Our Progress

Amazon's Carbon Footprint

In 2023, our absolute carbon emissions decreased by 3%.[2] 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.[3] 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

2022 Carbon Footprint recalculated in accordance with updated Carbon Methodology.

Carbon Intensity	2019	2020	2021	2022	2023	YoY%
Carbon Intensity (grams of CO_2e per $ of gross merchandise sales)	122.8	102.7	100.8	93.0	80.8	-13%
Emissions Category (MMT CO_2e)						
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.[4] 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.[5]

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_2e*)

* 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.