

**Epson is working to preserve  
the natural environment, creating  
memories and beautiful impressions  
for future generations.**



# Environmental Vision 2050

Recognizing that the Earth's carrying capacity\* is limited and believing that everyone must share responsibility for reducing environmental impacts equally, Epson is aiming to reduce CO<sub>2</sub> emissions by 90% across the lifecycle of all products and services by the year 2050.

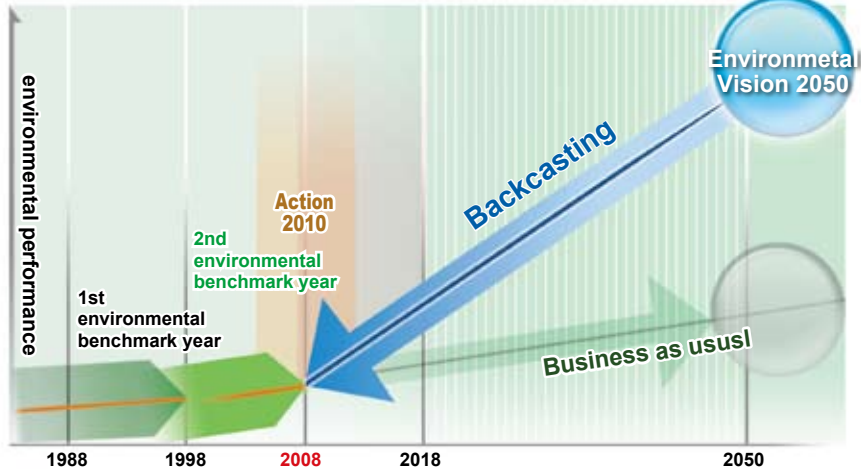
At the same time, as a member of the ecosystem Epson will continue to work towards restoring and protecting biodiversity\* together with local communities.



Epson has set four key conditions in order to work towards achieving "Environmental Vision 2050"

- 1.Reduction of CO<sub>2</sub> emissions by 90% across the entire product life cycle.
- 2.Inclusion of all products in the resource reuse and recycling loop\*.
- 3.Reduction of direct CO<sub>2</sub> emissions by 90%, and elimination of global warming gas emissions other than CO<sub>2</sub>.
- 4.Restoration and preservation of biodiversity as a member of the ecosystem, together with local communities.

**Environmental Vision 2050 in more detail (Backcasting\*)**



## Glossary

### Earth's carrying capacity

The amount of human activity and environmentally harmful materials (substances that degrade or pollute the environment) that can be supported without impairing the environment.

In "Environmental Vision 2050" carbon dioxide is cited as a representative environmentally harmful material, and the environmental carrying capacity is assumed to be the capacity of the Earth's natural environment to support it.

### Biodiversity

Biological diversity, i.e. the existence of diverse forms of life in a given ecosystem.

The Convention on Biological Diversity defines this term as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."

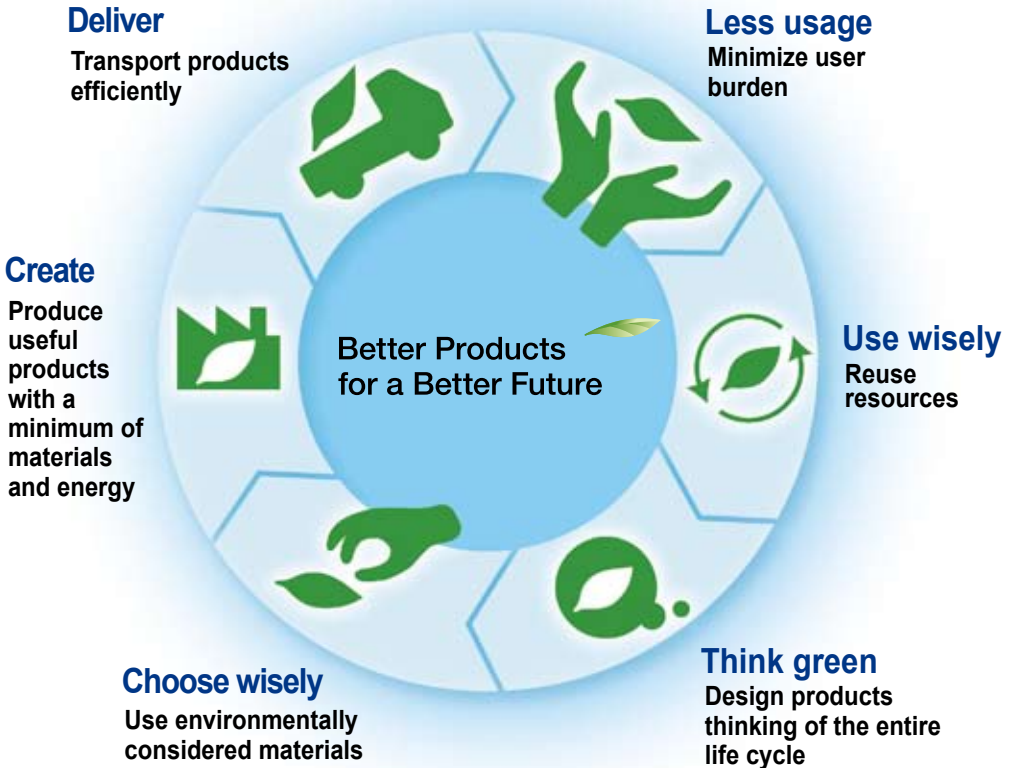
### Resource recycling loop

A system in which the input of new resources is gradually reduced by repeatedly reusing and recycling resources used in earlier products.

### Backcasting

A planning technique in which a desired outcome or goal is envisioned and planned before the scenario for achieving the outcome or goal is devised.

# Minimizing Environmental Impact Across the Life Cycle



## Basic product development policies

The environmental effects of a product during use (the environmental impact across the product life cycle) are mostly determined at the planning and design stages. Environmental awareness and environmental initiatives in these stages are thus critical for the creation of eco products. At Epson, planning and design activities are governed by the three basic policies.

### Energy-saving design

The power consumed during use accounts for a large portion of a product's total environmental impact across its life cycle. We therefore set energy-conservation goals for each product and work to ensure steady progress.

### Resource-saving

During the design stage, efforts are also made to reduce impacts through product size and weight reductions, targets for the recyclable rate (from a product's design drawings, the calculated ratio of the mass determined to be recyclable) are established, and efforts are made to simplify the recycling of products after they have been used.

### Elimination of harmful substances

Epson standards specify substances that are prohibited from inclusion in products and substances whose inclusion must be controlled. Information on these substances is collected and managed in a database. This database is used to ensure safety in all processes, from design and procurement to mass production.

# Reducing the Global Warming Impact Across the Product Life Cycle with Smaller, Lighter, and Energy-Saving Design

## All-in-one Inkjet Printers <EP-901F/901A> (Artisan 800, Epson Stylus Photo PX800FW/TX800FW)

### An eco-considerate product life cycle from the planning and design stages

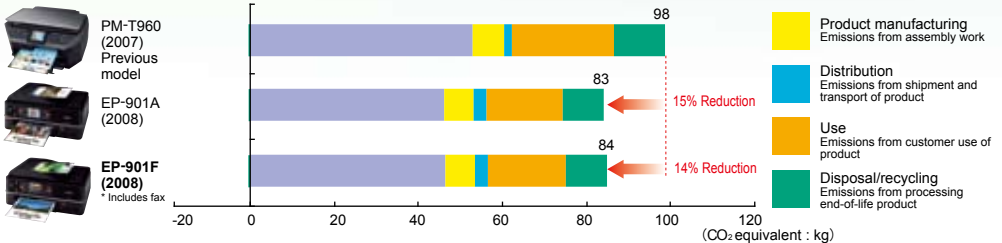
Epson develops and designs products that comprehensively minimize the impact on global warming across the product life cycle (material and product manufacturing, distribution, use, and disposal/recycling). The EP-901F has approximately 14% lower global warming impact (CO<sub>2</sub> equivalent) than the PM-T960 from 2007.



EP-901F

New model uses 35% less size, 16% less weight and 24% less energy than its predecessor.

### Global warming impact across the life cycle



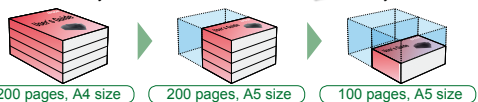
Values are based on Epson's evaluation criteria. We use a life cycle assessment to calculate the global warming impact of each part of the product life cycle as CO<sub>2</sub> emissions. The life cycle includes material & product manufacturing, distribution, use by customer, and disposal/recycling of end-of-life products. Use is calculated as 5 A4-size color copies per day with the power on for 8 hours and off for 16 hours per day, 20 days per month for 3 years. Negative values indicate the effect of recycling end-of-life products. Global warming impact may vary depending on customer use. 100V is used for calculation, based on Japanese specifications.

### Lighter manuals

Manuals in Europe require a huge amount of paper to accommodate the 30 languages being used. Epson revised the all-in-one inkjet printer manuals to improve usability and to reduce the amount of paper used by 75%.

### Reducing use of paper resources

Text-heavy → Mainly illustrations



200 pages, A4 size

200 pages, A5 size

100 pages, A5 size

Four separate translations of the manual are bundled together with the product

Using half-size paper results in a 50% reduction

Combining the four languages into one manual results in an additional 50% reduction

Manuals are prepared in 30 different languages for Europe. In some regions, 4 to 6 languages are combined into one manual. This comparison uses four languages with 50 pages per language.

## All-in-one Inkjet Printer <EP-801A> (Artisan 700, Epson Stylus Photo PX700W/TX700W)

### Constantly improving environmental performance

Printers consume power even when they are not printing. Since 1998, Epson has been striving to reduce the total daily energy consumption of its printers based on customer usage habits. We also are constantly making our products smaller and lighter to reduce the emissions from material manufacturing, which makes up the lion's share of the product life cycle.

Epson nearly halved the space required for head movement in the printer by integrating the "back-pressure control unit"—the part that regulates ink pressure—into a new, smaller print head.

The light sources for LCD panel and the scanner use mercury-free LEDs.



EP-801A

Epson creates products that are focused on the effective use of resources.

#### Unpainted housing

Reduces the impact of painting and improves plastic recyclability

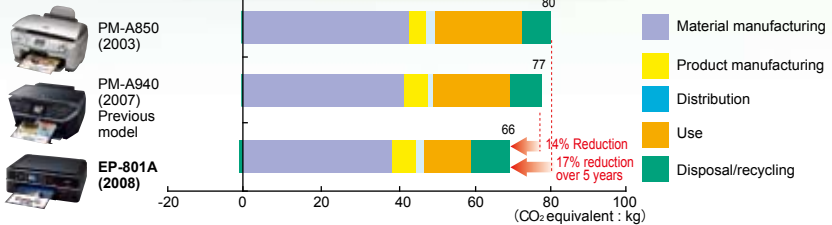
#### Use of recycled materials

Uses recycled plastic for internal printer parts

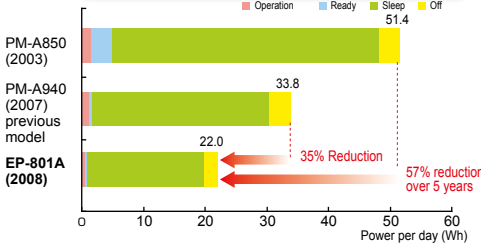
#### Effective use of paper

Optional auto-duplex printing feature

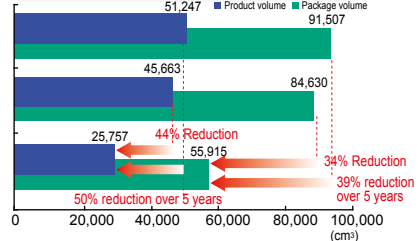
### Global warming impact across the life cycle



### Reduction of total power consumption



### Smaller products & packaging



Values are based on Epson's evaluation criteria. Global warming impact: We use a life cycle assessment to calculate the global warming impact of each part of the product life cycle as CO<sub>2</sub> emissions. The life cycle includes material & product manufacturing, distribution, use by customer, and disposal/recycling of end-of-life products. Use is calculated as 5 A4-size color copies per day with the power on for 8 hours and off for 16 hours per day, 20 days per month for 3 years. Negative values indicate the effect of recycling end-of-life products. Power consumption: Calculated as 5 A4-size color copies per day with the power on for 8 hours and off for 16 hours per day. Global warming impact and power consumption may vary depending on customer use. 100V is used for calculation, based on Japanese specifications.

# Providing a New Option that Combines High Environmental Performance and Usability in Business

## Business Inkjet Printer <PX-B500> (Epson B-500DN/B-508DN)

### Bringing consumer-oriented technology to the office

These days, most offices use laser printers. Utilizing our highly adaptable inkjet technology, Epson developed a business inkjet printer with low power consumption and high-capacity ink cartridges that can print 37 pages per minute in both color and monochrome.

#### High productivity

This model comes equipped with a feeder mechanism and print head that enable high-volume, high-speed printing. In addition, key functions have been moved to the top menu, making it quicker and easier to change consumables and view the printer status.

#### Ecology

Epson reduces the environmental footprint wherever possible with low power consumption and paper-saving printing options like duplex and multi-page layout printing.



PX-B500

#### High reliability

A robust design along with newly-developed sensor technologies and cleaning mechanisms help minimize paper jams and missing dots in this highly-reliable model.

#### Low cost

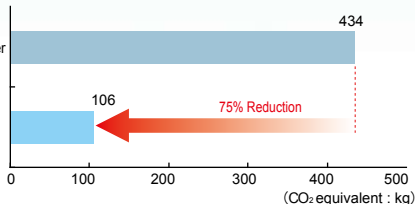
Save time and money with our special high-capacity ink cartridges. The cartridges come in three sizes: the standard M size, a high-capacity L size, and an ultra-high-capacity LL size (black only).

### Global warming impact across the life cycle

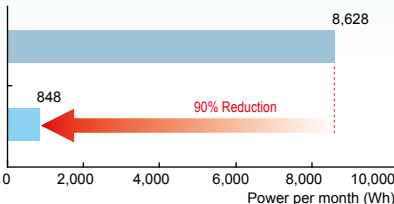


A4 Color Page Printer LP-V500

PX-B500 (2008)



### Lower total power consumption



Values are based on Epson's evaluation criteria. Global warming impact: We use a life cycle assessment to calculate the global warming impact of each part of the product life cycle as CO<sub>2</sub> emissions. The life cycle includes material & product manufacturing, transport, use by customer, and disposal/recycling of end-of-life products. Use is calculated as 100 A4-size color prints per day with the power on for 8 hours and off for 16 hours per day, 20 days per month for 3 years. Negative values indicate the effect of recycling end-of-life products. Power consumption: Calculated as 100 A4-size color prints per day with the power on for 8 hours and off for 16 hours per day, 20 days per month. Global warming impact and power consumption may vary depending on customer use. 100V is used for calculation, based on Japanese specifications.

## Acquiring eco-labels and releasing environmental information

Worldwide	International ENERGY STAR Program, Epson Ecology Label Program
Japan	Eco-Mark, FSC certification, PC Green Label, Eco-Leaf
South Korea	Korea Energy Saving Mark, Korea Eco-Label
China	Energy Conservation Product Certification, China Environmental Labelling
Hong Kong	Green Label

Taiwan	Green Mark
Singapore	Green Label
Germany	Blue Angel
United Kingdom Ireland	Energy Saving Recommended label
Europe	IT ECO Declaration

# Improving Customer Usability and Energy-Saving Performance

## Personal Color Scanner <GT-F720> (Epson Perfection V300 Photo)

### A CCD scanner with an LED light source

Epson has developed a CCD (charge coupled device) scanner that uses a white LED (light emitting diode) as a light source instead of the usual cold cathode fluorescent lamp (CCFL). The GT-F720 maintain a high 4800 dpi resolution while also improving usability for customers by shortening warm-up times and realizing steep savings in energy consumption.

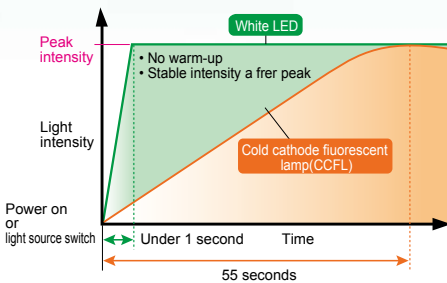
Warm-up is completed in a mere fraction of a second thanks to LEDs that reach the prescribed level of brightness almost the instant the power is supplied instead of the 55 seconds required by the 2007 model (GT-F670/Epson Perfection V200 Photo).



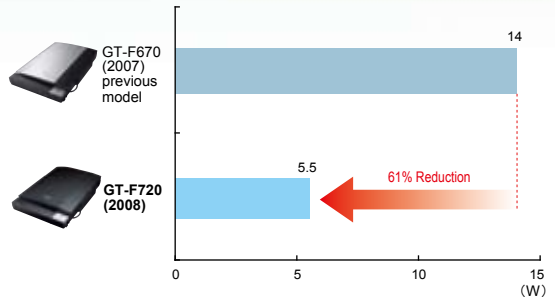
GT-F720

Because images can be exposed in an instant and the light source can be turned off immediately after scanning, power consumption in Ready mode is slashed by as much as 61%.

### Time until required intensity



### Reduction in Ready mode power consumption



### Release of product environmental information in the ECMA-370 "Eco Declaration"

Starting in 2008, Epson will be replacing its "Epson Ecology Profile" product environmental information disclosure sheet with an "Eco Declaration" based on the ECMA-370 standard prepared by Ecma International. You will see the new format beginning with our new products.



# Helping to Reduce Costs and Environmental Impact in the Office

## Monochrome Page Printer <LP-S300> (Epson AcuLaser M2000D/M2010D)

### Helping lower costs as well in an eco-considerate business model

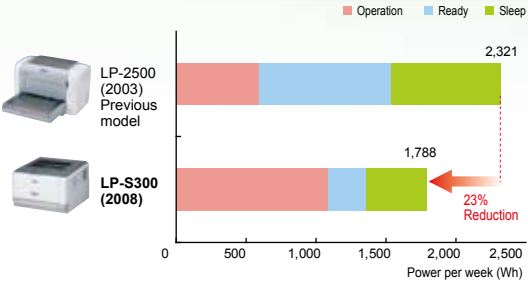
This eco-considerate printer cuts total weekly power consumption by 23% compared to the 2003 model (LP-2500/Epson EPL-6200). In addition, our new "Return cartridge" drives the collection and recycling of used cartridges while providing our customers with lower running costs.



By turning off the heater (lamp) immediately after printing, power consumption in Ready mode was cut from an average of 47 W to an average 7 W.

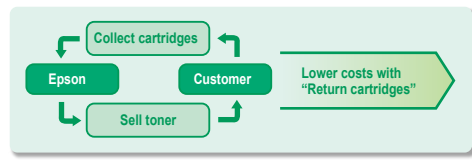
LP-S300

### Reduction of total power consumption



### Return and Recycle Program for Toner Cartridge

Epson has proposed a new "Return cartridge program" in addition to conventional toner cartridges. Our customers only pay for the toner, while we take care of collecting and recycling used cartridges. This eco-considered program also contributes to lower running costs.



Values are of TEC (typical electricity consumption) based on measurement methods prescribed by the International Energy Star Program. Power consumption may vary depending on customer use. 100V is used for calculation, based on Japanese specifications.

"Return cartridge" are owned by Seiko Epson. Users must accept the "Return cartridges License Agreement" to use "Return cartridge". Return cartridges must be returned to Epson after use and cannot be recycled by the customer or a third party.

## Procurement compliance rate of Epson-branded paper reaches 95%

Looking at Epson-branded paper procured in Japan, Epson verified our compliance with procurement standards in terms of legal compliance and sustainability based on the Seiko Epson Group Paper Procurement Standard established in fiscal 2007. We will be expanding our survey to include paper procured overseas in fiscal 2008 and intend to achieve a 100% compliance rate in 2010.



\* Procurement compliance rate: The amount of paper products that can be confirmed to be in compliance with the procurement policy as a percentage of the total amount of that type of product procured.

# Supplementing Superior Functionality as a Business Printer with Environmental Performance

## Thermal Receipt Printer <TM-T88IV>

### Faster print speed with lower power consumption

In addition to providing enhanced basic features such as 200 mm/sec printing at a maximum, this printer consumes 28% less power than the previous model (TM-T88III). Its energy-saving design contributes to improvements in business efficiency and service quality.

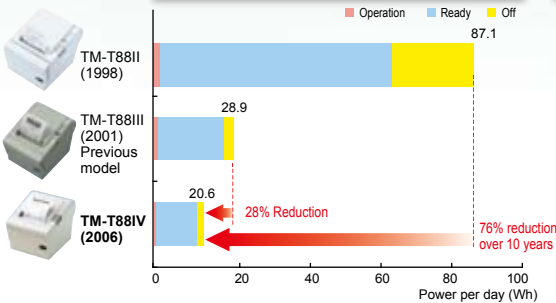
#### Line thermal printer

High-speed, silent printing enables smooth output. With support for Asian and European languages, graphics and barcodes, this printer can be used for a wide variety of applications including receipts, coupons and tickets.

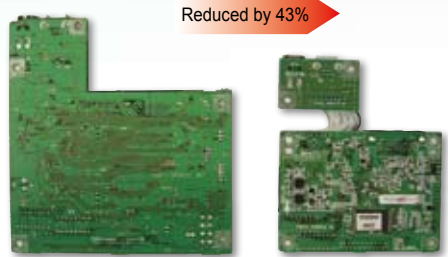


TM-T88 IV

### Reduction of total power consumption



### Conserve resources with smaller PCB



TM-T88III  
12,772mm<sup>2</sup>

TM-T88IV  
7,235mm<sup>2</sup>

Values are based on Epson's evaluation criteria. Calculated as 300 receipts per day with the power on for 16 hours and off for 8 hours per day. Power consumption may vary depending on customer use. 100V is used for calculation, based on Japanese specifications.

### Lower CO<sub>2</sub> emissions by using double-decker trucks for transport

In Europe, Epson ships 99% of its goods over land. Therefore, anything that makes truck transportation more efficient lowers our CO<sub>2</sub> output. As a way to solve the CO<sub>2</sub> problem, Epson Europe B.V. (Netherlands) introduced double-decker trucks in Europe. The separate upper and lower decks of these trucks increase loading efficiency, carrying a combined 54 standard pallets of goods, compared to just 33 in a conventional truck. Thanks to the double-decker trucks, Epson has been able to shrink its fleet of trucks by 40% while carrying the same volume.

# Dramatically Improved Light Efficiency with E-TORL Lamps—a Bright Picture in a Small Package

## 3LCD Projector <EB-1735W> (PowerLite 1735W)

### Using various optical technologies to achieve a bright picture in a small package

Epson's 3LCD projectors use a mix of optics technologies. Our E-TORL lamps are one of those technologies. With increasing demand for projectors that can be used without dimming the lights, we are increasing brightness by more effectively using the light instead of increasing the power.



EB-1735W

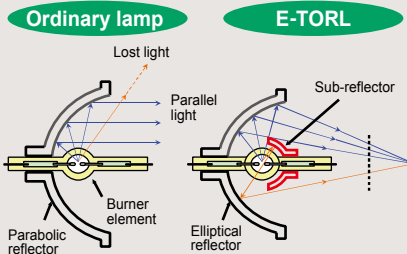
Equipped with a lead-free lens

#### E-TORL

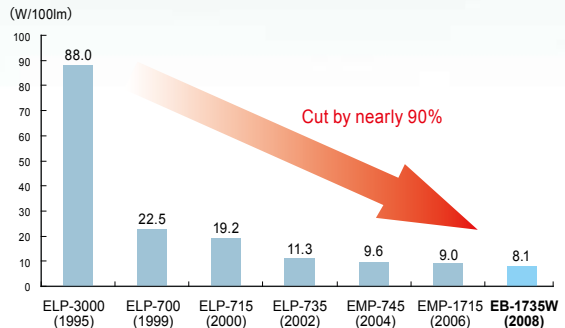
Epson-Twin Optimize Reflection Lamp

Outer plastic casing does not contain halogen flame retardants.

Epson redesigned the reflector and added a sub-reflector unit to improve the collection of light from its E-TORL lamps by 20%.



### Power consumption per 100 lumens of brightness



### 100% green purchasing of parts and raw materials

Epson purchases green production materials (including all parts, raw materials, packaging materials and OEM products used in our products) based on its Green Purchasing Standard for Production Materials. This standard is followed by the entire Epson Group. In addition, our factories try to reduce the use of chemical substances by categorizing them as "use prohibited," "reduce use and emissions," and "change to safer substances."

# Reducing Global Warming Impact with Smaller and Lighter Products

## 3LCD Home Projector <EH-DM2> (Movie Mate55)

### Reducing the impact of materials, distribution and disposal with a smaller and lighter design

This projector with an integrated DVD player includes only the essential features, thereby providing a low-cost and user-friendly experience. In addition, its new compact size is only 50% of the EMP-TWD3 model from 2006, reducing the impact of its materials, distribution and disposal.



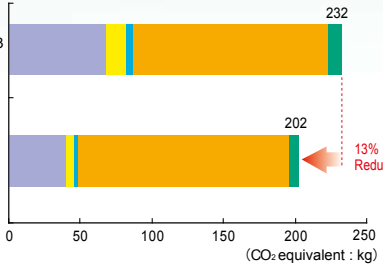
Outer plastic casing does not contain halogen flame retardants.

Equipped with a lead-free lens

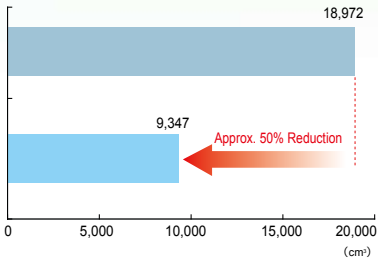
EH-DM2

### Global warming impact across the life cycle

Material manufacturing (purple), Product manufacturing (yellow), Use (orange), Distribution (blue), Disposal/recycling (green)



### Smaller projector with integrated DVD player



Values are based on Epson's evaluation criteria. We use a life cycle assessment to calculate the global warming impact of each part of the product life cycle as CO<sub>2</sub> emissions. The life cycle includes material & product manufacturing, distribution, use by customer, and disposal/recycling of end-of-life products. Use is calculated as 3.5 hours per day, 100 days per year for 5 years. 100V is used for calculation, based on Japanese specifications.

## Control of substances included in products

Epson's consideration of product safety and the environmental impact goes beyond the requirements of the RoHS directive and other laws. We are also taking a variety of steps to reduce or eliminate substances of concern in our projectors.

- We do not use chlorine- or bromine-based halogen flame retardants in the outer plastic casing of our products due to the risk of dioxins during disposal.
- The optical and reflective glass lenses used in our 3LCD products do not contain lead.

# Applying "MoDT" Technology on Desktop PCs to Maximize Three "Smalls"

## Desktop PC <Endeavor ST110>

### Reducing global warming impact across the whole life cycle

The Endeavor ST110, a desktop PC designed not only for maximum energy efficiency but also with the utmost attention to everything from materials selection to parts shipping method, succeeds in dramatically reducing the global warming impact across its life cycle.

#### Small Energy

Compliant with International ENERGY STAR Program, Ver. 4.0. Consumes only 22 Watts of power in Idle state.

#### Small Size

An ultra-compact PC that can be used flat or upright. Fits anywhere.

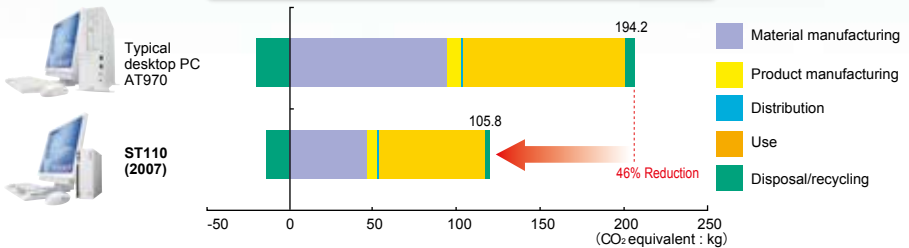
#### Small Sound

Engineered to run as quietly as a notebook PC. Purrs along at less than 22 dB, for a pleasant work environment.



\*Marketed in Japan only

### Global warming impact across the life cycle



Based on evaluation results for the Eco-Leaf environmental labeling program. (Excludes the monitor.) Use is calculated as running or idling for 4.5 hours, in standby for 4.5 hours and powered off for 15 hours per day, 240 days per year for 4 years. Negative values indicate the effect of recycling end-of-life products. Global warming impact may vary depending on customer use.

\* Visit <http://shop.epson.jp/st110/point/> for measurement conditions.

## MoDT (Mobile on Desktop)

A computer with the flexibility of a desktop PC yet built from notebook PC parts such as a mobile Intel processor engineered for low power consumption and low heat generation. The Endeavor ST110 truly is the eco-friendly personal computer of the future, as the use of MoDT curbs its appetite for power to that of a notebook PC while enabling it to be used freely like a desktop PC.

This product is manufactured and sold by Epson Direct Corp..  
Visit <http://shop.epson.jp/> for details.

# Uncompromising Design, Performance and Environmental Performance

## Notebook PC <Endeavor NA801>

### Environmental performance without sacrificing functionality

This compact model with a 13.3" wide LCD display has been equipped with high-performance graphics, a robust and durable design, and energy-saving features.

#### Strong graphics performance

This model comes standard with high-end graphics. Now you can enjoy high performance in 3D games and CAD applications.

#### Magnesium body with exceptional durability

Structural portion of the body is made from a magnesium alloy to protect your PC from daily wear and tear.



\*Marketed in Japan only

#### Long-lasting beauty with Self-Repairing Clear® coat

The Self-Repairing Clear® coating on the LCD back cover protects your investment from scratches during transport.

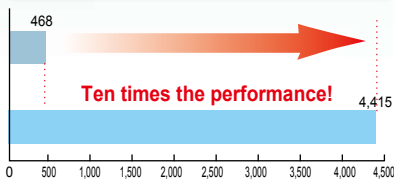
#### Equipped with new SSD

Solid-state drives provide a boost in read speeds over conventional hard drives. The lack of moving parts provides higher durability and lower power consumption.

#### International ENERGY STAR Program-compliant

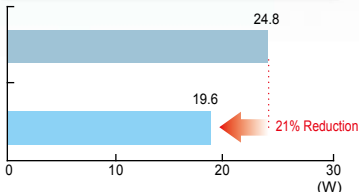
Compliant with Ver. 4.0 established in July 2007. Consumes 21% less power than predecessor in Idle state.

### Graphics performance in 3DMark06



Benchmark results are for reference purposes and were measured by Epson. The actual values may differ depending on hardware and software configuration. The values are taken from the 3DMark06 score used to indicate graphics performance.

### Power consumption in Idle state



Values were measured with the standard configuration. Values may vary depending on configuration and customer use.

\* Visit <http://shop.epson.jp/na801/point/> for measurement conditions.

## Self-Repairing Clear® Coat

The coating provides:

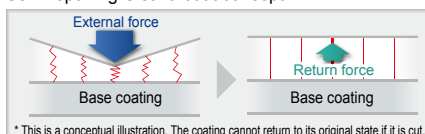
- Smudge resistance
- Scratch resistance
- Comfortable touch

Lowering our environmental impact by making long-lasting products—

That is the Epson Direct way.

This unique coating provides scratch resistance with its ability to recover from certain amounts of abrasion.

Self-Repairing Clear® coat concept



\* This is a conceptual illustration. The coating cannot return to its original state if it is cut.

\* Self-Repairing Clear® is a registered trademark of Natoko Co., Ltd.

This product is manufactured and sold by Epson Direct Corp.. Visit <http://shop.epson.jp/> for details.

# Low-Power 16-bit Flash Microcontroller with the Power-Draw of an 8-bit Chip

## 16-bit Flash Microcontroller <S1C17 Family>

### High performance with low power

This high-performance 16-bit Flash microcontroller has the core size of an 8-bit CPU and a power draw equivalent to that of an 8-bit Flash microcontroller.



Power consumption comparison of 16-bit Flash microcontroller and 8-bit Flash microcontroller (mass produced in 2002)

	8MHz operation	32kHz Halt mode
S1C17701 16-bit Flash microcontroller	1,800 $\mu$ A	2.6 $\mu$ A
S1C8F626 8-bit Flash microcontroller	1,800 $\mu$ A	2.5 $\mu$ A

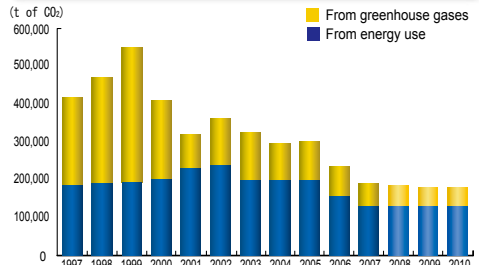
## Epson's semiconductor devices

Epson's semiconductor devices are used in a variety of products including portable computing devices, in-vehicle systems, and healthcare equipment. Epson is working to reduce our environmental impact by providing semiconductor devices that are feature-rich, compact, and low power.

## CO<sub>2</sub> emissions reduced by 54%!!

To ensure outstanding environmental performance of our products, we at Epson drive programs that minimize the impact of our manufacturing activities on the environment by, for example, curtailing greenhouse gas emissions, conserving and recycling resources, and reducing the use of chemicals and harmful substances. Our semiconductor manufacturing plants have cut CO<sub>2</sub> emissions by 54% compared to 1997 levels.

## Total Global Warming Emissions-Trend Semiconductor plants(consolidated)



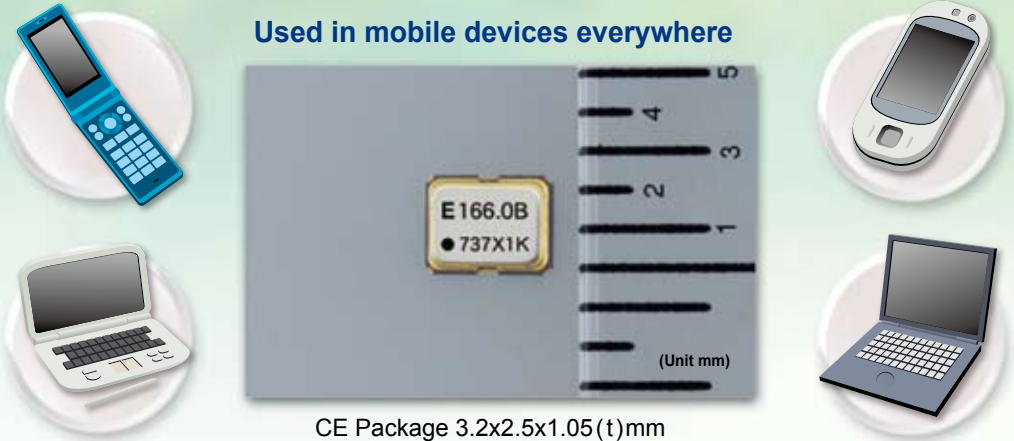
# Ecology is an Important Feature of Crystal Devices

## Programmable Crystal Oscillators <SG-8003CE Series>

### Low-voltage support and 50% less energy consumption

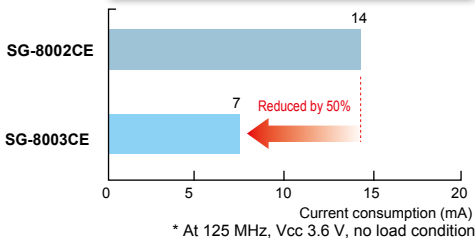
The new SG-8003CE series supports voltages down to 1.8 V and 2.5 V and frequencies up to 166 MHz, making them an excellent choice for a wide range of mobile devices and other equipment where low power consumption is critical. The products in this series are lead- and halogen-free.

### Used in mobile devices everywhere



CE Package 3.2x2.5x1.05 (t)mm

### Lower power consumption



### Definition of halogen-free

- Chlorine and chloride compound concentration of 900 ppm or less in a homogeneous medium
- Bromine and bromide compound concentration of 900 ppm or less in a homogeneous medium
- Combined concentration of chlorine, bromine and their compounds is 1,500 ppm or less in a homogeneous medium

### Contributing to the environment with high performance in small packages

- Provide compact and high-performance products with QMEMS (conserves resources and reduces CO<sub>2</sub> from shipping)
- Reduce the environmental impact of the manufacturing process by improving processing accuracy and mass production efficiency



#### What is QMEMS?

QMEMS is a combination of "Quartz," a crystalline material that has excellent stability and precision, and "MEMS," micro electro-mechanical systems engineered using microfabrication technology. QMEMS devices are created using quartz material instead of the semiconductors usually used in MEMS. QMEMS is a registered trademark of Epson Toyocom.

These products are manufactured and sold by Epson Toyocom Corp..  
Visit <http://www.epsontoyocom.co.jp/english/> for details.

# Epson's "Saving" Technologies, an Outgrowth of the Company's Precision Machining and Assembly technologies for Watches

## Spring Drive <Grand Seiko SBGA031>

Spring drives, powered by a mainspring yet equipped with quartz accuracy, are an innovative, eco-friendly mechanism.



The first diver's watch from Grand Seiko aims for practicality with excellent readability, magnetic resistance, shock resistance and thermal shock resistance in addition to water resistance.

\*Marketed in Japan only

**This movement for wristwatches is emblematic of Epson's hopes for a greener future.**



### Spring Drive

The Spring Drive is a unique drive mechanism that is powered by the unwinding of a mainspring even as it maintains accuracy by using precision signals from a crystal resonator. With no batteries or motors, this self-contained eco-mechanism relies on the wearer to generate the energy needed to keep time.

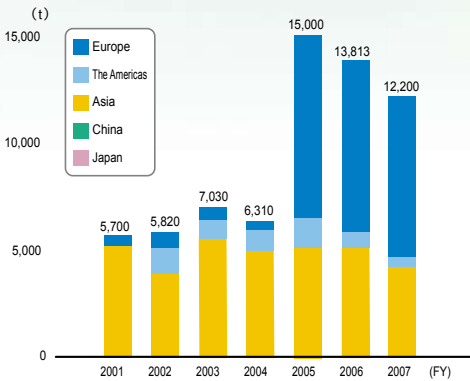
This product is manufactured by Seiko Epson Corp. and sold by Seiko Watch Corp..  
>><http://www.seikospringdrive.com/> (English) >><http://www.seiko-watch.co.jp/sd/> (Japanese)

# Building Systems Worldwide for Collecting and Recycling Epson Products at the end of Their Useful Lives

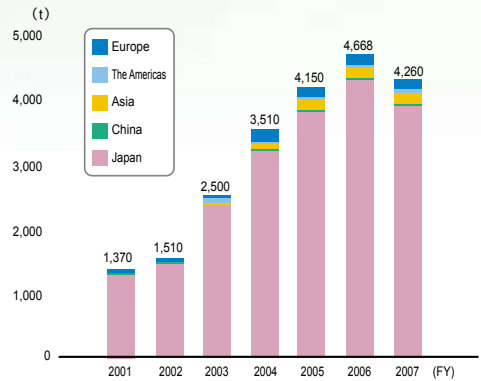
## Global collection and recycling system



### Collection of finished products



### Collection of ink & toner cartridges



### Ink Cartridge Home Coming Project

The "Ink Cartridge Home Coming Project" is a collaborative effort started by six printer manufacturers. Collection boxes for used ink cartridges have been installed at 3,600 post offices in Japan. The collected cartridges are sent to a company that employs a high percentage of persons with disabilities. There, the cartridges are sorted by printer manufacturer and sent for recycling.



# Creating an Energy-Saving Production Plant of the Future by Applying Micro Piezo Technology

## Yielding practical applications to drive innovations in manufacturing

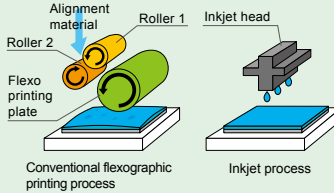
Inkjet technology is used to accurately eject liquid materials when, where and in the amounts needed. Commercially viable technology has been developed that enables an inkjet method to be used to create liquid crystal panel color filters and circuit boards. This technology enables the size of production plants to be reduced and curtails wasted materials and energy. Because production efficiency is improved while environmental impacts are reduced, the hopes of this technology are very high.

### Stage 1 Uniform coating

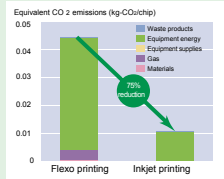
#### Advantages of inkjet technology

- A uniform alignment layer is formed using a contact free method
- Materials are used efficiently and manufacturing time is reduced
- Process is clean and virtually free of liquid wastes

Image for conventional flexographic printing and inkjet printing of alignment layers



CO<sub>2</sub> emissions in alignment layer process

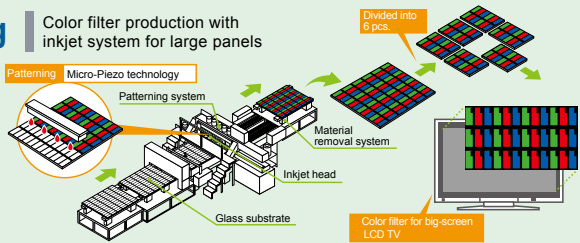


### Stage 2 Selective coating

#### Advantages of inkjet technology

- Far shorter process and sharply reduced cost and material waste
- Superior color characteristics

Color filter production with inkjet system for large panels

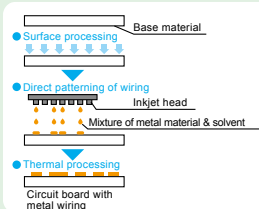


### Stage 3 Direct printing

#### Advantages of inkjet technology

- Dramatically fewer process steps, lower costs, and reduced resource and energy use
- Reduce device size by using direct patterning and layer stacking techniques to shrink complicated circuit boards

Inkjet circuit board fabrication process



Inkjet technology will make it possible to directly embed circuit patterns and electronic devices on thin films.



# History of Environmental Activities

- EU RoHS Directive (2006)

- EU WEEE Directive (2003)

- Basic Law for Establishing a Recycle-based Society in Japan (2000)

- Environmental Vision 2050 (2008)
- Established Action 2010 (2006 onward), linking ecology and economy
- All sites achieved Zero Emissions Level 1 (2004)
- Joined Bellmark program with used cartridges in Japan (2004)
- Established Green Purchasing Standard for Production Materials (2003)
- Zero Emissions Level 2 launched (2002)
- Began Epson Ecology Label program (2001)

## 2000s

Chemical substances

Global warming

Ecosystem destruction

Acid rain

Tropical rainforest destruction

- Kyoto Protocol (1997)

- Convention on Biological Diversity (1992)

- Began collection and recycling of used ink cartridges in Japan (1999)
- Began collection and recycling of used products in Europe (1999)
- Established General Environmental Policy (1998)
- Second Environmental Benchmark Year (1998)
- Zero Emissions Level 1 launched (1997)
- Began collection and recycling of used toner cartridges in Japan (1995)
- Established Environmental Philosophy and Major Activities (1994)
- Began collection and recycling of used toner cartridges in Germany (1993)
- Eliminated all CFCs (1992)

## 1990s

- Basel Convention (1989)

- Montreal Protocol (1988)

- CFC-free initiatives launched (1988)

- Environmental Benchmark Year (1988)

Hole in ozone layer

## 1980s

- Established independent standards that exceed legal and regulatory requirements

## Better Products for a Better Future

At Epson, we know that planning for the future requires a strong commitment to the environment. That is why we strive to create innovative products that are reliable, recyclable, and energy efficient.

Better products that use fewer resources help ensure a better future for us all.

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