

Carbon Methodology

July 2026

What's in Amazon's 2025 Carbon Footprint?

A carbon footprint measures the total greenhouse gas (GHG) emissions caused by the direct and indirect activities of a company.¹ These emissions are classified into three categories—Scope 1, 2, and 3 emissions. Scope 1 emissions result from a company's direct operations, such as the fuel used by Amazon's delivery fleet. Scope 2 emissions are indirect emissions resulting from the generation of purchased energy, like the electricity used to power Amazon facilities.² Scope 3 emissions result from activities that take place beyond a company's operational boundary, for example, the production of Amazon devices such as the Kindle, or the purchase of packaging materials used in our fulfillment operations.

To calculate Amazon's carbon footprint, we use the operational control approach to account for a diverse set of direct and indirect emissions that occur upstream of, within, and downstream of our operations. Our boundary includes the following emission sources:

- Amazon's last mile delivery fleet
- Amazon-operated freight, including trucks and airplanes
- Purchased delivery services (e.g., postal services) and other contracted freight
- Energy and refrigerants for cooling used in our operations, such as data centers, fulfillment facilities, retail stores, and corporate offices
- Amazon-provided packaging used in our fulfillment operations
- Amazon-branded product manufacturing, such as Echo devices, Kindle e-readers, Amazon Basics, Whole Foods Market brands, and other Amazon Private Brands products
- Goods and services that enable our operations, such as business travel, office supplies, corporate events, outside consulting services, and other expenditures
- Capital goods, such as emissions from building construction, vehicles, and manufacturing of servers and equipment
- Employee commuting
- Customers' trips to Amazon's physical stores
- Our customers' use of Amazon devices
- Amazon devices end-of-life treatment

Quantifying Our Carbon Footprint:

Our carbon footprint reflects the complexity of our business by combining operational and financial records from Amazon operations around the world. We first estimate our carbon emissions for all activities within our boundary using a spend-based environmental assessment model, then enhance the accuracy with process-based calculations or lifecycle assessment (LCA) models, when applicable.

We evaluate the quantity of GHG emitted for each of these activities by taking the amount of primary activity conducted (e.g., miles traveled or gallons of fuel burned) multiplied by an emissions factor (e.g., grams of carbon dioxide equivalent (CO₂e) per kilowatt-hour (kWh) of electricity used), which provides a representative value for the CO₂e associated with that activity.³ We first calculate the emissions from our individual activities, then sum them to

1. Amazon calculates our carbon footprint in accordance with "The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)" including the "GHG Protocol Scope 2 Guidance (An amendment to the GHG Protocol Corporate Standard)" and "Technical Guidance for Calculating Scope 3 Emissions (Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard)", published by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). We refer to this collectively as the GHG Protocol (GHGp). Amazon reports emissions according to GHGp's market-based method (MBM) in both Scope 2 and Scope 3 (as applicable), which accounts for renewable energy Amazon purchases to support our operations. Amazon's reported Scope 1 and Scope 3 emissions additionally reflect the inclusion of certain Environmental Attribute Certificates, as described on page 3.
2. These indirect emissions come from electricity consumed by Amazon's global facilities under Amazon's operational control (e.g., owned, leased, and co-located Amazon Web Services (AWS) data center infrastructure, fulfillment center and delivery network buildings, on-site electric vehicle charging, corporate offices, customer service centers, physical stores, and financially-integrated subsidiaries, including Whole Foods Market).
3. GHG emissions are converted into the standard unit of CO₂e via Global Warming Potentials (GWPs). For example, one kilogram of methane has a GWP of 29.8, meaning that those methane emissions are equivalent to 29.8 kilograms of carbon dioxide (CO₂). This conversion reflects the fact that methane traps heat 29.8 times more effectively than CO₂ over a 100-year time horizon.
4. WRI and WBCSD's GHGp delineates what actions fall within scope for international standards for corporate footprinting.

produce Amazon's total carbon footprint, spanning our physical and online retail operations, cloud computing, device manufacturing, and beyond.

Each year, we work to improve our estimates and assumptions used for emission calculations. As measurement techniques evolve, we adapt the way we measure and report our footprint, including the recalculation of prior year(s) data to enable consistent comparison over time. This may occur, for example, when we refine a calculation methodology, add new activity data as it becomes available, or when we improve the way we collect data from our existing sources. When the change is significant, we apply the current year's models, calculation methods, emission factors, and company structure to prior year(s) data to calculate comparable total carbon emissions.

This footprinting approach is informed by the widely adopted international standard of the GHG Protocol (GHGp).⁴ Amazon's GHGp-aligned Scope 1 and Scope 2 emission inventory values for 2025 were independently assured by Ernst & Young LLP, and Scope 3 was independently verified by Apex Companies, LLC.

Application of Environmental Attribute Certificates (EACs):

Amazon applies Environmental Attribute Certificates (EACs), referred to as carbon insets, as abatements in our reported Scope 1 and Scope 3 carbon emissions. Each EAC represents verified emission mitigation activities relevant to our operations and value chain. For each certificate type, we evaluate the lifecycle emission reductions, chain-of-custody documentation including fuel feedstock (as applicable), location of origin, and third-party verifications prior to application. Learn more on the [Amazon Sustainability Exchange](#).

Measurements and Models Used:

Our carbon footprinting approach incorporates the following elements

- **Financial:** We combine data on Amazon's spending with industry-average, spend-based emissions factors (e.g., a standard amount of CO₂e emissions associated with every dollar of spending on a particular activity). We use this model to reflect carbon emissions from activities, equipment used in our warehouses, and purchased goods and services such as office supplies and advertising services.
- **Transportation:** We measure the emissions resulting from shipping products and equipment to Amazon facilities, between warehouses, and outbound to our customers' homes, Amazon lockers, and other pickup points. This includes estimated emissions from customers' trips to physical stores.
- **Refrigerants:** We measure the emissions resulting from the cooling and refrigeration occurring within our facilities.
- **Energy:** We account for the impacts of purchased electricity, back-up power generation, and heating used in our offices and facilities, as well as the carbon-free electricity generated from our project commitments around the world.
- **Packaging:** We measure the emissions from materials and processes behind all the boxes, mailers, and other packaging items Amazon uses in our fulfillment operations.
- **Amazon Devices:** We developed a specialized carbon footprint model to address the complexity of the manufacturing, use, and end-of-life of Amazon devices, including Echo devices, Kindle e-readers, Fire Tablet, Fire TV, Ring, Blink, and eero devices. This starts at the component level—including where components are sourced and how they are manufactured into products—and extends to customers' use of the product and the

eventual product end-of-life.

- **Amazon-Branded Products and Supplier-Provided Emissions:** We utilize LCAs and supplier-provided data to calculate emissions across our supply chain. We use this approach for our Amazon-branded products and for materials and equipment used across our operations.
- **Amazon Buildings:** We use building design models to calculate the emissions associated with the construction of Amazon facilities. Source data comes from material, equipment, and procurement inventories, as well as internally and externally developed and supplier-provided LCAs.
- **Business Travel:** We incorporate third-party-calculated emissions based on trip-level information for air, rail, and car business travel.
- **Employee Commuting:** We estimate emissions associated with our employees' transit between their homes and worksites using survey results on how our employees regularly come to work (car, bus, walking, biking, shuttle, etc.) and the distance they travel.

The following sections elaborate on the science and data behind each of the emissions models developed to measure Amazon's carbon footprint.

Financial Emissions Model

Using the Economic Input-Output Life Cycle Assessment (EIO LCA) method, our spend-based model combines expenditure data from Amazon's general ledger with industry-specific, spend-based emissions factors published by the U.S. Environmental Protection Agency (EPA).⁵ EIO LCA emissions factors account for the "cradle-to-gate" emissions required to produce one dollar of goods or services from any industry, including emissions from the extraction of raw materials, energy use, supply-chain transportation, and manufacturing. This method leverages economic input-output data assembled by governments to track the "recipe" of inputs required to produce any good or service.⁶ EIO LCA accounts for the carbon emissions from producing each of these intermediate inputs, and from the production of all inputs from further up the supply chain.

We apply EIO LCA by mapping our expenditures to one or more industry sectors and multiplying the appropriate emissions factors by the dollars spent. For example, spending on parcel delivery by third-party carriers maps to the couriers and messengers sector, and shipping boxes map to the paperboard container sector. This method is the most efficient way to convert all corporate activity into an approximated carbon footprint. Outside of Amazon, this method has been widely used to estimate carbon footprints by a variety of organizations, from major corporations, to government entities like the U.S. Department of Defense, and even individuals who wish to understand the environmental impact of their personal activities.⁷

Transportation Emissions Model

The transportation of products to customers is an integral part of Amazon's business. Trips differ by mode, purpose, productivity, timing, and other localized variables, resulting in a broad range of emissions associated with transportation activities. To account for this complexity, we use a robust modeling framework that estimates carbon emissions at the trip level and accommodates different levels of data availability. We give priority to fuel- and distance-based calculations, but if this information is not available, we rely on a spend-based approach to calculate emissions. The scope of our assessment includes transport activities managed by Amazon and our third-party transportation providers, as well as the emissions generated from customers' trips to Amazon retail and Whole Foods Market stores.

5. When using the term "spend" in this document, we are referring to the U.S. Dollar (USD).

6. Li, M.; Ingwersen, W.W.; Young, B.; Vendries, J.; Birney, C. useeio: An Open-Source R Package for Building and Using US Environmentally-Extended Input-Output Models. *Appl. Sci.* 2022, 12, 4469. Retrieved online: <https://doi.org/10.3390/app12094469>.

7. Henderson, A., M. Bruckner, K. Scanlon, W. Ingwersen. The USEEIO framework to create IO models: application to the DoD and case demonstration. LCA XVIII, Fort Collins, CO, September 25-27, 2018. Retrieved online.

Emissions Sources for Transportation

Transportation activities generate carbon emissions from the combustion of fossil fuels and from the supply chain activities related to vehicle fuels. Our transportation emissions model assesses these “well-to-wheels” impacts. This is both the emissions associated with the well-to-tank (e.g., extraction, refinement, and distribution of fuels) and tank-to-wheels (i.e., combustion) emissions created from the use of transportation fuels.

For well-to-tank impacts, the emissions model estimates the carbon-intensity of the “well” fuels (e.g., grams of CO₂e per megajoule) based on data and logic from Argonne National Laboratory’s Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model.⁸ GREET is an LCA tool used to evaluate various transportation fuels like diesel, gasoline, hydrogen, natural gas, and biofuels. For tank-to-wheel impacts, we use emission factors related to transportation fuels from both GREET and the United Kingdom’s Department of Environment, Food and Rural Affairs (DEFRA). Fuel consumption rates for vehicles are based on fleet averages from a variety of country- and region-specific sources, including the U.S. EPA, U.S. Department of Energy, European Union, United Nations, and the International Council for Clean Transportation.

Supplier-Provided Transportation of Products and Equipment

To account for the emissions from certain segments of Amazon’s logistics network, we receive emission reports directly from third-party transportation providers. These providers calculate emissions using Smart Freight Centre Accredited tools that follow Global Logistic Emissions Council methodology, and we evaluate and include these supplier-provided “well-to-wheel” emissions when available.⁹

Customer Trips to Stores

Our model calculates the aggregate emissions from customer trips to Amazon’s physical stores (e.g., Whole Foods Market) using publicly available travel behavior information from the Federal Highway Administration’s National Household Travel Survey (NHTS). The model focuses on the following three variables that affect emissions for this category of activities:

- **Distance driven:** We use NHTS data to estimate the typical distance a customer drives for “goods purchasing” based on their setting (e.g., urban, suburban, or rural). We assume customers only travel to a single destination and that all trips are direct and round-trip.
- **Mode of transportation used:** NHTS data indicates how likely a customer is to use a certain mode of transportation among the following five categories: car, light-duty truck (e.g., truck, SUV, van), transit (e.g., bus, rail), non-motorized (e.g., walking, biking), and other.
- **Total customer trips per year:** We estimate the number of customer trips to each physical store based on the store’s setting (e.g., urban, suburban, or rural).

After assembling the data and emissions factors for all vehicle and transportation modes, we calculate emissions for each store by multiplying the distance traveled by mode by the appropriate emissions factor, scaled to the total number of customer transactions in the year.

Refrigerant Emissions Model

Emissions related to cooling and refrigeration are present across Amazon’s global operations. These occur through normal business processes such as the cooling of our data centers, corporate offices, and fulfillment facilities, and refrigeration for our Whole Foods Market stores and other grocery operations. We calculate the emissions associated with refrigerant

8. Wang, M., Elgowainy, A., Lu, Z., Baek, K. H., Bafana, A., Benavides, P. T., Burnham, A., Cai, H., Cappello, V., Chen, P., Gan, Y., Gracida-Alvarez, U. R., Hawkins, T. R., Iyer, R. K., Kelly, J. C., Kim, T., Kumar, S., Kwon, H., Lee, K., Lee, U., Liu, X., Masum, F., Ng, C., Ou, L., Reddi, K., Siddique, N., Sun, P., Vyawahare, P., Xu, H., and Zaimes, G. Greenhouse gases, Regulated Emissions, and Energy use in Technologies Model ® (2022 .Net). Computer Software. USDOE Office of Energy Efficiency and Renewable Energy (EERE). 10 Oct. 2022. Web. doi:10.11578/GREET-Net-2022/dc.20220908.2.

9. <https://www.smartfreightcentre.org>

materials across Amazon's facilities through a combination of data collection mechanisms. Where primary data is unavailable, we use estimation based on each facility's type and size, or intensity of electricity usage in the case of data centers. We then quantify these emissions by multiplying the net gas added during service events by the Global Warming Potential (GWP) of each refrigerant material.

Energy Emissions Model

We calculate the carbon footprint of energy used from purchased electricity and fuel used for back-up power generation and heating across Amazon's facilities, including data centers, fulfillment network facilities, retail stores, and corporate offices. Electricity emissions factors account for direct power plant emissions, upstream emissions, and transmission and distribution losses. Fuel emission factors account for combustion of fuels and upstream emissions associated with fuel production. The primary source of carbon emissions for our facilities is the electricity used to power our operations. We collect usage data from our facilities around the globe and process data from utility invoices to gain visibility into electricity and fuel usage. When usage data is unavailable, we estimate usage based on facilities with similar characteristics (e.g., size, type, location). In the case of data center back-up power generation, we use an estimate of fuel consumption based on the intensity of electricity use at the site. We then calculate carbon emissions by multiplying actual or estimated usage by the appropriate emission factor (e.g., CO₂e per kWh based on regional electricity grid mix or CO₂e per liter for fuel combusted on-site).

For electricity specifically, we use the GHGp's market-based method to demonstrate the impact of our renewable energy investments. For more information on our renewable energy measurements in support of our goal of matching 100% of the electricity consumed by our global operations with renewable energy, see our [Renewable Energy Methodology](#).

Calculating the carbon emissions of energy relies on accurate emissions factor data from a variety of local, national, and regional sources. For example, electricity consumed by a site is multiplied by an emissions factor specific to its locality. Carbon from electricity generation varies widely by utility provider, state, country, and region due to the variety of technologies used for generation. Some countries and regions rely more heavily on fossil fuels, while other regions use significant amounts of low-carbon wind or hydropower. Our emissions model assigns the most precise emissions factors available for each facility based on its location. When supplier-specific emission factors are not available, we assign state, province, sub-region, or region-level factors, and then national averages. In the U.S., the authoritative emissions factor sources come from the EPA's eGrid data (electricity emissions by U.S. grid sub-region), while the International Energy Agency provides average electricity emissions per kWh for almost every country in the world. For heating, we use fuel combustion emission factors from UK DEFRA in our energy model.

Packaging Emissions Model

Amazon uses a detailed emissions model to quantify the carbon footprint of each type of Amazon packaging (e.g., corrugate boxes or envelopes) from production to end-of-life. Carbon emissions are released during the raw material extraction, processing, manufacturing, and disposal of packaging. Our environmental packaging model quantifies the carbon footprint of every packaging material from manufacture to end-of-life given key parameters like material type, mass, and dimension. In total, the emissions model produces lifecycle carbon emissions factors for hundreds of packages based on Amazon's data on packaging materials, thickness, and recycling rates. We apply region-specific packaging emissions factors (where available) on a per-package basis to outbound shipments to calculate total emissions from packaging. The calculation covers emissions from raw materials and intermediate products, transportation, overbox manufacturing, and end-of-life (i.e., recycling or disposal). This service uses industry-standard LCA data from commercial LCA databases and supplier-

specific LCAs to model the impacts of raw materials and manufacturing processes.

Amazon Devices Emissions Model

We quantify the carbon footprint of Amazon devices sold during a given year using detailed data on the components of each device and the quantity sold each year. We produce detailed, parameterized models for our major device types, including Fire TV, Echo, Fire Tablets, Kindle, Ring, Blink, and eero. We calculate the carbon footprint of each device type by inspecting the device's "Bill of Materials"—which details the mass and makeup of each component used in a device—and model lifecycle emissions of each component using supplier-specific inputs and a mix of commercially and publicly available LCA databases. After each stage of the lifecycle is modeled, our research team creates emissions factors for each device by aggregating the carbon emissions from the manufacturing, transportation, and device end-of-life phases. We scale these emissions factors by the quantity sold to estimate the carbon footprint associated with manufacturing, transportation, and the end-of-life treatment of all Amazon devices sold in a given year.

To calculate the emissions associated with the use of our devices, our methodology relies on telemetry data to determine the number of active devices in the field. We then multiply that by each device's average annual energy use. See our [Devices Product Carbon Footprint Methodology](#) for more information. To match our customers' use of their devices with renewable energy sources, we calculate the emissions associated with the electricity grid that corresponds to the country in which the device is located. We match this electricity consumption to renewable energy investments, allocated in accordance with GHG Protocol market boundaries to offset average electricity grid emissions.¹⁰

Overall, annual emissions for devices are then determined by combining the annual emissions from all lifecycle phases.

Amazon Branded and Supplier-Provided Product Emissions

To calculate emissions associated with Amazon Private Brands and Whole Foods Exclusive Brand products, we use LCA emission factors both by unit and weight sold from Amazon.com and Whole Foods Market. These LCAs are primarily sourced from Amazon's Product Carbon Footprint Tool, supplemented by external and supplier-provided assessments based on the bill of materials and characteristics of the supply chain. Also covered in this approach, Amazon uses supplier-provided LCAs to calculate the emissions from equipment used in Amazon's operations, such as warehouse carts and vehicles.

Amazon Building and Equipment Emissions Model

This model addresses lifecycle emissions—materials, manufacturing, transportation, and construction—for both Amazon facilities and capital equipment such as servers and data center infrastructure. We estimate lifecycle emissions using individual building plans, material inventories, internally and externally developed LCAs, and supplier-provided data. Where primary data is unavailable, we estimate emissions based on designs of equipment with comparable characteristics (e.g., type, size, and location).

Business Travel Emissions Model

For emissions from air and rail travel, mileage and car rentals, Amazon provides trip-level details, including travel origin, destination, mode of transport (such as aircraft type, class of service, aircraft seating, etc.), and associated costs to a third-party partner. Using a hierarchical approach based on specificity of data, a distance-based approach is prioritized to calculate each trip's emissions using the provided detail multiplied by supplier-specific, regional, UK DEFRA, and International Civil Aviation Organization (ICAO)+ derived emission

10. See our [Device Renewable Energy Methodology](#) for more information on Devices renewable energy matching calculation.

factors. Amazon then combines these individual trip calculations to determine our total business travel emissions.

Employee Commute Emissions Model

We estimate the emissions associated with employees commuting to and from work at Amazon locations using a model that follows the GHGp recommended distance-based approach for employee commute estimation. We conduct a representative survey to understand how employees commute each day and what mode of transportation they use, such as walking, carpooling, biking, driving alone, or taking public transportation. Using the survey results, we generate estimated emission factors based on the distances employees reported traveling, the percentage of employees using each transportation mode, and the associated mode's emission factor based on available national, regional, and industry data sources. Finally, we multiply the emission factors by the number of employees and the frequency of their commute to calculate the Amazon employee commute carbon emissions.