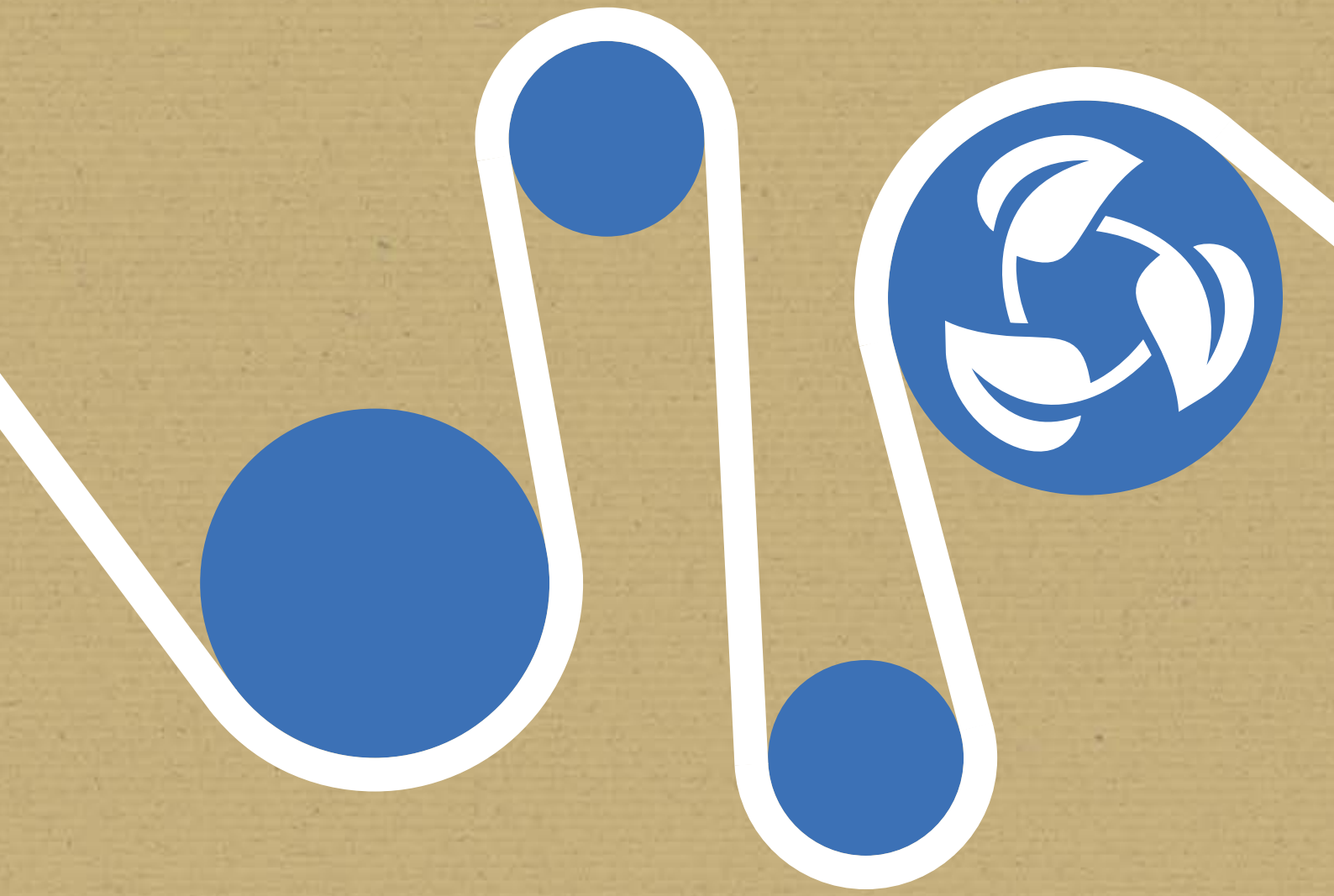
Facts on the environment and responsibility

score

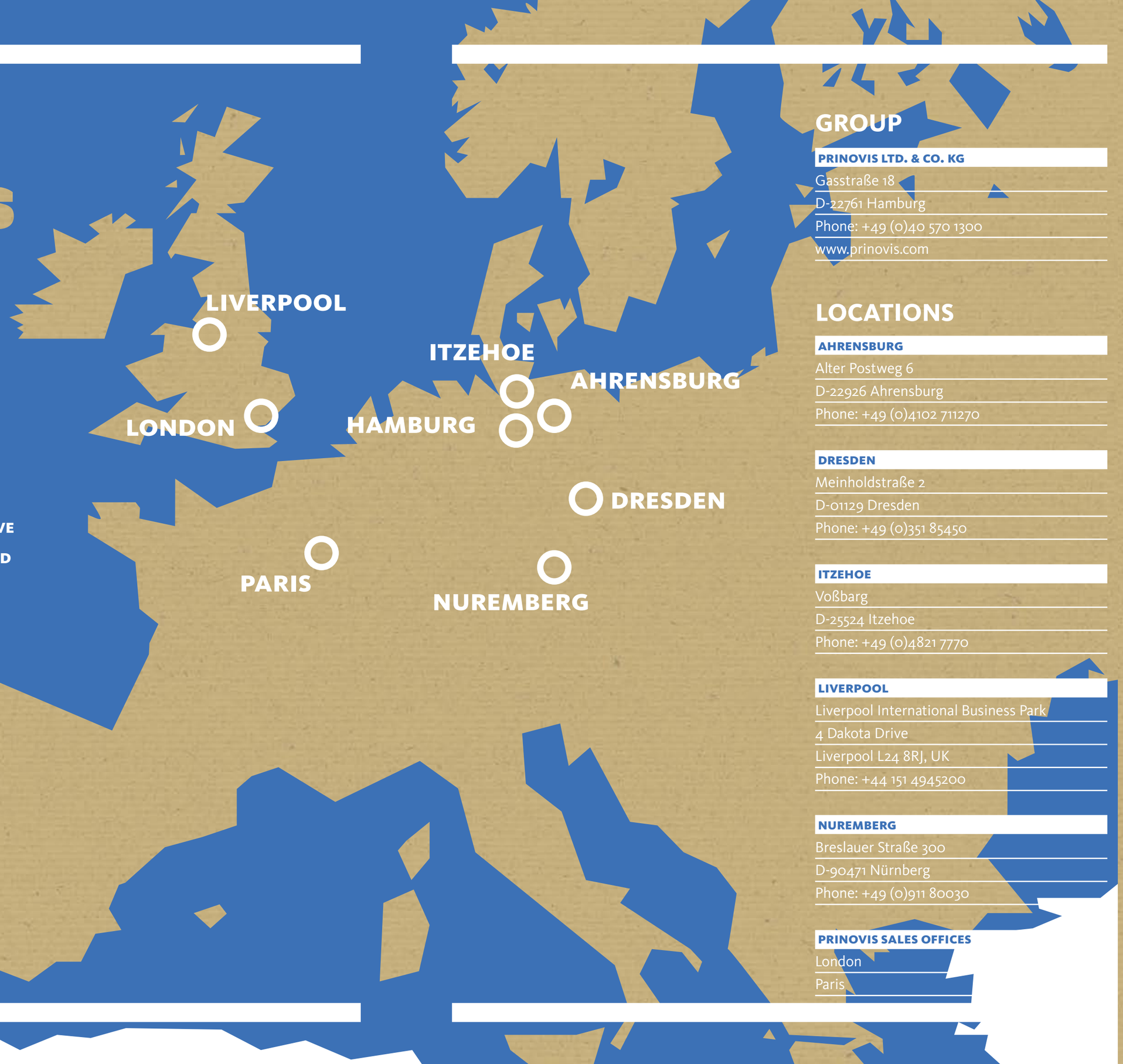


REPORT 2010

PRINOVIS

About Prinovis

PRINOVIS, EUROPE'S LARGEST GRAVURE PRINTING GROUP, PROVIDES TOP-QUALITY PRINTING AND PRINT FINISHING SERVICES. PRINOVIS IS ALSO A STATE-OF-THE-ART GLOBAL SERVICE PROVIDER FOR CREATIVE ADVERTISING, E-COMMERCE AND MOBILE SERVICE SOLUTIONS.



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Paris

»Preventive, efficient, gentle and future-oriented. These are the principles of our environmental policy.«

LADIES AND GENTLEMEN, VALUED CUSTOMERS AND PARTNERS,

» Prinovis, Europe's largest gravure printing group, is presenting its environmental report to you for the first time. We see this report as a sign of our ongoing and successful efforts to protect the environment and preserve the world around us for future generations. Score presents you with the facts resulting from this sense of responsibility. In our globalised world, a distinction can no longer be made between economy, ecology and society. Just as economic competitiveness remains essential, so it cannot be placed outside the context of ever more scare resources and rising energy prices. Climate change is already exacerbating the situation and will continue to be a major factor in the future.
Environmental responsibility has therefore been an operating principle at Prinovis since the company was founded in 2005. As a company with production processes that consume significant amounts of energy and natural materials, we recognise our responsibility to think of tomorrow today. More active, effective environmental protection is not just an empty phrase, but a daily reality at Prinovis.
We implement prevention by hitting targets well below statutory limits. We implement efficiency by permanently reducing the CO_2 emissions from our processes. We protect the environment by using rolls of paper with a lower margin of error to minimise waste. And we look to the future by carrying out research into new, environmentally sustainable techniques.
On the following pages, we would like to give you an overview of what we have achieved, where and how. Of course, we know there is always room for improvement – and we are working on it.
Let there be no mistake about it – sustainability is not a selfless act. Sustainability is profitable, as it means lower energy consumption and lower costs. Sustainability will also benefit Prinovis in general, as there is only a future for those who take from nature only as much as nature can regenerate. This is our conviction, this is our goal.
We hope you find the following pages both informative and inspiring.

DR BERTRAM STAUSBERG

THORSTEN THIEL

» As indispensable as economic competitiveness is, it is inextricably linked to increasingly scarce resources and rising energy prices. «

THORSTEN THIEL, CEO
DR BERTRAM STAUSBERG, SUSTAINABILITY OFFICER, MANAGING DIRECTOR OF PRINOVIS NORTH/DRESDEN

PRINOVIS

Preamble

PRINOVIS RECOGNISES ITS RESPONSIBILITY TO SOCIETY AND THE ENVIRONMENT ASSOCIATED WITH THE MANUFACTURE OF PRINT PRODUCTS AND THE SUPPLY OF COMMUNICATION SERVICES. THE GROUP OPERATES AN ACTIVE ENVIRONMENTAL AND ENERGY POLICY TO FULFIL THIS RESPONSIBILITY. THE POLICY IS BASED ON THE FOLLOWING TEN GUIDELINES.

1 Statutory Provisions

Compliance with the requirements of laws and permits is a given. We register all applicable laws and regulations. Within Prinovis, we provide information on changes promptly. And we guarantee that implementation of all legal regulations will be ensured by the responsible company employees.

2 Internal Standards

In addition to legal requirements, we have developed more extensive in-house requirements and standards for the construction and operation of our facilities and for our services. These requirements are also binding for Prinovis.

3 Internal Targets

Clear environmental and energy targets and concrete measures to implement them ensure the systematic pursuit of our policy. We therefore draw up measures each year with our employees, suppliers and customers to improve our environmental situation.

4 Our Prevention

We regularly implement preventive safety measures to avoid any impact on the environment as a result of accidents.
We see the high safety standards of our facilities as an investment in the environment and the future.

5 Our Investment

We employ the best available technology under economically acceptable conditions, in order to avoid or minimise the negative impact on the environment. At the same time, we promote investment and research projects that develop innovative and eco-friendly technologies and production processes.

6 Our Employees

The active participation of all our employees is an essential prerequisite, if we are to contribute extensively to environmental protection. We ask our employees to behave responsibly towards the community and the environment.
At the same time, we take significant measures to promote qualifications and awareness via regular training and instruction on occupational safety and environmental protection.

7 Internal Controls

We assess the activities and products of Prinovis from the point of view of environmental sustainability. These internal analyses are used to optimise and develop the use of eco-friendly processes.

8 Independent Controls

We have the implementation and development of our guidelines reviewed regularly in audits, including unannounced audits. If there are reasons for complaint, we will act rapidly to remedy a deficiency.

9 Diverse Exchange

We use cooperation with authorities and specialist bodies to exchange ideas with experts from a range of disciplines, at an early stage and intensively.
We plan, construct and operate our facilities with due consideration for ecological and safety issues in open dialogue with others.

10 Comprehensive Communication

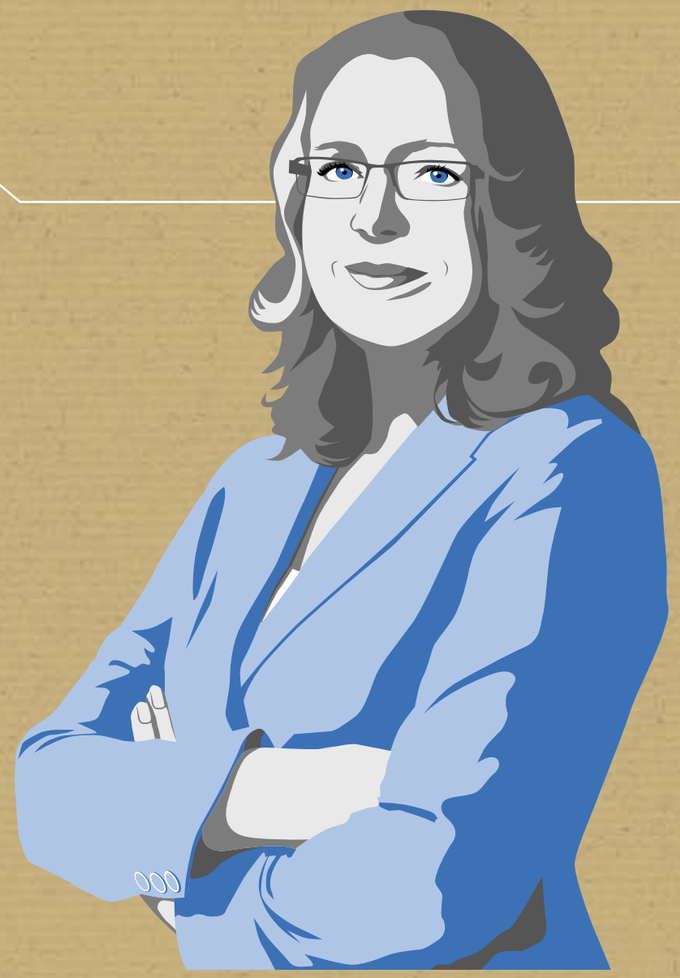
We disclose the environmental issues at Prinovis in regular environmental reports, as information and communication are part of our company culture. We foster an open and constructive dialogue with our employees, customers, business partners and associations. The company management ensures that all the resources and information required to achieve strategic and operative targets are available.

THIS IS HOW WE DO IT

Responsibility for environmental management reaches the highest management levels at Prinovis. The CEO provides site managers with group-wide requirements on environmental policy and with specific guidelines. A member of the group management team is also given the role of Sustainability Officer. The Sustainability Officer manages the group-wide environment and energy team, which consists of the environment and energy officers from the local sites and all our occupational safety experts. The task for the team is to develop joint standards and to constantly increase the environmental performance of the various sites and the group as a whole. The Sustainability Officer reports directly to the CEO on implementation of environmental policy.
Applicable structures are created, responsibilities defined and business processes optimised at the local sites to implement the environmental policy. These are significant prerequisites for a consistent and functioning environmental management system. The environmental management systems of the various sites all meet the requirements of ISO 14001.

PRINOVIS

Earn money with climate change



WHY PROTECTING THE ENVIRONMENT AND CAPITALISM GO HAND IN HAND – AN INTERVIEW WITH GERMANY'S LEADING ENVIRONMENTAL ECONOMIST, CLAUDIA KEMFERT

PROF. KEMFERT, GERMANY HAD TWO EXTREMELY TOUGH WINTERS, WHEREAS APRIL 2011 WAS SO HOT AND DRY THAT A BAD HARVEST HAS ALREADY BEEN FORECAST. THE QUESTION FOR AN ENVIRONMENTAL ECONOMIST – IS THIS THE RESULT OF CLIMATE CHANGE?
We should distinguish between local weather conditions and the effects of global climate change. The increase in greenhouse gas emissions caused by human activities will lead to an increase in extreme weather conditions, which will mean more powerful storms, heavier precipitation and longer dry periods. However, it is difficult to say what local conditions are attributable to climate change.

WHY?
That is the nature of research. Weather can be predicted relatively accurately three or four days in advance. But climate researchers are looking at very long-term developments, both retrospectively and into the future.

AND HOW CERTAIN ARE THEIR FORECASTS?
They are working with probabilities. We can compare it to a plane. The pilot says the plane will crash with a probability of more than 90 per cent. The airline's technicians confirm his prediction, as do the airport's maintenance service and an independent team of experts. What would you do? Get on the plane? One hundred per cent certainty is, of course, only possible after the event has occurred.

THERE ARE PREDICTIONS SHOWING HOW THE EARTH'S CLIMATE WILL CHANGE BY 2100 IF NOTHING SERIOUSLY CHANGES...
And it looks like they could be right, at least at the moment. According to the latest reports from the International Energy Agency, greenhouse gas emissions that damage the environment reached a record high in 2010.

THAT SOUNDS APOCALYPTIC. PERHAPS A NAIVE QUESTION, BUT IS THERE ANYTHING AT ALL WE CAN DO?

> **» Action is vital. We simply do not want to experience such horror scenarios. «**

We can act – and that is vital. We simply do not want to experience such horror scenarios, so it would be wrong to paint such a bleak picture or become indifferent. Everyone can do something, and everyone must do something.

ARE WE ALL IN THE SAME BOAT?
For a start, "we" are those nations that have emitted a vast quantity of greenhouse gases and continue to do so.

WHY? MANY OF THESE COUNTRIES ARE IN THE NORTHERN HEMISPHERE AND ARE NOT LIKELY TO BE AS BADLY AFFECTED. PRINOVIS IS BASED IN GERMANY AND THE UK...
It is true that the climate in Northern Europe will not change to the same extent as in regions that will become uninhabitable, either as the result of increasing floods in Asia or long droughts in Africa.

COULD PRINOVIS ACTUALLY BENEFIT FROM CLIMATE CHANGE?
No, unfortunately not. Regardless of the cynicism behind such thinking, the fact is that if we continue to behave as we are doing there will be no winners. Climate change does not mean that you will be walking under palm trees in Hamburg. The extremes will also increase here as climate change progresses. Northern Germany is at serious risk of storms and floods. There will also be mass migrations of climate refugees – violence is a likely outcome.

GERMANY ONLY PRODUCES A SMALL FRACTION OF GLOBAL CO_2 EMISSIONS...
A killer argument. But if an industrial nation such as Germany develops new technologies, manages to switch from fossil to renewable energies and experiments with new forms of energy efficiency, it will be ahead of the competition. In any case, doing nothing has never yet prevented a catastrophe.

BUT WHY SHOULD I STOP DRIVING MY CAR IF THE CHINESE ARE ALL STARTING TO DRIVE THEIRS?
I'm not telling you to stop, I'm telling you to take control. You have to embrace the opportunities that come your way. But the German automotive industry has failed to offer the world and China cars that do not increase CO2 emissions. If it had done so, we would be driving different cars today. The point I'm trying to make is that we have to be much more of a role model, as we are the world's economic anchor because our products are used worldwide.

DO YOU WANT TO EARN MONEY WITH CLIMATE CHANGE?
Why not? A fireman, producers of fire extinguishers and fire insurers do the same thing – in addition to doing good.

WHAT ARE YOU YOURSELF DOING?
I try to produce as few greenhouse gases as possible to minimise my impact on the climate. I travel almost exclusively by bicycle and train and offset my air miles. I also live in an insulated building, use energy-efficient devices, do not eat meat and mainly buy regional products. It is fun, saves on costs and is healthy – what could be better?

NOT A LIFESTYLE FOR THE CHINESE, OR IS IT?
We cannot dictate to the Chinese how they should live their lives when they are making the same mistakes we made in the past.

YOU ARE DOING QUITE A BIT TO SAVE ENERGY. IS THIS A KEY ISSUE?
First of all, without nothing works. And, we have to import that energy – be it oil, gas or uranium, even some coal – in some cases from politically unstable countries. At the point number one. At the beginning of the 70s we experienced what happens if energy becomes a weapon when the Arabian oil producers reduced output by about five per cent. That caused prices to increase by 70 per cent and led to a real economic crisis. Secondly, our energy sources are not endless. Even today, we pump less oil than we need and it will continue to become more expensive. And thirdly, oil and coal and, to a lesser extent, gas – the wheels of the economy –

are the worst climate killers. The more efficiently we use them and the more we recycle, the longer we can survive. It's the same for everyone. Sooner or later, this will affect every company and every national economy.

SHOULD WE ALWAYS THINK OF THE CLIMATE, ENERGY AND THE ECONOMY AS BEING RELATED?
These are not opposites, but two sides of the same coin. Our aim must be to create an environment worth living in by using new technologies. Who else has the know-how, the technology and the economic strength? We need new propulsion technologies and new methods for exploiting renewable energies and sustainable water management so that humanity can survive for the long term. Ultimately, that requires investment. For investment we need the economy.

THE ECONOMY, PI.E. MAJOR LISTED COMPANIES IN PARTICULAR, GENERALLY THINK SHORT TERM.
We ought to be telling companies that they have the opportunity to discover the brands of the future. A company that is still relying on cheap oil being there forever is definitely not in a good position. I am not particularly worried. I sit on various juries, such as for the German Sustainability Award. Every year we receive thousands of proposals, many of which are very promising. The truth is that the economy reaches its limits where it ought to be solving market failure.

WHAT DO YOU MEAN BY THAT?
In fossil energies, the system had a less-than-promising form of energy. Politicians have to act and regulate in this area to create sustainable economic growth and we need regulatory intervention for climate change as well. This is about integrating the environment and ecology and about pricing environmental damage.

PRINTING IS A HIGH-RESOURCE AND ENERGY-INTENSIVE BUSINESS. WHAT ADVICE WOULD YOU GIVE A COMPANY THAT CANNOT FUNDAMENTALLY CHANGE ITS PRODUCTION PROCESS?
It is all about saving energy. If you use this scarce resource more efficiently, you can save an incredible amount of money right now – and invest more.

AND WHAT DOES THAT MEAN SPECIFICALLY?
Combined heat and energy plants are currently the most effective means of generating energy. Even for print products, there are players on the market who are developing resource-efficient products in a targeted way and using sustainable materials. Sustainability is right at the top of the entire value-added chain. My last book, for example, was printed climate neutral, so it is possible. Climate neutral is the new buzzword for offsetting emissions, even though it isn't actually 100 per cent correct.

WHAT DO YPU MEAN BY PRINTED CLIMATE NEUTRAL? ON FSC®-PAPER?
Climate-neutral printing means a lot more than that. It includes eco-friendly printing processes, improved energy efficiency and offsetting unavoidable greenhouse gas emissions – in the same way as we can offset air miles. Even when I printed a book in 2008, I wanted to offset the CO2 emissions. Almost all publishing houses, and a large number of providers, now have extensive knowledge in this area. Printing without worrying about the consequences is a business model that is dying out.

PRINOVIS IS A GRAVURE PRINTER AND REQUIRES THE SOLVENT TOLUENE FOR ITS PRODUCTION PROCESSES. WHAT CAN WE DO IF THERE IS NOTHING TO REPLACE IT?
I am certainly no expert in the field of chemistry. However, in principle I do not believe anything is irreplaceable – it may look that way now, but technical progress is the solution. Many people said that oil could not be replaced. That has since been disproved.

» Combined heat and energy plants are currently the most effective means of generating energy. «

RESEARCH COSTS MONEY, A LOT OF MONEY. AND THERE IS A PRICE WAR IN THE PRINTING INDUSTRY ...
Which makes it even more important for the state to increase research funding. There are a large number of chemical giants investing huge sums in research into resource efficiency and substitute materials. If a market develops, large companies will want to be in on it. It is important that the printing industry clarifies what it needs and looks for useful alliances.

WHY SHOULD COMPANIES ACCEPT MORE AND MORE RESPONSIBILITY? THE ECONOMIST MILTON FRIEDMAN SAID THAT THE SOCIAL RESPONSIBILITY OF THE ECONOMY IS TO INCREASE PROFITS ...
Obviously profit comes first. You need to be profitable to be able reinvest and to be able to achieve sustainability. But external requirements, particularly from customers, have changed companies.

IT THIS NOT JUST "GREENWASHING"?
There are areas of business to be discovered that benefit the world and are also positive for companies. If the process is credible, it can be anything other than "greenwashing". Companies that live sustainability at all stages of their activity are viewed in a positive light – which helps in the long term. It is also more intelligent to stay ahead of statutory regulations.

IF, AS YOU SUGGESTED, WE WERE TO PRICE IN THE SOCIAL COSTS, A LOT OF PRODUCTS WOULD BECOME MORE EXPENSIVE. HOW WILLING DO YOU THINK INDUSTRIAL CUSTOMERS AND END CUSTOMERS WOULD BE TO PAY MORE?
There are many examples indicating that a lot of customers are clearly prepared to pay more for energy-efficient and sustainable products. And the more widespread such products are offered and in demand, the more reasonably priced they can become – look at organic-products.

ARE YOU BASICALLY IN FAVOUR OF PRINTING CARBON FOOTPRINTS ON PRODUCTS?
Basically yes, although it's not as straightforward as that. While it would provide transparency for companies, it may be information overload for end customers.

THIS YEAR IS THE INTERNATIONAL YEAR OF FORESTS. PRINOVIS CONSUMES PAPER – TREES THAT CAPTURE CO_2. WOULD IT BE BETTER FOR THE ENVIRONMENT IF WE PRODUCED FEWER PRINT PRODUCTS?
Sustainability means consuming as much as can grow back. Paper and forests are renewable raw materials – the very essence of sustainability. We have to avoid waste of course, but simply abandoning an activity is not automatically sustainable.

BUT ISN'T THE PRINCIPLE OF ECONOMIC GROWTH – THE CONSTANT PURSUIT OF MORE – PRECISELY WHAT HAS CAUSED CLIMATE CHANGE?
The problem is not growth itself. The problem is greed, indulgence and wastefulness. Our economic system has brought people a lot of prosperity in many regions of the world. But there have also been undesirable developments where the environment has been exploited without considering the negatives. We can view them as illnesses, and illnesses that we can cure. That does not mean that the system itself is ill. On the contrary, we need strength to cure the system. Strength lies in investment – in growth markets that guarantee sustainability. Sustainable growth is what it is all about.

YOU HAVE SAID WHAT THE ECONOMY AND THE POLITICIANS SHOULD DO. BUT CAN END CONSUMERS DO ANYTHING?
The consumer effectively decides what is produced and how through their consumption. From a German perspective, there are already a lot of consumers who have developed considerable awareness, from the bio-boom to platforms like www.utopia.de Even waste separation in homes – an example of resource efficiency – is important. We are able to show more easily than others that it works.

CLAUDIA KEMFERT

Prof. Claudia Kemfert, born in 1968, is regarded as one of Germany's leading environmental economists. She has studied at Stanford University, amongst others, and has taught as a visiting lecturer in Moscow and Sienna. She is now Head of the Department of Energy, Transportation and Environment at the German Institute for Economic Research (DIW Berlin) and Professor of Energy Economics and Sustainability at the Hertie School of Governance. She has received numerous awards as a leading researcher and sought-after expert on politics and media. Her most recent books include "Die andere Klima-Zukunft - Innovation statt Depression – The Other Climate Future: Innovation Instead of Depression" and "Jetzt die Krise nutzen – Taking Advantage of the Crisis".

PRINOVIS

Paper

FSC®, FEW MISPRINTS, SOFTPROOFS: PRINOVIS' SUSTAINABLE WAY OF HANDLING THE PRECIOUS RESOURCE WOOD DOESN'T JUST LOOK GOOD ON PAPER

Oil, coal and metals – the known reserves which are largely exhausted. Finding new sources requires intensive research and exploration of inaccessible regions. Or, systematic recycling – the approach adopted by Prinovis. "Only those who can minimise their consumption of natural resources and use energy and raw materials efficiently have a future", says CEO Thorsten Thiel.
Of course, that applies first and foremost to the most common raw material in gravure printing: paper. The Prinovis Group prints more than one million tons of paper every year. Around a quarter is purchased by the company itself – mainly from suppliers such as UPM, Stora Enso, Norske Skog, Myllykoski and SCA, all of which make sustainable forest management a high priority and have FSC or PEFC certification.
The seals of the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification Schemes, the two largest independent organisations in this sector, ensure that the wood comes from sustainable forestry producers who meet high ecological and social standards.
All Prinovis printing plants are also certified according to these leading standards – a first for any gravure printing company. Prinovis is also a supporting member of the FSC.
Besides using sustainably renewable raw material, Prinovis also uses 100% recycled paper. Paper can be recycled four to six times, although the length and cohesion of the fibres is steadily reduced. That is why Prinovis also supports its customers by using papers from responsible forestry across the board.
In the printing process itself, Prinovis can boast of well-equipped machinery that keeps paper waste to a minimum. Rotary presses in seven different widths ensure that waste and spoilage are extremely low. All paper waste – 98 per cent of all waste produced at Prinovis – is collected separately and recycled back into the paper process. The cuttings from processes such as trimming are also immediately removed from the presses by air extraction. The extracted air is then filtered using a sophisticated technique before it is released into the atmosphere.
Where technically possible, Prinovis tries to make do without paper. The softproof system developed and refined by Prinovis has made it possible to create digital true-colour previews of the expected print output. Avoiding proofs on paper also saves on ink, the energy required for printing and on transport costs.
Of course, paper is not the only resource we use. The other two important resources are the printing inks (which contain toluene), and gas to generate power.
You can find out how Prinovis uses these resources efficiently in the sections on Air (see page 14) and Energy (see page 12).

» Only those who can minimise their consumption of natural resources and use raw materials efficiently have a future. «

THORSTEN THIEL, CEO

THE RESULT

Paper consumption at Prinovis only increased from 940,494,270 to 1,073,768,072 kilogrammes between 2008 and 2010. This increase is mainly due to rising demand. 2008 was the core year of the international currency and financial crisis.

+14.2 %

MORE PAPER CONSUMPTION

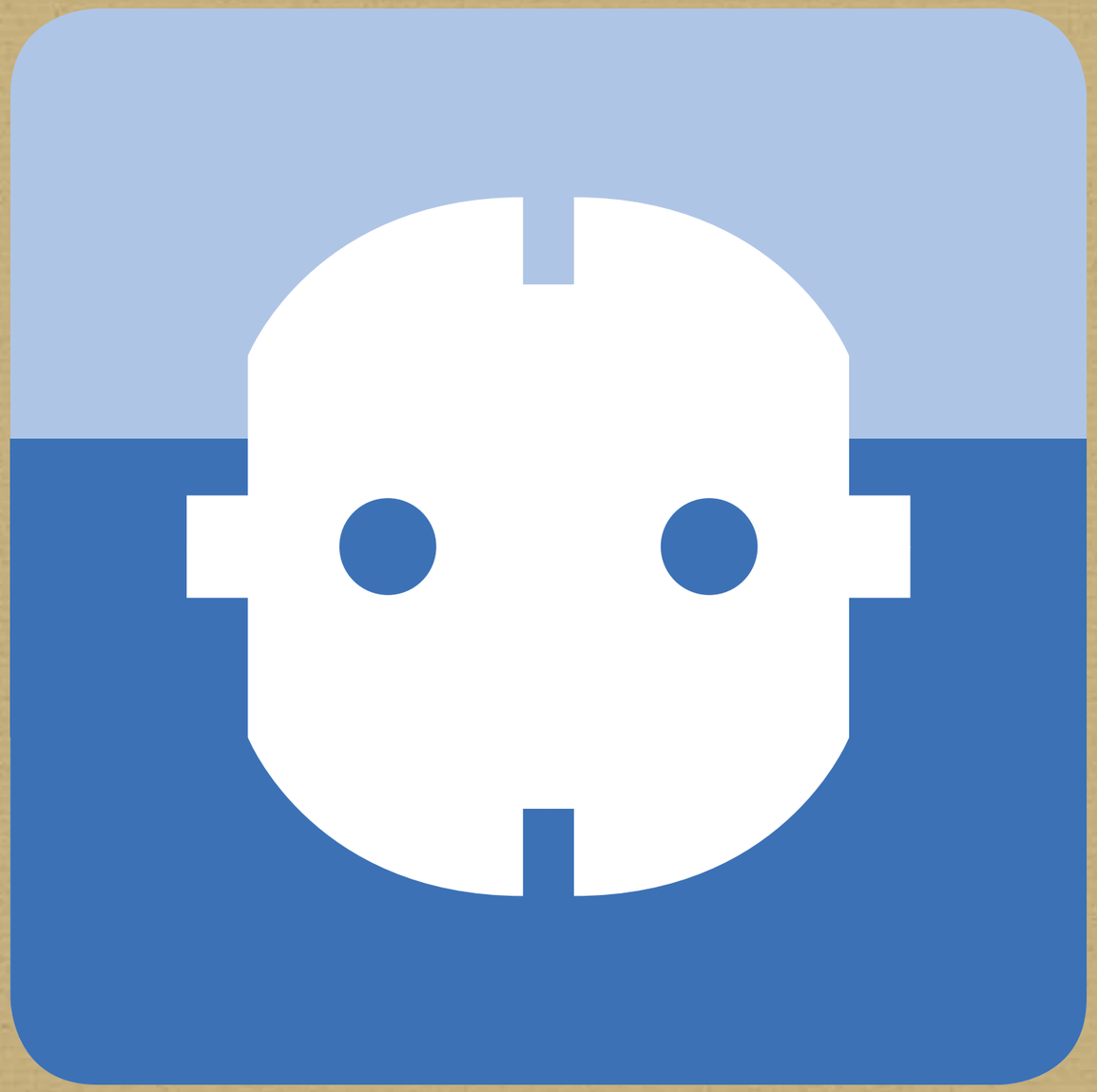
Energy

PRINOVIS DOES NOT RECOVER USED ENERGY. WE USE IT AS EFFICIENTLY AS POSSIBLE.

Even physicist, philosopher and Nobel Prize winner Werner Heisenberg knew that energy is the primary substance of the world. No one can live without eating and drinking – without energy for the body.
From a strictly physical point of view, energy cannot be created or consumed, but only converted – from natural gas into heat, for example. The efficiency with which primary energy is converted is decisive for the environment.
Prinovis needs energy for its plants, gravure printing presses and for the machines that supply cylinders, paper and ink and the presses that then produce brochures, catalogues and magazines from the pressed rolls of paper. A range of secondary systems are needed for equipment to operate, including systems to generate steam, heat and compressed air, to provide process refrigeration, to purify waste air and to treat wastewater.
Continually reducing how much energy is required and using that energy responsibly is at the heart of all endeavours at Prinovis – for both ecological and economic reasons. The extent of our endeavours is all-encompassing. We already use gas turbines at three of our five printing sites to drive the combined heat and power (CHP) systems, for example. Electrical energy is generated using combined heat and power directly at the point of consumption in Itzehoe, Liverpool and Nuremberg. The switch to gas motors using combined heat and power in Dresden is currently at the planning stage.
The conversion of energy in the combined heat and power process provides an extremely high degree of efficiency thanks to the simultaneous use of power and heat. Incidental thermal energy is used in heating and production processes in addition to power. CHP facilities at Prinovis achieve conversion rates of between 80 and 85 per cent of fuel energy, whereas conventional power plants only provide energy efficiency of around 45 per cent. The fuel requirements for CHP plants are therefore around 30 per cent lower, as are emissions of pollutants.
Even if CHP plants are currently the most efficient way to convert energy, Prinovis is constantly looking into other options to increase sustainability. For example, the construction of a biomass power plant and the use of photovoltaic and wind power plants have already been reviewed so that the use of renewables can be increased rapidly as soon as these options become cost-effective.
Prinovis does not just aim for maximum efficiency in power generation however. Our machinery is up to date, using the most innovative and therefore most eco-friendly technology in the day-to-day printing process. Energy consumption is also being reduced in terms of infrastructure. "We have installed motion sensors and wherever possible reduced the number of fluorescent lights", says Hans-Friedrich Süssmann, Head of Technical Equipment and Installation at Itzehoe.
The awards Prinovis has received in recent years are a sure sign that this approach is paying off. The Nuremberg site, where a CHP system fired by natural gas was installed back in 1993, was awarded the Bavarian Environmental Medal. The printing centre in Ahrensburg, which was the first European company in the printing industry to be validated according to the EU Eco-Management and Audit Scheme (EMAS), was named "Most Environmentally Friendly Company" by the Society for the Study and Support of the Economy in Schleswig-Holstein (StFG) in 1996. Itzehoe won the same prize in 1997 and 2005. In 2010, the Association of German Chambers of Industry and Commerce (DIHK) added Prinovis to a group of just 15 Climate Protection Companies in Germany that can demonstrate a particularly efficient use of resources. All these awards make Prinovis even more determined to continuously improve.

» Our cogeneration plants convert up to 90 per cent of the fuel energy. «

DR HANS-FRIEDRICH SÜSSMANN,
OPERATION TECHNOLOGY MANAGER ITZEHOE



-9.7%

HEATING POWER

Our result

From 2008 to 2010, Prinovis managed to reduce heating energy requirements by nearly 10 per cent, thanks to more efficient machines and better building insulation.

PRINOVIS

Air

-3.6%

CARBON DIOXIDE EMISSION

THE RESULT

Between 2008 and 2010, Prinovis was able to reduce its CO_2 emissions by three per cent.

THERE'S NOTHING IN THE AIR. THAT'S BECAUSE PRINOVIS FILTERS EVERY MOLECULE BEFORE RELEASING IT INTO THE ATMOSPHERE.

The smell in a number of sections of the Prinovis factory buildings is sweet, almost floral, while also a little redolent of shoe polish. The smell is characteristic of the solvent toluene, a hydrocarbon.
Alongside pigments and resins, toluene is a vital ingredient in printing inks. In contrast to benzene, which was used in the past, it is not poisonous and does not contain any heavy metals. As toluene is a volatile organic compound (VOC), Prinovis strives to release as little toluene as possible into the environment.
The Prinovis ink and paper laboratories in Itzehoe and Dresden are, of course, looking for alternatives to toluene. However, the simplest solution – water-based inks – has significant ecological disadvantages. The drying process alone would consume more than six times the energy. The print quality would also be unacceptable. Besides weak colours and loss of glossiness, the paper would be uneven and would tend to wrinkle, which could cause tears leading to energy-intensive interruptions to production.
Prinovis has therefore opted to recycle toluene using sophisticated techniques – and now achieves recovery rates of up to 98.5 per cent.
A "closed-loop" system has been installed in Liverpool and Nuremberg which can achieve a recovery rate of 100%. (For more information, see the Toluene Cycle on p. 16)
Toluene is not the only source of emissions. Burning primary energy sources such as gas and fuel oil – mainly to operate and heat the facilities that generate the required process steam – produces nitrogen oxides (NO_x), carbon monoxide (CO), carbon dioxide (CO_2), smaller amounts of sulphur dioxide (SO_2) and soot.
The Technical Instructions on Air Quality Control (TA Luft), published by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety in 2002, define the limits for the concentration of immissions (to protect neighbours) and emissions (to prevent harmful impact on the environment), as permitted under EU law. Prinovis not only complies with these limits, but frequently operates well below them.
There are two basic methods used to minimise such emissions – the target at Prinovis: either by employing filtering techniques or using energy more efficiently.
Filtering techniques are exploited to their full potential at Prinovis. The white cloud that can be seen rising from the chimneys and cooling towers at Prinovis on cold days is pure steam. It is mainly produced when the adsorber is dried after a cycle of the toluene recovery process has finished, but is also produced during energy production. Burning one cubic metre of natural gas produces more than one litre of water.
Reducing energy consumption is also a pillar of our policy, as anyone consuming less fuel automatically generates lower emissions. We use combined heat and power (see p. 12) – currently the most efficient way to produce power and heat – which reduces the overall emission load.
But the story is far from over. "For the future, the focus is on minimising emissions figures", says Sven Wegeleben, Environmental Engineer at Prinovis Dresden. Plans are now under way to install innovative steam-saving facilities for the first time, which could reduce the steam used in the production process by around 30 per cent. That would reduce energy consumption even further – the main target at Europe's largest gravure printing company.

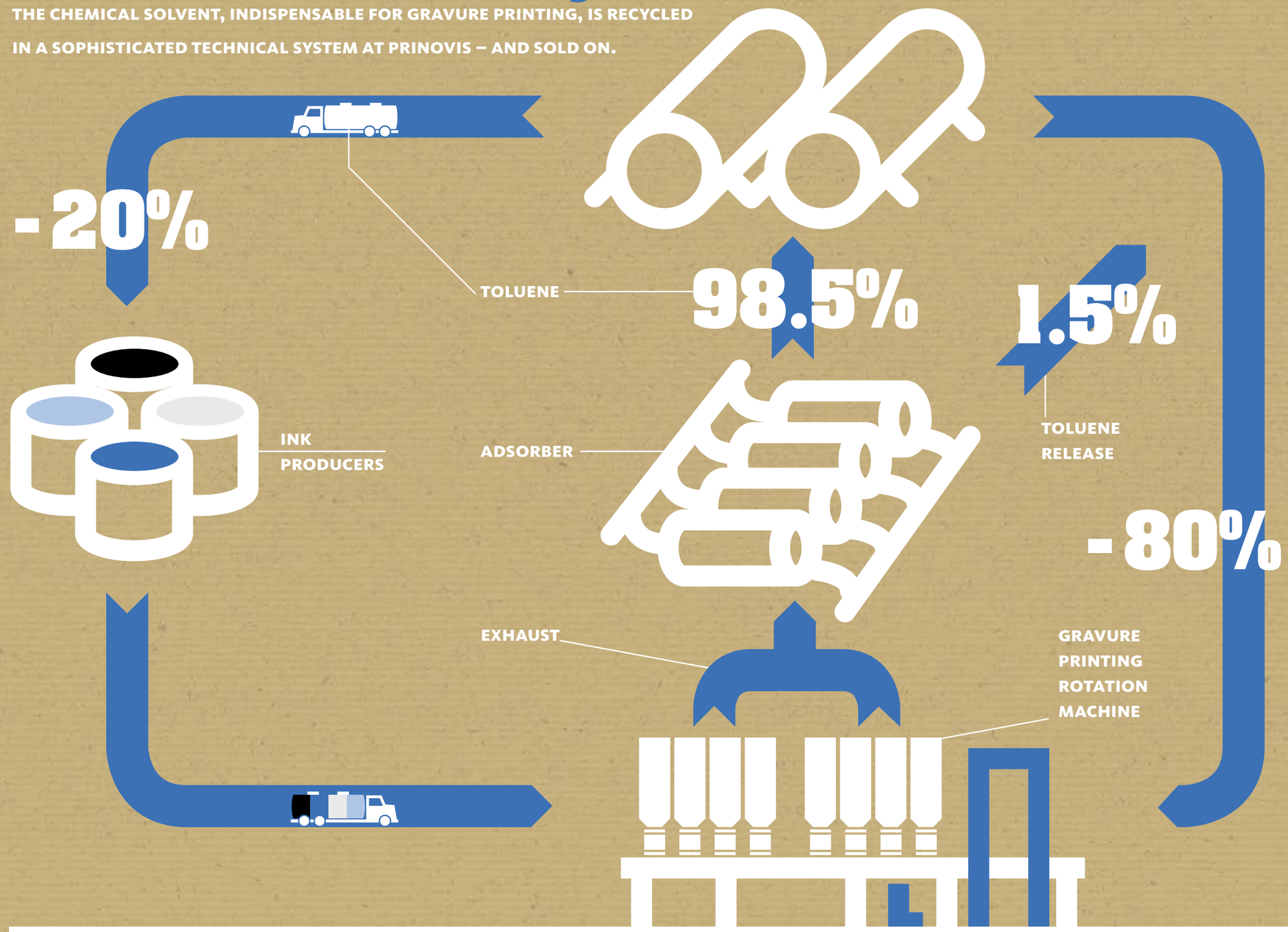
» We recycle toluene – between 98.5 and 100 per cent of it. «

SVEN WEGELEBEN, ENVIRONMENTAL ENGINEER DRESDEN

PRINOVIS

The Toluene Cycle

THE CHEMICAL SOLVENT, INDISPENSABLE FOR GRAVURE PRINTING, IS RECYCLED IN A SOPHISTICATED TECHNICAL SYSTEM AT PRINOVIS – AND SOLD ON.



HOW IT WORKS

To recycle toluene, the exhaust air which contains the solvent is extracted directly from the printing presses. This exhaust air is passed through an activated coal filter where the toluene is deposited and thereby separated from the air flow. The filters are designed so that at most only a few milligrams of toluene per cubic metre are left in the exhaust air flow. When an adsorber is full, it is filled with steam to drive the solvent out of the coal. This steam-toluene mixture is then condensed and condensed into a separator, where the two liquids divide thanks to their different densities. About 80 per cent of the reclaimed toluene is then immediately put back into the production process and the remainder is sold on to ink producers.

There are of course other routes for toluene emissions (known as diffuse emissions). In the case of larger potential sources of emissions such as ink tanks, no solvent escapes thanks to the systematic use of the vapour recovery system – the toluene that is displaced when the tanks are filled is captured using a second line in the valve and returned to the storage tank. Smaller potential sources of emissions such as cleaning rags are collected in gas-proof containers and cleaned and recycled by certified waste management companies – the extracted solvent is recycled thermally and used by laundries to heat water.

However, diffuse emissions cannot be prevented entirely. Minimal quantities are also emitted into the environment by the printed paper. According to Ordinance 31 on implementing the Federal Imission Control Act (Bundes-Immisionsschutzgesetz), losses of solvents (diffuse emissions) from older facilities must not exceed 10 per cent and such losses must not exceed five per cent in facilities that have become operational since 28/08/2001. Prinovis complies with these requirements and achieves targets well below these statutory limits.

PRINOVIS

Water

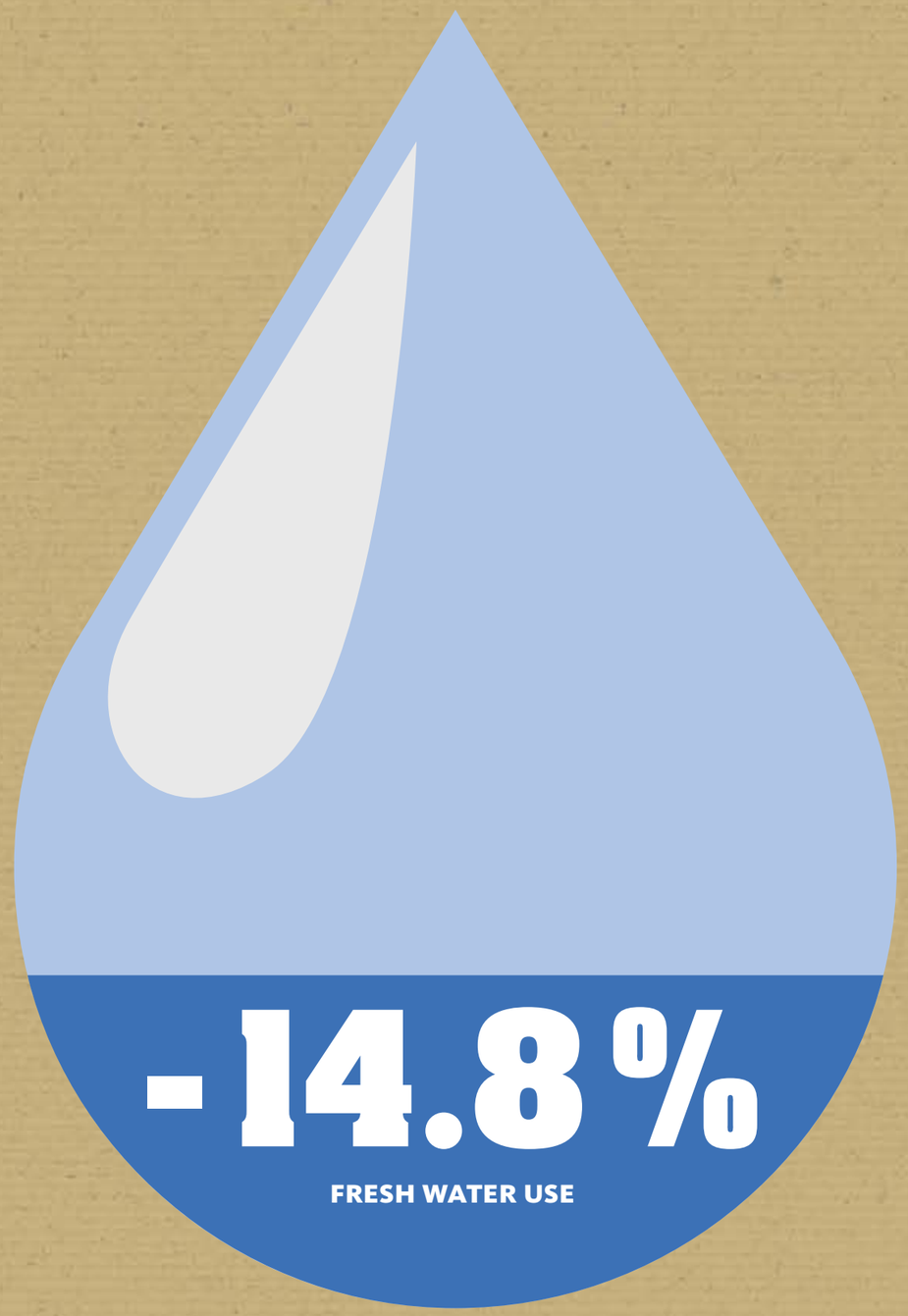
WE KNOW WHAT'S HAPPENING – ONLY HALF OF THE VALUABLE WATER IS UNCONTAMINATED

Household, agricultural and commercial wastewater brings contaminants into the sewerage system and therefore into the water cycle every day.
Prinovis also produces some wastewater from secondary sources related to the production process, such as employee showers and toilets and on-site cafeterias. Rain and surface water must also be managed as wastewater. All these types of wastewater are carefully treated before being fed into the sewerage system to ensure that the quality of Prinovis waste water is well above that of private households. Rainwater interceptors are also installed where accidents or oil leakages could occur, such as areas where paper is unloaded from lorries.
Even waste water from the kitchens is treated. The wastewater is fed through a grease separator which filters fats and oils out of the water on the principle of gravity – fats float to the top, solids sink to the bottom. Before being sent on to the public sewage works, the quality of the wastewater is also subject to random checks by the responsible authorities, unannounced.
The water from the gravure process is always treated. Investment in batch systems has brought our targets even further below the statutory limits compared to the continuous systems used in the past, and safety has been increased significantly. Two types of wastewater – from cylinder correction and cylinder production – are combined in these batch systems.
The water is passed through a toluene separator (which also functions on the principle of gravity) to recycle the toluene. Wastewater from electroplating – the process of applying a 100-micrometre-thick copper working layer (Ballard skin) to the printing cylinder followed by hard chromium plating – flows directly into the treatment installation, which neutralises acids and alkalis. Dissolved metals such as chrome, copper, nickel, silver and tin are converted into insoluble compounds and combined into larger units by adding flocculating agents. During the filtration that follows, these flakes are removed from the water under high pressure in a chamber filter press and recycled as filter cakes.
This purified water is then also passed through an ion exchanger and a gravel aggregate filter to absorb any remaining metal ions. The pH value is checked and neutralised, if necessary, and the metal (to pH 7), and the metal content is also monitored. These final checks are mandatory – no wastewater leaves the treatment plant without them. An external, independent laboratory also regularly takes samples from the outlet for analysis on an ongoing basis. The results are submitted to the environmental and supervisory authorities.
The Ballard skin procedure has replaced galvanic dechroming, which means Prinovis has been able to reduce its quantity of wastewater by half since 1998. The concentration of heavy metals is also constantly being reduced: "There are now only traces of chrome, and copper has been reduced to a tenth of what it was", says Christine Uhde-Leischner, Head of Quality Management, Occupational Safety and the Environment. "All other metals were already at very low levels and have been reduced even further, in some cases below trace levels."
Last but not least comes rain and surface water. Rainwater interceptors are also installed where accidents or oil leakages could occur, such as areas where paper is unloaded from lorries. The surface drainage system is also linked to fire water containment, which prevents contaminated water draining away uncontrolled, as is normally the case with fire water. Similarly, all surfaces used to transport hazardous substances are sealed and fitted with retention systems such as stop valves or interceptors to contain potential accidents. All eventualities have also been considered to prevent ground and water pollution.

> **» The quality of our sewage is far above that from private households. «**
>
> CHRISTINE UHDE-LEISCHNER, HEAD OF ENVIRONMENT

THE RESULT

Prinovis was able to reduce fresh water requirements by more than 140,000 cubic metres in 2010, thanks to a consistent in-house water-saving policy.



PRINOVIS

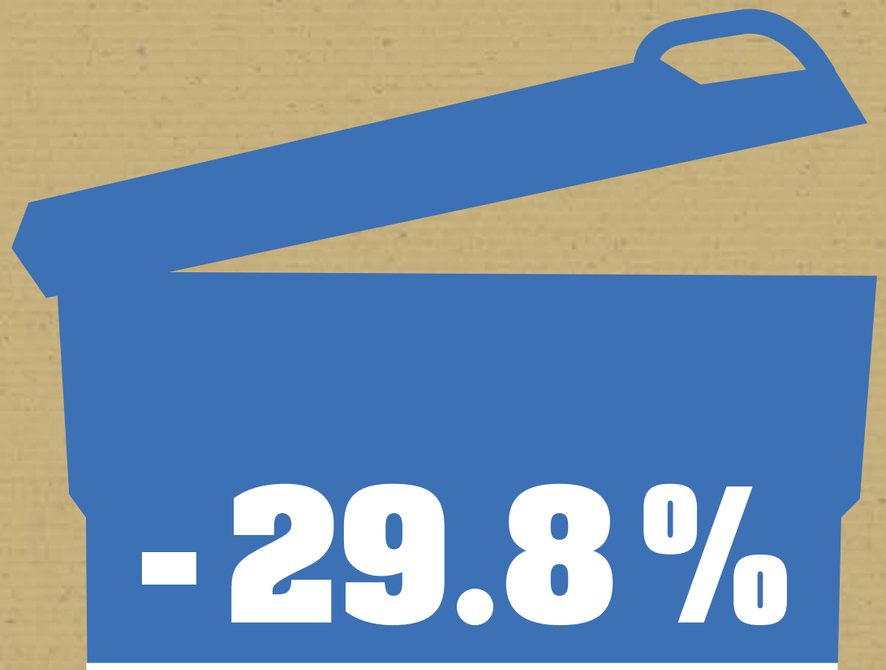
Noise, fire protection and waste

BLAZING AHEAD WITH GRAVURE PRINTING – BUT WITH OUR OWN IN-HOUSE FIRE-FIGHTERS

Prinovis doesn't just just concentrate on major environmental issues, such as energy efficiency, minimising the use of fresh water, cleaner exhaust air and the more efficient use of resources. The company also looks at supposedly less important issues, because what works for printing works for sustainability – constant attention to detail.
The immediate vicinity of production sites can be disturbed by noise from printing presses, toluene recycling, ventilators and incoming and outgoing traffic. All our sites comply with the environmental legislation in the Technical Instructions on Noise Abatement (TA Lärm), and never exceed the defined limits – 65 dB(A) during the day (equivalent to the noise in a cafeteria) and 50 dB(A) during the night (comparable to rain or the noise of a fridge). Dresden has a specific limit, as the site is not in a purely commercial zone. Noise at the Dresden site must not exceed 40 dB(A) during the night (the level of noise from quiet music). The noise levels at Prinovis are periodically reviewed by independent, officially recognised institutes. And so far, no complaints have been made to the company or to the responsible authorities.
Fire is a risk wherever people are working with paper, solvents and machines. Fire prevention is high priority at Prinovis, as each fire can cause significant damage to the environment. Automatic alarms and extinguishing systems are a must. The sites at Ahrensburg, Dresden, Itzehoe and Nuremberg also have accredited factory or company fire brigades. The firefighting team is made up of part-time firefighters and is organised into groups so that at least one team is always on site during production. They also have qualifications on how to handle environmental hazards, such as uncontrolled diesel leakages from a lorry.
Of course, all employees undergo regular fire drills so that they can act quickly and appropriately in case of fire. All operating areas are also fitted with fire extinguishers and emergency kits for use in the event of spillages of oil or chemicals.
Waste is monitored on the basis of waste guidelines, and hazardous waste is only recycled or disposed of by certified waste management companies.
All employees are therefore required to use the available waste separation system, so that resources can be exploited efficiently.
Besides the various forms of paper waste – which make up 98 per cent of all waste at Prinovis – various coloured plastics, household waste and waste metal (such as steel strips) are collected separately and recycled appropriately.
The Ballard skin is a unique type of waste onto which all print data is engraved. After the printing process has been completed, the Ballard skin is separated from the cylinder using an organic and particularly eco-friendly solution, and is then removed manually and recycled.

» Our site makes as much noise as rain. «

ROLF SMETS, SAFETY ENGINEER NUREMBERG



RECYCLABLE WASTE

The result

Prinovis was able to use its variable machines to reduce recyclable waste by nearly one-third.

PRINOVIS

Carbon Footprint

Corporate responsibility is one of the four essentials of Bertelsmann AG, the majority owner of Prinovis. Bertelsmann AG considers climate change and environmental protection to be central challenges. For this reason, the company strives to reduce direct and indirect greenhouse gas emissions in cooperation with its employees and and in dialogue with stakeholders, to minimise the impact on the environment. Based on this, a group-wide climate protection strategy was decreed in 2008. One of its first measures was to take stock of the greenhouse gas emissions in the form of a carbon footprint – a measure to determine the total amount of carbon dioxide emissions.

The 2008 carbon footprint of the Bertelsmann group and thus also that of Prinovis were published in 2010. The 2010 carbon footprints will be determined and published as early as 2011, thanks to improved processes.

Printing magazines and catalogues requires diverse interaction with the environment. Prinovis has therefore taken on a special responsibility – like many industrial production plants, printing machines also require large amounts of electrical power and steam. The consumption of power and fossil fuels was thus determined for the carbon footprint (in particular gas, fuel oil and fuels), as well as the scope of business trips (flights, train journeys, etc.). Prinovis was supported and audited by the independent and non-profit ecological research institute IFEU, the Heidelberg Institute for Energy and Environmental Research, which was founded in 1978. Its work, in turn, was reviewed by auditor PriceWaterhouse-Coopers (PWC). This audit confirmed that the procedure and determination of the carbon footprint meets all standards relevant in 2008.

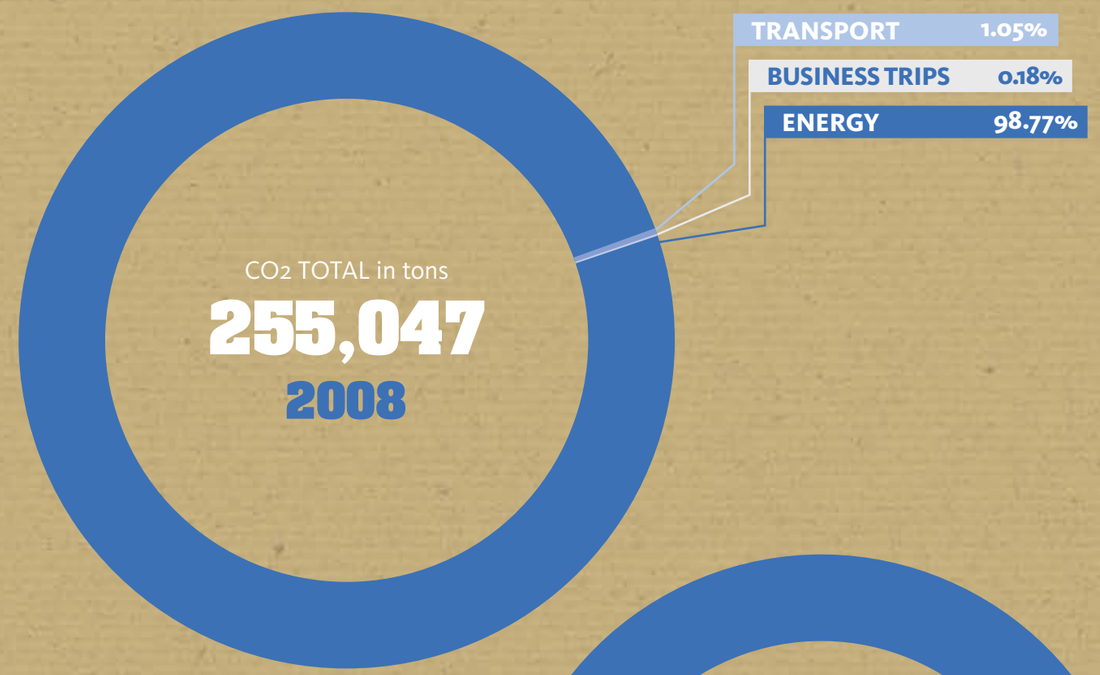
> **» Our companies show responsibility to the society and the environment at all times. «**
>
> PRINCIPLE OF THE BERTELSMANN ESSENTIALS

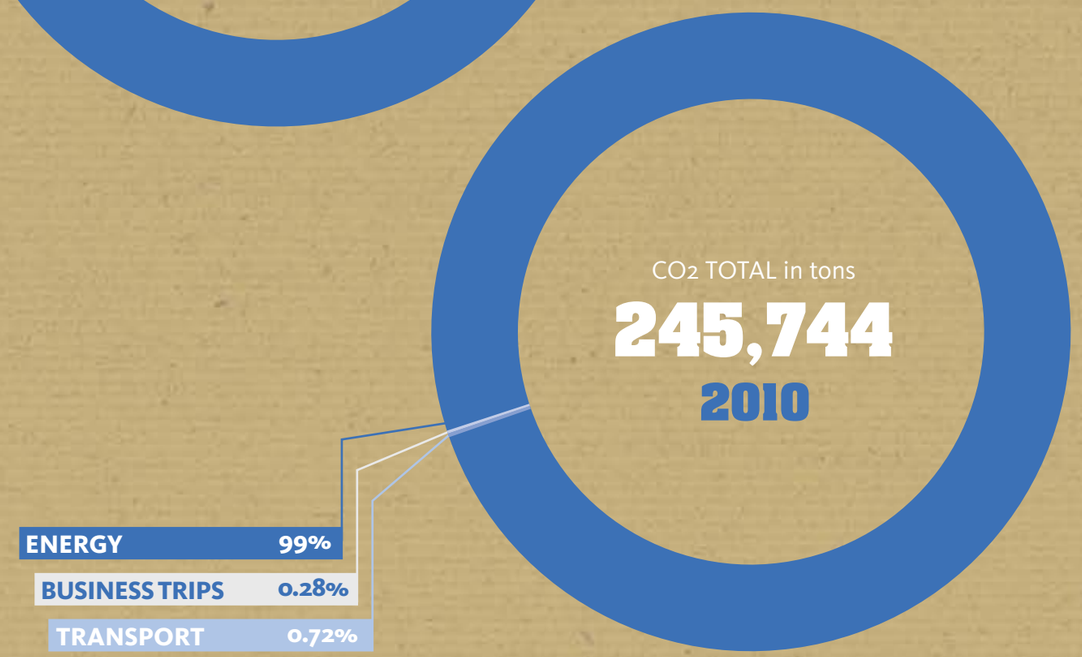
The current carbon footprint is now available. Again, it was determined by the IFEU and audited by PWC. Prinovis has come a long way.

In 2008, Prinovis' footprint was at nearly 305,000 tons of carbon dioxide. Excluding the site at Darmstadt, which was shut down at the end of 2008, the reference value used was 255,000 tons.

In 2010, total CO_2 emissions were down by almost four per cent at just under 246,000 tons. In comparison: to absorb and convert the same amount of carbon dioxide saved by Prinovis would require about 9,000 beech tries grown for about 80 years each.

This shows that Prinovis is on the right track despite a 14 per cent increase in production output in the period under review.

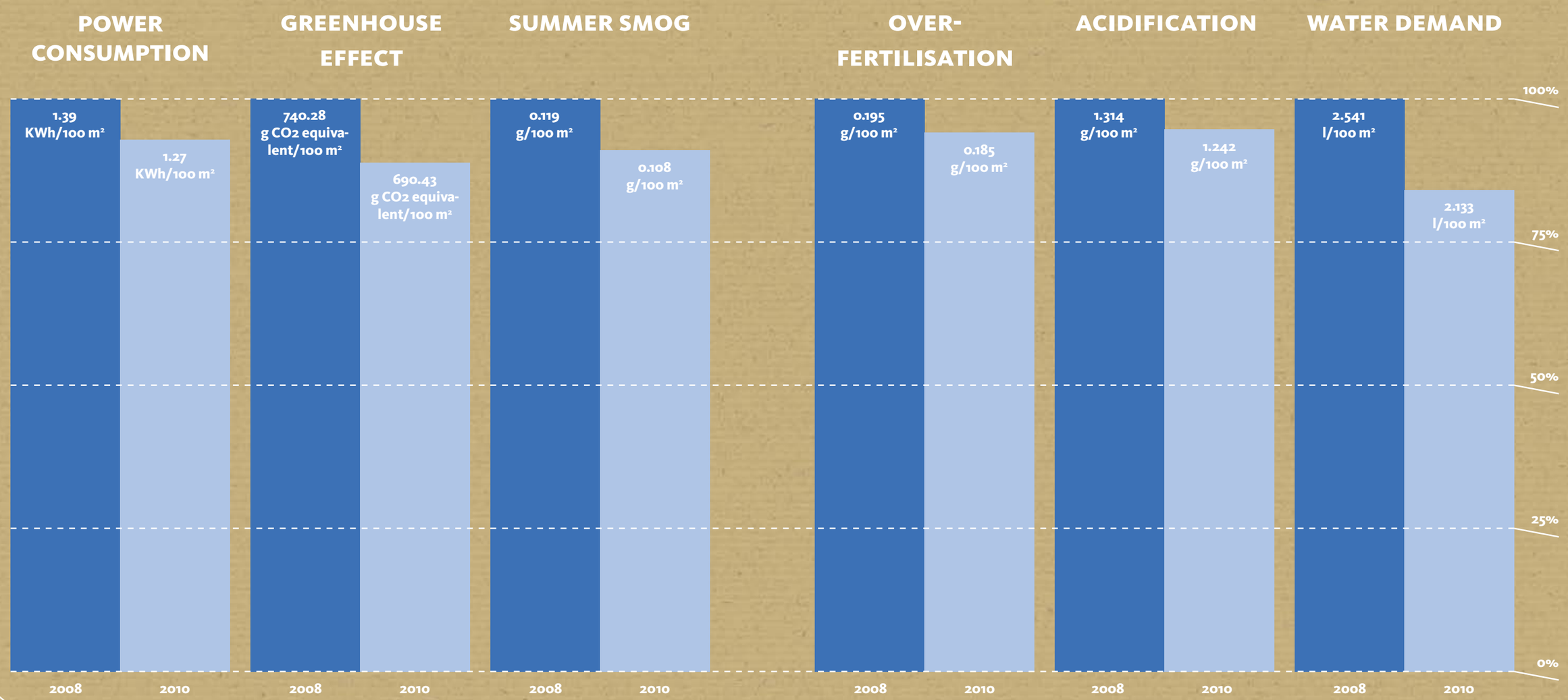




	2008	2010	DIFFERENCE IN %	TOTAL DIFFERENCE
CO_2 TOTAL IN T	255,047	245,744	-3.6	-9,303
TRANSPORT	2,686	1,779	-33.8	-907
BUSINESS TRIPS	474	727	+53.2	+252
ENERGY	251,887	243,239	-3.4	-8,648

PRINOVIS

Key Figures



Energy consumption is calculated in megawatt hours. It comprises the consumption of heating energy (mainly natural gas and oil), power and fuels used for operating vehicles and forklifts. The green-house gas effect describes the heating of the lower stratums of our atmosphere by combustion processes caused by humans. It is caused by the release of carbon dioxide from fossil sources and methane, and is determined in CO_2 equivalents.
Summer smog potential describes the formation of ozone close to the ground due to the conversion of volatile substances such as isopropanol, carbon dioxide, methane and sulphur in the air under the influence of heat and solar power and by catalysis with nitrous oxides (NOx).

It is determined in ethene equivalents (grammes per 100 square metres).
The eutrophication potential describes the overfertilisation of soils and water caused by, e.g., phosphates (PO_4) and nitrous oxides (NOx).
It is determined in phosphate equivalents (gramme per 100 square metres).
The acidification potential describes the release of acid gases into the air, where they introduce acid into plants, the soil and surface waters via precipitation ("acid rain"). It is determined in SO_2 equivalents (gramme per 100 square metres).
The water demand is indicated in cubic metres. It is made up of water removed from our own well or public supply companies.

PRINOVIS

Life-Cycle Assessment

A DETAILED COMPARISON OF PRINOVIS' CONSUMPTION IN THE YEARS OF 2008 AND 2010

Item	2008	2010		Unit
Raw materials, total (kg)	940,494,270	1,073,768,072	↑	kg
Paper	33,562,895	32,286,536	↓	kg
Paint		711,141	↓	kg
Auxiliary materials, total (kg)	924,269	1,617,891	↓	kg
Glue	1,929,167	812,101	↑	kg
Packaging material	772,443			
Stapling wire		770,298	↑	kg
Operating materials, total (kg)	675,879	5,185	↑	kg
Chemicals (acid/alkali)	4,702	92,065	↓	kg
Cleaning agents	71,349	144,878	↓	kg
Lubricants	155,210	264,660	↓	kg
Salt	266,586	120,015	↑	kg
Copper	77,172			
Other operating materials		818,561	↓	m³
Fresh water, total (m³)	960,501			
Fresh water, total (m³)		266,291	↓	MWh
Energy carriers (MWh)	276,021	215,460	↓	MWh
Electrical power	238,541	7,196	↓	MWh
Heating power	11,735			
Fuels		1,691,118	↑	km
Business trips	1,012,848	241,588	↑	km
Flight kilometres < 1,000	56,774	308,886	↑	km
Flight kilometres < 300	307,122	508,601	↑	km
Flight kilometres > 1,000	295,318	24,645	↑	km
Leased car kilometres	7,563	221,802	↑	km
Train kilometres < 100	388,936			
Train kilometres > 100				

THE LIFE-CYCLE ASSESSMENT SHOWS THE OPERATIONAL PROCESSES, AS WELL AS OPTIMISATION OPTIONS

Item	2008	2010		Unit
Products, total (m²)	37,798,297,776	38,371,813,659	↑	m²
Printed products		102,710,928	↓	kg
Waste, total (kg)	146,380,560	103,249,490	↑	kg
Waste for reuse	94,769,630			
of which paper waste (i.e. roll packaging, sleeves, etc.)	481,950	570,854	↑	kg
Waste for disposal	323,289	784,220	↑	kg
Proportion of waste subject to particular monitoring		281,831	↑	m³
Contaminated water, total (m³)	231,510			
Contaminated water, total (m³)		245,744.24	↓	t
Atmospheric emissions* (t)	255,046.97	458.93	↓	t
Carbon dioxide, fossil	522.27	545.71	↓	t
Carbon monoxide	568.17	94.70	↓	t
Nitrous oxides	98.81	18.77	↓	t
Sulphur dioxide	19.52	1,070.85	↓	t
Dust/particles	--**			
VOC (toluene)				

*the figures for atmospheric emissions also take into consideration up- and downstream processes and were determined with the help of Umberto software (ifeu Institute Heidelberg)

**not determined in 2008

The Prinovis life-cycle assessment collects all relevant data from production for a direct comparison of 2008 and 2010 figures – from raw materials consumption to the total volume of printed paper. Many of these figures are interdependent – for example, fewer magazines or catalogues were glued and more were stapled together. This results in a reduction of solvent-free glue while increasing consumption of stapling wire. Although the volume of printed paper has increased from 37.8 to nearly 38.4 billion m² in the reporting period, many essential figures – among them power demand, use of fresh water, the amount of recyclable wastes and air emissions – are generally declining. The efforts made by the Prinovis sites are therefore paying off and form the basis for the continued development of environmental protection measures.

PRINOVIS

Customers

Is our production clean? Even though we were the first German publisher to be PEFC CoC certified as early as 2005, we continue to ask ourselves this question. Therefore, we also review our own results as well as those of our business partners regularly – from paper suppliers to forwarders. Of course that includes Prinovis. The company impresses us with its innovation and consulting. As early as 2009, we jointly used the softproof method to save paper, ink and energy for the German weekly women's magazine "Frau im Spiegel". Prinovis is a clear leader in environmental commitment.

MATTHIAS HUBER,
PRODUCTION MANAGER,
WAZ MAGAZINES SERVICE
(WAZ MEDIENGRUPPE)

WAZ MEDIEN GRUPPE

Argos and Prinovis have a long-standing relationship. Prinovis not only delivers great quality continuously and on time, but also provides comprehensive advice on how to supply our customers with our catalogues in the most environmentally friendly way possible – be it on the use of paper from sustainable forestry or CO2 emissions along the entire production chain.

DOMINIC PEMBERTON,
PROCUREMENT MANAGER, PRINT PROJECTS, ARGOS

Argos

Environmental protection has been a high priority of German publisher SPIEGEL-Verlag for many years. Our long and close cooperation with Prinovis helps to ensure high quality and environmental standards. Prinovis has proven its expertise in this area, especially with its key developments for the CO2 emission calculator for the German Printing and Media Industries Federation (bvdm) – another area in which the publishing house is reviewing its activities.

MARK ASHER, ENVIRONMENTAL OFFICER,
SPIEGEL-VERLAG RUDOLF AUGSTEIN GMBH & CO. KG

DER SPIEGEL

One of the challenges of our time is the global destruction of forests with the resulting climate and social changes. The Otto Group consistently supports sustainable forestry: we support the FSC® in catalogue production, paper and cardboard procurement and the procurement of goods. Prinovis, in turn, supports the Otto Group in producing FSC-certified catalogues. We aim to continue down this path with the FSC and Prinovis.

MICHAELA BEVOT,
PRODUCTION MANAGER,
OTTO HAMBURG KG

OTTO

Prinovis approached me in June 2010 with the prospect of working as a pilot partner in the mail-order business to introduce softproofing in the print shop. It was just the opportunity we had been waiting for. After all, we had declared that we wanted to close this last gap in the otherwise completely digital workflow at Baur. The project initiated for this purpose was very successful. We were able to start processing colour reconciliation with Prinovis using soft-proofs as early as August – which makes up about 50 per cent of our catalogues. There are many advantages to switching over. In particular, it saves time. After all, a proof has a long way to go – from repro to the customer, then back to the service provider with the correction remarks. If required, another round of corrections takes place with a new proof. Cost savings from dispensing with hard proofs and their despatch offer added benefits. Of course, the environment also profits if less paper has to be produced, printed and transported.

THOMAS JAEGER,
HEAD OF THE PRODUCTION DEPARTMENT,
BAUR VERSAND, BURGKUNSTADT

BAUR

PRINOVIS

By the way...

INTERESTING FACTS ON ENVIRONMENTAL MANAGEMENT AT PRINOVIS

The CO2 calculator

Due to the increasing demand for climate-friendly products in the print industry, too, Prinovis played a key role in developing the CO_2 calculator for gravure printing presented by the bvdm in 2010. This tool enables the carbon dioxide emissions from print production to be determined on a scientific basis and in compliance with all the requirements of the life-cycle assessment standards DIN ISO 14040 and DIN ISO 14044. The 2011 advanced version provides a quick and convenient graphical overview of up to six print runs and is also available for digital, sheet, roll and newspaper offset print.

Working in the greens

In cooperation with the the Institute for General Botany at Hamburg University, the Ahrensburg site ecologically converted its extensive green areas. Where once only grass used to grow, renaturation has led to the development of a thriving biotope with hay and wild flower meadows and a new damp biotope. Nesting aids for birds and insects have also been built as well as a reptile wall.

Awards (selection)

1996

The Ahrensburg site is awarded the title of "Most Environmentally Friendly Company" by the Society for the Study and Support of the Economy in Schleswig-Holstein (StFG).

1997

The Itzehoe site is awarded the title of "Most Environmentally Friendly Company" by the Society for the Study and Support of the Economy in Schleswig-Holstein (StFG).
The Nuremberg site is honoured by the city of Nuremberg for special achievements in environmental protection.
he Bavarian State Ministry for Regional Development and Environmental Affairs awards the "Bavarian Environmental Medal" to the Nuremberg site.

2003

The manager of the Nuremberg site, Dr Winfried Marquardt, is appointed Ambassador of the Bavarian Environmental Pact by the Bavarian State Ministry for Regional Development and Environmental Affairs for his outstanding commitment to cooperative environmental protection.

2005

The Itzehoe site is once again awarded the title of "Most Environmentally Friendly Company" by the Society for the Study and Support of the Economy in Schleswig-Holstein (StFG).

2009

Winner of the 2009 Print and Media Award for "Most Innovative Company of the Year".

The climate protection company

According to the website www.klimaschutz-unternehmen.de, an initiative founded in 2009 by the German Association of Chambers of Industry and Commerce (DIHK) together with the Federal Environmental and Economics Ministry, "investing in climate protection and energy efficiency means investing in the future of one's own company". The website goes on to say that the measurable commitment of the companies accepted in the group "goes well beyond what is required by law. They fare much better than other sectors and can therefore serve as examples.". One of the 15 companies accepted in the group is Prinovis.

Pri-no-vis

The name of the company was originally an artificial word made up of Print, Innovation and Vision. However Prinovis has long been making the word come to life as a print and communications service provider: in 2009, Prinovis won the Print & Media Award for "Most Innovative Company of the Year". Prinovis is working towards its vision of becoming more and more successful and sustainable every day.

Pri-
no-
vis

PRINOVIS

Glossary

WHAT IS A BALLARD SKIN? NOx MEANS WHAT EXACTLY? WHAT DID YOU SAY WAS THE MASS UNIT FOR ALKALINE SOLUTIONS? QUICK EXPLANATIONS FOR SOME TECHNICAL TERMS.

BALLARD SKIN
An extremely thin, removable copper coat on the printing cylinder. The print image is engraved into the coat, while chrome plating is used to provide greater durability. After printing, it is removed with the chrome layer and recycled.

CARBON DIOXIDE (CO2)
A gas that is produced by the complete combustion of organic sources of energy (gas, coal, oil etc.). A major contributor to the greenhouse effect.

CARBON FOOTPRINT
The amount of carbon dioxide that is used by a person, a company or a state, etc., over a defined period of time.

CARBON MONOXIDE (CO)
Colourless, poisonous gas that is produced by the incomplete combustion of organic sources of energy (gas, coal, oil, etc.).

COMBINED HEAT AND POWER (CHP)
The efficient simultaneous extraction of mechanical energy, which is converted directly into electrical energy, and of available heat for heating purposes or production processes from primary sources of energy.

EMISSION
The introduction of interference factors into the environment. Every emission (from the Latin emittere: to send out) necessarily results in an immission (from the Latin immittere: to send in) into the environment.

ENVIRONMENTAL GUIDELINES
The overall targets and operating principles of an organisation in terms of the environment.

ENVIRONMENT MANAGEMENT SYSTEM
A voluntary instrument for preventive environmental protection to systematically prevent and reduce the impact of a company on the environment. External auditors provide globally recognised certification under ISO 14001.

EUTROPHICATION POTENTIAL
The overfertilisation of ground and water caused by phosphates, nitrogen oxides (NOx) and other substances. Calculated in phosphate (PO4) equivalents.

FSC ®
The Forest Stewardship Council (FSC) is a charitable international organisation that developed the first system to certify sustainable forestry.

GREENHOUSE EFFECT
The unnatural excess heating of the lower layers of the atmosphere as the result of combustion processes caused by humans. This refers in particular to the release of carbon dioxide from fossil sources and of volatile organic compounds (VOCs). Calculated in CO2 equivalents.

GREENHOUSE GASES
Gaseous substances in the air that affect radiation from the sun and contribute to the greenhouse effect. The main greenhouse gases include carbon dioxide (makes up around 60 per cent of the additional greenhouse effect caused by humans), methane (around 20 per cent) and nitrous oxide (N20; 5 to 6 per cent).

NITROGEN OXIDES (NO_x)
Created primarily during combustion processes from the oxidation of nitrogen in the air. Partly responsible for the acidification of the ground and oceans and for excess nitrogen oxides in the food cycle.

WASTE PAPER
Waste paper refers to print sheets that can no longer be used because of printing errors and/or faults in the paper. In general, it refers to printed paper that no longer has any value.

PEFC
The Programme for the Endorsement of Forest Certification Schemes (PEFC) is an international scheme based on agreements made by the Ministerial Conference on the Protection of Forests in Europe.

PHOTOVOLTAIC
The direct conversion of light energy into electrical energy using solar cells.

PH VALUE
A measure used to define whether an aqueous solution is acidic or alkaline. A pH value of 7 indicates a neutral solution. Lower values are acidic, higher values are alkaline.

SUMMER SMOG POTENTIAL (POCP)
The formation of ozone close to the ground due to the conversion of volatile organic substances (VOC) in the air under the influence of heat and solar energy and catalysed by nitrogen oxides (NOx). Calculated in ethylene equivalents.

PRIMARY ENERGIES
Refers to energy that is available from naturally occurring forms and sources such as natural gas, coal, oil, solar energy, and water or wind power.

PROOF
A colour-accurate preview of the subsequent print output.

RECYCLING
The reprocessing and/or reuse of used resources.

RESOURCES
The means used to carry out an action or run a process (from the French word for "source"): a distinction is made between material resources (land, capital and raw materials) and immaterial resources (services, patents and rights).

SUSTAINABILITY
A concept applied to a system such that the system continues to exist and is regenerated by natural means.

TOLUENE (C_7H_8)
An aromatic, highly volatile chemical solvent which converts the resin-coated colour pigments into a printable state.

VOC
A collective name for volatile compounds that contain carbon. Some compounds of this kind are partly responsible for the greenhouse effect.

PRINOVIS

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PRINOVIS

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