Product Environmental Report

13-inch MacBook Pro

July 9, 2019

Made with better materials

100%

recycled tin in the solder of the main logic board

Energy efficient

59%

less energy consumed than the ENERGY STAR® energy efficiency requirement

Responsible packaging

100%

of the wood fiber comes from recycled and responsible sources

Engaging suppliers

100%

of the 13-inch MacBook Pro final assembly supplier sites are Zero Waste

Smarter chemistry[1]

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

Apple Trade In

Return your device through Apple Trade In and we'll give it a new life or recycle it for free.
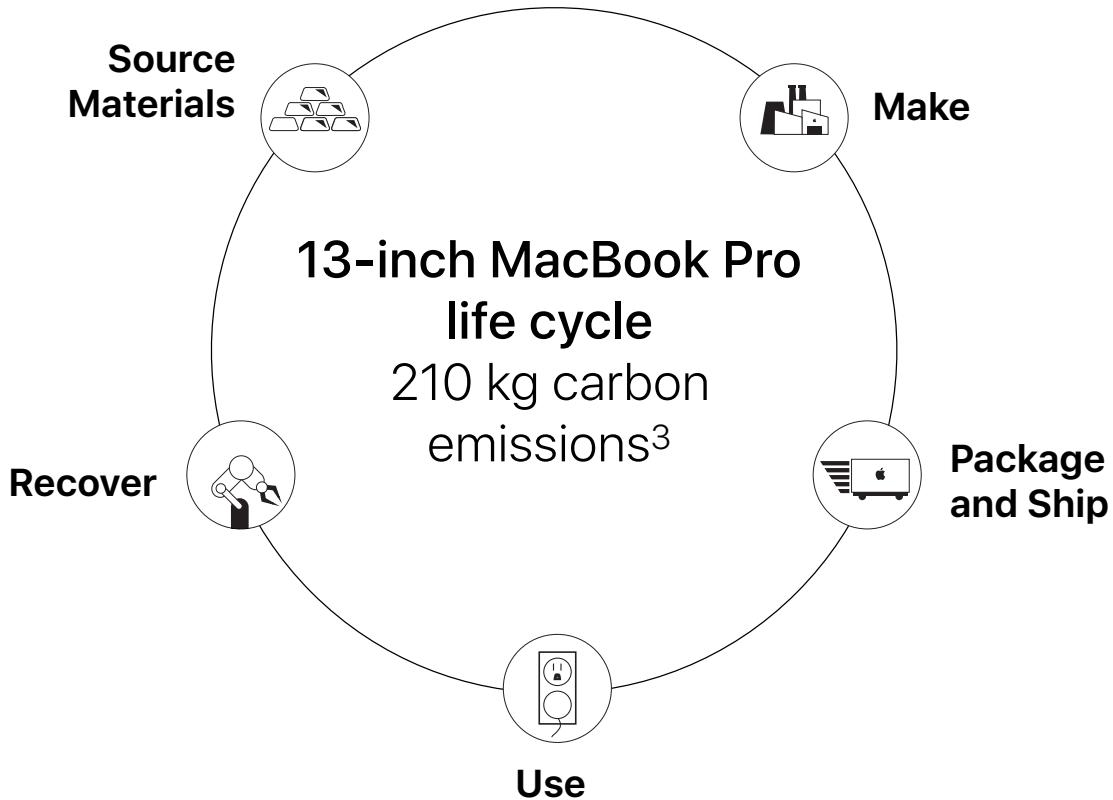
Enclosure made with low-carbon aluminum

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 important resources, and using safer materials.

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

Source Materials

Make

13-inch MacBook Pro life cycle
210 kg carbon emissions[3]

Recover

Package and Ship

Use

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. Through these efforts, we reduced the 13-inch MacBook Pro emissions by 5 percent compared to the previous generation.[4] And we're committed to continuing to reduce our greenhouse gas emissions and using our life cycle assessment to drive that change.

13-inch MacBook Pro life cycle carbon emissions

77%	Production
16%	Transport
6%	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 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 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 renewable or recycled alternatives from fossil fuel–based plastics. For the 13-inch MacBook Pro, we use 35 percent or more recycled plastic in multiple components.

Tin

We use 100 percent recycled tin[5] 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.[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 Pro are covered 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 over 75 percent by mass of the 13-inch MacBook Pro.
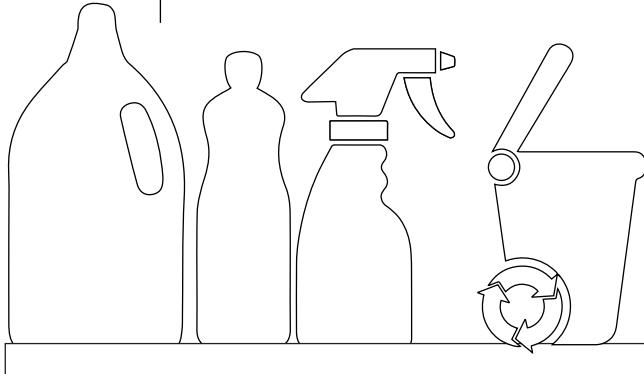
Make

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, 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 Mac final assembly test and packaging facilities.[7]
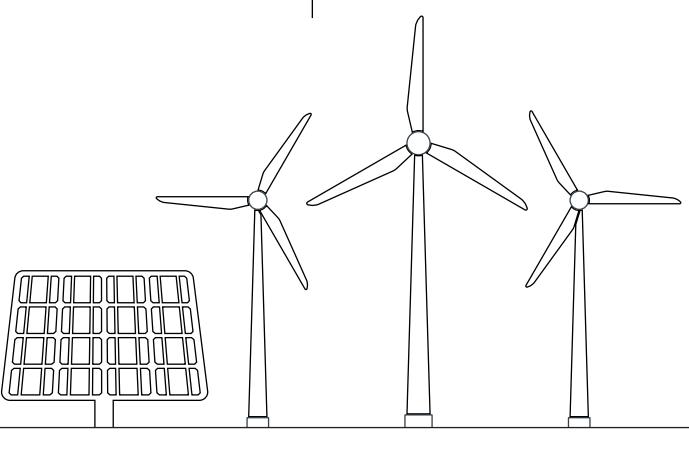
Greener chemicals

All 13-inch MacBook Pro final assembly supplier sites use safer cleaners and degreasers in their manufacturing processes.[8]

Zero Waste

All 13-inch MacBook Pro final assembly supplier sites are Zero Waste.[7]

Supplier energy use

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

Package and Ship

All of the primary wood fiber in our packaging comes from responsibly managed forests.[9]

To improve our packaging, we are working to eliminate plastics, increase recycled content, and use less packaging overall. 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[9]

68%

of the retail packaging[10] is fiber based

36%

of the fiber content in retail packaging is recycled
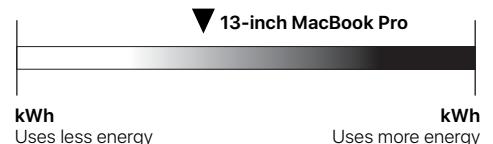
Use

The 13-inch MacBook Pro consumes 59 percent less energy than the requirement for ENERGY STAR.

We design our products to be energy efficient, long lasting, and safe. The 13-inch MacBook Pro 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 Pro consumes 59 percent less energy than the requirement for ENERGY STAR.[11]

ENERGY STAR
requirement

▼ 13-inch MacBook Pro

kWh
Uses less energy

kWh
Uses more energy

Designed to last

To maximize durability, we assessed the 13-inch MacBook Pro in our Reliability Testing Lab, using rigorous testing methods that simulate customers' experiences.

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 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.[12] 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 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 Pro 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 in accordance with ISO 14040 and 14044 standards and based on the 13-inch MacBook Pro (128GB) memory configuration.

Carbon footprint			
13-inch MacBook Pro		**Previous-generation 13-inch MacBook Pro**	
1.4GHz Quad-Core Processor with 128GB / 256GB Storage	210 / 229 kg CO_2e	2.3GHz Dual-Core Processor with 128GB / 256GB Storage	222 / 237 kg CO_2e
2.4GHz Quad-Core Processor with 256GB / 512GB Storage	247 / 267 kg CO_2e	2.3GHz Quad-Core Processor with 256GB / 512GB Storage	247 / 267 kg CO_2e

Endnotes

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

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

[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] Final assembly supplier sites for the 13-inch MacBook Pro 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.

[8] 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.

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

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

[11] 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 Pro. 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 Pro is tested with a fully charged battery and powered by the 61W 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 61W 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 61W 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 Pro | | |
Mode	100V	115V	230V
Off	0.04W	0.04W	0.06W
Sleep	0.28W	0.28W	0.32W
Idle—Display on	3.18W	3.24W	3.25W
Power adapter, no-load	0.03W	0.02W	0.03W
Power adapter efficiency	90.1%	90.4%	90.3%

[12] 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.