Solutions for an Environmentally Friendly Print Process
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Environmental Management Strategy: Prevent, Reduce, Offset.
The challenge of climate change

Global warming due to greenhouse gases. There is no escaping climate change. It is happening right here, right now. Almost on a daily basis, images reach us of changes in the natural world attributed to global warming. The primary cause is well known. The Earth’s temperature is rising due to the greenhouse effect caused by gases being released into the atmosphere and, in particular, the volume of CO₂ emissions worldwide.

Upper limit for greenhouse gas emissions. Greenhouse gases have long been recognized as one of the main causes of global warming. As early as 1997, the first binding upper limit for greenhouse gas emissions was stipulated in the Kyoto Protocol. Taking 1990 as the base year, the aim was to reduce annual CO₂ emissions by 5.2 percent in the period between 2008 and 2012.

Two degrees Celsius as the threshold value. Two degrees Celsius were first officially recognized as the threshold value for global warming in Cancún in 2010. According to climate simulations, it is likely that any increase in excess of this value would trigger irreversible climate change. Despite this, global CO₂ emissions continue to rise dramatically. Given the rate at which emissions are increasing, it is highly unlikely that the target of two degrees Celsius can now be achieved.

Trend toward sustainable production. The public is now very much aware of the grave consequences of climate change. The concept of ecological production processes that protect the environment and conserve resources is gaining currency across the globe. As a result, climate protection has long been one of the key corporate goals pursued by many customers in the printing industry. They prefer to work with print shops that can provide proper details of the CO₂ emissions involved in their print jobs, so they can then integrate this information into their own climate balance sheets. In short, companies that use eco-friendly production methods not only help protect the environment, but also enjoy real competitive advantages.

Climate-neutral print production offers numerous benefits:
- Expansion of customer base through differentiation
- Improved image as a result of positioning
- Cost savings
- Staff motivation
- Clear commitment to nature and the environment
Time to act: Strategies for climate-neutral printing

Environmental management system. An environmental management system ensures the environmental compatibility and sustainability of a company’s products and processes. The consequences of not having such a system can be severe. Putting the environment at risk puts your business at risk!

Introducing an environmental management system demonstrates a real commitment to nature and the environment. First, all internal processes are scrutinized to identify any weak points from an ecological perspective and define objectives for corporate environmental protection activities. The next step is to initiate specific measures. For example, cost-intensive technologies, processes, and materials can be systematically replaced by more eco-friendly and economical solutions. All of these measures make an active contribution to environmental protection – and boost the company’s ecological and economic performance at the same time.

Offsetting CO₂ emissions. Emissions trading puts a price on CO₂ emissions. In economic terms, the idea is to make environmental protection marketable and to use the proceeds to promote investment in cutting-edge, eco-friendly technologies and concepts. This is an effective method of offsetting greenhouse gas emissions.

Emissions trading is a legal requirement for large manufacturing companies within the EU, but small and medium-sized businesses and private individuals can also opt to participate on a voluntary basis. The objective is to improve their own CO₂ balance or to become climate neutral. Voluntary emissions trading is becoming increasingly important, particularly in the printing industry, and is now established as a core element of sustainable production.

The carbon footprint. Information about the carbon footprint is absolutely essential for climate-neutral print products. It is calculated by recording all of a print shop’s CO₂ emissions – the lower the emissions, the smaller the footprint. This makes a company’s environmental commitment transparent not only to its own customers, but also to its customers’ customers.

Stay in the black with green printing. As a rule, investments in sustainable production quickly pay for themselves. Cutting-edge technologies from Heidelberg® help print shops use their resources much more efficiently. The savings made bring both ecological and economic benefits. The end result is a healthier environment – and a healthier balance sheet.

Global warming is causing ice to melt, threatening the natural habitat of polar bears.
Commitment to conserving resources. Heidelberg opted for an integrated approach very early on. Environmental protection has been an integral part of the company’s corporate policy since 1992. The company’s largest plant, in Wiesloch-Walldorf, complies with the guidelines of the international ISO standard 14001:2004, as do other sites in Heidelberg, Amstetten, Brandenburg, Kiel, Leipzig, and Ludwigsburg, and the Sidney plant in the U.S. Heidelberg is the clear market leader whenever it comes to comprehensive solutions for environmentally friendly print processes. Our activities focus on three areas:

1. **Reducing and preventing CO₂ emissions**
As paper is responsible for 90 percent of the CO₂ emitted during the printing process, reducing waste paper is a particularly effective strategy. Paper production is a very energy-intensive process. On average, making one kilogram of paper generates 1.28 kg of CO₂. A Speedmaster® SX 52 Anicolor®, for example, has the potential to save up to 87 metric tons of emissions every year, equivalent to the CO₂ absorption capacity of 8.7 hectares of forest.

Reducing waste paper not only cuts unproductive paper costs, but also makes a very real contribution to improving environmental credentials.

The following products play a key role in reducing waste paper:

- Integration of the entire production process with the Prinect® print shop workflow
- Spectrophotometric Prinect measuring devices, particularly the inline sheet inspection system, for quality control during the printing process
- Anicolor inking unit
- CutStar® short-grain sheeter for cutting sheets to the required format

2. **Reducing energy consumption.** Heidelberg is constantly working to further reduce the energy consumption of its machines. Examples include the Suprasetter® A52/A75/A106 and Star peripheral systems such as the AirStar® air supply cabinet and DryStar® dryer.

3. **Climate-neutral presses.** Manufacturing and transporting machines emits a certain amount of CO₂. Heidelberg creates an opportunity for companies to fully offset these emissions by co-financing climate protection projects. Heidelberg is the only manufacturer with a precise method for calculating CO₂ emissions, developed in cooperation with Darmstadt University of Technology. Only certificates recognized by the Carbon-Fix Standard are used for carbon offsetting.

The calculations take into account not only the CO₂ emitted during production, but also the emissions generated during the previous process stages. For example, manufacturing a Speedmaster XL 106-5+L releases around 220 metric tons of carbon dioxide, depending on the machine configuration. Materials and production energy account for similar volumes.

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1. Source: ecoinvent database version v 2.01, coated sheetfed offset paper
Eco-friendly solutions from Heidelberg prove that ecology and economy can go hand in hand during the printing process.

In terms of materials, the largest source of CO₂ is not steel, but electronic components. The production of the precious metals and rare earth elements these components contain involves extremely laborious cleaning processes.

2. Reducing and preventing process emissions
Reducing or even eliminating emissions makes a major contribution to protecting the environment and the health of employees in the workplace. This is achieved by:

- Saving washup solution using blanket washup devices
- Saving powder using the PowderStar® AP 500 powder spray device
- Reducing volatile organic compounds using solutions for alcohol-reduced and alcohol-free printing
- Reducing noise using sound dampers and noise protection on all key machine components
- Using environmentally friendly Saphira Eco consumables

3. Reducing and preventing waste
In addition to reducing waste paper, it is also important to prevent all other types of waste as far as possible. This can be done using:

- Saphira® Chemfree printing plates
- The InkStar® ink supply system to reduce ink residues
- FilterStar Compact and FilterStar dampening solution filter systems to save dampening solution and reduce volumes of dirty water
Annual CO₂ emissions of a printing press

The volume of CO₂ emitted by a press during operation depends on the paper, energy, printing plates, and other auxiliary and process materials used. Over the course of a year, the production-related CO₂ emissions of a Speedmaster XL 106-6+L amount to around 7,100 metric tons, based on an average run of 8,000 sheets and 18 jobs per day. This equates to 36 million printed sheets each year.

At 6,400 metric tons, paper is responsible for the majority of CO₂ emissions, while paper waste accounts for 230 metric tons. Energy consumption generates similarly high volumes, followed by printing plates at around 200 metric tons, and inks and coatings, which each contribute around 100 metric tons to the annual CO₂ emissions of the press. Lesser volumes are emitted by the cleaning agent, dampening solution additive, alcohol, and water.
Paper
The Right Paper Reduces CO₂ Emissions.

A seal of quality for the sake of our forests. Choosing the right paper can greatly reduce CO₂ emissions. All the key information about the composition of the paper, important environmental parameters, and the wood fiber used is detailed in the Paper Profile, available on request from the paper manufacturer. It provides binding information about the CO₂ component. It is therefore possible to lower the CO₂ emissions of a print product simply by selecting the right paper.

Paper sourced from sustainably managed forests is particularly environmentally friendly. Here, the focus is not only on producing wood, but also on maintaining the forests. Confirmation of sustainable management practices is provided by the label of the Forest Stewardship Council (FSC), a non-profit, non-governmental organization committed to protecting forest environments. The FSC label can be displayed only if the entire process chain is certified accordingly.

Similarly, the international PEFC (Programme for the Endorsement of Forest Certification) system also takes account of all stages of the process chain. Once again, certification is granted by an independent organization dedicated to ensuring sustainable forest management worldwide, taking into account ecological, social, and economic standards.

Environmental benefits of recycled fibers. Paper made from recycled fibers displays virtually all the same properties as virgin fiber paper. Given this, it makes perfect sense to use paper with a high proportion of recycled fibers. In Europe, the recycling rate for paper is around 62 percent, equivalent to approximately 50 million metric tons of recycled paper per year. As each ton of recycled paper produces some 8 to 13 percent less CO₂ than virgin fibers, this reduces CO₂ emissions by up to 4.5 million metric tons in Europe alone.

1Source: IFEO Institute on behalf of the German Federal Environment Agency, 2006
Reducing waste paper is a key element of environmental protection.

During the printing process, paper accounts for the majority of the climate-damaging greenhouse gases produced, generating up to 90 percent of the total CO₂ emissions. Processing 1,000 kg of virgin fiber paper releases around 1,280 kg of CO₂. In the interests of cutting CO₂ emissions and costs, reducing waste paper must take top priority.

Heidelberg offers a wide range of product solutions in this field. CutStar, for example, cuts sheets from the roll, thus enabling the sheet size to be cut to the correct length very accurately. Savings of just one millimeter per sheet can reduce the annual volume of waste paper by up to 6.67 metric tons. This in turn cuts CO₂ emissions by 8.53 metric tons. The potential savings can be increased even further if the paper format deviates significantly from standard formats. With CutStar, it is also possible to use reel stock rather than more expensive sheeted paper, thus saving additional material costs.

Standardizing the entire printing process with fixed production parameters and standardized consumables is also a key factor in successfully make-ready waste. Other strategies include ensuring the temperature and humidity are the same right throughout the paper store and pressroom.

### Potential savings per million sheets

Savings generated by one-millimeter format reduction:

<table>
<thead>
<tr>
<th></th>
<th>Paper</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.185 t</td>
<td>–</td>
<td>0.237 t</td>
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</table>
Performance Services
Substantial Paper Savings Thanks to Controlled Processes with Prinect Print Shop Workflow.

Enormous amounts of paper can be saved each year by integrating the Prinect workflow into the entire make-ready process.

Less waste, more environmental protection. All the components in the Prinect print shop workflow are perfectly coordinated, including the ink zone presetting, control systems, and Prinect color measurement and control systems. For a Speedmaster XL 106-10-P, this results in savings of 350 sheets per make-ready process with annual savings of up to 210 metric tons of paper, or 270 metric tons of CO₂. It can also cut the make-ready time by up to twelve minutes.

- Prinect Pressroom Manager® – for the direct transfer of CIP3 data from prepress and for greater precision in presetting ink zone profiles.
- Prinect Color Assistant® – defines characteristic curves for presetting to ensure continuous improvement in the preset values of the ink fountain.
- Prinect Image Control® – spectrophotometric color control for the entire print image.
- Prinect Axis Control/Prinect Easy Control – spectrophotometric color control in the print control strip for achieving and maintaining target values.
- Prinect Inpress Control – spectrophotometric inline measuring system for outstanding productivity.

Potential savings per million sheets
Savings achieved by reducing make-ready waste by 350 sheets per make-ready process:

<table>
<thead>
<tr>
<th>Paper</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.86 t</td>
<td>-</td>
<td>7.50 t</td>
</tr>
</tbody>
</table>

Minimizing waste paper: Prinect Inpress Control automatically measures and controls color and register on the fly – no matter what the speed. The press does not need to be halted for setup or production run monitoring.

In practice, this generates average potential savings of 100 to 150 sheets per make-ready process. However, the system not only reduces make-ready waste, but also shortens production times, cuts energy consumption, and increases productivity.

Prinect Inpress Control also offers effective quality assurance. The measurement and control system operates during production to ensure end-to-end monitoring and a high level of color stability throughout the job.

Significant reductions in emissions. A saving of just 100 sheets per make-ready process can reduce the overall waste generated by a 70 x 100 cm format press by 60 metric tons. This is equivalent to reducing annual CO₂ emissions by 77 metric tons.

Prinect Inpress Control is available for the following sheetfed offset presses:
- Speedmaster XL 75
- Speedmaster SX 102
- Speedmaster CX 102
- Speedmaster XL 106
- Speedmaster XL 145
- Speedmaster XL 162

Potential savings per million sheets
Savings achieved by reducing make-ready waste by 100 sheets per make-ready process:

<table>
<thead>
<tr>
<th>Paper</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.67 t</td>
<td></td>
<td>2.14 t</td>
</tr>
</tbody>
</table>
Prepress

Suprasetter – Optimize Energy Efficiency with Cutting-Edge CtP Systems.

Platesetters in the Suprasetter range are among the most economical CtP systems on the market.

Computer-to-Plate conserves resources. Quality and costs are not the only important criteria to consider when investing in a CtP system. Opting for an energy-optimized solution also makes a real contribution to improved environmental protection.

Thanks to highly effective, cutting-edge laser diode systems, integrated automation modules, sophisticated electronics, and the latest generation of cooling systems, Suprasetter platesetters in the A series offer the lowest power consumption on the market and produce the smallest amount of waste heat. The power consumption of the Suprasetter A106 is a mere 600 watts. This generates annual savings of up to 14,300 kilowatt hours and 8.09 metric tons of CO₂.

Potential savings per million sheets
Savings in comparison to conventional platesetters per 1,250 plates:

<table>
<thead>
<tr>
<th>Water</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>–</td>
<td>398 kWh</td>
<td>0.22 t</td>
</tr>
</tbody>
</table>
Prepress

Saphira Chemfree Plates – Lower Environmental Impact and Disposal Costs.

The Saphira Chemfree plate enables eco-friendly plate production without the use of developers and replenishers.

Improved environmental protection, lower costs.

Chemical methods of developing printing plates pose major challenges for print shops. Stable processes and stringent quality control are absolutely essential for consistent plate production. The Saphira Chemfree plate virtually eliminates fluctuations during processing. It also offers the following benefits:

• Eco-friendly plate production without developer and replenisher
• Short processing time
• No developing in the press
• Short make-ready times

Saphira Chemfree plates and conventional CtP plates demonstrate exactly the same qualities in the press. Standard inks and dampening solution additives can be used without any problems. Unlike with conventional processors, wash-off units require no permanent water supply when used with Saphira Chemfree plates, generating savings of around 9.2 liters of water per plate or 414,000 liters per year.

Chemical waste can also be greatly reduced. Waste volumes can be cut by around a fifth compared to conventional thermal plates. There are also significant improvements in terms of energy requirements. The Chemfree solution requires just 1.9 kilowatts, less than half the energy needed for a corresponding five-kilowatt processing system. This generates savings of up to 2,620 kilowatt hours. The volume of water and electricity saved reduces the carbon footprint by 1.52 metric tons per year.

Potential savings per million sheets

Savings generated in the wash-off unit by the Saphira Chemfree plate per 1,250 plates:

<table>
<thead>
<tr>
<th>Water</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>11,500 l</td>
<td>73 kWh</td>
<td>0.042 t</td>
</tr>
</tbody>
</table>
A model of energy-efficient printing. Another example of the eco-friendly approach adopted by Heidelberg is the development and manufacture of energy-saving components, machines, and peripherals. The main drives in the presses are brushless sinusoidal synchronous motors. These extremely compact motors not only benefit from wear-free operation and a longer service life, but are also far quieter and produce less electromagnetic interference. This improves the overall energy efficiency by up to 30 percent compared to other standard motors.

Heidelberg is the only printing press manufacturer to use this type of motor. In the case of a Speedmaster XL 106-10-P, this technology can save up to 135,000 kilowatt hours or 76.3 metric tons of CO₂ emissions per year.

The sinusoidal synchronous motor is just one of the many innovations that make Heidelberg a pioneer in the field of energy-efficient printing. Please read on for further details of these solutions.

Renewable energies can reduce CO₂ emissions to zero.

<table>
<thead>
<tr>
<th>Paper</th>
<th>Energy (kWh)</th>
<th>CO₂ (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>–</td>
<td>3,750</td>
<td>2.12</td>
</tr>
</tbody>
</table>
The Unique Environmental Credentials of Anicolor Short Inking Unit Technology.

Up to 90 percent less waste paper. Anicolor short inking unit technology stands out thanks to its impressive eco-credentials. When used in conjunction with Print Color Management for cross-system calibration of all print-related processes, the required color values are achieved after just 20 sheets of make-ready waste. This is 90 percent less than the 200 sheets of waste generally produced by a normal offset press with conventional inking unit.

Assuming a print shop processes 500 jobs with runs of 2,000 sheets and an average paper weight of 135 gsm, this would save 2.13 metric tons of paper and 2.72 metric tons of CO₂ emissions per million sheets. Based on 4,500 jobs per year, Anicolor inking unit technology can cut CO₂ emissions by as much as 24.5 metric tons annually.

Climate-neutral manufacturing improves credentials. Anicolor short inking unit technology displays a unique and impressive set of eco-credentials. That is why, as of drupa 2012, all Anicolor presses from Heidelberg will be climate-neutral as standard. In other words, any CO₂ emitted during the manufacturing process will be offset through certified climate protection projects. This sets an excellent example for climate and environmental protection throughout the entire printing industry.

<table>
<thead>
<tr>
<th>Paper</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.13 t</td>
<td>-</td>
<td>2.72 t</td>
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</table>
Double the efficiency. Heidelberg is pursuing a similarly innovative strategy when it comes to air supply. The AirStar air supply cabinet is the only system on the market with highly efficient frequency-controlled turbo radial blowers. This feature saves a great deal of energy.

At 70 percent, the high-performance AirStar is more than twice as efficient as a conventional side channel blower, which achieves an efficiency level of only 30 percent. The greater the number of printing units involved in the process, the greater the energy savings.

In addition, the output-controlled drives ensure that only as much air is produced as is actually needed. In the case of a Speedmaster XL 106-10-P, this saves up to 140,000 kilowatt hours per year, equivalent to cutting CO₂ emissions by 79.1 metric tons.

Potential savings per million sheets
AirStar improves performance – more air, less CO₂:

<table>
<thead>
<tr>
<th>Paper</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>3,890 kWh</td>
<td>2.20 t</td>
</tr>
</tbody>
</table>
FilterStar lengthens the replacement intervals for dampening solution by a factor of between three and six.

Far less dirty water. Alcohol-reduced¹ printing and, increasingly, alcohol-free printing are becoming more and more important when it comes to optimizing environmental protection and cost savings. Ongoing technological developments mean that today’s print shops can switch to alcohol-free printing without suffering any restrictions or impact on print quality. This is a crucial move, as using just one percent less alcohol can reduce the annual volume of alcohol required in the printing process by up to 750 liters.

Alcohol-reduced and alcohol-free printing. There is much debate about the use of alcohol in dampening solutions. Alcohol supports the printing process in a number of ways. It reduces the surface tension of the dampening solution and ensures better wetting of the plates. It also provides a cooling function thanks to its continuous evaporation, and prevents the growth of bacteria and algae. However, in the interests of sustainable environmental protection, the use of isopropyl alcohol (IPA) in the pressroom must be avoided to the greatest possible extent.

Heidelberg offers solutions for switching presses to alcohol-free or alcohol-reduced printing without compromising consistently high print quality. These solutions involve:
- Equipping the dampening system with special Saphira water pan and dampening form rollers
- Optimized Saphira dampening solution additive
- Precise adjustment of the dampening system
- Integrated inking unit temperature control and dampening solution circulator
- Fine dampening solution filtration
- Exact metering of dampening solution additives

One key feature is the innovative two-stage filter system. FilterStar® stabilizes the print process and lengthens the replacement intervals for the dampening solution. This increases the shelf life of the dampening solution from 2–4 weeks to 4–12 months.

Based on a Speedmaster XL 106-10-P, this is equivalent to reducing the volume of dirty water by at least 1,000 liters per year.

<table>
<thead>
<tr>
<th>Potential savings per million sheets</th>
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<tbody>
<tr>
<td>Dampering solution filtration enables alcohol-free printing:</td>
</tr>
<tr>
<td>Alcohol</td>
</tr>
<tr>
<td>166 l</td>
</tr>
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</table>

¹ The term alcohol-reduced printing is used to indicate a proportion of up to three percent.
The free cooling system of the CombiStar Pro saves energy by making intelligent use of cool outdoor temperatures.

Stable conditions in dampening and inking unit. Clean dampening solution, stable dampening solution additive and alcohol concentration, and constant temperatures in the printing unit are all essential for optimum printing results. CombiStar® Pro is the high-end device designed to fulfill special requirements. It meters dampening solution additives even more precisely and incorporates an intelligent trend value analysis function to monitor the printing process.

Free cooling cuts energy costs. Refrigeration units are used to cool the inking units in a press. However, the innovative CombiStar Pro offers a much more energy-efficient alternative by making use of cool outdoor air. Thanks to a recooling function for outside temperatures up to approximately 20 °C, it uses the outside air to achieve cooling without the need for additional electrical energy. This function significantly reduces the energy costs involved in cooling, thus also cutting the operating costs of the press. It is suitable for use as an inking unit cooling system wherever the inking unit is generally operated at temperatures of 26 °C to 28 °C.

Under certain climatic conditions, specifically those that prevail in cooler regions, CombiStar Pro can be used for up to 90 percent of the operating time without having to switch on the refrigeration unit. This reduces energy costs and saves 14,500 kilowatt hours of electricity and 8.18 metric tons of CO₂ per year.

Potential savings per million sheets
CombiStar Pro reduces energy consumption:

<table>
<thead>
<tr>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>402 kWh</td>
<td>0.227 t</td>
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</table>
All the benefits of an automatic ink supply. Residual ink is a key environmental factor in offset printing. The eco-friendly automatic InkStar ink feed system reduces ink waste. Virtually all the ink in the standardized ink cartridge is used up. Only around 0.5 percent remains as residual ink, just one tenth of the volume left when using other ink cans. This equates to savings of up to 782 kg of ink or 1.96 metric tons of CO₂ per year.

The system also enhances quality. The sensor monitoring system ensures the fill level in the ink fountains remains constant and printing conditions stay the same.

The two-kilogram cartridges can be replaced and stored away easily even if only partially empty. As a result, InkStar serves as a convenient, efficient, and clean ink metering system in any situation.

InkStar covers virtually the entire spectrum of offset inks, including process inks, PMS inks, and even metal pigment or UV inks. These are supplied in special light-proof cartridges.

Potential savings per million sheets
InkStar cuts ink waste:

<table>
<thead>
<tr>
<th>Ink</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.7 kg</td>
<td>–</td>
<td>0.054 t</td>
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</table>
Distance from dryer to printing material. Optimizing the position of dryers in the delivery of a press with coating unit can greatly reduce energy costs. The distance between the slide-in dryer modules and the print sheet is key to improving efficiency during drying. Each time the distance is reduced by one centimeter, the efficiency of an IR dryer increases by five percent.

Heidelberg is the only printing press manufacturer to also offer its own dryer concept. DryStar dryers consume 20 percent less energy than rival products. If, for example, jobs with coatings make up 50 to 60 percent of the work assigned to a specific machine, using DryStar can save up to 18,400 kilowatt hours of electricity per year. This in turn cuts CO₂ emissions by around 10.4 metric tons.

Heat recovery. Large quantities of hot air are required to dry dispersion coatings quickly. It takes a great deal of energy to heat the air from room temperature to up to 120 °C. The hot air blown onto the sheet to dry the coating is then extracted again in the delivery. At this point, the air – still at a temperature of 70 °C to 100 °C – would previously have been released into the open as waste heat.

However, heat recovery now makes it possible to remove heat from the exhaust air and feed it back into the fresh air supply. During this process, the cross-flow heat exchanger ensures none of the humidity contained in the exhaust air is transferred. Heat recovery extracts up to 18,700 kilowatt hours of heat from exhaust air each year, equivalent to 10.6 metric tons of CO₂.

### Potential savings per million sheets
DryStar cuts energy costs and CO₂ emissions:

<table>
<thead>
<tr>
<th>Paper</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,030 kWh</td>
<td>0.582 t</td>
</tr>
</tbody>
</table>
Innovative reflector coating boosts efficiency. Proper integration of UV dryers in the delivery and between the individual printing units is the only way to ensure even thick coatings and ink layers can be cured at high print speeds. This is done using reflectors that reflect back the UV radiation with the best possible focus and absorb heat-generating IR radiation via the water-cooled dryer enclosure. The power of the dryer can be reduced accordingly for lower printing speeds.

With DryStar UV, Heidelberg has developed a UV system that offers exceptional efficiency thanks to its perfect integration in the press, the very short distance between dryer and sheet, and the use of well-planned reflector geometry.

These special features make the DryStar UV dryer up to 20 percent more efficient than other models. Every percent plays its part in reducing the annual energy consumption by 15,900 kilowatt hours and saving 8.96 metric tons of CO₂ a year.

Heidelberg is now opening up the UV commercial printing market with its new DryStar LE (Low Energy) UV dryer, which has been specially designed for four- and five-color commercial jobs with and without coatings.

The DryStar LE UV features the tried-and-tested technology and all the benefits of the DryStar UV, adapted to the requirements of professional commercial printing. The result is impressive quality, rapid curing, and print sheets that require only minimal amounts of powder before being passed on directly to postpress.

The DryStar LE UV is available with one, two, or a maximum of three lamps per press configuration. Depending on the job specification, the output of each lamp can be adjusted flexibly between 80 and 200 W/cm. This broad range enables the curing of both standard and highly reactive UV inks and coatings.

The DryStar UV dryer is up to 20 percent more efficient than other models.

The flexibility of the DryStar LE UV makes it an excellent solution for commercial print shops keen to apply the benefits of UV printing on the commercial market.

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Potential savings per million sheets
DryStar UV reduces energy costs and CO₂ emissions:

<table>
<thead>
<tr>
<th>Paper</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>441 kWh</td>
<td>0.249 t</td>
</tr>
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More efficient heat absorption. Water-cooled peripherals are available for almost all models in the Speedmaster series. Water cooling systems have clear advantages over air cooling devices:

- Water has a thermal capacity around four times greater than air.
- Transporting coolant requires far less energy than air cooling systems.
- The cooling water circulates in a closed circuit, preventing any contamination.
- With air cooling, the air extracted to the outside must be replaced by fresh air, a process that often requires an air conditioning system.
- The climate in the pressroom can be greatly improved and maintained at a standard level.

Equipping a Speedmaster XL 106-6+L with a water cooling system can generate savings of up to 80,900 kilowatt hours of power per year, equivalent to reducing CO₂ emissions by 45.7 metric tons.

Potential savings per million sheets
Water-cooled peripherals standardize printing conditions and save energy:

<table>
<thead>
<tr>
<th>Paper</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,250 kWh</td>
<td>1.27 t</td>
<td></td>
</tr>
</tbody>
</table>
Postpress

Automation Reduces Energy Consumption and Waste Paper.

Automation harnesses potential savings. The wide range of options for the automatic presetting of postpress equipment speeds up the make-ready process and greatly reduces paper waste.

Among other things, these improvements help to significantly reduce make-ready waste when using the automated combination folding machine Stahlfolder® KH 82. These savings benefit companies and the environment in equal measure.

The Stitchmaster® ST 450 saddlestitcher also conserves natural resources by optimizing the workflow. The valves on the feeders can be controlled individually, reducing the consumption of compressed air by up to 8.6 m³/h. Servomotors ensure perfect quality while also cutting back on waste. This results in annual savings of around 31,400 waste copies or approximately seven metric tons of paper, equivalent to nine metric tons of CO₂.

Potential savings per million copies

The Stitchmaster ST 450 saves time, cuts energy costs, and improves the CO₂ balance:

<table>
<thead>
<tr>
<th>Paper</th>
<th>Energy</th>
<th>CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.47 t</td>
<td>140 kWh</td>
<td>0.68 t</td>
</tr>
</tbody>
</table>
Cut energy consumption automatically. The energy-saving features of the Eurobind Pro are just one example of the approach Heidelberg has adopted in the area of postpress. The intelligent control system focuses on the product, ensuring individual components are not operated during empty cycles. This automatically saves energy during longer production-related breaks by ensuring entire system parts run at creep speed or, for example, lowering the temperature in the equipment used to premelt the adhesive. The system can quickly return to full production speed as and when required.

The strip milling cutter is a further example of increased sustainability. This optional tool is used to achieve smooth surfaces on book spines. The stand-out feature of this device is the unique blade geometry designed to produce particularly low-dust paper trimmings that can be recycled later. This reduces the volume of raw materials required and, as costly disposal of waste from the milling process is no longer necessary, saves even more money.
Eco-Friendly Consumables

Saphira Eco.

The comprehensive Saphira Eco range of eco-friendly consumables from Heidelberg is designed to optimize the eco-credentials of print products. Saphira Eco products are available for all stages of the process chain, from prepress and press to postpress. They comply with – or even exceed – all the strict ecological standards of leading environmental certificates, including Nordic Swan, the EU Ecolabel, or the New Zealand Ecolabel, in addition to industry standards.

Conserving resources and the environment. Saphira Eco products are made from renewable raw materials and/or can be recycled. With the Saphira Eco label, print shops can be sure of lower emissions than with most comparable products. All manufacturers included in the production chain are certified to ISO 9001/14001.

Ecological benefits. Saphira Eco consumables play a key role in meeting the requirements of the most popular environmental certificates. In addition to their environmental benefits – such as reducing emissions of volatile organic compounds (VOCs), ammonia, and fine dust – Saphira Eco products also use fewer chemicals, generate less waste water, and result in lower energy consumption. Further information is available at: www.heidelberg.com/saphira-eco

Transparency is everything. Heidelberg has put together a reliable catalog of criteria that shows the ecological classification of its consumables. This catalog provides detailed information on all the relevant components of Saphira Eco products. These evaluations are constantly updated in line with the latest environmental standards.
Technical Services

Proactive Maintenance – Making a Key Contribution to Environmental Protection.

Regular maintenance ensures less waste paper and lower energy consumption. Machines and systems from Heidelberg exhibit high availability and a long life cycle. They also minimize unscheduled service call-outs and replacements.

However, high-tech manufacturing demands systematic maintenance and regular servicing to ensure operations continue to run smoothly in the long term. With that in mind, the technical services provided by Heidelberg concentrate first and foremost on the proactive maintenance of machines and systems.

The preventive maintenance programs cover meticulous checks, fine-tuning, and the replacement of wear parts at individually defined intervals. Checklists have been developed for all products and machines from Heidelberg to ensure relevant issues can be investigated quickly and accurately. Heidelberg also offers training sessions for maintenance staff to safeguard the long-term performance of machines and equipment. As this minimizes machine downtime and enables potential problems to be identified in advance, preventive maintenance programs can significantly reduce waste, energy consumption, and consumables.

To ensure print shops can look to their own future with confidence while also caring for the environment, Heidelberg recommends at least one maintenance check per year for its machines and equipment.
Remote Service cuts costs and lowers CO₂ emissions. Remote Service technology gives service engineers from Heidelberg access to customers’ machines via the Internet. As a result, many service operations that would normally have to be carried out on-site can instead be completed online. These include preventive measures, troubleshooting, diagnosis, application advice, and user training.

One new feature is the eCall® emergency support service. If a fault occurs, the machine automatically generates an eCall to both the print shop and the Heidelberg service team. A single click of the mouse is all that is needed to send an immediate request for Remote Service. An expert from Heidelberg then analyzes the machine data and calls back as quickly as possible.

In up to 70 percent of cases – including settings, application issues, and process errors – the problem can be identified and resolved during the very first conversation between the service engineer and machine operator.

Remote Service not only reduces downtime and service callouts, but also cuts the associated costs. Work to replace parts can be scheduled for a convenient time. What’s more, cutting the distances traveled for service call-outs also reduces the CO₂ emissions involved in logistics.
Technical Services

Print Color Management Safeguards Sustainability Across All Systems.

Stable, standardized processes are essential for cost-effective, economical production.

Everything under control with Print Color Management. Quality is the top priority when it comes to monitoring production processes from start to finish. Print Color Management provides valuable support with its cross-system calibration for proofs, plate production, and offset printing.

Practice-oriented training on equipment and machines gives staff the skills they need to design efficient workflows, ranging from data acquisition right through to the finished print product.

Using cross-system calibration of all print-related processes, Print Color Management improves production conditions while also minimizing the risk of errors. This creates a smooth workflow and conserves energy and materials.

Consequently, Print Color Management makes a direct contribution to ensuring resources are handled responsibly and efficiently.
Factors Used to Calculate the Savings Described Above.

The following factors have been used in the sample calculations in this guide:

**CO₂ emissions per kilowatt hour:**
German electricity mix with 565 g CO₂ /kWh  
Source: German Federal Environment Agency for 2009, as at May 2011.

**Calculations:**
All calculations are based on:
• Runs of 8,000 sheets per job  
• 4,500 jobs per year  
• 125 jobs per million sheets  
• Paper weight of 170 gsm

**Calculation principles:**
The calculations on pages 11, 12, 13, 14, 15, 16, 18, 19, 20, and 21 are based on a Speedmaster XL 106-10-P, assuming:
• 15,000 prints per hour

The calculations on pages 9, 22, 23, and 24 are based on a Speedmaster XL 106-6+L / XL 105-6+L UV, assuming:
• 18,000 prints per hour

The calculations on page 17 are based on a Speedmaster SX 52-5+L Anicolor, assuming:
• Runs of 2,000 sheets per job  
• Paper format: 35 × 50 cm  
• Paper weight: 135 gsm  
• 500 jobs per million sheets

The calculations on page 25 are based on a Stitchmaster ST 450, assuming:
• 15 million copies per year  
• 1,500 jobs per year  
• 36-page A4 product  
• 250 days a year, on a one-shift basis
Heidelberg Services offers a comprehensive portfolio extending from technical and machine-based services to coordinated consumables and a wide range of training and consulting services. All the services are designed to help print media companies strengthen and expand their performance and competitiveness in the long term.

Technical services and consumables. Stable production and maximum machine availability lay the foundation for efficiency and top performance. That is why Heidelberg Systemservice® offers service packages for all aspects of the press, service parts service, and technical support. These offerings include preventive machine maintenance concepts with Remote Services, round-the-clock access to the global Heidelberg network of experts, on-site support, and the supply of Original Heidelberg Service Parts. Selected consumables help improve productivity and performance considerably, while also ensuring you benefit from consistently high print quality. Saphira® consumables from Heidelberg provide a broad range of perfectly coordinated products that are tested to make sure they meet all the requirements.

Improving efficiency with Performance Services. This service segment covers productivity and process optimization and incorporates the Prinect® print shop workflow and employee and company development. It looks beyond the pressroom to focus on the company as a whole, with the aim of increasing sales and/or cutting costs through higher efficiency and enhanced productivity. Crucial factors include lean processes, the ability to stand out from the competition, and innovative ideas for new, profitable areas of business. The portfolio for this segment is further complemented by services relating to the sale of remarketed equipment.
Productivity optimization. To ensure maximum productivity coupled with top quality, Heidelberg experts identify potential for improvement in your print shop. Fitness checks are used to ensure that your equipment is in the best possible condition. With Print Color Management, you can shorten makeready times and cut waste while maintaining the same high print quality.

Process optimization. This service from Heidelberg helps optimize the coordination of your processes – and makes sure your efforts pay off. To this end, we analyze your processes, develop measures for improvement, and train your staff. The Prinect print shop workflow combines all the production processes from prepress to postpress with print shop management and thus ensures lean, fully integrated corporate processes. This renders each individual process transparent, thereby enabling efficient end-to-end management of all processes at any time. Services related to color management with Prinect provide support for everything from the calibration of plate-setters and the printing of test forms to the correct use of color measuring systems and color profiles and precise implementation of the key principles behind Print Color Management. This helps cut your workload and boost your profit.

People development. A print shop is only as good as its employees. The training and advisory services of the Print Media Academy (PMA) ensure your specialists and managers acquire comprehensive expertise. The training programs and seminars offer employees and managers the chance to boost their strategic know-how with the aim of realizing your full entrepreneurial potential and maximizing your competitive edge.

Business development. Heidelberg consultants work with you to analyze the strengths and weaknesses of your company, identify potential for improvement, and then derive the optimum market positioning strategy. The key is to utilize promising industry trends, e.g. web-to-print, that dovetail with your own business model. The management consultants also help to redefine marketing and sales strategies, improve controlling and financing know-how, and ensure investment decisions are made on a sound basis.

Equipped for the future with Heidelberg. The portfolio of Heidelberg Services provides print shops with far-reaching support to set the course for future success. The experts of Heidelberg Services offer a broad range of specialist know-how in the search for solutions – from machine-based services to management consultancy.

Heidelberg Services

Technical services and consumables: For stable production and maximum availability.

- Productivity optimization: For maximum productivity and top quality.
- Process optimization: For efficient production processes from a single source.
- People development: For comprehensive expertise throughout the company.
- Business development: For successful business and higher profit.
As a technology pioneer in our industry, we’re constantly pushing boundaries. We have become a leading international solution and service provider to the print media industry thanks to our innovative strength, cutting-edge technology, and closeness to customers. We supply not only extremely high-performance equipment covering the entire value-added chain in sheetfed offset printing but also digital printing systems for hybrid applications or extremely short runs. Our complementary services and training and advisory portfolios significantly enhance print shops’ economic performance and green credentials.

We give you the solutions that meet your customers’ needs. Find out about the customized products and services from Heidelberg that will strengthen your company in the long term on every market.
Discover HEI – for print media business with a future.

**HEI Productivity:** Boost your productivity with seamless processes and efficient and reliable production equipment from Heidelberg.

**HEI Emotions:** Use our surface finishing techniques to transform feelings and original ideas into visual and haptic experiences.

**HEI Flexibility:** Our digital and offset printing range gives you the flexibility you need to handle any kind of job.

**HEI School:** Hone your skills and expertise with training courses, seminars, and know-how from our Print Media Academy.

**HEI Eco:** Production equipment from Heidelberg ensures that eco-friendly printing also makes economic sense – true to our motto “Think economically, print ecologically”.

**HEI Integration:** We can provide you with the software you need for your online operations with our Prinect print shop workflow.

**HEI End:** Our postpress technologies transform your print products into bestsellers that fly off the shelves.

**HEI Quality:** Ensuring top quality is your aim – and ours, too.