Product Environmental Report

Mac mini

October 30, 2018

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Tackling climate change

45%
fewer emissions compared to the previous-generation Mac mini

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

Energy efficient

74%
less energy consumed than the ENERGY STAR® energy efficiency limit

Made with better materials

60%
recycled plastic in the foot cover and connector wall

27%
bio-based plastic in the fan



Responsible packaging

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

<4%
plastic in retail box

Made without[1]

- 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.

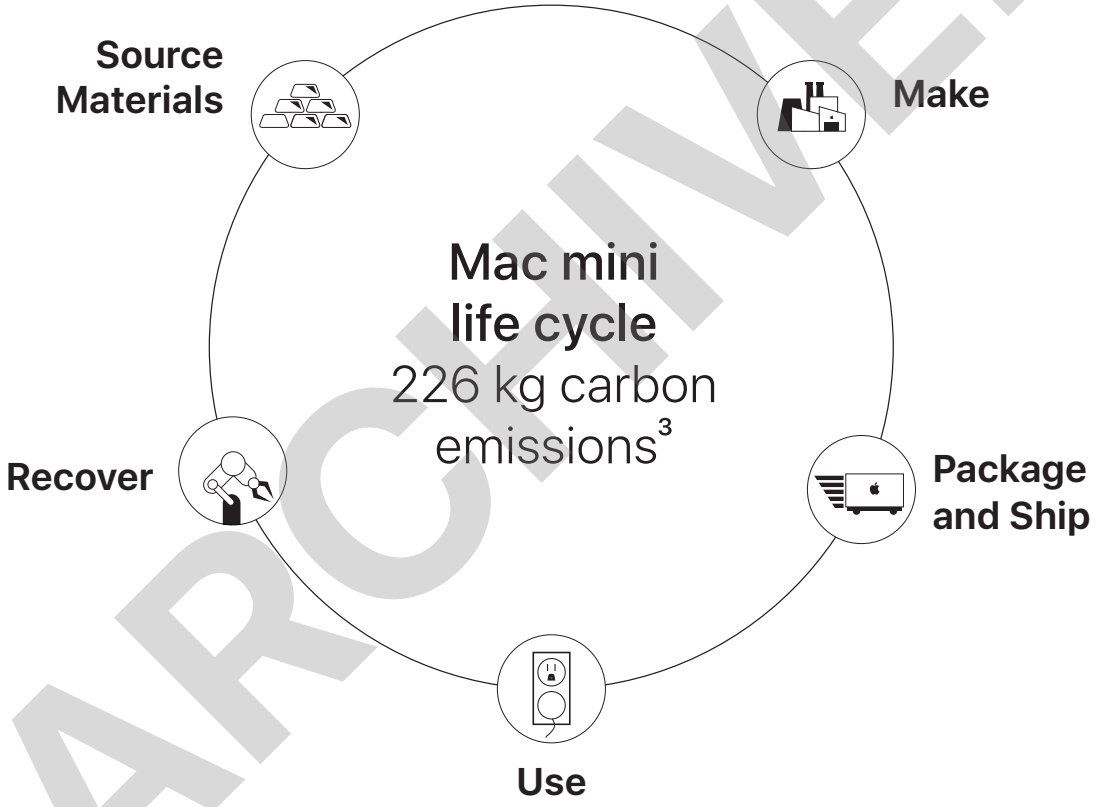
Enclosure made of 100% recycled aluminum

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

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: 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.



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Carbon footprint

By focusing on making energy efficient products with better materials and renewable energy, we reduced the Mac mini carbon footprint by 45 percent compared to the previous-generation Mac mini.[4] This means we're reducing Apple's contribution to climate change, which is threatening human health and well-being at a global scale.

Mac mini life cycle carbon emissions

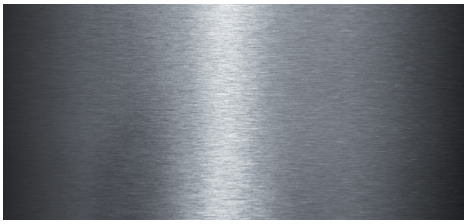
53%	Production
44%	Transport
3%	Use
<1%	End-of-life processing



Source Materials

The enclosure for Mac mini is made with 100% recycled aluminum.

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 far beyond what's required by law to protect people and the environment.



Aluminum

Apple created a new aluminum alloy made of 100 percent recycled aluminum for the enclosure of Mac mini. 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 bio-based and recycled alternatives from petroleum-based plastics. For Mac mini, we use these alternatives in a number of components like the connector wall (60 percent recycled), foot cover (60 percent recycled), AC inlet (50 percent recycled), speaker (35 percent recycled), and fan (27 percent bio-based).



Tin

We map and identify our primary tin, tantalum, tungsten, gold, and cobalt supply chains to the smelter level, and 100 percent of these smelters have participated in independent third-party audits[5] annually since 2016.



Made without

Free of harmful substances like brominated flame retardants, PVC, phthalates, beryllium, and lead in the solder.[1] And 100 percent of the materials in Mac mini 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 60 percent by mass of Mac mini.

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Make

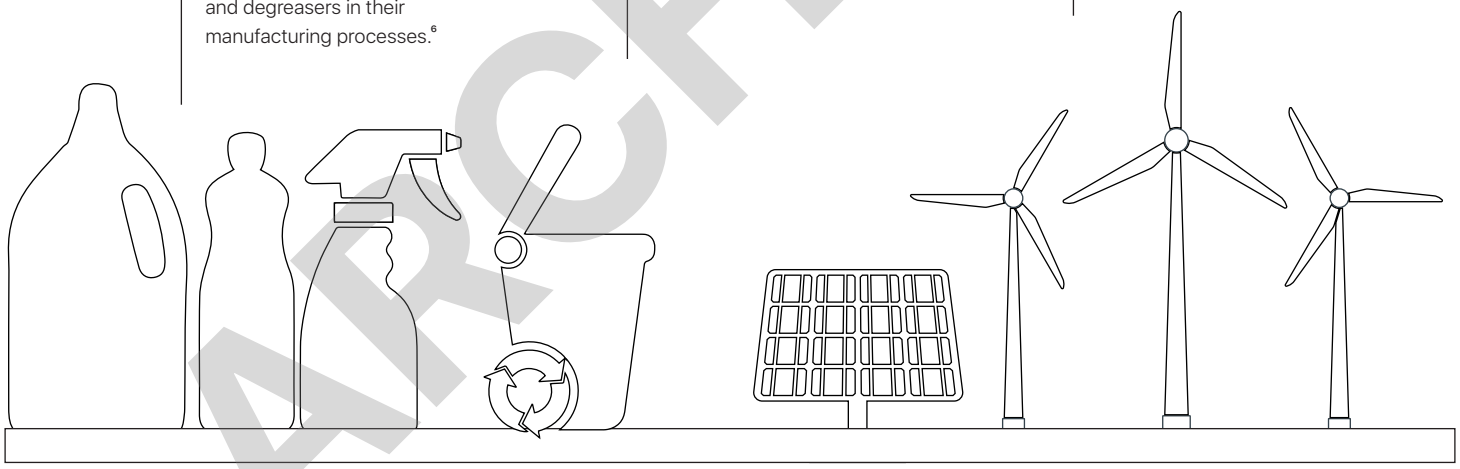
Every year, we assess our suppliers against our Supplier Code of Conduct, which aims to make workplaces better for employees and for the environment.

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. Only on the foundation of these standards can we make further progress, from helping suppliers transition to renewable energy to providing education opportunities for their employees.

Greener chemicals
All Mac mini final assembly sites use safer cleaners and degreasers in their manufacturing processes.[6]

Zero Waste
All Mac mini final assembly sites are Zero Waste.[7]

Supplier energy use
Apple's Supplier Clean Energy Program helps suppliers transition to clean energy.



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Package and Ship

We have nearly eliminated plastic in the Mac mini 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.[8] 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[8]

96%

of the retail box is fiber based

37%

recycled content in fiber packaging



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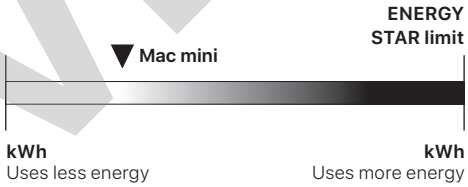
Use

Mac mini consumes 74 percent less energy than the limit for ENERGY STAR.

We design our products to be energy efficient, long lasting, and safe. Mac mini 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. Mac mini consumes 74 percent less energy than the limit for ENERGY STAR.[9]





100% renewable energy

All iMessages, answers from Siri, FaceTime messages, and song downloads from iTunes are 100 percent powered by renewable energy.[10]

Made with safer materials

We apply rigorous controls for all materials in the Mac mini through our Regulated Substances Specification.

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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.[11] 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

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Definitions

Recycled material: Recycling makes better use of finite resources by sourcing from recovered rather than mined materials.

Responsibly managed renewables: We define renewable materials as those that can be regenerated in a human lifespan, like paper fibers or sugarcane. Renewable materials can help us use fewer finite resources. But even though renewable resources have the ability to regrow, they are not always managed responsibly. That's why we focus on sources that are certified for their management practices.

Bio-based plastics: Bio-based plastics are made from renewable sources rather than from petroleum-based sources. Bio-based plastics allow us to reduce reliance on petroleum.

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 will generate and procure more than 4 gigawatts of new clean power worldwide by 2020. Once completed, this will represent 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. 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 and South Korea, where we continue to seek government approval for our PVC and phthalates replacement.

[2]Mac mini 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 1680.1-2009. For more information, visit www.epeat.net.

[3]Greenhouse gas emissions were calculated using a life cycle assessment methodology and based on Mac mini 128GB memory configuration.

Carbon footprint			
Mac mini		**Previous-generation Mac mini**	
3.6GHz 4C Intel Core i3 + 128GB SSD Storage	226 kg CO_2e	1.4GHz dual-core Intel Core i5 + 500GB HDD Storage	416 kg CO_2e
3.0GHz 6C Intel Core i5 + 256GB SSD Storage	255 kg CO_2e	2.8GHz dual-core Intel Core i5 + 1TB Fusion Storage	446 kg CO_2e

[4]The previous-generation Mac mini (introduced in 2014) was used for product comparisons.

[5]Third-party assessments make sure minerals in our products are responsibly sourced following standards set by the Organisation for Economic Co-operation and Development and other internationally recognized human rights instruments. Our efforts consider conflict, human rights, and other risks as we go above and beyond what's required by law.

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Endnotes

[6]Only chemicals that meet GreenScreen® benchmark 3 or 4 are considered safer and preferred for use. In 2017, 18 final assembly facilities adopted these safer cleaners. And in 2018, 100% of process chemicals used at final assembly 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.

[7]Final assembly sites for Mac mini are third-party certified as Zero Waste by UL LLC. This means these final assembly sites do not generate any waste sent to landfill.

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

[9]Energy consumption and energy efficiency values are based on the ENERGY STAR® Program Requirements for Computers, including the max energy allowance for Mac mini. 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.

- Off: Lowest power mode of the system when Mac mini is shut down. Also referred to as Standby.
- 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. Connected to Ethernet.
- Idle—Display on: System is on and has completed loading macOS. Connected to Ethernet.
- Power supply efficiency: Average of the power supply's measured efficiency when tested at 100 percent, 50 percent, and 20 percent of the power supply's rated output power.

Power consumption for Mac mini

Mode	100V	115V	230V
Off	0.34W	0.31W	0.34W
Sleep	1.01W	1.19W	1.16W
Idle—Display on	10.6W	10.6W	11.5W
Power supply efficiency	91.3%	91.8%	92.6%

[10]Services like iMessage, Siri, FaceTime, and iTunes are powered by data centers that run on 100 percent wind, solar, low-impact hydro, or biogas fuel cell power.

[11]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.

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