Product Environmental Report

MacBook Air with M3 chip

Date introduced
March 4, 2024

Progress toward our 2030 goal

50% recycled content[1]

Over 25% of manufacturing electricity sourced from supplier clean energy projects[2]

Responsible packaging

100% recycled or responsibly sourced wood fibers

99% fiber-based, due to our work to eliminate plastic in packaging[3]

Supplier Responsibility

The Apple Supplier Code of Conduct sets strict standards for safeguarding people and the environment in our supply chain.

Smarter chemistry[4]

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

Longevity

To ensure durability, we assessed MacBook Air with M3 chip in our Reliability Testing Lab, using rigorous testing methods that simulate a customer's experience.

Recovery

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

Apple's first product with 50 percent recycled content

This report includes data current as of product launch. Product evaluations are based on U.S. configuration of 15-inch MacBook Air with M3 chip and 256GB. Product carbon footprint calculations include in-box accessories as well as packaging.

ENERGY STAR

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Our product carbon neutrality strategy

Our goal is for Apple and all the products we make to be carbon neutral by 2030, reducing our total carbon emissions to no more than 9.6 million metric tons—at least a 75 percent reduction against our 2015 baseline. The only way to reach this ambitious goal is to substantially decarbonize our products.

Our plan to decarbonize products is rigorous and focuses on transitioning to clean electricity, designing with recycled and low-carbon materials, and prioritizing lower-carbon ways of shipping products, like with ocean freight. Only after we've substantially reduced emissions will we apply credits from high-quality carbon removal projects to achieve carbon neutrality.

How we are reducing emissions

- **Transition to 100% clean electricity for manufacturing:** To eliminate emissions from the electricity used to make products, we're prioritizing manufacturing energy efficiency and helping to transition our entire supply chain to 100 percent clean electricity.[6]
- **Transition to 100% clean electricity for product use:** To gradually negate emissions from the electricity our customers use to charge their Apple products, we're prioritizing product energy efficiency and investing in clean energy projects around the world.
- **Prioritize non-air transportation:** To reduce emissions from transporting products, we're prioritizing the use of lower-carbon non-air shipping modes, like ocean or rail.
- **Use recycled and low-carbon materials:** To address emissions generated by using primary materials, we're increasing the recycled content of our products, maximizing material and manufacturing efficiencies, and improving yields. And where we've not yet fully transitioned to recycled content, we're prioritizing low-carbon materials, such as aluminum smelted with hydroelectricity.

How we'll get to carbon neutral

For emissions that remain after reductions, we and our suppliers are supporting nature-based solutions that result in high-quality carbon credits. These play an important role in addressing our climate crisis, as nature-based solutions contribute to the health of ecosystems in addition to removing carbon from the atmosphere. We are aligned with the scientific consensus that these solutions should only be deployed alongside aggressive emissions reductions.

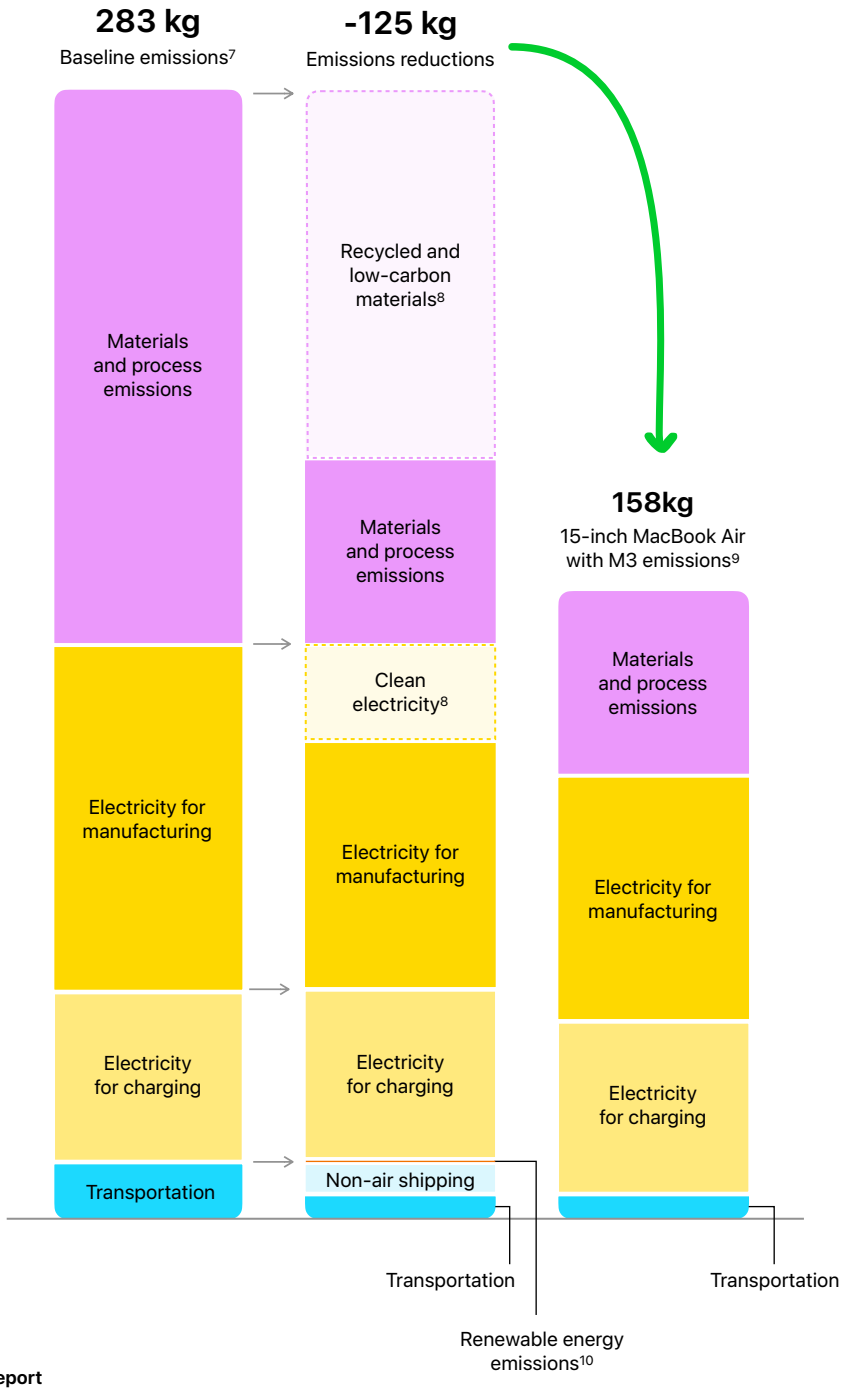
How we're monitoring progress

We first calculate the final carbon footprint of the product using a life cycle carbon analysis approach, in accordance with international standards. To help ensure our work is translating to real reductions, we consider what emissions would have been without our actions. We apply the following assumptions to create this baseline scenario:

- No use of clean electricity for manufacturing or product use, beyond what is already available on the latest modeled grid (based on regional emissions factors).
- Apple's carbon intensity of key materials as of 2015. Carbon intensity of materials reflects use of recycled content and production technology.
- Apple's average mix of transportation modes (air, rail, ocean, ground) by product line across three years (fiscal years 2017 to 2019) to best capture the baseline transportation emissions of our products.

Progress toward carbon neutral

We've reduced emissions for 15-inch MacBook Air with M3 chip by 44 percent against our baseline.[7] This device contains 50 percent recycled content, reducing product emissions by about 32 percent. We're also working with our suppliers to transition to 100 percent clean electricity for Apple production. The clean electricity solutions that suppliers have already implemented to date have reduced 15-inch MacBook Air with M3 chip emissions by 8 percent. In our carbon footprint calculations, we also account for the emissions necessary to generate clean electricity, specifically to manufacture and maintain renewable energy infrastructure, like wind and solar farms.



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 build 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

MacBook Air with M3 chip contains a total of 50 percent recycled content.[1]

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're proud to be recognized as a worldwide leader in the responsible sourcing of minerals in our products. We map many materials, some to the mineral source, and establish the strictest standards for smelters and refiners. Apple also requires all identified tin, tantalum, tungsten, gold, cobalt, and lithium smelters and refiners to participate in third-party audits.[11] 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.

Aluminum. We use 100 percent recycled aluminum in the enclosure and trackpad gel plate.

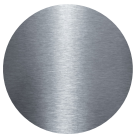
Plastic. We use 35 percent or more recycled plastic in 10 components.

Tin. We use 100 percent recycled tin in the solder of multiple printed circuit boards.

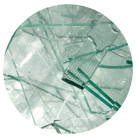
Rare earth elements. We use 100 percent recycled rare earth elements in all magnets, representing 99 percent of the total rare earth elements in the device.

Copper. We're now using 100 percent recycled copper foil in multiple printed circuit boards, 100 percent recycled copper in the thermal sheet, and—in a first for Apple—100 percent recycled copper in the main logic board.

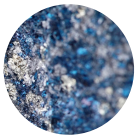
Gold. We use 100 percent recycled gold in the plating of multiple printed circuit boards.



Steel. We use 90 percent recycled steel in the battery tray, keyboard feature plate, and trackpad beam plate.



Glass. We use 15 percent recycled glass in the display panel and trackpad glass.



Cobalt. We use 100 percent recycled cobalt in the battery[12] and the magnets of the MagSafe connector.

Smarter chemistry

MacBook Air with M3 chip is free of harmful substances like beryllium, brominated flame retardants, PVC, phthalates, arsenic in the glass, and mercury.[4] And 100 percent of the materials in MacBook Air with M3 chip 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 80 percent by mass of MacBook Air devices.

Make

The Apple Supplier Code of Conduct sets strict standards for safeguarding people and the environment in our supply chain. 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 clean electricity, to providing educational opportunities, to supporting suppliers in reducing waste. For more information, see apple.com/supplier-responsibility.

Greener chemicals

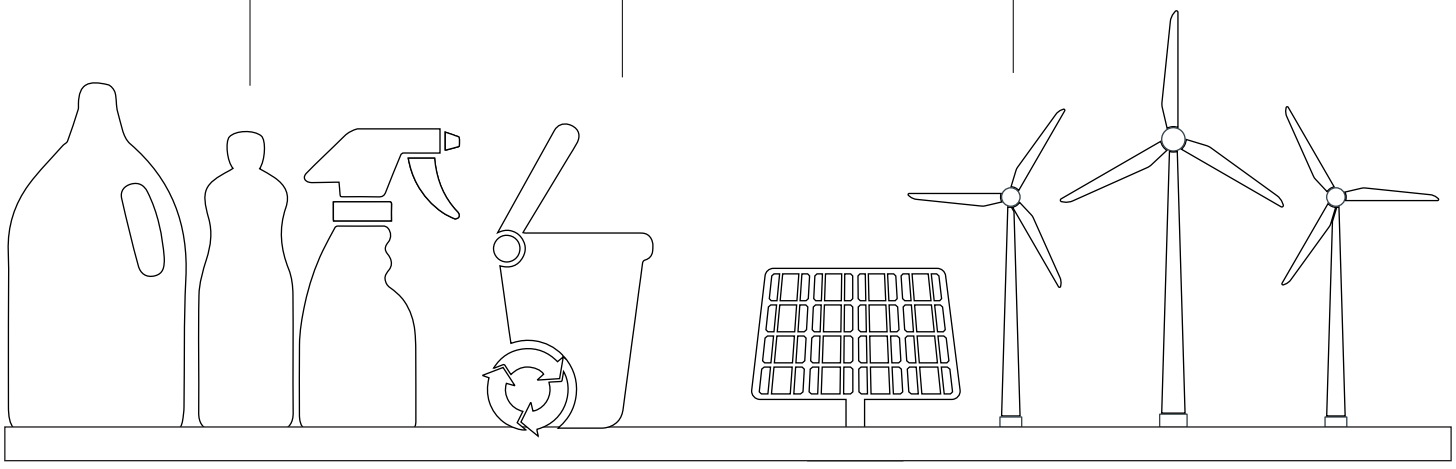
All established Mac final assembly supplier sites use safer cleaners and degreasers in their manufacturing processes, as determined by methodologies like the GreenScreen® assessment.[13]

Zero Waste to Landfill

No established Mac final assembly supplier sites generate any waste sent to landfill.[14]

Supplier energy use

Over 25 percent of manufacturing electricity is sourced from supplier clean energy projects, supported by Apple's Supplier Clean Energy Program.[2]



Package and Ship

MacBook Air with M3 chip packaging is 99 percent fiber-based, which brings us one step closer to our goal of removing plastic from all our packaging by 2025.[3]

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.[15] And we have protected or created enough responsibly managed forests to cover all the virgin wood fiber we use in our packaging.[16] This ensures working forests are able to regrow and continue to clean our air and purify our water.

As we transport our products from our manufacturers to our consumers, we're prioritizing less carbon-intensive shipping modes than air transport, such as rail and ocean.

99%

of the packaging[3] is fiber-based, due to our work to eliminate plastic in packaging

53%

recycled content in fiber packaging

100%

of the virgin wood fiber in the packaging comes from responsibly managed forests[15]

Use

MacBook Air with M3 chip uses 66 percent less energy than the requirement for ENERGY STAR.[17]

We design our products to be energy efficient, long-lasting, and safe. MacBook Air with M3 chip uses software and power-efficient components that intelligently manage power consumption. We also run our own Reliability and Environmental Testing Labs, where 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. To address emissions tied to the electricity our products use, we are building clean energy projects and engaging with our customers to educate and provide opportunities to support the decarbonization of the grid.

Energy consumption of ENERGY STAR–rated products

Apple devices consistently rank among the high-performing products rated by ENERGY STAR, which sets specifications that typically reflect the 25 percent most energy-efficient devices on the market. MacBook Air with M3 chip consumes 66 percent less energy than the requirement for ENERGY STAR.[17]

Designed to last

To ensure durability, we assessed MacBook Air with M3 chip in our Reliability Testing Lab, using rigorous testing methods that simulate a customer's experience.

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. And we want the materials in our products to live on in other products. 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.[18] 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 mean our materials are safer to recover and reuse.

We're also creating Apple Recycler Guides to provide guidance for professional electronics recyclers on how to safely disassemble Apple products to maximize recovery of resources. The guides provide valuable insight into the steps for recycling, as well as the recommended downstream material recycler for the disassembled parts.

Apple Trade In

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

apple.com/trade-in

Definitions

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.

Carbon footprint: Estimated emissions are calculated in accordance with guidelines and requirements as specified by ISO 14040, ISO 14044, and ISO 14067. 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. We calculate carbon emissions using the 100-year time horizon global warming potentials (GWP100) from the IPCC Sixth Assessment Report (AR6), including biogenic carbon. Our carbon footprint calculation includes emissions for the following life cycle phases in CO_2 equivalency (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 ground, 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-year period for power use by first owners for iOS, iPadOS, and watchOS devices and a four-year period for macOS, tvOS, and visionOS devices. Product use scenarios are based on historical customer use data for similar products. Energy use is simulated in various ways; for example, by modeling daily battery drain or through performing activities like movie and music playback. 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 our product carbon footprint methodology, visit apple.com/environment/answers.

Clean electricity: Refers to both renewable electricity as well as other projects that Apple considers "low carbon" but not "renewable," like nuclear and large-impact hydroelectricity projects, which may be included as a result of low-carbon electricity provided by the grid.

Low-carbon materials: Refers to materials created using production techniques with reduced carbon impact, such as Elysis (a patented technology that eliminates direct greenhouse gas emissions from the traditional aluminum smelting process) or aluminum smelted using hydroelectricity instead of coal.

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.

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 decarbonize their Apple production, including by transitioning electricity use to 100 percent clean sources.

Carbon Footprint

Greenhouse gas emissions were calculated using a life cycle assessment (LCA) methodology in accordance with ISO 14040, ISO 14044, and ISO 14067 standards and based on MacBook Air with M3 chip. The LCA boundary for this product includes the physical product and all of its components, packaging, as well as all in-box accessories (such as charging cables or power cords).

Greenhouse gas emissions	13-inch MacBook Air with M3 chip 256GB	15-inch MacBook Air with M3 chip 256GB
Total product footprint	**135 kg CO_2e**	**158 kg CO_2e**
Apple emissions from utility-purchased electricity (scope 2)	0 kg CO_2e	0 kg CO_2e
Life cycle product emissions (scope 3)	135kg CO_2e	158kg CO_2e
• Production	75%	69%
• Transportation	6%	4%
• Product use	19%	27%
• End of life processing	<1%	<1%
GHG reductions achieved[7]	↓42%	↓44%

Note: Percentages may not total 100 due to rounding.

We've also calculated the product carbon footprint for different configurations.

	MacBook Air with M3 chip	
Configuration	**13-inch**	**15-inch**
512GB	144 kg CO_2e	167 kg CO_2e

Note: 13-inch MacBook Air with M3 chip and 256GB storage is modeled with 30W USB-C adapter, 13-inch MacBook Air with M3 chip and 512GB storage is modeled with 35W Dual USB-C Power Adapter, and both configurations of 15-inch MacBook Air with M3 chip are modeled with 35W Dual USB-C Power Adapter.

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.

For more information on our product carbon footprint methodology, visit apple.com/environment/answers.

Endnotes

[1] Product recycled or renewable content is the mass of certified recycled material relative to the overall mass of the device, not including packaging or in-box accessories.

[2] We estimate the percentage of electricity-related emissions in our manufacturing that is sourced from clean electricity by attributing to our carbon model clean energy procured by our suppliers in the prior fiscal year, based on the supplier manufacturing allocations at time of product launch. Included in this number is only clean electricity that Apple or its suppliers have procured as part of Apple's Supplier Clean Energy Program.

[3] Breakdown of U.S. retail packaging by weight. Adhesives, inks, and coatings are excluded from our calculations of plastic content and packaging weight.

[4] Apple's Regulated Substances Specification describes Apple's restrictions on the use of certain chemical substances in materials in Apple products, accessories, manufacturing processes, and packaging used for shipping products to Apple's end-customers. Restrictions are derived from international laws or directives, regulatory agencies, eco-label requirements, environmental standards, and Apple policies. Every Apple product is free of PVC and phthalates except for 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 for new products where technically possible.

[5] MacBook Air with M3 chip 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.

[6] We recognize that even clean sources of electricity have residual carbon emissions across their life cycle (e.g., from manufacturing), which we account for when calculating our product scope 3 emissions.

[7] Carbon reductions are calculated against a baseline scenario: 1) No use of clean electricity for manufacturing or product use, beyond what is already available on the latest modeled grid (based on regional emissions factors). 2) Apple's carbon intensity of key materials as of 2015 (our baseline year for our 2030 product carbon neutrality goal). Carbon intensity of materials reflects use of recycled content and production technology. 3) Apple's average mix of transportation modes (air, rail, ocean, ground) by product line across three years (fiscal years 2017 to 2019) to best capture the baseline transportation emissions of our products.

[8] We calculate emissions savings from the use of recycled or low-carbon materials in our products by comparing the carbon intensity of key materials today with their 2015 baseline for Apple products. We currently only quantify the carbon savings from the use of recycled aluminum, titanium, and stainless steel in the enclosure, which means the actual emissions avoided are likely larger. We plan to improve our accounting of recycled content over time.

[9] Greenhouse gas emissions were calculated using a life cycle assessment methodology in accordance with ISO 14040, 14044, and 14067 standards and based on 15-inch MacBook Air with M3 chip and 256GB storage configuration. The life cycle assessment boundary for this product includes the physical product and all of its components, packaging, as well as all in-box accessories.

[10] Renewable energy emissions are too small to be visible on the chart.

[11] We map materials in our supply chain and publish a list of identified tin, tantalum, tungsten, and gold (3TG), cobalt, and lithium smelters and refiners in our supply chain. Third-party assessments seek to confirm sourcing practices and are part of our responsible sourcing program. In addition, our efforts consider a broad range of risks, including social, environmental, human rights, and governance risks.

[12] Recycled cobalt in the battery uses mass balance allocation.

[13] Chemicals that meet GreenScreen® benchmark 3 or 4 or other equivalent methodologies like U.S. EPA Safer Choice are considered safer and preferred for use. GreenScreen® is a comprehensive hazard assessment tool that evaluates substances against 18 different criteria. For more information, visit www.greenscreenchemicals.org.

[14] All established final assembly supplier sites—those that have been Apple suppliers for more than one year—for MacBook Air with M3 chip are third-party verified 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.

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

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

Endnotes

[17] Energy consumption and energy efficiency values are based on the ENERGY STAR Program Requirements for Computers, including the max energy allowance for MacBook Air with M3 chip. 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.

13-inch MacBook Air with M3 chip is tested with a fully charged battery and powered by the 30W USB-C Power Adapter with the USB-C to MagSafe 3 Cable (2 m). 15-inch MacBook Air with M3 chip is tested with a fully charged battery and powered by the 35W Dual USB-C Port Power Adapter with the USB-C to MagSafe 3 Cable (2 m).

- Off: Lower power mode of the system. System is shut down.
- Sleep: Low power state that is entered automatically after two 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 Power Adapter with the USB-C to MagSafe 3 Cable (2 m) is connected to AC power, but not connected to the system.
- Power adapter efficiency: Average of the Power Adapter with the USB-C to MagSafe 3 Cable (2 m) 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 M3 chip		
Mode	**100V**	**115V**	**230V**
Off	0.13W	0.13W	0.15W
Sleep	0.25W	0.26W	0.28W
Idle—Display On	3.09W	3.12W	3.13W
Power adapter, no load	0.07W	0.07W	0.08W
Power adapter efficiency	88.8%	89.1%	88.8%

	Power consumption for 15-inch MacBook Air with M3 chip		
Mode	**100V**	**115V**	**230V**
Off	0.14W	0.15W	0.15W
Sleep	0.27W	0.27W	0.29W
Idle—Display On	3.91W	3.91W	4.00W
Power adapter, no load	0.09W	0.09W	0.09W
Power adapter efficiency	87.3%	87.4%	86.8%

[18] 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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