/year including materials and logistics



All scope 3 emissions, including procurement of raw materials and packaging materials, and outbound logistics

Total volume of waste in t/year





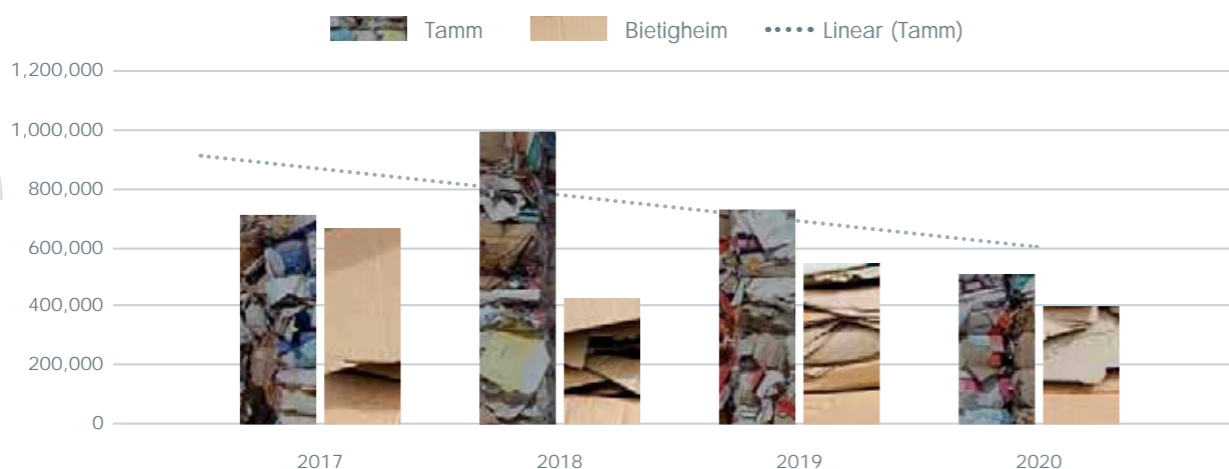
LESS PAPER MEANS MORE FOREST

Background info on forestry

Almost one in five industrially felled trees ends up as paper. And paper consumption continues to grow worldwide – from 130 million tonnes in 1970 to 415 million tonnes in 2019. In terms of both paper use and production, Germany is in fourth place globally, behind China, the USA and Japan. Logging, approx. 30% of which is illegal, leads to annual deforestation worldwide of around 30 million hectares of land, a loss equivalent in size to the UK and Ireland combined. And this despite the vital importance of global forests as gigantic stores of carbon dioxide, influencing the climate and acting as a key habitat for flora and fauna. The paper industry has a key role in determining the future of our forests (cf. wwf.de 2022).

There has been increased media coverage of shortages of wood and paper products in autumn 2021. Marabu has focused on efforts to conserve paper for many years. Through digital information exchange with customers and suppliers, we have halved paper consumption in Tamm and Bietigheim-Bissingen, from 1.8 million sheets in 2012 to 900,000 sheets in 2020. We only use 100% recycled paper with the Blue Angel eco-label. There was a brief peak in 2018 as a result of the rollout of a new ERP system. From 2022, internal documents have also been digitised. There is a clear trend in the right direction, away from paper and toward digital communications, to the benefit of forestland.

Paper consumption in sheets/year

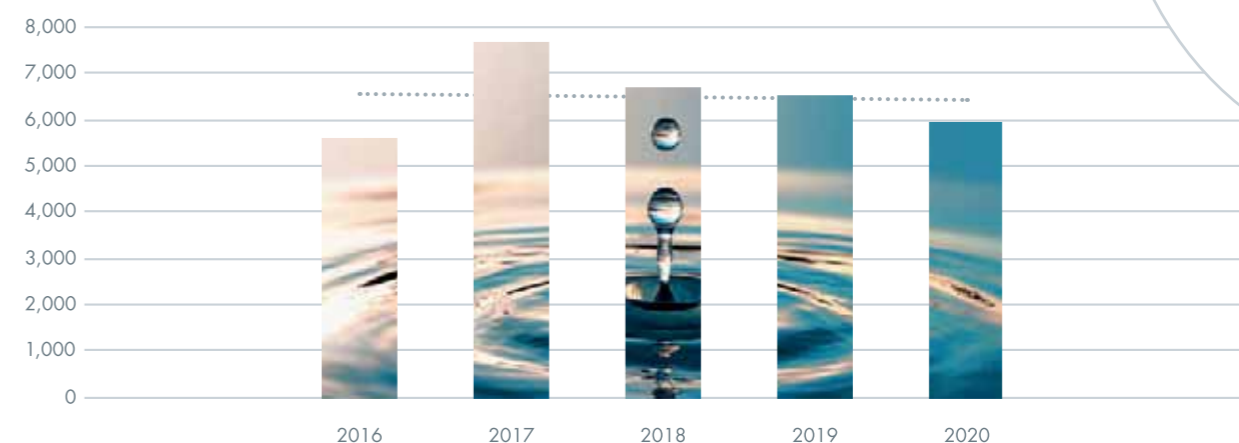


LOW WATER CONSUMPTION

Water usage at Marabu in Tamm is of little ecological significance. Water is employed to cool machinery in closed-loop systems. In the future, however, water will be required in increasing amounts as a raw material for water-based inks.

Accordingly, waste water is currently of a composition comparable to that from private households, and can be discharged into the public sewage system, which takes it to a nearby treatment plant. Water consumption fell by about 22% in 2020 to 5,965 m³ after a high of 7,697 m³ in 2017, when a mobile cooling unit was required on a temporary basis for the production process.

Water consumption in m³/year



PROTECT NATURE TO PROTECT HEALTH

Especially critical for us as a printing ink manufacturer is packaging for food and personal care products. To uphold the exceptional quality standards that apply to the ingredients and manufacturing processes, Marabu decided to make the corresponding inks in line with Good Manufacturing Practices (GMP). GMP defines specific requirements regarding purity and quality over and above ISO 9001. It was developed by EuPIA and has become established as the standard for the relevant sectors. Following its successful introduction, and the checks made on all raw materials to verify their contents are of consistent quality, Marabu will, from 2022 onwards, be able to offer the corresponding customers the ability to print any packaging substrate with our low-migration UVFP ink range. Additional product lines are under consideration.

ENVIRONMENTAL PERFORMANCE – THE MARABU ECO-GRID

The key performance indicators (KPIs) for the environment are determined monthly or annually, depending on their relevance, and used to arrive at a Green Development Index value. The weighting of the various KPIs is in accordance with a predefined points system. The average for the last five years is taken as the basis for comparison with the values for 2020.

Explanation of the underlying parameters:

Environmental engagement: This entails recording ISO 14001, OHSAS and FSC certifications, as well as other relevant activities, such as our participation in the chemical industry's Responsible Care programme and the CDP (Carbon Disclosure Project).

PCF: The product carbon footprint encompasses all Scope 1 and Scope 2 emissions that are generated at the various sites in relation to production volume. To track the change in carbon footprint over time, we began with four indicator points

in the base year 2005, and we now use six. Our site in Tamm was not yet carbon-neutral in 2020, and as a result this is not reflected in the PCF eco-grid for 2020.

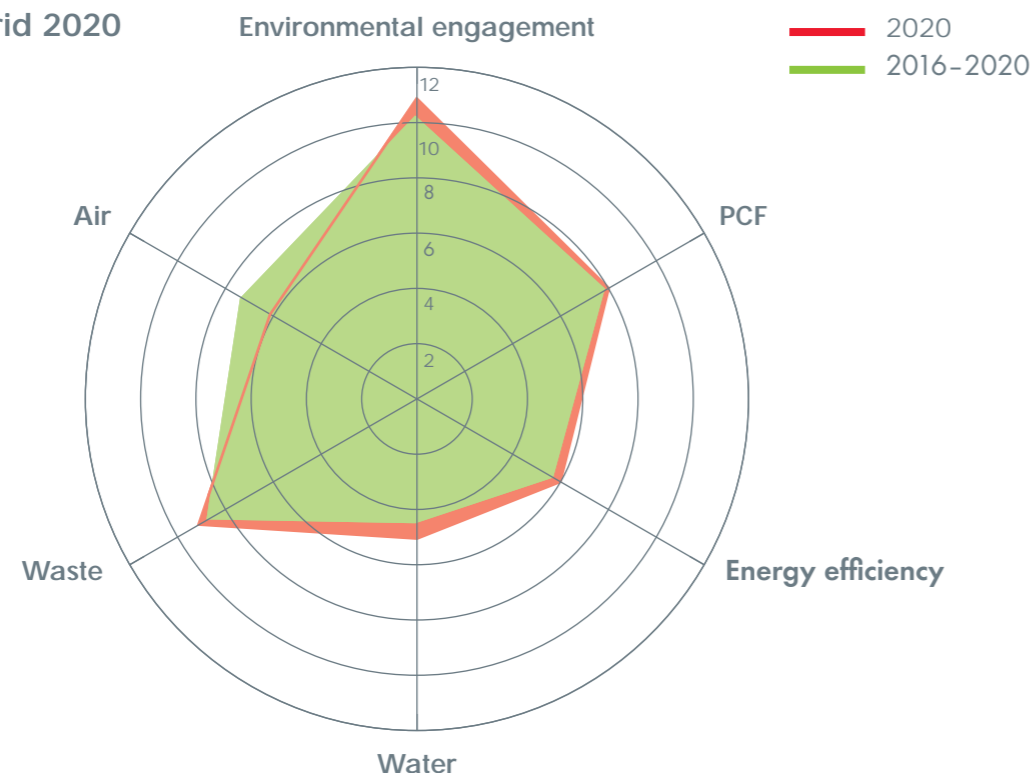
Energy efficiency: Energy efficiency is calculated as the volume of gas and electricity consumed per kg of manufactured ink.

Water: The metric for water reflects fresh water consumption per kg of manufactured ink.

Waste: Waste is the total volume of waste in relation to the total volume of manufactured ink. There is no division into hazardous and non-hazardous waste, or into waste that is to be disposed of and waste that can be recycled or incinerated to generate heat.

Air: The metric for air is calculated using the measurements of exhaust air required by regulatory bodies. These values are multiplied by the number of operating hours and the mass flow rate.

Tamm eco-grid 2020



TAMM PLANT INPUTS		2017	2018	2019	2020
Energy					
Electricity	kWh	2,535,325	2,486,192	2,324,861	2,142,452
Natural gas	kWh	2,696,457	2,367,355	2,884,047	2,780,412
Total energy input	kWh	5,231,782	4,853,547	5,208,908	4,922,864

Raw materials					
Fresh water	m ³	7,697	6,688	6,539	5,965
Binders and resins	t	599	606	575	450
Solvents	t	1,585	1,563	1,438	1,293
Pigments	t	498	322	290	278
Fillers	t	133	133	107	110
Additives/agents and photoinitiators	t	120	135	102	87
Metallic and glitter effect materials	t	16	12	11	7
Total raw materials	t	2,951	2,771	2,523	2,225

Packaging					
Aluminium, aluminium composites, tin, sheet metal	t	219.73	212.39	196.28	222.58
Paper/cardboard	t	156.47	151.23	139.76	158.48
Plastic/plastic composites	t	95.27	91.97	85.1	96.5
Total packaging	t	471.47	455.59	421.14	477.56

TAMM PLANT OUTPUTS		2017	2018	2019	2020
Gaseous emissions					
CO ₂ Scope 1		787.9	708.88	814.4	779.87
CO	from exhaust air thermal oxidation	t	0.3	0.3	0.3
NO _x as NO ₂	from exhaust air thermal oxidation	t	0.5	0.6	0.6
Total C	from exhaust air thermal oxidation	t	1	4.9	0.6

Solid emissions					
Hazardous waste					
Ink and distillation sludge	t	78.86	81.76	85.88	79.75
Waste ink	t	8.33	8.12	14.61	10.8
Other	t	4.4	3.55	5.29	4
Total hazardous waste	t	91.6	93.4	105.78	94.55

Other waste and materials					
Mixed plastic and other waste	t	34.685	34.671	37.82	31.73
Paper/cardboard	t	33.32	30.66	25.08	27.5
Wood	t	22.26	28.21	33.48	22.77
Scrap metal	t	55.79	40.1	37.39	23.5
Other	t	1.025	1.83	3.78	0
Total materials and other waste	t	147.08	135.47	135.55	105.5

Liquid emissions					
Waste water	m ³	7,697	6,688	6,539	5,965

Products					
Volume manufactured	t	2,781	2,688	2,484	2,818

BIETIGHEIM- BISSINGEN

CREATIVE COLOURS



Research and development



Production:
Printing Inks



Logistics



Administration



Product Management



Marketing



Distribution/Sales



Custom formulations



Customer service

Certifications



ISO 9001



ISO 14001



FSC® 2013

Marabu GmbH & Co. KG,
Creative Colours plant



89

Total employees at site

BIETIGHEIM-BISSINGEN – “PROJECT GREEN” FOR THE COMING DECADE

Our Creative Colours are almost entirely water-based and are designated as non-hazardous according to the CLP Regulation (classification, labelling and packaging of chemical substances and mixtures).

Development of an especially sustainable product

Yet we have even more ambitious plans. In 2020, the Creative Colours business unit decided to develop an especially sustainable paint. Two years later, we can state: mission accomplished. As a result, we will be launching a water-based alkyd product in spring 2022. Made with raw materials derived from vegetable oil, Marabu will commence manufacture of an entirely new type of product that is an attractive option for artists working on canvas and people pursuing a creative hobby on a variety of substrates.



At least 92% of this vegan product comprises raw materials of natural origin (including water and renewable materials).

Marabu paid close attention not just to the ingredients but also to the packaging. The tube requires up to 30% less input material than a conventional tube. Additionally, as the new tube material is thinner, it is easier to completely remove all its contents. The packaging is 100% recyclable if the cap is disposed of separately. The quality and ease of use correspond to the high made-in-Germany standards that Marabu is famous for.

But “PROJECT GREEN” is about much more than the development of a single product. It addresses all processes and products with regard to their environmental impact, and identifies potential improvements. With both product packaging and shipment packaging, Marabu not only pays attention to appropriate size, but also seeks to maximise the amount of recycled material used.

In the case of card, this can be as much as 95%, followed by up to 80% for plastic blister packs, and up to 40% for glass. But there are still areas that can be improved. For instance, we now prioritise banding for palletised shipments rather than stretch wrap wherever possible.



STATE-OF-THE-ART BUILDINGS WITH LOW ENERGY DEMAND

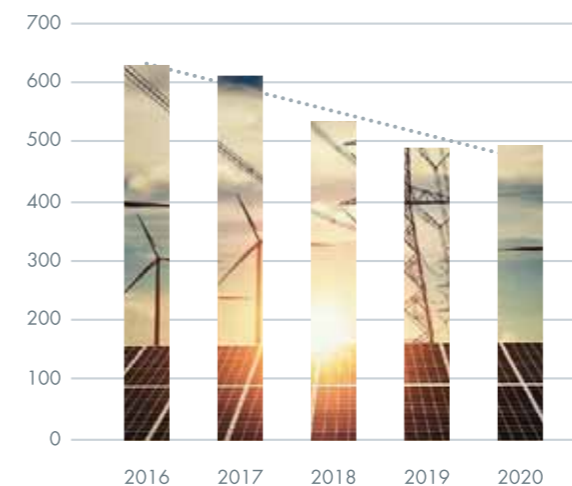
The Creative Colours unit is in a state-of-the-art industrial building, 2 km from Marabu headquarters, where all operational processes, from goods received, to manufacturing, to storage and shipping are efficiently arranged in close proximity to each other.

The building has large expanses of glazing, creating a pleasant working environment and enabling best possible use to be made of

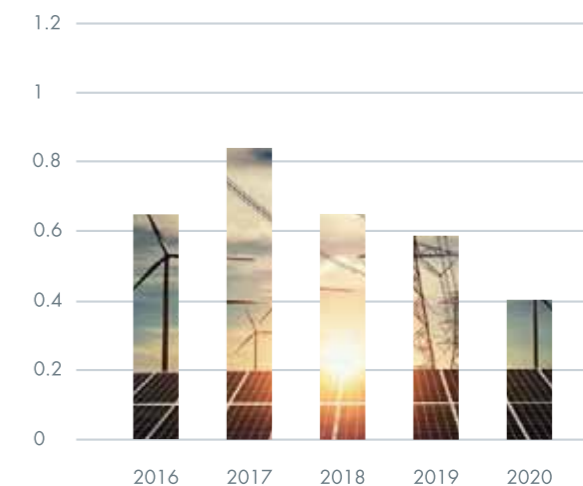
natural sunlight. Nevertheless, in recent years, all artificial lighting has been converted to LED technology. An advanced building control system ensures all lights, except for emergency lighting, are turned off outside of working hours.

As a result, we succeeded in reducing specific electricity consumption per kg of manufactured ink/paint from 0.6462 kWh in 2016 to 0.4021 kWh in 2020.

Electricity consumption in MWh/year



Electricity demand in kWh per kg of manufactured paint





Images from left to right: Picking warehouse (2017); green roof retains moisture and cools through evaporation; atrium with greenery

The advanced natural-gas heating system is also connected to the building control system and supplies heat in line with actual requirements. Moreover, the waste heat from the air compressors is used to heat the production areas in winter.

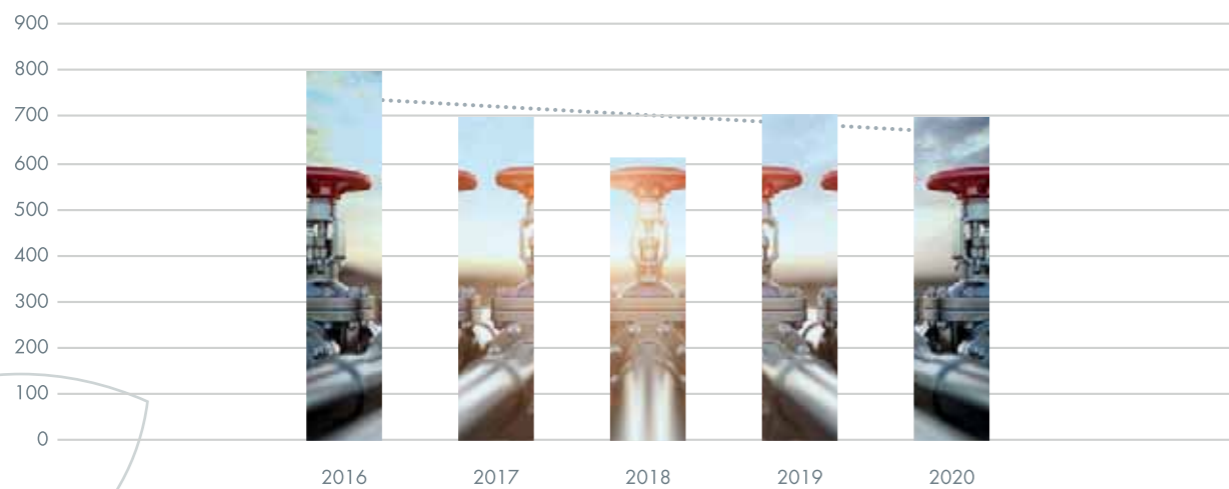
The building is well sealed and insulated. It also has double roller doors. Together, this contributes to the specific heat consumption of just approximately 80 kWh/m².

To minimise the environmental impact of the structure, plants are cultivated on large areas of the roof. This "green roof" retains moisture and, during warmer weather, helps cool ambient air through evaporation. As a result, only certain critical areas, such as the laboratories, require

additional powered cooling at certain times of day in the summer. Air conditioning serves, on the one hand, to ensure compliance with temperature thresholds defined by legislation governing workplace health and safety. On the other, it ensures consistent conditions for paint quality control checks – the ideal interior temperature for this process is a constant 23° C.

The building's excellent energy efficiency is key to our Bietigheim-Bissingen plant achieving an annual Scope 1 value of just 203 t, whereas the Scope 3 value is more than 3,900 t, 1 to 9 times as much. Reducing this CO₂ value, in partnership with our suppliers and freight forwarders, will be the major challenge in the near future.

Gas consumption in MWh/year

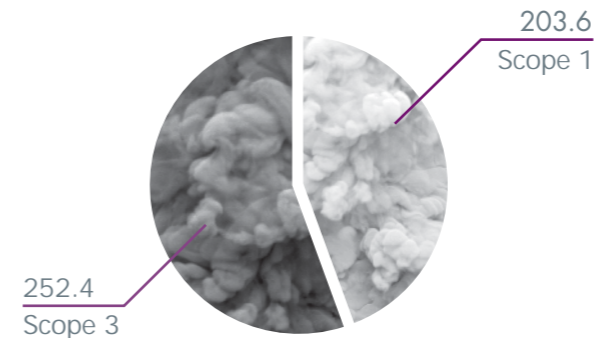


Since August 2021, energy prices have known only one direction – a steep upwards trajectory. There are a number of reasons: low gas storage levels after the cold winter of 2020/2021, greater demand for gas due to the economic bounce-back following the Covid-19 crisis, growing need in China, the partial substitution of coal by LNG and, not least, the insecurity surrounding gas deliveries from Russia. Moreover, the more ambitious climate goals have led to the reduced availability of tradable emission allowances. On account of rising gas prices, there has been a shift towards coal for power generation. On account of the climate goals, this has led to high demand for, shortages of and increasing prices for CO₂ certificates. There is no sign of conditions on the energy market easing in 2022, and the political situation in

Ukraine is causing further spikes in prices. For certain industries, the affordability of electricity and gas is a question of survival.

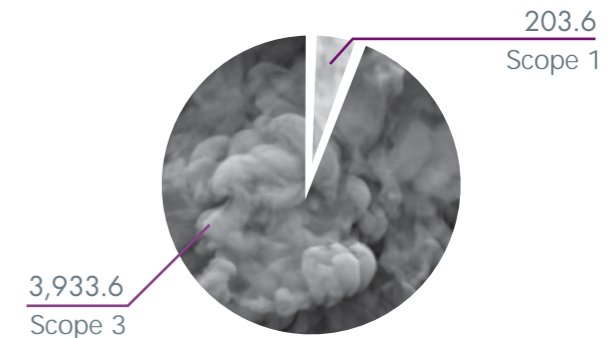
In addition to an intelligent procurement strategy, supported by the VEA (Federal Association of Energy-Consuming Businesses), we will take further measures with immediate effects, such as the installation of non-adjustable thermostats in corridors and stairwells, to further lower gas consumption and carbon emissions. In the longer term, we will consider alternative solutions, such as the construction of a photovoltaic array, to reduce, as far as possible, our dependency on the volatile electricity market, and the sourcing of district heating if the city of Bietigheim-Bissingen extends its network into the Laiern industrial park.

Scope 1, 2, 3 in t/year not including materials and logistics



Scope 3 emissions, such as employee commutes, business travel, upstream gas and electricity, disposal of waste and other materials, canteen

Scope 1, 2, 3 in t/year including materials and logistics



All scope 3 emissions, including procurement of raw materials and packaging materials, and outbound logistics

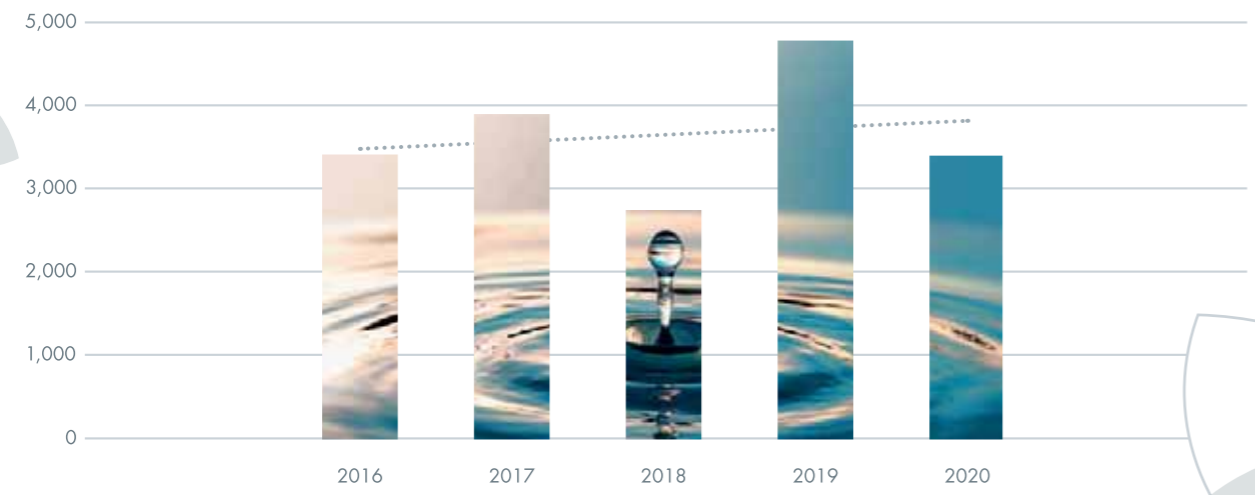


CLEAN WATER AND NO HAZARDOUS WASTE

In contrast to the items made at our plant in Tamm, where binders are largely based on artificial resins containing solvents or UV-curable acrylate-oligomers, our Bietigheim facility makes paints with aqueous emulsions. Water is therefore part of the final product. Water is also employed to clean metal containers used in production. Waste water from this process is purified in a dedicated in-house treatment plant, making it suitable for disposal via the public sewage system. Regular analysis of the waste water by a recognised inspection laboratory has demonstrated that the quality of the water is far better than statutory thresholds. Our specific water consumption per kg of product is approximately 3.4 l. The higher value for 2019 is a result of a deep clean of all pipes carrying waste water and of washing systems.

A slight disappointment with regard to waste water treatment is the relatively large amount of sewage sludge generated by the use of flocculants, despite compression via a chamber filter press. Following experiments with new chemicals, we have established that it will be possible to remove pollutants while producing some 80% less sewage sludge, i.e. a reduction from 17 t/a to just 3-4 t/a. With the retrofit of the treatment system complete, we commenced conversion to the new method in autumn 2021. This change will have a positive impact on our annual waste figures. At our Bietigheim plant, too, we regard the waste generated as raw material. Although we have not been able to end the correlation between the total annual volume of waste and production volume, the various waste types are collected separately and sent to recycling.

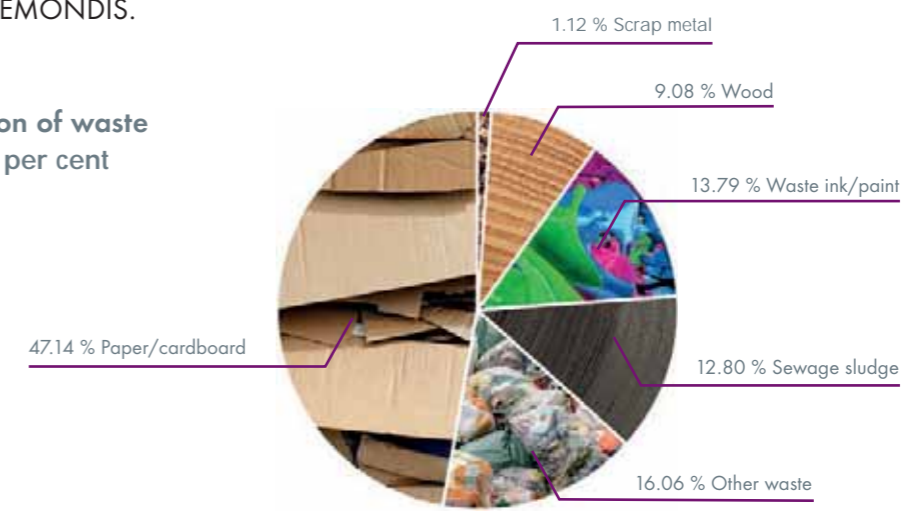
Water consumption in m³/year



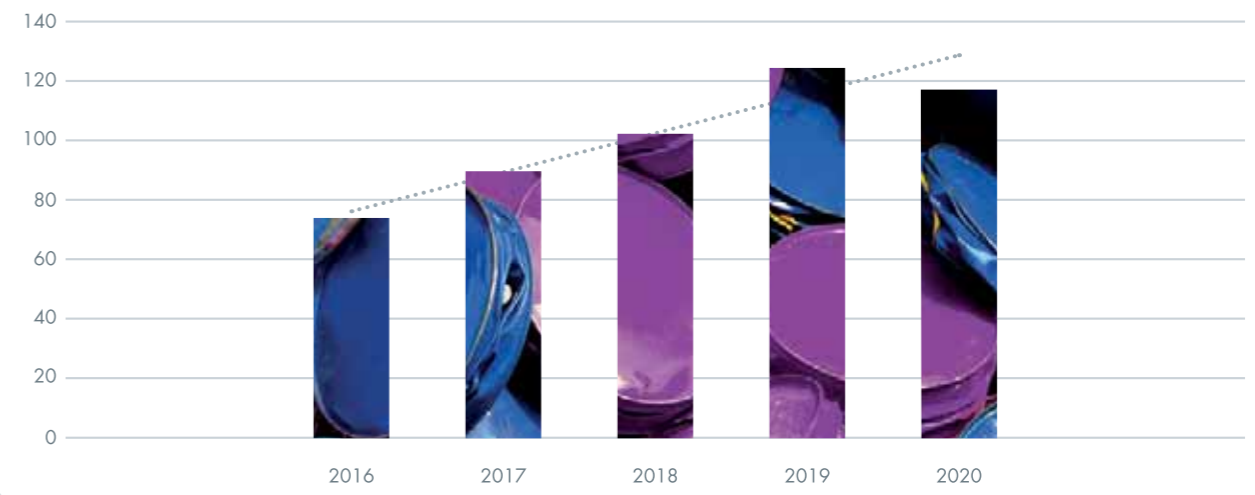
Images from left to right: collection tank for water treatment system, air conditioning for laboratory, air extraction system in laboratory, green outside space with pond

Of the 133 t of waste produced in 2020, more than 76 t of paper, card, scrap metal and wood, and 35.6 t of fabric, waste paint/ink and sewage sludge were incinerated to generate heat. For the resources and CO₂ saved in this way, Marabu receive a sustainability certificate issued by REMONDIS.

Composition of waste in 2022 in per cent



Total volume of waste in t/year





WOOD PRODUCTS FROM FSC®-CERTIFIED WOOD CULTIVATION

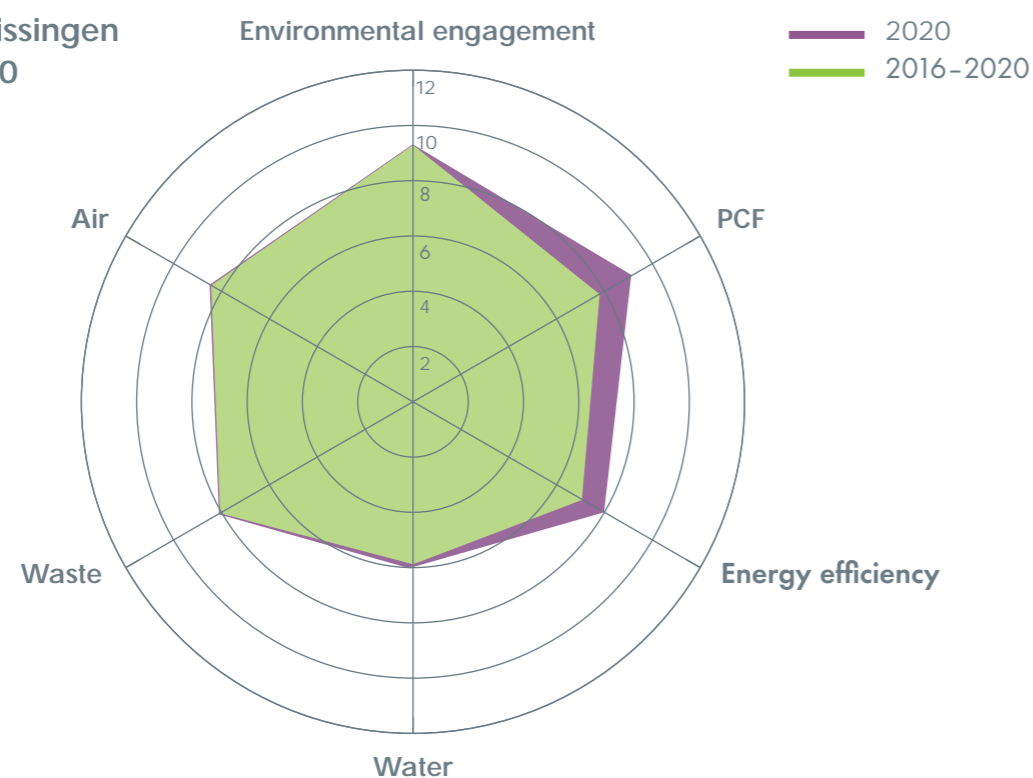
When purchasing wooden goods, Marabu only uses wood from well-managed forests. The “Forest Stewardship Council®” was founded in Rio de Janeiro in 1993 to promote ecologically appropriate, socially beneficial and economically profitable management of forests worldwide.

Marabu has been listed in the global database of FSC®-certified companies since 2013. Since then, all items made of wood or with wooden components such as brushes, pencils, stretcher

frames and easels have been made from FSC®-certified wood and are labeled FSC 100%. In 2020, Marabu expanded the FSC® certification to include the FSC MIX label and also offers drawing pads with this label. The FSC RECYCLED label will be added from 2022.

Enjoy creating without overexploiting nature – by purchasing painting accessories from Marabu, everyone can make a small contribution to protecting the forest through their shopping habits.

Bietigheim-Bissingen eco-grid 2020



BIETIGHEIM-BISSINGEN PLANT INPUTS		2017	2018	2019	2020
Energy					
Electricity	kWh	612,336	535,851	489,806	493,634
Natural gas	kWh	698,041	611,926	703,012	701,138
Total energy input	kWh	1,310,377	1,147,777	1,192,818	1,194,772
Raw materials					
Fresh water	m³	2,829	2,279	4,030	3,411
Binders and resins	t	253	239	259	350
Solvents	t	17	23	22	51
Pigments	t	53	59	60	94
Fillers	t	102	141	121	244
Additives/agents and photoinitiators	t	40	37	39	57
Metallic and glitter effect materials	t	1.2	1	1.2	1.2
Total raw materials	t	466.2	500	502.2	797.2
Packaging					
Glass	t	71	81	82	86
Aluminium, aluminium composites, tin, sheet metal	t	3	3.2	3.5	5.1
Paper/cardboard	t	65.5	72	75	110.19
Plastic/plastic composites	t	90.87	98	104.9	157.35
Total packaging	t	230.37	254.2	265.4	358.64
BIETIGHEIM-BISSINGEN PLANT OUTPUTS					
Gaseous emissions					
CO ₂ Scope 1		236	214	203,6	203,6
NO _x as NO ₂	t	0.13	0.12	0.14	0.15
Solid emissions					
Hazardous waste					
Paint/ink and distillation sludge	t	10.64	14.92	25.33	17.09
Waste paint/ink	t	16.31	9.17	26.25	18.42
Other	t	0.43	1.26	1.26	0
Total hazardous waste	t	27.38	25.35	51.77	35.51
Other waste and materials					
Mixed plastic and other waste	t	23.78	20.97	18.43	21.45
Paper/cardboard	t	39.19	48.56	51.87	62.94
Wood	t	3.3	10.86	13.5	12.13
Scrap metal	t	9.17	10.3	4.27	1.5
Other	t	–	–	–	–
Total materials and other waste	t	75.44	90.69	88.07	98.92
Liquid emissions					
Waste water	m³	2,829	2,279	4,030	3,411
Products					
Volume manufactured	t	730.1	825.9	835.5	1.227.60



SCREEN PRINTING INKS | PAD PRINTING INKS |
DIGITAL PRINTING INKS | LIQUID COATINGS |
CREATIVE COLOURS

FRANCE:
LYON HEADQUARTERS
LE MANS

SPAIN:
GRANOLLERS

ITALY:
MAILAND



Logistics



Administration



Distribution/Sales



Custom formulations



Screen printing stencils/
film production



Customer service



50

Total employees at site

Certifications



ISO 9001



Images from left to right: Le Mans site, Milan site, screen stretching in Lyon

MARABU LATIN – THE LARGEST AND OLDEST INTERNATIONAL SUBSIDIARY

Marabu France was established in 1970, and is the oldest and largest international subsidiary. In terms of printing inks, it is the international subsidiary with the highest sales in the Marabu Group. Over the years, other locations in Italy and Spain were added to form Marabu Latin, serving the Romance-language market. The acquisition of Sefar Leguay in Lyon has enabled, as in Le Mans, the provision of a first-class screen stretching service. The excellent work of Marabu France was recognised by Grunig, a manufacturer of stretching and coating equipment, who named the company its best supplier of stencils and screens in 2019.



The Grunig Award for the best supplier of printing stencils

ADIEU BONDY – BONJOUR LYON ET HOLA GRANOLLERS

“Change is the only constant.”* In 2021, the Latin Europe Sales Region launched a project (CAT) designed to increase its competitiveness. This included the decision to implement significant restructuring, such as a reduction in the number of French sites from three to two. As a result, we have taken our leave from our main site in Bondy, on the eastern periphery of Paris, which had been the heart of Marabu Latin for 33 years. The new French headquarters, with

sales, customer service and technical support, was recently relocated to Lyon. The warehouse and mixing laboratory, previously situated in Bondy, was transferred to Marabu Spain in Granollers, close to Barcelona, where we will operate our only laboratory for the manufacture of customer-specific inks in the Latin region. The screen stretching service and stencil production in Le Mans are not affected by the CAT project and will remain in the city.

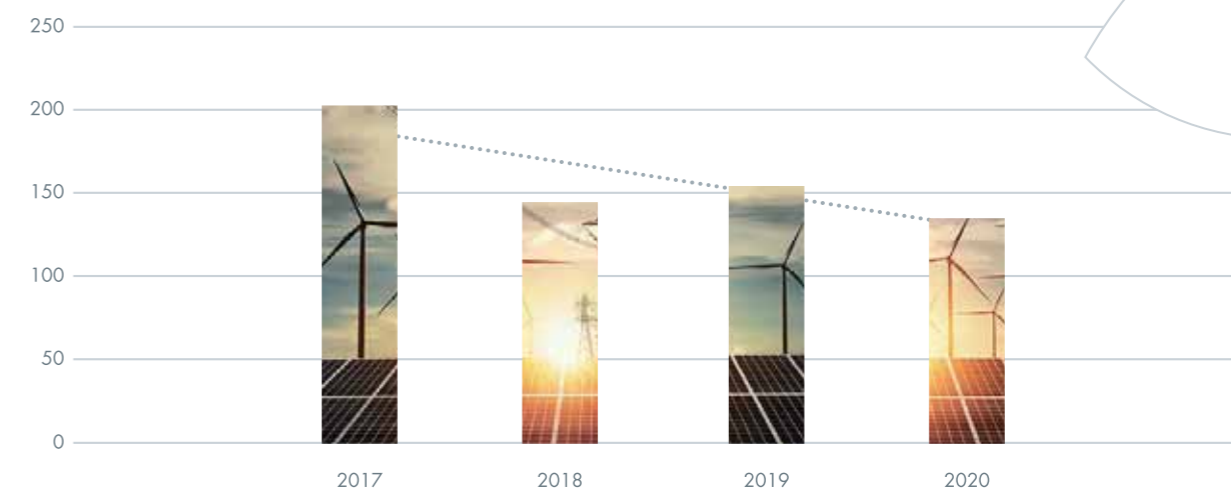
A FRESH OUTLOOK FOR LATIN GROUP

The sites in Le Mans, Bondy and Lyon in France and in Milan in Italy have “only” introduced ISO 9001 quality management systems – nevertheless, our ecological footprint is a key focus, as corporate policy worldwide and internal audits critically review our environmental standards. To save energy, lighting in Lyon, Bondy and Milan was fully converted to LED technology, and motion sensors were installed in rooms and corridors used only occasionally. A new screen copying and drying system was installed in Le Mans that completely shuts off the UV light when the copier is not in active operation. Our facility in Italy has been equipped with solar protection mechanisms, so air conditioning is not required continuously during the summer.

Together, these changes have led to a fall in electricity consumption for all sites together of 33% in the last four years.

The marked drop in water consumption is also very positive. Good results were achieved by fitting an inclined filtration system to the screen washing machine. This new technology mechanically separates solids and liquids. As a result, the water can be reused multiple times, with a marked reduction in the volume of waste. Dirty waste water is classed as hazardous and must be disposed of accordingly.

Total Marabu Latin electricity consumption in MWh/year



*Heraclitus of Ephesus, 535-475 BC, Greek philosopher



CONSOLIDATION HAS A POSITIVE IMPACT

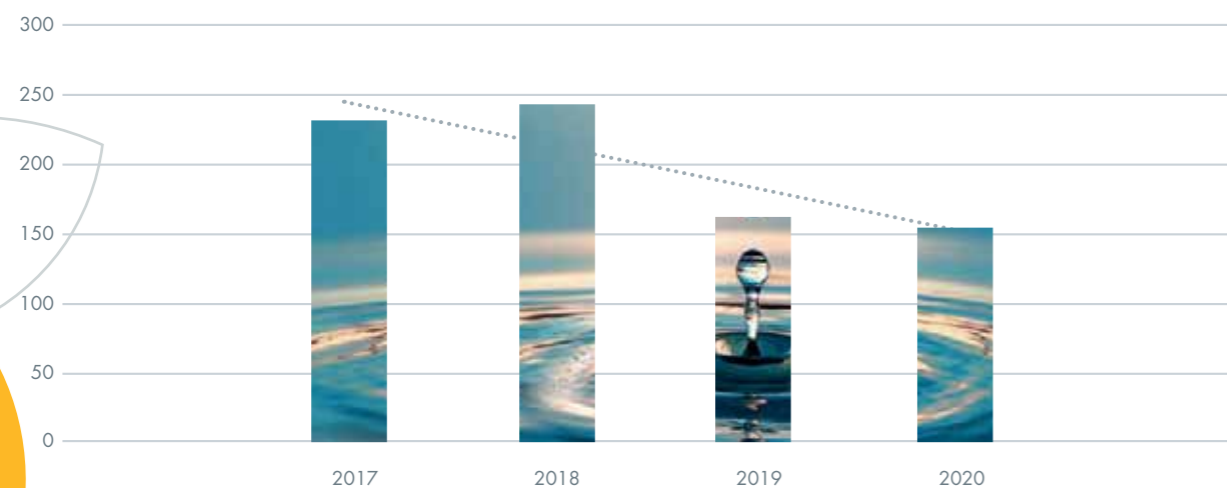
2020 was marked by the coronavirus, leading to a drastic fall in business travel – trips were at times simply impossible. Moreover, the need for social distancing led to many employees working from home. This meant far lower petrol and diesel usage, with a corresponding drop in carbon emissions. To safeguard the positive impact remote working has had on the environment, this practice, wherever possible, will continue in future.

As a result of the closure of our Bondy site, there is only a single warehouse for France and Spain. As a result, deliveries must only be made to a single destination, and there is no need for transportation between the two subsidiaries.

In addition to the large economic advantages of choosing the Spanish site, there is far less need for time-consuming and energy-intensive road travel. Centralisation of ink mixing activities in Spain will also have a positive impact on the volume of waste.

A further innovation for our customers is our Zero Paper project. In 2020, we decided to significantly cut paper consumption. Documents are now managed and archived digitally, and invoices are sent electronically, not by conventional post – with savings in terms of paper and transportation.

Water consumption at Marabu France in m³/year



STRENGTHENING OF SITES IN SPAIN AND ITALY

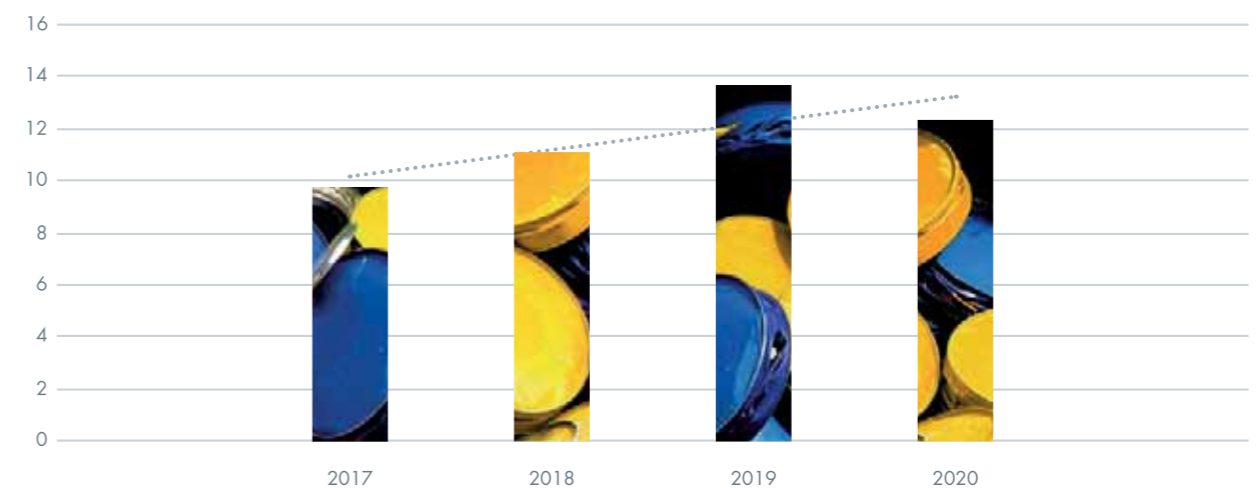
The decisions to divest Bondy and to make Granollers the only site for mixing custom inks within the Latin Group were made simultaneously. Subsequently, the building in Spain was modernised and the laboratory upgraded. Moreover, all lighting was converted to LED technology. In spring 2022, M-Espana will convert its ERP system to IFS software, and will be connected to the central database in Tamm. This is a further milestone in our efforts to strengthen this site.

As a result of the closure of Bondy, Marabu Italy will be the only international subsidiary within the Latin region responsible for sales of plant and equipment. The closure of the site

leads to a considerable reduction in energy and water consumption, and in waste generation. Business operations will be spread across the three existing locations, leading to corresponding increases – but we do not expect the total to match the aggregate for the four previous sites. Marabu Latin also plans to further lower carbon emissions by continuing to switch to hybrid and electric vehicles.

In the second quarter of 2022, Granollers will introduce ISO 9001 quality management in order to ensure the same standards as at the sites already certified.

Total volume of waste at Marabu Latin in t/year






56
Total employees at site

SCREEN PRINTING INKS | PAD PRINTING INKS |
DIGITAL PRINTING INKS | LIQUID COATINGS

MARABU SCANDINAVIA

SWEDEN:
MALMÖ

HEADQUARTERS

DENMARK:
VEJLE

FINLAND:
VANTAA

NORWAY:
OSLO

UK:
MILTON KEYNES

NETHERLANDS:
ALMERE



Logistics



Administration



Marketing



Distribution/Sales



Custom formulations



Screen printing stencils/
film production



Customer service

Certifications



ISO 9001



ISO 14001

MARABU NORTH EUROPE

MALMÖ – TAILWINDS IN THE HIGH NORTH

Since its foundation in 1979, Marabu's Swedish subsidiary (Marabu Scandinavia SE) has been based in Malmö, at the southernmost tip of the country. To better serve the extensive Scandinavian market – the distance from Malmö to Milan is shorter than to Kiruna in northern Sweden – Marabu also established offices in Göteborg (Sweden), Vejle (Denmark) and Helsinki (Finland) in the 1990s.

Marabu Scandinavia offers a comprehensive portfolio of digital, screen, pad and UV flexo printing inks, as well as screen stretching and stencil services. The office also sells printers and coating materials from other manufacturers.

Our company philosophy – that primarily focuses on customer requirements and satisfaction with the quality of our products and services – played a key role in ensuring Marabu North Europe was highly successful for many years.

More recently, the subsidiary has had to endure falls in revenue, in particular resulting from the drop in demand for printers and accessories. In 2020, the situation was exacerbated by the coronavirus pandemic. It is therefore all the more welcome that Marabu Scandinavia has experienced a positive upward trend in orders over the past year, and is charting a strong course.



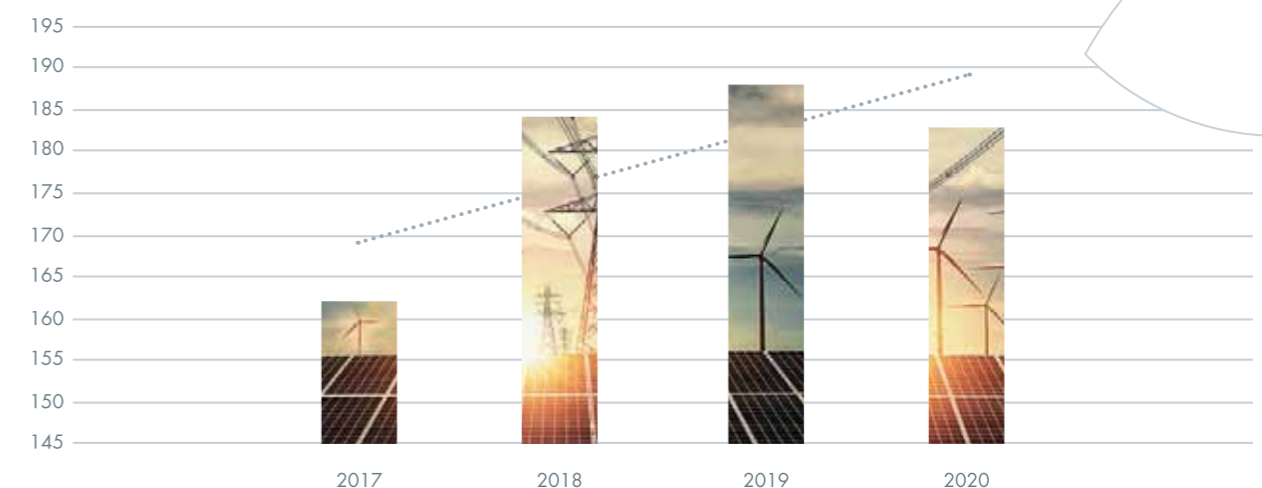
THE COUNTRY AND THE COMPANY ARE BOTH ENERGY-EFFICIENT

In 2008, Marabu Scandinavia moved into a newly constructed building with rooms custom-designed for their defined purposes. The offices have large windows to allow good use of natural daylight. Throughout the building there are sensors that detect when a room is unoccupied, automatically switching off the lighting. At the end of the business day, a smart control system deactivates all unnecessary sources of illumination.

Since 2015, all electricity at the Malmö site has come from renewables. The installation of a heat pump for space heating caused a 12% increase in electricity consumption in 2018 and 2019 compared with 2017. Gas usage, by

contrast, fell by 80%. The use of green electricity means there are no Scope 2 emissions, and the Scope 1 emissions attributable to gas are relatively low. Accordingly, we only generate 8.8 t of CO₂ annually (not including company cars). Malmö is therefore by far the best performing Marabu subsidiary in this regard. And this is very much in tune with the energy efficiency of the country as a whole. According to the Climate Protection Index of 2021 (CCPI 2021) published by Germanwatch, which assesses the efforts of 57 countries and the EU, Sweden is in top place, and categorised as "good" for greenhouse gas emissions, renewables and climate policy.

Total electricity consumption in MWh/year





CO2 emissions/kilometre in grammes

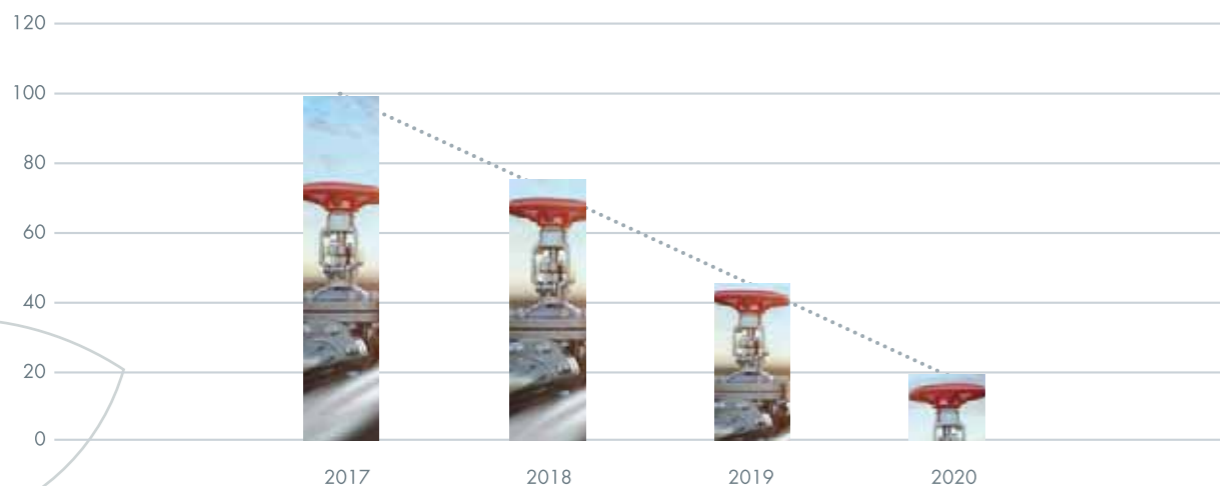
YEAR	CO ₂		Compared with previous year
	kg CO ₂ /mil	g/km	
2014	1.77	177	
2015	1.82	182	↗
2016	1.7	170	↘
2017	1.9	190	↗
2018	1.91	191	→
2019	1.87	187	↘
2020	1.83	183	↘
2021	1.55	155	↘

10 km = 1 swedish mile

Despite an excellent national CO₂ footprint, Marabu Scandinavia is taking further steps to contribute to the use of renewables in Sweden, for example with plans to install a 110 kWp photovoltaic array on the building roof in 2022. This will produce approximately 110,000 kWh of electricity, i.e. 60% of the power required at the site. This initiative is a fine example to others, and receives excellent government support in Sweden, as there is no tax on solar power, plus there are substantial subsidies for investment in systems employed for the generation, use and storage of renewable energy.

Marabu is also planning to purchase additional electric and hybrid vehicles to reduce transport-related carbon emissions further. Charging points have already been installed on the company premises. In addition, Marabu Scandinavia encourages its employees to drive sparingly. The "Car Policy" contains instructions in the form of videos and other tips and tricks. As a result of these measures, the average emissions of the company fleet in 2021 will be 155 g CO₂/km.

Gas consumption in MWh/year



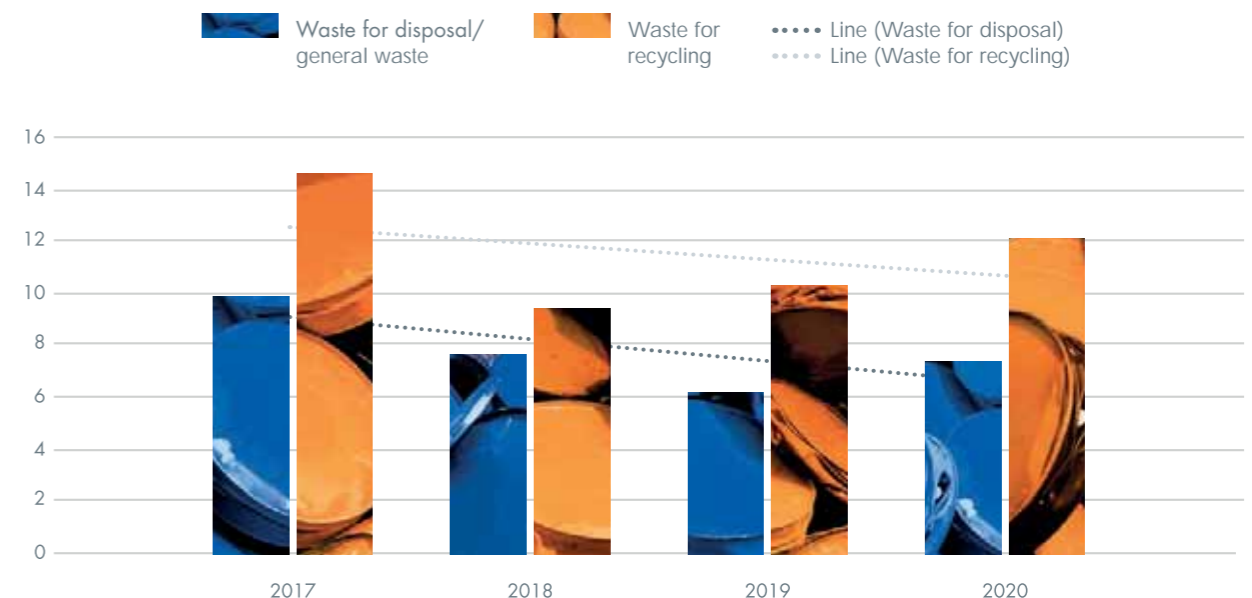
A focus on recycling

At a central point, waste is segregated into categories, such as paper, plastics, glass, metals, electronic waste, batteries and fluorescent tubes.

Remaining waste that is combustible is delivered to one of Sweden's waste-to-energy plants that incinerate around half of the country's refuse to generate heat and power.

The volume of waste at our Malmö site destined for disposal has dropped by around 25% from just under 9.9 t/a in 2017 to 7.4 t/a in 2020. The majority is recycled, but this type of waste has also fallen in volume in recent years. After all, avoiding waste in the first place is the best type of resource conservation.

Waste for disposal and recycling in tonnes/year



A safe and welcoming working environment

In addition to environmental protection, we pay close attention to the health and safety of our employees. All workstations have been carefully designed and equipped to offer a secure, safe environment. All desks are height-adjustable, and there is a quiet zone, complete with a massage chair.

In laboratories, too, a healthy working environment is a priority. To shield staff against VOCs, laboratory workstations as well as waste containers with refuse that contain solvents are connected to the air extraction system.



SCREEN PRINTING INKS | PAD PRINTING INKS |
DIGITAL PRINTING INKS | LIQUID COATINGS

BRAZIL:
SAO BERNADO DO CAMPO
HEADQUARTERS

PARAGUAY:
CIUDAD DEL ESTE



26

Total employees at site



Logistics



Administration



Distribution/Sales



Custom formulations



Customer service

Certifications



ISO 9001



ISO 14001

UPSWING – DESPITE DIFFICULT CIRCUMSTANCES

Marabu established a subsidiary in São Paulo, Brazil, in 2004, three years before the foundation of Marabu North America. We moved into the current headquarters, now with 19 employees, in 2013, in an industrial park in São Bernardo do Campo, south of São Paulo.

The metropolitan region of São Paulo is the heart of German business in Brazil. More than 800 of the 1,400 German companies active in Brazil are located here. It is home to the Latin American headquarters of major names such as Bosch, Siemens, Bayer and VW. Together, they employ 250,000 people and generate a remarkable 10% of industrial GDP. In fact,

São Paulo is the largest “German” industrial city in the world outside of Germany itself (cf. bdi.eu 2021).

Companies based in this region serve a huge domestic market, with a population of 210 million in the world’s fifth largest nation, plus ten neighbouring countries with a further 180 million residents – in total, almost as many as in the European Union. Brazil is remarkably rich in flora and fauna, agricultural land, and natural resources such as ores and minerals, much of which have yet to be discovered. Due to its huge potential for hydropower, the country has the largest reserves of electricity.



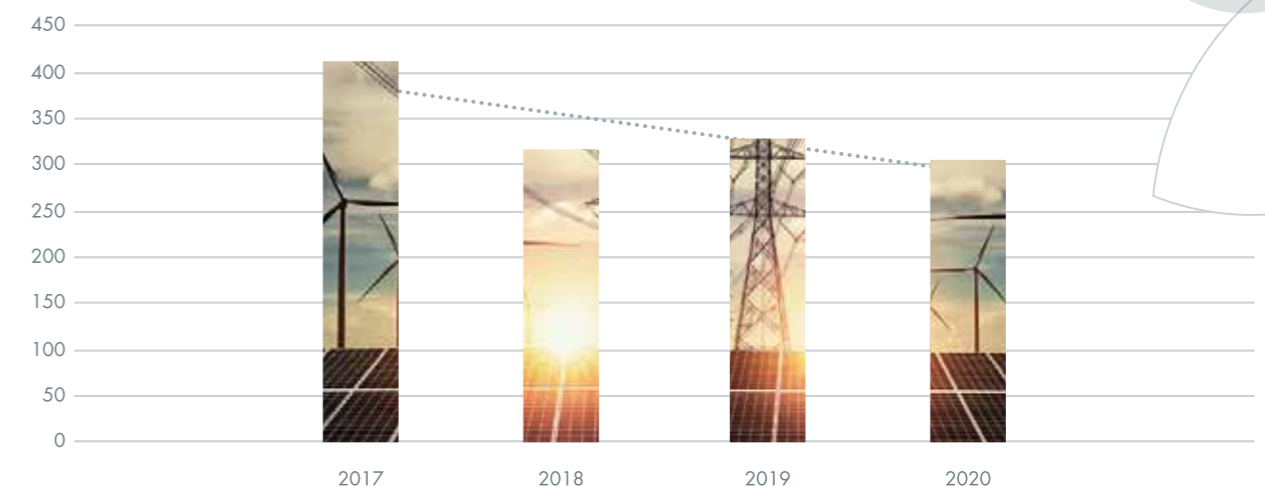
STRICT REGULATIONS TO BE MET FOR OPERATING LICENSE

Legislation and the resulting environmental protection requirements are extremely strict in Brazil. The three-storey building and grounds where we are located are shared by three companies, with Marabu South America leasing approximately a quarter of the available space, equivalent to around 650 m². Government agencies made approval for the storage of inks dependent on Marabu fulfilling multiple requirements. The company implemented a comprehensive fire safety system, with alarms, fire doors and explosion-proof lighting. Extra hydrants were installed to ensure sufficient water to extinguish any fires. Raised barriers were placed on the flooring of the ground level (which houses the laboratory,

the store for ink, and the store for liquid ink waste), to create a containment system for any liquid spillage. We were only permitted to use the on-site laboratory once suitable ventilation systems had been installed. Exhaust air entrained with solvents and odours is scrubbed by means of activated carbon before it is vented to the ambient atmosphere..

A recent renovation was the creation of barrier-free access to the business premises and the installation of a disabled-friendly bathroom to NBR 9050/2020 to aid people with disabilities to master their everyday lives as best as possible.

Power consumption in MWh/year





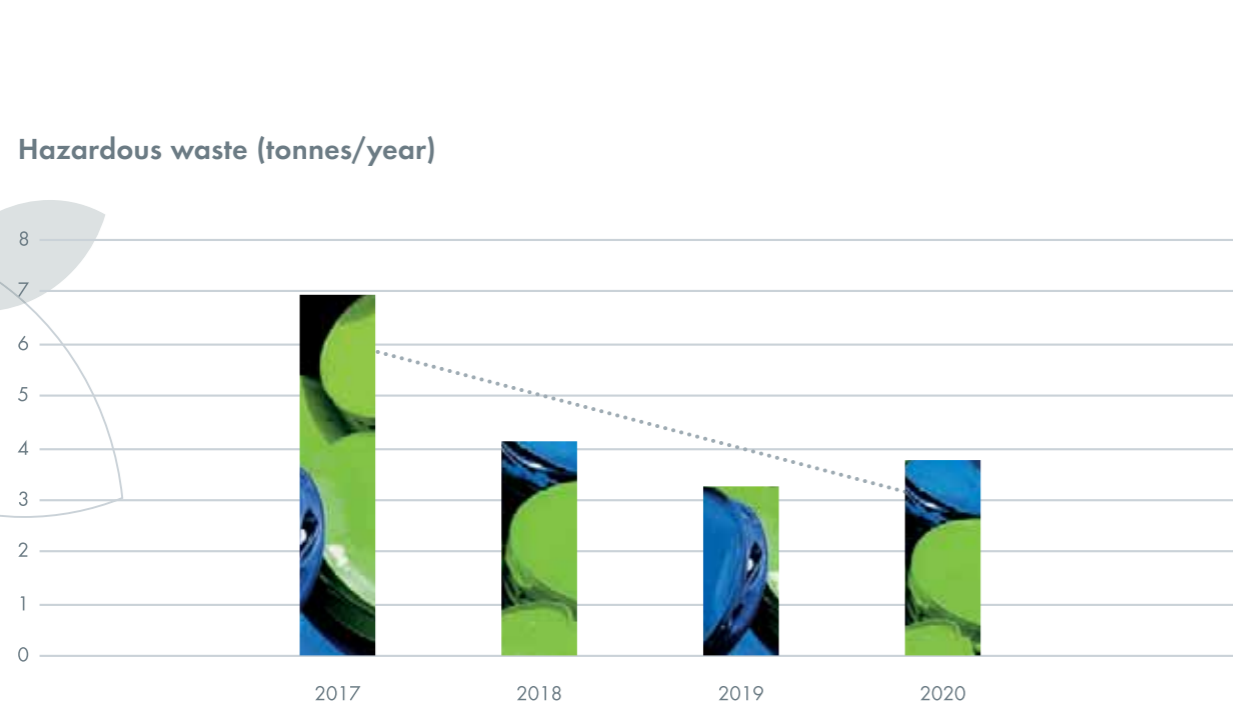
A SMALLER ECOLOGICAL FOOTPRINT DESPITE RISING SALES

The pandemic hit Brazil especially hard, but despite tough business conditions, Marabu do Brasil was able to increase year-on-year sales in 2020. Since 2017, revenues have risen sharply, with 56% growth between then and 2020. Yet despite this strong upward trend, KPIs for e.g. electricity and waste show that we have lowered our environmental impact.

The only source of energy is electricity. Measures such as the conversion of all lighting to LED technology have cut power consumption by 25%, from more than 41,000 kWh in 2017 to 30,587 kWh in 2020. The volume of hazardous waste, known as category 1 in Brazil, has also been falling, supported by effective, well-organised storage.

There are no concrete reportable figures for domestic-type waste. This is simply placed in plastic bags in front of the building on a daily basis and collected by the local refuse management service at night. It is taken to landfills that are, in the south-eastern region of Brazil, predominantly government controlled and equipped with containment systems (cf. Deutsch-Brasilianische IHK von Rio de Janeiro 2020).

Recyclable waste, such as paper/cardboard, plastics and aluminium, is separately collected in corresponding containers. Each category of waste is then transferred to a private cooperative that sells the materials at a profit.



STATE-OF-THE-ART PRODUCTION PLANT IN PARAGUAY

Marabu do Brasil includes our site in Paraguay, Ciudad del Este, where seven members of staff produce mainly digital printing inks for the South American market. Marabu purchased the building in 2012 and upgraded it to the state of the art, with an emphasis on leak-proof flooring and fire safety. What is immediately striking about the production and storage areas is the tidiness and cleanliness – it is hard to believe it is a building for the manufacture of printing inks.

In 2022, first-time certification will be sought to ISO 9001 (quality management) and ISO 14001 (environmental management). Currently, existing processes are being prepared for certification within dedicated work groups – and, via Microsoft Teams, in close cooperation with the QUS department in Tamm, Germany. By leveraging advanced information systems, it is possible to provide remote support for the preparation and performance of the corresponding certification audit. This eliminates the previously necessary and CO₂-intensive business trips of German colleagues. At this point again a plus for the Marabu environmental balance sheet.





SCREEN PRINTING INKS | PAD PRINTING INKS |
DIGITAL PRINTING INKS | LIQUID COATINGS |
CREATIVE COLOURS

USA:
CHARLESTON

CANADA:
MISSISSAUGA



Research and development



Production:
Liquid Coatings



Logistics



Administration



Product Management



Distribution/Sales



Custom formulations



Customer service



34

Total employees at site

Certifications



ISO 9001



ISO 14001



Pictures from left to right: Logistics MNA; custom ink production; application testing; print room

MARABU IN THE WORLD'S STRONGEST ECONOMY

The acquisition of Clearstar in 2008, followed by the purchase of Autoroll in 2011, led to the establishment of Marabu North America in Charleston, South Carolina. As a manufacturer of liquid coatings for a variety of applications, Clearstar was an ideal and complementary match for Marabu and its portfolio of inks. The integration of the Autoroll team allowed Marabu North America to commence direct sales of our own screen and pad printing inks.

Moreover, the purchase of a sales office from SAATI in Canada in 2018 meant the addition of a further North American site, in Mississauga.

Modernisation of the building and first sustainability efforts

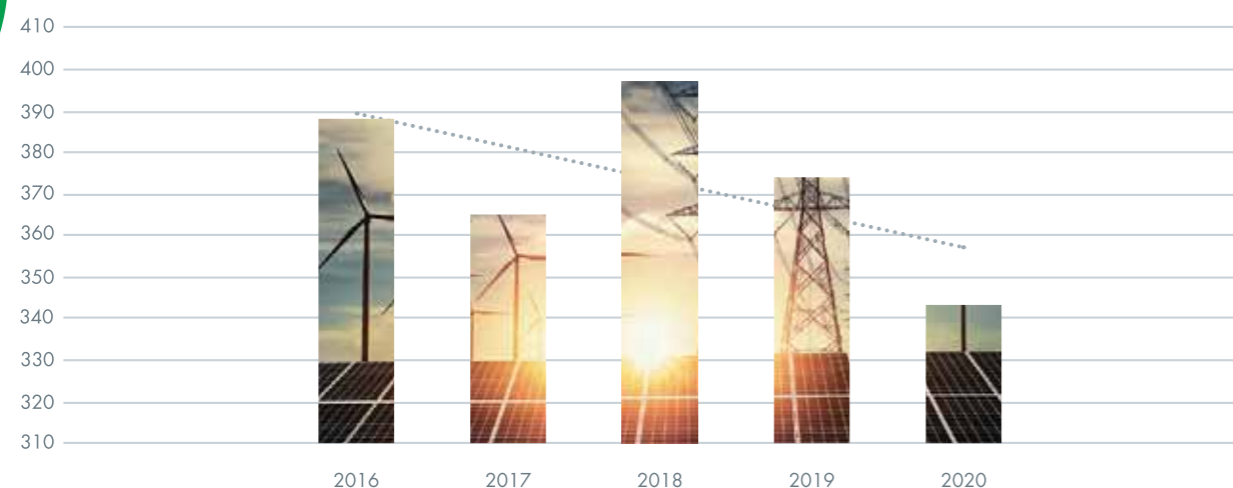
Continuous business growth generated the need for more space and fuelled a desire to own our own premises rather than to lease. The goal was to establish state-of-the-art laboratories, production operations and ink storage facilities, with corresponding exhaust air systems and sealed floors. In 2015, the opportunity arose to purchase the property that had originally been leased. In the same year, three highly advanced laboratories were created, with a fully automatic air ventilation system that also provides air conditioning and controls ambient humidity.

Ten air changes per hour ensure low contamination of the interior atmosphere, and pressure tests can be performed under ideal climatic conditions. The downside is the relatively high power consumption, in part due to the need for additional air conditioning in the summer months. The exhaust air purification system is equipped with energy recovery technology, so less gas is required for heating during colder periods of the year. To reduce total energy consumption, lighting is to be converted step by step to LED technology.

In the USA, waste is generally disposed of in highly advanced landfills. Depending on the state, reclaimable materials, such as metals, plastics and cardboard, are separated out and, due to a lack of domestic recycling plants, exported (cf. bvse.de 2022).

Until 2018 they were primarily shipped to China. Since 2018, China has only accepted waste that has been 99% sorted. Other East Asian countries have also forced entire container ships loaded with refuse to return to their port of origin. As a result, the US recycling market collapsed and the prices for recyclable materials plummeted. Nevertheless, Marabu continues to separate out cardboard and transfer it to a recycling company to conserve resources. The metal material can be recycled endlessly without any loss of quality and thus represents a great economic benefit. These steps led to a fall in landfill waste volume of around 30% between 2016 and 2020. Recent improvements include the use of flexible barriers for storage areas with water-hazardous materials to prevent pollution of groundwater and surface water through, for example, leaks.

Power consumption in MWh/year



Air conditioning and exhaust air cleaning system with heat recovery (2016)



Pictures from left to right: proofing mixed inks; cardboard box compactor; storage for pressurised containers; finished goods store

CUSTOMERS VALUE ENERGY-SAVING AND WATER-BASED INKS

The USA had a GDP of 21 trillion US \$ in 2020, ahead of China with a GDP of just under 15 trillion US \$, and is therefore the world's largest economy. The country's energy consumption reflects this, accounting for 14.7% of global carbon emissions, whereas China's share is 28% (cf. statista.com 2022). As a result, the two most economically powerful nations generate significantly more than 40% of global CO₂ emissions. The announcement in November 2021 that the USA and China will cooperate to combat CO₂ emissions is therefore very welcome.

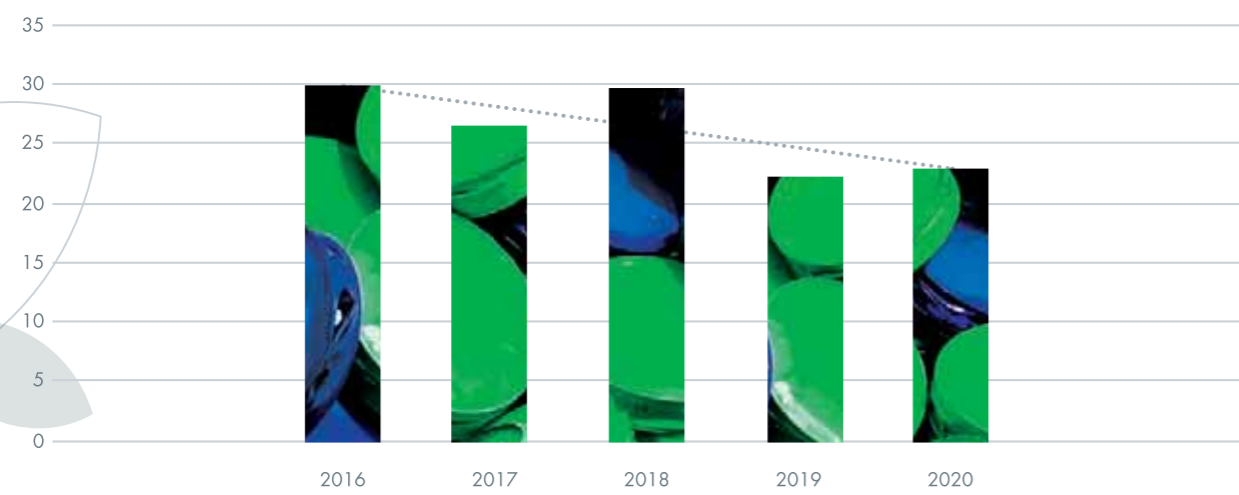
"We will achieve 100% carbon-free electricity by 2035. No future president can reverse that."

Joe Biden

Plans to combat climate change are not always received positively by the general public. Many Americans feel they threaten their way of life. They advocate lean government, an unrestrained free market, and the right to unconstrained consumption. However, apart from lobbyists for the powerful oil, gas and coal industry, there are numerous supporters of measures to protect the environment and transition to new sources of energy.

It is surely no coincidence that our UV LED curable screen printing ink for glass is in especially high demand on the American market. The use of UV LED technology cuts energy input and therefore costs by 50% compared with conventional UV curing. The UV LED units contain no mercury, and there is no emission of health-hazardous ozone that would require extraction.

Municipal waste (tonnes/year)



FOLLOW-UP SUCCESS WITH CREATIVE COLOURS

Following its success with printing inks, Marabu launched selected items from its Creative Colours portfolio on the North American market in autumn 2015. Our expectations were exceeded, and Marabu is now an established brand for professional and amateur artists. The additional storage space required is in a neighbouring building, located on our own land.

Among the bestsellers, along with various other products, is the Marabu GRAPHIX concept, which stands out with its unusual, young design. A highlight among these is the water-based Marabu Aqua Ink, a pigmented, water-soluble water-colour ink. It is particularly popular with creative people and artists, as there is no comparable product on the market that promises a similarly high lightfastness of the colour tones. Pens like the Marabu Aqua Pens and Fineliners are also very popular. The development of new ranges for the North American market is also having a positive effect on the further development of other markets.

It remains a major challenge for the Creative Division to further increase the level of awareness of Marabu as a German premium brand in the North American B2C market, which a committed, international team has already taken on with great success.

A further best-selling product is Maqua® Pad MAP. This was the first-ever water-based pad printing ink on the market to meet all requirements on the part of toy manufacturers and the textile industry. The ink is almost entirely odour-free, and only very small amounts of VOCs are released when it is used.

The buoyant demand for these product ranges shows that our American customers value not just quality, but also environmental protection and human health and safety. As an ink manufacturer, we are proud to play our part in helping the print industry to be a pioneer in sustainability. It is also a fortunate coincidence that Marabu's "PROJECT GREEN" was launched in the first year of Biden's administration.





SCREEN PRINTING INKS | PAD PRINTING INKS |
DIGITAL PRINTING INKS | LIQUID COATINGS

CHINA:
FENGXIAN
HONG KONG SINCE 2021

MARABU ASIA



Logistics



Administration



Distribution/Sales



Custom formulations



Customer service

Certifications



ISO 9001



ISO 14001

MARABU IN THE MIDDLE KINGDOM

China is Germany's leading trade partner, ahead of the USA, and therefore the prime mover of growth for German business. China will continue to extend its trade relationships and seek to exert ever greater influence on Europe and other continents, in particular through its gigantic New Silk Road projects.

Marabu was very quick to recognise the opportunities offered by the Far East, and has been present in the Chinese market for almost 30 years, with a broad portfolio of printing inks. Through our long-established business partnerships, the Marabu brand has become very well known in China and has a very good reputation. Leveraging our first-class products, Marabu ASIA has been able to take advantage of China's economic success story, doubling sales between 2017 and 2020. The Asian subsidiary is on the road to success and plans to keep on growing! A significant step was the acquisition of Iconinks Limited, Hong Kong, with sites in mainland China, in spring 2021.

In Hong Kong, ten workers produce a water-based ink for printing upmarket sports and work clothes for the Asian market. In China, inks are made for a variety of applications, including identifying shipment containers, and are sold to domestic customers.

In order to be responsive to customer needs, and to mix custom inks locally, a first Chinese subsidiary was established in Kunshan, 60 km west of Shanghai. However, it quickly became clear that this location was too small, and in early 2017 we found a suitable site in Fengxian, to the south of Shanghai – for which we also had the corresponding licenses required to handle inks. Unfortunately, the owner sold the land, making it necessary to relocate within the industrial park in late 2019/early 2020.



LOCAL MANUFACTURING MEANS LOWER ECOLOGICAL IMPACT

With the success on the Asian market, the desire for local production in China arose in order to be able to respond better to customer requests and to be able to guarantee the ability to deliver.

With local production, there is no need for transport by ship from Germany to Shanghai, which would take at least 30 days. Moreover, local manufacturing means far greater flexibility in terms of planning and can meet special requirements. Now, 15 tonnes of ink and accessories are made in Fengxian every month, primarily based on Icon Inks formulas, plus other Marabu inks, sold under the "MAAsia"-Label. These operations make use of local raw materials, transported short distances, and without reliance on air freight from Germany when there are bottlenecks.

In retrospect, this was a good and expedient decision, since the risk is being spread, especially with regard to the challenging raw materials situation on the German market. In 2019, 100% of all products were imported; in 2021 only 25%. This has also lowered CO₂ emissions, due to the shorter distances involved and the elimination of air freight.





NEW PACKAGING FOR THE ASIAN MARKET

With the commencement of local manufacturing, the product management team reviewed the suitability of the existing packaging for screen and pad printing inks. Instead of using exclusively metal cans, it was decided to package MAsia label products in plastic pouches that are far lighter in weight. This meant a saving in material of 70% compared with the original metal. The pouches are robust, do not allow odours to escape and are fitted with a screw fastening.

The opening is just 2.2 cm in diameter, in contrast to 10 cm with the metal can. This sharply reduces emissions of VOCs, that form hazardous ozone when exposed to UV light, causing a phenomenon known as summer smog. Depending on the exact composition of the ink, the smaller opening also limits the escape of other health-hazardous substances, helping to safeguard the health of customers.

Ink in pouches: In contrast to the widely used metal can, the ink cannot be stirred before use, but can only be squeezed and shaken. If desired, the ink must also be mixed in an extra container. On the plus side, the ink can be easily measured by pouring. Though leftover ink cannot be used and must be thrown away. The stability of partially emptied bags in storage is also an issue.



New material-saving packaging for the MAsia products

After use, the empty pouches are simply disposed of via general waste collection, which is typically incinerated in major conurbations in China. In Shanghai, one of the largest and most advanced incineration plants in the country was commissioned in 2019. It has an annual capacity of 3 million tonnes and generates 900 GWh of electricity. In rural areas, refuse is mostly disposed of in landfills. Most incinerate waste to generate heat, and some burn off (flare) the gas that is produced by decomposition (cf. gtai.de 2022).

WASTE COLLECTION BY TYPE AND THE 0 PAPER STRATEGY

At Marabu Asia, waste ink and batteries (both hazardous waste) and general domestic waste are collected separately and sent to disposal. All reclaimable materials, such as glass and plastic bottles, paper, cardboard and metals, are collected in dedicated containers, and taken away by recycling companies. In order to conserve resources even more and reduce waste, crockery is provided in-house to counteract the high volume of disposable food packaging. This is exemplary, because in the metropolis of Shanghai alone, with its 28 million, around 60 million pieces of single-use food packaging waste accumulates every day – a huge amount of rubbish!

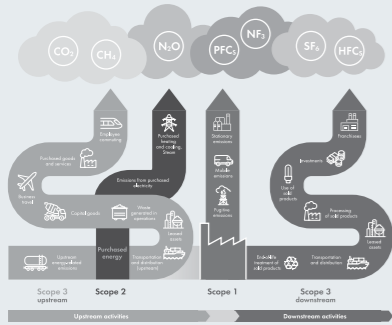
China's current 5-year plan for the period 2021 to 2025 proposes "Green Development", with peak carbon emissions in 2030, and carbon neutrality by 2060. China is already a world leader in the generation and use of renewable energy and will continue to expand its capabilities in this area. However, at the same time the country will continue to build coal-fired power plants – that are apparently urgently needed – until at least 2026, and then be replaced by regenerative technologies. To sequester more carbon, China intends to increase its forestland from currently 22% of its total area to more than 24%.

In view of the current shortage of wood, and therefore paper, Marabu ASIA has found the right answer: its 0 Paper strategy. All internal documents and external customer information, such as brochures, flyers and cost quotations, are only to be provided and published digitally. It is intended to fully implement the 0 Paper strategy within a maximum of five years, making a further key contribution to resource conservation.

Background info: why is China called the Middle Kingdom?

Originally, the expression Middle Kingdom was plural, and described the geographic location of a number of small principalities on the Yellow River that formed the core of what is now China. Over the course of several centuries, further states were established around this core. These were united in 221 BC by ruler Qin Shi Huang (259-210 BC), who called himself the "first emperor of Qin". As a result, the "countries in the middle" became the Middle Kingdom. Following a very chequered history, with cultural highlights but also painful military defeats, China has, in recent decades, found renewed strength and will displace the USA in 2028 as the world's largest economy. This goes hand in hand with a new understanding of its economic and political leadership position in the world. As a result, the originally geographical Middle Kingdom is taking on a new role in the 21st century (cf. bpb.de 2022).

Explanation of Scopes



In order to achieve the 1.5 degree target of the Paris Agreement, CO₂ emissions must drop significantly and as quickly as possible. To do this, companies must measure their carbon footprint and create a report that is defined according to uniform criteria. This is the only way for industries and companies to present their CO₂ emissions along the supply chain in a comparable manner and ultimately also to show the improvements. The greenhouse gas (GHG) protocol was drafted back in 2011 with the participation of several NGOs. The GHG Protocol divides emissions into 3 scopes: Scope 1, 2 and 3.

Scope 1 includes all direct emissions arising from the activities of an organisation or its subsidiaries (emission sources: heat, cooling and steam generation, the company's vehicles and air conditioning leaks); **Scope 2** includes the indirect emissions from electricity, heat and steam that companies buy from utilities; **Scope 3** includes the other indirect emissions in the supply chain (activities along the value chain - both upstream at suppliers and downstream at customers), (cf. fidelity.de 2022).

Photo credits

Cover photo ©Betelgejze/AdobeStock – stock.adobe.com
Chart power consumption P. 6, 23, 35, 45, 51, 57, 62
©lovelyday12/AdobeStock – stock.adobe.com
Chart gas consumption P. 24, 36, 52
©Maksym Yemelyanov/AdobeStock – stock.adobe.com
Chart water consumption P. 29, 38, 46
©willyam/AdobeStock – stock.adobe.com
Paper usage chart SP. 28, 39
©dihalcyonic/AdobeStock – stock.adobe.com
©by-studio/AdobeStock – stock.adobe.com
Chart Waste Amount P. 27, 39, 47, 53, 64
©DL80WES/AdobeStock – stock.adobe.com
Diagram Scope P. 26, 37
©Dancing Man/AdobeStock – stock.adobe.com
Diagram of waste composition P. 39
©by-studio/AdobeStock – stock.adobe.com
©Jamrooferpix/AdobeStock – stock.adobe.com
©adimas/AdobeStock – stock.adobe.com
©Yingyaipumi/AdobeStock – stock.adobe.com
©Yvonne/AdobeStock – stock.adobe.com
Global Commitment P. 18/19 Green Leaf Map of World:
©lumyaisweet/AdobeStock – stock.adobe.com
Marabu – Germany P. 28
Photo Forest: ©Alex/AdobeStock – stock.adobe.com
Photo Paper: ©Jose Luis Stephens/AdobeStock – stock.adobe.com
Marabu – Germany P. 29
Photo Water: ©lightpoet/AdobeStock – stock.adobe.com
GMP Photo (background): ©richterfoto/AdobeStock – stock.adobe.com
Marabu – Asia P. 71
Photo Forest: ©quickshooting/AdobeStock – stock.adobe.com

References to literature and sources

- allversum.com (2019):** Wie Schweden aus Müll Millionen macht – und so das Klima rettet. <https://www.allversum.com/wie-schweden-aus-muell-millionen-macht-und-so-das-klima-rettet/>. Stand: 29.07.2019
- bdi.eu (2021):** Brasilien: Wichtigster Wirtschaftspartner in Südamerika. <https://bdi.eu/artikel/news/brasilien-wichtigster-wirtschaftspartner-in-lateinamerika/>. Stand: 25.03.2022
- bpb.de (2010):** „Großartiges Reich der Mitte“: Zur Aktualität chinesischer Mythen. Bundeszentrale für politische Bildung. <https://www.bpb.de/shop/zeitschriften/apuz/32505/grossartiges-reich-der-mitte-zur-aktualitaet-chinesischer-mythen/>. Stand: 22.09.2010
- bvse.de (2018):** Bundesverband Sekundärrohstoffe und Entsorgung. Gut informiert. Recycling- UU-Abfallwirtschaft tief in der Krise. <https://www.bvse.de/recycling/recycling-nachrichten/3665-recycling-us-abfallwirtschaft-tief-in-der-krise.html>. Stand: 12.10.2018
- CCPI – Klimaschutz-Index (2021):** www.germanwatch.org/de/19552. file:///C:/Users/muel/AppData/Local/Temp/Climate-change-performance-index-2021.pdf Klimaschutz Index2021: Die wichtigsten Ergebnisse. Stand: 2021
- Deutsch-Brasilianische Industrie und Handelskammer von Rio de Janeiro (2020):** Brasilien Abfall- und Recyclingwirtschaft. Zielmarktanalyse 2020. 1. Auflage (Studie). Rio de Janeiro.
- fidelity.de (2022):** Vgl. fidelity.de. Nachhaltigkeit. CO₂-Fußabdruck von Unternehmen messen. <https://www.fidelity.de/nachhaltigkeit/co2-fussabdruck-von-unternehmen/>. Stand: 24.03.2022
- gtai.de (2019):** China baut Hunderte Anlagen zur Mülltrennung. <https://www.gtai.de/de/trade/china/branchen/china-baut-hunderte-anlagen-zur-muellverbrennung-203062>. Stand: 09.12.2019
- statista.com (2020), a:** Ranking der 20 Länder mit dem größten Bruttoinlandsprodukt (BIP) im Jahr 2020 (in Milliarden US Dollar) <https://de.statista.com/statistik/daten/studie/157841/umfrage/ranking-der-20-laender-mit-dem-groessten-bruttoinlandsprodukt/>. Stand: 2020
- statista.com (2020), b:** CO₂-Emissionen: Größte Länder nach Anteil am weltweiten CO₂-Ausstoß im Jahr 2020. <https://de.statista.com/statistik/daten/studie/179260/umfrage/die-zehn-groessten-co2-emittenten-weltweit/>. Stand: 2020
- statistik-bw.de (2021):** Pressemitteilung 191/2021 Treibhausgas-Emissionen um 8,7 % gesunken Klimabilanz im Pandemie-Jahr 2020: Starker Emissionsrückgang im Verkehr vom 14.Juli 2021 <https://www.statistik-bw.de/Presse/Pressemitteilungen/2021191>. Stand 14.07.2021
- tga-fachplaner.de (2021):** Excel-Tool: TGA Fachplaner, Gradtagszahl für Deutschland, Sachsenheim 2018. <https://www.tga-fachplaner.de/node/160653/printuelle>. Stand: 25.03.2022
- umweltdialog.de (2021):** CDP Ranking 2020: 19 deutsche Unternehmen mit Bestnoten. <https://www.umweltdialog.de/de/management/ratings-rankings/2020/CDP-Ranking-2020-19-deutsche-unternehmen-mit-bestnoten.php>. 25.03.2022
- wwf.de (2021):** Aus Wäldern wird Papier. WWF 2021 <https://www.wwf.de/themen-projekte/waelder/papierverbrauch/zahlen-und-fakten>. Stand: 25.03.2022

Marabu GmbH & Co. KG
Asperger Strasse 4
71732 Tamm
Germany
Phone: +49 7141 691-0
Fax: +49 7141 691-147

Email: info@marabu.com
www.marabu.com

Management:
York Boeder, Chairman & Managing Director
Rolf Simon, Managing Director

Marabu GmbH & Co. KG
Amtsgericht Stuttgart, HRA 300662

Content: Jeannette Müller
Design & Proofreading: Katharina Rogner



Marabu

Marabu GmbH & Co. KG
71732 Tamm · Germany
Phone: +49 7141 691 0
info@marabu.com
www.marabu.com

