



iPad Environmental Report



Date introduced
March 27, 2018

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 iPad as it relates to climate change, energy efficiency, material efficiency, and restricted substances.¹

Environmental Status Report

iPad 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
- Beryllium-free
- Recyclable and low-carbon aluminum enclosure
- Speaker enclosures made with 60 percent recycled plastic
- 100 percent of packaging fibers are sourced from responsibly managed forests, bamboo, waste sugarcane, or recycled paper



Meets ENERGY STAR® requirements

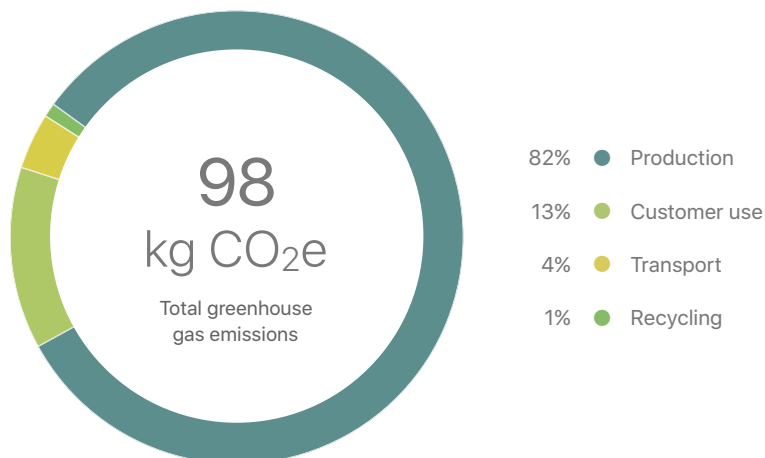


Achieves a Gold rating from EPEAT³

Climate Change

Greenhouse gas emissions have an impact on the planet's balance of land, ocean, and air temperatures. Most of Apple's greenhouse gas emissions come from the production, transport, use, and recycling of our products. Apple seeks to minimize product-related greenhouse gas emissions by designing products to be as energy efficient as possible, sourcing materials with lower-carbon emissions, and partnering with suppliers to procure clean energy to power their facilities. For example, Apple utilizes aluminum that is smelted using hydroelectricity rather than fossil fuels, and has reengineered the manufacturing process to reincorporate scrap aluminum. As a result, the greenhouse gas emissions associated with the aluminum enclosure of iPad are 25 percent less than those of the previous-generation iPad. The chart below provides the estimated greenhouse gas emissions for iPad over its life cycle.²

Greenhouse Gas Emissions for iPad—32GB model (Wi-Fi)





Battery design

iPad features a battery that is free of lead, cadmium, and mercury. In addition, the lithium-ion polymer chemistry extends the lifespan of the battery, enabling it to deliver up to 1000 full charge and discharge cycles before it reaches 80 percent of its original capacity.

Energy Efficiency

A significant portion of product-related greenhouse gas emissions occurs during the customer use phase. Energy efficiency is therefore prioritized throughout the product’s design. iPad uses power-efficient components and software that intelligently manages power consumption. In addition, iPad outperforms the stringent requirements of the ENERGY STAR Program Requirements for Computers. The following table details the power consumed by iPad in different use modes.

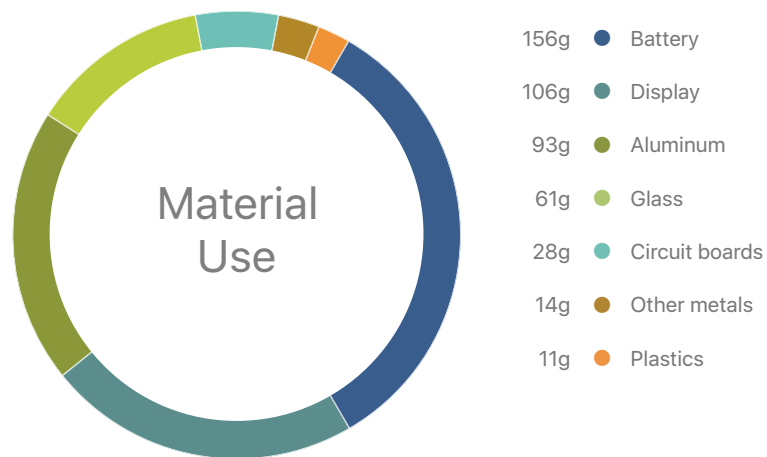
Power Consumption for iPad

Mode	100V	115V	230V
Sleep	0.22W	0.23W	0.22W
Idle—Display on	2.98W	3.35W	3.34W
Power adapter, no-load	0.042W	0.041W	0.044W
Power adapter efficiency	81.0%	81.4%	77.5%

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 energy consumed during production and material waste generated at the end of the product’s life. iPad is made of aluminum and other materials highly desired by recyclers. In addition, the speaker enclosures are made from 60 percent recycled content, which reduces the dependence on finite resources. The chart below details the materials used in iPad.⁴

Material Use for iPad





U.S. retail packaging of iPad contains 90 percent less plastic than the previous-generation packaging and contains at least 43 percent recycled content.

Packaging

The packaging for iPad is highly recyclable, and 100 percent of the fiber in its retail box is from recycled content, bamboo, waste sugarcane, or responsibly managed forests. The following table details the materials used in iPad packaging.¹

Packaging Breakdown for iPad

Material	Retail box	Retail and shipping box
Fiber (paperboard, corrugate, non-wood fiber)	186g	410g
Plastic film	7g	7g

Restricted Substances

Apple has long taken a leadership role in restricting harmful substances from our 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. iPad 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
- PVC-free
- Beryllium-free



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 99 percent of the countries where Apple sells products, including at all Apple Stores. For more information on how to recycle your products at end of life, visit www.apple.com/recycling.

Definitions

Electronic Product Environmental Assessment Tool (EPEAT): A program that ranks computers and displays based on environmental attributes in accordance with IEEE 1680.1-2018. 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 for the following life-cycle phases contributing to Global Warming Potential (GWP 100 years) in CO₂ equivalency factors (CO₂e):

- **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 the manufacturing site to regional distribution hubs. Transport of products from distribution hubs to end customer is modeled using average distances based on regional geography.
- **Customer use:** Apple conservatively assumes a three-year period for power use by first owners. Product use scenarios are based on historical customer use data for similar products, collected anonymously. Geographic differences in the power grid mix have been accounted for at a regional level.
- **Recycling:** Includes transportation from collection hubs to recycling centers, and the energy used in mechanical separation and shredding of parts.

Energy efficiency terms: iPad is tested with a fully charged battery and powered by the 12W USB Power Adapter with the Lightning to USB Cable (1m). The energy efficiency values in this report are based on the ENERGY STAR Program Requirements for Computers. For more information, visit www.energystar.gov.

- **Sleep:** Low power state that is entered automatically after 2 minutes of inactivity (default), or by pressing the Sleep/Wake button. Connected to Wi-Fi. All other settings were left in their default state.
- **Idle—Display on:** Display brightness was set as defined by ENERGY STAR Program Requirements for Computers, and Auto-Brightness was turned off. Connected to Wi-Fi. All other settings were left in their default state.
- **Power adapter, no-load:** Condition in which the 12W USB Power Adapter with the Lightning to USB Cable (1m) is connected to AC power, but not connected to iPad.
- **Power adapter efficiency:** Average of the 12W USB Power Adapter with the Lightning to USB Cable (1m) 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. Apple defines a material as beryllium-free if it contains less than 1000 parts per million (ppm) of beryllium. Apple defines a material as RoHS compliant if it conforms to European Union Directive 2011/65/EU and its amendments, including exemptions for the use of lead. Apple is working to phase out the use of these exempted substances where technically possible. A complete list of Apple’s restrictions on hazardous substances is included in Apple’s Regulated Substances Specification at www.apple.com/environment/reports.

1. Product evaluations based on U.S. configurations of iPad 32GB (Wi-Fi).
2. Greenhouse gas emissions vary according to the configuration of iPad. The following table details the estimated greenhouse gas emissions for U.S. configurations of iPad over its life cycle.

Configuration	Greenhouse Gas Emissions
iPad 32GB Wi-Fi / Wi-Fi + Cellular	98 / 99 kg CO ₂ e
iPad 128GB Wi-Fi / Wi-Fi + Cellular	105 / 106 kg CO ₂ e

3. iPad achieved a Gold rating from EPEAT in the United States and Canada.
4. Excludes Apple Lightning to USB Cable and Apple USB Power Adapter. Mass will vary by configuration.

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