Product Environmental Report

13-inch MacBook Air with Retina display

July 9, 2019

Tackling climate change

47%
fewer emissions compared to the previous MacBook Air (13-inch, 2017)

100%
renewable energy powering services like FaceTime, iMessage, Siri, and Apple Music

Made with better materials

35%
or more recycled plastic in the speakers and vent

100%
recycled tin in the solder of the main logic board

Energy efficient

62%
less energy consumed than the ENERGY STAR® energy efficiency requirement

Smarter chemistry[1]

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

Responsible packaging

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

87%
less plastic in retail packaging than the MacBook Air (13-inch, 2017)

Apple Trade In

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

The first Mac enclosure made with 100% recycled aluminum
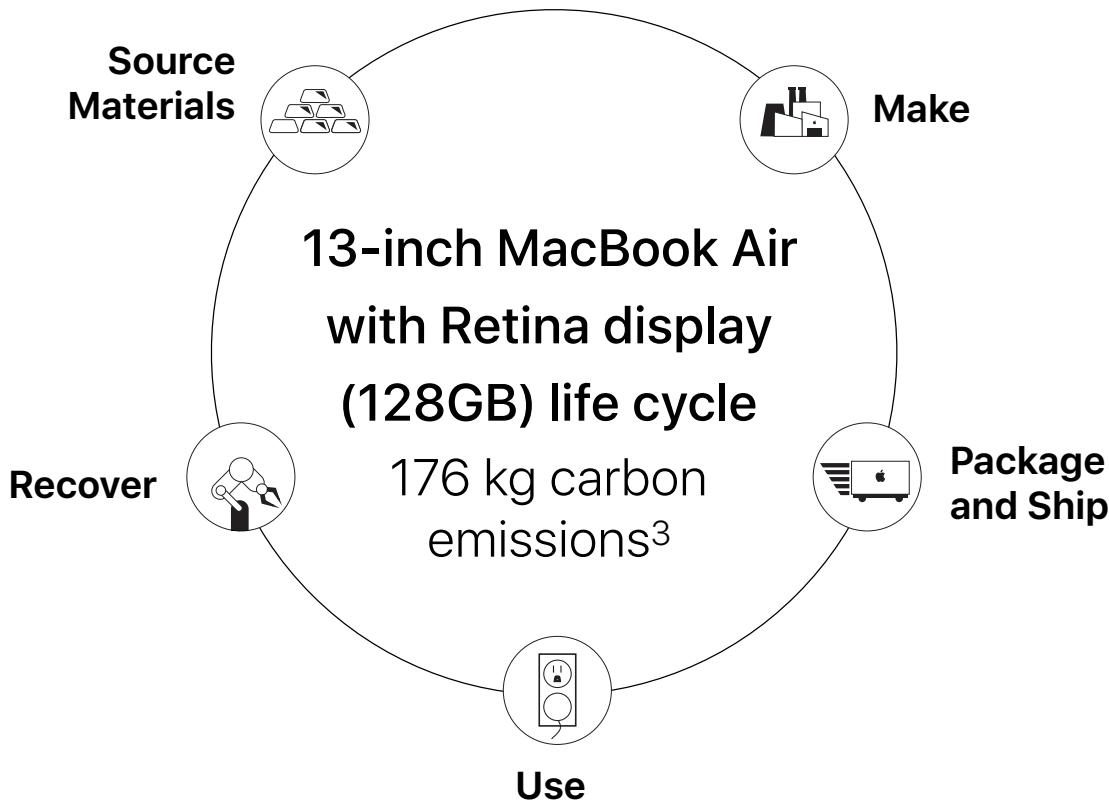
This report includes data current as of product launch. Product evaluations are based on U.S. configuration of the 13-inch MacBook Air with Retina display (128GB).

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.

Source Materials · Make · Package and Ship · Use · Recover

13-inch MacBook Air with Retina display (128GB) life cycle
176 kg carbon emissions[3]

Carbon footprint

By focusing on making energy-efficient products with recycled and bio-based materials as well as with renewable energy, the 13-inch MacBook Air with Retina display has the lowest carbon footprint of any Mac. This means we're reducing Apple's contribution to climate change.

13-inch MacBook Air with Retina display life cycle carbon emissions

77%	Production
17%	Transport
6%	Use
<1%	End-of-life processing

Source Materials
Make
Product life cycle
Package and Ship
Recover
Use

Source Materials

The enclosure of the 13-inch MacBook Air with Retina display is made of 100 percent recycled aluminum.

To conserve important resources, we work to reduce the material we use and aim to 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 identify and map materials in our products to the farthest reaches of our supply chain and proudly lead our industry in establishing the strictest standards for smelters and refiners. 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 far beyond what's required by law to protect people and the environment.

Aluminum

Apple created a new aluminum alloy made of 100 percent certified recycled aluminum[4] for the enclosure of the 13-inch MacBook Air with Retina display. This alloy delivers the same strength, durability, and flawless finish—without mining any new bauxite (aluminum ore) from the earth.

Plastic

We're transitioning to renewable and recycled alternatives from fossil fuel–based plastics. For the 13-inch MacBook Air with Retina display, we use these alternatives in a number of components like the vent (45 percent recycled), speakers (35 percent recycled), and keyboard butterfly mechanism (34 percent bio-based).

Tin

We use 100 percent recycled tin[5] in the solder of the main logic board and input/output board, where the majority of the tin is located. Apple requires 100 percent of identified tin, tantalum, tungsten, gold, and cobalt smelters and refiners to participate in third-party audits.[6]

Smarter chemistry

Free of harmful substances like mercury, brominated flame retardants, PVC, phthalates, beryllium, lead in the solder, and arsenic in the display glass.[1] And 100 percent of the materials in the 13-inch MacBook Air with Retina display are protected by our Regulated Substances Specification. We go even further by aiming to understand the nonregulated substances in every part of every product—so far we've identified the makeup of 75 percent by mass of the 13-inch MacBook Air with Retina display.
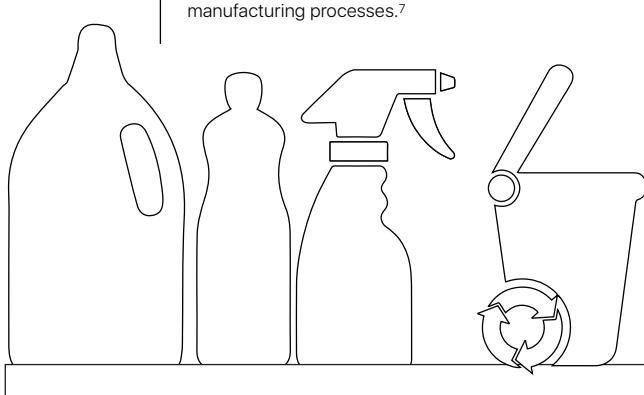
Make

Every year, we assess our suppliers against our Supplier Code of Conduct, which aims to make workplaces better for employees and for the environment.

We work closely with the suppliers that make our products to reduce their environmental impact, and we ensure that everyone making Apple products is treated with dignity and respect, given opportunities to advance, and works in a safe environment. Our Supplier Code of Conduct sets high expectations for our suppliers. With strong foundational standards, we can make further progress, from helping suppliers transition to renewable energy to providing educational opportunities for their employees.

Greener chemicals

All final assembly supplier sites for the 13-inch MacBook Air with Retina display use safer cleaners and degreasers in their manufacturing processes.[7]
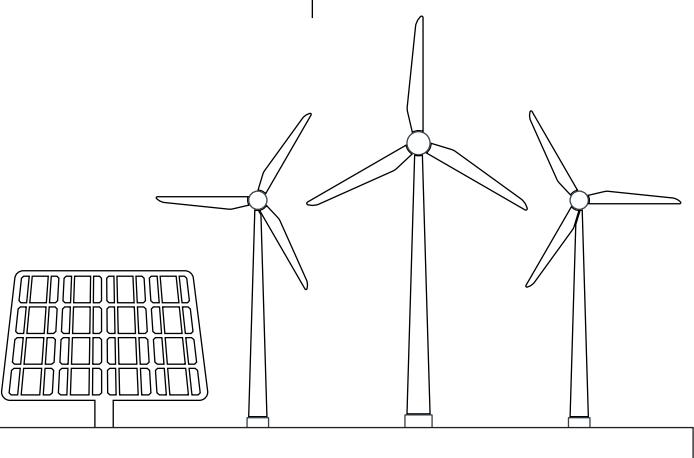
Zero Waste

All 13-inch MacBook Air with Retina display final assembly supplier sites are Zero Waste.[8]

Supplier energy use

Suppliers for the 13-inch MacBook Air with Retina display reduced manufacturing emissions equal to 1 kg CO_2e per unit.[9]

Make

Product
life cycle

Source
Materials

**Package
and Ship**

Recover

Use

Package and Ship

By replacing the tray and adapter wrap with fiber-based alternatives, we reduced the plastic used in retail packaging by 87 percent.

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.[10] And we have protected or created enough sustainably managed forests to cover all the wood fiber we use in our packaging. This ensures working forests are able to regrow and continue to clean our air and purify our water.

Smaller and lighter packaging also means fewer emissions from transporting our products— we take responsibility for that too.

100%

of the primary wood fiber in the packaging comes from responsibly managed forests[10]

87%

less plastic in retail packaging compared to the MacBook Air (13-inch, 2017)[11]

46%

recycled content in fiber packaging
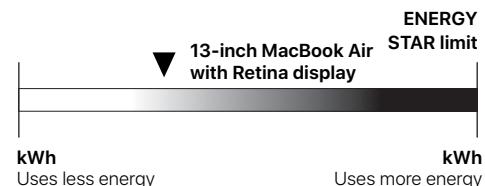
Use

The 13-inch MacBook Air with Retina display consumes 62 percent less energy than the limit for ENERGY STAR.

We design our products to be energy efficient, long lasting, and safe. The 13-inch MacBook Air with Retina display 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 consumption of ENERGY STAR–rated products

Apple devices consistently rank among the high-performing products rated by ENERGY STAR—which was established to represent the 25 percent most energy-efficient computers on the market. The 13-inch MacBook Air with Retina display consumes 30 percent less energy than the previous-generation MacBook Air (13-inch, 2017),[12] and 62 percent less energy than the requirement for ENERGY STAR.[13]

ENERGY STAR limit

13-inch MacBook Air with Retina display

kWh
Uses less energy

kWh
Uses more energy

Designed to last

The battery in the 13-inch MacBook Air with Retina display is designed to deliver up to 1000 full-charge and discharge cycles before it reaches 80 percent of its original capacity.

Made with safer materials

We apply rigorous controls for materials that users touch most—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 we'll 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 to Apple. Customers can trade in eligible devices for an Apple Store Gift Card.[14] If a device is not eligible for credit, we'll recycle it for free. We also offer and participate in product take-back and recycling 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.

Make

Product life cycle

Source Materials

Package and Ship

Recover

Use

Apple Trade In

For more information on how to recycle your products at end of life, visit:

www.apple.com/shop/trade-in

Definitions

Recycled materials: Recycling makes better use of finite resources by sourcing from recovered rather than mined materials. Recycled content claims for materials 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. As part of this program, Apple and our suppliers are working to generate and procure more than 4 gigawatts of new renewable energy worldwide by 2020. This goal represents approximately one-third of our current manufacturing carbon footprint.

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 conservatively assumes a four-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.

- **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 https://www.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, 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] The 13-inch MacBook Air with Retina display achieved a Gold rating for EPEAT in the United States and Canada. Electronic Product Environmental Assessment Tool (EPEAT) is 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.

[3] Greenhouse gas emissions were calculated using a life cycle assessment methodology and based on the 13-inch MacBook Air with Retina display (128GB) memory configuration.

Carbon footprint			
13-inch MacBook Air with Retina display		**MacBook Air (13-inch, 2017)**	
1.6GHz Processor with 128GB Storage	176 kg CO_2e	1.8GHz Processor with 128GB Storage	336 kg CO_2e
1.6GHz Processor with 256GB Storage	198 kg CO_2e	1.8GHz Processor with 256GB Storage	361 kg CO_2e

[4] The recycled content claim applies to the aluminum in the enclosure, and was verified by an independent third party to a recycled content standard that conforms to ISO 14021.

[5] The recycled content claim applies to the tin in the solder.

Endnotes

[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. In 2017, 18 final assembly supplier facilities adopted these safer cleaners. And in 2018, 100% of process chemicals used at final assembly supplier facilities were verified to comply with Apple Regulated Substances Specification for the third year in a row. 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 the 13-inch MacBook Air with Retina display are third-party certified as Zero Waste by UL LLC. This means these final assembly sites do not generate any waste sent to landfill.

[9] Percent emissions reduction from supplier renewable energy is based on estimated operational loads as of product launch, compared to default grid emissions.

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

[11] The previous-generation MacBook Air (13-inch, 2017) was used for comparison as the most recent and similar device with the same screen size.

[12] The ENERGY STAR Total Energy Consumption (TEC) calculation was used to compare current and previous-generation products.

[13] Energy consumption and efficiency values are based on the ENERGY STAR® Program Requirements for Computers, including the max energy allowance for the 13-inch MacBook Air with Retina display. For more information, visit www.energystar.gov. ENERGY STAR and the ENERGY STAR mark are registered trademarks owned by the U.S. Environmental Protection Agency.

The 13-inch MacBook Air with Retina display is tested with a fully charged battery and powered by the 30W USB-C Power Adapter with the USB-C Charge Cable (2m).

- Off: Lowest power mode of the system. System is shut down.
- 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.
- Idle—Display on: System is on and has completed loading macOS. Display brightness was set as defined by ENERGY STAR Program Requirements for Computers and Auto-Brightness was turned off. Connected to Wi-Fi.
- Power adapter, no-load: Condition in which the 30W USB-C Power Adapter with the USB-C Charge Cable (2m) is connected to AC power, but not connected to the system.
- Power adapter efficiency: Average of the 30W USB-C Power Adapter with the USB-C Charge Cable (2m) 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 13-inch MacBook Air with Retina display			
Mode	100V	115V	230V
Off	0.05W	0.05W	0.05W
Sleep	0.25W	0.25W	0.25W
Idle—Display on	3.09W	3.12W	3.11W
Power adapter, no-load	0.02W	0.02W	0.01W
Power adapter efficiency	90.5%	91.0%	91.8%

[14] 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.