Goals and progress

GOAL

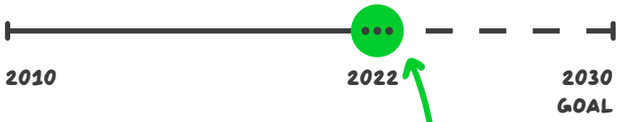
Become carbon neutral for our corporate operations.

HIGHLIGHT

ACHIEVED CARBON NEUTRALITY SINCE APRIL 2020 by implementing energy efficiency initiatives, sourcing 100 percent renewable electricity for Apple facilities, and securing carbon offsets for the remaining corporate emissions.

GOAL

Achieve carbon neutrality for our entire carbon footprint, including products, by 2030, reducing related emissions by 75 percent compared with 2015.



HIGHLIGHT

OVER 45 PERCENT EMISSIONS REDUCTION since 2015 across our value chain.

GOAL

Transition our entire product value chain, including manufacturing and product use, to 100 percent clean electricity by 2030.

HIGHLIGHT

As of March 2023, **OVER 250 SUPPLIERS** have committed to transitioning to 100 percent renewable electricity for their Apple production, with **OVER 85 PERCENT OF APPLE'S DIRECT SPEND** for materials, manufacturing, and assembly of our products worldwide included in those commitments.

Key

- Achieved
- Ongoing
- Not achieved

Our approach

Climate change continues to define the world around us in ways that impact our daily lives. Shifting weather patterns threaten the food we eat. Widespread wildfires and flooding devastate the communities we live in and the ecosystems we depend on. These dangers are felt around the globe and are developing at an unprecedented pace. The stakes are fundamental: Human rights like life, health, food, and an adequate standard of living face grave risks, disproportionately affecting low-income and historically marginalized communities. The worst, and potentially irreversible, impacts of climate change can be prevented with global, comprehensive, and immediate action.

As a large global company, we believe it's our responsibility to take strong, decisive, and inclusive steps to mitigate our impact on the climate. We've committed to achieving carbon neutrality across our entire value chain by 2030 — reducing emissions by 75 percent compared with 2015 and balancing the residual emissions with high-quality carbon removal.[7] This means that our goal to be carbon neutral also extends to all our products. This goal is more aggressive than the Intergovernmental Panel on Climate Change's recommendation for global carbon neutrality within 20 years.[8]

Apple is also committed to working toward reaching a 90 percent reduction in emissions from our 2015 baseline by 2050. Attaining this deep decarbonization target will require a different focus and a collective, global effort. Entire industries and economies must decarbonize. And while reaching a 90 percent reduction in emissions is outside Apple's or any one company's control, Apple is committed to supporting action as part of this global shift: to push for better policies, invest in new technological innovations, and engage in new and expanded partnerships, both public and private.

Our goals are ambitious — and they come with many challenges. But we've already made progress by cutting emissions across our value chain by over 45 percent since 2015.

We began by making the transition to sourcing 100 percent renewable electricity at our offices, retail stores, and data centers, which we achieved in 2018. And in 2020, we achieved carbon neutrality for our corporate emissions.[9]

Our philosophy for achieving carbon neutrality follows these principles:

Calculate our footprint across our value chain: Our responsibility extends beyond our direct operations to our product-related emissions. That's why we model our emissions across the entire life cycle of our products — including the sourcing of raw materials, manufacturing, shipping, product use, and end-of-life processing.[10] We use the results of our detailed carbon accounting to adjust our 2030 Climate Roadmap, which lays out our plan to become carbon neutral.

Set ambitious targets: Our plan to reach carbon neutrality by 2030 centers around our strategy to reduce emissions by 75 percent, relative to our 2015 carbon footprint. This reduction aligns with what current climate science shows is necessary to limit warming to 1.5° C.[11] We plan to invest in high-quality carbon removal projects to address the remaining emissions, prioritizing nature-based solutions. And by focusing on emissions reduction, we're tackling the transformative work of making low-carbon products.

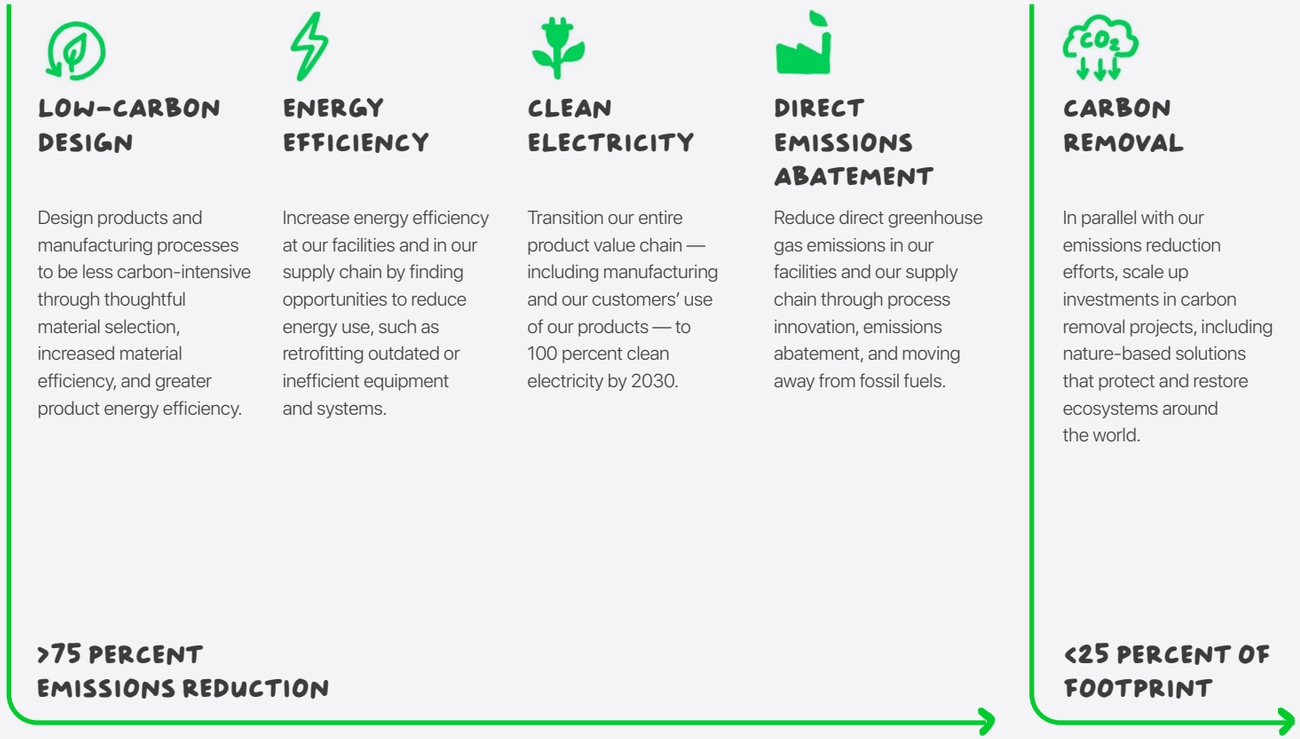
Match solutions to sources: For each activity within our value chain, we seek out decarbonization actions that tie to the source of those emissions. For example, we'll look to reduce emissions from electricity by using renewable or low-carbon electricity and decrease emissions from transportation by using alternative fuels and lower-carbon modes of transport. By matching solutions to carbon sources, we'll do our part to help decarbonize the economy.

Make environmental progress good for our business: We're proving every day that there doesn't need to be a trade-off between what's good for the planet and what's good for business. This means that we seek out climate solutions that are cost competitive, offer a financial return, benefit our customers, or achieve more than one of these outcomes. For example, we're working with investment managers who are creating investment funds for clean energy and nature-based carbon removal solutions, which aim to deliver both environmental benefits and financial returns. And when we design products to be energy efficient and use recycled content, we view these as product features that add value for our customers. By underpinning our climate strategy with strong business principles and innovation, we aim to harness the power of markets to replicate our solutions at scale, creating the impact necessary to meet global reduction targets.

$4.7B

We've issued $4.7 billion in green bonds to model how businesses can drive investments to reduce global emissions. In our latest Annual Green Bond Impact Report, we share progress on the projects funded in 2022. Read our latest Annual Green Bond Impact Report (PDF).

Our 10-year Climate Roadmap addresses Apple's carbon footprint through five pillars:



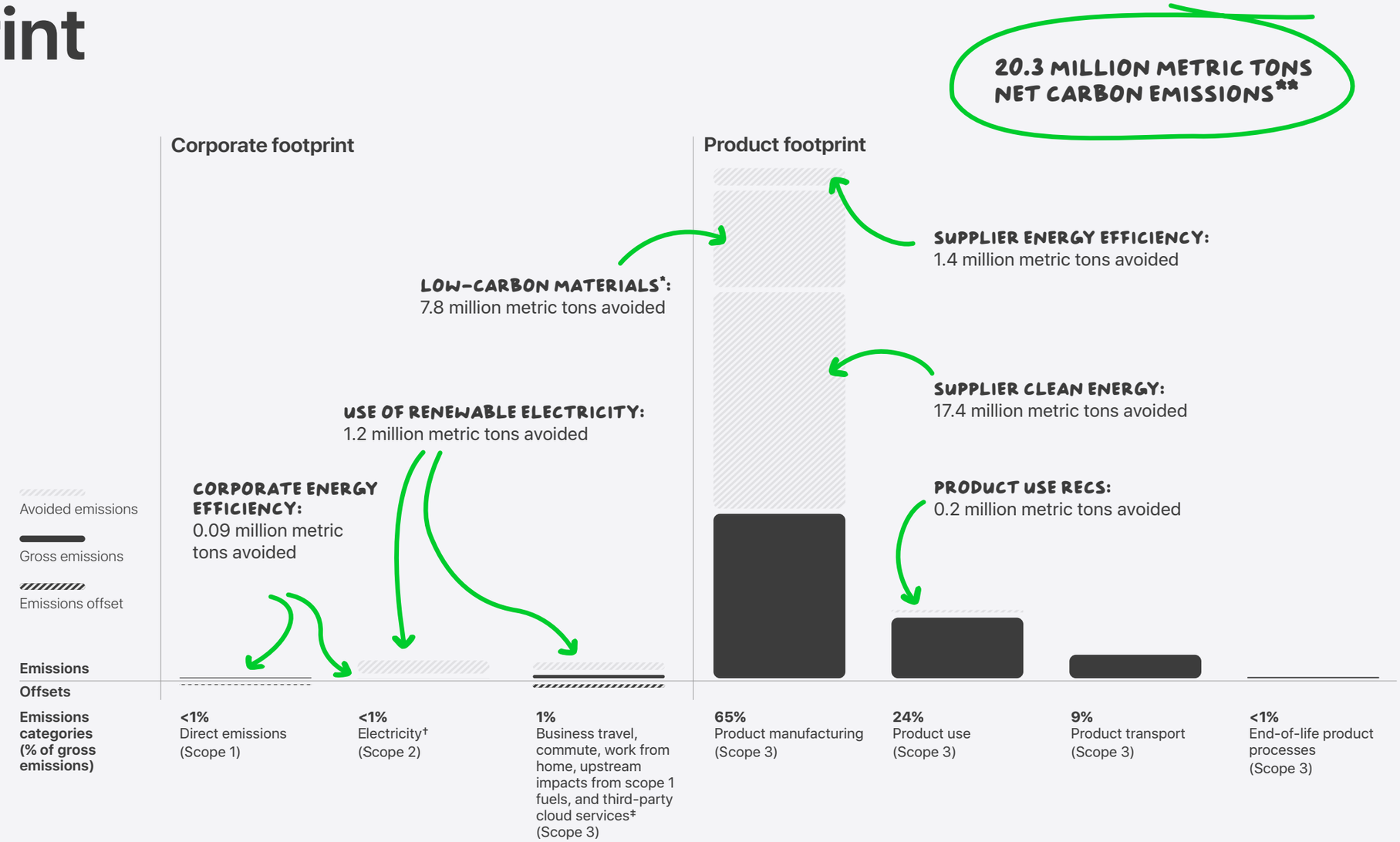
Explore all solutions: Reaching our 2030 carbon goal will require scaling proven solutions that are available today, as well as exploring the solutions of the future. This includes facilitating the development of new technologies, like direct carbon-free aluminum smelting, adopting novel financial approaches such as the Apple Restore Fund, advancing policies that support a low-carbon economy, and continuing to invest in research and development to enable decarbonizing our products by 2030.

Be open: We're committed to disclosing our carbon footprint as well as our climate strategy and progress. By sharing our approach, we aim to send clear signals to others and invite them to work with us. We also hope to empower our peers in their pursuit of carbon neutrality and engage investors through financing options, such as green bonds. This means sharing both challenges and successes. Our annual Environmental Progress Reports, as well as our response to the global disclosure nonprofit CDP, provide details on our progress.

Support underrepresented communities: Low-income and historically marginalized communities too often bear the brunt of the effects of climate change. So we're pursuing ways to directly support these communities in our climate program — like with the Apple Impact Accelerator, which aims to bolster equity and foster opportunity for Black-, Hispanic/Latinx-, and Indigenous-owned businesses in the environmental sector. We're advocating for greater access to clean energy, and we're investing in renewable energy projects in emerging markets. And our carbon removal projects often benefit the livelihoods of local and Indigenous communities.

Apple's comprehensive carbon footprint

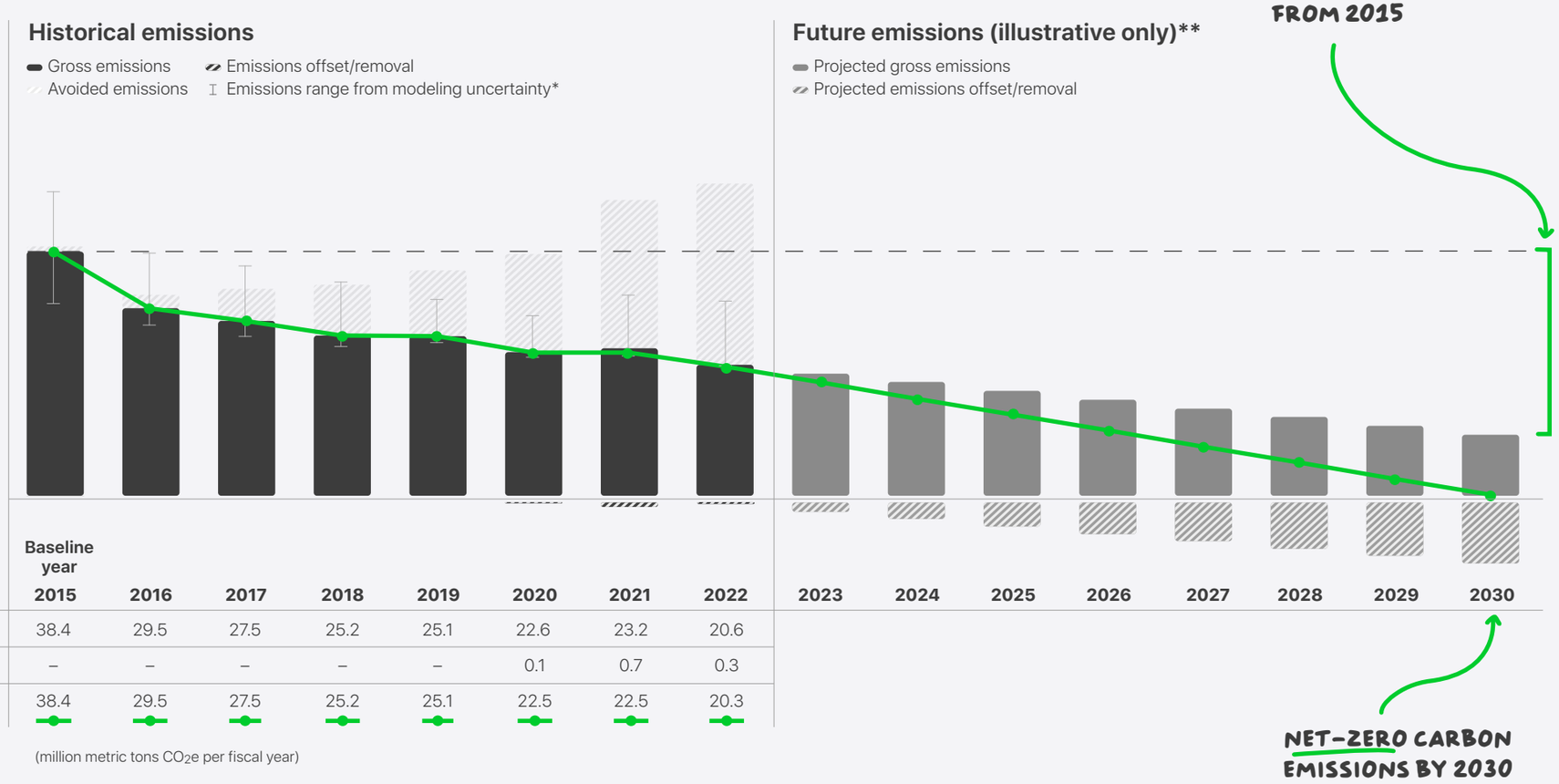
This past year, we've continued our efforts to reduce Apple's emissions. In 2022, our environmental programs avoided over 28 million metric tons of emissions across all scopes. Initiatives that we've been growing for years — like sourcing 100 percent renewable electricity for our facilities, transitioning suppliers to renewable energy, and using low-carbon materials in products — have yielded clear results. Thanks to this work, we're decoupling business growth from emissions: While our revenue has grown by over 68 percent since 2015, our gross emissions have decreased by over 45 percent.



* Low-carbon materials represents emissions savings from transitioning to recycled materials in our products, or use of low-carbon aluminum, as described on page 14.
** Net carbon emissions represents our total gross footprint minus carbon offsets applied to each category. Percentages shown for each emissions category represent the share of Apple's gross footprint. Totals add up to more than 100 percent due to rounding.
† Beginning in fiscal year 2022, we're including transmission and distribution losses as part of scope 3 emissions, which are matched with renewable electricity.
‡ Beginning in fiscal year 2022, we're incorporating emissions associated with employees working from home as part of Apple's new hybrid work model, as well as emissions from third-party cloud services — the electricity from both of which is addressed using renewable energy.

Progress toward net-zero emissions

Our plan to become carbon neutral by 2030 centers around a 75 percent emissions reduction target compared with our 2015 footprint. We've already reduced our gross carbon footprint[12] by over 45 percent since 2015. And we plan to address residual emissions through high-quality carbon removals.



	2015	2016	2017	2018	2019	2020	2021	2022
Gross emissions	38.4	29.5	27.5	25.2	25.1	22.6	23.2	20.6
Carbon offsets/removal	–	–	–	–	–	0.1	0.7	0.3
Net emissions	38.4	29.5	27.5	25.2	25.1	22.5	22.5	20.3

(million metric tons CO_2e per fiscal year)

* Error bars: We're continuously refining our methodology to improve our carbon footprint estimate. But there's uncertainty inherent to modeling product-related carbon emissions, which we've illustrated through error bars in this graphic.
** Future emissions: Future emissions, including offsets and removals, are displayed as a linear trend to reach net-zero carbon emissions by 2030. Actual future emissions will likely not be linear.

Carbon neutrality for our corporate emissions

Since April 2020, we've been carbon neutral for our corporate operations, including direct emissions (scope 1); indirect emissions from purchased electricity, steam, heat, or cooling (scope 2); and emissions from business travel and employee commute (scope 3). In 2022, we expanded the scope 3 emissions we include in our corporate footprint and are now also carbon neutral for work from home, third-party cloud services, electricity transmission and distribution losses, and upstream impacts from scope 1 fuels. To reach neutrality, we focused on driving energy efficiency improvements and transitioning our facilities to 100 percent renewable electricity, which we achieved in 2018. These programs have reduced our scope 1 and scope 2 emissions by 67 percent since 2011, when we first began procuring renewable electricity, even as our business grew. We've addressed the remaining scope 1, 2, and 3 emissions (for a total of 324,100 metric tons) by securing high-quality carbon credits from projects that protect and restore forests, wetlands, and grasslands.

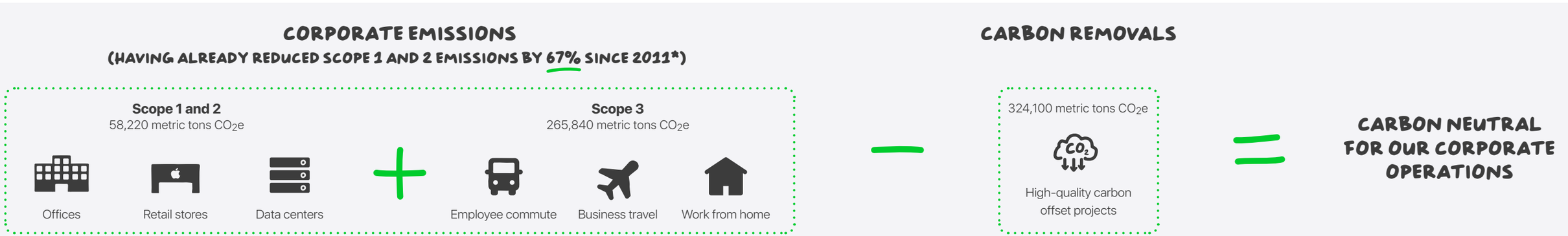
Measuring our footprint

We account for our carbon footprint by following internationally recognized standards, like the World Resources Institute (WRI) Greenhouse Gas Protocol and ISO 14040/14044. For our corporate footprint, we calculate emissions based on consumption data when available; when it's not available, we rely on reasonable assumptions and methodologies to estimate emissions, which we revisit and improve on regularly. For our product hardware carbon footprint, we use a life cycle–based approach. Apple-specific data drives many of our most critical calculations; in cases where that data isn't available, we rely on secondary sources, including industry averages. We continually refine our model to include new sources of product life cycle data — and offer a more accurate and transparent assessment of our footprint. Our comprehensive carbon footprint and our methodology are assessed by a third party each year to confirm accuracy and transparency (see Appendix D). Improving the accuracy of our carbon footprint is an ongoing process — as we learn more, we refine our carbon models and adjust our climate road map. We also regularly revisit the boundary of our footprint to best reflect our impact. For example, in 2022, we expanded our corporate footprint to include work from home emissions, third-party cloud services, electricity transmission and distribution losses, and upstream impacts from scope 1 fuels.

Evaluating climate risks

In 2020, we conducted a climate scenario analysis to help us better understand the potential physical and transition effects of climate change. To align with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations, we considered a range of future scenarios, including a scenario below 2° C. Our assessment had a global scope to capture all our corporate facilities — including offices, retail locations, and data centers — as well as 200 supplier facilities, based on spend. The analysis highlighted how our renewable energy program and carbon neutrality goals could contribute to our corporate resilience. It also provided environmental data that we considered when developing business strategies, including around supply chain diversification, and when safeguarding our global assets. The results of the scenario analysis contributed to a larger body of internal assessments on the physical and transition impacts of climate change on our business.

We're committed to managing regulatory, reputational, and market risks related to climate change. For more information on these climate-related risks and Apple's governance of these risks, read our CDP Climate Change 2022 submission (PDF).



* We've reduced corporate emissions through energy efficiency, renewable electricity, and low-carbon fuels, and we're applying carbon offsets to the remaining emissions.

Low-carbon design

Each Apple product represents an opportunity to reduce our carbon footprint — even small changes can yield significant results. Our carbon footprint helps us identify opportunities to reduce the carbon intensity of our product designs. We prioritize the materials and components that account for significant portions of our carbon emissions. This means that the choices we make product by product can scale toward reducing our overall footprint. These priorities inform our work to design for material efficiency and increased use of recycled and renewable materials.

Improving material and manufacturing efficiency

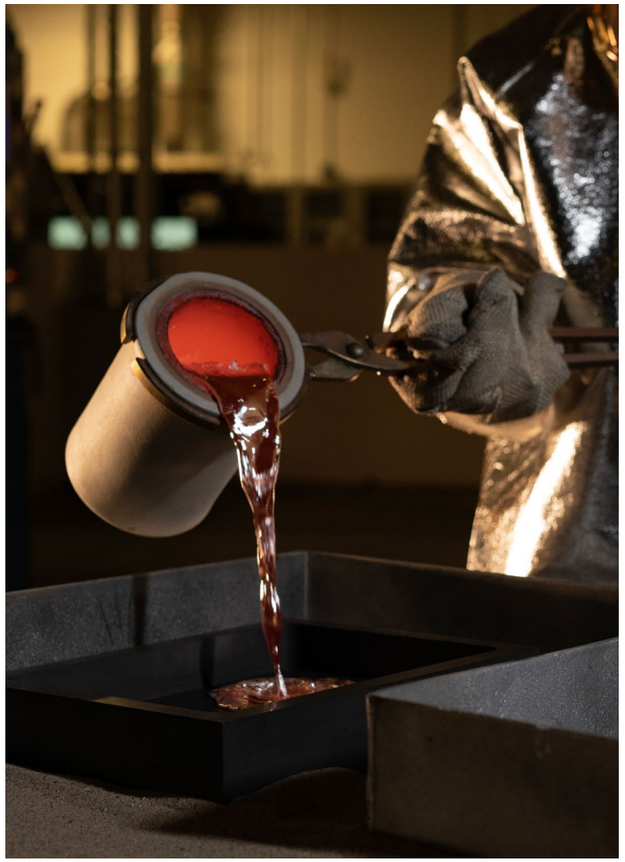
Less means more when it comes to our approach to materials and how we process them. Making our manufacturing processes more efficient creates less waste and helps us make the most of the materials we source. We're also working to design our products so that they require less material in the first place. Combined, these efforts help reduce emissions from transporting and processing materials. And as we progress toward our 2030 carbon neutrality goal, we continue to investigate new materials and new ways to manufacture efficiently.

We've continued to improve the carbon efficiency of the integrated circuits that we use in our products — components we've prioritized because they're carbon-intensive. Integrated circuits perform vital functions in electronic devices but require significant energy to manufacture. We also continued our work with the sustainable semiconductor technologies and systems research program of imec, a world-leading research and innovation hub in nanoelectronics and digital technologies, of which we were the first public company to join in October 2021. Our goal in collaborating is twofold: to improve the data associated with integrated circuit production, from end to end, and to use improved data and shared expertise to identify carbon reduction opportunities for the entire integrated circuits industry.

And we keep investigating new opportunities for improved efficiency across our product manufacturing processes. In 2022, we continued to invest in research and development projects aimed at: creating less waste in processing materials, reducing machining time and associated energy use, more efficiently transforming material into the shapes we need, and maximizing recovery and reprocessing of manufacturing scrap. Once these improved processes are successfully developed, we plan to work with our suppliers as they deploy them at scale at our supplier facilities.

Using recycled materials to lower our product carbon footprint

Materials selection is another way to reduce the carbon footprint of our products. Our strategy is to transition to materials manufactured using low-carbon energy and recycled content. We've prioritized the materials and components that make up a large part of our product carbon footprint to move us closer to our goal of product carbon neutrality. And to accelerate collective efforts, we signed on to the First Movers Coalition's near-zero emissions primary aluminum commitment for 2030 (see more on page 26).



Undertaking a comprehensive life cycle analysis for the materials and components in our products led us to prioritizing low-carbon aluminum. In 2018, Apple created an aluminum alloy made of 100 percent recycled aluminum and a reduced carbon footprint.

Low-carbon design addresses emissions from:

PRODUCT MANUFACTURING (SCOPE 3)

PRODUCT USE (SCOPE 3)

PRODUCT TRANSPORT (SCOPE 3)

Aluminum is a great example of Apple's comprehensive approach: We're transitioning to recycled content, and where we haven't yet, we're moving to low-carbon suppliers and technology innovations to further decarbonize. In 2015, aluminum represented over a quarter of our product manufacturing footprint. Since then, we've continued to introduce 100 percent recycled aluminum in the enclosures of Apple products: All iPad models in our lineup use 100 percent recycled aluminum in their enclosures — joining Apple Watch Series 8, Apple Watch SE, MacBook Air, Mac mini, and the 14-inch and 16-inch MacBook Pro computers. In addition, the new Studio Display contains a 100 percent recycled aluminum stand, and the Mac Studio enclosure and Apple TV thermal module both contain 80 percent recycled aluminum. And with iPhone 14, we've increased recycled content by using recycled CNC chips with Apple's strongest aluminum alloy for the first time.

For products shipped in 2022 that had enclosures made with primary aluminum, we prioritized the use of aluminum smelted using low-carbon sources of electricity rather than fossil fuels, for a lower carbon impact. We also shipped iPhone SE enclosures that contained ELYSIS aluminum, which was smelted without generating greenhouse gas emissions (see page 26 for more information).

We also continue to make progress in how we source recycled aluminum. Our first priority is to recover any of our own scrap at high quality. Then, to augment this, we look to other postindustrial and postconsumer sources for high-quality recycled aluminum, which emits less carbon than newly mined materials. And we're expanding our sourcing to include postconsumer recycled aluminum from building and construction scrap that meets the high standards that our products require. These emissions reduction efforts have reduced our aluminum-related emissions by 71 percent since 2015 and now represent less than 8 percent of our product manufacturing footprint, compared with 27 percent in 2015.

In 2022, we began shipping products with certified recycled steel and expanded our use of certified recycled gold — two materials that typically have significant carbon footprints. We introduced certified recycled steel for the first time in the MacBook Air with M2 chip, which has 90 percent recycled steel in the battery tray. And we significantly expanded the use of certified recycled gold in our products — from the gold plating on the main logic board on iPhone to other product main logic boards and flexible printed circuit boards — increasing recycled gold content from 1 percent in 2021 to approximately 4 percent across all product lines in 2022.

71%↓

Switching to recycled and low-carbon aluminum has decreased our carbon emissions associated with aluminum by 71 percent since 2015. Read more about how we plan to address emissions from our customers' use of Apple products on page 24.

Driving product energy efficiency

Product energy use accounts for 24 percent of our gross carbon footprint — and it has an impact on the individual energy use of each of our customers. This is why we've set aggressive targets to reduce our products' energy usage. We approach this challenge in the earliest phases of design, taking a holistic view of each product — from how efficiently the software operates to the power requirements of individual components.

With each generation of products, we strive to improve energy efficiency. For example, the transition to Apple silicon on Mac devices continues to drive these improvements. The latest generation of our Pro chips is enabling more Mac devices to run with improved energy efficiency. For example, MacBook Pro with M2 Pro and M2 Max made significant progress in reducing energy use in 2022, and the new Apple TV 4K is designed to minimize its impact on the environment, using nearly 30 percent less power than the previous generation while achieving more powerful performance.[13] The efficiency gains of the A15 Bionic chip eliminate the need for an internal fan, resulting in a more compact design and contributing to a 25 percent reduction in carbon footprint over the previous generation. Through our energy efficiency improvements, we've cut overall product energy use across all major product lines by more than 70 percent since 2008.[14] And Apple products are consistently rated by ENERGY STAR, which sets specifications that reflect the 25 percent most energy-efficient devices on the market. In 2022, all eligible Apple products received an ENERGY STAR rating for superior energy efficiency.[15] They also met the requirements for EPEAT registration,[16] another environmental rating system for electronic products, which considers energy efficiency and a number of other environmental topics.

Product energy efficiency

Apple TV 4K is designed to use nearly **30 PERCENT LESS POWER** than the previous generation while achieving more powerful performance.[17]

Over the course of a year, Mac Studio uses up to **1000 KILOWATT-HOURS LESS ENERGY** than a high-end PC desktop.[18]

iPhone 14 uses **57 PERCENT LESS ENERGY** than the U.S. Department of Energy's requirements for battery charger systems.[19]