MacBook Air

Environmental Report

Model MB543

Date introduced

October 14, 2008

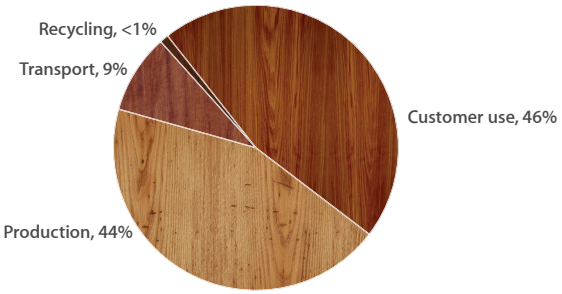
Apple and the Environment

Apple believes that improving the environmental performance of our business starts with our products. The careful environmental management of our products throughout their life cycles includes controlling the quantity and type of materials used in their manufacturing, improving their energy efficiency, and designing for better recyclability. The information below details the life cycle environmental performance of the MacBook Air as it relates to climate change, energy efficiency, restricted substances and material efficiency.

Climate Change

Greenhouse gas emissions have an impact on the planet's balance of land, ocean, and air temperature. Most of Apple's corporate greenhouse gas emissions come from the production, transport, use and recycling of its products. Apple seeks to minimize greenhouse gas emissions by setting stringent design-related goals for material and energy efficiency. The chart below provides the estimated life cycle greenhouse gas emissions for MacBook Air.

Greenhouse Gas Emissions for MacBook Air



Total greenhouse gas emissions: 340 kg CO_2e

Energy Efficiency

Because the largest portion of product related greenhouse gas emissions result from its use, energy efficiency is a key part of each product's design. Apple products use power efficient components and software that intelligently powers them down during periods of inactivity. The result is that MacBook Air is energy efficient right out of the box.

MacBook Air outperforms the stringent requirements of the ENERGY STAR® program. The following table details the power consumed by MacBook Air in different use modes.

Power Consumption for MacBook Air

Mode	100V	115V	230V
Power adapter, no-load	0.17 W	0.11 W	0.19 W
Off	0.46 W	0.50 W	0.59 W
Sleep	0.99 W	0.99 W	1.12 W
Idle—Display off / on	6.9 W / 12.0 W	6.9 W / 12.0 W	7.2 W / 12.9 W
Power adapter efficiency	84.3%	84.3%	85.3%

Environmental Status Report

MacBook Air is designed with the following features to reduce environmental impact:

- Mercury-free LCD display
- Arsenic-free display glass
- Majority of components are brominated flame retardant-free
- PVC-free internal cables
- Highly recyclable aluminum enclosure

Meets ENERGY STAR® requirements.

MacBook Air achieved a Gold rating from EPEAT.

At less than 13W in idle with the display on, MacBook Air consumes the least amount of power of any Apple computer. To put that in perspective, it takes nearly five MacBook Air computers in idle to equal the power consumed by a single household 60W lightbulb.

Battery Chemistry

System battery: lithium-ion polymer, 37 Whr

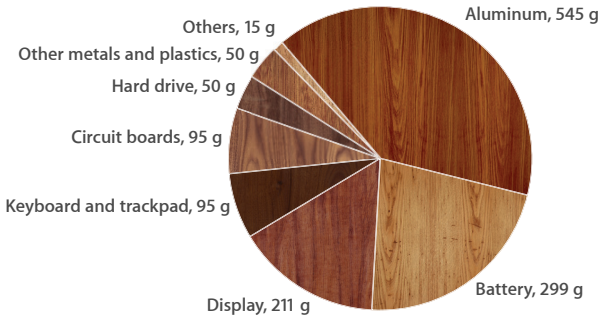
Free of lead, cadmium, and mercury in compliance with EU directive 98/101/EC

MacBook Air consumes 36% less volume than first-generation MacBook packaging.

Material Efficiency

Apple's ultra-compact product and packaging designs lead the industry in material efficiency. Reducing the material footprint of a product helps maximize shipping efficiency. It also helps reduce energy consumed during production and material waste generated at end of life. MacBook Air's enclosure is made of aluminum, a material highly desired by recyclers. The chart below details the materials used in MacBook Air.

Material Use for MacBook Air



Packaging

MacBook Air packaging uses corrugate cardboard made from a minimum of 25% post-consumer recycled content, and is free of expanded polystyrene (EPS). In addition, MacBook Air retail packaging is extremely material efficient, consuming 36% less material than the first generation MacBook Air, allowing up to 6% more units to fit per shipping container. The following table details the materials used in MacBook Air's packaging.

Packaging Breakdown for MacBook Air (U.S. configurations)

Material	Retail box	Retail and shipping box
Paper (corrugate, paperboard)	372 g	758 g
Expanded polypropylene	—	28 g
High impact polystyrene	232 g	232 g
Other plastics	44 g	58 g

Restricted Substances

Apple has long taken a leadership role in restricting harmful substances from its products and packaging. As part of this strategy all Apple products comply with the strict European Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, also known as the RoHS directive. Examples of materials restricted by RoHS include lead, mercury, cadmium, hexavalent chromium, and PBB, and PBDE brominated flame retardants (BFRs). MacBook Air goes even further than the RoHS Directive by incorporating the following more aggressive restrictions:

- Mercury-free display
- Arsenic-free display glass
- Majority of PCB laminates, electrical components, and enclosure parts are free of brominated flame retardants (BFRs)
- All internal cables are free of polyvinyl chloride (PVC)

Recycling

Through ultra-efficient design and use of highly recyclable materials, Apple has minimized material waste at product end of life. In addition, Apple offers and participates in various product take-back and recycling programs in 95% of the regions where Apple products are sold. All products are processed in the country or region in which they are collected. For more information on how to take advantage of these programs, visit www.apple.com/environment/recycling/.

Definitions

EPEAT, Electronic Product Environmental Assessment Tool: EPEAT is a program which ranks computers and displays based on environmental attributes in accordance with IEEE 1680. For more information visit www.epeat.net.

Greenhouse gas emissions: Estimated emissions are calculated in accordance with guidelines and requirements as specified by ISO 14040 and ISO 14044. Calculation includes emissions from the following life cycle phases contributing to Global Warming Potential (GWP 100 years) in CO_2 equivalency factors (CO_2e).

- **Production:** Includes the extraction, production, and transport of raw materials; and the manufacture of the product as well as product packaging.
- **Transport:** Includes air and sea transportation of the finished product and its associated packaging from the manufacturing site to continental distribution hubs. Transport of products from distribution hubs to the end customer is not included.
- **Use:** End user power consumption assumes a 4 year period. Consumption patterns are modeled according to European Commission and US Environmental Protection computer eco-design studies. Geographic differences in the power grid mix have been accounted for at a continental level.
- **Recycling:** Includes transportation from collection hubs to recycling centers, and the energy used in mechanical separation and shredding of parts.

Energy efficiency terms: The energy values in this report are based on the ENERGY STAR® Program Requirements for Computers Version 4.0 and/or ENERGY STAR® Program Requirements for Single Voltage External AC-DC and AC-AC Power Supplies. For more information visit www.energystar.gov.

- **Off:** Lowest power mode of the system when the battery is fully charged and the system is shut down. Also referred to as standby.
- **Idle—Display on:** System is on and has completed loading Mac OS X; the display set to its full brightness.
- **Idle—Display off:** System is on and has completed loading Mac OS X; the display set to sleep.
- **Sleep:** Low power state that is entered automatically after 10 minutes of inactivity (default), or by selecting "Sleep" from the Apple menu.
- **Power adapter, no-load:** Condition in which the power adapter is connected to AC power, but not connected to the system.
- **Power adapter efficiency:** Average of the power adapter's measured efficiency when tested at 100%, 75%, 50%, and 25% of the power adapter's rated current.

Restricted substances: Apple defines a material as BRF-free and PVC-free if it contains less than 900 parts per million (ppm) of bromine and chlorine.