



iPhone XR Environmental Report




Date introduced
September 12, 2018

Environmental Status Report

iPhone XR 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 enclosure
- 100 percent of packaging fibers are sourced from responsibly managed forests, bamboo, waste sugarcane, or recycled paper
- Main logic board assembled with 100 percent recycled tin solder
- Cover glass frame made with 32 percent bio-based plastic
- Speaker enclosure made with 35 percent post-consumer recycled plastic

 Achieves a Gold rating from EPEAT⁴

Apple and the Environment

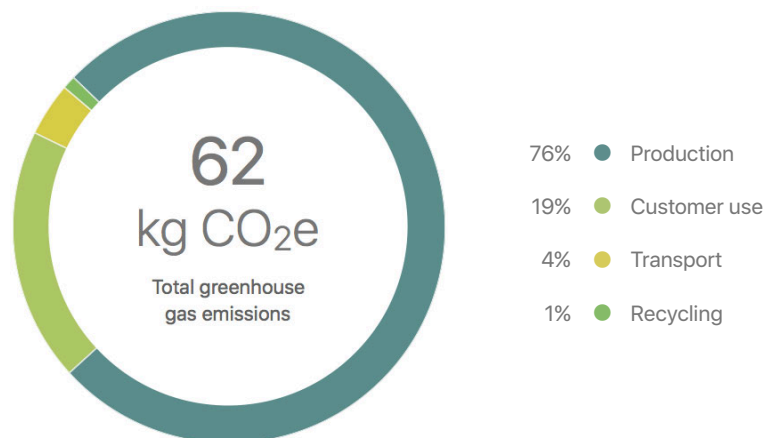
Apple believes that improving the environmental performance of our business starts with our products. The careful environmental management of our products throughout their life cycles includes controlling the quantity and types of materials used in their manufacture, improving their energy efficiency, and designing them for better recyclability. The information below details the environmental performance of iPhone XR 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, which reduces the greenhouse gas emissions by 68 percent. Apple has also reengineered the manufacturing process to reincorporate scrap aluminum, further reducing its carbon impact.

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 nearly a 5 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 XR over its life cycle.³

Greenhouse Gas Emissions for iPhone XR—64GB model





Battery design

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

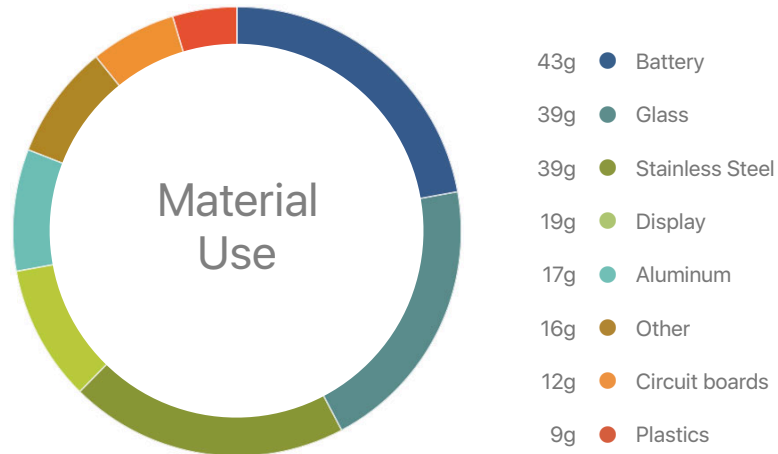
Power Consumption for Apple USB Power Adapter

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 XR is made of aluminum and other materials highly desired by recyclers. To help achieve Apple's goal of using only recycled or renewable materials, iPhone XR utilizes materials that reduce dependence on finite resources: the main logic board is assembled with 100 percent recycled tin solder, the cover glass frame is made with 32 percent bio-based plastic, and the speaker enclosure is made with 35 percent post-consumer recycled content. The chart below details the materials used in iPhone XR.⁵

Material Use for iPhone XR





U.S. retail packaging of iPhone XR contains 54 percent recycled content.

Packaging

The packaging for iPhone XR is highly recyclable, and 100 percent of the fiber in its retail box is from recycled content, bamboo, waste sugarcane, or responsibly managed forests. Through design and material selection, nearly all of the plastics in the packaging have been eliminated. The following table details the materials used in iPhone XR packaging.¹

Packaging Breakdown for iPhone XR

Material	Retail box
Fiber (fiberboard, paperboard, non-wood fiber)	187g
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 XR 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 efficient design and the use of highly recyclable materials, Apple has minimized material waste at the product's end of life. Through Apple GiveBack, customers can trade in eligible devices for an Apple Store Gift Card. If it's not eligible for credit, we'll recycle it for free. 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 every Apple Store. For more information on how to recycle your products at end of life, visit www.apple.com/giveback.

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. 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 iPhone XR 64GB.
2. Enclosure greenhouse gas emission reduction compared to average primary aluminum ingot. 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 XR. The following table details the estimated greenhouse gas emissions for U.S. configurations of iPhone XR over its life cycle.

Configuration	Greenhouse Gas Emissions
iPhone XR 64GB	62 kg CO ₂ e
iPhone XR 128 GB	67 kg CO ₂ e
iPhone XR 256GB	76 kg CO ₂ e

4. iPhone XR 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.