

Sustainable technology, circularity and efficiency for climate action

White Paper

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Sustainability is part of the Epson DNA; it is firmly embedded in our Management Philosophy. For us as a global technology leader, sustainability is not just a trend but the continuation of a long-standing commitment to the environment and society – something that also stems from our Japanese roots. Three areas are particularly important in this context: climate action, resources and fairness.

For Epson, being a sustainable company means paying attention to every aspect of the organisation. All activities are based on Epson's Environmental Vision 2050 with the goal of using our technologies to achieve sustainability in a circular economy. For our company, that not only means acting as sustainably as possible but also developing technologies and products that help our customers to achieve their own sustainability goals. Throughout their entire life cycle our products are designed to have the least possible impact on the environment. Three pillars play a role in this: development and design, sustainable production methods and reuse & recycling. Our aim is to raise awareness of climate-friendly products and sustainable production standards and to convince both individuals and companies of the importance of fair consumption. With IT equipment as with all other products it is important to know how they were produced. As a leading global company in this field we are committed to demonstrating that it is possible to sustainably manufacture resource-efficient products without compromising on quality, productivity or cost.

Climate Action – Advantage Inkjet

¹ EPSON WorkForce Pro WF-C8190DW uses 95% less energy than the HP Color LaserJet Enterprise M750dn, the highest-selling model in the A3 colour single-function 21-30ppm printer segment as reported by IDC Q4 2015 to Q3 2019. Methodology verified by TÜV Rheinland,

Epson focuses on sustainable printing. There are two main criteria for making printing more sustainable in the business environment and at home: that printers should be energy-efficient and generate little waste. Epson inkjet printers for the office, Business Inkjets (BIJ), meet these criteria. The main advantage of inkjet printers is their energy efficiency. An Epson BIJ printer can save up to 95 %¹ of electricity compared to laser printers. One reason for the economical use of electricity is that Epson inkjet printing is based on Heat-Free Technology². This means that unlike laser printing no heat is required. Low power consumption also means lower CO₂ emissions when using the printers. In order to visualise these differences between laser and inkjet printing we have developed a simple tool that calculates possible savings (power consumption, electricity costs, power-based CO₂ emissions) for customers who switch from laser to Epson inkjet. The calculation method is based on the typical energy consumption (TEC value) according to the EnergyStar measuring method and has been verified by TÜV Rheinland.

Epson's BIJ technology is energy-efficient because the printing process requires very little electricity. What does that mean? Epson attaches great importance to minimising energy consumption while producing an optimal power outage to perform effectively. For example, the WorkForce Pro WF-C869RDTWF, a typical A4 BIJ printer, consumes a maximum of 58 watts (when switched on) and 45 watts in operation. Comparable laser printers, on the other hand, require up to ten times the power consumption in operation.

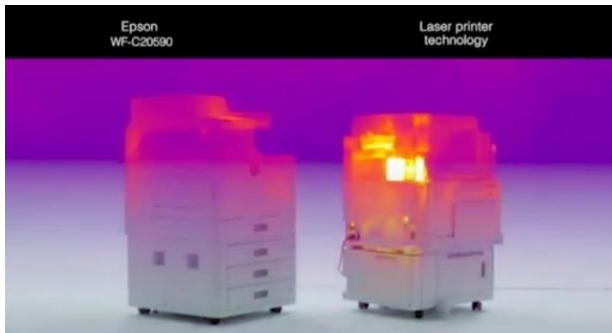
By switching from laser printing technology to modern inkjet printing, companies can easily and very efficiently reduce their energy consumption. With around 100 million printers sold worldwide each year³ there is an immense potential to reduce climate-damaging CO₂ emissions through lowering the energy consumption of the devices. Just by replacing one large copier with a comparable inkjet

based on 'Typical Energy Consumption', defined under the Energy Star test procedure and presented in kWh per year.

² <https://www.epson.eu/heat-free-technology>

³ statista, 2018

printer, electricity costs of up to €1,300 can be saved and CO₂ emissions reduced by up to 3 tons (usage period 5 years). To put this into the right perspective: all Western European companies that switched from laser printers to Epson BIJ in 2018 will save up to €15.4 million (or around £13.9 million) in electricity costs during the four-year usage phase of the devices - money that these companies can invest in their own additional sustainability initiatives.



The CO₂ emissions caused by electricity are also reduced by 37,573 tons.⁴ That is the equivalent to the amount of CO₂ that could be absorbed 1,724 trees in a year.⁵ For a German Epson customer, an international non-governmental organisation, this means that by switching to Epson BIJ they have been able to reduce their electricity costs by around €3,300/£2,972 and their CO₂ emissions by almost 7 tons over a period of four years. If all European companies switched to Epson inkjets, they could reduce their electricity costs by €213m/£192m and their electricity consumption by as much as 1.8 billion kWh per year - enough to supply 507,000 European households with electricity.⁶

Epson's commitment to sustainability has ensured continued demand by companies for business inkjet technology against an industry backdrop of declining printer sales. The market

share of Epson BIJ printers has grown steadily in recent years: according to IDC data, Epson currently holds a total market share of 39 percent in Western Europe.⁷ Contrary to the declining market trend, Epson has recorded significant growth.

Thanks to the [Epson CO₂ and electricity calculator](#), companies can quantify and evidence the benefit of opting for inkjet instead of laser in terms of reduced carbon footprint. This information can be included in their environmental or energy management systems (ISO 14001, ISO 50001, EMAS), in energy audits and can also be communicated in their sustainability reports. German flat glass manufacturer [f|glass](#) for example has made the switch to inkjet to achieve its internal energy saving target and has thus also contributed to the successful re-certification of its ISO 50001 energy management system.⁸

In order to further reduce negative effects on the climate, Epson launched the campaign "CO₂-neutral printing with EcoTank" in the fall of 2019 for all EcoTanks sold in Germany, Austria and Switzerland.⁹ The already low emissions due to the low power consumption of the printers are offset in cooperation with the environmental consultant [Climatepartner](#) through emission certificates (Gold Standard VER) from a climate protection project in Uganda for the average use phase of four years.

⁴ Calculated on the basis of 2018 sales of Epson business inkjet printers in the largest EU markets (Germany, Austria, Switzerland, UK, Ireland, France, Italy, Spain, Portugal, Netherlands, Belgium, Denmark, Sweden, Finland and Norway) with an average product life of four years. The calculation method was verified by TÜV Rheinland.

⁵ On average, each tree absorbs 21.8 kg of CO₂ per year, according to North Carolina State University <https://www.ncse.edu/project/treesofstrength/treefact.htm> (figure given is 48 pounds, which is 21.7724 kg)

⁶ Method verified by TÜV Rheinland on the basis of "typical energy consumption", as defined by the "Energy Star" test procedure and in

kWh per year. Models identified using IDC HCP Tracker 2019Q2 (data 2015Q1 to 2018Q4) and installed base 2018 in EU22 companies according to IDC ("Installed Base by Vertical, 2019Q2").

⁷ IDC Quarterly Hardcopy Peripherals Tracker – Final Historical 2019 Q2 (comparison on the basis of July-June Moving Annual Total (MAT) 2014/2015 and 2018/2019)

⁸ <https://www.epson.de/insights/casestudy/glasklare-argumente-fuer-den-tintenstrahldruck-im-buero> (only available in German)

⁹ <https://www.epson.de/ecotank-klimaneutral> (only available in German)

Resources

Resource protection and the concept of recycling are central components of the Epson Environmental Vision 2050. The goal is to use our technologies to achieve the transition to a circular economy. Therefore, Epson is working worldwide towards the goal of zero emissions. Production processes are designed to minimise the use of resources and waste and to close cycles wherever possible. Where waste cannot be reduced opportunities are sought to reuse it directly on site at Epson locations and add it back into the production process or where not possible to recycle it. We also prioritise both the use of recycled materials and a high degree of recyclability of the product (on average more than 65% of the device). With a clear focus on resource-efficient processes, all Epson factories work to minimise waste. Here, too, the principle applies: avoid, reuse, recycle. For example, at the Epson factory in Telford, UK, at least 95% of all waste is already being recycled. Materials that cannot be returned to the cycle are thermally recycled - the dumping of waste is prohibited. When the central European warehouse was built in Bedburg, Germany, materials from the old warehouse, such as the foundations, were recycled and used for the new building. In addition, by switching to more efficient wrapping machines, the consumption of foil for securing pallets was reduced by 18% compared to the previous year.

A key approach of Epson in the area of resource conservation is also the investment in research and development and in resource-efficient technological innovations. \$1.2 million are invested in R&D every day. These innovations relate both to the further development of existing printing technology and to new visionary approaches.

¹⁰ The average number of cartridges or average savings when printing the specified number of pages are for the ink bottle and EcoTank product pack and do not include the hardware price. Comparison based on the average of the EcoTank series (DIN A4), compared with the average of the ten best-selling models in Western Europe between

Advantage Inkjet

Thanks to their simple design Epson printers are durable with few regularly replaceable parts and produce little waste. For example, with a print volume of 6 million pages only 42 parts need to be replaced on an Epson WorkForce WF-C20590, compared to 296 on a comparable laser printer. The scalability is enormous: Heinrich-Haus, a German social enterprise for people with disabilities, for example, uses 13 WorkForce printers. For them, as just one customer, this means a saving of 3,302 parts.

Another logical step was to use large-volume ink bags instead of cartridges for a series of printers (WorkForce).



This not only reduces the volume of consumables but also the associated packaging waste, transport-related CO₂ emissions and the time and effort required for maintaining and servicing the equipment.

The idea of offering printers that no longer rely on ink cartridges has also been transferred to the traditional consumer market. With its EcoTanks, Epson developed inkjet printers for private use and the home office that rely on large-volume ink tanks instead of cartridges. These tanks can be easily refilled with ink bottles. The bottles (4-8) included with the printer correspond to up to 88 ink cartridges.¹⁰

At the same time, the EcoTanks are also based on the energy-efficient inkjet printing technology

January 2017 and December 2017, as recorded by GfK. Printing costs calculated using standard and XL cartridges in Western Europe as recorded by GfK during the same reference period, based on average retail prices. Ink cartridge capacities as reported on the manufacturer's website.

and thus not only save electricity compared to laser printers, but also reduce CO₂ emissions during use.



PaperLab

PaperLab is the world's first paper recycling machine for the office which produces new paper from wastepaper using a dry process and closes the paper cycle directly on site. The idea originated at one of our production facilities and the wish to reuse cardboard from ongoing production processes. Unlike conventional paper recycling the process works almost without water. Only a very small amount of water for keep stable the level of humidity inside the machine. The wastepaper is first defibrated so that it is no longer possible to reproduce the information. Then the fibres are formed into new paper (on average 720 DIN-A4 sheets per hour).



PaperLab not only allows you to close the paper cycle on site but also consumes less water and energy compared to industrially produced fresh fibre or recycled paper. The production of 500

sheets of PaperLab paper (one package of A4 paper) requires 95-96% less water compared to recycled paper produced in Germany. Energy consumption is also between 15-32% lower for recycled paper.¹¹ By using wastepaper PaperLab also conserves valuable wood resources. Paper is already recycled to a large extent in many countries, e.g. Germany, however PaperLab offers the advantage that the size of the resource cycle is reduced. For example, the entire logistics (transport of wastepaper to recycling centres and paper mills, transport of newly produced recycled paper to dealers and customers) and the associated greenhouse gas emissions are eliminated. In addition to environmental aspects PaperLab is interesting from a safety point of view: the paper is destroyed in such a way that its contents cannot be recovered. With appropriately organised processes users can potentially take over the disposal of confidential documents which is often outsourced to external service providers and thus save further transport-related emissions.

Even though paper consumption is generally decreasing there are many areas in which paper is still being used despite digitalisation, e.g. public authorities, banks and insurance companies. This is where we see great potential for PaperLab in the coming years. At the same time, further applications are planned in the medium term. One concrete approach being pursued is to make the machine smaller so that it fits into every office - even where space is limited. With around 3.5 million small and medium-sized companies (99.5% of German companies) alone¹², the potential for reducing paper cycles in Germany is enormous. Industrial applications are also being examined. For example, we use PaperLab at the Epson plant in Indonesia to process the wastepaper produced there into absorbent pads which are then used, for example, in maintenance boxes in our printers or as insulating material in PaperLab machines themselves. Other conceivable applications include the production of packaging and filling material as an

¹¹ October 2019. Calculation method was verified by TÜV Rheinland.

¹² <https://www.ifm-bonn.org/statistiken/unternehmensbestand/#accordion=0&tab=0>

alternative to plastic-based materials such as Styrofoam.

Moverio

Virtual applications have lost their "horror". We can see that the hurdles to working in this way have been removed and are used more naturally in everyday office life. This also affects very innovative products and scenarios such as Augmented Reality (AR). The next step after Teams and other virtual meeting applications are AR applications that help to keep in touch without having to face each other personally. Epson has been leading in the development of the technology: since 2011 our Moverio AR glasses and software solutions have been constantly adapted and improved, not least through an active partner network of software developers worldwide.

An actual real-life example is remote maintenance. Technicians can diagnose and solve the problem directly on site, "through the eyes" of the employee. Travel activities which are usually very high in the service and repair sector can be avoided. Moverio is currently being used by many customers: Siemens uses it for remote maintenance, Audi as a sales tool.



Actual calculations are not yet available, but it is clear that thanks to AR glasses, the number of business trips and related greenhouse gas emissions have been significantly reduced. Especially against the background of Covid19

we are currently observing a change in behaviour and greater acceptance of virtual applications, which is leading to an increasing demand for AR solutions.

Fairness – The Epson Factory Story

Social aspects have a greater influence on purchasing and investment decisions. In addition to environmental criteria social requirements are also increasingly being incorporated into public tenders, e.g. through the German Declaration of Commitment to Comply with Labour and Social Standards in Public ITC procurement which was drawn up jointly by the German Procurement Office and the digital association Bitkom. Social standards such as TCO Certified or RBA VAP play an important role here. Investors also focus on the sustainability of companies. In 2020, Epson was included in the recognised sustainability index FTSE4Good for the 16th time.¹³ In addition, the number of inquiries from partners and customers regarding social issues is increasing - a great sign that a change in awareness is taking place among customers. Many countries have already passed or are currently working on corporate due diligence laws (e.g. France, Germany) which shows how seriously compliance with social and ecological criteria along the entire supply chain is now being taken.

Production

For Epson high social standards in production have been important since the company was founded in 1942. We pursue a holistic sustainability approach: ethical aspects are just as important to us as ecological ones. All Epson products are therefore deliberately produced exclusively in Epson's own factories - against the trend towards third party production in the IT industry. This is the only way we can be sure that labour, environmental and quality standards are observed throughout the entire production phase. These standards are the same everywhere regardless of which country

¹³ https://global.epson.com/newsroom/2020/news_20200624.html

the factory is located in. In the factories in Asia alone (excluding Japan) this affects around 35,500 employees. The idea is that only companies that have full autonomy over all their processes can implement high quality and sustainability standards.



Social responsibility and the creation of a safe, healthy and fair working environment in which human rights are respected are central to the Corporate Principles of Conduct that apply to all Epson employees worldwide. For example, all our production facilities meet or exceed the requirements of the core labour standards of the United Nations International Labour Organisation, the UN Convention on the Rights of the Child and national legislation on occupational safety, health protection, labour law and the prohibition of child and forced labour.

One example: the Epson projector plant in the Philippines was audited and successfully certified for compliance with strict social and ecological criteria as part of the TCO Certified¹⁴ certification process. We are also a member of the Responsible Business Alliance (RBA)¹⁵, an industry coalition to improve sustainability in global supply chains.

Our goal for 2020 is to have all of Epson's own production sites in Asia externally certified in accordance with the RBA VAP Recognition Program.

We want to set a good example and encourage other companies in the IT industry to take over responsibilities in this area. Due to the current situation the ongoing audit processes were put

on hold in spring. However, we expect to receive the first certificates in autumn. In addition, new TCO Certified product certifications will continue to be implemented.

Supply Chain

Epson's vision of sustainability also includes establishing and maintaining trusting relationships with all its partners and suppliers. A prerequisite for this is that they commit to maintaining high sustainability standards just as we do. We work with around 1,700 suppliers and therefore feel responsible for ensuring that our business partners also adhere to high social, ecological and ethical standards along the entire supply chain. The basis for this is the Epson Supplier Code of Conduct which consists of the RBA Code of Conduct and Epson's own criteria. All potential and existing suppliers (both direct and indirect suppliers such as logistics, construction and personnel companies) are evaluated annually regarding environmental protection, occupational health and safety, human rights and fair business practices. The evaluation is a prerequisite for establishing or maintaining business relationships. Suppliers are assessed from various perspectives based on an evaluation programme. A detailed self-assessment questionnaire is used to assess compliance with the Code of Conduct.



Depending on the result suppliers are additionally audited by an independent organisation based on the RBA's Validated Assessment Program (VAP) or reviewed by trained Epson auditors. The use of conflict raw materials also plays an important role in this context. For many years Epson has been monitoring compliance with the ban on the use of conflict raw materials by its suppliers, among other things with the help of the questionnaire provided by the Responsible Minerals Initiative.

¹⁴ <https://www.epson.eu/verticals/tco-certified>

¹⁵ https://global.epson.com/newsroom/2019/news_20190425.html

It is important to us to accompany our suppliers on the path to greater sustainability, to support them in the implementation of improvement measures, to create space for mutual exchange and also to learn from them - e.g. during annual supplier conferences and training sessions.

Over the past few years, the sustainability ratings of our suppliers have improved steadily. In 2019 none of the audited suppliers were classified as critical, 84% of the suppliers were able to successfully demonstrate that they comply with all requirements of the Code of Conduct, while the remaining companies only had to implement a few improvement measures.

Our commitment to a fair and ethical supply chain is also recognised externally. Epson has participated in the EcoVadis ranking since 2017 and has achieved gold status every year. Progress in the area of labour and human rights in particular has made a significant contribution to the fact that we were able to improve our rating again in 2019.



Epson is now one of the top 1% of companies worldwide in terms of sustainability standards in the IT industry.¹⁶

In the area of climate protection, Epson was identified in 2020 as a global leader in the cooperation with its suppliers and included in the Supplier Engagement Leaderboard by the Carbon Disclosure Project.¹⁷ This puts us in the top 1% of the companies assessed. This is due to our commitment to measures and strategies to reduce emissions and manage climate risks in our supply chain.

¹⁶ https://global.epson.com/newsroom/2019/news_20191217.html

¹⁷ https://global.epson.com/newsroom/2020/news_20200227_2.html