iPhone 4S

Environmental Report



Date introduced

September 12, 2012

Environmental Status Report

iPhone 4S is designed with the following features to reduce environmental impact:

- Arsenic-free display glass
- Mercury-free LED-backlit display
- Brominated flame retardant–free
- PVC-free
- Majority of packaging made from post-consumer recycled fiberboard and bio-based materials
- Power adapter that outperforms strictest global energy efficiency standards

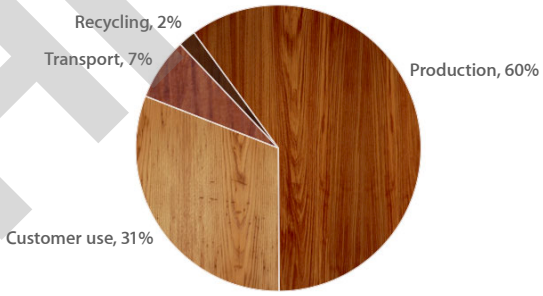
Apple and the Environment

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 types of materials used in their manufacture, improving their energy efficiency, and designing them for better recyclability. The information below details the environmental performance of iPhone 4S as it relates to climate change, energy efficiency, material efficiency, and restricted substances.

Climate Change

Greenhouse gas emissions have an impact on the planet's balance of land, ocean, and air temperatures. 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 greenhouse gas emissions for iPhone 4S over its life cycle.*

Greenhouse Gas Emissions for iPhone 4S



Total greenhouse gas emissions: 55 kg CO_2e

Energy Efficiency

iPhone 4S uses power-efficient components and software that intelligently manage power consumption. In addition, the Apple USB Power Adapter outperforms the stringent requirements of the ENERGY STAR® specification for external power supplies. The following table details the energy efficiency of the Apple USB Power Adapter.

Energy Efficiency of the Apple USB Power Adapter

Mode	100V	115V	230V
Power adapter no-load	0.22W	0.23W	0.25W
Power adapter efficiency	74%	75%	70%

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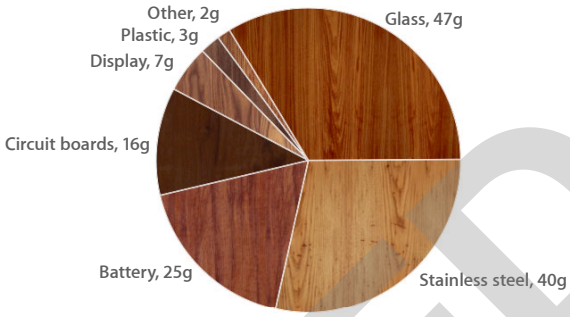
Battery chemistry

- Lithium-ion polymer
- Free of lead, cadmium, and mercury

Material Efficiency

Apple's ultracompact 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 the energy consumed during production and material waste generated at the end of the product's life. The chart below details the materials used in iPhone 4S.

Material Use for iPhone 4S





U.S. retail packaging of iPhone 4S is 14 percent lighter and consumes 14 percent less volume than the iPhone 3GS packaging.

Packaging

The packaging for iPhone 4S is almost entirely recyclable, and its retail box is made primarily from bio-based materials, including fiberboard containing 90 percent post-consumer recycled content. In addition, the iPhone 4S packaging is extremely material efficient, allowing more units to be transported in a single shipping container. The following table details the materials used in iPhone 4S packaging.

Packaging Breakdown for iPhone 4S (U.S. Configurations)

Material	Retail box
Paper (fiberboard, paperboard, paperfoam)	120g
Thermoformed polystyrene	11g
Other plastics	2g

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 the brominated flame retardants (BFRs) PBB and PBDE. iPhone 4S goes even further than the RoHS Directive by incorporating the following more aggressive restrictions:

- Arsenic-free display glass
- Mercury-free LED backlit display
- BFR–free
- PVC-free

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Recycling

Through ultra-efficient design and the use of highly recyclable materials, Apple has minimized material waste at the product's end of life. In addition, Apple offers and participates in various product take-back and recycling programs in 95 percent 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/recycling.

Definitions

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 transportation of raw materials, as well as the manufacture, transport, and assembly of all parts and product packaging.
- **Transport:** Includes air and sea transportation of the finished product and its associated packaging from manufacturing site to continental distribution hubs. Transport of products from distribution hubs to end customer is not included.
- **Use:** User power consumption assumes a three-year period. Product use scenarios are modeled on data that reflects intensive daily use of the product. 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 efficiency values in this report are based on the ENERGY STAR Program Requirements for Single Voltage External AC-DC and AC-AC Power Supplies. For more information, visit www.energystar.gov.

- **Power adapter no-load:** Condition in which the Apple USB Power Adapter is connected to AC power, but not connected to iPhone.
- **Power adapter efficiency:** Average of the power adapter's measured efficiency when tested at 100 percent, 75 percent, 50 percent, and 25 percent of the power adapter's rated output current.

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

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* Greenhouse gas emissions based on evaluation of iPhone 4S with 16GB capacity.

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