



# Product Environmental Report

## iPad Air

March 18, 2019

### Made with better materials

**100%**

recycled tin in the solder of the main logic board

**25%**

or more recycled plastic in the display chassis, Wi-Fi carrier, pin align, and battery block

### Energy efficient

**61%**

less energy consumed than the ENERGY STAR® energy efficiency limit

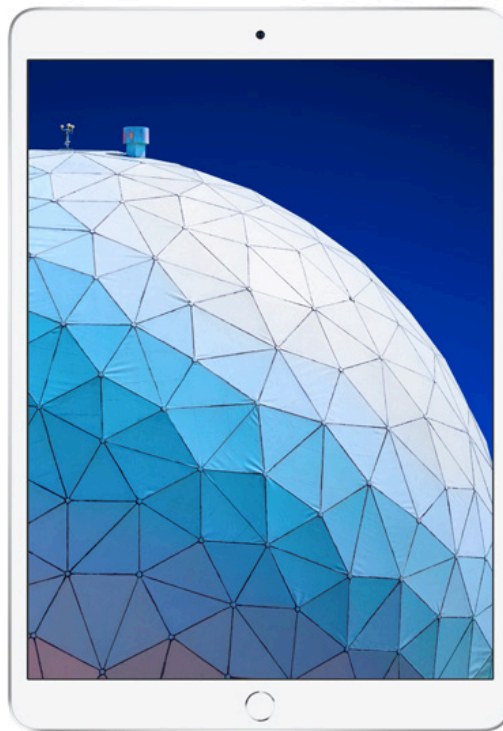
### Responsible packaging

**100%**

of the wood fiber comes from recycled and responsible sources

**<6%**

plastic in retail box



### Engaging suppliers

**100%**

of iPad Air final assembly supplier sites are Zero Waste

### Made without<sup>1</sup>

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

### Apple GiveBack

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

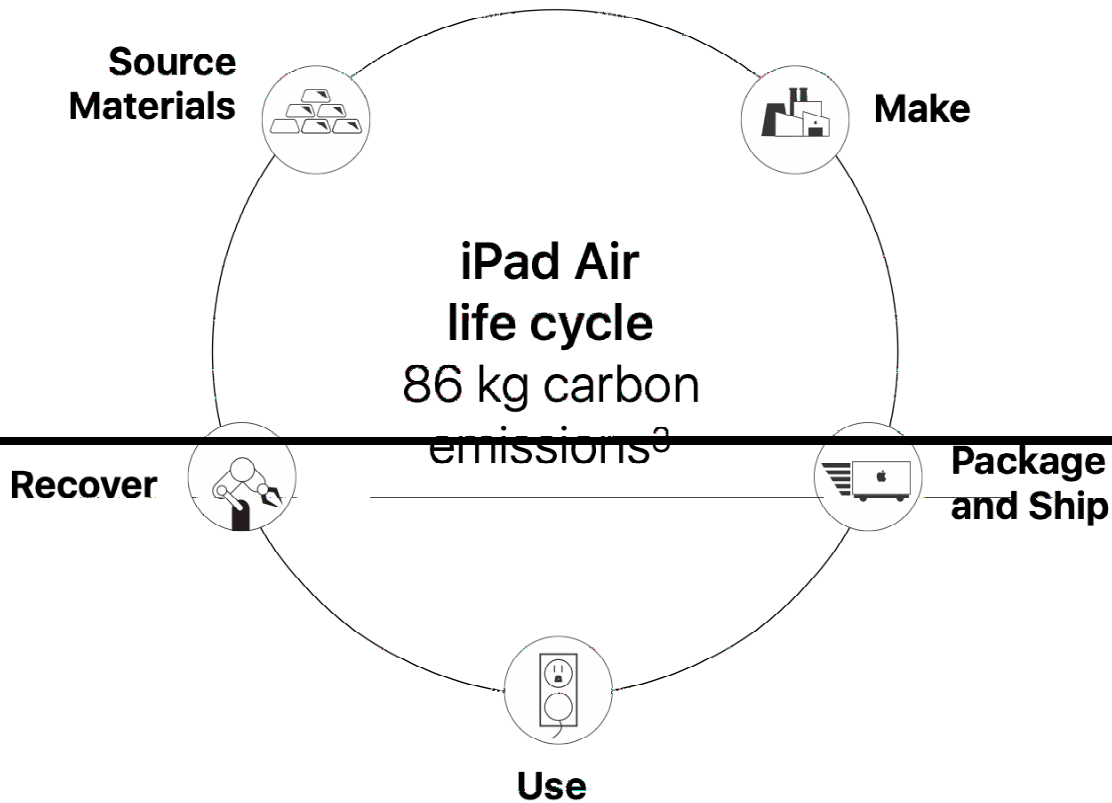
## Enclosure made with low-carbon aluminum



# 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 precious 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 recycled or bio-based materials and with renewable energy. Through Apple's Supplier Clean Energy Program, for example, supplier renewable energy use avoided emissions equal to 4.9 percent of the iPad Air manufacturing footprint.<sup>4</sup> We're committed to continuing to reduce our greenhouse gas emissions and using our life cycle assessment to drive that change.

## Product life cycle carbon emissions

- 81% Production
- 5% Transport
- 13% Use
- <1% End-of-life processing

# Source Materials



The tin in the solder on the main logic board—where most of the tin is found—is 100 percent recycled.

To conserve precious 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 beyond what's required by law to protect people and the environment.



## Aluminum

Our focus on Apple's carbon footprint extends to the materials we source. So we prioritized aluminum that was smelted using 100 percent hydroelectricity rather than fossil fuels for the enclosure, where the majority of the aluminum is located.



## Plastic

We're transitioning to bio-based and recycled alternatives from petroleum-based plastics. For iPad Air, we use these alternatives in a number of components, including the display chassis (40 percent), Wi-Fi carrier (25 percent), pin align (25 percent), and battery block (25 percent).



## Tin

We use 100 percent recycled tin<sup>5</sup> in the solder of the main logic 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.<sup>6</sup>



## Made without

Free of harmful substances like mercury, brominated flame retardants, PVC, phthalates, beryllium, lead in the solder, and arsenic in the display glass.<sup>1</sup> And 100 percent of the materials in iPad Air are covered by our [Apple-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 85 percent by mass of iPad Air.



# Make

Every year, we assess our suppliers against our Supplier Code of Conduct, which requires suppliers to make workplaces better for employees and 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, is 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. And in 2018, we achieved UL Zero Waste certification for all iPad final assembly test and packaging facilities.<sup>7</sup>

### Greener chemicals

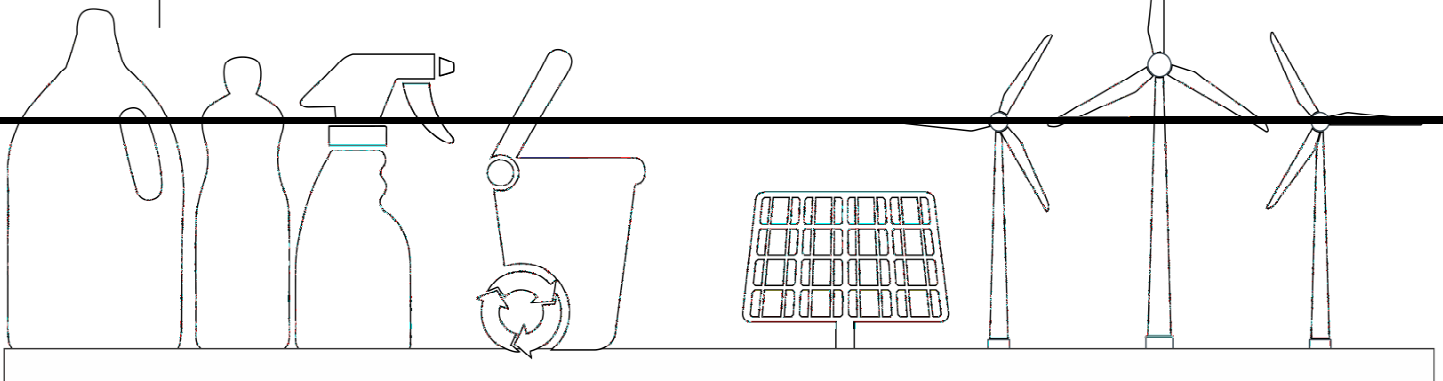
All iPad Air final assembly supplier sites use safer cleaners and degreasers in their manufacturing processes.<sup>8</sup>

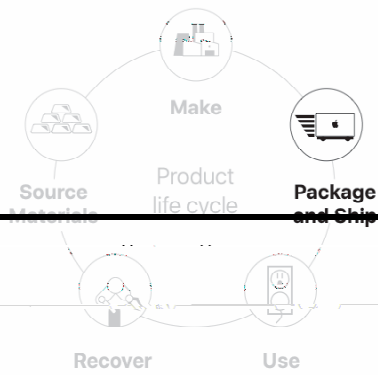
### Zero Waste

All iPad Air final assembly supplier sites are Zero Waste.<sup>7</sup>

### Supplier energy use

Supplier renewable energy use avoided emissions equal to 4.9 percent of the manufacturing footprint of iPad Air.<sup>4</sup>





# Package and Ship

We have nearly eliminated plastic in the iPad Air retail box.

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.<sup>9</sup> 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<sup>9</sup>

**94%**

of the retail packaging<sup>10</sup> is fiber based

**36%**

recycled fiber content in retail packaging





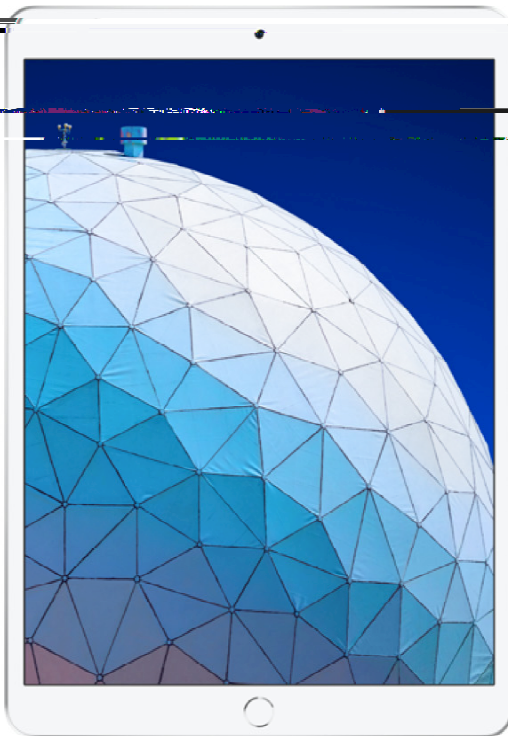
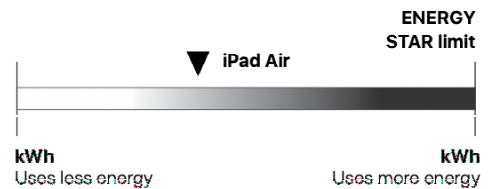
# Use

iPad Air consumes 61 percent less energy than the limit for ENERGY STAR.

We design our products to be energy efficient, long lasting, and safe. iPad Air uses software and power-efficient components that intelligently manage power consumption. We also run our products through 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. iPad Air consumes 61 percent less energy than the limit for ENERGY STAR.<sup>11</sup>



## Designed to last

iPad Air features a durable aluminum unibody construction and has undergone rigorous testing for durability.

## Made with safer materials

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



# Recover

Return your product with Apple GiveBack 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 GiveBack—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.<sup>12</sup> 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.

## Apple GiveBack

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

[www.apple.com/giveback](http://www.apple.com/giveback)



# 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 the earth's resources. That's why we focus on sources that are certified for their management practices.

**Supplier Clean Energy Program:** Because 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<sub>2</sub> equivalency factors (CO<sub>2</sub>e):

- **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 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.
- **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

<sup>1</sup> Apple defines its restrictions on harmful substances, including definitions for what Apple considers to be "free of," in the [Apple Regulated Substances Specification](#). 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.

<sup>2</sup> iPad Air 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](http://www.epeat.net).

<sup>3</sup> Greenhouse gas emissions were calculated using a life cycle assessment methodology in accordance with ISO 14040 and 14044 standards and based on the iPad Air (64 GB) memory configuration.

Configuration	Carbon footprint
	iPad Air
64GB	86 kg CO <sub>2</sub> e
256GB	102 kg CO <sub>2</sub> e

<sup>4</sup> Percent emissions reduction from supplier renewable energy is based on estimated operational loads as of product launch, compared to default grid emissions. Only the renewable energy the supplier committed to Apple production was counted.



# Endnotes

- <sup>5</sup> The recycled content claim applies to the tin in the solder.
- <sup>6</sup> 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.
- <sup>7</sup> Final assembly supplier sites for iPad Air are third-party certified as Zero Waste by UL LLC (UL 2799 Standard). This means these final assembly supplier sites do not generate any waste sent to landfill.
- <sup>8</sup> 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 percent of process chemicals used at final assembly supplier facilities were verified to comply with the 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](http://www.greenscreenchemicals.org).
- <sup>9</sup> Responsible sourcing of wood fiber is defined in [Apple's Sustainable Fiber Specification](#). We consider wood fibers to include bamboo.
- <sup>10</sup> Breakdown of U.S. retail packaging by weight.
- <sup>11</sup> Energy consumption and energy efficiency values are based on the ENERGY STAR Program Requirements for Computers, including the max energy allowance for iPad Air. For more information, visit [www.energystar.gov](http://www.energystar.gov). ENERGY STAR and the ENERGY STAR mark are registered trademarks owned by the U.S. Environmental Protection Agency.

iPad Air is tested with a fully charged battery and powered by the 12W USB Power Adapter with the Lightning to USB Cable (1m).

- 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 12W USB Power Adapter with the Lightning to USB Cable (1m) is connected to AC power but not connected to iPad Air.
- Power adapter efficiency: Average of the 12W 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.

Mode	Power consumption for iPad Air		
	100V	115V	230V
Sleep	0.16	0.15	0.20
Idle—Display on	3.12	3.17	3.56
Power adapter, no-load	0.042	0.041	0.044
Power adapter efficiency	81.0%	81.4%	77.5%

- <sup>12</sup> Trade-in values will vary based on the condition, year, and configuration of your trade-in device. You must be at least 18 years old to be eligible to trade in for credit or for an Apple Store Gift Card. Not all devices are eligible for credit. More details are available from Apple's Mac trade-in partner and Apple's iPhone, iPad, and Apple Watch trade-in partner for trade-in and recycling of eligible devices. Restrictions and limitations may apply. Payments are based on the received device matching the description you provided when your estimate was made. Apple reserves the right to refuse or limit the quantity of any device for any reason. In the Apple Store: Offer only available on presentation of a valid, government-issued photo ID (local law may require saving this information). Value of your current device may be applied toward purchase of a new Apple device. Offer may not be available in all stores. Some stores may have additional requirements.