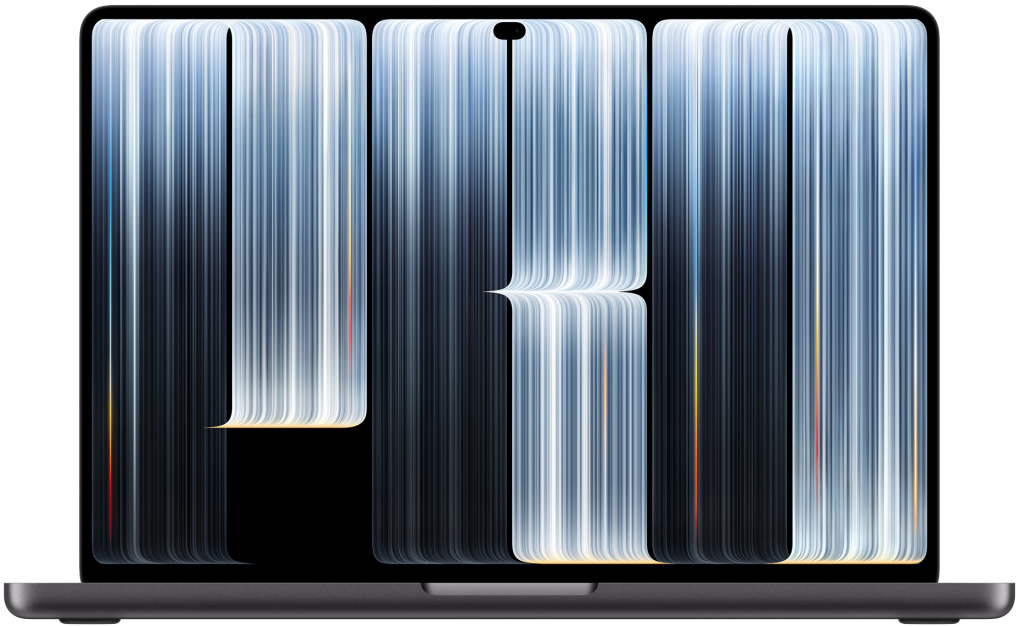
MacBook Pro with PROLED XDR Display

Product Environmental Report

Date introduced
October 28, 2026



55% recycled content
in MacBook Pro with PROLED XDR[1]

45% manufacturing electricity
is sourced from renewable energy[2]

100% fiber-based packaging
as part of our goal to remove plastic from packaging[3]

This report includes data current as of product launch. Product evaluations are based on U.S. configuration of MacBook Pro with PROLED XDR.
Product carbon footprint calculations include in-box accessories as well as packaging.

Product Carbon and Material Footprint

We're focused on decarbonizing the three largest sources of emissions—materials, electricity, and transportation—across our value chain. We're making progress by expanding our suppliers' sourcing of renewable energy—45 percent of manufacturing electricity for MacBook Pro with PROLED XDR was sourced from renewable energy.[2] We prioritize the use of recycled, renewable, and low-carbon materials while focusing on the energy efficiency of our software and hardware.

We've prioritized the responsible selection and sourcing of materials and components that make up a large part of our product carbon footprint. We work to recover as much as possible of our own scrap at purity that meets our high standards. Since recycled material typically emits less carbon than newly mined materials over its lifetime, we look to postindustrial and postconsumer sources for waste streams that can be recovered and used in new products.

MacBook Pro with PROLED XDR Display

14-inch, M5 Pro, 1TB

243 kg gross GHG emissions (CO_2e)[4]

Production	**183**
Non-electricity (e.g., materials and process)	*65*
Electricity	*118*
Infrastructure for renewable energy generation	**3**
Transportation	**21**
Customer product use	**36**
End-of-life processing	**<1**

MacBook Pro with PROLED XDR Display

contains 55% recycled content,[1] including:

100% recycled **aluminum** in the enclosure and thermal module stage

100% recycled **cobalt** in the battery

100% recycled **copper** in multiple thermal module components

100% recycled **copper**, **gold** plating, and **tin** solder in all Apple-designed printed circuit boards

100% recycled **gold** wire in the camera and **gold** plating in all connectors

95% recycled **lithium** in the battery

100% recycled **rare earth elements** in all magnets

80% recycled **steel** in multiple components including the keyboard feature plate and logo

100% recycled **tantalum** in multiple capacitors, a first for Apple

Read more at apple.com/2030.

Product Insights

Water

Water is a local resource. For this reason, our water strategy is respectful of local conditions where we and our suppliers operate. We collect and analyze data and site-level feedback to make sure we understand our water impacts.

Our Supplier Clean Water program prioritizes high water users in high water stress locations and drives participants to an average 50 percent water reuse rate by 2030. Learn more ›

Safer Cleaners

All final assembly supplier sites are required to use safer cleaners and degreasers in their manufacturing processes, as determined by methodologies like ChemFORWARD, US EPA Safer Choice, or GreenScreen®.[6]

Learn more about the requirements in our Regulated Substances Specification.

Energy Efficiency

MacBook Pro with PROLED XDR Display 16-inch uses 55 percent less than the ENERGY STAR standard.[7]

55% less energy

Smarter Chemistry

All of the materials used in Apple products, accessories, and packaging are covered by the requirements of our Regulated Substances Specification, which was one of the first in the industry to restrict the use of key substances of concern. Apple continues to stand out from our industry peers through other substance restrictions and initiatives:

- Our Full Material Disclosure (FMD) program, which allows us to collect material and chemical data deep into our supply chain to support Apple initiatives and compliance
- Routine and robust toxicological assessments of all materials in prolonged skin contact to help minimize risk to customers under normal use conditions
- NGO partnerships to advance safer alternatives, including the identification of substitutes and improved access to chemical hazard data

To learn more, read Protocol for Prioritizing Chemicals of Concern in the Electronics Industry and Integrating Toxicological Assessments in Material Selection for Apple Products.

Package and Ship

The packaging is 100 percent fiber-based and uses only recycled or responsibly sourced fibers.[4]

100% Fiber-based packaging[4]

Longevity

We assessed MacBook Pro with PROLED XDR Display in our Reliability Testing Lab using rigorous testing methods that simulate customers' experiences. Learn more ›

We are continuously striving to increase product longevity through new design and manufacturing technologies, ongoing software support, and expanded access to repair services. See repair options ›

Zero Waste to Landfill

All established final assembly supplier sites are Zero Waste to Landfill validated.[5]

People and Environment in Our Supply Chain

We require our suppliers to provide safe and healthy workplaces where people are treated with dignity and respect, and to reduce their environmental impact. From the strong foundation set by our Supplier Code of Conduct, we go further—from helping suppliers transition to clean electricity, to providing educational opportunities for their employees, to supporting final assembly suppliers in reducing waste.

For more information, see apple.com/supply-chain.

Definitions

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, processing, 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 hubs and customers.
- **Use:** Apple assumes three years of use time for Apple Watch and AirPods, three and a half years of use time for iPhone, and four years of use time for iPad, Mac, and other devices including Apple Vision Pro and Apple TV. The total energy use over that period is based on use patterns of historically similar products calculated using data from a variety of sources including, but not limited to, field telemetry from users who opt in to sharing device analytics and modeling battery drain from activities such as movie and music playback. Geographic differences in power grid mix are accounted for at a regional level. Measurement practices follow Apple's privacy practices and policies, which can be found on Apple's privacy website.
- **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.

Infrastructure for renewable energy generation: 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.

Low-carbon electricity: Refers to both renewable electricity as well as other fossil-free 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. Apple accounts for the carbon impact of building and operating these projects, and so considers them to be low-carbon but not zero-carbon.

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.

Paper: Our definition of paper is adapted from ISO 4046 to cover materials in the form of a coherent sheet or web made by deposition of fibers from a fluid suspension onto a suitable forming device, with or without the addition of other substances.

Recycled materials: Recycling makes better use of finite resources by sourcing from recovered rather than mined or primary materials. The recycled content of materials used in our products has been verified by an independent third party to a recycled content standard that conforms to ISO 14021 definitions.

Renewable materials: We define bio-materials as those that can be regenerated in a human lifespan, like wood 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 responsible 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 renewable 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. The LCA boundary for this product includes the physical product and all of its components and packaging, as well as all in-box accessories.

We've calculated the product carbon footprint for the following configurations.

MacBook Pro with PROLED XDR Display 14-inch	Gross GHG emissions (CO_2e)
M5 Pro, 24GB memory, 1TB storage	243 kg
M5 Max, 36GB memory, 2TB storage	297 kg

MacBook Pro with PROLED XDR Display 16-inch	Gross GHG emissions (CO_2e)
M5 Pro, 24GB memory, 1TB storage	295 kg
M5 Max, 36GB memory, 2TB storage	341 kg

We model different configurations of our products to show the potential range of carbon emissions. 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.

In Fiscal Year 2026, Apple implemented LCA model updates in two areas: display panels and system on chip (SoC). Apple partnered with key suppliers to leverage updated primary data and industry groups to create a more accurate carbon model for displays applicable to Apple products and other consumer electronics. Average carbon intensity is calculated using data from inputs such as production site, operational renewable energy, and abatement of N_2O and F-gases. For SoC, Apple implemented imec.netzero models developed by imec's Sustainable Semiconductor Technologies and Systems program, third-party validated in 2024. We use primary data for complementary metal oxide semiconductor (CMOS) logic technology nodes, including effective die size, regional electricity grid, and suppliers' greenhouse gas abatement.

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

Recover

Apple Trade In 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.[8] 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. Learn more at apple.com/recycle.

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. Recycled and renewable plastic content calculation includes mass balance allocation.

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. Fiber sourcing requirements are defined in Apple's Responsible Fiber Specification. We consider wood fibers to include bamboo.

4 Greenhouse gas emissions were calculated using a life cycle assessment methodology in accordance with ISO 14040, 14044, and 14067 standards. The life cycle assessment boundary for this product includes the physical product and all of its components and packaging, as well as all in-box accessories.

5 All established final assembly supplier sites—those that have been Apple suppliers for more than one year—for MacBook Pro with PROLED XDR Display 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.

6 Chemicals that meet ChemFORWARD Hazard band C or better, except for x/c-CMR(2), or equivalent results from other methodologies like GreenScreen or U.S. EPA Safer Choice are considered safer and preferred for use. ChemFORWARD, GreenScreen®, and Safer Choice are comprehensive hazard assessment tools that evaluate substances against multiple human health, environmental, and physical endpoints.

Endnotes

[7] Energy consumption and energy efficiency values are based on the ENERGY STAR Program Requirements for Computers, including the max energy allowance for MacBook Pro with PROLED XDR Display. For more information, visit energystar.gov. ENERGY STAR and the ENERGY STAR mark are registered trademarks owned by the U.S. Environmental Protection Agency.

MacBook Pro with PROLED XDR Display 14-inch is tested with a fully charged battery and powered by the 70W Power Adapter with the USB-C to MagSafe 3 Cable (2m).

MacBook Pro with PROLED XDR Display 16-inch is tested with a fully charged battery and powered by the 140W Power Adapter with the USB-C to MagSafe 3 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 USB-C Power Adapter with the USB-C to MagSafe 3 Cable (2m) is connected to AC power, but not connected to the system.
- Power adapter efficiency: Average of the USB-C Power Adapter with the USB-C to MagSafe 3 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 MacBook Pro with PROLED XDR Display 14-inch

Mode	100V	115V	230V
Off	0.12W	0.13W	0.16W
Sleep	0.32W	0.33W	0.37W
Idle—Display on	4.15W	4.42W	4.16W
Power adapter, no load	0.05W	0.06W	0.06W
Power adapter efficiency	90.5%	90.5%	90.8%

Power consumption for MacBook Pro with PROLED XDR Display 16-inch

Mode	100V	115V	230V
Off	0.13W	0.13W	0.15W
Sleep	0.35W	0.36W	0.39W
Idle—Display on	4.98W	5.03W	5.30W
Power adapter, no load	0.09W	0.10W	0.13W
Power adapter efficiency	91.4%	91.5%	91.3%

[8] 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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