Product Environmental Report

iPhone 12

Date introduced
October 13, 2020

Made with better materials

99%
recycled tungsten

98%
recycled rare earth elements

Tackling climate change

100%
We're committed to transitioning our entire manufacturing supply chain to 100 percent renewable electricity by 2030.

Energy efficient

53%
less energy consumed than the U.S. Department of Energy requirements for battery charger systems

Smarter chemistry[1]

- Arsenic-free display glass
- Mercury-free
- Brominated flame retardant–free
- PVC-free
- Beryllium-free

Responsible packaging

100%
of the wood fiber comes from recycled and responsible sources

93%
of the packaging is fiber based, due to our work to use less plastic in packaging

Apple Trade In

Return your device through Apple Trade In and we'll give it a new life or recycle it for free.

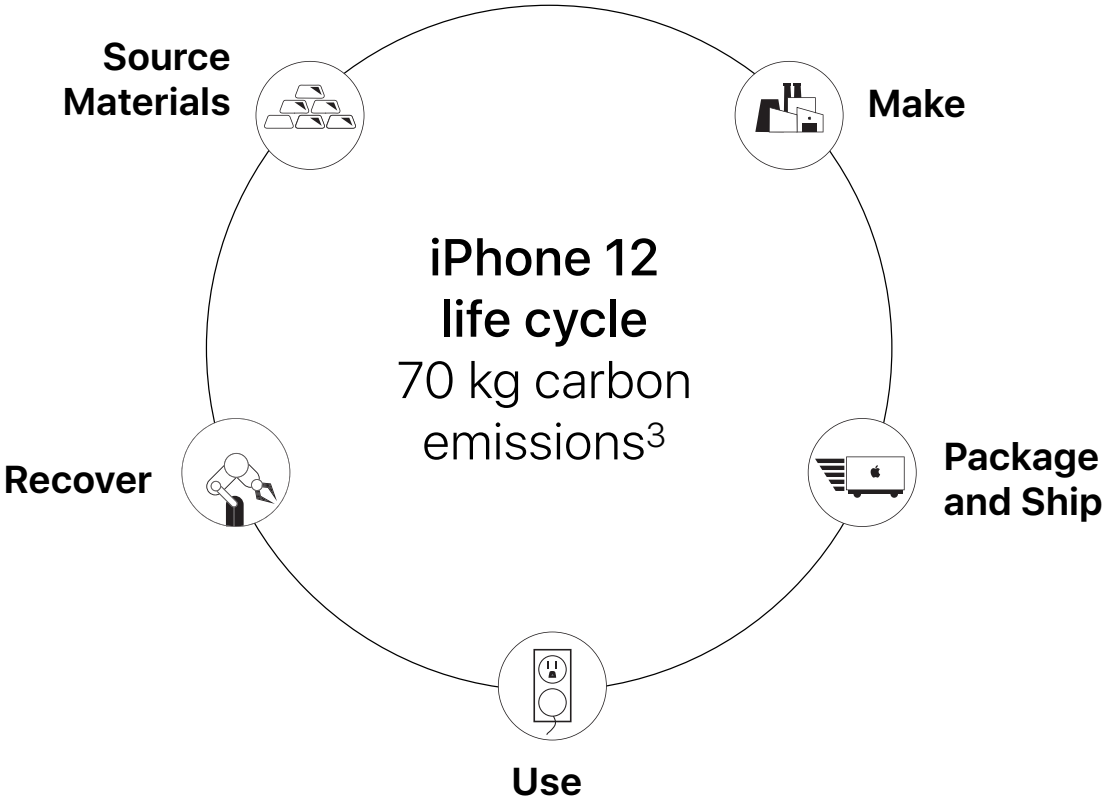
First smartphone with 100 percent recycled rare earth elements in all magnets

This report includes data current as of product launch. Product evaluations are based on U.S. configuration of iPhone 12.

Taking responsibility for our products at every stage

We take responsibility for our products throughout their life cycles—including the materials they are made of, the people who assemble them, and how they are recycled at end of life. And we focus on the areas where we can make the biggest difference for our planet: reducing our impact on climate change, conserving important resources, and using safer materials.

We sell millions of products. So making even small adjustments can have a meaningful impact.

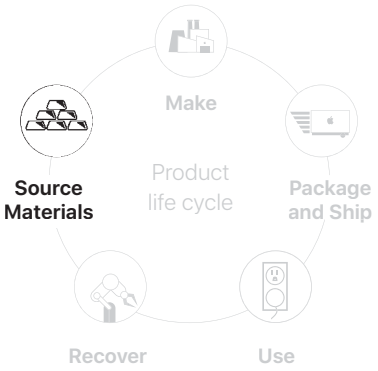


Carbon footprint

We continue to make progress in reducing Apple's contribution to climate change—by focusing on making energy-efficient products with renewable or recycled materials and with renewable energy. Suppliers' use of renewable energy through our Supplier Clean Energy Program and removal of select inbox accessories helped reduce emissions from production and transport of iPhone 12. And we continue to use low-carbon aluminum in the enclosure smelted using hydroelectricity rather than fossil fuels. Overall, with the inclusion of next-generation 5G technology, the iPhone 12 carbon footprint is about the same as the previous generation.[4] Apple is committed to using carbon life cycle assessments to identify opportunities to drive down product greenhouse gas emissions.

iPhone 12 life cycle carbon emissions

83%	Production
2%	Transport
14%	Use
<1%	End-of-life processing



Source Materials

iPhone 12 is the first Apple product made with recycled tungsten, and the first with majority recycled rare earth elements.

To conserve important resources, we work to reduce the material we use and aim to one day source only recycled or renewable materials in our products. And as we make this transition, we remain committed to the responsible sourcing of primary materials. We map many materials, some to the mineral source, and establish the strictest standards for smelters and refiners. We're proud to be recognized as a worldwide leader in the responsible sourcing of minerals in our products. Our product designs also consider the safety of those who make, use, and recycle our products, restricting the use of hundreds of harmful substances. Our standards go beyond what's required by law to protect people and the environment. By removing select inbox accessories across all of iPhone 12 and iPhone 12 Pro models, we anticipate avoiding the equivalent of mining more than 600,000 metric tons of of copper, zinc, and tin ore.[5]

Tungsten

We use 100 percent recycled tungsten in the Taptic Engine. This represents 99 percent of the total tungsten in the device—a first for a smartphone.

Rare earth elements

We use 100 percent recycled rare earth elements in all magnets, representing an unprecedented 98 percent of the total rare earth elements in the device.

Plastic

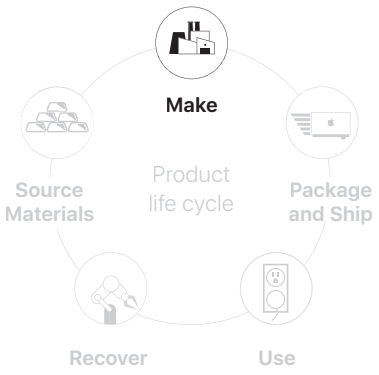
We're transitioning to plastics from renewable or recycled sources as alternatives to fossil fuel–based plastics. For iPhone 12, we use 35 percent or more recycled plastic in 14 components.

Tin

We use 100 percent recycled tin in the solder of the main logic board. Apple also requires 100 percent of identified tin, tantalum, tungsten, gold, and cobalt smelters and refiners to participate in third-party audits.[6]

Smarter chemistry

iPhone 12 is free of harmful substances like beryllium, brominated flame retardants, PVC, phthalates, arsenic in the display glass, and mercury.[1] And 100 percent of the materials in iPhone 12 are covered by our Regulated Substances Specification. We go beyond what's required by aiming to understand the non-regulated substances in every part of every product—an effort that requires an industry-leading level of transparency through the entire supply chain. We consistently identify the makeup of over 75 percent by mass of iPhone devices.



Make

The Apple Supplier Code of Conduct sets strict standards for the protection of people in our supply chain and the planet that we all share. Every year, we assess our suppliers' performance in upholding the standards required by our Code.

We work closely with our suppliers to provide safe and healthy workplaces where people are treated with dignity and respect, and to reduce suppliers' environmental impact. Our requirements apply across our supply chain, and include the responsible sourcing of materials. From the strong foundation set by our Code, we go further—from helping suppliers transition to renewable energy, to providing educational opportunities for their employees, to supporting final assembly suppliers in reducing waste.

Greener chemicals

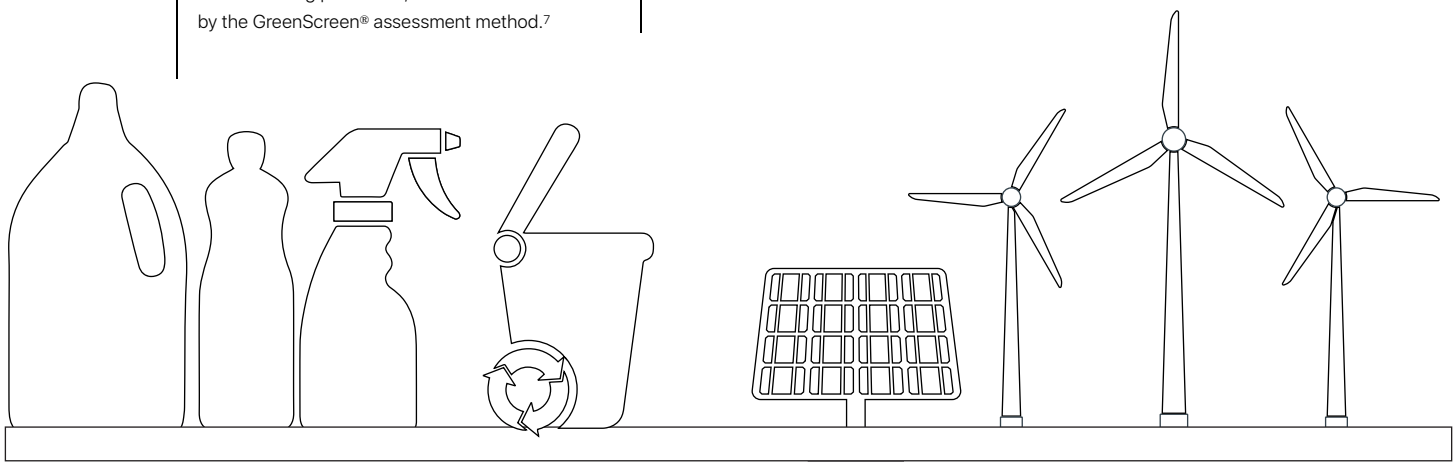
All iPhone 12 final assembly supplier sites use safer cleaners and degreasers in their manufacturing processes, as determined by the GreenScreen® assessment method.[7]

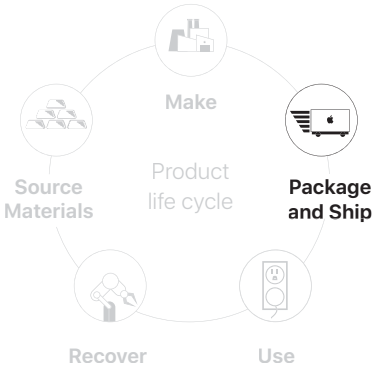
Zero Waste to Landfill

iPhone 12 final assembly supplier sites do not generate any waste sent to landfill.[8]

Supplier energy use

All iPhone 12 final assembly supplier sites are transitioning to 100 percent renewable energy for Apple production.





Package and Ship

iPhone 12 packaging is made with 100 percent recycled and responsibly sourced wood fiber.

To improve our packaging, we are working to eliminate plastics, increase recycled content, and use less packaging overall. All of the wood fiber in our packaging is either recycled or comes from responsibly managed forests.[9] And we have protected or created enough responsibly managed forests to cover all the virgin wood fiber we use in our packaging.[10] This ensures working forests are able to regrow and continue to clean our air and purify our water. With the removal of select inbox accessories, we reduced the weight of the iPhone 12 packaging by 39 percent and we reduced the carbon footprint from shipping.[11] And for the first time, we've replaced plastic films that protect the display with ones made from fiber—one step closer to eliminating plastics in our packaging.

93%

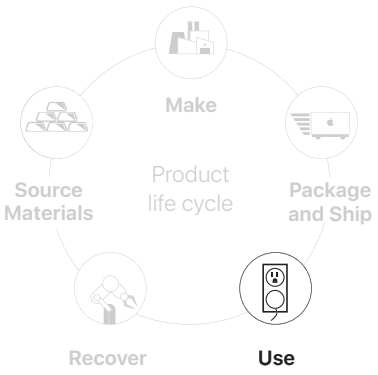
of the packaging[11] is fiber based, due to our work to use less plastic in packaging

72%

recycled content in fiber packaging

100%

of the virgin wood fiber in the packaging comes from responsibly managed forests[9]



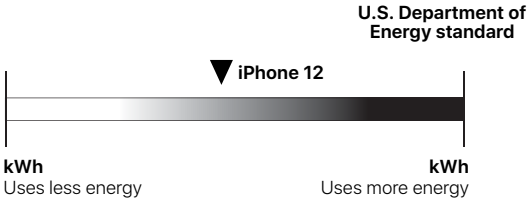
Use

iPhone 12 uses 53 percent less energy than the energy conservation standard.

We design our products to be energy efficient, long lasting, and safe. iPhone 12 uses software and power-efficient components that intelligently manage power consumption. We also run our own Reliability and Environmental Testing Labs, so our products go through rigorous testing before they leave our doors. Our support continues throughout each product's life cycle, with regular software updates to keep devices current and a network of authorized repair professionals to service them, if necessary.

Energy efficiency

Apple devices consistently exceed the U.S. Department of Energy Federal Energy Conservation Standards for Battery Chargers.[12] iPhone 12 consumes 53 percent less energy than required by this standard.

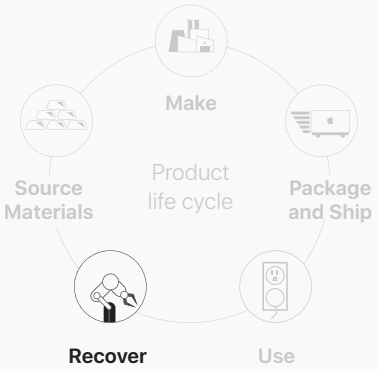


Designed to last

iPhone 12 will launch with iOS 14, which offers features to optimize battery charging and reduce the effects of battery aging.

Made with smarter chemistry

We apply rigorous controls for materials users touch—all based on recommendations from toxicologists and dermatologists.



Recover

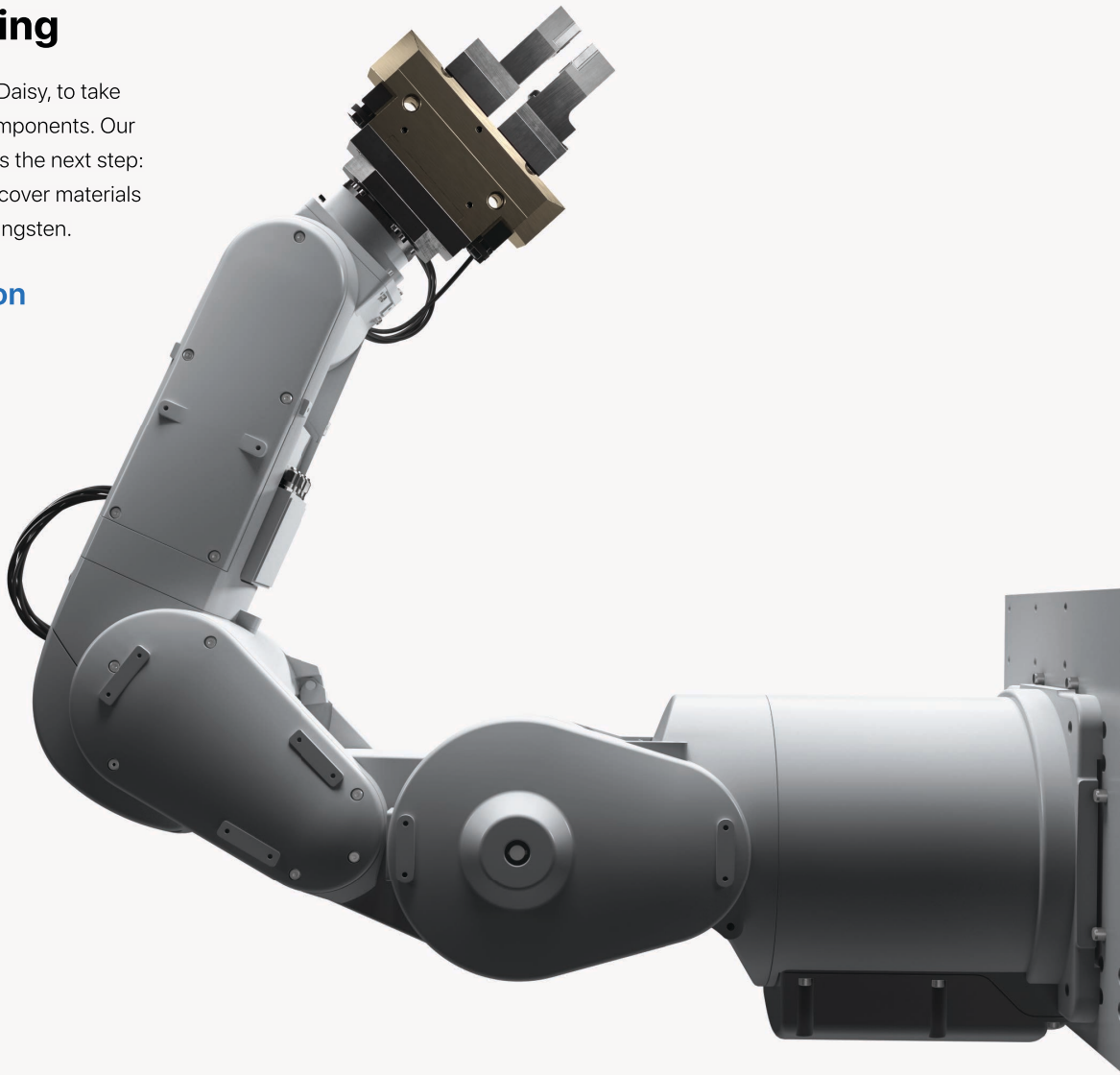
Return your product with Apple Trade In and we'll ensure it has a long life or recycle it for free.

When products are used longer, fewer resources are extracted from the earth. That's why we launched Apple Trade In—it offers customers a seamless way to return their old devices and accessories to Apple. Eligible devices can be traded in for credit or an Apple Store Gift Card, while accessories and other devices can be recycled for free.[13] We also offer and participate in product take-back and recycling collection programs for 99 percent of the countries where we sell products—and we hold our recyclers to high standards. Our efforts to keep harmful substances out of our products also mean our materials are safer to recover and reuse.

iPhone recycling

We designed a disassembly robot, Daisy, to take apart iPhone devices into distinct components. Our newest disassembly robot, Dave, takes the next step: disassembling the Taptic Engine to recover materials like rare earth elements and tungsten.

See Dave in action



Definitions

Recycled materials: Recycling makes better use of finite resources by sourcing from recovered rather than mined materials. Recycled content claims for materials used in our products have been verified by an independent third party to a recycled content standard that conforms to ISO 14021.

Bio-based plastics: Bio-based plastics are made from biological sources rather than from fossil-fuel sources. Bio-based plastics allow us to reduce reliance on fossil fuels.

Renewable materials: We define bio-materials as those that can be regenerated in a human lifespan, like paper fibers or sugarcane. Bio-materials can help us use fewer finite resources. But even though bio-materials have the ability to regrow, they are not always managed responsibly. Renewable materials are a type of bio-material managed in a way that enables continuous production without depleting earth's resources. That's why we focus on sources that are certified for their management practices.

Supplier Clean Energy Program: Since the electricity used to make our products is the largest contributor to our overall carbon footprint, we're helping our suppliers become more energy efficient and transition to new renewable energy sources. We're committed to transitioning our entire manufacturing supply chain to 100 percent renewable electricity by 2030.

Carbon footprint: Estimated emissions are calculated in accordance with guidelines and requirements as specified by ISO 14040 and ISO 14044. There is inherent uncertainty in modeling carbon emissions due primarily to data limitations. For the top component contributors to Apple's carbon emissions, Apple addresses this uncertainty by developing detailed process-based environmental models with Apple-specific parameters. For the remaining elements of Apple's carbon footprint, we rely on industry average data and assumptions. Calculation includes emissions for 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 regional distribution hubs. Transport of products from distribution hubs to end customers is modeled using average distances based on regional geography.
- **Use:** Apple assumes a three- or four-year period for power use by first owners based on the product type. 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.
- **End-of-life processing:** Includes transportation from collection hubs to recycling centers and the energy used in mechanical separation and shredding of parts. For more information on the carbon footprint, visit apple.com/environment/answers.

Endnotes

[1] Apple defines its restrictions on harmful substances, including definitions for what Apple considers to be "free of," in the Apple Regulated Substances Specification. Every Apple product is free of PVC and phthalates with the exception of AC power cords in India, Thailand (for 2-prong AC power cords), and South Korea, where we continue to seek government approval for our PVC and phthalates replacement. Apple products comply with the European Union Directive 2011/65/EU and its amendments, including exemptions for the use of lead such as high-temperature solder. Apple is working to phase out the use of these exempted substances where technically possible.

[2] iPhone 12 achieved a Gold rating in the United States and Canada, in accordance with IEEE 1680.1 or UL 110, and is listed as such on the Electronic Product Environmental Assessment Tool (EPEAT) Registry. EPEAT registers computers, displays, and mobile phones based on environmental requirements in these standards. For more information, visit www.epeat.net.

[3] Greenhouse gas emissions were calculated using a life cycle assessment methodology in accordance with ISO 14040 and 14044 standards and based on iPhone 12 with 64GB storage configuration. We often update our carbon models to leverage new information. As a result, our estimate for the carbon footprint of the previous generation—iPhone 11 with 64GB storage—decreased from 72 kg CO_2e (as published in its Product Environmental Report) to 70 kg CO_2e.

	Carbon footprint	
Configuration	**iPhone 12**	**iPhone 11**
64GB	70 kg CO_2e	70 kg CO_2e
128GB	75 kg CO_2e	75 kg CO_2e
256GB	85 kg CO_2e	87 kg CO_2e

Endnotes

[4] iPhone 11 was used for comparison as the most recently released and similar device. Preproduction iPhone 12 with 64GB storage was compared to shipping iPhone 11 with 64GB storage since these are the two lowest configurations offered.

[5] Reduction projected based on estimated production volumes.

[6] Third-party assessments seek to confirm sourcing practices and are part of our responsible sourcing program. In addition, our efforts consider conflict, human rights, and other risks.

[7] Only chemicals that meet GreenScreen® benchmark 3 or 4 are considered safer and preferred for use. Final assembly sites for iPhone 12 are among the 18 final assembly supplier facilities that have adopted these safer cleaners. GreenScreen® is a comprehensive hazard assessment tool that evaluates substances against 18 different criteria. For more information, visit www.greenscreenchemicals.org.

[8] Final assembly supplier sites for iPhone 12 are third-party certified as Zero Waste by UL LLC (UL 2799 Standard). UL requires at least 90 percent diversion through methods other than waste to energy to achieve Zero Waste to Landfill (Silver 90–94 percent, Gold 95–99 percent, and Platinum 100 percent) designations.

[9] Responsible sourcing of wood fiber is defined in Apple's Sustainable Fiber Specification. We consider wood fibers to include bamboo.

[10] For more information about our work to protect and create responsibly managed forests, please read our Environmental Progress Report.

[11] Breakdown of U.S. retail packaging by weight.

[12] Efficiency performance is based on the U.S. Department of Energy Federal Energy Conservation Standards for Battery Chargers. Please note that ENERGY STAR does not certify smartphone devices.

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 USB-C to Lightning Cable (1m) is connected to AC power, but not connected to iPhone.
- Power adapter efficiency: Average of the Apple 20W USB Power Adapter with the USB-C to Lightning Cable (1m) measured efficiency when tested at 100 percent, 75 percent, 50 percent, and 25 percent of the power adapter's rated output current.

	Power consumption for iPhone 12		
Mode	**100V**	**115V**	**230V**
Power adapter, no-load	0.04W	0.04W	0.05W
Power adapter efficiency	86.8%	87.9%	87.8%

[13] Trade-in values vary based on the condition, year, and configuration of your trade-in device, and may also vary between online and in-store trade-in. You must be at least 18 years old. In-store trade-in requires presentation of a valid, government-issued photo ID (local law may require saving this information). Additional terms from Apple or Apple's trade-in partners may apply.

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