



# How can we advance sustainability?

## 2024 Environmental Sustainability Report

Reporting on our 2023 fiscal year






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Cover captured by:  
**Finnian Power**  
Regional CE Program Manager,  
Ireland

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5M

metric tons of carbon removal contracted in FY23

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18.5K

metric tons of waste diverted from landfills and incinerators

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61M

cubic meters of water replenishment projects contracted by end of FY23

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\$761M

allocated towards climate technologies through our Climate Innovation Fund (CIF)<sup>1</sup>

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Reporting disclosure

A key principle of our work is transparency. This report, published annually, includes our strategy, progress against our goals, and key challenges and trends we see in this work. We also publish our environmental data, which is included in the separate [Environmental Data Fact Sheet](#). Deloitte & Touche LLP performed a review relating to specified information within Section 1 of the [Environmental Data Fact Sheet](#).  
Read about how we report in Appendix A.



## Overview

# Reviewing our 2023 progress and learnings

Our employees are at the core of our sustainability journey. Their passion and commitment catalyzes progress in every part of our business and their communities around the world.

Images taken by employees are featured throughout the 2024 Environmental Sustainability Report.

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Captured by:  
**Erika Basham**  
Director of Sustainability  
Product Strategy,  
United States



## Foreword

# Accelerating innovation and partnership for people and the planet



**Brad Smith**  
Vice Chair and President



**Melanie Nakagawa**  
Chief Sustainability Officer

Four years ago, Microsoft committed that by 2030 we would become carbon negative, water positive, zero waste, and protect more land than we use. Since that announcement, we have seen major changes both in the technology sector and in our understanding of what it will take to meet our climate goals. New technologies, including generative AI, hold promise for new innovations that can help address the climate crisis. At the same time, the infrastructure and electricity needed for these technologies create new challenges for meeting sustainability commitments across the tech sector. As we take stock as a company in 2024, we remain resolute in our commitment to meet our climate goals and to empower others with the technology needed to build a more sustainable future.

“There is no issue today that connects everyone on the planet more than the issues around climate change.”

At the end of last year, the world met in Dubai at COP28 to assess global sustainability progress. The results were sobering. The world is not on track to meet critical climate goals, and we see many of the world’s challenges reflected in our own situation. During the past four years, we have overcome multiple bottlenecks and have accelerated progress in meaningful ways. As we report here, we are on track in several areas. But not in every area. We therefore are mobilizing to accelerate progress in areas where we’re not yet on track.

In four areas we are on track, and in each of these we see progress that has the potential to have global impact beyond our own sustainability work. These are:

- Reducing our direct operational emissions (Scope 1 and 2).
- Accelerating carbon removal.
- Designing for circularity to minimize waste and reusing cloud hardware.
- Improving biodiversity and protecting more land than we use.

At the same time, there are two areas where we’re not yet on track, and in each of these we are intensively engaged in work to identify and pursue additional breakthroughs. These are:

- Reducing our Scope 3, or indirect, emissions.
- Reducing water use and replenishing more water than we consume in our datacenter operations.

Even amid the challenges, we remain optimistic. We’re encouraged by ongoing progress across our campuses and datacenters, and throughout our value chain. Even more, we’re inspired by the scores of executives and employees across Microsoft who are rolling up their sleeves and identifying new and innovative steps that are helping us to close critical gaps. We all recognize the same thing: there is no issue today that connects everyone on the planet more than the issues around climate change. We all need to succeed together.

### Carbon negative

Our carbon negative commitment includes three primary areas: reducing carbon emissions, increasing use of carbon-free electricity, and carbon removal. We made meaningful progress on carbon-free electricity and carbon removal in FY23. Microsoft has taken a first-mover approach to supporting **carbon-free electricity** infrastructure, making long-term investments to bring more carbon-free electricity onto the grids where we operate.



## Foreword continued

In 2023, we increased our contracted portfolio of renewable energy assets to more than 19.8 gigawatts (GW), including projects in 21 countries. In FY23, we also contracted 5,015,019 metric tons of **carbon removal** to be retired over the next 15 years. We are continuing to build a portfolio of projects, balanced across low, medium, and high durability solutions.

**Carbon reduction** continues to be an area of focus, especially as we work to address Scope 3 emissions. In 2023, we saw our Scope 1 and 2 emissions decrease by 6.3% from our 2020 baseline. This area remains on track to meet our goals. But our indirect emissions (Scope 3) increased by 30.9%. In aggregate, across all Scopes 1–3, Microsoft’s emissions are up 29.1% from the 2020 baseline.

The rise in our Scope 3 emissions primarily comes from the construction of more datacenters and the associated embodied carbon in building materials, as well as hardware components such as semiconductors, servers, and racks. Our challenges are in part unique to our position as a leading cloud supplier that is expanding its datacenters. But even more, we reflect the challenges the world must overcome to develop and use greener concrete, steel, fuels, and chips. These are the biggest drivers of our Scope 3 challenges.

We have launched a company-wide initiative to identify and develop the added measures we’ll need to reduce our Scope 3 emissions.

Leaders in every area of the company have stepped up to sponsor and drive this work. This led to the development of more than 80 discrete and significant measures that will help us reduce these emissions—including a new requirement for select scale, high-volume suppliers to use 100% carbon-free electricity for Microsoft delivered goods and services by 2030. As a whole, this work builds on our multi-prong strategy, this year focusing on the following:

- 1 **Improving measurement** by harnessing the power of digital technology to garner better insight and action.
- 2 **Increasing efficiency** by applying datacenter innovations that improve efficiency as quickly as possible.
- 3 **Forging partnerships** to accelerate technology breakthroughs through our investments and AI capabilities, including for greener steel, concrete, and fuels.
- 4 **Building markets** by using our purchasing power to accelerate market demand for these types of breakthroughs.
- 5 **Advocating for public policy** changes that will accelerate climate advances.



## Water positive

We take a holistic approach to becoming water positive, which includes **water access**, replenishment, innovation, reduction, and policy. In 2023, we achieved our water access target by providing more than 1.5 million people with access to clean water and sanitation solutions. We contracted **water replenishment** projects estimated to provide more than 25 million m<sup>3</sup> in volumetric water benefit over the lifetime of these projects—enough water to fill about 10,000 Olympic sized swimming pools. Finally, we continue to drive **innovation in water**, through first-of-their kind replenishment projects like FIDO, which leverages AI-enabled acoustic analysis to reduce water loss from leakage.

Looking ahead, as our datacenter business continues to grow, so does the need to minimize our water consumption and replenish more than we consume in these operations. In FY23 our progress on water accelerated, and we know we need to implement an even stronger plan to accelerate it further. We therefore are investing in our water positive commitment in four ways:

- 1 We are taking action to **reduce the intensity with which we withdraw resources** by continuing to design and innovate in order to minimize water use and achieve our intensity target.

- 2 Our new **datacenters are designed and optimized to support AI workloads** and will consume zero water for cooling. This initiative aims to further reduce our global reliance on freshwater resources as AI compute demands increase.
- 3 We are **partnering to advance water policy**. In 2023, we joined the Coalition for Water Recycling. Over the coming year we will finalize a position and strategy for water policy.
- 4 We are developing innovative scalable replenishment projects in high water stress locations where we operate datacenters. We recently announced Water United, a new initiative to unite public and private sectors in reducing water loss from leakage across the Colorado River Basin.

## Zero waste

Our journey to zero waste includes reducing waste at our campuses and datacenters, advancing circular cloud hardware and packaging, and improving device and packaging circularity. In FY23, we achieved a reuse and recycle rate of 89.4% for servers and components across all cloud hardware, a target that is increasingly important as needs for cloud services continue to grow. In 2023, we also diverted more than 18,537 metric tons of waste from landfills or incinerators across our owned datacenters and campuses, and we reduced single-use plastics in our Microsoft product packaging to 2.7%.



## Foreword continued

From expanding our Circular Centers to piloting programs that give a second life to used fiber optic cables through partnerships with local technical schools, we are working to keep materials in use longer and approach our work at every stage with circularity in mind. We are accelerating our work to reuse and recycle cloud hardware wherever possible, and launched two new Circular Centers in Quincy, Washington and Chicago, Illinois in 2023.

### Protecting ecosystems

We have committed to protect more land than we use by 2025, while preserving and restoring ecosystems in the areas where we live and work. As of FY23, we exceeded our land protection target by more than 40%. At this point, 15,849 acres of land have been legally designated as permanently protected compared to our goal of 11,000 acres.

We are incorporating green business practices that support the surrounding ecosystems near our campuses and datacenters. This includes regenerative design solutions around our datacenters that enhance local biodiversity, improved stormwater management, and contributing to climate resilience. We are also piloting AI-driven Microsoft technology to provide insights into the overall health of the ecosystem and inform future actions.



### Customer and global sustainability

In last year's [Environmental Sustainability Report](#), we announced that we were expanding our ambition to help advance sustainability for our customers and the world. In 2023, we continued this work to empower our customers and partners on their own sustainability journey by creating the technology needed to better manage resources and optimize systems. On a global scale, we focused on accelerating innovation, research, and policy, not only for ourselves but also to support a more sustainable world for all.

The shift from pledges to progress requires action, transparency, and accountability. Microsoft Cloud for Sustainability is helping customers unify data and garner richer insights into the sustainability of their business. In 2023, we expanded Microsoft Sustainability Manager to include Scopes 1, 2, and all 15 categories of Scope 3 carbon emissions to help track progress and inform action across an organization's operations and value chains.

As the world experiences worsening impacts of climate change, we are also helping to put planetary data into the hands of researchers, governments, companies, and individuals through the Planetary Computer. We are providing open access to petabytes of environmental monitoring data to help empower people with actionable information to protect their communities.

Microsoft's sustainability progress requires global engagement. We are investing in innovative solutions, advancing research, and advocating for policies that we believe can drive progress at scale. A hallmark of this effort has been our Climate Innovation Fund (CIF)—our \$1 billion commitment set in 2020 to advance innovation beyond Microsoft's four walls. To date the CIF has allocated \$761 million toward innovative climate technologies<sup>1</sup> including commercial direct air capture technologies, sustainable aviation fuel (SAF), industrial decarbonization, and more.

Our science, research, and AI for Good teams are also working to accelerate solutions and develop climate resilience with AI. In November 2023, we published a [whitepaper](#) and [playbook](#) that expands on the incredible potential of AI for sustainability. Through our AI for Good team, we are collaborating with the United Nations to research the use of AI to advance the Early Warning for All Initiative, with a goal of better understanding the populations that may be at risk of extreme weather events and other threats.

*"The shift from pledges to progress requires action, transparency, and accountability."*

Last year, Microsoft CEO Satya Nadella called climate change "the defining issue of our generation." To meet this generational challenge, we are putting sustainability at the center of our work. With each emerging technology, with each new opportunity, we ask ourselves an important question: how can we advance sustainability?

As we strive to answer that question, we are developing new approaches, experimenting with new partnerships, and learning as we go. We are optimistic about the role technology can continue to play in accelerating climate progress, and we look forward to working with others on this critical journey for all of us.

A handwritten signature in black ink, appearing to read 'Brad Smith'.

**Brad Smith**  
Vice Chair and President

A handwritten signature in black ink, appearing to read 'Melanie Nakagawa'.

**Melanie Nakagawa**  
Chief Sustainability Officer



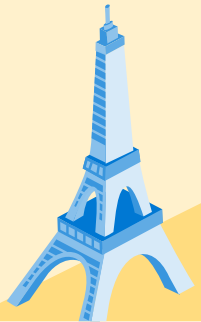
# 2023 highlights

## Carbon

Total renewable electricity use in FY23

23.6 million MWh

This would be enough to power Paris with renewable electricity for about two years.



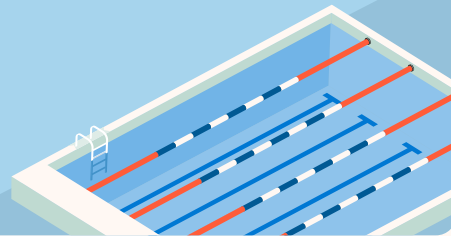
- ✓ 19.8 gigawatts (GW) of renewable energy assets were contracted, including projects in 21 countries around the world.
- ✓ We contracted 5,015,019 metric tons of carbon removal in FY23, and continue to build a portfolio of projects, balanced across low, medium, and high durability solutions.

## Water

Total contracted water replenishment since 2020

61.7 million m<sup>3</sup>

This is enough water to fill over 24,000 Olympic sized swimming pools.



- ✓ We met our water access target by providing more than 1.5 million people with access to clean water and sanitation solutions.
- ✓ Our new datacenters are designed and optimized to support AI workloads and will consume zero water for cooling.

## Waste

Total amount of solid waste diverted from landfills and incinerators FY23

18,537 metric tons

This is equivalent to the weight of over 45 commercial passenger jets.



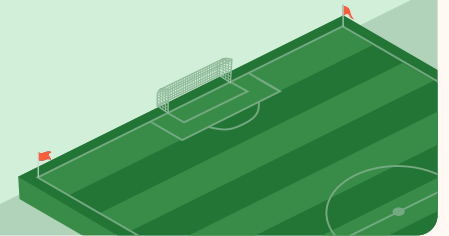
- ✓ 18,537 metric tons of solid waste were diverted from landfills and incinerators across our owned datacenters and campuses.
- ✓ Our reuse and recycle rates of servers and components across all cloud hardware reached 89.4% in FY23.
- ✓ We reduced single-use plastics in our Microsoft product packaging to 2.7% in FY23.

## Ecosystems

Total amount of land protected in FY23

15,849 acres

This is equivalent to over 9,000 soccer pitches.



- ✓ 15,849 acres were designated as permanently protected. We exceeded our land protection target of 11,000 by more than 40%.
- ✓ Through the Microsoft Datacenter Community Environmental Sustainability program we are responding to local needs in the communities that host Microsoft datacenters and where our employees live and work.



# How we work

Our sustainability journey starts with getting our own house in order. In 2020, we set bold targets to be a carbon-negative, water-positive, zero-waste company that protects ecosystems by 2030. We are committed to sharing our progress, challenges, and learnings through our annual Environmental Sustainability Report to help accelerate global progress toward net zero.

We recognize that our actions alone will not solve the climate crisis. As a global technology provider, we also believe we have a role to play in supporting the thousands of customers and partners who put their trust in Microsoft. We think about Microsoft's role in sustainability through three spheres of influence: Microsoft sustainability, customer sustainability, and global sustainability.



## Microsoft sustainability: Taking care of our own environmental footprint

Our sustainability work starts with taking accountability for our operational footprint. This means taking accountability for our operational footprint across our campuses, datacenters, devices, software, and value chain. We look at our operations across the entire life cycle of assets and products, from design to building, usage, and end of life. We are committed to sharing our learnings, accelerating markets, scaling solutions across our value chain, and being transparent about our progress.



## Customer sustainability: Delivering digital technology for net zero

Microsoft is committed to providing innovative digital technology to help build a more sustainable world. From managing environmental footprints with Microsoft Cloud for Sustainability to accelerating innovation for new climate technologies, we're working to empower our customers and partners across industries. We are advancing greener software and reducing carbon intensity to improve device sustainability, and helping organizations measure and manage the health of the planet's natural ecosystems with the Microsoft Planetary Computer.



## Global sustainability: Enabling a more sustainable world

Microsoft's actions alone cannot solve the climate crisis. As a global technology leader, we are also committed to helping build the enabling societal conditions that will support a net zero economy. We're focused on accelerating the availability of new climate technologies, strengthening our climate policy agenda, helping to develop a more reliable and interoperable carbon accounting system, advocating for skilling programs to expand the green workforce, and working to help enable a just energy transition.



## Microsoft sustainability

# How are we addressing our environmental footprint?

Our sustainability work starts with taking accountability for our operational footprint. In 2020, we made a bold set of commitments: to be a carbon negative, water positive, zero waste company that protects ecosystems—all by 2030.

We are committed to sharing our learnings, accelerating markets, scaling solutions across our value chain, and being transparent about our progress.

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Captured by:  
**Emilia Zamora**  
Sourcing Engineer,  
United States



# Getting to carbon negative

Carbon

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Our approach

Our commitment to becoming carbon negative requires unprecedented innovation and partnership. Over the last four years since setting our sustainability targets, thousands of companies have also joined the call to reach a net zero future and are taking steps, big and small, to help make that future a reality. This year, technologies like AI brought renewed promise of the role innovation can play in accelerating progress. From improving measurement to increasing datacenter efficiency and improving energy transmission, technology can be a powerful accelerant for the pace and scale the world needs to achieve net zero.

Amid this optimism, we face the realities of the complexity of the challenge. Addressing Scope 1, 2, and 3 emissions requires partnership and systemic action. We need to decarbonize supply chains and take action to build the carbon-free electricity infrastructure needed by Microsoft, our suppliers, our partners, and the world.

In FY23 our emissions increased by 29.1% across Scope 1, 2, and 3 from our 2020 baseline, as we continue to invest in the infrastructure needed to advance new technologies.

Since 2020, our Scope 1 and 2 emissions have decreased by 6%. This result is driven by our ongoing work to advance clean energy procurement, green tariff programs, and use of unbundled renewable energy certificates.

Scope 3 accounts for over 96% of our total emissions, which includes emissions from our supply chain, the life cycle of our hardware and devices, and other indirect sources. Our Scope 3 emissions continue to be our most significant decarbonization challenge. Progress will take deep collaboration across industries.

Microsoft has taken a first-mover approach, making long-term investments to bring more carbon-free electricity onto the grids where we operate, and we continue to advocate for the expansion of clean energy solutions around the world.



## Our approach continued

# Our journey to carbon negative

We are committed to being carbon negative by 2030 and by 2050 to remove from the atmosphere an equivalent amount of all the carbon dioxide our company has emitted either directly or by our electricity consumption since we were founded in 1975.

## Working to help decarbonize the industrial sector



At Microsoft, we are also partnering to address carbon-intensive industries such as building materials, chemical products, and fossil fuels for aviation, shipping, and trucking.

## Our targets

### Reducing direct emissions

We will reduce our Scope 1 and 2 emissions to near zero by increasing energy efficiency, decarbonization of our operations, and reaching 100% renewable energy by 2025.

### Reducing value chain emissions

By 2030, we will reduce our Scope 3 emissions by more than half from a 2020 baseline.

### Replacing with 100/100/0 carbon-free energy

By 2030, 100% of our electricity consumption will be matched by zero carbon energy purchases 100% of the time.

### Removing the rest of our emissions

By 2030, Microsoft will remove more carbon than it emits. By 2050, we will remove an amount of carbon equivalent to all our historical operational emissions.

## Our progress

### ✓ Scope 1 and 2 emissions

Our Scope 1 and 2 emissions decreased by 6% from the 2020 base year. This result is driven by our ongoing work to advance clean energy procurement, green tariff programs, and use of unbundled renewable energy certificates.

### ✓ Scope 3 emissions

Our value chain or Scope 3 emissions increased by 30.9% from our 2020 baseline. Microsoft continues to work to scale corporate clean energy purchases across our supply chain and invest to help decarbonize hard-to-abate industries, including steel, concrete, and other building materials used in our datacenters.

### ✓ 19.8 GW of carbon-free energy

In 2023, we increased our contracted portfolio of renewable energy assets to over 19.8 gigawatts (GW), including projects in 21 countries around the world.

### ✓ 5M metric tons of carbon removal

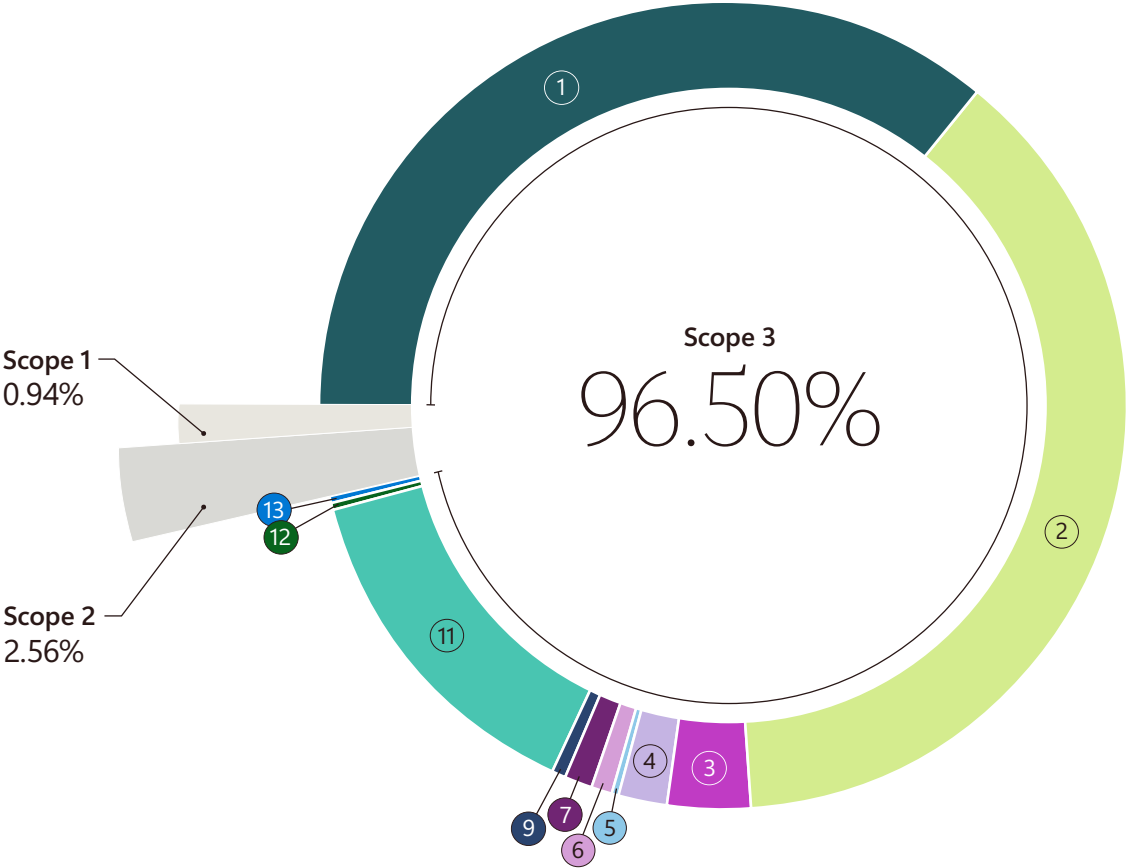
We contracted 5,015,019 metric tons of carbon removal in FY23. We are continuing to build a portfolio of projects, balanced across low, medium, and high durability solutions.



Our approach continued

Carbon Table 1–Breaking down our FY23 Scope 3 emissions by source

Microsoft’s Scope 3 emissions continue to account for more than 96% of our total emissions, with the vast majority of these emissions coming from two categories upstream, Purchased Goods and Services (Category 1) and Capital Goods (Category 2), and one downstream, Use of Sold Products (Category 11).



Scope 3 Categories

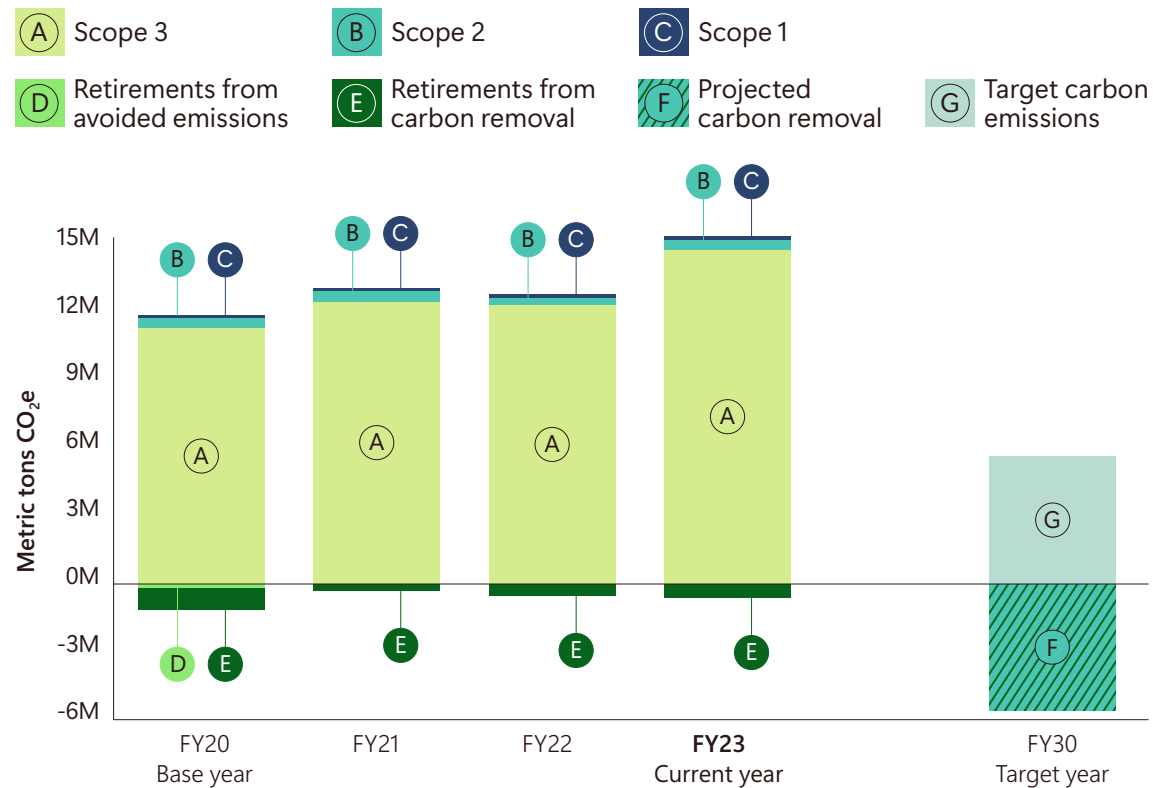
1	Purchased Goods & Services	36.23%
2	Capital Goods	38.24%
3	Fuel-and Energy-Related Activities (Market-Based)	3.39%
4	Upstream Transportation	1.99%
5	Waste	0.05%
6	Business Travel	0.81%
7	Employee Commuting	1.22%
9	Downstream Transportation	0.45%
11	Use of Sold Products	14.05%
12	End of Life of Sold Products	0.03%
13	Downstream Leased Assets	0.05%

Scope 2 and 3 emissions included in this chart are market-based. Scope 3 emissions are management criteria values.

## Our approach continued

## Carbon Table 2—Tracking progress toward carbon negative by 2030

Microsoft's overall emissions increased by 29.1% in FY23, in relation to our base year. Additionally, we retired 605,354 metrics tons of carbon removal as part of achieving our annual target to be carbon neutral.

[Find out more in our Data Fact Sheet](#)

## Key definitions

## Carbon-free electricity (CFE)

Microsoft refers to the broader suite of technologies compatible with a fully decarbonized electricity system as CFE. CFE technologies include solar, geothermal, sustainable biomass, hydropower, nuclear, carbon capture utilization and storage, and others with zero direct emissions.

## Renewable energy

Electricity technologies including wind, solar, geothermal, sustainable biomass, and sustainable hydropower.<sup>2</sup>

## Scopes 1, 2, and 3

Indirect emissions from all other activities up and down the value chain such as upstream and downstream transportation, materials, and end-of-life impacts, as well as all suppliers' direct Scope 1 and 2 emissions.

Scope 3 represents over 96% of Microsoft's annual emissions in FY23. Our Scope 3 emissions result primarily from the operations of our tens of thousands of suppliers (upstream) and the use of our products across millions of our customers (downstream).

Tackling Scope 3 means decarbonizing industrial processes such as steel, concrete, and other building material production for use in our campus and datacenter construction, as well as jet fuel for business travel and logistics.



## Scope 1

Direct emissions created by a company's activities



## Scope 2

Indirect emissions from the consumption of the electricity or heat we use



## Scope 3

Indirect emissions from all other activities in which we're engaged

Since setting our targets in 2020, data has played an increasingly important role in our journey by allowing us to better measure and manage our resource consumption.



# Improving the measurement and efficiency of our operations

Reducing the carbon intensity of our operations is the first pillar of our approach to carbon negative. From the construction of our datacenters and campuses to our daily operations, efficiency is built into our design and use. Since setting our targets in 2020, data has played an increasingly important role in our journey by allowing us to better measure and manage our resource consumption. At Microsoft, we strengthened our supply chain methodologies in 2023 to drive progress in major sectors like building materials, sustainable aviation fuel, and hardware.

## Datacenter efficiency

### Measuring efficiency

Power usage effectiveness (PUE) is a ratio that describes how efficiently a datacenter uses energy. The lower the number, the better the score. We design and build Microsoft datacenters as close to a PUE of 1.0 as possible. This year our datacenters delivered a design rating of 1.12 PUE and, with each new generation, we will strive to be even more efficient.

### Transitioning servers to a low-power state

We continue to seek opportunities to reduce server energy consumption. Using low-power server states, we observed a reduction in energy usage of up to 25% on unallocated servers, with a corresponding reduction in Scope 2 emissions. This year, we expanded our deployment of this technique from a few thousand servers in 2022 to around one million by the end of 2023. This initiative reduces energy usage by thousands of megawatt-hours per month across our global datacenters. A similar initiative targets servers that are awaiting maintenance, reducing energy usage by hundreds of megawatt-hours per month.



◀ We support carbon-free electricity infrastructure through procurement and investment.

### Improving resource utilization

Datacenter resources are traditionally designed and built to accommodate peak power demands, often resulting in underutilization and the necessity to construct new datacenters. Microsoft is focused on improving datacenter efficiency by minimizing peak power consumption, effectively harnessing unused power, and maximizing server density within existing datacenters. This is achieved through power harvesting driven by service level agreements (SLAs), intelligent power-aware workload allocation, and utilizing the inherent redundancy in Microsoft internal services to tap into datacenter capacity that is conventionally reserved for use only during power grid or infrastructure failures.

In 2023, these initiatives have directly contributed to a roughly 7% reduction in datacenter power infrastructure and the associated embodied carbon.

Microsoft is also increasing server utilization by oversubscribing central processing unit (CPU) cores of internal workloads that have low CPU utilization. The direct impact in 2023 was an approximately 1.5% reduction in datacenter hardware needs for the Microsoft Azure platform—an improvement of three times over 2022 with a proportional reduction in associated embodied carbon.

## Improving the measurement and efficiency of our operations continued

### Building operations and construction

#### Infrastructure decarbonization

Our sustainability standards for new construction continue to expand to meet our climate goals. New campus projects require the procurement of high-efficiency refrigeration systems, all-electric kitchens and mechanical systems, and non-fossil-fuel-powered backup power systems. Combustion is no longer permitted for daily use in any new office construction project in our standard. We have also expanded our requirements to reduce embodied carbon in interior materials.

# 76.5%

In FY23, 76.5% of our total emissions originated from our suppliers. We believe Microsoft also has a role to play in bringing the global supply chain with us on our journey to net zero.

#### Innovations in low-carbon concrete

To minimize our carbon impact in constructing datacenters, we build our datacenters to meet LEED Gold certification, with 37 datacenters already meeting this goal globally.<sup>3</sup> LEED buildings also use less water, utilize renewable energy and fewer resources, create less waste, and preserve land and habitat. One example of innovation in this area is a series of pilots completed this year using a net-negative embodied carbon limestone alternative to traditional concrete. Derived from algae cultivation in concert with other alternative cementitious materials, the combination yielded a concrete mix that met our performance requirements and achieved an estimated 65% embodied carbon reduction from conventional concrete of a similar strength.

#### Fleet electrification

On Microsoft campuses around the world, we are making progress toward electrifying our fleet and eliminating dependence on fuel burning vehicles.

To establish the infrastructure needed to support our goal of operating a 100% electric fleet by 2030, we're constructing an Electric Vehicle Fleet Facility that will house, charge, and maintain our electric commute fleet of the future at our Redmond headquarters. The project is currently in the design phase and is pursuing LEED Platinum certification.

Additionally, an underground garage is set to be completed in FY24 as part of our Redmond campus modernization project and will include 130 EV charging stations with 176 additional EV charging stations planned for future phases.

As we continue to electrify our global fleet by 2030, these projects will help us test and implement our EV infrastructure and apply it to more campuses across the globe.

### Improve measurements across our supply chain

While we know that the majority of our emissions are from Scope 3, over 96% in 2023, we also needed greater precision on the drivers contributing to these emissions. What we found is that these emissions have three primary, interrelated drivers:

- 1 Electricity use** in both upstream embodied in what we purchase, and downstream from the usage of our products.
- 2 Key material procurement** including semiconductors, steel, cement, aluminum, and plastics.
- 3 Fuel use** from direct travel, commuting, logistics, and embodied in what we purchase.<sup>4</sup>

Achieving net zero is not something we can do alone. As 76.5% of our total emissions originate from our suppliers, we have a role to play in bringing the global supply chain with us on our journey to net zero.

By leaning into education and investing in meaningful tools for carbon reduction, we can move these efforts up the supply chain tier.



- ^ We are working to scale carbon accounting methodologies to drive progress across our supply chain.



## Improving the measurement and efficiency of our operations continued

### Partnering with our suppliers

Access to granular emissions data from our supply chain is essential to identifying where our largest Scope 3 reduction opportunities exist and how these can be actioned.

To understand the full extent of our Scope 3 carbon footprint, we piloted a new feature in Microsoft Sustainability Manager called the environmental, social, and governance (ESG) value chain solution. In 2023, Microsoft Procurement acted as customer zero, as we used our own technology and utilized the ESG value chain solution as its disclosure platform to successfully collect emissions from top in-scope suppliers. Additionally, due to the flexibility the ESG value chain solution offers, the Procurement Sustainability team was able to customize the platform to collect more advanced, granular emissions data from suppliers. In the future, the ESG value chain solution will enable customers to customize and collect detailed emissions data directly from suppliers.

### Advancing procurement of carbon-free electricity

When we identified a near-term need to support suppliers in decarbonizing their electricity consumption, especially our smaller- to medium-sized suppliers who traditionally lack the expertise and resources to navigate this process on their own, we partnered with climate solutions expert 3Degrees to launch Supplier REach, a renewable electricity portal.

The portal assists with Microsoft supplier evaluation and procurement of high-quality carbon-free electricity options based on factors such as their geography and energy load.



### Reducing emissions in Cloud Logistics

In 2023, the Cloud Logistics team implemented a three-pillar strategy for emissions reduction:

- 1 Apply industry-leading data models, based on the Global Logistics Emissions Council (GLEC) Framework, to obtain detailed emissions data for each shipment. This “digital twin” of our operations data earned us a finalist spot in Gartner’s 2024 “Power of the Profession” award.
- 2 Utilize data to optimize our supply chain, identifying efficiency gains that helped us avoid over 90,000 mtCO<sub>2</sub>e emissions. These savings were achieved by shifting cargo to more carbon-efficient transportation modes, consolidation, and network design.
- 3 Drive transformational solutions in trucking, shipping, and aviation. In partnership with our largest transportation service providers, we have enabled them to source low-carbon or carbon-free logistics services. This led to the successful deployment of electric vehicles and sustainable fuels.

To further our goal of sustainable transportation, we joined collaborations like the Sustainable Aviation Buyers Alliance (SABA) and we have launched a new initiative with cargo-owning peers and suppliers that plans to build the first electric interstate trucking corridor in the United States.

### Measuring semiconductor emissions

Driving targeted Scope 3 emission reductions requires more precise measurement.

For semiconductors, this means measuring emissions drivers down to the square centimeter of silicon—a unit of measure required for life cycle assessment (LCA)-based methodologies—and applying product-specific emissions factors. We modeled this for all high-impact components installed and sold by Microsoft.

This advancement, which reflects Microsoft’s application of leading-edge research findings from imec’s Sustainable Semiconductor Technologies and Systems (SSTS) program, enables us to quantify which specific products, manufacturers, geographic locations, and production stages are driving emissions. This specificity deepens our supplier engagement efforts and focuses our policy and advocacy discussions.

# 90K

By using data to optimize our logistics supply chain, 90,000 mtCO<sub>2</sub>e emissions were avoided.

## Improving the measurement and efficiency of our operations continued

### LinkedIn

Our teams at LinkedIn have developed Healthy & Sustainable Building Materials specifications to guide our Workplace Design and Build team. We have also provided input to and utilized the Embodied Carbon in Construction Calculator (EC3) for identification and evaluation of the carbon intensity of workplace construction materials alternatives. We have piloted a variety of initiatives, including electrified kitchens in four sites, battery back-up and solar installation in one site, and installation of fault detection diagnosis (FDD) in one site. We also conducted a battery versus generator carbon life cycle study.

### Expanding campus initiatives

At our LinkedIn campus in Omaha, Nebraska, we have been accessing direct renewable energy through our parking canopy solar installation since July 2022. In FY23, this solar installation project provided approximately 17% of the building's total electricity, including helping to power the all-electric kitchen.

### Reducing carbon through our food programs

At LinkedIn, we are committed to reducing the carbon footprint of our food program and have implemented various initiatives to achieve that goal.



One of the key strategies employed to reduce Scope 3 emissions of suppliers' purchased foods in FY23 was to increase local purchasing of agricultural products to, or above, 20% of total purchasing spend, while partnering with regional producers focused on climate-smart agricultural practices and regenerative farming.

### Mitigating carbon impacts of travel

We have also implemented an employee-facing travel solution called Tripkicks which supports our corporate sustainability initiatives. In partnership with BCD and Advito, Tripkicks allows employees to better understand their carbon impact before they travel. As employees plan their trips, they are able to see accurate and ISO-Certified carbon dioxide figures, powered by Advito's GATE4 carbon emissions methodology, for each flight option, identifying the most sustainable options.

## Reducing the impact of our supply chain

### Building transparency

Collaboration across Microsoft has led us to adapt an effective approach to shift from spend-to process-based methodologies for measuring embodied carbon impact of construction materials. This methodology is based on a framework using today's best available third-party verified data via Building Transparency's EC3 tool. This new methodology aims to appropriately incorporate actual global warming potential of the materials we buy, where data is available, with existing spend-based methodologies, as we work to improve our Scope 3 measurement and emissions.



## Greenhouse Gas Protocol

In 2023, we submitted responses to four Greenhouse Gas Protocol (GHGP) surveys that kicked off GHGP's comprehensive review of its corporate carbon accounting guidance. Microsoft's survey responses articulated a vision for more accurate, consistent, impact-relevant carbon accounting. We also published a [white paper](#) laying out Microsoft's approach, challenges, and innovations with respect to carbon accounting.

### Cognitive visual learning

To improve data quality and reduce manual entry errors, we have been developing a cognitive visual learning (CVL) tool in partnership with the Microsoft Finance team. The CVL AI tool will be capable of automatically reading utility invoices (such as PDFs, Excel files, or image files) in any language and extracting the required data. Ultimately, this innovative tool will streamline reporting on our utility consumption and replace a time-consuming third-party application that is subject to manual error.



# Building markets and driving progress

The ability of Microsoft and the technology sector to meet net zero targets is dependent on our collective ability to procure carbon-free electricity and decarbonize our supply chains. Microsoft continues to build and scale carbon-free electricity through our procurement of renewable energy and investing to bring more carbon-free electricity onto the grids where we operate. As one of the largest corporate purchasers of renewable energy, we continue to seek ways to diversify and scale-up supply of impactful renewable energy and mechanisms enabling access for all.

## 6.6 MW

We are partnering with Clearloop to help decarbonize the grid in the Mississippi Delta region, enabling a 6.6-megawatt project.

## Building markets

### Accelerating carbon-free electricity circularity

Microsoft's unique position as one of the world's largest corporate renewable energy purchasers provides the opportunity and responsibility to help facilitate a circular economy in the renewable energy sector. Our leadership is enabling and supporting the market due to the scale of our procurement, laying the foundations for renewable energy infrastructure reuse and recycling, concurrently addressing environmental, community, and supply chain challenges. In advancing a circular economy for all, we follow three principles:

- 1 Requiring recycling of renewable energy infrastructure.
- 2 Requiring recycled materials in renewable energy infrastructure manufacturing.
- 3 Using our voice on circular economy for renewable energy public policy.



Sustainability Champion:

**John Tien**

At Microsoft, I play a role in achieving our sustainability goals by working with suppliers to implement best practices and technology solutions in the sourcing of memory semiconductors. The positive impact of these efforts on Microsoft, our customers, and the planet inspires me to believe that we all have the power to make a difference, both in our personal and professional lives.

## Procuring carbon-free electricity

Incorporating environmental justice principles into our carbon-free electricity procurement, we partnered with EKOenergy's Climate Fund to enable the installation of solar-powered refrigeration for a Kenyan fishing village, offering ice and clean water at 20% lower prices for 2,000 households and addressing food security and economic hardship by reducing fish harvest loss.

We have begun embedding community funds in global power purchase agreements (PPAs)—for example, a 366-MW renewable energy deal in Ireland with European developer Statkraft includes such a fund to support local community needs.

We also partnered with Clearloop to expand equitable access to clean energy and help decarbonize the grid in the Mississippi Delta region, enabling a 6.6-megawatt project in Mississippi through an upfront payment for long-term renewable energy credits. Microsoft helped get the project online and provided support for Clearloop's model.



## Building markets and driving progress continued

### Advancing carbon dioxide removal (CDR)

At Microsoft, we continue to support the development of carbon removal. In FY23 we accelerated procurement of various pathways, building on our long-term agreement framework. We worked through the details in each of those agreements to make sure we are building this first generation of large-scale carbon dioxide removal projects to be as impactful as possible.

These multi-year agreements draw on our renewable energy procurement experience and are structured to help projects obtain external financing. Our carbon removal contracts reflect general industry risks along with the specifics of individual projects to ensure we are buying additional, durable, measurable, and net negative carbon credits.

As we fill our balanced portfolio of greater than 5 million metric tons a year starting in 2030, we are also buying novel solutions, for example enhanced rock weathering, to test what else will be ready for scale by 2030.

# 5M

In FY23, we procured 5.015 million metric tons of carbon removal in support of our carbon neutral and negative targets.

### Progressing towards 2030

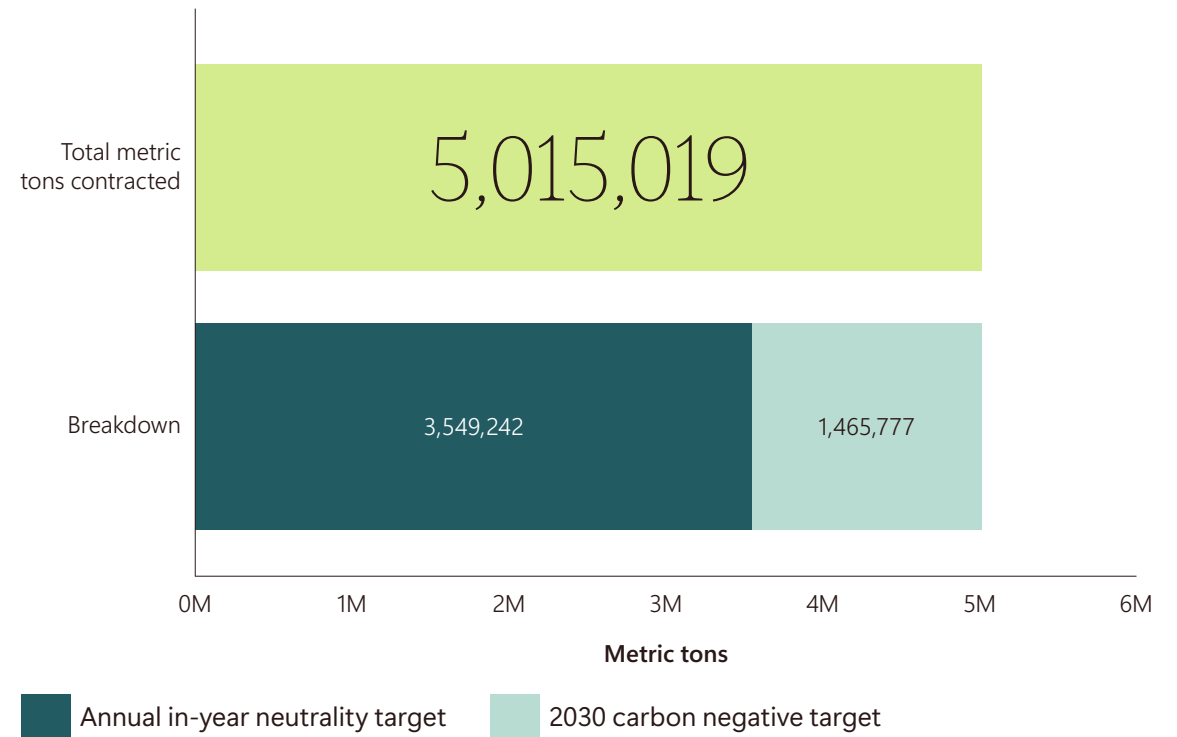
In FY23, we contracted 5,015,019 metric tons of carbon removal to be retired over the next 15 years. Many of these projects entail multi-year commitments to carbon removal. Altogether we expect our contracts signed as of December 2023 to provide 875,000 metric tons toward our 2030 goal of greater than 5 million metric tons. Projects signed in 2023 include the following.

**Reforestation in the Amazon:** In November 2023, we signed a long-term offtake with Mombak for carbon removal from reforestation in the Brazilian Amazon. We believe Mombak's best-in-class project design and work to bolster a crucial carbon sink and biome represent an extraordinary win for the climate and local communities.



### Carbon Table 3—Tracking progress toward carbon negative by 2030

In FY23, we procured 5.015 million metric tons of carbon removals. Carbon removal contracted each year includes credits retired in the same year and to be retired in future years, in support of our annual in-year carbon neutrality and 2030 carbon negative targets.



Find out more in our Data Fact Sheet





## Building markets and driving progress continued

**Landmark BECCS in Europe:** Our recent agreement with Orsted shows the near-term potential of bioenergy with carbon capture and storage (BECCS). This project will add carbon capture to an existing heat and power plant and then store the carbon dioxide geologically to provide significant carbon removals and anchor the high durability category this decade.

Securing the sustainability of biomass for the Orsted project and future biomass-based pathways was a major focus and drove us to support [Carbon Direct's cross-sector work on this topic](#) alongside Frontier Climate. We believe that the time for responsibly scaling BECCS is here and look forward to the coming wave of project developments.



We support carbon-free electricity infrastructure through procurement and investment.

### Scaling up carbon removal

**Heirloom direct air capture:** Heirloom's next direct air capture (DAC) projects will prove their potential to scale towards the megatons per year that society needs this decade to stay on track for the goals of the Paris Agreement. Heirloom's technology of making and breaking limestone to take carbon dioxide out of air is simplicity itself.

**Enhanced rock weathering:** Our deals this year with UNDO and Lithos explore the novel carbon removal pathways that will reduce outstanding market uncertainties, and which could feasibly scale in the next several years. In addition to the science of enhanced rock weathering (ERW), we note that innovative business models will be important to expand projects with such front-loaded costs.

# 19.8 GW

We increased our contracted portfolio of renewable energy assets to over 19.8 gigawatts.

### Supporting global progress

Meeting our carbon negative goals is tightly linked with global decarbonization. Supporting carbon-free electricity infrastructure through procurement and investment is critical to making this happen. It's a challenge that is bigger than any one company, but Microsoft has taken a first-mover approach, making long-term investments to bring more carbon-free electricity onto the grids where we operate. We continue to seek ways to diversify and scale-up supply of impactful renewable energy and mechanisms enabling access for all.

### Partnering to scale clean energy

Microsoft partnership goals are threefold: achieve our own operational needs, accelerate the development of technologies that will help our customers and partners, and rapidly increase the scale of the global sustainability market.

In 2023, Microsoft increased its contracted portfolio of renewable energy assets to over 19.8 gigawatts (GW) across 21 countries. We signed new PPAs around the world, including with AES in [Brazil](#), Constellation Energy in [Virginia](#), Powerex in [Washington](#), Contact Energy in [New Zealand](#), and Lightsource bp in [Poland](#).

Microsoft is the first large commercial entity to use Powerex's wholesale 24x7 Clean Load Service for its new datacenter in Washington state. Under this agreement, Powerex will match Microsoft's hourly datacenter demand with direct deliveries of carbon-free hydro, solar, and wind power on a 24-hour, year-round basis—supplying reliable electricity to our datacenter while also supporting our 100/100/0 goal.

During the hours that Microsoft's contracted renewable resources produce more electricity than the datacenter can use, Powerex will take the surplus renewable power, allowing hydro generation to be reduced and water to be conserved for later use. This will enable clean deliveries back to this datacenter in later hours, when Microsoft's contracted renewable resources produce less electricity than the datacenter needs.

Microsoft and [Helion](#) announced an agreement to provide Microsoft with electricity from its first fusion power plant. The plant is expected to be online by 2028 and will target power generation of 50 MW or greater, dramatically shortening the projected timeline for commercially viable fusion energy. The planned operational date for this first-of-its-kind facility is significantly sooner than typical projections for deployment of commercial fusion power.

## Building markets and driving progress continued

### The Cajuna wind project

Microsoft's first power purchase agreement in Brazil (154 MW) is sourced from the Cajuna Wind Complex, developed by AES Brasil, and will be operated by an all-female operations and maintenance (O&M) team. AES Brasil is the first company in the country to have a wind farm operated and maintained locally by a team composed entirely of women.



### Deerfoot solar project

The Deerfoot solar project in Canada (37 MW) is majority-owned (51%) by local First Nations, Chiniki and Goodstone. This project is expected to generate economic returns for the Indigenous communities and contribute to the lasting prosperity of the Nations for future generations.

### The Skyward Community Solar project

In Oregon, we signed on as the major commercial partner on the Skyward Community Solar project, a solar farm in the Greater Portland area that generates nearly 3.6 million kilowatt-hours of clean energy each year. Clean electricity from the project is fed into the electric grid, replacing fossil fuels and reducing carbon emissions from our workplace operations.



### Investing in sustainable aviation fuel

In 2023, Microsoft entered a 10-year contract with World Energy for sustainable aviation fuel (SAF) certificates, aiming to replace 43.7 million gallons of fossil jet fuel, and jointly funded a large-scale global SAF purchase with International Airlines Group (IAG). Additionally, Microsoft joined the Roundtable on Sustainable Biomaterials (RSB), contributing to RSB's sustainability framework and participating in programs supporting SAF development. Together with RSB and Alaska Airlines, Microsoft launched SAF-now.org, an educational resource designed to empower key decision makers with information on topics most relevant to choosing SAF.

### Advocating for clean energy infrastructure

In August 2023, Microsoft hosted and participated in the Asia-Pacific Economic Cooperation (APEC) roundtable on GHG accounting standards on August 4 and the APEC Energy Ministers Meeting on August 15.

Microsoft has a direct interest in an expanded and clean electric grid; with over 60 Azure regions operating now or coming soon, and more than 300 datacenters globally. Over half of these regions are in APEC economies.

# 43.7M

Microsoft entered a 10-year contract with World Energy for sustainable aviation fuel (SAF) certificates, aiming to replace 43.7 million gallons of fossil jet fuel.



# Learnings and what's next

## Growing the supply for clean energy will require policy advocacy

Microsoft decarbonization policy advocacy is expected to contribute to reducing our upstream emissions in two ways:

- 1 Helping to create more direct corporate renewable procurement options in markets that are currently difficult to access, as in much of Asia-Pacific, thus increasing opportunities for reducing operational emissions in the near term.
- 2 Contributing to the enactment of policies that decarbonize the grids on which our suppliers operate.

These efforts can help to reduce the amount of baseline emissions to be addressed through renewable procurement.

## Partnership and investment remains critical for Scope 3 emissions reduction

Collaboration remains critical to success, for Microsoft and our suppliers. While many of our suppliers are willing and want to reduce their footprints, they may still face considerable barriers like access to capital or market knowledge.

As we work to achieve our own operational needs, we are also working to accelerate the development of solutions that will help our customers and partners, and rapidly increase the scale of global sustainability markets.

## Scaling markets for lower-carbon materials requires investment

While lower-carbon building construction materials are on the market today, they do not exist at the volume, in the geographies, nor at the scale needed to decarbonize the sector. We continue to pursue key mitigations to embodied carbon risk through extensive collaboration across Microsoft datacenters.

Our actions are focused on accelerating the uptake of low-embodied carbon solutions and driving innovation through new building materials with the potential to drastically reduce embodied carbon from those materials. Building on our experience with other industrial sectors, we will use forward contracting mechanisms to spur the market supply of lower-carbon materials.

## Measurement plays an important role in Scope 3 reduction

Driving Scope 3 reductions requires developing better data visibility and more accurate and actionable methodologies than are generally available today. With improved life cycle assessment (LCA) methodologies and detailed analysis of specific products, manufacturers, geographic locations, and emissions life cycle stages, we are better able to understand the complexity of our supply chain and which tangible levers we can pull both with our suppliers and through policy.

Additionally, we are exploring how technology, like AI and blockchain, can further increase accountability and traceability for our Scope 3 carbon emissions.

## Sharing our learnings to support global construction efforts

With our Redmond campus modernization project still in progress, we are continuing to catalog emissions, carbon, water, and energy use data. This data will inform future construction and modernization efforts at Microsoft campuses globally.

We will continue to share our learnings in hope that it inspires greater sustainability in construction—as well as transparency in reporting—from other organizations large and small in the future.



2023

# Amazon Sustainability Report

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# Contents

**On the cover**  
The Baldy Mesa Solar and Storage Project (developed and operated by AES), located in Adelanto, California.

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# Introduction




## About Amazon

Amazon is a global company with approximately 1.5 million full- and part-time employees worldwide and operations in Africa, Asia-Pacific, Europe, Latin America, the Middle East, and North America.


At Amazon, we combine data and science with passion and invention. We set big goals and work backward to achieve them, such as The Climate Pledge, our goal to reach net-zero carbon emissions by 2040, 10 years ahead of the Paris Agreement. We apply that same tenacity to how we address some of the world’s biggest environmental and societal challenges, striving to make every day better for our customers, employees, communities, and planet.




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## About This Report

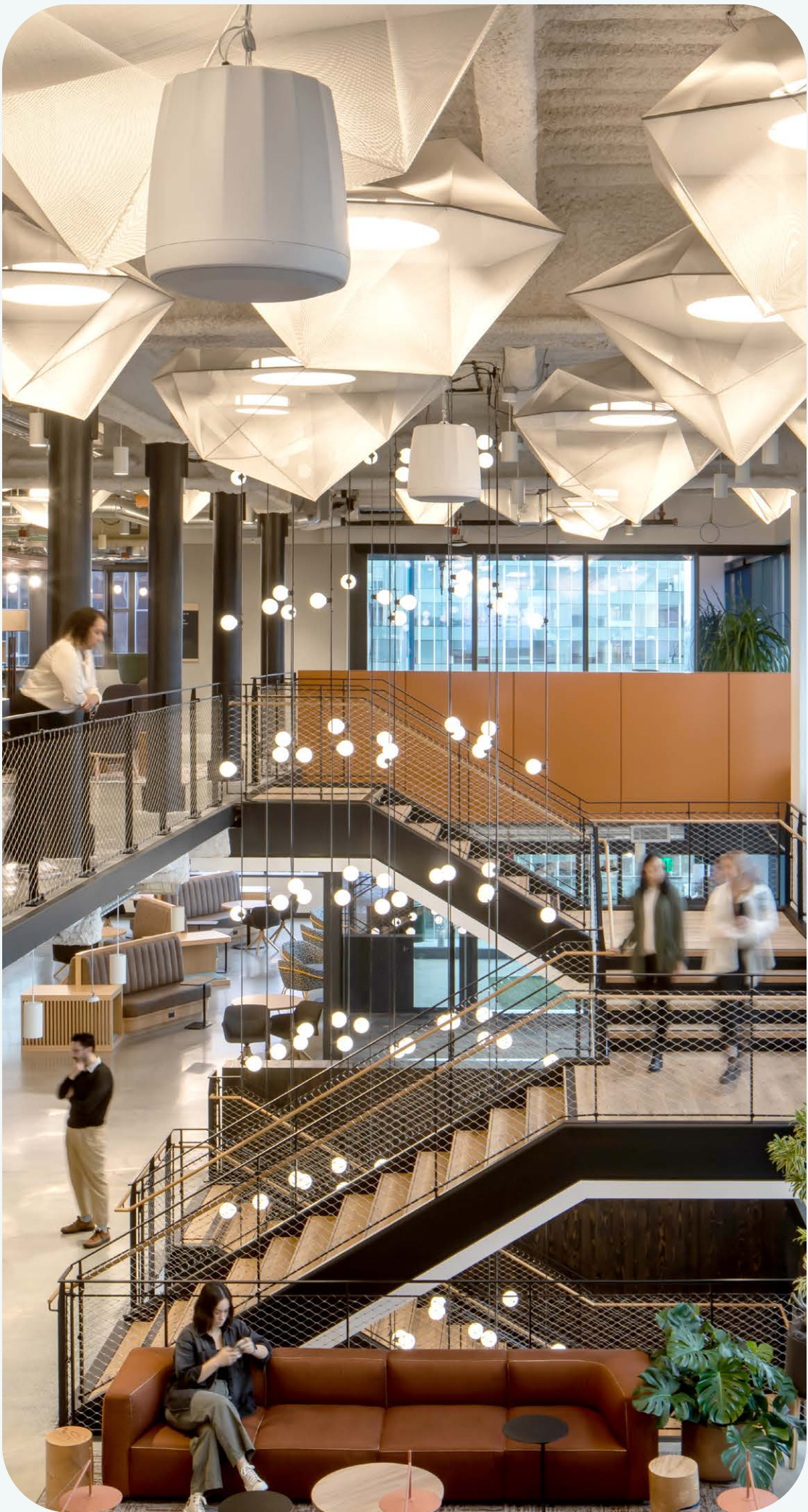
This is our sixth annual report detailing progress against our [goals](#)  and environmental, social, and governance topics. All financial figures are reported in U.S. dollars (\$), unless otherwise stated. The data within this report reflects progress from January 1 through December 31, 2023, unless otherwise indicated. This report includes information about many business units and subsidiaries including AWS, Devices, Fresh, Whole Foods Market, Amazon Private Brands, Twitch, MGM Studios, and Ring.

Our 2023 Sustainability Report is structured into three main categories: Environment, Value Chain, and People. In the [Environment](#)  section, we discuss scaling our work, partnering with others, and inventing new solutions to minimize our emissions, waste, and water use; increasing our use of carbon-free energy; and pioneering solutions to improve packaging, products, and the materials we use. In the [Value Chain](#)  section, we discuss our commitment to respect the human rights of people connected to our global business, managing a responsible supply chain, creating sustainable products and using more sustainable materials, advancing supplier diversity, and having a positive impact on the communities where we operate. In the [People](#)  section, we discuss our ambition to be Earth’s best employer and the safest place to work in our industries, including our focus on creating positive employee experiences, prioritizing health and safety, and building inclusive experiences.

### Framework Disclosures

In addition to this report, we share on our website our approach to sustainability governance and disclose our 2023 performance against reporting frameworks including the Sustainability Accounting Standards Board (SASB), the United Nations Sustainable Development Goals (SDGs), the Task Force on Climate-related Financial Disclosures (TCFD), and the United Nations Guiding Principles on Business and Human Rights (UNGPs).

**Learn more** in our [2023 Sustainability Reporting Framework Summary](#) 



Employees inside one of our newest office buildings in Bellevue, Washington.





# A Letter from Our Chief Sustainability Officer



At Amazon, we are always looking for ways to move faster, deliver the best possible customer experience, and innovate. We regularly hear from our customers, corporate partners, and employees how much they care about sustainability and social responsibility. For a company as diverse as Amazon, embedding these values into all of our businesses, products, and services—as well as how we deliver for our customers—has been an incredible undertaking, with much of it taking place behind-the-scenes.

Progress is likely easiest to spot in our Stores business. Our customers let us know that their Amazon packages are now arriving at their doorsteps faster, with less packaging, and delivered by more electric delivery vehicles than ever before. By regionalizing our operations and transportation networks in the U.S., we can now deliver items faster and at lower costs. This also allows us to minimize or avoid extra packaging altogether, while reducing the distance a package has to travel, cutting back on the carbon emissions associated with deliveries.

We also know our customers look to Amazon to be a leader among our peers. On renewable energy, we set an ambitious goal to match 100% of the electricity consumed by our global operations with renewable energy by 2030, and we reached that goal in 2023—seven years early. As we look to the future, we are steadfast in our Climate Pledge commitment to be net-zero carbon across our operations by 2040. We will continue to lead and invest in creating carbon-free energy around the world at scale, including through solar, wind, nuclear, and other emerging energy technologies. Our progress toward a net-zero carbon business will not be linear, and each year as our various businesses grow and evolve, we will produce different results. These results will be influenced by significant changes to our business, investments in growth, and

meeting the needs of our customers. Through it all, we will remain steadfast as we invent, adapt, and will our way to meeting our commitment to The Climate Pledge.

We know that driving change means staying focused on bringing entire industries along with us. Over the past five years, we’ve done this by encouraging companies to join The Climate Pledge—and we’re proud that over 500 have joined us and committed to be net-zero carbon 10 years ahead of the Paris Agreement. But we wanted to do more. Most recently, our sustainability team has been developing resources to share our expertise and help our suppliers build, measure, and act on their sustainability commitments. That’s why we’ve launched the Amazon Sustainability Exchange, a free sustainability resource center that contains a number of Amazon’s previously proprietary playbooks, templates, case studies, and science models, among other sustainability best practices.

Looking ahead, we know our customers look to us to be at the cutting edge of new and growing technologies and enable them for good. We’re already deploying artificial intelligence (AI) in ways that benefit our customers directly, such as using it to right-size packaging and avoid waste. We’re exploring a growing number of AI applications—whether it’s monitoring and optimizing our energy use or helping combat deforestation in Brazil. We also see an opportunity to use AI to address sustainability challenges at an unprecedented scale, all while delivering new solutions for our customers. Much work remains, and we’re excited that Amazon is uniquely positioned to figure out how AI can help us address climate change in a more efficient and responsible way.

Most importantly, we need to continue to invest in talent and hire employees who can lead on sustainability. We’re proud

of the wide range of sustainability-focused career paths we offer at Amazon, including engineers, scientists, content creators, building architects, and more. And for those whose jobs aren’t directly within a sustainability field, we offer upskilling programs and affinity groups where our employees can learn more and get involved. It’s thanks to the thousands of professionals working behind-the-scenes across Amazon that we are able to bring all of this amazing work to life.

I’m proud of the work that’s underway, and truly excited for what’s to come.

With gratitude,  
**Kara Hurst**  
Chief Sustainability Officer



# How We Work

Our Mission

To make customers’ lives better and easier every day.

## Our Business

We are committed to addressing sustainability at every stage of our value chain.

## Our Operations

We offer products and services—both Amazon-branded and from many other brands and third-party sellers—in our Amazon stores, leveraging advanced transportation logistics to deliver globally. We also create entertainment content and, through AWS, provide the world’s most widely adopted and comprehensive cloud offering.

## Our Supply Chain

We procure materials, commodities, components, finished goods, and services from a complex supplier network. We engage suppliers globally to align our expectations for respecting human rights; maintaining safe, inclusive workplaces; and promoting sustainable practices.

## Our Employees

The approximately 1.5 million people in Amazon’s global workforce are the key behind our successes—from enabling global fulfillment to delivering on sustainability initiatives. To support them in advancing their own career goals, we offer competitive pay and benefits, upskilling and educational programs, and a workplace that promotes inclusion and diversity. Additionally, we use independent contractors and temporary personnel to supplement our workforce.

## Our Communities

Amazon has a presence in communities around the world. We seek to be a good neighbor wherever we operate and to support local people and charitable organizations that meet on-the-ground needs. In particular, we leverage our scale, resources, and expertise to address issues where we can have the greatest impact—namely affordable housing, education, disaster relief, and food security.

## Our Customers

We continually seek new and better ways to serve customers, offering lower prices, more convenient services, and a larger selection of more sustainable products. We also help customers advance their businesses and enable digital transformation through AWS, content development services, and advertising options. In addition, we support small businesses with access to Amazon’s tools, resources, and network, helping them reach customers around the world.

## Our Reporting Topics

We include a number of topics in our reporting. We view these topics as interconnected and recognize that our progress in one area can often help address challenges in another.

- Carbon

Carbon-Free Energy

Packaging

Waste and Circularity

Water

Human Rights

Responsible Supply Chain

Sustainable Products and Materials

Supplier Diversity

Community Impact

Employee Experience

Health and Safety

Inclusive Experiences





# Goals Summary

→ Making progress

✓ Achieved

⦿ Did not meet

Goal	2022 Progress	2023 Progress	Status
<b>Carbon</b> ⓘ			
Reach net-zero carbon emissions by 2040	70.74M metric tons CO <sub>2</sub> e*	68.82M metric tons CO <sub>2</sub> e	→
	93.0 g CO <sub>2</sub> e/\$GMS†	80.8 g CO <sub>2</sub> e/\$GMS	
Through The Climate Pledge, inspire and empower others to join us on a mission to reach net-zero carbon emissions by 2040	396 signatories	473 signatories	→
At least 100,000 electric delivery vans on the road by 2030, from Rivian and other manufacturers	2.6K+ electric delivery vans	19K+ electric delivery vans	→
Deploy 10,000 electric vehicles (EVs) in India by 2025	3.8K+ EVs deployed	7.2K+ EVs deployed	→
<b>Carbon-Free Energy</b> ⓘ			
Match 100% of the electricity consumed by our global operations with renewable energy by 2025—five years ahead of our original target of 2030	90% matched	100% matched	✓
Invest in wind and solar capacity equal to the energy used by all active Echo, Fire TV, and Ring devices worldwide by 2025‡	100% capacity procured	Achieved in 2022	✓
<b>Waste and Circularity</b> ⓘ			
Reduce food waste by 50% across U.S. and Europe operations by 2030	82M meals donated globally	75% reduction in food waste intensity in Europe operations and 28% in U.S. operations compared to a 2021 baseline§	→
<b>Water</b> ⓘ			
AWS will be water positive by 2030	Goal set in 2022	41% progress toward meeting its water positive goal#	→
<b>Packaging</b> ⓘ			
Make Amazon device packaging 100% recyclable by 2023	Achieved for 79% of product launches	Achieved for 90% of product launches	⦿

\* Carbon dioxide equivalent.

† Grams of carbon dioxide equivalent per dollar of gross merchandise sales.

‡ To understand what this goal should encompass, we model and measure the energy consumed by our devices in different types of use, then project their total average global annual electricity consumption.

§ Food waste intensity is a measure of food waste as a percentage of total food handled by weight.

# Water positive means AWS will return more water to communities than it uses in its direct operations. A number below 100% indicates AWS is still working to meet the water positive goal.

Goal	2022 Progress	2023 Progress	Status
<b>Employee Experience</b> ⓘ			
Invest \$1.2 billion to upskill over 300,000 U.S. Amazon employees by 2025	110K employees upskilled**	358K+ employees upskilled	✓
<b>Inclusive Experiences</b> ⓘ			
Hire 100,000 U.S. military veterans and military spouses through 2024	78.5K veterans and spouses hired††	100K+ veterans and spouses hired‡‡	✓
Conduct a racial equity audit to evaluate the impacts of our policies, programs, and practices on hourly operations employees	Goal set in 2022	On track to be completed in 2024	→
Hire at least 5,000 refugees in the U.S. by the end of 2024	Goal set in 2022	~18K refugees hired in the U.S.	✓
Provide training for 10,000 Ukrainians globally through the AWS program ITSkills4U by 2024	Goal set in 2022	~16.5K Ukrainians received training	✓
<b>Community Impact</b> ⓘ			
Invest \$2 billion to create and preserve more than 20,000 affordable homes through 2025	\$1.6B committed and 11K homes created or preserved	\$1.8B committed and ~16K homes created or preserved	→
Distribute up to \$60 million in AWS cloud computing credits to support organizations promoting health equity globally by the end of 2024§§	\$14M+ in cloud computing credits distributed	\$32M+ in cloud computing credits distributed	→
Help 29 million people globally grow their technical skills by providing free cloud computing skills training by 2025	13M people helped	21M people helped	→
Provide free artificial intelligence (AI) skills training to 2 million people globally by 2025	—	Goal set in 2023	→

\*\* In 2022, we reported progress for the Career Choice program in the U.S. In 2023, we expanded our reporting to include all in-scope upskilling programs in the U.S.

†† Progress from July 2021 through December 2022.

‡‡ Goal achieved in January 2024. Progress from July 2021 through January 2024.

§§ In January 2024, AWS announced an additional \$20 million in funding for the Health Equity Initiative, bringing the company's total commitment to \$60 million in cloud credits.



# 2023 Year in Review

As we reflect on 2023, we are proud of the progress we made. We worked hard to reduce our environmental footprint, drive progress throughout our value chain, and create a safer, more inclusive place for people to work.

## Environment

3%

Reduction in absolute carbon emissions

100%

Of electricity consumed by Amazon matched with renewable energy sources, up from 90% in 2022

77

New signatories of The Climate Pledge, bringing the total to 473

13%

Decrease in carbon intensity

#1

Largest corporate purchaser of renewable energy in the world for the fourth year in a row, according to BloombergNEF

75%

Reduction in food waste intensity—a measure of food waste as a percentage of total food handled by weight—in Europe operations and 28% reduction in U.S. operations compared to a 2021 baseline

680M

Packages delivered using more than 24,000 electric delivery vehicles globally

9%

Decrease in average single-use plastic packaging weight per shipment across Amazon’s global operations network

12%

Of packages globally shipped without additional Amazon packaging as part of our Ships in Product Packaging program

41%

Of the way toward meeting our AWS water positive goal to return more water to the communities where AWS operates than is used in direct operations

## Value Chain

3K

Assessments of suppliers of Amazon-branded products on their social and environmental performance

\$4.3B

Spent with more than 500 certified U.S. Tier 1 diverse suppliers—certified diverse businesses that provide goods and services directly to Amazon to operate our businesses

1.16B

Items sold that are recognized by certifications in our Climate Pledge Friendly program, a 42% increase from 2022

Nearly 16K

Affordable homes created or preserved and nearly 35,000 residents supported through the Housing Equity Fund

\$20M

Catalyzed by founding members of U.S. Agency for International Development (USAID)’s Climate Gender Equity Fund, a public-private partnership that leverages funding to scale climate finance that advances gender-equitable climate action

\$16.8M

In cloud computing credits distributed to 125 organizations globally to promote equal access to health resources, totaling more than \$32 million distributed to 229 organizations since 2021

## People

358K+

U.S. employees have participated in upskilling programs since we announced our Upskilling Pledge in 2019

20K

Military veterans and military spouses hired in 2023, totaling over 100,000 hired through January 2024

76K

Amazon employees from 51 countries participated in our second Global Month of Volunteering

\$1.3B

Invested toward pay increases for customer fulfillment and transportation employees in the U.S., bringing the average pay for those roles to over \$20.50 per hour

30%

Improvement in global Recordable Incident Rate in 2023 versus 2019

Nearly 16.5K

Ukrainians globally, including refugees, received training through the AWS program ITSkills4U by the end of 2023

60%

Improvement in global Lost Time Incident Rate in 2023 versus 2019





# Environment

At Amazon, we combine data and science with passion and invention to drive everything we do. We are committed to and invested in sustainability because it’s a win all around—it’s good for the planet, for business, for our customers, and for our communities. We set big goals and work backward to achieve them. We are working to innovate and scale solutions that minimize our emissions, waste, and water usage; increase our use of carbon-free energy; and pioneer new approaches for packaging, materials, and products.

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Wind Wall, a wind farm located in California’s Tehachapi Mountains, generates carbon-free energy to AWS.






# Carbon

The science is clear. Significant carbon emission reductions are required to avoid the most severe effects of climate change, restore biodiversity, protect vulnerable communities, and ensure a habitable planet for future generations. Climate change also has the potential to disrupt global supply chains and change the ways businesses operate today. We have an opportunity—and responsibility—to use our size, scale, and resources to do our part to solve global challenges. In 2019, we co-founded and committed to The Climate Pledge—our goal to reach net-zero carbon emissions by 2040, 10 years ahead of the Paris Agreement. We are continually working to reduce emissions throughout our business, as well as partnering across our supply chain and the industries in which we operate to share and scale what we’ve learned.

Goal

Reach net-zero carbon emissions by 2040—10 years ahead of the Paris Agreement



3%


Reduction in absolute carbon emissions since 2022

13%

Decrease in carbon intensity since 2022

Goal

At least 100,000 electric delivery vans on the road by 2030, from Rivian and other manufacturers



19K+

Electric vans deployed in the U.S., Europe, and India

19K+

100K

Goal

Deploy 10,000 electric vehicles (EVs) in India by 2025

7.2K+

EVs deployed in India

7.2K+

10K

Goal


Inspire and empower others to sign The Climate Pledge and join us on a mission to reach net-zero carbon emissions by 2040

473

Signatories, up from 396 in 2022



Actions



100%

Of electricity consumed by Amazon was matched with renewable energy sources, up from 90% in 2022

Up to 50%

More energy efficiency and up to 40% in cost savings with Inferentia2 chips over other comparable Amazon Elastic Compute Cloud (EC2) chips

24K+

EVs globally, including over 11,800 in the U.S., over 7,200 in India, and over 3,000 in Europe

680M

Packages delivered by EVs globally

200M

Boxes and 226,000 metric tons of carbon dioxide equivalent (CO<sub>2</sub>e) avoided with Amazon Day delivery—a shipping option whereby Prime members choose a specific day of the week to receive orders—up from nearly 115 million boxes in 2022





# Our Approach

At Amazon, we think long term, take on grand challenges, and invent solutions to complex problems. These are some of the reasons we co-founded and committed to The Climate Pledge in 2019—our goal to reach net-zero carbon emissions by 2040, 10 years ahead of the Paris Agreement—and have invited hundreds of companies to join us.

Amazon has a variety of businesses touching many sectors, some of which rely on carbon-intensive industries to provide critical goods and services to our customers. However, we believe the complexity of our business puts us in a unique position to be a leader in decarbonization strategies. We have an opportunity to demonstrate how achieving net-zero carbon emissions is possible across many sectors, while creating solutions that benefit our business as well as the industries in which we operate.

Foundationally, our strategy relies on embedding decarbonization initiatives and efficiency improvements across our business. Our comprehensive approach to reducing and avoiding carbon emissions focuses on key sectors of our business, including delivery and logistics; building construction and operations; servers and hardware; grocery, products, and devices; and packaging. Teams across Amazon are accountable for setting decarbonization plans that map back to Amazon’s worldwide strategy because ownership and accountability are critical to operational success and managing complexity. We focus on four crosscutting initiatives to decarbonize our business:

- **We focus first on driving efficiency** across our operations to reduce and avoid emissions at scale. This includes improving transportation routing, increasing pack and fill rates, improving cloud-computing chip efficiency, adding Low Power Mode to devices, and installing energy-efficient lighting and HVAC solutions in buildings.

- **We select lower-carbon alternatives**, such as lower-carbon concrete and steel in construction, and lower-emission fuels and vehicles in transportation. We use these alternatives where possible, based on a number of factors including cost, emissions reduction potential, and availability.
- **We’re transitioning toward carbon-free electricity**, investing in renewables—rooftop solar installations on our buildings, and new, utility-scale wind and solar projects—as well as other carbon-free electricity sources, such as nuclear.
- **We engage with suppliers** to help reduce emissions from activities beyond our direct operations. We encourage them to set credible decarbonization goals, publicly share progress, and implement carbon reduction strategies throughout their operations and supply chains—and we are providing support to help our supply chain take action.<sup>1</sup>

In addition to decarbonizing our own business, we are helping drive progress across industries. To do this, we focus on three accelerators:

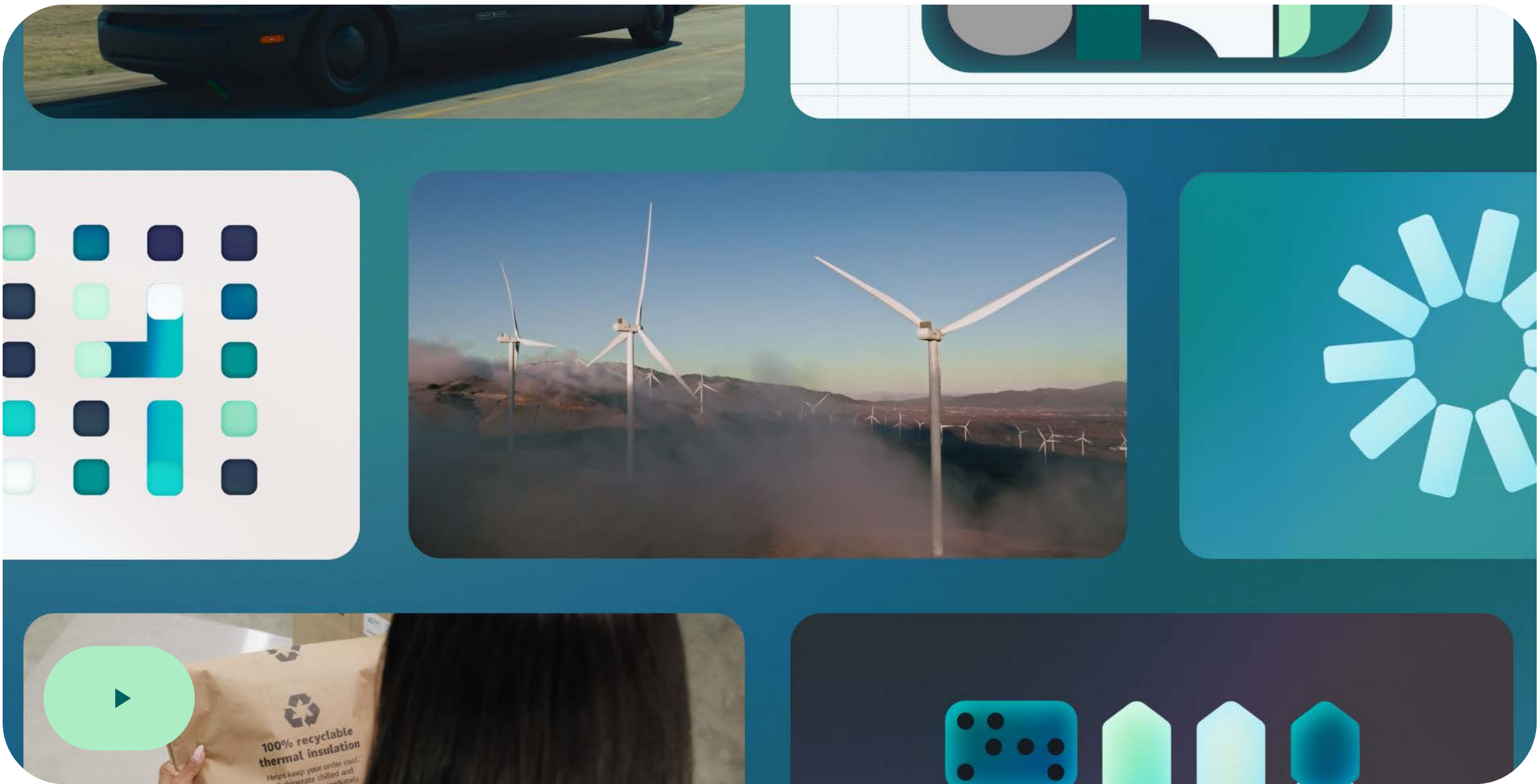
- **We invest in breakthrough technology** by adopting ready-to-scale solutions, as well as evaluating and investing in emerging technologies that can help address emissions from hard-to-abate sectors including aviation, shipping, and building construction. Through direct funding, we aim to advance our own progress toward net-zero carbon emissions and help accelerate the widespread adoption of new technologies by making them more affordable and accessible.
- **We support policies that drive decarbonization.** Amazon works with policymakers, governments, nongovernmental organizations (NGOs), industry associations, coalitions, and other partners on numerous

regulatory and policy issues. We seek to advance and incentivize decarbonization by supporting policies that scale lower-emission fuels, drive lower-emission vehicle deployment and infrastructure, advance the deployment of carbon-free energy, modernize the grid, and accelerate investments in clean technologies.

- **We catalyze industry action.** Through The Climate Pledge, Amazon brings together companies from around the world to drive collective action, cross-

sector collaboration, and engagement in initiatives that encourage industry action toward decarbonization.

In parallel to reducing and avoiding emissions throughout our business, we are also investing in carbon neutralization through additional, quantifiable, real, permanent, and socially beneficial offsets. As part of this effort, we are engaging in science-led collaborations to build credible neutralization initiatives that can be deployed at scale in the future.



Watch [how we embed sustainability initiatives throughout all aspects of our business.](#)



# Our Progress

## Amazon’s Carbon Footprint

In 2023, our absolute carbon emissions decreased by 3%.<sup>2</sup> This overall decrease was driven by an 11% reduction in emissions from electricity (Scope 2) and a 5% decrease in indirect and supply chain emissions (Scope 3). We had a 7% increase in emissions from our direct operations (Scope 1), primarily from the use of transportation fuels. Our carbon intensity decreased for the fifth consecutive year, down 13% from 2022 to 2023.<sup>3</sup> This metric demonstrates how we are working to decouple emissions growth from business growth.

Every year, we aim to serve our customers better, more quickly, and with fewer emissions, but we know our progress may not be linear as our business continues to grow. In 2023, we invested in carbon abatement projects across Amazon. We continue to invent, think long term, and place big bets to accelerate decarbonization efforts year over year. In addition to our direct investment and work to decarbonize our business, we also worked with organizations throughout our supply chain and broader industry to reduce and avoid emissions and create solutions to help decarbonize our value chain. Annually, we also improve our science and data-driven approach to track and measure decarbonization across Amazon.

### Scope 1: Direct Emissions and Operations

Amazon’s Scope 1 emissions are primarily generated from the fuel used by our transportation and logistics fleet to deliver packages to customers. In 2023, our Scope 1 emissions increased 7% compared to 2022 and represented 21% of our total carbon footprint. This change was due to an increase in the number of packages delivered by Amazon Logistics versus third-party transportation providers, as well as overall business growth.

### Amazon’s Carbon Footprint

Carbon Intensity	2019	2020	2021	2022	2023	YoY%
Carbon Intensity (grams of CO <sub>2</sub> e per \$ of gross merchandise sales)	122.8	102.7	100.8	93.0	80.8	-13%
Emissions Category (MMT CO <sub>2</sub> e)						
Emissions from Direct Operations (Scope 1)	5.76	9.62	12.11	13.32	14.27	7%
Fossil fuels	5.57	9.37	11.89	12.96	14.00	8%
Refrigerants	0.19	0.25	0.22	0.36	0.27	-25%
Emissions from Purchased Electricity (Scope 2)*	5.50	5.27	4.07	3.14	2.79	-11%
Emissions from Indirect Sources (Scope 3)*	39.91	45.75	55.36	54.28	51.76	-5%
Corporate purchases and Amazon-branded product emissions (e.g., operating expenses, business travel, and Amazon-branded product manufacturing, use phase, and end-of-life)	15.41	16.70	19.09	19.72	19.11	-3%
Capital goods (e.g., building construction, servers and other hardware, equipment, vehicles)	8.01	10.52	15.37	10.25	8.95	-13%
Other indirect emissions (e.g., third-party transportation, packaging, upstream energy-related)	12.44	15.77	18.00	20.90	20.07	-4%
Lifecycle emissions from customer trips to Amazon’s physical stores	4.05	2.77	2.91	3.41	3.63	7%
Amazon’s Carbon Footprint	51.17	60.64	71.54	70.74	68.82	-3%
Greenhouse Gas Protocol Aligned Scope 3 Categories				2022	2023	
Purchased Goods and Services (Amazon corporate purchases made for Amazon’s operations and services, Amazon-branded products)				20.60	19.86	
Capital Goods				10.25	8.95	
Fuel- and Energy-Related Activities				4.76	4.97	
Upstream Transportation and Distribution				10.65	9.30	
Business Travel				0.61	0.63	
Employee Commuting				2.78	2.88	
Downstream Transportation and Distribution				3.41	3.63	
Use of Sold Products (Amazon Devices)				1.18	1.50	
End-of-Life Treatment of Sold Products (Amazon Devices)				0.04	0.04	

| **Learn more** about what’s included in Amazon’s carbon footprint in our [Carbon Methodology](#) ↗

\* Scope 2 and 3 carbon emissions are calculated using a market-based method.





In 2023, our net sales grew 12% and more than two-thirds of Amazon packages were delivered via Amazon’s own logistics network. We decreased emissions per package through operational efficiencies, such as improving truck fill rates (the percentage of truck volume that is utilized), shipping products in their own packaging without additional Amazon packaging, and using artificial intelligence (AI) to optimize packaging types. For example, Amazon data scientists trained an AI model to understand a variety of product attributes, including an item’s shape and durability, and to analyze customer feedback on how different packaging options have performed. The model is constantly learning and has helped reduce our use of packaging material since it launched in 2019.

We strive to keep our packaging lightweight and minimal, while ensuring products reach customers without damage. Lighter, more flexible, and right-sized packaging helps reduce delivery emissions per package by using less material and taking up less space in delivery vehicles. Since 2015, we have reduced the average per-shipment packaging weight by 43% and avoided more than 3 million metric tons of packaging, including more than 446,000 metric tons in 2023 alone.<sup>4</sup> Globally, we shipped 12% of products in their own packaging in 2023. This provides a better customer experience by minimizing the packaging materials used for delivery, and avoids incremental carbon emissions associated with additional materials and weight.

| [Learn more about how we’re improving packaging](#) ↗

As the number of products we deliver has continued to increase, we aim to keep improving the efficiency of the routes our trucks drive. For example, to get packages to customers faster and with fewer emissions, we reorganized

our U.S. transportation network from one national network to eight strategic regions in 2023. Regionalization helped us avoid driving nearly 16 million miles last year. We also prioritized shipping products by lower-carbon train and sea routes—instead of trucking—for middle mile deliveries in Europe. We are excited to invest in technologies today that will help reduce our footprint in the future, such as scaling up our use of electric vehicles (EVs) and other lower-carbon vehicles to decrease our Scope 1 emissions.

### Scope 2: Indirect Emissions from Purchased Electricity

Our Scope 2 emissions are from electricity used to power Amazon’s buildings, including data centers, office buildings, fulfillment centers, and grocery stores, and to charge EVs at our facilities. In 2023, our Scope 2 emissions decreased by 11% compared to 2022 and represented 4% of our total carbon footprint. This decrease resulted from our increased use of electricity from renewable sources, such as wind and onsite solar, as well as from purchasing additional environmental attributes (such as renewable energy credits) to signal our support for renewable energy in the grids where we operate, in line with the expected generation of the projects we have contracted.

In 2023, we are proud to have achieved our goal to match 100% of the electricity consumed by our global operations with renewable energy—seven years ahead of our original 2030 goal. This achievement was driven by scaling up our portfolio of renewable energy projects. Our journey has included enabling major solar, wind, and battery storage projects around the world, including the first wind farm in Mississippi, and becoming the first corporate purchaser to invest in renewable energy projects in countries such as

Indonesia, Poland, and South Africa. At the end of 2023, Amazon had invested in 513 global renewable energy projects, including 243 utility-scale wind and solar projects, and 270 solar rooftops at our facilities and stores around the world. In 2023 alone, 42 new utility-scale wind and solar projects and 50 new on-site solar energy systems became operational. Collectively, our portfolio represents 28 gigawatts (GW) of renewable energy capacity, an increase from 20 GW in 2022. This portfolio provides carbon-free electricity to our operations, as well as delivers new carbon-free electricity to the grids in communities where we operate. With this scale, we have been named the world’s largest corporate purchaser of renewable energy for the fourth year in a row.<sup>5</sup>

Two of the most important ways we lower electricity-related carbon emissions are by improving energy efficiency and transitioning to carbon-free energy. To date, we have focused on scaling renewable energy; going forward, the nature of our business requires us to leverage additional carbon-free energy options—such as nuclear—to support our continued growth and enable us to develop and deploy new technologies such as AI. We are also focused on creating new chips that are increasingly energy-efficient, such as AWS Graviton4, the most powerful and energy-efficient chip AWS has built. Graviton4 is more energy efficient than Graviton3 processors while providing up to 30% better computing performance, 50% more cores, and 75% more memory bandwidth than Graviton3 processors. By scaling carbon-free energy, we aim to make Amazon a more resilient and sustainable business, drive a global transition to cleaner energy, and achieve our commitment to The Climate Pledge to reach net-zero carbon emissions by 2040.

| [Learn more about our transition to carbon-free energy](#) ↗

### Amazon’s Carbon Footprint (MMT CO<sub>2</sub>e\*)

Scope 1 Scope 2† Scope 3‡ Carbon intensity (g CO<sub>2</sub>e/\$GMS§)



\* Million metric tons carbon dioxide equivalent.  
† Scope 2 and 3 carbon emissions are calculated using a market-based method.  
‡ Grams of carbon dioxide equivalent per dollar of gross merchandise sales.  
§ We updated our Carbon Methodology used for our 2022 and 2023 carbon footprint.



### Scope 3: Indirect Emissions from Other Sources

Scope 3 emissions include emissions from activities that take place beyond our direct operations, including building construction, third-party transportation, and the production of Amazon-branded products and the materials and components used in those products. In 2023, our Scope 3 emissions decreased by 5% from 2022 and represented 75% of our total carbon footprint. This decrease resulted from reductions related to building construction, leased buildings and equipment, and third-party transportation, as more goods were shipped by Amazon’s own logistics providers versus third-party providers than in 2022.

Building construction is a significant driver of carbon emissions in many supply chains due to the associated embodied carbon that is emitted. Embodied carbon includes any carbon emissions created during the manufacturing of building materials, the transport of those materials to the job site, and the construction practices used. Embodied carbon is counted in a company’s carbon footprint the year the building is completed and operational. We aim to reduce embodied carbon in building construction by using lower-emission concrete, lower-emission steel, and mass timber. In 2023, 29 Amazon building projects were constructed with lower-carbon concrete and steel, and collectively reduced embodied carbon by 79,500 metric tons of CO<sub>2</sub>e, equivalent to the emissions generated by 17,200 cars driven for a year.

Because Scope 3 emissions are beyond our direct operational control, the efforts our suppliers take to reduce their emissions help us progress toward our ambition to achieve net-zero carbon emissions by 2040. We will prioritize working with suppliers who are also committed to decarbonization and reaching net-zero carbon emissions. We have identified a list of the highest-emitting suppliers directly supporting our operations, and expect those suppliers, who collectively contribute more than 50% of emissions globally to Amazon’s Scope 3 footprint, to provide a plan for how they will decarbonize their operations and demonstrate real progress over time. We will prioritize our business toward those

who provide their plans and results on their path to net-zero carbon emissions. We are already working with many of these suppliers, and will continue our engagement and share learnings. In addition, we also launched our “Amazon Sustainability Exchange”—a free, publicly available website that democratizes our guidelines, playbooks, science models, and other resources to help other companies make meaningful progress toward net-zero carbon emissions.

[Learn more](#) about how we’re [engaging suppliers to decarbonize our supply chain](#) ↗

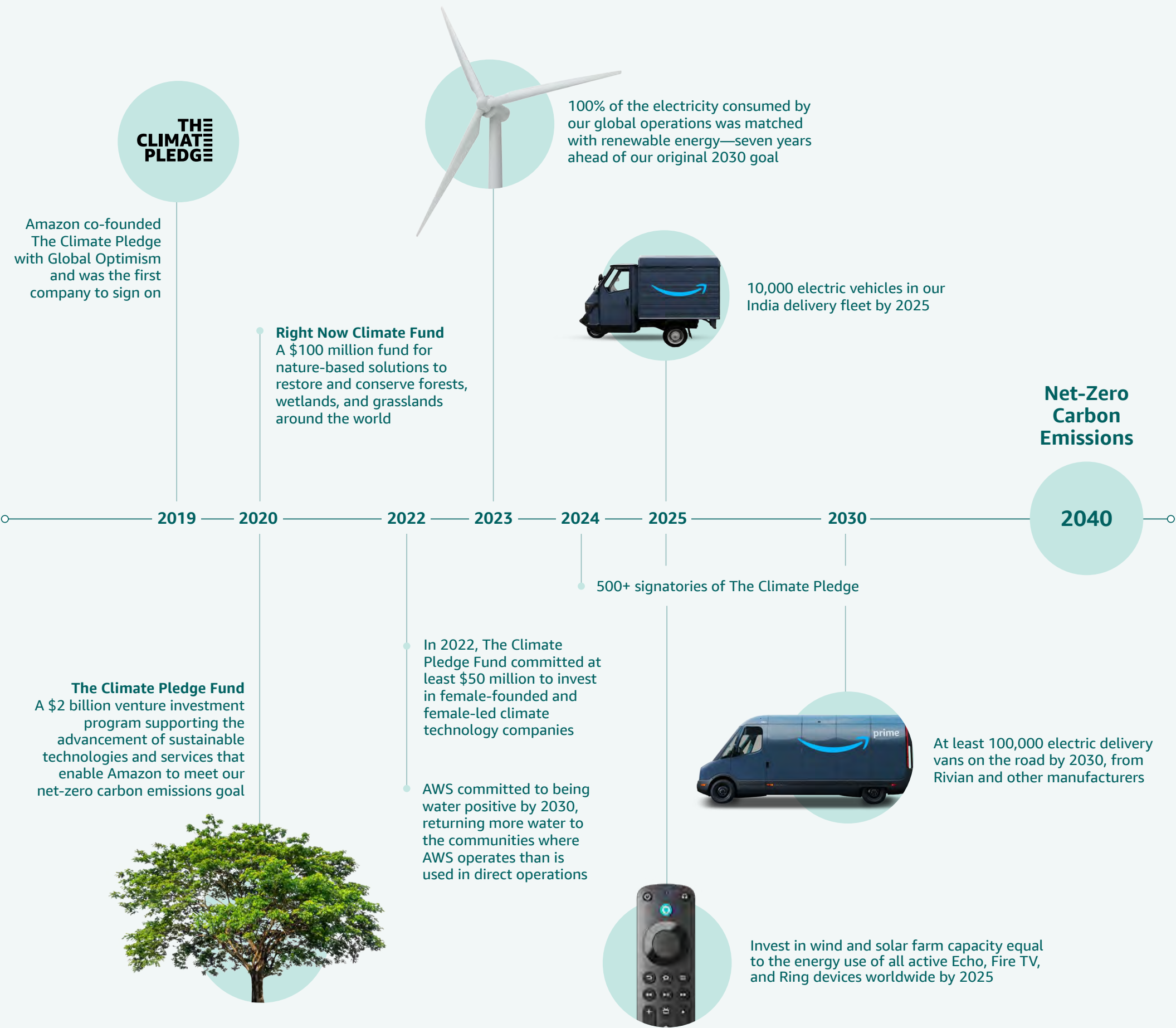
### Path to 2040

We know the path to net-zero carbon by 2040 will be challenging, but we are making investments, creating new ways of working, and inventing new solutions to help us decarbonize now and in the future. At Amazon, we think long term, and we’re committed to working collectively with our supply chain and industry partners to create and scale new decarbonization solutions.

We’re proud of the work we do, not just within our own operations but across the many industries of which we are a part. At the end of 2023, The Climate Pledge included 473 signatories focused on achieving net-zero carbon emissions by 2040. Signatories are working together more than ever before, with five new joint action projects launched in 2023. We are also investing in companies that are building breakthrough technologies and other solutions that could, longer-term, lower the overall cost of decarbonization, even in hard-to-abate sectors. One way we do this is through The Climate Pledge Fund, Amazon’s \$2 billion venture investment program, which supports the advancement of sustainability-focused technologies and services that will enable us to meet our net-zero carbon emissions goal.

We will continue to innovate, collaborate, and do the work needed to deliver the best for our customers, progress toward net-zero carbon emissions by 2040, and most importantly, contribute to a healthier planet.

### Key Milestones on Our Net-Zero Carbon Journey





# Delivery and Logistics

We rely on a complex transportation network to get products from manufacturers and sellers to customers around the globe. Our logistics network uses different modes of transportation, including ships, planes, freight trains, trucks, vans, and bikes, across three transportation legs:

- **First mile** is the first transportation leg, used for transporting shipments from the manufacturer or supplier to an Amazon facility. First mile includes maritime and airfreight shipping, as well as movement by truck and rail.
- **Middle mile** is the intermediate transportation leg, where we move shipments between Amazon facilities. It is also called long-distance transportation. Middle mile includes commercial trucking, aviation, maritime, and intermodal sea and rail.
- **Last mile** is the final transportation leg that delivers packages from Amazon to customers. It includes vans, trucks, and micromobility solutions such as e-cargo bikes and on-foot delivery.

We have adopted a multi-pronged strategy to transport products safely, quickly, efficiently, and more sustainably. We are decarbonizing first, middle, and last mile transportation by:

- **Increasing routing and fleet efficiency.** In 2023, we restructured our U.S. fulfillment operations by reorganizing our national network of fulfillment centers, intermediate sort centers, last mile delivery hubs, and transportation fleet into eight regions. This shift ensures we’re producing, packaging, and shipping from facilities that are closer to the communities we serve, which reduces the complexity of our shipping network and the miles traveled to get to our customers—helping drive down both carbon emissions and shipping costs. This new model optimizes delivery speed, reduces emissions, and provides the breadth of selection that customers expect. In the fourth quarter of 2023 alone, we shipped nearly 544 million more items from in-region fulfillment

centers than we did during the same period of 2022. Shipping from in-region fulfillment centers to our delivery stations also reduces the number of stops per package—avoiding nearly 16 million miles driven in 2023—and decreases our reliance on air transportation.

- **Increasing packaging and packing efficiency.** We focus on increasing pack and fill rates—the percentage of package volume that is utilized—and truck fill rates—the percentage of truck volume that is utilized—to fit more products into shipping vehicles. This reduces the number of trucks we need—and the carbon emissions associated with them—to deliver our products.
- **Scaling use of EVs and micromobility solutions.** Sending demand signals and scaling availability of alternative transportation solutions is critical to accelerating industry progress. This includes charging infrastructure, electric trucks, electric delivery vehicles, e-cargo bikes, e-mopeds, and on-foot deliveries from micromobility hubs.
- **Increasing use of alternative-fuel vehicles and low-carbon fuels.** The early adoption of lower-carbon fuels is another way we are working to minimize the carbon footprint of our transportation and logistics network, as well as a critical component to building out the alternative fuels market. We are investing in lower-carbon fuels today to encourage industry development and demand, with the goal of ultimately making them more accessible and affordable for everyone.
- **Partnering on initiatives to decarbonize transportation.** We participate in multi-stakeholder initiatives to shift the industry toward lower-carbon solutions at scale, such as EVs, charging infrastructure, and lower-carbon fuels.
- **Creating lower-carbon shipping options for customers.** We focus on consolidating shipments to reduce deliveries, as well as reducing packaging by shipping more items in each box and more items in their original packaging.

## First Mile

First mile transportation is the beginning of a product’s shipment path from the manufacturer, wholesaler, or distributor to an Amazon facility via ship, airplane, train, or truck. In many cases, first mile shipments cross international borders. We are focused on decarbonizing first mile transportation while maintaining efficiency and reliability and reducing costs. For instance, we have discovered innovative ways to prioritize ocean and rail transportation to reduce our reliance on airfreight.

Ocean transportation has a lower carbon footprint than air transportation does, so we prioritize shipping our products on ships, whenever feasible. In 2023, we transported 90% of

our imported transoceanic shipments via ocean freight and 2% via airfreight.

### Ocean Freight

**Zero-emission fuel:** Along with opting for more efficient shipping routes, we also prioritize lower-carbon marine biofuels. In 2021, we were a founding member of the First Movers Coalition, a global coalition of companies leveraging their purchasing power to decarbonize the world’s heavy-emitting sectors, such as ocean transportation. Through our active participation, we are supporting First Movers Coalition’s goal to use maritime ships with zero-emission fuels for at least 10% of cargo shipped internationally by 2030. In 2021, we also helped launch Cargo Owners for

## Transportation Types by Delivery Stage

### First Mile



Air



Ocean

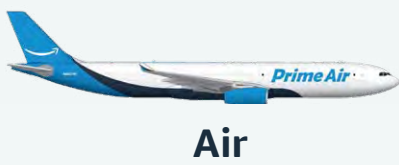


Rail



Truck

### Middle Mile



Air



Intermodal Sea



Intermodal Rail



Truck or Electric Heavy Duty Goods Vehicle

### Last Mile



Conventional Van



Electric Delivery Van



Micromobility Solution (e-bike, walker, etc.)





Zero Emission Vessels (coZEV) with the Aspen Institute to support initiatives that increase the availability of zero-emission technologies and fuels while gaining support from shipping lines, cargo owners, ports, and other organizations that can help to enable the energy transition. Through our membership, we are supporting coZEV’s goal to use maritime ships with zero-emission fuels for 100% of ocean cargo by 2040.

**Biofuel:** Our investment in maritime biofuel helps to accelerate the shipping industry’s transition to zero-emission fuels by demonstrating demand for lower-carbon fuel alternatives to bunker fuel. In 2023, we transported 10% of our ocean cargo via maritime ships powered by low-emission biofuels and finalized a 2023–2024 agreement with Maersk through their “ECO Delivery” ocean product offering. As part of this collaboration, Amazon piloted shipping cargo on the first methanol-powered vessel, from Singapore to Rotterdam. As availability increases, we will continue to increase the percentage of cargo we transport on these types of ships and leverage additional lower-carbon fuels in 2024 and beyond.

| [Learn more](#) about this [landmark zero-emission voyage](#) ↗

In early 2023, we co-founded the Zero Emission Maritime Buyers Alliance (ZEMBA) with the Aspen Institute, Patagonia, and Tchibo. ZEMBA seeks to accelerate commercial deployment of zero-emission shipping, enable economies of scale, and reduce maritime emissions. Six months after its launch, ZEMBA released a request for proposals for zero-emission shipping services to be delivered by 2025. This was the first major buyer-led initiative for the transition to zero-emission fuels in maritime shipping—one of the most challenging sectors to decarbonize.

| [Learn more](#) about how we are [improving the shorelines and areas surrounding the ocean routes we utilize](#) ↗

Airfreight

While we prioritize ocean transportation, air transportation is an important part of our first mile logistics network, though it represents only 10% of our transoceanic imports.

Aviation is also considered a hard-to-abate sector, which is why we are sourcing lower-carbon aviation fuels such as sustainable aviation fuel (SAF) and using SAF credits to reduce our own airfreight emissions as well as working with peers on innovative industry-wide solutions. Lower-carbon aviation fuel, such as SAF, currently represents less than 0.1% of global aviation fuel and remains cost-prohibitive for most companies. To help address these challenges, Amazon is a founding member of the [Sustainable Aviation Buyers Alliance](#) ↗ (SABA) and played a critical role in launching the [Sustainable Aviation Fuel certificates \(SAFc\) Registry](#) ↗ at the 28th meeting of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP28). The SAFc Registry aims to bring more transparency to emissions reduction claims and accelerate SAF deployment.

Middle Mile

Middle mile transportation starts when packages arrive at an Amazon facility and covers the journey between fulfillment centers and sort centers to delivery stations. In addition to enhancing routing efficiency through regionalization, we are decarbonizing middle mile transportation by increasing the number of EVs on the road and at our facilities and adopting lower-carbon fuels. We also partner with others to create industry solutions that accelerate decarbonization of this leg of the transportation network.

Middle Mile Efficiency

Moving products by rail or sea—instead of on the road, by conventional trucks—reduces carbon emissions by an average of nearly 50%. Europe’s geographic landscape and infrastructure in particular often make rail and sea the faster and more efficient routing options. In 2023, we increased our use of rail and ocean transportation in Europe by over 50%, distributing products through more than 100 rail lanes and more than 300 sea routes across the continent. This reduced our demand for more carbon-intensive transportation methods, such as trucks, in Europe. Additionally, we shortened the average distance each package traveled within our middle mile network by 25 kilometers in 2023 compared to 2022.

Journey of a Kindle through Our Transportation Network

Products travel through Amazon’s transportation network from manufacturers and sellers to customers around the globe. An Amazon Kindle starts its journey at a manufacturing facility in China, traveling through various ports, a crossdock, a fulfillment center, and a delivery station before it is delivered to the customer in Valencia, Spain.

1

**First Mile**

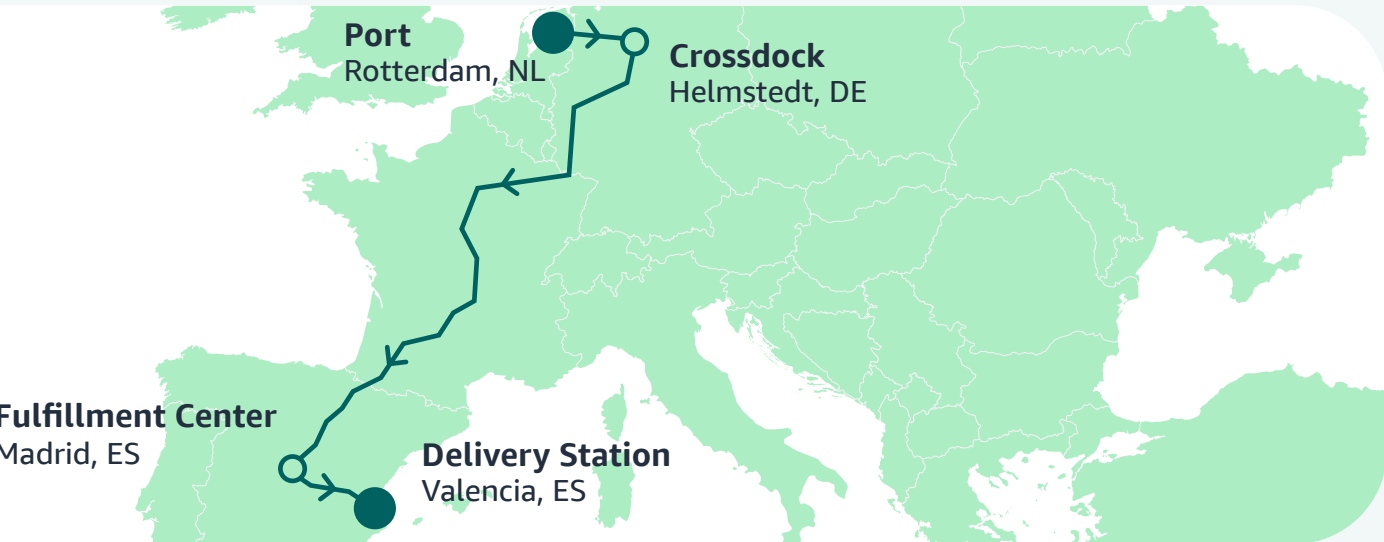
The first transportation leg, used for transporting shipments across international borders.



2

**Middle Mile**

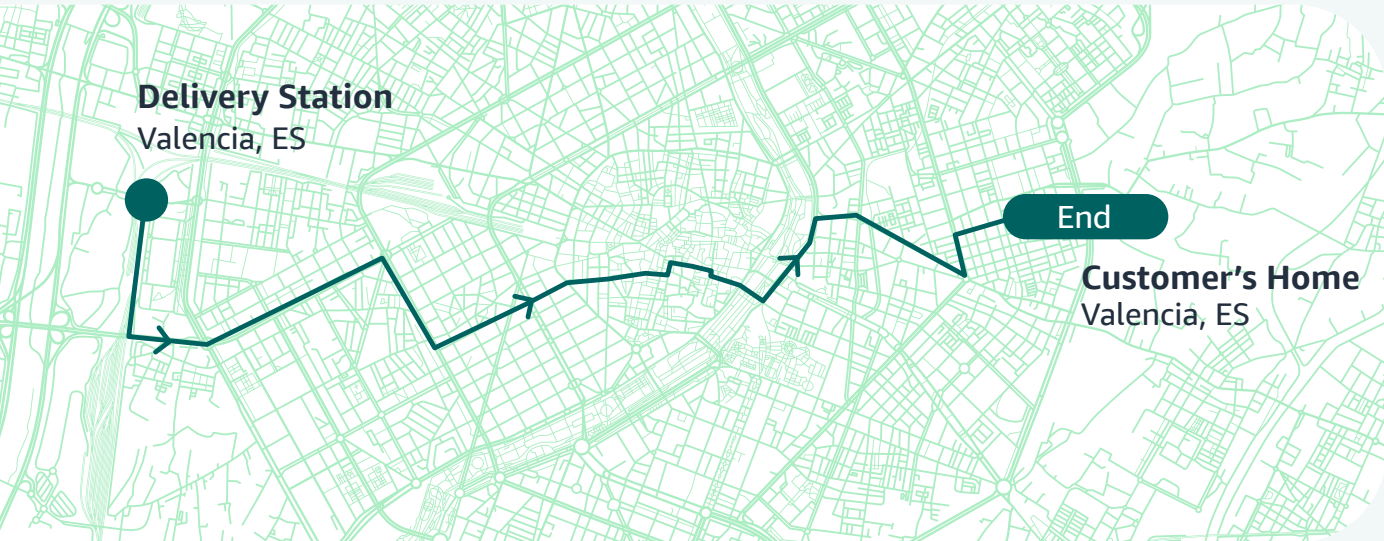
The intermediate transportation leg, where shipments are moved between Amazon facilities.



3

**Last Mile**

The final transportation leg, where packages are delivered to customers. We prioritize EVs and micromobility solutions when possible.





In 2023, we increased our total rail load volume by 45% in Europe and 25% in the U.S. Our sustainable rail freight solutions were recognized by BNSF Railway, which selected Amazon as one of the recipients of its 2023 Sustainability Award.

Middle Mile Electric Vehicles

Scaling up middle mile EVs is another way we aim to decarbonize our logistics network, both on the road and at our logistics facilities. Amazon and delivery service providers (DSPs) deployed more than 245 electric middle mile vehicles in 2023. We also have nearly 18,000 hydrogen-powered forklifts operating at more than 81 fulfillment centers, as well as 110 electric yard hostlers—vehicles that move truck trailers around fulfillment centers—in North America.



Jaya Varma Sinha, CEO of Indian Railways, spoke at the Smbhav Summit in 2023. Indian Railways’ partnership with Amazon India enables more sustainable modes of transportation and faster and more reliable delivery of customer packages in the region.

Indian Railways are the backbone of India’s transportation system thanks to the widespread network of trains that transport millions of people and freight across the country each day. In 2019, Amazon became the first e-commerce company to leverage this vast train network by entering into an operational engagement with Indian Railways to meet our customer promise of fast and reliable deliveries. We have continued this collaboration, increasing our use of Indian Railways’ electric locomotives to ship packages in 2023. We also partnered with eFast—India’s first national freight electrification platform led by the government policy think tank NITI Aayog—to engage policymakers on policies that can help decarbonize rail freight.

Amazon recognizes that the infrastructure needed to support the charging of electric heavy goods vehicles (eHGVs) at delivery stations and on the road is one barrier to scaling their use around the world. That is why we work with eHGV manufacturers and other partners to improve charging infrastructure and electricity grids. For instance, we partner with third-party charge point operators to set up charging yards at locations that best serve our Amazon sites. In Europe, we published CHALET (Charging Locations for Electric Trucks), a new, open-source tool to help private industry, governments, electricity network operators, and local authorities determine where to build electric charging points for eHGVs. Transportation and logistics operators are encouraged to input data into the tool, which CHALET then uses to generate a ranked list of recommended charger locations.

Middle Mile Zero-Emission and Lower-Carbon Fuels

In addition to putting EVs on the road, we are exploring ways to decarbonize our middle mile transportation operations by adopting lower-carbon fuels such as hydrogen, renewable diesel, and renewable natural gas (RNG).<sup>6</sup>

In 2023, we piloted the use of hydrogen fuel cell vehicles (FCVs) in Europe and Japan. These initiatives will provide us with more information about the right FCV size to maximize performance, determine optimal hydrogen storage and power management, and understand the viability of these

vehicles for middle mile transportation. In 2024, we aim to increase the number of FCVs deployed in our transportation network.

Amazon began mobile fueling diesel-powered vehicles—including trucks that operate short, local routes and vehicles that operate within our facilities—with renewable diesel at all California and Oregon fulfillment and sort centers in 2023. Renewable diesel is made from waste fats, greases, and other oils. And in India, we are collaborating with local oil companies to develop renewable diesel and other alternative fuels such as compressed biogas.

To reduce our logistics-related emissions, Amazon is also increasing the availability of compressed natural gas vehicles (CNGs). CNGs are trucks powered by natural gas instead of gasoline or diesel fuel. They can reduce carbon emissions by at least 75% compared to diesel when refueled with RNG. Globally, Amazon had 4,400 CNGs on the road in 2023, using 30 million gallons of RNG. This growth was driven by the opening of seven permanent RNG fueling stations across our North American logistics network in partnership with Clean Energy, the largest provider of RNG for the transportation industry in North America.

Partnerships Accelerating Middle Mile Decarbonization

Trucking is a challenging area to decarbonize, particularly considering the long-haul distances driven and the requirements for high-power EV charging infrastructure across transportation routes. Identifying and scaling solutions for this important method of transportation cannot be done by one company alone—it requires the know-how, resources, and experience of collaborative partners across industries and sectors.

In 2023, Amazon participated in the Smart Freight Centre (SFC) Exchange Network, a nonprofit organization whose mission is to accelerate the reduction of logistics emissions by fostering collaboration. As part of its work, SFC is increasing transparency and accountability around logistics emissions. In 2023, SFC and the World Business Council for Sustainable Development (WBCSD) launched guidance

to enable companies to better understand and track their logistics emissions on a granular operational level, from supplier to final customer.

We also became the first logistics provider to join the EVs2Scale2030 initiative with the Electric Power Research Institute (EPRI). Bringing together industry and the U.S. government, this initiative aims to increase the number of EVs on U.S. roads—from cars to heavy-duty trucks. Members are working to ready the electric grid in support of accelerated development of EV charging infrastructure. In 2023, the organization released eRoadMAP, a publicly available interactive map of transportation load growth across the U.S.

Additionally, in 2023, The Climate Pledge and C40 Cities (C40) developed Laneshift, a partnership to accelerate the transition to zero-emission electric trucks and charging infrastructure across major cities in India and Latin America.

| [Learn more about Laneshift](#)

Last Mile

Last mile transportation refers to the final part of the delivery journey. This is when products are transported from sort centers and delivery stations to customers via delivery vans, electric delivery vehicles (four-wheel, three-wheel, two-wheel, and e-mopeds), and micromobility solutions, including e-cargo bikes and on-foot deliveries. To help reduce delivery-related emissions, we are investing in EVs and working to optimize our delivery van and package fill rates as products embark on the final leg of their journey. Amazon deliveries are made by DSPs, who are independent contractors that operate their own delivery businesses.

| [Learn more about Amazon’s DSP program](#)

Last Mile Electric Delivery Vehicles

Increasing the number of EVs in Amazon’s delivery fleet is an important part of our approach to avoiding carbon emissions across the last mile of our transportation network. We are committed to having at least 100,000 electric delivery vans—from Rivian and other manufacturers—on the road by 2030.





In 2023, we delivered more than 680 million packages globally using more than 24,000 electric delivery vehicles, including 19,000 electric delivery vans, around the world.

United States

- Our U.S. fleet included 11,800 electric delivery vans from Rivian, up from more than 2,600 in 2022.
- We delivered 431 million packages via EVs.

Europe

- We deployed more than 300 electric delivery vans from Rivian on the road in Europe as part of our broader fleet of more than 3,000 electric delivery vehicles.
- We delivered 150 million packages via EVs.

India

- We nearly doubled the number of EVs in our Indian delivery fleet to more than 7,200, including 3,600 electric delivery vans, and more than 3,600 two-, three-, and four-wheel vehicles.
- We delivered 81 million packages via EVs.
- We installed charging infrastructure near more than 100 Amazon locations.

In India, 81% of last mile deliveries are made by delivery

Last Mile Electric Delivery Vehicles by Region<sup>7</sup>

Region	2022	2023
U.S.	2,600	11,800
Europe	1,220	3,000+
India	3,800	7,200+

associates using personal two-wheel vehicles. To encourage DSP associates to convert their personal vehicles to electric, we offer exclusively sourced EV deals from original equipment manufacturers as well as access to affordable financing.



Zero-Emission Deliveries in London

In August 2023, we began transporting packages in London using both zero-emission middle mile vehicles (electric heavy-duty trucks) and last mile vehicles (electric vans). While our current volumes of these vehicles are small, this pilot provides important learnings as we continue our work to decarbonize our transportation network.

Reducing Emissions with Micromobility Delivery Solutions

Micromobility hubs are smaller, centrally located delivery stations. In dense cities, these hubs enable us to utilize non-traditional delivery methods, such as e-cargo bikes and on-foot deliveries, to bring packages to customers in ways that generate fewer carbon emissions.

In 2023, we delivered more than 125 million packages via e-cargo bikes and on foot from micromobility hubs around the world. In Europe, we doubled the number of cities in which we operate micromobility hubs from over 20 in 2022 to more than 40 in 2023. New cities including Glasgow, Madrid, Rome, and Vienna joined existing hubs in London, Paris, Milan, and Munich.

In the U.S., Manhattan, New York, is an ideal place to deploy micromobility delivery operations due to its high population

density and pedestrian and cycling infrastructure. In 2023, we delivered:

- 50 million Amazon packages via micromobility solutions, up from 9.1 million packages in 2022
- 1.6 million grocery orders with micromobility solutions
- 259,643 packages in our first North American e-bike package delivery pilot in Brooklyn, New York
- As many as 222,000 packages were delivered daily by 1,460 on-foot delivery associates using pushcarts in Manhattan and a small area of Queens, reducing the need for hundreds of vehicles every day

In Japan, we delivered over 23 million packages using e-cargo bikes and on-foot delivery. We also scaled the Amazon Hub Delivery program—which partners with small and medium-sized businesses to deliver packages in local neighborhoods—to over 2,000 partners that delivered nearly 14 million shipments in 2023, around half of which were delivered on foot or bike.

Customer Shipping Options to Avoid Carbon Emissions

We offer our customers shipping options that help reduce the carbon emissions associated with the delivery of their products. We also have programs for sellers to reduce delivery emissions and decrease costs.

Amazon Day Delivery

Our Amazon Day shipping option allows Prime members to choose a designated day of the week to receive their orders. By consolidating orders into fewer packages and deliveries, we are avoiding emissions by saving boxes and reducing trips to individual addresses. In 2023, Amazon Day delivery avoided the use of more than 200 million boxes (up from nearly 115 million in 2022) and 226,000 metric tons of CO<sub>2</sub>e.

Ships in Product Packaging

Our Ships in Product Packaging program, formerly called Ships in Own Container, tests and certifies products that can

ship safely in just their original manufacturers' packaging—without an additional Amazon box, envelope, or bag. This minimizes the packaging materials used for delivery and allows packages to take up less space in delivery vehicles, increasing our truck fill rate.

Amazon recently launched an initiative in the U.S. to increase the number of items tested for qualification in the Ships in Product Packaging program by extending the program to [Fulfillment by Amazon sellers](#) . The program benefits these sellers by enabling them to provide a better customer experience while reducing the costs associated with fulfillment.

**Learn more** about how we are [reducing our packaging footprint](#)

Building Construction and Operations

Our building portfolio comprises thousands of owned and leased facilities in more than 60 countries, including operations buildings, grocery stores, corporate offices, and [data centers](#) . The construction, operation, and decommissioning of these buildings accounted for one fifth of Amazon's total carbon emissions in 2023, which is why we're committed to implementing and scaling decarbonization solutions and processes to reduce the footprint of this sector of our business.

Carbon emissions connected to our buildings fall into two categories: embodied emissions and operational emissions. Embodied emissions in the buildings sector are generated from the manufacture, transportation, installation, maintenance, and disposal of building materials. Operational emissions refer to resources consumed by day-to-day processes needed to run our business, including computing, lighting, heating, cooling, ventilation, refrigeration systems, and operating other equipment.





Globally, our work to reduce carbon emissions related to our buildings focuses on:

- **Implementing foundational efficiency initiatives:** We are instituting and improving data collection practices to better track our performance and inform our efforts to improve efficiency and reduce energy use and carbon emissions across our buildings portfolio.
- **Scaling renewable energy and lower-carbon approaches to heating and cooling:** We use on-site renewables, such as rooftop solar installations on buildings we operate, as well as renewable energy from the grid to power our buildings. We’re also scaling up our use of refrigerants with low global warming potential (GWP) and utilizing alternative fuels as backup power sources and to cool data centers.
- **Creating industry solutions to reduce embodied carbon:** We collaborate with suppliers, industry partners, signatories of The Climate Pledge, and governing bodies to develop and implement standards, alternative materials, and solutions that address environmental challenges specific to the buildings sector.

Implementing Foundational Efficiency Initiatives

We are working to make our buildings more energy-efficient and reduce their carbon emissions. This work starts with collecting robust, accurate, timely, and meaningful data to identify opportunities for improvement.

Our Enterprise Building Management System (EBMS) is one of the tools we use to measure and track energy efficiency at our existing sites. This standardized platform manages facility energy use and controls various building systems to minimize associated carbon emissions. Many of our buildings have thousands of sensors to monitor water use, air flow, temperature, and other environmental variables, which help

us further improve and optimize our designs. By the end of 2023, our EBMS was active in more than 1,200 facilities globally, a 14% increase from 2022.

We increase energy efficiency across our building operations through lighting and EBMS retrofits as well as rooftop heating, ventilation, and air conditioning unit replacements. Lighting retrofits alone have saved 1.23 billion megawatt-hours (MWh) of energy and avoided more than 873,000 metric tons of CO<sub>2</sub>e from 2017 to 2023. These upgrades have included converting all non-LED lamps to high-efficiency LED fixtures with dimming controls.

Validating Our Progress

As teams across Amazon progress toward the decarbonization of our buildings, we’ve begun to validate our efforts using the International Living Future Institute’s Zero Carbon Certification (ZCC). This third-party certification program validates improvements to our building decarbonization efforts and provides clear accountability for our internal teams and external building partners. This rigorous, carbon-centric program requires us to provide actual measured—not predicted—performance over one year of building occupancy to assess credible carbon emission reductions. This means that we are just now receiving certifications for the first pilot projects we submitted for evaluation.

Amazon achieved two full certifications for building projects in 2023: an Amazon Fresh store in Seattle, Washington—which was the world’s first building of its type to achieve the certification—and a Same Day delivery station in Sacramento, California—the first-ever North American logistics building to be certified. We are working to scale alignment with this certification program throughout our company, with dozens of projects across our global buildings portfolio currently using ZCC standards to measure and validate our decarbonization efforts.



Design elements at HQ2 incorporate native flora and fauna and use earth tones and natural materials, such as wood and stone, to create a warm and inviting atmosphere.

Sustainability at Our Second Headquarters

We want our corporate offices to be both inspiring places to work and models of what is possible when it comes to sustainable design and construction.

We built our second headquarters (HQ2) in Arlington, Virginia, with sustainability in mind. Opened in May 2023, HQ2 runs on 100% renewable electricity and achieves energy savings of 24% relative to a comparable Leadership in Energy and Environmental Design (LEED) baseline. In March 2024, it became the largest project (by building square footage) in the U.S. to receive LEED v4 Platinum certification.

Using an advanced lower-carbon concrete mix design developed by CarbonCure, which we invested in through The Climate Pledge Fund [☞](#), we achieved a 20% reduction in HQ2’s concrete structure carbon footprint compared to the industry baseline.<sup>8</sup> This avoided 14,700 metric tons of CO<sub>2</sub>e, which is the equivalent of taking 3,500 cars off the road in the U.S. for an entire year. More than 40 Amazon sites globally now use this same CarbonCure technology.





## Scaling Renewable Energy and Lower-Carbon Approaches to Heating and Cooling

We are working to reduce the emissions associated with operating our buildings by using renewable energy and other lower-carbon alternatives.

### Scaling Renewable Energy

At the end of 2023, Amazon had 270 rooftop solar projects at our facilities around the globe. We brought 50 new on-site solar energy systems online in 2023, for a total capacity of 58 MW. These on-site solar energy systems are estimated to generate 123,000 MWh annually—enough energy to power over 33,600 European homes—and avoid the equivalent of roughly 47,400 metric tons of CO<sub>2</sub>e each year compared to nonrenewable electricity sources.

| **Learn more** about how we are [scaling carbon-free energy](#) ↗

### Lower-Emission Refrigerants

Refrigerants are cooling agents used in air conditioners, heat pumps, refrigerators, and freezers. Refrigerants with high GWP—such as hydrofluorocarbons (HFCs)—contribute to climate change by trapping more heat in the atmosphere than CO<sub>2</sub>. That’s why Amazon Fresh and Whole Foods Market use low-GWP refrigerants, such as CO<sub>2</sub> refrigerants, to help grocery stores reduce emissions.

By the end of 2023, 46 Whole Foods Market stores were using low-GWP refrigeration systems. Whole Foods Market has also committed to using only low-GWP refrigeration systems in new stores in North America starting in 2025. Together, Amazon and Whole Foods Market donated to the North American Sustainable Refrigeration Council in 2023 to accelerate the council’s efforts to train the next generation of skilled technicians needed to install and maintain sustainable refrigeration systems.

### Energy Efficiency and Alternative Fuels in AWS Data Centers

AWS takes a holistic approach to minimizing energy and water consumption in its operations, including in data

centers. For example, AWS is increasing the use of free-air cooling systems that cool servers with outside air. This avoids the need for energy-intensive compressor-based cooling systems throughout much of the year. Even during peak summer temperatures, data centers can utilize direct evaporative cooling, a process that uses water to cool the air and remove heat from servers.

In 2023, AWS started transitioning to hydrotreated vegetable oil (HVO) to power backup generators at its data centers in the U.S. and Europe. HVO is a type of renewable diesel made from waste cooking oil or vegetable, plant, and residue oils. AWS sites in Ireland, Sweden, and Oregon were among the first to make the switch to HVO. Renewable diesel is readily available in regions such as the U.S. West and parts of Europe, but sourcing in areas such as the U.S. East and Midwest remains a challenge due to the lack of distribution terminals and established supply chains for this type of fuel. In response, fuel distributors are beginning to invest in renewable diesel terminals along the U.S. East Coast, and AWS plans to explore these sourcing opportunities once they are available.

## Creating Industry Solutions to Reduce Embodied Carbon

Decarbonizing the buildings sector is a challenge no one company or organization can solve alone. We can, however, accelerate progress by engaging with industry partners to develop and scale innovations that reduce carbon emissions associated with the construction, operation, and decommissioning of buildings across sectors and markets.

### Using Lower-Carbon Materials

We are working to reduce embodied carbon in our infrastructure by increasing the use of lower-carbon materials in Amazon buildings, such as lower-carbon steel, lower-carbon concrete, and mass timber, a lower-carbon structural wood product that can replace concrete and steel in building construction.

In 2023, 29 Amazon building projects were constructed with lower-carbon concrete and steel, collectively reducing embodied carbon by over 79,000 metric tons of CO<sub>2</sub>e. Amazon used mass timber when building HQ2 and, in 2023, progressed in the design and construction of three new buildings that will use mass timber structural elements.

In 2023, AWS built 36 data centers with lower-carbon concrete, up from 16 in 2022. AWS also tested a low-carbon, performance-based ASTM C1157 Hydraulic Cement by Ozinga, a concrete, bulk materials, and logistics solutions supplier, which achieved a 64% reduction in embodied carbon compared to the industry average. In January 2024, AWS updated its design standards to require the use of concrete with 35% less embodied carbon than the industry average in new data centers around the world.

We can also mitigate a building’s carbon footprint by using higher-strength structural steel, which is made by cooling the metal quickly during manufacturing. The manufacturing process of lower-carbon steel gives it a higher strength-to-weight ratio, which means that less material—and as a result, less embodied carbon—is used to perform the same function. By incorporating higher-strength steel into its data center structural designs, AWS has reduced steel content by 70 tons for each two-story data center and 137 tons for each three-story data center, decreasing emissions by 63 and 124 metric tons of CO<sub>2</sub>e, respectively. In 2023, AWS built 31 data centers with lower-carbon steel, up from 10 in 2022.

Using lower-carbon steel and concrete enabled AWS to avoid over 46,700 metric tons of CO<sub>2</sub>e in 2023—equivalent to the carbon emissions generated from driving over 11,100 cars in the U.S. for one year. We will continue working with suppliers to achieve even greater carbon savings in future Amazon buildings by increasing the use of lower-carbon materials in their construction.

### Partnering to Develop Industry Standards for Measuring Embodied Carbon

Embodied carbon is our largest source of building-related carbon emissions and something we address in our building design and construction strategies. Since 2022, we

have been using the [Embodied Carbon in Construction Calculator](#) ↗ to track and report the embodied carbon of our building construction materials. This open-access industry tool allows us to benchmark, assess, and reduce embodied carbon. It focuses on emissions from the construction materials supply chain, using a database of digital, third-party-verified Environmental Product Declarations (EPDs). EPDs are a way for manufacturers to take comprehensive, third-party-verified life cycle assessments (LCAs) and turn them into standardized labels for their products. We use this data to select lower-carbon construction materials.

Amazon asks our building contractors, including architectural, design, and construction companies, to use this tool as part of our building delivery process. In 2023, this requirement increased the use of the tool by 231 building contractors across 47 companies and 26 countries. This uptake has helped scale and deploy expertise in how to reduce embodied carbon across the broader building industry.

In 2023, we worked with the UK Chartered Institution of Building Services Engineers (CIBSE) and our supply chain partners to create public-facing embodied carbon baselining guidance for the logistics sector. This guidance, called [Technical Memorandum 65.3](#) ↗, seeks to help professionals across Europe assess and understand the embodied carbon of material handling and mechanical, electrical, and plumbing equipment. Using data that is new to the industry, Technical Memorandum 65.3 will enable Amazon, our supply chain partners, and our peers to establish a baseline understanding of carbon emissions from industrial equipment, paving the way to ultimately identifying additional carbon reduction opportunities.

## Servers and Hardware

As the world’s most comprehensive and broadly adopted cloud provider, AWS is committed to building a lower-carbon business for its customers and the planet. AWS designs its data centers—including servers and hardware—for efficiency, resiliency, and a lower carbon footprint.





AWS’s scale allows for higher resource utilization and energy efficiency than the typical on-premises data center. From the infrastructure that powers its servers to the techniques that keep them cool, efficiency is a primary goal for every part of the AWS Global Cloud Infrastructure.

The AWS Global Cloud Infrastructure is built on AWS’s own custom hardware and optimized for workloads run by AWS customers. Research shows that in North America, AWS can lower its customers’ workload carbon footprints by up to 96% compared to on-premises computing workloads when the electricity AWS uses is matched with 100% renewable energy—a goal that Amazon, including AWS, achieved in 2023.

AWS is reducing emissions related to server use and networking equipment by increasing server lifespan. This includes refining software to run more efficiently, which lowers stress on hardware and extends the amount of time it can be used. In February 2024, AWS announced that the average expected life of its servers had improved from five to six years. To support these efforts, AWS has a robust maintenance and repair program in place that is designed to increase component reuse and further reduce carbon emissions and waste across its supply chain.

[Learn more](#) about how [AWS is advancing circular economy principles](#) ↗

### Enhancing Chip Efficiency

One of the most visible ways AWS is innovating for power efficiency is through its investment in purpose-built chips. A chip is a tiny wafer of semiconducting material with an embedded electronic circuit. It contains millions of microscopic electronic components called transistors that transmit data signals. Chips today are high-performance processors that power all types of advanced analytics, graphics, and machine learning applications.

In 2023, AWS launched Inferentia2, the second generation of its Inferentia chip, developed to deliver the highest

performance at the lowest cost per watt. Inferentia2 is up to 50% more energy-efficient and can reduce costs by up to 40% against comparable Amazon Elastic Compute Cloud (EC2) instances.

Meanwhile, AWS Graviton4 is the latest generation of chips designed by AWS and the most powerful and energy-efficient chip AWS has built as of 2023. Graviton4 provides up to 30% better computing performance, 50% more cores, and 75% more memory bandwidth than Graviton3 processors while being more energy efficient.

### Partnering to Reduce Carbon Emissions in the Semiconductor Industry

AWS knows that by collaborating across the entire semiconductor industry, it can drive carbon emission reductions at a scale greater than what is possible on its own. To that end, AWS is partnering with its suppliers to decrease their operational emissions and engage their own upstream supply chains to do the same. In 2023, AWS joined the Semiconductor Climate Consortium (SCC), an organization focused on reducing carbon emissions across the global semiconductor supply chain. The SCC collaboration accelerates decarbonization for member company operations and enables new solutions and approaches for adoption.

## Products and Devices

### Amazon Private Brands

Two of our private brands, Amazon Essentials and Amazon Basics, make products across many categories, including clothing, bedroom furniture and mattresses, kitchen appliances and cookware, toys, pet essentials, and workout gear. Amazon works with suppliers around the world to manufacture these products at a high quality and great value.



### Reducing Emissions from the Transportation of Data Center Hardware

AWS is reducing emissions from transporting hardware, including racks and their related components, by using more sustainable fuels and less carbon-intensive modes of shipping where possible.

- **Increasing ocean freight:** In 2023, AWS transported approximately 6,600 metric tons of hardware components on cargo ships, avoiding approximately 65,000 metric tons of CO<sub>2</sub>e by reducing airfreight in favor of ocean freight where possible.
- **Investing in lower-carbon fuels:** AWS is encouraging its suppliers to decarbonize long-haul transportation, including through the use of SAF. In 2023, AWS purchased over 6 million liters of SAF, which avoided approximately 15,600 metric tons of CO<sub>2</sub>e compared to conventional aviation fuel.
- **Making ground deliveries using EVs:** AWS is increasing the use of EVs for equipment-related ground deliveries. In Dublin and Singapore, for example, AWS worked with transportation providers to transport racks, loose gear, and other components to data center locations using electric trucks.

Carbon emissions from the materials and manufacturing of these products are part of our Scope 3 carbon footprint. We know that supporting our suppliers’ understanding of the factors that influence a product’s carbon footprint can enable future innovation and avoid carbon emissions across our supply chain.

In 2023, we worked with our top suppliers to develop carbon footprints for the products responsible for over half the greenhouse gas (GHG) emissions of our private brands. These insights informed the creation of joint abatement plans, which help avoid future product emissions through actions including moving to recycled materials, using renewable energy to power manufacturing facilities, and reducing packaging. For example, we began using recycled polyester certified by Textile Exchange’s Global Recycled Standard, which now represents 16% of the polyester we use for Amazon Essentials apparel products. We also worked with Amazon Private Brands battery suppliers to reduce product packaging weight by 13%. In 2024, we aim to expand our product carbon measurement activities to a larger group of suppliers.

[Learn more](#) about how we [focus on sustainability throughout the lifecycle of our products](#) ↗

### Amazon Grocery and Whole Foods Market

Amazon Grocery and Whole Foods Market teams are working with HowGood—an independent research company and data platform with the world’s largest database on food product sustainability—to measure and improve the impact of our food products across multiple categories, including carbon emissions, soil health, and water usage. HowGood measures the carbon footprint of our products based on each product’s ingredient breakdown, sourcing locations, and certifications, instead of using industry averages. This gives us a more accurate understanding of our carbon footprint, allowing us to identify emissions hotspots and prioritize abatement solutions with our suppliers.






Whole Foods Market also actively supports and finances projects that have the potential to strengthen ecosystem services, promote biodiversity, and improve soil health within our supply chain. These projects include manure management with dairy farmers, planting native grasses on farms in collaboration with grain and legume suppliers, and process electrification and feed efficiency with seafood suppliers.

Devices


Amazon’s sustainability strategy considers the entire lifecycle of our devices—from how we build them to how our customers use and retire them. We strive to make each generation of new Amazon devices more carbon- and energy-efficient and less resource-intensive than the last.

In 2023, we published the carbon footprint of newly launched Echo, eero, Ring, Fire TV, and Fire tablet devices on the product detail pages of our U.S. Amazon.com site, along with product sustainability fact sheets for each device. Fact sheets provide customers with a detailed breakdown of emissions throughout the device’s lifecycle, including those resulting from the extraction, production, and transportation of raw materials and device parts; the energy associated with device use; and end-of-life processing. We also published the [Amazon Devices Product Carbon Footprint Methodology](#)  to give customers insight into how we calculate the carbon footprint of our devices.

Many of our devices offer a Low Power Mode feature, which reduces energy consumption when the device is idle. Our latest Echo and Fire TV devices, for example, feature Low Power Mode, and we are delivering updates to introduce this feature in older devices already in use. By the end of 2023, over 67% of Echo devices and Fire TVs had Low Power Mode, up from over 60% in 2022.


Amazon supports the development of new renewable energy capacity to match the electricity used by our customers’ devices. This renewable energy comes from investments in off-site wind and solar farms. Amazon may choose to purchase additional environmental attributes, such as

renewable energy certificates in the U.S. and Guarantees of Origin in the EU, to signal our support for renewable energy in the grids where we operate, in line with the expected energy generation of the projects we’ve contracted. By the end of 2022, we had contracted enough renewable energy capacity through new wind and solar farms to equal the expected electricity used by all active Echo, Fire TV, and Ring devices globally by 2025. Some of these wind and solar projects are operational today; others are currently under construction and expected to begin operating in 2024.

**Learn more** about how we [calculate the percentage of renewable energy matched to the electricity used by Amazon devices](#) 


In 2022, we announced a collaboration with the Carbon Trust, which partners with businesses, governments, and organizations around the world to accelerate the transition to net-zero carbon emissions. We work with the Carbon Trust on technical specifications for decarbonizing the use phase of internet-connected devices. As part of this work, throughout 2023, we partnered with Samsung, Meta, Microsoft, and Comcast to develop standards that provide practical, meaningful steps for mitigating emissions at the customer use stage of the device lifecycle.

Reducing embodied carbon in our hardware requires us to decarbonize all parts of the device lifecycle, including manufacturing. We encourage Amazon device suppliers to reduce their manufacturing emissions, including by using renewable energy. As of the end of 2023, we’ve received commitments from 49 device suppliers to work with us on decarbonization, up from 28 suppliers in 2022. We also helped 21 suppliers develop renewable energy plans, including final assembly suppliers that make up over 70% of our direct manufacturing spend for Echo, Kindle, Fire tablet, Fire TV, Ring, Blink, and eero devices and accessories.

**Learn more** about how we [make our products with sustainability in mind](#) 

Engaging Suppliers

As we progress on our net-zero carbon emissions journey, Amazon is continuing to engage suppliers in the critical work of reducing their operational emissions and working with their own upstream supply chains to do the same. We have identified a list of the highest-emitting suppliers directly supporting our operations, and expect those suppliers, who collectively contribute more than 50% of emissions globally to Amazon’s Scope 3 footprint, to provide a plan for how they will decarbonize their operations and demonstrate real progress over time. We will prioritize our business toward those who provide their plans and results on their path to net-zero carbon emissions. In addition, we also launched our “Amazon Sustainability Exchange”—a free, publicly available website that democratizes our guidelines, playbooks, science models, and other resources to help other companies make meaningful progress toward net-zero carbon emissions.

**Learn more** about how [our new Amazon Sustainability Exchange is helping our selling partners reach their sustainability goals](#) 

Carbon Neutralization

Amazon’s first priority under The Climate Pledge is to eliminate emissions within the value chain of our businesses, keeping pace with science-aligned pathways to the temperature targets established by the Paris Agreement. In parallel, we are investing in climate mitigation outside of our value chain (“carbon neutralization”), and we plan to neutralize any emissions that cannot be eliminated by 2040. We’re making targeted investments and developing science-led partnerships that are making an impact today, while also aiming to inspire global climate action and build the foundation for credible neutralization initiatives at scale.

Our carbon neutralization approach focuses on three actions outside of our value chain. Based on climate science, we know that these areas have a significant unmet need for investment and can deliver critical mitigation benefits:

- 1. Reducing deforestation
- 2. Advancing the removal of carbon from the atmosphere with nature-based solutions
- 3. Scaling up carbon removal technologies

Today’s carbon credit market is fragmented, complex, and opaque. At Amazon, we use the best available science to design and evaluate projects and measure, verify, and monitor carbon credits.<sup>9</sup> We also use robust methodologies to verify that the projects we support do, in fact, neutralize carbon. In doing so, we are paving the way for a future where carbon credits are a quantifiable, real, permanent, and socially beneficial method by which to reduce and remove carbon from the atmosphere.

In recent years, we’ve focused on developing and improving new methods to better evaluate the effectiveness of forest restoration projects. As part of an independent working group made up of leading carbon market experts, scientists, and conservation professionals, we helped develop ABACUS, a rigorous set of principles and requirements for quantifying the climate benefits of restoration projects.

ABACUS aims to quantify the complete set of climate impacts associated with restoration projects. One example of this is “leakage:” when a project designed to restore forests displaces production and leads to deforestation somewhere else. ABACUS requires projects to maintain or enhance agricultural production to avoid leakage. ABACUS also requires a data-driven dynamic baseline that compares carbon removal progress over time to control areas that are not restored.

Reducing Deforestation

We have made an ambitious pledge to protect nature and mitigate climate change through the Lowering Emissions by





Accelerating Forest finance (LEAF) Coalition—a public-private initiative that is mobilizing more than \$1 billion to protect the world’s tropical forests and surrounding communities by supporting government policies and programs that reduce emissions from deforestation at national or large sub-national scale.

Additionally, Amazon provided funding and technology to help the State of Pará, Brazil, institute traceability in the cattle sector, advance alternative livelihoods for family farmers, deter illegal land use by streamlining and digitizing proper land titling, and reclaim illegally deforested state lands. AWS is supporting the government of the State of Pará in designing and deploying SeloVerde (Green Seal), a cutting-edge AI tool to address climate change challenges and traceability in supply chains with a high risk of deforestation. SeloVerde combines government databases, innovative map services, and land-use data from high spatial resolution satellite imagery. This allows industry stakeholders access to information that helps them make environmentally responsive, data-based purchasing decisions for commodities such as cattle and soy.

### Advancing the Removal of Carbon from the Atmosphere with Nature-Based Solutions

Nature-based carbon removal, when done well, harnesses the power of photosynthesis to enhance the carbon stored in natural and managed ecosystems, like forests and grasslands. These projects have the additional benefit of helping preserve the natural world by creating wildlife habitat, promoting biodiversity, improving water quality, and reducing flood risk.

In 2023, we expanded our investments in nature-based carbon removal with two new agroforestry projects in the Amazon rainforest. Located in Peru and Brazil, these projects aim to integrate trees into farming systems while improving the livelihoods of surrounding farming communities. Additionally, they demonstrate an innovative new quality standard for measuring and verifying carbon removal in agroforestry and restoration projects.

We also created the Agroforestry and Restoration Accelerator, which aims to restore degraded lands in ways that both remove carbon from the atmosphere and improve the livelihoods of local communities. The Accelerator experiments with scalable business models, landholder engagement strategies, and measurement techniques to support agroforestry and native restoration on small-scale family farms in Brazil.

[Learn more](#) about how we are [advancing nature-based solutions](#) ↗

### Scaling Up Carbon Removal Technologies

In 2023, we signed an agreement to support what is expected to be the world’s largest deployment of direct air capture (DAC). DAC is an emerging set of technologies that chemically scrub CO<sub>2</sub> from the air. The captured CO<sub>2</sub> is then stored deep underground or used in applications such as building materials (including concrete, brick, and cement) and low-carbon fuels. We committed to purchasing carbon dioxide removal credits equaling 250,000 metric tons of CO<sub>2</sub> from 1PointFive, which is currently constructing its first DAC plant in Texas. When fully operational, the plant is expected to be the largest in the world, with capacity to capture up to 500,000 metric tons of CO<sub>2</sub> annually.

Amazon also supports CarbonCapture Inc., a climate technology startup recognized for its pioneering modular DAC systems. The company’s patented modular open systems architecture allows the swapping of new sorbents—materials used to absorb CO<sub>2</sub>—as they become available. Maximizing sorbent performance is one way to drive down the cost of DAC over time to unlock scale. CarbonCapture Inc. will make up to 100,000 carbon removal credits available to Amazon. The Climate Pledge Fund also made an equity investment in CarbonCapture Inc. to help accelerate its growth and scale its operations.

[Learn more](#) about Amazon’s [Right Now Climate Fund](#) ↗

## The Climate Pledge

The Climate Pledge is a commitment to reach net-zero carbon emissions by 2040. Amazon co-founded The Climate Pledge with Global Optimism in 2019 and was the first company to sign on. The Climate Pledge brings the world’s top companies together to drive joint action, cross-sector collaboration, and responsible change. Companies signing up to The Climate Pledge agree to the following three areas of action:

- **Regular reporting:** Measure and report GHG emissions on a regular basis.
- **Carbon elimination:** Implement decarbonization strategies in line with the Paris Agreement through business change and innovations, including efficiency improvements, renewable energy, materials reductions, and other carbon emissions elimination strategies.
- **Credible offsets:** Neutralize any remaining emissions with additional, quantifiable, real, permanent, and socially beneficial offsets to achieve net-zero annual carbon emissions by 2040.

The Climate Pledge celebrates its fifth anniversary in September 2024. While companies will chart their own paths to net-zero carbon emissions, signing The Climate Pledge reinforces their commitment to sustainability, holds them accountable to their goals, and provides new opportunities for collaboration and a collective knowledge base to accelerate their progress. At the end of 2023, The Climate Pledge represented 473 signatories in 42 countries and 59 industries.

In 2023, 77 additional companies signed The Climate Pledge, including Mastercard, Sony, and T-Mobile. Amazon encourages our suppliers to sign The Climate Pledge, and in 2023, nine Amazon transportation and logistics suppliers became signatories, including CTT Portugal Post, Global Feed Ecotrans, Poste Italiane, and Emirates Post.

[Learn more](#) about how [global companies are working together to address the climate crisis through The Climate Pledge](#) ↗

### The Climate Pledge by the Numbers

	2021	2022	2023	YoY%
Signatories	300	396	473	19%
Countries	29	36	42	17%
Industries	51	55	59	7%

### Partnering with Others to Scale Progress

With 473 signatories, The Climate Pledge focused more on cross-industry collaboration in 2023 than ever before. In 2023, The Climate Pledge launched five joint action projects involving its signatories to accelerate progress to net-zero carbon emissions by 2040. Working together, signatories addressed tough problems in hard-to-abate sectors to promote technological innovation, send demand signals, address supply chain conundrums, and encourage the integration of climate justice business practices. So far, 24 signatories have joined The Climate Pledge projects related to low-emission supply chain transportation solutions, circularity, increasing urban charging infrastructure, electrifying middle mile freight, and data transparency.

Laneshift is one example of The Climate Pledge’s joint action projects. In 2023, The Climate Pledge and C40, a global network of nearly 100 mayors of the world’s leading cities, developed Laneshift to accelerate the transition to zero-emission electric trucks and charging infrastructure across major cities in India and Latin America. Laneshift is creating a roadmap for the freight industry to partner with rapidly urbanizing cities to utilize cleaner transportation solutions. This joint action project involves:

- Catalyzing the deployment of electric freight vehicles and corresponding infrastructure across cities in India (Bengaluru, Delhi, Mumbai, and Pune) and Latin America





(Bogotá and Medellín, Colombia; Curitiba and Rio de Janeiro, Brazil; Quito, Ecuador; and Mexico City, Mexico)

- Co-creating business incentives for long-term investment
- Developing a blueprint for cities that provides insights on industry resources, demand, and supply-side investment and demonstrates the benefits of sustainable e-mobility policies

This program is expected to reduce emissions, improve air quality, create green jobs, and work toward a just transition for workers. In 2023, Laneshift set up operations and initiated groundwork, including hiring staff and establishing global key performance indicators.

The Climate Pledge also launched Passport, an online community for its signatories that provides practical tools and industry expert connections to help them meet their emission reduction goals. As part of this, The Climate Pledge released its first training course on Passport Academy, a professional development online learning tool. Leaders from Amazon, Brooks Running, CDP, and more teach the course, *Your Practical Guide to Measurement and Reporting*, which informs participants about best practices in measurement and reporting.

The Climate Pledge signatories also use Passport to stay connected throughout the year and during events such as COP and Climate Week.

## The Climate Pledge Fund

The Climate Pledge Fund is a \$2 billion venture investment program supporting the advancement of sustainable technologies and services that enable Amazon to meet our net-zero carbon emissions goal. It specifically targets hard-to-abate sectors for investment, with the goal of supporting companies building breakthrough solutions that could eventually lower the overall cost to decarbonize Amazon and the broader industry.

In 2023, The Climate Pledge Fund made nine investments—including both new and follow-on investments for existing portfolio companies—bringing its total investment portfolio to 24 companies. The Climate Pledge Fund’s new investments covered a broad set of categories including packaging (Genecis Bioindustries), grocery and agriculture (Windfall Bio), and transportation (Forum Mobility). The Climate Pledge Fund also invested in a new category—carbon removal—through its support of CarbonCapture Inc.

**Learn more** about how we are [using new technologies to remove carbon from the atmosphere](#) ↗

### Accelerating Climate Solutions from Female Founders

As part of The Climate Pledge Fund’s broader dedication to accelerate female-led climate solutions, in 2022, it committed at least \$50 million to invest in female-founded and female-led climate technology companies. This investment includes the support of incubators and accelerators focused on women entrepreneurs and is designed to help address the gender equity funding gap that currently exists for women in climate technology.

In 2023, The Climate Pledge Fund invested in Genecis Bioindustries, a women-led climate tech company in the U.S. founded by scientist Luna Yu. Yu and her team are using specialized bacteria to turn organic waste—such as bread crusts and other food scraps—into bioplastic, a biodegradable and easily recyclable alternative to plastic packaging. Amazon is evaluating ways to use Genecis’s technology in our own business, such as to deliver grocery and consumer goods.

**Learn more** about Genecis by watching [this video](#) ↗

Together with the U.S. Agency for International Development (USAID) and its implementing partners Chemonics and 2X Global, we’re helping address inequities women are facing in the climate finance ecosystem and supporting their ability

to accelerate climate change innovations. We pledged \$3 million to the USAID-led Climate Gender Equity Fund (CGEF), a public-private partnership that leverages funding to scale climate finance that advances gender-equitable climate action. Since its launch in November 2022, CGEF’s founding members have committed a combined \$20 million to the fund. USAID announced an additional \$5 million investment during COP28 in November 2023. The funding will be used over the next several years to make grants to businesses, investment vehicles, accelerators, incubators, and grassroots organizations supporting climate solutions that are led by and benefit women.

In 2023, CGEF selected the first cohort of women-led organizations to receive grants, each of which is focused on advancing gender-equitable climate action in Africa. The organizations selected include:

- **ATG Samata**, a women-led fund focused on early-stage, scalable businesses in emerging markets in sub-Saharan Africa with an emphasis on Kenya, Uganda, Nigeria, Ghana, Mozambique, and Zambia
- **M-Kyala Ventures**, a gender lens incubator that supports women entrepreneurs working in climate smart enterprises
- **wCap**, a woman-owned venture capital firm in Zambia that is focused on bridging the funding gap for early-stage, high-growth women-led businesses offering climate solutions for selected countries in Southern Africa
- **WomHub**, an ecosystem builder in South Africa that supports female science, technology, engineering, and mining and manufacturing business founders

Amazon also continues to support the Resilience Fund for Women in Global Value Chains (Resilience Fund), created to support women’s economic resilience, health, and well-being.

**Learn more** about our [support of the Resilience Fund](#) ↗

## Supporting Policies That Drive Decarbonization

Achieving global decarbonization requires robust and clear policies to reduce the cost gap between established and emerging lower-carbon technologies, as well as an enabling environment to transition multiple sectors simultaneously. At Amazon, we are contributing to policymaking processes and informing public officials of our stances on issues that matter to our customers, stakeholders, and businesses, such as carbon-free energy and climate action. Our public policy team works with policymakers, multilateral organizations, industry associations, coalitions, and other partners on numerous regulatory and policy issues. Specifically, we seek to advance and incentivize decarbonization, supporting policies that scale zero-emission fuels, advance zero-emission vehicle deployment and associated infrastructure, drive the deployment of carbon-free energy, modernize the grid, and accelerate investments in clean technologies.

**Learn more** about how we [advocate for strong climate action](#) ↗ and [global renewable energy policies](#) ↗

## Looking Forward

Reaching net-zero carbon emissions by 2040 will be challenging. Achieving this ambitious goal will require a multifaceted approach that spans Amazon’s delivery and logistics networks; building construction and operations; servers and hardware; grocery, products, and devices; and packaging operations. We will continue working to reduce carbon emissions, including by expanding our use of carbon-free energy and switching to lower-carbon materials and fuels where possible. We know that we can make even greater progress when we collaborate with others, and we will continue to engage external partners—from expert coalitions to our diverse network of suppliers—to scale our efforts to decarbonize worldwide in the service of building a better future for all.

