2025 GHG Supplement

The Boeing Company Scopes 1-3 Greenhouse Gas Emissions (GHG) Supplement to the Global Sustainability Report

This supplement to Boeing's Global Sustainability Report and Taskforce for Climate-Related Financial Disclosure (TCFD) Report provides additional detail and context for understanding our disclosure of greenhouse gas (GHG) emissions. Boeing has shared our Scope 1, Scope 2 and Scope 3 – Category 6 (Business Travel) emissions for over a decade, and our efforts to increase fuel efficiency of our aircraft and reduce emissions at our operational sites have been priorities for years. We continue to calculate and disclose our Scope 3 – Category 11 (Use of Sold Products) GHG emissions, for both commercial (first shared in 2021) and defense aircraft (first shared in 2022). This supplement provides additional transparency about our methodology.

Overview

In 2008, Boeing released our first Environment Report, reporting on 2007 data and announcing significant strides in our governance as well as our goals for performance.

Since our initial commitment, we regularly set targets, measured and disclosed GHG emissions publicly, with baseline updates in 2008, 2012 and 2017. Boeing achieved our 2025 GHG reduction goal from our 2017 baseline two years early in 2023. After this accomplishment, we revisited our 2030 goals, which were previously established when manufacturing operations were impacted by the COVID-19 pandemic. We revised our 2030 goals to a 2023 baseline, reflecting more 'normal' working conditions, incorporating the progress made on reducing emissions and aligning better to emerging global regulatory requirements. For our latest GHG disclosures, please see our Global Sustainability Report and TCFD Report.

In Boeing's factories and worksites, energy efficiency helps drive both our competitiveness and our GHG emissions reductions. To support these efforts we are accelerating our use of renewable electricity, and have set a target of 100% renewable electricity by 2030, which includes the purchase of renewable electricity, Energy Attribute Certificates (EAC) and Renewable Energy Certificates (REC). Boeing is a member of both the EPA Green Power Partnership program and the Renewable Energy Buyers Alliance, a community of large energy buyers accelerating a lower-carbon energy future.

We continue efforts to increase the fuel efficiency of aircraft and have made substantial progress with each new generation of products. Aircraft and engine manufacturers have made long-term investments in technological innovation to reduce fuel burn and carbon emissions. In the past two decades, these investments are already decoupling the growth in carbon dioxide (CO_2) emissions from the growth in overall air traffic—with the rate of CO_2 growth less than half of that of traffic growth before the COVID-19 pandemic. We continue to heavily invest in technological innovations to achieve further reductions, in alignment with our customers as they achieve better fuel efficiency through newer products and operational efficiencies reducing fuel consumption, airline costs, and carbon emissions.

Methodology

Boeing calculates emissions in accordance with the Greenhouse Gas Protocol [Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard for calculating Scope One and Scope Two emissions, and follows guidance from Greenhouse Gas Protocol: Corporate Value Chain (Scope Three) Accounting and Reporting Standard] using the organizational boundary of operational control.

Enterprise GHG emissions from operations, products in use, and business travel are calculated after the conclusion of the reporting year. Emissions from natural gas and electricity usage are calculated through the use of utility bills and are continuously validated and updated throughout the reporting year. The emissions factors for these energy sources are validated at least annually and updated when appropriate following guidance from the World Resources Institute GHG Protocol.

Each year, we calculate the previous calendar year's emissions (as well as any revised or restated emissions for other years), and receive third-party verification of our GHG data and calculation methodology to the level of "limited assurance" per the ISO14064 standard. Our emissions for 2022-2024 are shared within our Global Sustainability Report.

Organizational Boundary

The Boeing Company has chosen to use operational control as the primary approach in determining inclusion in its GHG emissions inventory. Operational control is defined as having the full authority to introduce and implement operating policies at the company — under this approach, Boeing reports 100 percent of the GHG emissions, barring de minimis exclusions, from operations over which it has operational control as defined by the Greenhouse Gas Protocol.

Boeing has integrated the sites/buildings into the corporate reporting inventory through adoption of the corporate greenhouse gas accounting and reporting process. A comprehensive list of all buildings which Boeing has operational control over is developed annually. Leased facilities are identified and included in the list.

The following exclusions are applied to the organization boundary— retired or vacant buildings, government, joint ventures, vendor or unknown buildings, residences not identified as home offices, and areas less than 50 square feet.

Scope 1

Scope 1 GHG emissions are those under our direct control, associated with our facilities and our vehicles across the enterprise.

For Scope 1, the primary emissions source is the combustion of fossil fuels from stationary combustion sources. Fuel emissions are calculated based on the total fuels delivered to the facilities or source. The total fuel delivered to the site or source (either based on actual or estimated quantities) are converted to emissions using the appropriate emission factors as referenced in the hierarchy noted in the Emission Factors section below. The inventory includes the emissions from the total fuel delivered and consumption by the small sources (including electrical generators, heaters, pumps, and other internal combustion equipment), but the equipment is not individually inventoried. This scope also includes: direct emissions from use of Boeing owned off-road vehicles used at Boeing sites, and on-road vehicles used on and/or off Boeing sites; fugitive emissions from refrigerant leaks; and fugitive emissions from use of chemicals with global warming potentials. Scope 1 emissions are calculated based on actual delivery/consumption data, or estimated. The total is summed and included in the GHG Inventory.

Data from these sources come from monthly utility bills, consumption data from meter readings or records provided by site focals. Emissions from building heating and cooling where purchased utility records are not available are estimated based on square footage and building use/type using factors from EIA's CBECS. If data is not available in time for reporting, estimation is made based on prior year consumption. Information on jet fuel consumption, including defueling, refueling, paybacks and distinction between Boeing fuel and customer-purchased fuel, is obtained from invoices. Procedures are in place to ensure the correct separation between fuel used by The Boeing Company and fuel supplied through The Boeing Company for customer use. Additionally, Executive Flight Operations logs fuel use in corporate aircraft domestically and outside the United States. For direct emissions from fugitive sources and processes, totals are calculated from the chemical quantities multiplied by a Global Warming Potential (GWP).

Scope 2

Scope 2 GHG emissions covers indirect emissions associated with purchased electricity. Boeing does not purchase, or purchases negligible, heat, steam, or cooling, therefore these are excluded from our Scope 2 calculations.

Indirect emissions from purchased electricity represent approximately two thirds of the total reported Enterprise Scope 1 and 2 (location-based) emissions. The majority of purchased electricity data is provided by a third-party bill pay service which covers most U.S. locations. For others sites (including in the US, UK, India, Australia, and others) we collect actual data from in-country environmental, health and safety representatives. For buildings where no records are available (e.g. leased office space), electricity use is estimated according to occupancy type, floor area, and appropriate regional emission factors. Currently, actual electricity and natural gas data is collected from 1,354 buildings and estimates are used for approximately 360 buildings. Both location-based and market-based calculation methods are utilized and disclosed.

For Scope 2 location- and market-based emissions, indirect emissions from purchased electricity are calculated and included in the inventory. We apply emissions factors in accordance with the hierarchy noted below on the basis of purchased electricity, reported in units of megawatt hour. Scope 2 market-based emissions include the application of RECs, supplier specific emission factors, and residual mixes as applied per the hierarchy below.

Emissions from building heating and cooling via natural gas and/or electricity where purchased utility records are not available are also calculated. These emissions are estimated based on square footage and building use/type using factors from Energy Information Administration's Commercial Buildings Energy Consumption Survey's data. Seldom, when data is not available in time for reporting, estimation is made based on prior year consumption. The resulting estimated natural gas emissions are included in Scope 1, and estimated electricity emissions is included in Scope 2.

Scope 3

Scope 3 GHG emissions are from sources that are not under Boeing's operational control, but instead occur in the value chain. There are 15 categories of Scope 3 emissions, and we currently have quantified, audited data for two categories as noted above: Category 6 (Employee Business Travel) and Category 11 (Use of Sold Products).

For Scope 3 Category 6 (Business travel), indirect emissions from employee business travel, including commercial air and U.S rail travel as well as business car rentals, are calculated and included in the inventory. Emissions from US rail was added for the first time in 2024. Commercial air and U.S. rail travel is estimated using miles traveled per business trip as provided by the travel booking company and includes lifecycle emissions. Business car rental emissions are estimated from the total fuel consumed as reported to The Boeing Company by car rental companies. The calculation does not include the emissions from other modes of travel, such as ride-share personal car use have been excluded. We apply emission factors as outlined in the hierarchy below.

We currently disclose Scope 3 – Category 11 (Use of Sold Products) for both commercial and defense aircraft; other defense products have been excluded from the calculations including space, detonation emissions, land and marine vehicles in line with currently published International Aerospace Environmental Group (IAEG) guidance. Scope 3 - Category 11 for our commercial products represents an estimated >90% of Boeing's total calculated emissions.

In 2025, we will be expanding our approach to assess all Scope 3 categories ensuring alignment with industry standards, the GHG Protocol and best practices; relevant categories will continue to be audited and disclosed externally.

For Scope 3 Category 11 (Use of Sold Product), we use published delivery data from Boeing Commercial Airplanes, published and non-published delivery data for Boeing Defense, Space & Security and informed assumptions about their performance and longevity. Emissions are calculated for both delivered commercial and defense aircraft. We assume no benefit from sustainable aviation fuel (SAF).

Boeing Commercial Airplanes Longevity Assumptions

Design	Lifetime
Single-Aisle	22.8 years
Twin-Aisle	21.5 years
Freighter	32.2 years

Emissions Factors (EF)

The below table depicts where emissions are sourced from and the hierarchy applied.

	Title	Source
Scope 1	Environmental Protection Agency (EPA); US 40CFR98 table C-1, C-2	https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98?toc=1
	National Greenhouse and Energy Reporting Scheme (NGER)	https://cer.gov.au/schemes/national-greenhouse-and-energy-reporting-scheme
	Department for Energy Security and Net Zero (DESNZ)	https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting
	United Nations' (UN) Intergovernmental Panel on Climate Change (IPCC)	https://www.ipcc.ch/data/
	US Energy Information System	https://www.eia.gov/international/data/world
Scope 2 Location & Market	EPA eGRID	https://www.epa.gov/energy
	National Greenhouse and Energy Reporting Scheme (NGER)	https://cer.gov.au/schemes/national-greenhouse-and-energy-reporting-scheme
	National Inventory Report: Greenhouse Gas Sources and Sinks in Canada	https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html
	Department for Energy Security and Net Zero (DESNZ)	https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting
	International Energy Agency	https://www.iea.org/data-and-statistics/data-product/emissions-factors-2022
	US Energy Information System	https://www.eia.gov/international/data/world

Scope 2 Market	The Climate Registry	https://cris4.org/(S(acwlcikyplc30bhg23jjumbl))/frmLILogin.aspx
	Snohomish PUD	https://www.snopud.com/community-environment/clean-energy/carbon-emissions-data/
	Association of Issuing Bodies, European Residual Mixes	https://www.aib-net.org/facts/european-residual-mix
	Green-E	https://www.green-e.org/residual-mix
Scope 3 Category 6	Department for Energy Security and Net Zero (DESNZ)	https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting
	Environmental Protection Agency (EPA)	https://www.epa.gov/climateleadership/ghg-emission-factors-hub
	Environmental Protection Agency (EPA); US 40CFR98 table C-1, C-2	https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98?toc=1
Scope 3 Category 11	International Aerospace Environmental Group	https://www.iaeg.com/binaries/content/assets/iaeg/2024/wg3/iaeg-guidance-calculating-civil-military-scope3-cat11_v2.0_final.pdf

Recalculation & Restatement Procedure

We follow the GHGP Corporate Standard (WRI/WBCSD 2004) for significant changes that may trigger a base year recalculation include the following:

- Structural changes to ownership or control (e.g., mergers, acquisitions, divestitures, and outsourcing and in sourcing of emitting activities)
- Changes in state of leased assets (ending leases or obtaining new leases)
- Changes in calculation methodology or improvement in the accuracy of emission factors or activity data
- Discovery of significant errors

If any of the changes listed above are relevant and impact the base year in excess of a 5% significance threshold, the base year and all subsequent years are updated to reflect the latest changes in methodology and data accuracy.