



iPhone 8 Environmental Report



Date introduced
September 12, 2017

Environmental Status Report

iPhone 8 is designed with the following features to reduce environmental impact:

- Arsenic-free display glass
- Mercury-free
- Brominated flame retardant-free
- PVC-free
- Beryllium-free
- Recyclable and low-carbon aluminum
- 100 percent of packaging fibers are sourced from responsibly managed forests, bamboo, waste sugarcane, or recycled paper



Achieves a Gold rating from EPEAT⁴

Apple and the Environment

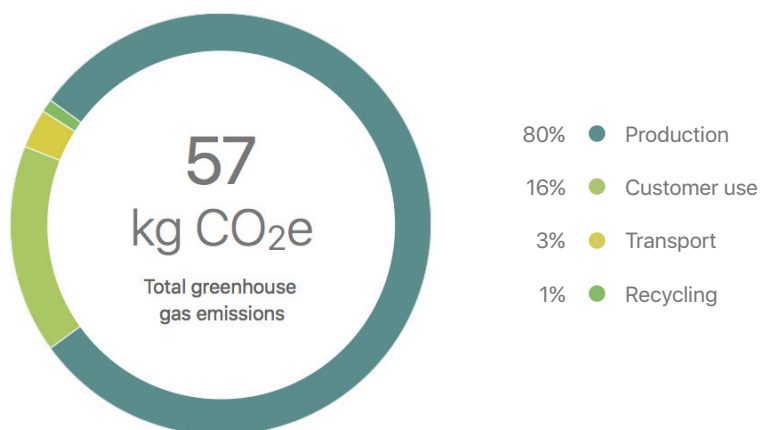
Apple believes that improving the environmental performance of our business starts with our products. The careful environmental management of our products throughout their life cycles includes controlling the quantity and types of materials used in their manufacture, improving their energy efficiency, and designing them for better recyclability. The information below details the environmental performance of iPhone 8 as it relates to climate change, energy efficiency, material efficiency, and restricted substances.¹

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 setting stringent design-related goals for material and energy efficiency, and by increasing use of renewable energy in our supply chain. 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, every gram of aluminum used in iPhone 8 generates 11 percent fewer greenhouse gas emissions than the aluminum used in iPhone 7, and 83 percent less than the aluminum used in iPhone 6.

In addition, Apple’s Supplier Clean Energy program has enabled direct iPhone suppliers to develop their own renewable energy projects to further reduce greenhouse gas emissions. These projects resulted in a 6 percent decrease in the greenhouse gas emissions from iPhone production, compared to what they would have been without renewable energy.² The chart below provides the estimated greenhouse gas emissions for iPhone 8 over its life cycle.³

Greenhouse Gas Emissions for iPhone 8—64GB model





Battery design

iPhone 8 features a lithium-ion polymer battery chemistry that is free of lead, cadmium, and mercury. This allows for an extended lifespan, and is designed to deliver up to 500 full charge and discharge cycles before it reaches 80 percent of its original capacity.

Energy Efficiency

iPhone 8 uses power-efficient components and software that intelligently manages power consumption. The following table details the energy efficiency of the Apple USB Power Adapter.

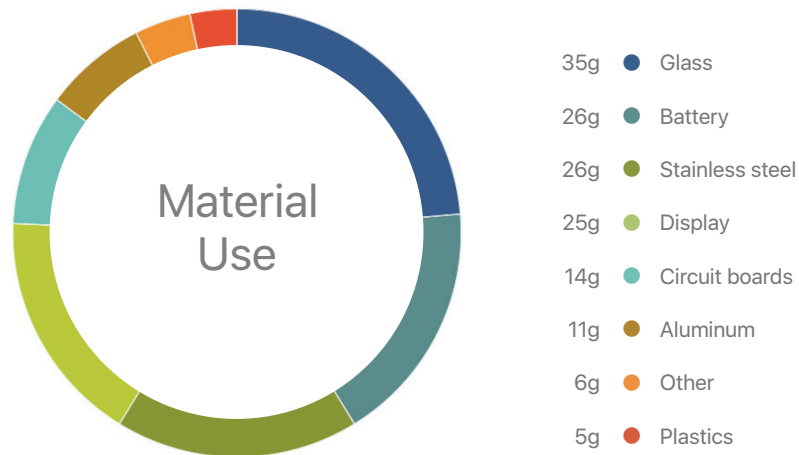
Energy Efficiency of the Apple USB Power Adapter

| Mode | 100V | 115V | 230V |
|--------------------------|--------|--------|--------|
| Power adapter, no-load | 0.014W | 0.014W | 0.012W |
| Power adapter efficiency | 74.3% | 74.3% | 73.1% |

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. iPhone 8 is made of aluminum and other materials highly desired by recyclers. In addition, plastics used in the internal antenna and receiver are made with 35 percent post-consumer recycled content, which reduces dependence on finite resources. The chart below details the materials used in iPhone 8.⁵

Material Use for iPhone 8





U.S. retail packaging of iPhone 8 contains 79 percent less plastic than iPhone 6s packaging and contains 59 percent recycled content.

Packaging

The packaging for iPhone 8 is highly recyclable, and 100 percent of the fiber in its retail box is either from recycled content, bamboo, waste sugarcane, or responsibly managed forests. Through the reduction of plastics in the packaging, the greenhouse gas emissions associated with the packaging of iPhone 8 are 57 percent less than those of iPhone 6s. The following table details the materials used in iPhone 8 packaging.¹

Packaging Breakdown for iPhone 8

| Material | Retail box |
|--|------------|
| Fiber (fiberboard, paperboard, non-wood fiber) | 163g |
| Plastic film | 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. iPhone 8 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 products are sold, including at all Apple Stores. All products are processed in the country or region in which they are collected. 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 mobile phones based on environmental attributes in accordance with UL 110. 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 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. 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: The energy efficiency values are based on the following conditions.

- **Power adapter, no-load:** Condition in which the Apple USB Power Adapter with the Lightning to USB Cable (1m) is connected to AC power, but not connected to iPhone.
- **Power adapter efficiency:** Average of the Apple 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. A complete list of Apple’s restrictions on hazardous substances is available at www.apple.com/environment/reports.

1. Product evaluations based on U.S. configurations of iPhone 8 64GB.
2. Greenhouse gas emissions reductions associated with the Supplier Clean Energy program were calculated relative to default grid emissions in the supplier’s country or region, based on best available data.
3. Greenhouse gas emissions vary according to the configuration of iPhone 8. The following table details the estimated greenhouse gas emissions for U.S. configurations of iPhone 8 over its life cycle.

| Configuration | Greenhouse Gas Emissions |
|----------------|--------------------------|
| iPhone 8 64GB | 57 kg CO ₂ e |
| iPhone 8 256GB | 71 kg CO ₂ e |

4. iPhone 8 achieved a Gold rating from EPEAT in the United States and Canada.
5. Excludes Apple Lightning to USB Cable and Apple USB Power Adapter. Mass will vary by configuration.

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