MacBook Pro with Retina Display

Environmental Report

Model MC975, MC976

Date introduced

June 11, 2012

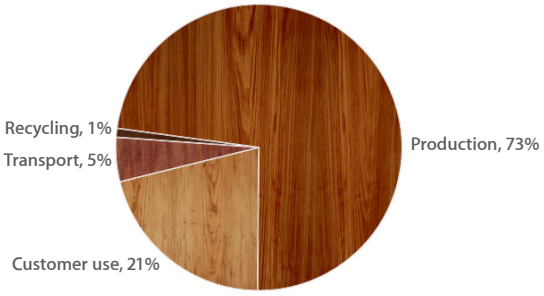
Apple and the Environment

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 manufacture, improving their energy efficiency, and designing them for better recyclability. The information below details the environmental performance of the 15-inch MacBook Pro with Retina display 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 the 15-inch MacBook Pro with Retina display over its life cycle.

Greenhouse Gas Emissions for 15-inch MacBook Pro with Retina Display



Total greenhouse gas emissions: 710 kg CO_2e

Energy Efficiency

Because one of the largest portions of product-related greenhouse gas emissions results from actual 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 Pro is energy efficient right out of the box.

The 15-inch MacBook Pro with Retina display outperforms the stringent requirements of the ENERGY STAR Program Requirements for Computers Version 5.2. It has been designed to be energy efficient, consuming 40 percent less energy than the original 15-inch MacBook Pro. The following table details the power consumed in different use modes.

Power Consumption for 15-inch MacBook Pro with Retina Display

Mode	100V	115V	230V
Off	0.26W	0.29W	0.31W
Sleep	1.01W	1.00W	1.03W
Idle—Display off / on	5.4W / 17.7W	5.3W / 18.5W	5.5W / 18.4W
Power adapter, no-load	0.004W	0.005W	0.020W
Power adapter efficiency	89.7%	89.7%	90%

Environmental Status Report

The 15-inch MacBook Pro with Retina display 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*
- Highly recyclable aluminum and glass enclosure

Meets ENERGY STAR® Version 5.2 requirements

Battery chemistry

Lithium-ion polymer, 95 Whr; free of lead, cadmium, and mercury

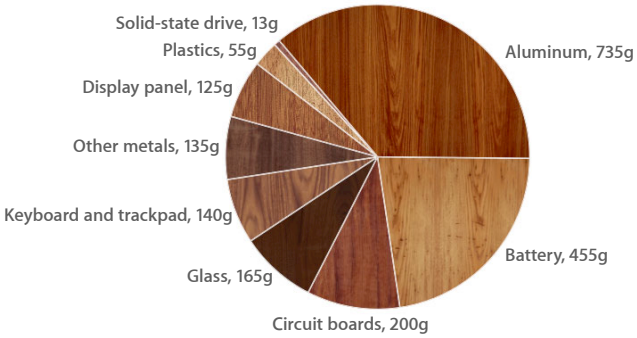
Battery design

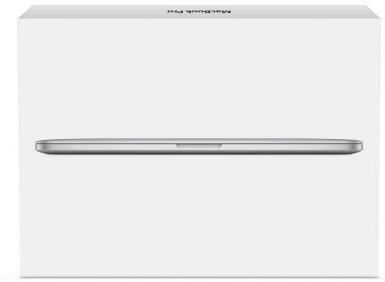
The 15-inch MacBook Pro with Retina display features a breakthrough battery design that dramatically improves its lifespan—up to five years. So it uses just one battery in the same time a typical notebook uses three.

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 the end of the product's life. Waste is further minimized through the use of batteries that last up to three times longer than typical notebook batteries. The 15-inch MacBook Pro with Retina display is made of aluminum and other materials highly desired by recyclers. The chart below details the materials used in this model.

Material Use for 15-inch MacBook Pro with Retina Display





Packaging for the 15-inch MacBook Pro with Retina display is extremely material efficient, allowing at least 84 percent more units than the original 15-inch MacBook Pro to fit in each shipping container.

Packaging

The packaging for the 15-inch MacBook Pro with Retina display uses corrugated cardboard made from a minimum of 30 percent recycled content and molded fiber made entirely from recycled content. In addition, the packaging is extremely material efficient, allowing at least 84 percent more units than the original 15-inch MacBook Pro to fit in each shipping container. The following table details the materials used in its packaging.

Packaging for 15-inch MacBook Pro with Retina Display (U.S. Configurations)

Material	Retail box	Retail and shipping box
Paper (corrugate, paperboard)	427g	826g
Molded fiber	—	292g
High-impact polystyrene	238g	238g
Other plastics	24g	24g

Restricted Substances

Apple has long taken the lead 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. The 15-inch MacBook Pro with Retina display goes even further than the requirements of the RoHS Directive by incorporating the following more aggressive restrictions:

- Arsenic-free display glass
- Mercury-free LED-backlit display
- BFR-free
- Polyvinyl chloride (PVC)–free internal cables and power adapter DC cable
- PVC-free AC power cord available in all regions except China and South Korea

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 transport of raw materials, as well as the manufacture of the product and 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:** User power consumption assumes a four-year period. Consumption patterns are modeled according to European Commission and U.S. Environmental Protection Agency 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 5.2 and/or ENERGY STAR Program Requirements for Single Voltage External AC-DC and AC-AC Power Supplies Version 2.0. 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 is set to its full brightness.
- **Idle—Display off:** System is on and has completed loading Mac OS X; the display is 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. Wake for network access enabled.
- **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 percent, 75 percent, 50 percent, and 25 percent of the power adapter's rated 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.

* PVC-free AC power cord available in all regions except China and South Korea.