



SUSTAINABLE
AEROSPACE
TOGETHER



2023 Sustainability Report

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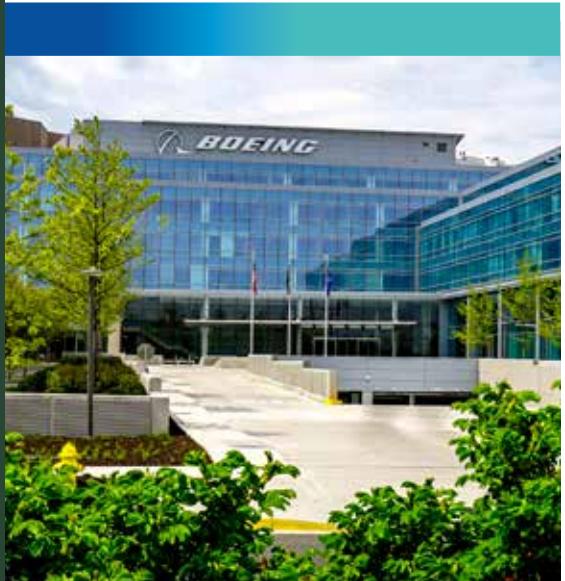
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On the cover: Habitat restoration in Seattle; Reginald Douglas at St. Louis paint shop; ecoDemonstrator sustainability test bed; Jacqueline Mercier, Defense Procurement. (Boeing photos)

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Sustainability

Alongside our strong commitment to safety, quality, and integrity, sustainability is tightly woven into the fabric of our values, our culture and our aerospace industry. Aviation is integral to our modern world, touching many sectors of the global economy and enabling personal human connections. That's why we title our report "Sustainable Aerospace Together." Each of us has a role to play to ensure we make the world better for future generations.

In this report, you'll see examples of our collective efforts and partnerships to advance environmental stewardship, human development and inclusion — underpinned by transparency at every level as we strive to make aerospace more sustainable, together.

Working Together for the Environment

Collaboration with global industry partners, the energy sector, governments, nongovernmental organizations, higher education institutions and other stakeholders to advance sustainable solutions is more necessary than ever. To increase education around the commercial aviation industry's carbon footprint, and its ambition to reach net-zero carbon emissions by 2050, Boeing created an innovative visual data modeling tool known as Cascade, which you will learn more about in this report. Cascade models the climate impact of the commercial aviation industry and explores paths to decarbonize and reach net zero by 2050.

Within our manufacturing operations, it is not just what we build, but how we build our products. We increasingly look at every stage of the product life cycle through a sustainability lens. Our people have worked hard to reduce our environmental impact by investing in conservation and procuring more renewable electricity.

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Dave Calhoun, President and CEO

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Working Together for Our Employees and Communities

We also continue our focus on providing a transparent, inclusive workplace culture in which teammates' voices are heard and managers are empowered to make meaningful change when necessary. Our latest progress and efforts in 2022 are seen within our Global Equity, Diversity & Inclusion report, including an increase in women's representation in our global workforce and racial/ethnic minority representation in the U.S. workforce and connecting incentive compensation to inclusion.

We routinely encourage use of our Seek, Speak & Listen habits in internal interactions. Quarterly enterprise culture surveys indicate that a majority of our teammates are comfortable discussing concerns with managers and feel comfortable telling others at work when they have made an error. Our goal is to provide a safe environment so that each employee's voice is heard.

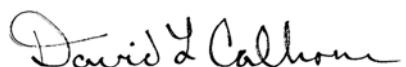
Our employees are also at the heart of our community work. Through our global community engagement efforts across

Boeing, we support science, technology, engineering and math (STEM) education initiatives; assist military members, veterans and their families; promote environmental stewardship; advance racial equity; and provide for communities in need — including disaster recovery and relief.

Transparency at Every Level

We continue to prioritize safety, quality, integrity and sustainability every step of the way. Trust is earned one airplane and one interaction at a time. Our leadership team also works closely with the Boeing Board of Directors to help ensure industry standards and ethical practices are followed. Our Board and specifically the Governance & Public Policy Committee provides oversight and holds us accountable to our sustainability policies, practices and strategy.

We are in the era of more sustainable aerospace, and together, we look forward to achieving it.



David L. Calhoun
President and CEO

Our Values

How We Operate

Start with engineering excellence

Be accountable — from beginning to end

Apply Lean principles — eliminate traveled work

Crush bureaucracy

Reward predictability and stability — everywhere in our business

How We Act

Lead on safety, quality, integrity and sustainability

Foster a Just Culture grounded in humility, inclusion and transparency

Import best leadership practices

Earn stakeholder trust and preference

Respect one another and advance a global, diverse team

Innovate and operate to make the world better

[Read more about our values](#)

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Mapping the Sustainable Aerospace Future Together

Decarbonizing aerospace is both the challenge and opportunity of our lifetime. We have long maintained that decarbonizing aerospace will take everything — technology, policy, capital, energy, entrepreneurship — and everyone — employees, customers, financiers, regulators, academics and business partners. For that reason, we just convened global thought leaders and decision-makers from across these communities to review our progress to date and discuss the way forward toward achieving Sustainable Aerospace Together.

Aerospace is more than an industry. We connect people around the globe and promote an understanding of different cultures; we protect through national security and humanitarian relief; we contribute to the global economy with jobs, trade, technology and commerce; and we inspire young minds to seek careers in STEM. Commercial aviation also generates about 2.5% of the world's carbon emissions and 12% of transport emissions, so we must find ways to further decouple forecasted growth of aerospace from greenhouse gas emissions (GHG) ... and continue to do so safely and transparently.

The engagement was energizing and encouraging as sector leaders leaned into the issues and potential roadblocks that could slow the commercial aviation industry's progress toward meeting its net-zero 2050 ambition. What struck me was the collective decision in tackling this issue together for the greater good of the industry and humanity at large. It was also a reminder that this hard-to-abate industry has historically solved hard challenges — from inventing flight to discovering the universe. It's with humility and resolve that we collectively take on the challenge of more sustainable aerospace.

During the event, we also launched a public version of Cascade, a web-based application that uses public aviation and energy data to visualize how various approaches might be combined to lower emissions. It was rewarding to see our partners and stakeholders engage with the tool, and we can't wait for the global user community to further refine Cascade over time. We invite everyone to check it out at SustainabilityTogether.aero.

This Sustainable Aerospace Together Forum was a culmination of many activities and events that took place throughout 2022 with the same common theme — together. We made important progress over the past year with valued partners around the globe.

Together ...

We launched Cascade. At the Farnborough International Airshow in July 2022, we announced Cascade and provided a live demonstration of Version 1.0. Cascade was developed to visualize the climate impact of aviation across the world and explore scenarios to most effectively decarbonize commercial aviation by 2050: fleet renewal, operational efficiency, sustainable aviation fuel (SAF) and new aviation technologies such as transonic truss-braced wing structures, hybrid-electric, all-electric or hydrogen airplanes. This tool allows stakeholders across the industry — in particular customers and policymakers — to make informed decisions and trade-offs about how to best reach the commercial aviation industry's net-zero 2050 ambition. We look forward to the additional feedback from the recent public launch and will continue to invest in Cascade through collaborating with founding members of the Community to include IATA, NASA, University of Cambridge's Whittle Laboratory and the MIT Laboratory for Aviation and the Environment.



Chris Raymond, Chief Sustainability Officer

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Neil Titchener, Ellen Ebner and Chris Raymond unveil the public version of Cascade during the Sustainable Aerospace Together Forum in Renton. (Boeing photo)



The Sustainable Aerospace Together Forum, presented by Boeing in partnership with the Financial Times, brought together the aviation, energy, finance and policy sectors. (Boeing photo)



Boeing President and CEO Dave Calhoun discusses the importance of working together for a sustainable aerospace future with Boeing communicator Elisa Hahn at the pre-forum reception. (Boeing photo)

We advanced SAF. Nearly all industry and governmental decarbonization road maps conclude that SAF is the biggest lever we have to reduce GHG emissions from commercial aviation. Our company is focused on multiple areas to catalyze SAF scaling, including investing in airplane efficiency and compatibility, purchasing SAF for our own fuel use in our operations, engaging global regulators on smart policies, promoting robust sustainability criteria, and investing in Cascade to further industry partnerships and policy advocacy to scale up SAF supply and bring down cost.

We continue to make progress on the technical journey working with our suppliers to ensure our commercial airplanes are 100% SAF compatible by 2030. We are seeing exciting SAF innovation occurring in sustainable feedstocks and partnering on technologies including waste-and-biomass-based SAF, power-and-biomass-to-liquid and power-to-liquid enablers that can make existing and future SAF pathways more sustainable over time.

We purchased 5.6 million gallons (21.2 million liters) of blended SAF to support our commercial operations. The challenge remains scaling SAF availability and lowering its cost. Together, we've made important progress this year on building the industry. Governments around the world are unlocking policy mechanisms to scale SAF, including a blending mandate and corresponding offtake requirement in Europe, and incentives such as the Blenders Tax Credit for SAF producers in the U.S. These policies and incentives are beginning to attract necessary capital to scale production.

Finally, the Boeing ecoDemonstrator team partnered with NASA on emissions testing to better understand SAF and contrails.

We advanced the future of flight. While SAF is a necessary lever to decarbonize commercial aviation, we have a “SAF and” view and not a “SAF or” approach to achieving the commercial aviation industry’s net zero goal by 2050. Together with partners, we continue to explore the safety and viability of other renewable energy carriers and technologies for aircraft. You’ll read about several of these developments in this report, including our Wisk joint venture’s announcement of the world’s first self-flying, all-electric four-passenger vertical takeoff and landing (eVTOL) air taxi. As Wisk’s go-to-market aircraft, the latest generation of this aircraft represents the first-ever candidate for type certification by the U.S. Federal Aviation Administration of an autonomous eVTOL. We also value our partnerships around the world to advance sustainable technologies, such as the new Boeing Research and Technology center in Japan with a focus on sustainability. We are also honored to be selected by NASA for the Sustainable Flight Demonstrator program, which will inform future designs that could lead to breakthrough aerodynamics and future efficiency gains.

The aforementioned Boeing ecoDemonstrator program embodies our “together” theme and is celebrating its 10-year anniversary this year. The ecoDemonstrator takes promising technologies out of a lab and tests them in operational environments with a variety of partners,

including airline customers, suppliers and regulatory agencies. From the first ecoDemonstrator in 2012 through this year’s effort, the ecoDemonstrator program will have evaluated more than 225 technologies with approximately one-third of those getting implemented. Projects include technologies that reduce fuel use, emissions and noise, enhance safety and incorporate more sustainable materials.

Sustainable Aerospace starts within our four walls and Boeing continues to make progress on our 2025 operational targets as outlined on [Page 53](#).

See [Page 7](#) for a more comprehensive snapshot of our accomplishments last year and [Page 45](#) for an overview of how we partnered around the globe to advance sustainable aerospace together.

Together as an industry, we’ve made modern jet travel a reality, helped defend freedom around the world, and made space exploration possible. We now enter the era of more sustainable aerospace. The foundation we are laying now will be carried forward by future generations to preserve and grow the societal benefits of this industry. We are proud to be on this journey — together — with so many capable and committed partners around the globe.

A handwritten signature in blue ink that reads "Chris".

Chris Raymond
Chief Sustainability Officer

Sustainable Aerospace Together

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January 2022



Wisk secured \$450 million from Boeing to advance certified autonomous electric flight

May



Named ENERGY STAR Partner of the Year

June



Boeing and MIT announced research project to help decarbonize aerospace



Became founding member of UK Innovation Hub to drive SAF development

February



Purchased 2 million gallons (7.6 million liters) of SAF for Boeing's commercial airplane operations

April



Announced multiyear commitment to Yale Center for Natural Carbon Capture

July



Debuted Cascade, a data modeling tool that visualizes how to get to a net-zero carbon emission future for commercial aviation



Boeing and Mitsubishi Heavy Industries partnered on innovative climate change solutions



Announced research project with the University of Cambridge to further advance Aviation Impact Accelerator

May



Boeing and Alder Fuels partnered to scale SAF globally



Debuted future flight concepts at Farnborough Airshow



Opened Japan Research Center and expanded sustainability partnerships



Announced as the aviation sector champion in First Movers Coalition, global alliance established by the U.S. government and World Economic Forum

September



Boeing and Wisk unveiled concept of operations for urban air mobility



New Boeing Additive Manufacturing facility in Auburn, Washington, uses 3D printing to produce essential components, reducing waste

October



Wisk unveiled world's first autonomous, four-seat, all-electric, vertical takeoff and landing air taxi



ecoDemonstrator program collaborated with NASA to test SAF emissions



ecoDemonstrator technology testing featured in Aviation Week

November



Partnered with Avolon, an aircraft leasing company, to scale SAF in Ireland

January 2023



Selected for NASA Sustainable Flight Demonstrator award

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Connecting Globally to Advance Sustainable Aerospace



Americas

Brazil — Boeing Sustainability Forum: Boeing celebrated its 90th anniversary in Brazil at an inaugural summit with the Roundtable on Sustainable Materials and Brazilian-American Chamber of Commerce in São Paulo in September.

U.S.

- Summit of the Americas: Hosted a roundtable on sustainable aviation with IATA as part of Summit of the Americas in Los Angeles in June.
- Decarbonizing Aviation “Everything for Zero”: Hosted an event in Washington, D.C., in November, sharing Boeing’s vision and a Cascade demo with U.S. and non-U.S. policymakers, legislators and think tanks.

Asia-Pacific

Australia — Indo-Pacific Clean Energy Forum: Co-hosted a high-level SAF panel discussion in July in Sydney.

China

- Peking University Institute of Energy’s Report Launch: Supported the report launch in October, which compiled results of SAF research.
- Boeing participated at the 1st China Civil Aviation Green Development Forum, which was sponsored by CAAC and in the Annual Civil Aircraft Industry International Forum.

Japan — Boeing Tokyo Sustainability Summit: Hosted a two-day sustainability summit to celebrate a new research center opening in August.

Indonesia, Malaysia, Vietnam — Supported aviation industry forums and workshops with regulators, airlines and academics, sharing key aviation decarbonization priorities and strategies.

Singapore

- Singapore Airshow: Engaged with key industry and policy stakeholders to advocate for sustainable aviation initiatives and partnerships.
- Singapore Sustainable Air Hub Report: Contributed key sustainability insights as part of international advisory panel established by the Civil Aviation Authority of Singapore.

Europe

Belgium

- European Parliament Sustainability Event: Organized a joint event with Ryanair in October, engaging with members of the Parliament, media, industry and EU stakeholders about ongoing policies and regulations that contribute to accelerating SAF supply and use.
- Conference on National Armaments Directors: Joined NATO’s first Industry Symposium on Climate Change and Capabilities, which brought together over 150 representatives from NATO Allies and industry. Participants discussed the military challenges of a climate changed world, navigating the energy transition and the national security opportunities of technologies like SAF.

Germany — Berlin Air Show: Briefed media about Boeing’s work to decarbonize both commercial and defense products.

United Kingdom

- Farnborough Airshow: Unveiled Cascade and announced several sustainability initiatives, including partnerships with University of Sheffield Energy Innovation Centre, Cambridge – Aviation Impact Accelerator, Alder Fuels, Mitsubishi Heavy Industries and MIT. Joined UK Ministry of Defense and industry partners to discuss how sustainability enhances operational effectiveness and resilience.
- Jet Zero Council: Boeing hosted the Council meeting in London in February 2023, showcasing both Boeing’s UK presence and the Cascade modeling tool, which informs future climate policy choices such as UK SAF mandates.

Republic of Ireland — Airfinance Journal Dublin: Joined a panel on carbon offsetting and operational strategies for carbon reduction.

Middle East & North Africa

United Arab Emirates — Power-to-Liquid Report Launch: Supported and joined the launch event of the Power-to-Liquid roadmap led by the UAE government in July.

Egypt — COP27: Engaged government, industry, civil society partners and local and international media.

Bahrain — Energy & Sustainability Forum MENA 2023: Joined panel and discussed opportunities for alternative fuels, rising importance to diversify and build out low-carbon fuels and green chemical industry to create development opportunities.

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APPROACH & GOVERNANCE

Transparent and Accountable

Boeing global headquarters in Arlington, Virginia campus just outside Washington,
D.C. (Boeing photo)

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Company Profile



The Boeing Company

As a leading global aerospace company, Boeing develops, manufactures and services commercial airplanes, defense products and space systems for customers in more than 150 countries. As a top U.S. exporter, the company leverages the talents of a global supplier base to advance economic opportunity, sustainability and community impact. Boeing's diverse team is committed to innovating for the future, leading with sustainability and cultivating a culture based on the company's core values of safety, quality and integrity and sustainability. Learn more at boeing.com.



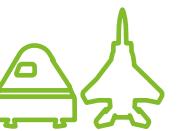
- \$23B Defense, Space & Security
- \$26B Commercial Airplanes
- \$18B Global Services
- \$0.2B Boeing Capital



- \$2.8T Defense, Space & Security
- \$3.5T Commercial Airplanes
- \$3.3T Global Services



- 16,961 Defense, Space & Security
- 41,256 Commercial Airplanes
- 20,523 Global Services
- 77,614 Enterprise



Commercial Airplanes

This business develops, produces and markets commercial jet aircraft, principally to the commercial airline industry worldwide. We are a leading producer of commercial aircraft and offer a family of commercial jetliners designed to meet a broad spectrum of global passenger and cargo requirements of airlines. This family of commercial jet aircraft in production includes the 737 standard-body model and the 767, 777 and 787 widebody models. We ended production of the 747 widebody model in 2022. Development continues on the 777X program and the 737-7 and 737-10 derivatives.



Defense, Space & Security

This business engages in the research, development, production and modification of manned and unmanned military aircraft and weapons systems for strike, surveillance and mobility, including fighter and trainer aircraft; vertical lift, including rotorcraft and tilt-rotor aircraft; and commercial derivative aircraft, including anti-submarine and tanker aircraft. In addition, this segment engages in the research, development, production and modification of the following products and related services: strategic defense and intelligence systems, including strategic missile and defense systems, command, control, communications, computers, intelligence, surveillance and reconnaissance, cyber and information solutions, intelligence systems, satellite systems, including government and commercial satellites and space exploration.



Global Services

This business provides services to our commercial and defense customers worldwide. Boeing Global Services sustains aerospace platforms and systems with a full spectrum of products and services, including supply chain and logistics management; engineering, maintenance and modifications; upgrades and conversions; spare parts; pilot and maintenance training systems and services; technical and maintenance documents; and data analytics and digital services.

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Advancing Our Sustainability Journey

Stakeholder-Driven Transparency

Boeing is committed to transparency. Boeing considers stakeholders' interests to identify and prioritize the most relevant issues and to assess the most significant challenges and risks facing the company. Through our annual disclosure and reporting cycle, we compile and share a broad set of data, information and operating examples that are relevant to our stakeholders, including our employees, customers, industry partners, investors, regulatory authorities, communities and others. These diverse groups of stakeholders have been identified by Boeing as being key to the business because of their potential to influence or be affected by Boeing's mission to protect, connect and explore our world and beyond. Using widely applicable disclosure frameworks, Boeing reports each year on our financial performance and company priorities; our employee demographics and progress toward achieving equity, diversity and inclusion goals; our sustainability performance; our community investments and advocacy; and our industry-leading aerospace market outlooks.

Throughout 2022, we maintained a comprehensive engagement strategy that focused on engaging with key stakeholders through proactive ongoing dialogue, surveys, industry forums and events, and monitoring external data, some of which is discussed throughout this report. This dialogue and collaboration informs our approach, goals and actions to drive sustainable, long-term value for our stakeholders. We look forward to continuing to evolve and refine our stakeholder engagement strategy throughout 2023 and beyond.

Embedding Sustainability at Boeing

We continue to embed sustainability practices across our business, learning and evolving to meet stakeholder

expectations. We have organized our sustainability efforts around four key pillars: People, Products & Services, Operations and Communities. Our sustainability priorities and enterprise initiatives are managed through these pillars, with key goals and metrics monitored by company leaders including our Global Sustainability Council ([See Page 13](#)). Our efforts reflect the shared value we create with our key stakeholders. You will see our sustainability priorities, listed below, emphasized in this report. Our collaborative relationships inform these priorities and our sustainability goals, driving long-term value for our stakeholders.

- Global Aerospace Safety
- Employee Safety and Well-Being
- Climate Action
- Environmentally Responsible Operations
- Global Equity, Diversity & Inclusion
- Ethical and Compliant Business
- Data Privacy and Information Security
- Professional Development, Education and Learning
- Community Engagement
- Responsible Supply Chain
- Economic Performance

Reporting Approach and Alignment

To address the diverse interests of our stakeholders, we have provided a detailed overview of our sustainability activities and data in this report. We are providing indexes with alignment to the Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), Task Force on Climate-related Financial Disclosures (TCFD) and the United Nations Sustainable Development Goals (U.N. SDGs) in the Reporting section.

To supplement this report, we publish additional information at boeing.com/sustainability.

Stakeholder Group	Engagement Channel
Employees	<ul style="list-style-type: none">• Annual and quarterly surveys• Employee forums and meetings• Internal websites• D&I committees• Boeing resource groups
Commercial	<ul style="list-style-type: none">• Airshows• Trade shows• Customer meetings and summits
Customers	<ul style="list-style-type: none">• Airshows• Customer meetings and summits• Industry groups and forums
Defense	<ul style="list-style-type: none">• Investor conferences• Investor meetings and summits• NGO events and forums• Government regulator meetings• Industry groups and forums
Investors	<ul style="list-style-type: none">• Boeing supplier conferences• Supplier communications• Industry groups and forums
Regulators	<ul style="list-style-type: none">• Third-party surveys• Media
Suppliers	<ul style="list-style-type: none">• Customer meetings and summits• Industry groups and forums
Flying Public	<ul style="list-style-type: none">• Customer meetings and summits• Industry groups and forums

Sustainability Goals

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Goal Statement	2030 Target	Progress
Employee Safety & Well-Being Value human life and well-being above all else and take action accordingly; strive to prevent all workplace injuries	<ul style="list-style-type: none"> Top quartile recordable injury rate (among sector benchmarked performance). 	<ul style="list-style-type: none"> We continue to strive to be in the top quartile of recordable injury rates among benchmarked peers. In 2022, COVID-19-related impacts led to a 39% increase in recordable injury rate. When normalized for COVID-19 impacts we saw a 4% reduction in recordable injury rate, suggesting continued progress as COVID-19 subsides. Read more about Workplace Safety on Pages 19-20.
	<ul style="list-style-type: none"> ≥90% believe their manager supports their well-being. 	<ul style="list-style-type: none"> In 2022, 91% of employees reported that their manager supported their well-being. Read more about Employee Well-Being on Pages 21-23.
Global Aerospace Safety Drive aerospace safety to prevent accidents, injury or loss of life with our Boeing culture and actions rooted in safety	<ul style="list-style-type: none"> Drive aerospace safety via global aerospace safety initiatives to maintain downward trend of worldwide commercial jet fleet 10-year moving average fatal accident rate. 	<ul style="list-style-type: none"> Established a dedicated ombudsman for FAA Organization Designation Authorization representatives. Inducted a new real-time data and analytics platform called Boeing Safety Intelligence into our Safety Management System. Introduced Boeing Virtual Procedures Trainer and Maintenance Synthetic Trainer for pilots and mechanics to provide experiential training and complement current training. Delivered competency-based training and assessment (CBTA) courses to four commercial customers; Boeing Next-Generation 737, MAX and 787 CBTA training courses were approved by multiple regulatory agencies.
	<ul style="list-style-type: none"> Increase representation of women globally and underrepresented racial/ethnic minorities in the U.S. 	<ul style="list-style-type: none"> Increased women and U.S. racial/ethnic minority representation at Boeing at nearly every level of the company. Tied inclusive hiring processes to incentive compensation: 92% of candidate interview slates for manager or director-level roles included at least one woman globally, or at least one woman or racial/ethnic minority in the U.S. Read more on Page 25. Read more in our GEDI Report.
Sustainable Operations Maintain net-zero future for Boeing operations through conservation and renewable energy	<ul style="list-style-type: none"> Achieve 55% absolute reduction in Scope 1 and Scope 2 GHG from 2017 base year.¹ Maintain net-zero emissions for Scope 1 and Scope 2. Achieve 100% renewable electricity. Work with our suppliers to increase GHG reporting and proactively address risks driven by climate change-driven risks. 	<ul style="list-style-type: none"> Achieved 16% absolute GHG reduction at year-end 2022 from 2017 base year toward 2030 goal (Scope 1 and 2). Achieved net-zero at manufacturing and work sites, for a third year, by emphasizing and incentivizing employee conservation and increasing renewable electricity use while procuring verified offsets for the remaining GHG. Achieved 35% renewable electricity in 2022 by purchasing renewable electricity and renewable energy credits. Implemented supplier code of conduct aligned to ESG elements including climate change and environment priorities. Launched supplier engagement via CDP Climate Change submissions to report emissions, assess reduction targets/progress and identify collaboration opportunities.
	<ul style="list-style-type: none"> Partner with supply chain for responsible business practices 	
Innovation & Clean Tech Enable the transition to carbon-neutral aerospace through investments and partnerships for fleet efficiency improvements, SAF and future platform technologies	<ul style="list-style-type: none"> Current and future commercial airplanes will be 100% SAF compatible. 	<ul style="list-style-type: none"> Established plan for all materials, systems and part compatibility testing required to support qualification, certification and implementation of SAF compatibility by 2030. Developed jet reference fluids (JRFs) composed of the simple chemical compounds found in SAF. These JRFs will help standardize testing and evaluation of how SAF interacts with airplane materials and systems.
	<ul style="list-style-type: none"> Build and certify our first zero-emission, electric, autonomous aircraft via Wisk joint venture. Support the commercial aviation industry's ambition to achieve net-zero carbon emissions for global civil aviation operations by 2050. 	<ul style="list-style-type: none"> Wisk became the first autonomous air mobility company to join the FAA's voluntary Safety Management program. Built trust with regulators with the public release of Wisk's Concept of Operations (ConOps). Selected by NASA to lead the development and flight testing of a full-scale Transonic Truss-Braced Wing demonstrator airplane. Introduced the Boeing Cascade Climate Impact Model, or Cascade, a dynamic modeling tool that quantifies the power of aviation's major strategies to reduce emissions.
Community Engagement Build better, more equitable communities through corporate investments, employee engagement programs and advocacy efforts	<ul style="list-style-type: none"> Expand opportunities for more than 12.5 million youth, veterans, veterans' families and underserved individuals across communities around the world in 2022. 	<ul style="list-style-type: none"> Expanded opportunities for over 7 million youth, veterans, veteran's families and underserved individuals across communities around the world in 2022. Read more about our Boeing 2023 Community Impact Portfolio.

1. The 2030 GHG reduction target is set with an operational boundary of The Boeing Company, and includes all Scope 1 and Scope 2 emissions.

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Oversight of Sustainability



Board of Directors Governance and Public Policy Committee

Oversees Boeing's sustainability policies and practices, including matters related to environmental stewardship and climate change



Chief Sustainability Officer Executive Council Member Leads Global Enterprise Sustainability

Responsible for enterprise-wide sustainability strategy, focusing on priorities, stakeholder-oriented reporting and company performance



Global Sustainability Council and Extended Council

Global leaders from across business units and functions provide leadership, partnership and action to advance objectives and strategy for sustainability

Subcouncils



Corporate and Sustainability Governance

The Board of Directors has extensive oversight of strategy development, company culture, political and charitable contributions, corporate sustainability and key strategic, operational and compliance risks. Please see our [corporate governance materials](#) for more information.

Sustainability is rooted in Boeing's values. The Board, and specifically the Governance and Public Policy (GPP) Committee, oversees a variety of sustainability topics and Boeing's Chief Sustainability Officer (CSO), Chris Raymond, is an Executive Council member reporting to Boeing's CEO. As CSO, Raymond reports the progress of Boeing's sustainability objectives and stakeholder-oriented reports regularly to the GPP Committee and the full Board. The Board reviews and provides input on the sustainability report.

Read the [Governance and Public Policy Committee's Charter](#).

Oversight of Political Activity

Together, the Board, the GPP Committee and senior leadership are committed to aligning political activities with the company's values, business strategies, long-term shareholder interests and long-term strategic imperatives. This includes regular discussions about the company's public policy priorities; the company's memberships in and payments to trade associations and other tax-exempt organizations; Boeing Political Action Committee (BPAC) strategy and expenditures; and the company's network of compliance procedures related to these activities.

Risk Management

With over 100 years at the forefront of innovation, Boeing has established processes to identify, assess, mitigate and manage risk. It is the responsibility of the Board and senior management to ensure that we avoid imprudent risks and mitigate the strategic, technological, operational and compliance risks we face, all with our core values of safety, quality, integrity and sustainability at the forefront. Our Board has significant climate change risk expertise and management skills and experience, which is described further in the [Proxy Statement](#). Senior management is responsible for day-to-day management of risk, including the creation of appropriate risk management policies and procedures.

Boeing has two overarching risk processes: Enterprise Risk Management (ERM) and Compliance Risk Management (CRM). All functions and business units participate in both ERM and CRM, including the Global Enterprise Sustainability organization. Global ERM and CRM risk assessments are completed annually to determine the most critical risks to Boeing.

Boeing's sustainability organization, informed by internal and external stakeholders and augmented by a digital tool, determined the most relevant sustainability priorities to our business. You can learn more about our 11 sustainability priorities on [Page 11](#).

To learn more about our lobbying and political activity governance, see:

- [Boeing's Oversight and Compliance Procedures for Political Activity](#)
- [BPAC Contributions](#)
- [2022 Trade Association Memberships](#)

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The results from the risk assessments and sustainability priority assessment are compared for commonality, and overlapping risks receive additional monitoring and management. For example, Innovation and Clean Tech is a key priority for Boeing and our 2030 goal of 100% SAF-compatible current and future commercial airplanes is a key component to the commercial aviation industry's climate goals. Within the ERM process, Boeing mitigates and manages the key strategic risk to this priority and goal — the ability to scale SAF supply to meet the demand needed to achieve the commercial aviation industry's net-zero ambitions. SAF as a drop in fuel is currently approved to be blended at 50/50 blend with Jet A and works with existing airplanes and offers the largest potential to reduce carbon emissions over the next 20 to 30 years in all aviation segments. Boeing's intent is to help catalyze SAF scaling through subject matter expertise, investments in product compatibility work, purchasing SAF for our own fuel use, and our partnerships and policy advocacy. As mentioned on [Page 45](#), Boeing continued to make key investments to scale SAF in 2022.

Within the sections of this report, we will continue to discuss our governance, risk identification and management of our key priorities.

Business Continuity Management

Boeing strengthens its resiliency through Business Continuity Management (BCM), managing and mitigating risks should a significant incident disrupt business operations. This entails five key preparedness programs: Business, Emergency, Information Technology, Supply Chain and Human Resources, working together to facilitate company resiliency. The primary objective of these preparedness functions is to develop and maintain guidelines, standards, processes and tools that enable business units and functions to mitigate risk and recover critical programs, applications and suppliers.

Enterprise Risk Management and Compliance Risk Management

Audit Committee

The Audit Committee receives annual reports on Boeing's Enterprise Risk Management (ERM) and Compliance Risk Management (CRM) processes and regular reporting on the company's compliance and ethics programs from the Company's Controller and Chief Compliance Officer (CCO).

Enterprise Risk Management

The full Board of Directors reviews enterprise risks on a regular basis as well as conducts regular reviews of our ethics and compliance programs. ERM assesses strategic risks to the company and industry, including topics within the environmental, social and governance elements of sustainability, such as climate and policy change.

Compliance Risk Management

The CRM process is overseen by the Compliance Risk Management Board (CRMB), chaired by Boeing's chief compliance officer. The CRMB includes senior company leaders who provide oversight on Boeing's CRM process designed to identify, evaluate and prioritize the most significant compliance risks; assess mitigation strategies; and provide visibility to Boeing's CEO and Audit Committee of the Board of Directors.

Annual Employee Training

All employees, from senior leaders to entry-level, receive annual training on compliance risk areas tailored to their specific duties and responsibilities, such as U.S. Department of Defense procurement rules, proper handling of sensitive information, safety training, Seek, Speak & Listen Habits and anti-corruption.

Boeing navigated challenges in 2022 that added to the company's risk profile, including:

- Social and political issues
- Organizational and structural challenges
- Regulatory review of the 737 MAX

BCM continues to identify risks and to implement strategies and processes to mitigate those risks to our people, programs, infrastructure, network and supply chain.

Tax Governance and Compliance

We are committed to being a responsible taxpayer wherever we operate. Our global tax team is responsible for maintaining the highest compliance standards, being transparent in our dealings with authorities and sustaining robust internal controls for risk management. Boeing's principled tax approach is grounded in ethical business practices and tax guidance that follows business substance.

Learn more about
Boeing's approach to
[global tax governance](#)
and compliance.

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Annual Incentive Plans Reinforce Sustainability Goals

Starting in 2022 and continuing into 2023, Boeing enhanced its enterprise annual incentive design to incorporate climate and equity, diversity and inclusion metrics into the Company Performance Score formula, which determines payouts under the company's largest employee incentive plans. These include the Performance-Based Incentive Plan, the Employee Incentive Plan, the Management Incentive Plan, and the Executive Annual Incentive Plan.

The climate metric is designed to incentivize and reward employee behavior that reduces our energy consumption across the enterprise, and along with equity, diversity and inclusion and our other operational goals, accounts for 25% of the overall Company Performance Score driving payouts under our incentive plans. Individual performance is also taken into account in determining individual employee payouts under most of our incentive plans.

Learn more about Boeing's 2022 company performance in our [Proxy Statement](#).

Good Habits: Seek, Speak & Listen

Teammates across the company continue to build Seek, Speak & Listen habits, which are fundamental to how we work together. These habits are foundational to our culture of integrity and inclusion, and they enable us to improve — in safety, quality, production, performance and inclusion. Individual performance is also assessed using our Seek, Speak & Listen habit framework.

By embracing these simple habits, we make better decisions, drive innovation and build connection. We seek out the places where things aren't going well and where potential issues could arise, so we can learn and address issues before they become problems. We get all perspectives on the table and ensure every team member feels safe to speak up. We listen to each other with humility and grace. This is a key part of our commitment to collective progress, lasting cultural change and enhancing trust from within.

The habits are simple acts of caring so our people can be their best at work and in life. We will continue to embed the habits into our daily work, processes, systems and communications to hold ourselves accountable.

Our Habits



Seek

Because awareness
can teach us and help
us improve



Speak

Because it's the right
thing to do and every
voice matters



Listen

Because listening
builds trust and leads
to better decisions



The Olathe Pollinator Prairie, near Kansas City, is an ecological habitat supported by Boeing. (Boeing photo)

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Ethical and Compliant Business

The Boeing Code of Conduct

At Boeing, our first commitment is to the people and customers who rely on our products and services to protect, connect and explore our world and beyond. Each Boeing employee has a personal responsibility to honor that promise and to serve as stewards of Boeing's legacy of aerospace excellence and innovation. New employees sign the Code of Conduct and complete Recommitment training when they join the company — and we all reaffirm this commitment every year. Learn more about our [Code of Conduct and Recommitment](#).

Our annual Code of Conduct signing and Recommitment remind all of our employees of their obligation to speak up and be a voice for others when something does not align with our values.

Robust Anti-Corruption Program

Integrity is a core company value and Boeing strictly forbids bribery and corruption of any kind. Boeing's robust anti-corruption program includes extensive controls, rigorous policies and procedures, and an annual risk assessment to ensure effectiveness and identify potential enhancement opportunities. Learn more about our [anti-corruption program](#).

Boeing publishes an internal policy that explains its anti-corruption and anti-bribery requirements and expectations for employees, while making its guidelines for ethical business conduct publicly available to employees and other stakeholders. The company also makes employees aware of their federally protected whistleblower rights, which are designed to protect employees against retaliation for reporting potential wrongdoing by a U.S. contractor or subcontractor.

Boeing recognizes that the company's long-term interests are advanced when employees are responsive to the concerns of employees, customers, public officials, investors, suppliers and the communities we serve. This starts with our Board who actively fosters a corporate culture that puts safety, quality, integrity and sustainability at the forefront of all that we do.

Board members commit to, and use, a Code of Ethics as guiding principles; the Code emphasizes the importance of compliance with all applicable laws, rules and regulations; maintaining confidentiality; avoiding any conflicts of interest; and reporting of illegal or unethical behavior.

The Audit Committee and the full Board oversee our compliance and ethics programs through close collaboration with Boeing's Chief Compliance Officer and periodic reviews of program metrics. These touch points provide visibility to the Board of significant compliance and ethics risks, as well as specific cases that are identified through the company's various reporting channels.

Learn more about our [Ethics and Compliance Program](#).

Understanding Ethical Concerns: 2022 Data¹

2,405

inquiries²

2,120

conflict of interest
determinations

3,132

investigative
requests³

7,657

total contacts to Ethics
and Business Conduct



1. Data reflects the reporting period of November 2021 through October 2022.

2. Inquiries comprise Requests for Guidance and Information Requests. Requests for Guidance are situations where employees are seeking guidance when facing ethical dilemmas or when they need assistance in understanding company policies or expected behaviors. Information Requests are situations where employees are seeking general information. Both demonstrate awareness of Boeing's Compliance and Ethics program, but Requests for Guidance are viewed as the most positive types of contact.

3. Investigated matters are considered unsubstantiated when investigation findings demonstrate that no misconduct occurred or where there is a lack of evidence to support a finding of misconduct.

4. Ongoing evaluations demonstrate that Boeing's substantiation rate is slightly higher than other published benchmarks, indicating an effective investigation process and informed reporting by company employees.

Contacting Ethics

Boeing encourages employees, subsidiaries, suppliers and external stakeholders to promptly raise concerns about safety, quality or potential violations of the law or Boeing policies. For more information, visit our [Boeing Ethics website](#).

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**Commitments and Actions
on Human Rights**

Boeing is committed to responsible business practices and promoting positive change while simultaneously creating value for our customers, shareholders and other stakeholders. In recognition of this commitment, the company has developed policies and practices designed to enforce our Code of Basic Working Conditions and Human Rights.

[Learn more about our approach to human rights.](#)

Through our [Supplier Code of Conduct](#), we establish foundational expectations of prospective and active suppliers, including adherence to human rights standards.

Strengthening compliance engagement through localized support

In 2022, Boeing continued to make tangible improvements to its compliance program and meaningful progress toward strengthening its culture of compliance and safety at locations around the globe. The company deployed two localized teams — the Site Compliance and Ethics Officers (SCEOs) and the Ethics Ambassadors — both of which are embedded within the business and serve as amplifiers for the company's compliance and ethics efforts, resulting in thousands of engagements with employees.

The SCEOs are physically deployed at 22 locations around the globe, leading localized and targeted compliance activities. SCEOs partner with company leaders, leveraging site-specific data to proactively address risks and foster a speak-up culture. SCEOs also serve as an on-site resource for employees, engaging through floor walks and team

meetings, new employee outreach, and manager trainings to answer questions, provide guidance, and help address compliance and ethics concerns.

The Ethics Ambassador Program, originally piloted in 2021, is currently deployed at sites including North Charleston, South Carolina; Mesa, Arizona; Michoud Assembly Facility in New Orleans; San Antonio; and St. Louis. Ambassadors are emerging leaders embedded within the business who extend the reach of the company's compliance program by fostering a culture of compliance and integrity by amplifying our values, listening to teammate concerns and encouraging them to speak up. Ambassadors also work with their designated SCEO to promptly elevate local risks and issues to site leadership.

Mesa Ethics Ambassadors: SCEO Larry Thompson (left) joins Mesa Ethics Ambassadors, employees and community members to help assemble 1,200 meal packages for local families as part of a volunteer event for United Food Bank in Mesa. Thompson along with SCEOs across the Boeing enterprise work each day to positively influence our workplaces and communities. (Boeing photo)



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Reginald Douglas at St. Louis paint shop. (Boeing photo)



PEOPLE

Healthy and Empowered

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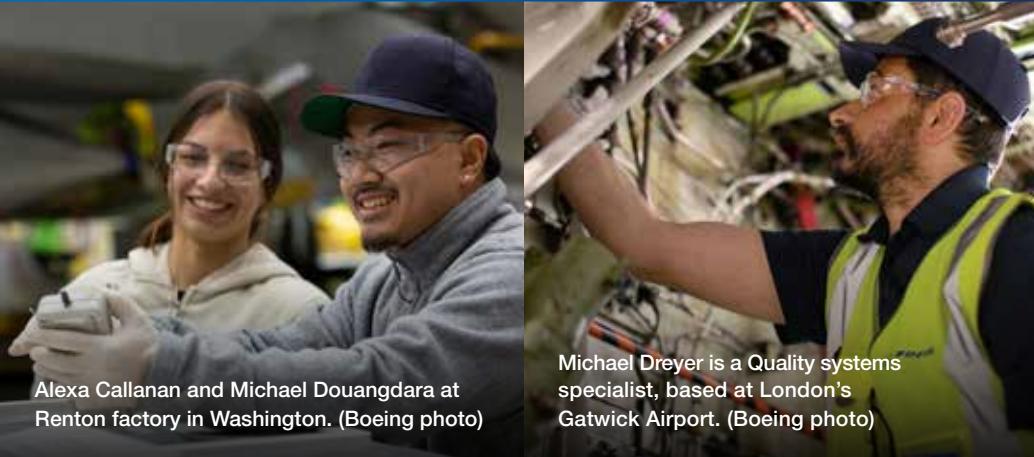
Workplace Safety

Boeing knows that operating to keep ourselves and our teammates safe in the workplace is everyone's responsibility. Safety is central to everything we do for ourselves, those we care about and our communities. The Safety Guiding Principles provide a framework to achieve the goal of zero workplace injuries so every person who works at, or visits, a Boeing site leaves as safe and healthy as when they arrived. Boeing's workplace safety program, Go for Zero – One Day at a Time, takes a holistic approach to worker safety, striving for a goal of zero injuries, which is underpinned by the belief that every injury is preventable.

Our occupational health and safety management system is modeled after the International Organization for Standardization (ISO) 45001. As of 2022, four sites are certified to ISO 45001 with multiple sites conforming to ISO 45001 in support of our business objectives.

Celebrating 10 years of Go for Zero

Go for Zero was introduced to help increase safety in our workplaces. Today, we take a look at how our company has performed in workplace safety since 2013.



Continuous improvement

The goal of zero injuries IS possible

↓ 26% decrease
in serious injuries
(since 2015)

↓ 39% decrease
in recordable injuries
(since 2013)

↑ 31% increase
in lost workday cases
(since 2013)



↓ 71% decrease
in ergonomic injuries
(since 2013)

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Boeing's Lifesaving Rules

Safety is a core value at Boeing. Some operations performed at Boeing are recognized as High Hazard Processes due to their potential for a serious injury or fatality. Lifesaving Rules go beyond regulatory requirements and are intended to reduce or eliminate the risks created when around or performing these processes and prevent life-critical incidents by increasing accountability for following safety policies and procedures.



Pedestrian/Vehicle

Follow safe driving
and walking rules.



Chemical Processing

Control sources of hazardous
chemical exposure.



Crane Operations

Plan lifting operations
and control the
load path.



Machine Operations

Operate machines
safely.



Aircraft Towing

Keep myself and others
safe during aircraft
towing operations.



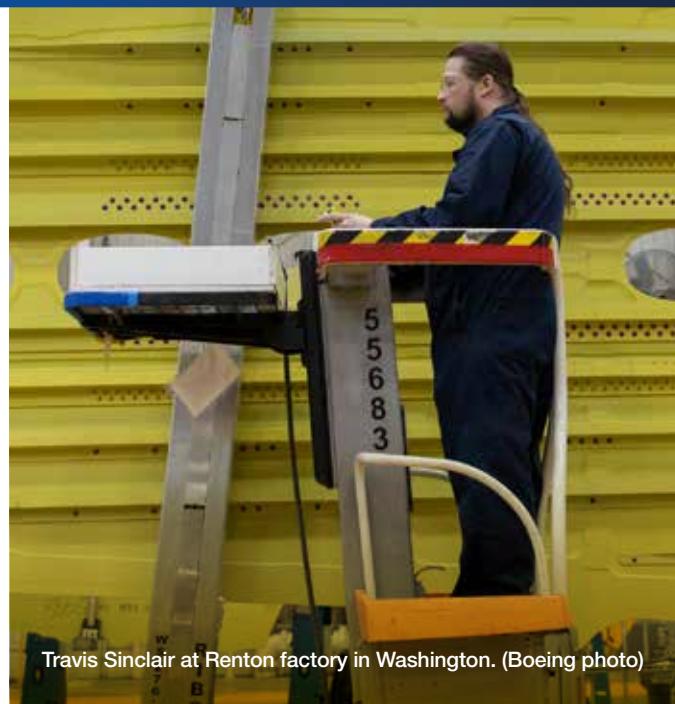
Hazardous Energy

Verify control of hazardous
energy or a zero-energy
state before work begins.

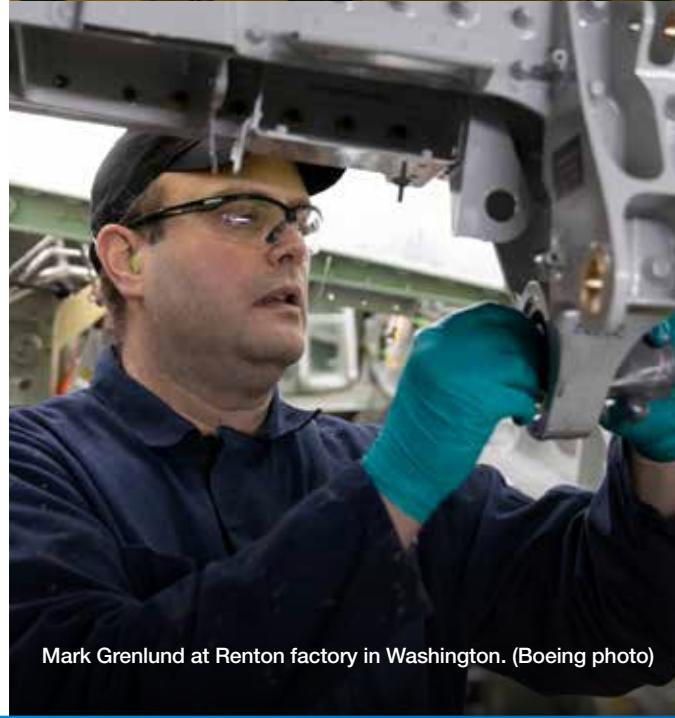


Working at Heights

Protect against falls and
dropped objects while
working at heights.



Travis Sinclair at Renton factory in Washington. (Boeing photo)



Mark Grenlund at Renton factory in Washington. (Boeing photo)

2022 Workplace Safety by the Numbers:

44:1

Near Miss to Hazard¹

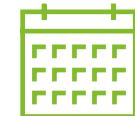


98%

Found/Fixed Metric²

1,096

Health and Safety Training
Courses Available



1.2

Lost Workday³
(includes COVID-19 cases)

1. Represents global data.

2. Represents global data.

3. Represents U.S., Canada,
Australia and UK data.

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Pamela Pulla, engineer, Flight Crew Operations. (Stephanie Su photo)

Employee Well-Being

Boeing takes a holistic approach to employee safety and overall well-being, including physical, financial and mental health components at work and at home. We value human life and well-being above all else and take action to improve many aspects of an employee's life. [Read more information about our benefits.](#)

Boeing continues to demonstrate strong commitment to employee well-being

Why it matters: Boeing has increasingly put a spotlight on the importance of striving to achieve and maintain good physical and mental health.

The Topic and Numbers

Boeing is committed to employees' well-being and believes that providing ongoing education about well-being topics is an important complement to the company's health benefits. The company offered engaging content to a diverse breadth of employees throughout 2022.

We hosted more than 60 well-being-related webinars, with 20,000+ employees participating. Some of the webinar topics included:

- Finding balance:** How to balance demands on time and feel fulfilled when managing work and life becomes challenging.
- Sleep and emotional well-being:** Why sleep is an important component of emotional wellness and how to improve sleeping habits to optimize health and productivity.
- Family nutrition and the farmers market:** Fruits' and vegetables' peak growing seasons, how to pick them and store after purchase, and tips to help children with fear of new/unfamiliar food.

- Loss and grief:** The stages of grief, myths and facts, symptoms, coping mechanisms, self-care, the difference between grief and depression, and when to contact a grief counselor.

- The gut-brain connection:** The microbiome and why we might care about the microbiome's effect on health.

- How to find a therapist:** Common terminology used in the mental health field, including types of mental health providers and types of therapy; insurance navigation tips; how to find the right fit, including questions to ask yourself and potential providers.

- Staying emotionally happy and healthy:** Practical tips to find joy, inner peace and fun by prioritizing what is important in your life and setting boundaries.

- Fertility wellness:** The best time to start seeing an infertility specialist, how to walk through the journey feeling supported emotionally and available benefits.

- Managing trauma and intense emotions:** The relationship between trauma, fear and anxiety and the tools for managing the range of intense emotions that may be experienced after distressing events.

- Pain:** Contributing factors and getting support: The science of pain, factors affecting the experience, and how exercise therapy can help improve overall health and well-being.

- Diabetes 101:** How to lower your risk or manage your diagnoses with small, impactful changes.

- Women's health through life stages:** Factors related to women's health during each life stage decade (e.g., 20s, 30s, 40s), including health conditions, preventive care and programs for support.

- Health and well-being for Black employees:** Discussed health conditions that are prevalent among African Americans, as well as behavioral health, prevention and management programs.

- Latinx health:** Focused on the physical and mental health disparities, as well as disease risk factors, chronic diseases, preventive care and health care access resources in the Latinx community.

- LGBTQIA+ inclusion in health care:** Barriers and inequalities that are experienced within the community, how the cycle is being broken, and benefits and resources available.

- What's next:** Boeing will continue to provide educational resources to empower employees to make informed decisions about their physical and emotional well-being and understand the many benefits and resources that are available to them.

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Grzegorz Stanny, a manager from Boeing Gdańsk, and Kseniia Karpechenko, a colleague from Ukraine, who relocated to Gdańsk. Stanny drove Karpechenko and her daughter to Gdańsk at the beginning of the war when she fled from Ukraine. (Boeing photo)

Boeing stands with our Ukraine team

When the war in Ukraine started, Boeing immediately informed its employees in Ukraine that they did not have to work and should make their safety a first priority. Despite the challenging situation, the Ukraine team continued to work and grow during the war. Boeing is supporting the local team with everything needed to stay safe and online.

A unified effort by Boeing and the initiative of individual employees kept the Ukraine team safe. Employees from Poland welcomed colleagues and other people who crossed the border to seek shelter in their neighboring country. The company provided housing opportunities for them in Poland and gave the team members who stayed in Ukraine financial means and the necessary IT equipment to work safely from home.

It comes down to this: Supporting Ukraine is a priority for Boeing and its employees. In addition to the support of the Boeing team, the company has committed \$2 million to support Ukraine relief efforts. Boeing employees, with a boost from the Boeing Gift Match program, donated more than \$1 million.

▶ **Video:** Learn more about how our [Boeing Poland team supported our Ukraine employees](#).

"It is incredible to witness the team spirit of our colleagues in Ukraine. We admire our local colleagues for facing all challenges upfront. Our role is to provide them with everything necessary to continue their fantastic engagement with a laser focus on safety and care."

Suzanne Purdum, senior director, Human Resources, Europe, Israel & Ukraine



Things are looking up: Boeing Ukraine employees who relocated to Gdańsk, Poland, include: Boeing employees Lilit Khumarian, Olha Avdieienko, Yaroslav Kontsur and Anna Rudenko. (Boeing photo)

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Boeing Employee Assistance Program provides help in times of need

Why it matters: “Some Boeing employees, like individuals in many communities, were impacted by tragic events and natural disasters — whether directly or indirectly,” said Andrea Landsman, manager, Boeing Employee Assistance Program (EAP). Boeing offers an EAP to provide support to employees and eligible family members navigating difficult life events.

A few examples of how the EAP helped employees:

- **Conflict Zones:** In addition to providing emotional support to leaders, managers and employees during the war in Ukraine, the EAP offered local employees and their families help with locating emergency resources and information. In March, Boeing extended EAP services to European-based subsidiaries and contract workers to help them cope with the crisis.
- **Pandemic Relief:** To assist employees in China impacted by strict COVID-19-related travel restrictions and lockdowns, EAP provided virtual group support for employee work groups in both Mandarin and English.
- **Trauma Care:** Following the Robb Elementary School shooting in Uvalde, Texas, in May and the Highland Park shooting near Chicago in July, counselors were available to support employees and provide information about the EAP.
- **Natural Disasters:** The EAP prepared resources to support multiple natural disasters occurring in the U.S., including employees affected by Hurricane Ian in September.
- **Stress Relief:** To relieve stress and promote emotional well-being, the EAP conducted 597 Mindfulness Meditation sessions with more than 3,100 participants.



“The Boeing EAP was available 24/7 worldwide to provide counseling and other resources for our employees, some of whom were faced with very challenging circumstances.”

Andrea Landsman, manager, Boeing EAP

Andrea Landsman, manager, Boeing EAP

- **Suicide Prevention:** EAP coordinated with the Boeing Veteran Engagement Team (BVET) employee resource group to offer suicide prevention webinars to their membership.
- **Mental Health Screenings:** All employees were encouraged to complete online anxiety and depression screenings to help assess their risks and learn about getting help if they needed it.

Our final thought: The Boeing EAP provides support to employees and eligible family members at no cost. Professional EAP counselors can provide help with navigating life events, stress management, work-life challenges, grief and loss, substance abuse and more.

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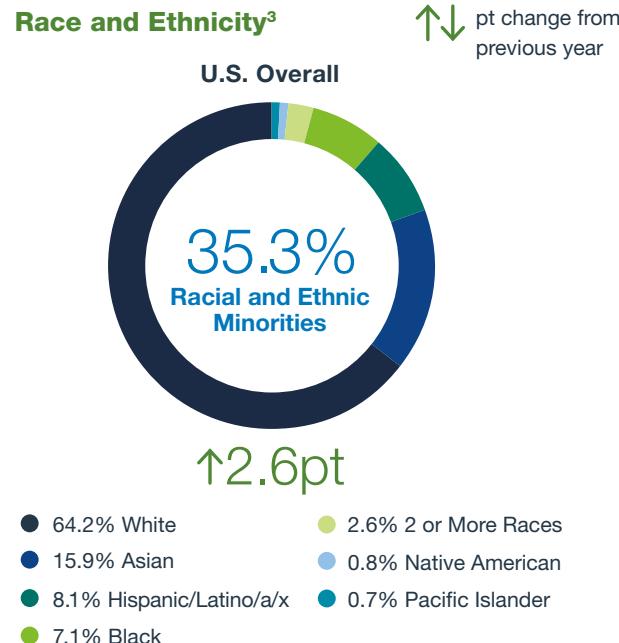
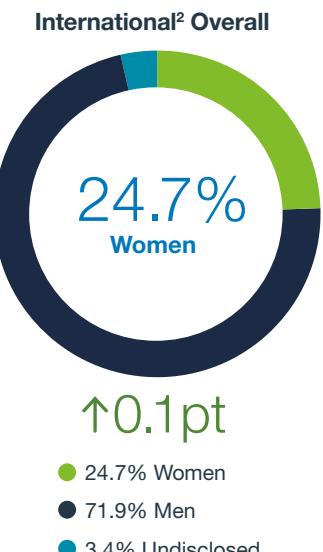
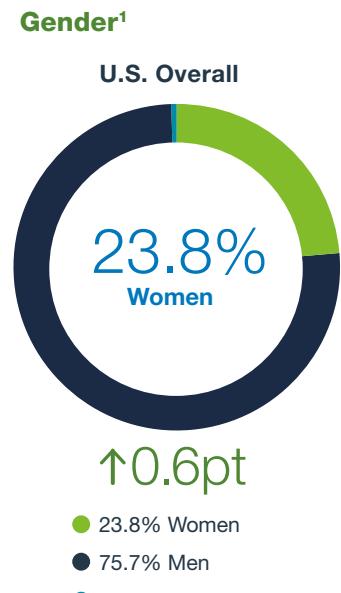
Global Equity, Diversity and Inclusion

Equity, diversity and inclusion are foundational values at Boeing and key drivers of business outcomes. Each member of our global team brings a unique perspective, and we grow stronger when everyone has an opportunity to contribute. We are committed to the necessary and challenging work of

building an environment in which each teammate has a voice and feels inspired to achieve their full potential. Transparency is the foundation of this commitment, and we have been sharing our progress each year in our [Global Equity, Diversity & Inclusion Report](#) and our [EEO-1 Report](#).



Read more about [Boeing's Global Equity, Diversity & Inclusion efforts](#) in our 2023 report.



U.S. Disability⁴

Self-ID participation rate	40%	Self-ID as having a disability	7.7%
----------------------------	-----	--------------------------------	------

U.S. Veterans⁵

14.6%

Gender identity self-ID participation rate	14%	Sexual orientation self-ID participation rate	12%
--	-----	---	-----

6. LGBTQIA+ is a term that includes people of all genders and sexualities, such as lesbian, gay, bisexual, transgender, questioning, queer, intersex, asexual, pansexual and all others. Gender identity and sexual orientation data reflects the U.S. workforce only based on voluntary, confidential self-identification. Data related to gender identity and sexual orientation are not shared with the government, unlike gender and race/ethnicity data, which Boeing is required to submit to the Equal Employment Opportunity Commission for U.S. employees. The gender identity options include female, male, nonbinary, not listed, prefer not to answer, transgender female and transgender male. Gender identity and sexual orientation participation rates are reported as of March 1, 2023. We will continue our efforts to educate and encourage all team members to self-identify and expand self-ID options outside the U.S. where it is safe and lawful to do so.

[View all Global Equity, Diversity and Inclusion data. Unless otherwise indicated, data presented are snapshots taken in December 2022.](#)

1. All data on gender is collected globally. Numbers for gender may not total 100% due to team members who identify as nonbinary or who choose not to disclose.
2. International indicates team members outside the U.S.
3. Race and ethnicity data reflects the U.S. workforce only. Numbers may not total 100% due to inclusion of people who choose not to disclose or due to rounding. Racial and ethnic minority representation includes Asian, Black, Hispanic/Latino/a/x, Native American, Pacific Islander and Two or More Races as defined by the U.S. Equal Employment Opportunity Commission.
4. A disability is defined as a physical or mental impairment or medical condition that substantially limits a major life activity or a history or record of such an impairment or medical condition.
5. Veteran data reflects the U.S. workforce only based on voluntary, confidential self-identification. A veteran is defined as a person who served in the active military, naval or air service and who was discharged or released therefrom under conditions other than dishonorable.

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Global Equity, Diversity & Inclusion Report reflects Boeing's journey

Boeing recently released its third annual Global Equity, Diversity & Inclusion (GEDI) report, which shared demographics data, progress toward the company's six 2025 aspirations, and stories from across the enterprise and around the world about policies, teams and individuals who are making a difference. The report is an invitation to all prospective and current employees, suppliers, customers and community partners to join us on our journey toward becoming a more equitable and inclusive company.

Boeing has roughly 156,000 employees representing 47 nationalities in 65 countries. In 2022 we hired more than 23,000 new teammates, resulting in an increase in female representation across virtually all job levels — production and maintenance, individual contributors, managers,

directors and executives — and increased racial and ethnic representation in the U.S. at junior and senior levels. We also saw increased rates of participation in our self-identification process, which encourages employees to confidentially share their disability status, sexual orientation, gender identity and veteran status.

Key Highlights Included:

In 2022, Boeing tied inclusive hiring processes to its incentive compensation: 92% of candidate interview slates in 2022 for manager or director-level roles included at least one woman globally, or at least one woman or racial/ethnic minority in the U.S., showing that specific, measurable and financially relevant accountability has an affect on incentivizing the right behaviors that naturally lead to more diverse outcomes.

Samuel Atilabachew, Commercial Airplanes, Renton. Duaa Alshareef, Human Resources, Saudi Arabia. (Boeing photos)



We reformed our Racial Equity Steering Team (newly named Equity & Inclusion Council) to include Executive Council champions and representatives from each of our nine Business Resource Groups, which increased transparency and access to senior leadership. We also made progress on our six specific 2025 aspirations we announced and continue to report against.

As we look forward to 2023 and beyond, we are energized by the progress we've made and are committed to continuing the hard work because it is necessary not just for our business success but also for the sustainability of aerospace and our communities.

Pay equity summary

We foster a diverse, collaborative and inclusive environment that empowers employees to do their best. Equal pay for equal work is a foundational element of our approach. We hold ourselves accountable to equal pay for equal work by conducting regular compensation reviews to ensure that employees are compensated equitably throughout their careers — independent of race, gender or ethnicity. It's the right thing to do and makes us a better, more inclusive and higher-performing company. We're committed to continuing and expanding our analysis globally and doing the work to ensure pay equity at the time of hire and throughout every employee's career.

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Professional Development, Education and Learning

Boeing is dedicated to growing and developing a diverse pipeline of aerospace talent at all levels. Our professional development programs provide education and training opportunities for current and future employees. We want our people to think about working at Boeing as a lifetime endeavor — full of opportunities to achieve their personal and professional goals. We understand that by supporting our team today, we build a successful tomorrow.

Read more about the [learning and professional development opportunities we offer our employees here](#).



Boeing employees in St. Louis at the Cortex, an innovation community.
(Boeing photo)

Growing with Boeing: Learning to build a great career

In 2022, we launched Learn@Boeing, a new digital learning resource that makes it easier for teammates to find learning content aligned to business goals. Learn@Boeing was leveraged by 77,000 teammates to develop knowledge and skills for their current role or to prepare for a future role. See more of the ways we invest in our employees' learning and development to help them foster new skills, boost performance and build a great career at Boeing.

5M trainings completed

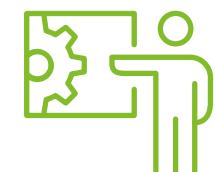


2M hours of production training delivered



5,000 coaching sessions to develop managers and executives globally

77,000 learners leveraged a new learning resource to build knowledge and skills



4,300 leaders developed through programs and courses

450,000 certifications and skill trainings completed

10,000 employees received tuition assistance for degree and nondegree programs

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PRODUCTS & SERVICES

Safe and Sustainable

ecoDemonstrator, Boeing's sustainability test bed. (Boeing photo)

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Global Aerospace Safety

Safety is a fundamental value. We take seriously the responsibility to ensure those who operate, fly on and service our products are safe.

Our Board of Directors oversees global aerospace safety through a dedicated subcommittee of the board, the Aerospace Safety Committee, to which our chief aerospace safety officer provides regular updates. More information about the subcommittee's oversight can be found in our Chief Aerospace Safety Officer Report.

In 2020, Boeing began implementing its enterprise Safety Management System, or SMS. As an integrated framework for managing safety risks throughout the product and service life cycle, SMS incorporates data from employee reporting, production, compliance, quality and safety processes. This provides line of sight to risks, incidents and identified hazards to enable proactive mitigation of issues and to continuously improve safety performance. Ultimately, SMS brings the right data into the right forums with the right people to make data-driven, risk-based decisions that result in safer products. It is a journey of continuous improvement informed by existing data and ongoing development of increasingly better safety analytics.

Learn more about our progress in the Chief Aerospace Safety Officer Report.

Boeing's safety journey: Every step is purposeful

The big picture: The safety of our products starts with our culture and is supported by technology and training. Advancements in both areas have led to progress in our safety journey.

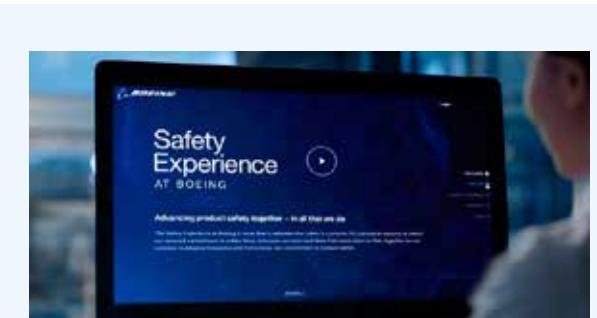
Why culture is first: When more teammates feel comfortable speaking up about safety issues and ideas — and more leaders listen — we will have safer products. Our Speak Up program is the fuel for our enterprise SMS that helps manage safety risks throughout the product and services life cycle. Through efforts in the past year:

- Submissions to our Speak Up reporting channel doubled from 2021 to 2022 — a sign of progress toward a healthy reporting culture.
- We trained more than 130,000 of our teammates on SMS, safety culture and why it matters.
- We established a dedicated ombudsman for FAA Organization Designation Authorization representatives to support their independence and transparency (see Page 29).

How technology and training help:

Alongside culture improvements, advancements in technology are helping us identify safety hazards and risks through data, and are helping customers. Last year, we:

- Introduced the Boeing Virtual Procedures Trainer and Maintenance Synthetic Trainer for pilots and mechanics to provide experiential training and complement current training.



Read more about our safety journey in the Boeing Chief Aerospace Safety Officer Report, including how we're working with industry to strengthen aviation safety and created a new Safety Experience website — a resource intended for employees to better understand their role in Boeing's safety culture.

- Inducted a new real-time data and analytics platform called Boeing Safety Intelligence into our SMS.
- Delivered competency-based training and assessment (CBTA) courses to four commercial customers. Additionally, Boeing Next-Generation 737, 737 MAX and 787 CBTA courses were approved by multiple regulatory agencies.

Why it matters: "Over the next few years, we're going to see the maturity of our SMS, increased collaboration with our customers to get ahead of safety risks and deployment of our Safety Experience tool for increasing transparency and learning throughout the organization," said Mike Delaney, Boeing chief aerospace safety officer. "Every step is purposeful to make our products safer. These efforts and more have laid both the cultural and structural foundation for our safety journey. It's up to us to keep that foundation strong and build on it."

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Ombudsperson empowers regulatory representatives

Dedicated focus: In June 2022, Boeing established a dedicated ombudsperson for Boeing employees who work on behalf of the U.S. Federal Aviation Administration (FAA). These employees — known as Organization Designation Authorization (ODA) representatives — serve a critical role in the design certification and conformance of aircraft.

ODA Ombudsperson Mark Fava, a lawyer with more than 35 years of aviation experience, serves as a neutral, independent third party to advise and assist ODA representatives. He supports them on work-related concerns relevant to their delegated authority and related matters, including those associated with independence and transparency, without fear of retaliation or reprisal.

Why it matters: The strength of the Boeing safety system is rooted in a transparent and open culture, one that gives all team members multiple ways to speak up when they have concerns. Boeing works every day to be trusted with the responsibility of holding an ODA, and the establishment of an ombudsperson demonstrates the company's commitment to strengthening its safety culture.

“Boeing is working to ensure the ODA program operates with the independence needed to fulfill all our FAA requirements. The appointment of a dedicated ombudsperson strengthens Boeing’s commitment to foster an environment where ODA representatives carry out their duties independently and without interference.”

Mark Fava, ODA Ombudsperson



Mark Fava, ODA Ombudsperson

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Engineering excellence, technically speaking

Boeing Technical Fellows are shaping the future of Boeing and aerospace.

Why it matters: Recognized as technology leaders inside and outside the company, the Boeing Technical Fellowship program represents the top 3% of Boeing's technical and scientific community.

Celebrating firsts: Christin Datz, Hugh Wong and Helen Lee are among Boeing's newest Associate Technical Fellows (ATF). They also share other distinctions. Lee is Boeing's first Technical Fellow appointed in China. Datz and Wong are the most recent ATFs appointed in the area of Sustainability. Together, they will help innovate and continue integrating sustainability into Boeing's engineering teams and functions to make our products, services and operations better for people and the environment.

- Datz is an expert on life cycle assessment tools and their application to Boeing's design processes, providing critical proof points about how we use sustainability principles in our product development and design.
- Wong is a technical expert in conceptual commercial aircraft design and analysis, and specializes in creating engineering tools and methods for design and analysis of aircraft with alternative energy and propulsion systems. Wong helped develop Cascade, Boeing's emissions modeling and analysis tool.
- Lee is the regional director of airspace and airport programs for Boeing China's Global Support Center, supporting the Greater China region. In her role, Lee thinks about ways advanced technologies like artificial intelligence can be applied to improve air traffic management operations.

It comes down to this: Technical Fellows are trusted consultants, advisers and mentors, and possess expertise in a variety of areas spanning the full life cycle of all Boeing products, processes and services, across a number of engineering disciplines.

"The breadth and depth of our Technical Fellowship is unique to the industry, and we count on our fellows to be stewards of technical excellence across the enterprise. This group will continue to strengthen our company and represent engineering excellence throughout the industry."

Howard McKenzie, Boeing chief engineer and executive vice president of Engineering, Test & Technology

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Sustainable Product Life Cycle

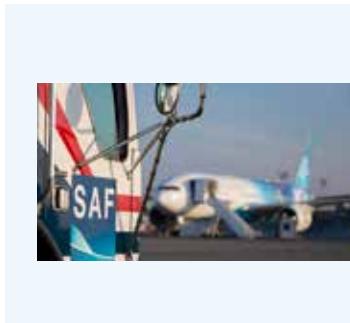
"Across Boeing Defense, Space & Security, we believe that operational effectiveness and sustainability are two sides of the same coin. A more sustainable, lower cost, energy efficient defense enterprise is a more operationally effective one.

That's why we have a history of partnering with our customers to pioneer the use of sustainable aviation fuels and are leveraging digital design and production to reduce our carbon footprint throughout the life cycle of our products"

Ted Colbert, president and CEO of Boeing Defense, Space & Security

Boeing increasingly looks at every stage of the product life cycle through a sustainability lens

We continue to evolve our approach so that our next generation of products consider the full breadth of sustainability including environmental, health, safety and human factors improvements by targeting the following seven areas:



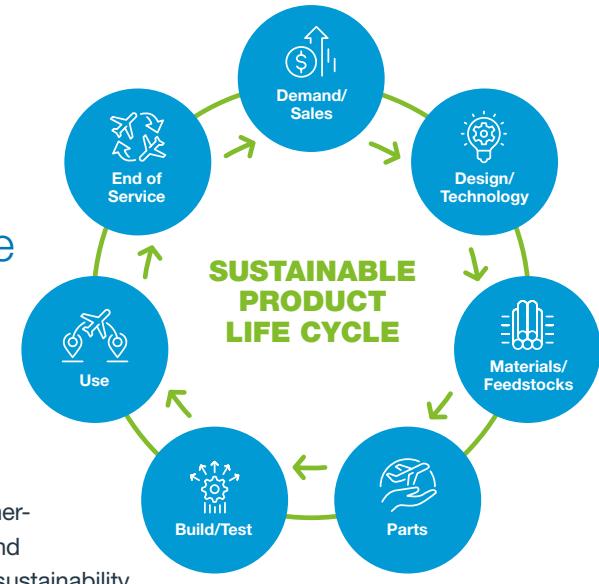
Demand/Sales. Customers continue to demand higher-efficiency, lower emissions products. Globally, airlines and governments are increasingly accountable to emerging sustainability standards, which requires that they evaluate the life cycle of aircraft they operate.

Cascade: Boeing's data modeling and visualization tool quantifies the potential of four strategies to cut emissions, including fleet renewal, operational efficiency, renewable energy and future aircraft introduction.

Design/Technology. Boeing evaluates new product designs and technologies to determine if they are safe and sustainable by conducting an environmental life cycle assessment. We strive to evaluate new aircraft design concepts, materials and technologies early in the development process to assess how much we can reduce the risks and expenses associated with its environmental footprint. We aim to examine whether more sustainable approaches exist for new product design, considering everything from selecting materials and parts to improving manufacturing processes and in-service operations to recycling the plane.

SAF-Compatible Commercial Airplanes: Boeing is collaborating with suppliers to achieve our goal that all commercial airplanes we deliver by 2030 will be compatible with SAF.

Materials/Feedstocks. Boeing examines coatings that improve our planes' aerodynamics, fuel efficiency and longevity, in part by using more parts that can be repurposed. Lighter composite materials permit us to design more fuel-efficient aircraft like our primarily composite 787 Dreamliner. Boeing simultaneously supports research into regenerative feedstocks that can replace constituents that are nonrenewable resources. For example, the bio-based regenerative feedstocks from forestry waste and pine root oil that we are researching at Villanova University may one day be integrated into the epoxy resins used in our interior parts, enabling us to reduce the feedstock-related emissions from extraction and refining compared to petrochemical-based feedstocks. Meantime, we recycle the metals used in manufacturing our aircraft back into our supply chain, reducing reliance on virgin materials.



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Parts. Boeing aims to reduce carbon emissions and waste from parts, components and systems procured from suppliers. We reduce carbon emissions from the movement of millions of airplane spare parts by consolidating shipments, eliminating single-use packaging and redesigning warehousing networks to regional hubs. In addition, we use additive manufacturing to 3D print some of our own parts. Doing so allows us to change the designs of some parts in a way that can lessen their environmental impact by creating lighter consolidated parts that use less raw material, fewer machining processes and leave less waste. [See Page 64 for more information.](#)

Supplier Collaboration: In 2021, Boeing co-founded an industry effort through the International Aerospace Environmental Group to establish a voluntary sectoral framework for ESG engagement, including assessment and awareness, throughout the aerospace manufacturing industry.

Used Serviceable Material Offerings: Boeing Service business provides access to recertified used parts from retired aircraft called used serviceable material.



Build/Test. Reducing waste from operations while boosting the use of renewable energy and digital technologies can help our manufacturing and other work sites reduce their environmental impact while building and testing a product. Boeing cuts waste to landfill, water, energy and hazardous chemicals. Read more about how we do so on [Page 52](#). For example, when testing aircraft, Boeing uses blended sustainable aviation fuels.



Sustainable Operations: Since 2020, Boeing has maintained workplace net-zero GHG emissions at manufacturing sites and other facilities (Scope 1 and Scope 2) and in its business travel (Scope 3, Category 6) by expanding conservation and renewable energy use while securing carefully selected, third-party-verified offsets for the remaining GHG emissions.

ecoDemonstrator: To accelerate innovation for current and future airplane sustainability, our 10-year-old ecoDemonstrator flying test bed program takes promising technologies out of a lab and tests them in an operational environment.



Use. Boeing provides solutions for customers to lower their carbon footprints while they are using our aircraft. For example, armed with real-time data, flight crews can make adjustments to optimize fuel use, and thus minimize the carbon footprint of each flight. Digital tools empower our airline customers to conserve fuel, track emissions and enhance their operations' overall efficiency, while defense customers can conserve fuel and lower emissions with platform-agnostic digital systems with maintenance, supply chain and flight planning recommendations based on analytics.

Government Services: As our tools ingest flight, maintenance and supply data, our analytics produce results that drive efficiency across the system. Read more on [Page 37](#).



End of Service. Up to 90 percent of the parts and materials in Boeing aircraft can be reused and recycled across aerospace and other industries. We manage and recertify used parts for aircraft, and engine platforms for our customers.

Remanufactured: Boeing remanufactures aircraft, such as the 115 AH-64D Apache for government customers, which includes upgrading configurations with the latest technology and keeping valuable materials in a closed loop.



Boeing Converted Freighter Fleet Renewal: Boeing's passenger-to-freighter programs provide airlines an economical way to replace less efficient, older-generation freighters with more efficient freighters created from repurposed passenger aircraft.

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Innovation and Clean Technology

Our company and our industry recognize finding solutions to climate change as an urgent challenge of our time. We are united in our goal to ensure billions of passengers can continue to fly every year to connect with friends and family, discover new places and cultures, engage in commerce and care for those in need.

Achieving this objective requires a portfolio of innovative solutions and partnerships that allows our sector to decarbonize. We are focused on four key areas: fleet renewal, operational efficiency, renewable energy and advanced technology. In 2022 we set ambitious 2030 targets related to our products, and throughout this section we share progress toward those goals and essential partnerships that will help us achieve them.

More about the governance of this strategy can be found in the Approach & Governance Section on [Page 13](#) of this report.



Sharing Cascade at the opening of the Boeing Research & Technology Sustainability Research Center in Tokyo, CSO Chris Raymond explains how the modeling tool projects the multiple paths to net-zero carbon emissions for commercial aviation. (Boeing photo)

The Cascade effect

Boeing debuted The Boeing Cascade Climate Impact Model (Cascade) at the Farnborough International Airshow in 2022. This web application uses digital technical data pulled from across the world to visualize how introducing various sustainable aviation options would impact global emissions. Cascade uses life cycle modeling to accurately quantify how choices in the four key areas impact the atmospheric concentrations of carbon dioxide.

Cascade is a way to visualize the climate impact of global commercial aviation while creating scenarios to calculate what kind of positive impacts our levers to decarbonize aviation would have on carbon emissions: fleet renewal, operational efficiency, renewable energy and new aviation technologies like hybrid, electric or hydrogen airplanes.

Why it matters: It's a data-driven way for our stakeholders to make informed decisions about how to reach the commercial aviation industry's net-zero 2050 ambition.

[Learn more about Cascade](#)

"Cascade helps airline operators, industry partners and policymakers see when, where and how different energy carriers and life cycle emissions affect their sustainability goals. The tool shows how incremental changes can cut emissions in commercial aviation."



Neil Titchener, program leader, Cascade. (Boeing photo)

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Four Strategies to Advance Sustainable Aerospace Together



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Cross-sector global partnerships required

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Fleet Renewal

New airplanes provide significant efficiency gains — historically each generation reduces fuel use and emissions 15%-25%. Deploying the latest generation of airplanes is one of the most significant contributions to CO₂ emissions reduction available over the next decade. Boeing will continue to invest in efficiencies that reduce fuel use and carbon emissions. [More detail on the sustainability of Boeing's products can be found here.](#)



In December 2022, Boeing and United Airlines announced the carrier is investing in its future fleet with an order for 100 787 airplanes, with the option to purchase 100 more. The deal is the largest 787 Dreamliner order in Boeing's history. United is also purchasing 100 737 MAX jets. (Boeing photo)

New orders mean more efficient fleets

774 big things: In 2022, our customers ordered 774 new commercial aircraft. New airplanes provide significant efficiency gains — each generation has reduced fuel use and emissions by 15%-25%.

Why it matters: Deploying the latest generation of airplanes is one of the most significant contributions to reducing carbon emissions available over the next decade.

Research matters: The emissions reductions available today in our latest generation of aircraft are a direct result of Boeing committing a significant amount of its research and development investment to sustainable technologies, such as:

- The Advanced Technology Winglet on the 737 MAX that reduces drag and increases lift.
- Lightweight carbon-fiber composite material on the 787 that is 30% lighter than aluminum.
- Folding wingtips on the 777X that offer unconstrained wingspan and contribute to 5% greater aerodynamic efficiency.

Go deeper: Read about [our orders and deliveries here](#).

"With this investment in its future fleet, the 737 MAX and 787 will help United accelerate its fleet modernization and global growth strategy. The Boeing team is honored by United's trust in our family of airplanes to connect people and transport cargo around the world for decades to come."

Stan Deal, president and CEO of Boeing Commercial Airplanes

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Showing up, sustainably

Boeing's newest and largest members of its 737 MAX and 777X airplane families flew to the 2022 Farnborough International Airshow on sustainable aviation fuel blended with conventional jet fuel at a 30/70 ratio, using the same SAF blend for their daily flying displays. The 737 MAX family leverages advanced aerodynamic design and highly efficient engines to reduce fuel use and emissions 20%, and the noise footprint is 50% less than the airplanes they replaced. The 777-9 will deliver 10% better fuel use, emissions and operating costs.

Videos:

▶ [777-9: Watch it fly.](#)

▶ [737-10: See efficient flight.](#)



Arriving at EAA AirVenture in Oshkosh, Wisconsin, on a 30/70 blend of SAF, the 2022 Boeing ecoDemonstrator provided tours to more than 5,000 show visitors and served as a beautiful backdrop for attendees celebrating WomenVenture day. Boeing sponsored EAA WomenVenture as it celebrated its 15th year of programming designed to encourage and support women in aviation. (Boeing photo)

▶ [Video: Watch AirVenture in Oshkosh.](#)

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Operational Efficiency

Safe, sustainable skies are the priority. Boeing continues to invest to ensure our aircraft have the latest equipment and services to support advanced procedures, and we also work with airlines, government customers, air navigation service providers and airports on efficiency improvements. These include procedures such as continuous descent approaches and equipment upgrades such as GPS-based navigation for more direct routings. We develop services to leverage data for fuel and flight efficiency, help customers optimize flight planning and provide pilots with real-time weather and traffic information.

“Boeing has multiple digital solutions available today and even more that are in development to help customers improve their fuel and flight efficiency while reducing carbon emissions.”

Stephanie Pope, president and CEO of Boeing Global Services

Managing air traffic efficiently

Boeing works with governments, airports, airlines and air navigation service providers around the world on exploring new approaches to air traffic management (ATM).

Why it matters: Optimized ATM is a critical component needed to reach the commercial aviation industry's net-zero ambition — collaboration on how to manage airspace more efficiently can reduce emissions by about 10%, according to EUROCONTROL.

Around the globe: ATM solutions designed to address specific, local and regional needs help airports and airlines operate more safely, quietly and sustainably:

- **China:** Boeing is supporting China's Air Traffic Management Bureau in exploring a new approach to ATM called “EoR” — Established on Required Navigation Performance (RNP). It's a separation standard for landing aircraft established by the ICAO, which enables safe separation on parallel runways through simultaneous RNP-equipped arrivals, while reducing fuel burn, greenhouse gas emissions and noise.

- **Europe:** Boeing is participating in seven new Single European ATM Research (SESAR) 3 Joint Undertaking research projects, renewing a 20-year-plus commitment to aircraft operational efficiency and air traffic management in Europe and paving the way to a future sustainable sky. The seven projects address critical areas for change, including emissions reduction, automation enabled by artificial intelligence, resilient ATM service provision, as well as the swift uptake of solutions for the integration of drones (U-space), urban air mobility, multimodality and reduced emissions operations. The partnership is a European undertaking between private and public sector partners to accelerate the delivery of the Digital European Sky through



Executive operations support assistant in EUROCONTROL's Maastricht Upper Area Control Centre, which enables air traffic controllers to provide safe and efficient air traffic services. (EUROCONTROL photo)

research and innovation. To do so, it is harnessing, developing and accelerating the implementation of the most cutting-edge technological solutions to manage conventional aircraft, drones, air taxis and vehicles flying at higher altitudes.

- **India:** Boeing completed the development of a 10-year road map for Communication, Navigation and Surveillance/Air Traffic Management (CNS/ATM) for Airports Authority of India (AAI). Backed by the U.S. Trade and Development Agency, Boeing and AAI conducted an analysis across operational, environmental, regulatory, technological, safety and financial factors. The resulting road map focuses on improving airspace utilization and maintaining safe and efficient aircraft operations — helping to modernize the Indian National Airspace System with domestic traffic expected to double by the end of this decade.

The bottom line: Boeing will continue developing local and global partnerships within the aviation ecosystem, enabling exchange of expertise and technology to help build a safer and more sustainable future of flight.

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Celebrating a decade of paperless flight decks

The big picture: In the summer of 2012, Boeing's Jeppesen FliteDeck Pro launched — the very first electronic flight bag (EFB) application to test what, at the time, felt revolutionary: pilots flying with digital charts and maps, free of paper binders. A decade later, the digital solutions revolution in aerospace continues to enable airlines to make impressive strides in operational efficiency and their sustainability targets.



Kubota Garden, Seattle (Boeing photo)

305,000
trees saved



5B+
sheets of paper
not printed

6,111
acres of forest not
needed for printing

300,000+
pilots supported



270,000
tonnes of
fuel saved

40,000+
paperless flights
enabled daily

100M+
paperless flights
enabled

857,722
tonnes of CO₂
emissions avoided

6.3M kg
(13.9M pounds) of paper
removed from airplanes

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Renewable Energy

Renewable energy can help reduce carbon emissions inside our operations and from our products and services. For our products, renewable energy can help reduce the carbon intensity of an energy powering our products, such as Sustainable Aviation Fuel (SAF), green hydrogen and batteries. Boeing believes SAF is a necessary lever to decarbonize aviation. However, it will take a “SAF and” approach and not a “SAF or” approach to support the commercial aviation industry’s ambition for net zero by 2050. As part of the “SAF and” approach, Boeing continues to advance the viability of other renewable energy carriers and their safe use on aircraft.

For additional information on SAF, please reference the [SAF Fact Sheet](#).

Creating a decarbonized solution in the UAE

When Boeing was invited to analyze a study that looked at developing SAF in the United Arab Emirates (UAE), the decision to participate was easy and will support the growth of SAF production in the region.

The “[Power-to-Liquids Roadmap](#)” report examines the financial, economic and environmental benefits of decarbonizing the country’s aviation industry with an emerging SAF technology.

Boeing’s role: The report was developed by the UAE Ministry of Energy and Infrastructure in collaboration with the World Economic Forum’s Clean Skies for Tomorrow Initiative. Boeing participated by offering expertise at the launch event, analyzing the findings and being an active member of the UAE’s SAF task force, which is led by the Ministry of Energy and Infrastructure and provides strategic guidance on a range of fuel options, including Power-to-Liquids (PtL), a type of SAF.

What is PtL? SAF requires careful attention to detail. There are several pathways to creating PtL (Power-to-Liquid) including the process where renewable electricity, CO₂ and water are synthesized into a liquid hydrocarbon, including jet fuel.



The Emirates flight test utilized 18 tons of SAF in one engine of a 777-300ER blended from two producers, Neste and Virent. The flight flew over the Dubai coastline for just over an hour. (Emirates photo)

Here's how it's made:

- Electricity is applied to the water (H₂O). The hydrogen is collected and the oxygen is set aside.
- The hydrogen is mixed with the carbon dioxide in a reactor until it matures.
- The liquid is removed from the reactor, which results in PtL jet fuel.

Resources needed: This PtL relies on two things in the UAE: tapping into the UAE’s abundant sources of renewable energy (intense sunshine and sustained winds), as well as its ability to capture carbon dioxide from the air or from point sources such as industrial waste gases.

PtL is considered a significant technology for the UAE to decarbonize aviation. Other

countries are also studying PtL to mature the technology and assess how this pathway may help them decarbonize.

The upshot: The UAE report shows that it would be ambitious but feasible for the country to produce as much as 11 million tons of PtL SAF by 2050 — equivalent to approximately 70% of national jet fuel consumption.

It's all about partnerships: “We collaborate with policymakers across six continents to support the SAF value chain, including its supply, use, certification and life cycle,” said Mohammed Al Ghailani, Boeing’s sustainability lead for the Middle East and Africa. “We were thrilled to support the UAE’s ongoing research into developing a renewable fuel that would be suitable to the region.”

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Feedstocks and forces – Boeing’s work to scale up SAF around the world

Why it matters: Today, SAF is made from waste-based agricultural products and used cooking oil and reduces emissions by up to 80% compared to conventional jet fuel. Most is currently blended with fossil fuel. Boeing is working to make SAF more accessible to help deliver on its commitment that commercial airplanes will be compatible to fly on 100% SAF by 2030. SAF development and production deliver economic growth, provide energy security for countries and create jobs across multiple industries.

SAF sources and building scale: Boeing is researching, developing and advocating for SAF across the globe, working with the most sustainable feedstocks that are available.

- **Australia and New Zealand:** Boeing is working on a SAF road map, in partnership with the Commonwealth Scientific and Industrial Research Organisation (CSIRO), to help analyze the availability of sustainable feedstocks in the Asia-Pacific region, primarily focusing on Australia and New Zealand.
- **Brazil** is the second-largest biofuel producer globally. Boeing’s focus includes feedstocks that can be sourced sustainably, such as sugar cane, eucalyptus and other residual biomass options.
- **China** is planning to scale up SAF adoption and Boeing has partnered with Peking University to develop fundamental research meant to guide the industry in identifying promising SAF feedstocks and pathways.
- **Ethiopia:** Boeing supports a SAF e-learning and academic program in partnership with Roundtable for Sustainable Biomaterials (RSB). Boeing conducted a feasibility study on Carinata (Ethiopian mustard) as a feedstock for SAF production.

• **Europe:** Boeing’s technology office in Madrid participates in research and development activities with the Horizon Europe program to develop new pathways and to join consortia focused on energy transition for both small and large airports.

• **India:** In collaboration with World Economic Forum’s Clean Skies for Tomorrow initiative, India produced a road map detailing how to scale production and use of SAF, including feedstock analysis, production capacity and technological maturity.

• **Japan:** In August 2022, Boeing announced its new center focusing on sustainability and supporting a newly expanded cooperation agreement with Japan’s Ministry of Economy, Trade and Industry. Read more on our partnerships in Japan on [Page 45](#).

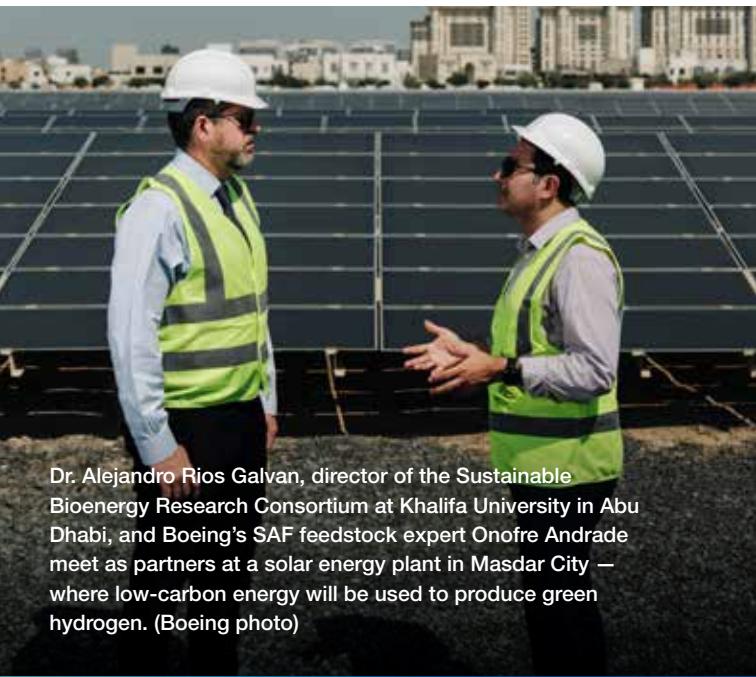
• **Middle East:** Boeing also participated in the Sustainable Bioenergy Research Consortium’s (SBRC) Seawater Energy and Agriculture System (SEAS), which is an integrated system of aquaculture, halo-agriculture and mangrove silviculture to produce SAF and seafood. The first airplane flight fueled with jet fuel produced through SBRC’s SEAS happened in January 2019.

• **Mexico:** Boeing is the only multinational company working with the Biojet Consortium, established in 2016 and is comprised of 14 research centers and companies that are exploring alternative aviation fuel supply chain in Mexico.

• **South Africa:** Since 2014, Boeing has been working with RSB and World Wildlife Fund-South Africa to help small-hold farmers to grow crops that produce SAF. Boeing is partnering with Stellenbosch University to deliver SAF e-learning.

• **UK:** Boeing is focused on supporting the creation of a policy, capital and innovation ecosystem in the UK to enable the Government’s Jet Zero Strategy commitment of having five plants in construction by 2025. Boeing was proud to be the founding partner of the Energy Innovation Centre at the University of Sheffield, which has since been selected as the home of the UK SAF clearing house.

• **U.S.:** Boeing focuses on SAF procurement, research and development, and promoting SAF commercial scale-up in the U.S. and around the globe. Boeing also recently announced the purchase of 5.6 million gallons of SAF for its commercial operations in 2023.



Dr. Alejandro Rios Galvan, director of the Sustainable Bioenergy Research Consortium at Khalifa University in Abu Dhabi, and Boeing’s SAF feedstock expert Onofre Andrade meet as partners at a solar energy plant in Masdar City – where low-carbon energy will be used to produce green hydrogen. (Boeing photo)

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Fond childhood memories propel a passion for possibility and sustainable fuel

Boeing's SAF feedstock expert Onofre Andrade witnessed the transformative economic power sustainable biofuels had on his job-deprived rural village, while growing up in central-west Brazil.

When he was a young boy, his father joined with other farmers to form a co-operative that built a sugar cane ethanol plant. It still operates today. Prior to this co-op being developed, the sole source of jobs was farm labor.

"The sugar cane ethanol co-op provided much-needed jobs, and that sparked hope in the lives of many people I care about," said Andrade. "The success of the ethanol plant catalyzed other co-ops and sparked capacity-building opportunities — including a co-op-led school started by my mother."

Andrade joined Boeing before SAF was a hot topic, but his early experience continues to give purpose to him and his family.

Boeing's SAF feedstock expert Onofre Andrade was inspired by seeing good jobs come to his rural village in Brazil when his father started a sugar cane ethanol co-op. (Onofre Andrade photo)

"I hope to inspire my kids the way my dad inspired me."

Onofre Andrade, sustainable aviation
fuel feedstock expert



Carissa Pajel at Boeing SAF lab.
(Boeing photo)



Peter Nease and Clarence Santiago fueling ecoDemonstrator
with SAF. (Boeing photo)

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To meet the commercial aviation industry's net-zero ambition by 2050, it will take an approach that includes SAF and other advanced technologies. Boeing has extensive experience on the "and," through research, studies, testing and partnerships. The future of flight will incorporate the latest digital design, test and production tools, airframe, propulsion and systems technology, and different power and energy solutions will apply to different market segments and aircraft sizes.

Informed by the company's extensive evaluation and testing of alternative propulsion sources and renewable energy and its research partnerships, and supported by Boeing's expertise in commercial aircraft design and history of innovation on alternative energy and propulsion systems, Boeing has launched a new effort to conceptually design and assess the potential environmental impacts of "Future Flight Concepts." These concepts are exploring applications of technologies including electrification and alternative fuels, such as hydrogen.

NASA awards sustainable flight program to Boeing and partners

In January 2023, NASA selected Boeing and its industry team to lead the development and flight testing of a full-scale Transonic Truss-Braced Wing (TTBW) demonstrator airplane through the Sustainable Flight Demonstrator (SFD) program. Through this unprecedented public-private partnership with NASA, Boeing and its industry partners are contributing more than half of the funding needed to shape the demonstrator program.

Why it matters: The technologies demonstrated and tested will inform future designs and could lead to breakthrough aerodynamics and fuel efficiency gains.

"One of the key outputs of this activity is really the learning, the knowledge. What at the integrated airplane level ... will the benefits be? And depending on the results of this effort, and market conditions — that'll dictate whether this shows up on a future commercial product."

Todd Citron, Chief Technology Officer

When combined with expected advancements in propulsion systems, materials and systems architecture, a single-aisle airplane with a TTBW configuration could see reduced fuel consumption and emissions of up to 30% relative to today's most efficient single-aisle airplanes, depending on the mission.

Years in the making: The TTBW airframe concept is the result of more than a decade of development supported by NASA, Boeing and industry investments. Under previous NASA programs, including the agency's Subsonic Ultra Green Aircraft Research program, Boeing conducted extensive wind tunnel testing and digital modeling.



Concept art showing possible commercial aircraft families with a Transonic Truss-Braced Wing configuration. (Boeing image)

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Wisk unveils self-flying, eVTOL aircraft

Wisk, a technology joint venture, is developing its 6th Generation aircraft. Designed with the highest safety standards, it will be the first candidate for certification of an autonomous, passenger-carrying electric vertical takeoff and landing (eVTOL) aircraft in the U.S. The Gen 6 aircraft has room for four passengers, carry-on luggage and personal items, can fly 90 miles (145 kilometers) and recharges in 15 minutes.

Why it matters: Wisk will be the first candidate for certification of an autonomous, passenger-carrying electric vertical takeoff and landing (eVTOL) aircraft in the U.S.



“Wisk is excited to partner with Boeing on the development of this autonomous aircraft. Our combined experience uniquely positions Wisk to succeed in this exciting new mobility market.”

Brian Yutko, CEO, Wisk

Wisk 6th Generation autonomous, passenger-carrying electric vertical takeoff and landing aircraft. (Wisk photo)



Space Launch System in flight.
(Boeing image)

Taking a SAF and other advanced technology approach

It will take a “SAF and” approach, not a “SAF or” approach, to achieve the commercial aviation industry’s net zero ambition by 2050. As part of our approach, which includes SAF and other technologies, Boeing continues to advance the safety and viability of other energy carriers and their use on aircraft. Since the mid-2000s, Boeing has conducted six hydrogen technology demonstrations with crewed and uncrewed aircraft using hydrogen fuel cells and combustion engines. Boeing successfully tested a cryotank designed for space with the capacity to hold 16,000 gallons of liquid hydrogen or the energy equivalent of the Jet A fuel in a typical regional jet.

Boeing was reminded of the challenges and opportunities associated with hydrogen with the recent Artemis mission. Chris Raymond, Boeing’s chief sustainability officer dives into more detail in this [Fortune article](#).

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Sustainability test bed turns 10

The Boeing ecoDemonstrator marked its 10-year anniversary in 2022 — accelerating innovation by taking promising technologies out of the lab and rigorously testing them in an operational environment.

By the numbers:

The program has tested over 225 technologies to help enhance safety, decarbonize aviation and improve operational efficiency and the passenger experience.

- Nine platforms served as flying test beds:
 - 2012: American Airlines 737-800.
 - 2014: Boeing 787-8 Dreamliner.
 - 2015: TUI 757.
 - 2016: Embraer E170.
 - 2018: FedEx 777 Freighter.
 - 2019: Boeing 777-200.
 - 2020: Etihad Airways 787-10.
 - 2021: Alaska Airlines 737-9.
 - 2022-2024: Boeing 777-200ER (Extended Range).
- Approximately one-third of those technologies progressed onto Boeing's products and services, including:
 - More aerodynamically efficient winglets on the 737 MAX.
 - iPad apps that provide real-time weather and other information to pilots, enabling them to improve fuel efficiency and reduce emissions.
 - Custom approach path information to lower community noise.
 - Flight deck touch-screen displays and a camera system on the 777X that will enhance safety by helping pilots avoid ground obstacles.



"I am proud of the ecoDemonstrator's role in pioneering the use of sustainable aviation fuel (SAF) for the industry.

Not only has almost every one of our platforms flown on SAF, we conducted the industry's first commercial flight on 100% SAF in both engines in 2018 with FedEx Express and tested SAF emissions with NASA. That is what we do — partner across the industry to help safely decarbonize aerospace."

Rae Lutters, ecoDemonstrator program manager

The 2022 Boeing ecoDemonstrator, a 777-200ER (Extended Range) flies on a blend of 30% SAF and 70% conventional jet fuel. (Boeing photo)

 [Video: See flying lab.](#)

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Boeing partners for a clean energy economy

Throughout 2022, Boeing joined forces with innovative partners from around the world to scale renewable energy and sustainable technologies for a more sustainable aerospace and future.

Why it matters: Boeing is aware that no one entity can decarbonize the commercial aviation industry alone. It will take “everyone” to achieve the industry’s net zero ambition by 2050. We recognize the significant capital investment required in the journey and appreciate the partnership and support of the financial community to channel liquidity into the ongoing transition pathway.

- **Avolon and SkyNRG:** Boeing partnered with Avolon, ORIX Aviation, SFS Ireland and SkyNRG to identify opportunities for a commercial-scale SAF production facility in Ireland. The country is a global leader in aviation finance and airline operations with a planned growth of renewable energy sources. The study will be completed in 2023.
- **Alder Fuels:** Boeing has committed to support testing and qualification of Alder Fuels-derived SAF on its airplanes to further grow the global SAF market. This technology enables the conversion of sustainable forest and agricultural residues into a low-negative carbon “greencrude” for jet fuel conversion — displacing the typical jet fuel need by up to 75% in the U.S. The first plant will be completed in 2024.
- **ACT FOR SKY:** Boeing is a member of ACT FOR SKY, a voluntary organization of 19 companies that works to commercialize, promote and expand the use of SAF produced in Japan.



At the Farnborough Airshow in June 2022, Boeing and Mitsubishi Heavy Industries announced we will build on our decades-long partnership. (Boeing photo)

• **Mitsubishi Heavy Industries (MHI):** Building on their decades-long partnership, Boeing and MHI agreed to study sustainable technologies for a low-carbon society. Their focus areas include green hydrogen, carbon capture, electrification, sustainable materials, emissions propulsion technologies, new aircraft design concepts as well as new feedstocks and technologies for SAF production.

• **NASA:** Boeing and NASA continued their partnership testing the emissions from SAF. This year, the team conducted tests on the 2022 Boeing ecoDemonstrator, a 777-200ER (Extended Range) with Rolls-Royce Trent 800 engines and a 787-10 with GEnx-1B engines ([see Page 44](#)).

• **Rocky Mountain Institute and Five U.S. Airlines:** Boeing, along with five major U.S. airlines and others, joined the Contrail Impact Task Force led by the Rocky Mountain Institute to explore the formation, impact, and mitigation of persistent condensation trails, or “contrails,” and their climate effects.

• **Roundtable on Sustainable Biomaterials (RSB):** Boeing has been a member of the Board of Directors since 2021 and has chaired RSB’s SAF Policy Platform to advance stakeholders’ collaboration on renewable energy.

• **SpiceJet, Council of Scientific and Industrial Research-Indian Institute of Petroleum (CSIR-IIP):** Boeing partnered with these organizations to explore SAF use in India, supporting the country’s environmental goals and self-reliance initiative. Boeing is currently assisting in the certification process for SAF developed by CSIR-IIP by providing review and support.

• **Virgin Atlantic:** In December 2022, partnering with Boeing, Virgin won the UK Department for Transport’s 100% SAF Trans-Atlantic Flight Fund Competition. This UK government initiative, which will see a 787 cross the Atlantic on 100% SAF in 2023, will showcase the spectrum of sustainable aviation approaches to the flying public and inform our journey toward routine commercial industry 100% SAF flights by 2030.

What's next: The commercial aviation industry's ambition is to achieve net-zero carbon emissions for global civil aviation operations by 2050, while also growing the societal benefits of air transportation. Boeing will continue to work across sectors and industry to ensure the benefits of aerospace remain available for generations to come.

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University partnerships strengthen sustainability at Boeing

Why it matters: Strong university partnerships are one way Boeing demonstrates that it is looking outside the aerospace industry to give and receive support for research and development and to attract top talent.

Here are some universities partnering with Boeing on sustainability:

- **Yale Center for Natural Carbon Capture:** In April 2022, Boeing pledged \$10 million to research efforts in natural carbon sequestration to scale natural solutions to mitigate GHG. The Center's focus is on near-term solutions that can capture approximately one gigaton of CO₂ per year, the equivalent to current annual airline emissions. This approach offers potential co-benefits such as improved soil health and biodiversity conservation.
- **University of Sheffield:** Boeing is the founding member of the Energy Innovation Center (EIC), which is focused on driving SAF development. In early 2023, the EIC was announced as the UK's SAF Clearing House, in partnership with the University of Dayton, reinforcing the critical role this first-of-its-kind facility in the UK will play in the global ecosystem. The EIC builds on Boeing's long-standing relationship with Sheffield, which started with the co-founding of an advanced research center for manufacturing and led to the opening of Boeing's first European manufacturing facility, demonstrating a successful model for university and industry collaboration.

Fossil-Free Future for Aerospace: His Majesty King Charles III visits Cambridge University, when he was Prince of Wales, to see plans for a new Whittle Laboratory building that would act as a hub for the university-led Aviation Impact Accelerator (AIA), of which Boeing is an official industry adviser, focused on accelerating the move toward the commercial aviation industry's climate goals. (University of Cambridge photo)

• **University of Cambridge:** In 2023, Boeing is celebrating 20 years of collaboration with the University of Cambridge. Among other research projects, Boeing is partnering with the university's Whittle Lab on its Aviation Impact Accelerator (AIA) to draw from a multidisciplinary range of expertise. AIA develops interactive, evidence-based models, simulations and visualization tools for decision-makers and others to understand low-emissions flight pathways, complementing our own Cascade tool. The AIA tool will help Boeing and interested parties understand how policies, scenarios and technology transitions support the industry's net-zero carbon emissions from commercial aviation by 2050.

• **Cranfield University's Digital Aviation Research and Technology Centre:** This partnership focuses on technologies that are relevant to the operational efficiency pillar of our sustainable aerospace strategy.

• **Villanova University:** The Resilient Innovation through Sustainable Engineering (RISE) Forum advances corporate sustainability by identifying and applying data-driven sustainability solutions. Boeing has access to faculty and graduate students who possess the technical expertise to examine real-world problems by evaluating various technologies or operational innovations through a systems perspective.

What's next: We will continue to partner with academic institutions at the forefront of sustainable aerospace research.



Alicia Piscitelli. (Boeing photo)

Studying sustainable materials in

forestry waste: University partnerships nurture the sustainability talent pipeline, which benefits graduates and the company. Alicia Piscitelli secured a position on Boeing's Research & Technology team after completing three company internships and earning both master's and doctorate degrees from Villanova's sustainable engineering program.

Boeing's circular economy expert and Associate Technical Fellow ([see Page 30](#)), Christin Datz, was Piscitelli's master's thesis adviser as she researched ways to advance the sustainable product life cycle. Piscitelli's doctoral research focused on renewable feedstock material for thermoset polymers used in interior aircraft composites. She studied ways to synthesize phenolics with renewable feedstocks derived from pine root oil and forestry waste.

Most recently, she's helping Boeing to find sustainable ways to manage polymers at the end-of-life phase of the sustainable product life cycle.

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Boeing partners with decision-makers for sustainable aerospace

Boeing is working with decision-makers and policy institutions globally to create tailor-made paths forward to decarbonize commercial aviation.

Why it matters: The commercial aviation industry's ambition of net-zero carbon emissions by 2050 has multiple levers to work toward meeting this target. SAF is seen as the best solution to accelerate toward this goal as it is a drop-in solution to the aviation ecosystem.

Around the globe: Here's a snapshot of Boeing's global policy partnerships.

- Americas:** Partnering with International Air Transport Association (IATA), Boeing hosted a SAF Roundtable at the IX Summit of the Americas and asked heads of state to develop sound policies to incentivize the production of SAF across the western hemisphere, highlighting the potential of the region. Boeing also partnered with seven airlines from across the Americas, using nearly 400,000 liters (106,000 gallons) of SAF for commercial flights during the week of the summit, avoiding the release of over 214 tonnes of CO₂.

- Australia:** SAF will unlock its share of an extra \$10 billion each year in GDP, generating 26,000 jobs, while reducing emissions by around 9%. Boeing and Bioenergy Australia hosted a panel at the Prime Minister's Sydney Energy Forum to accelerate the production of SAF, where the Australia Transport Minister announced plans for a Jet Council. Boeing also chaired the SAF Alliance of Australia and New Zealand to make key policy recommendations on scaling SAF.

- China:** Boeing and Peking University Institute of Energy released a report that compiles results of a yearlong research effort into SAF, the basis of a plan to decarbonize air travel in the world's second-largest commercial aviation market.

Boeing Global Sustainability Policy & Partnerships Vice President Brian Moran (right) is joined by Mohamed Al Ghailani, Boeing's sustainability lead for Middle East, Türkiye and Africa, at COP27, where they engaged with government, industry and civil society partners. (Boeing photo)

- Europe:** Boeing became a member of the European Commission's Renewable and Low-Carbon Fuels Value Chain Industrial Alliance. As part of the Aviation Working Group, Boeing is partnering with the European policymakers to inform how to scale production and uptake of SAF. In 2022, Boeing also took the lead as Sector Champion for Aviation in the World Economic Forum's First Movers Coalition (FMC), which has assembled 24 of the world's leading companies. All airlines and air transport companies in this sector have set a target to procure 5% of their fuel demand as advanced SAF. The group works to overcome technology barriers and bring forward supply with the intent of striking binding commitments between buyers and sellers.

- Middle East:** Boeing discussed real-world climate actions at the 2022 COP27 via panels and keynotes with partners and stakeholders, amplifying that the only way to keep 1.5 degrees C alive is through cross-sector partnerships, strategies, regulation and data to keep all parties on track.

- Singapore:** Boeing joined the International Advisory Panel (IAP) set up by the Civil Aviation Authority of Singapore to develop Singapore Sustainable Air Hub Blueprint by 2023. Boeing provided insight into IAP's report on scaling SAF and improving air traffic management to create a conducive policy framework for the region's busiest aviation hub. Boeing also briefed the Association of Southeast Asian Nations Air Transport Ministers on key strategies for sustainable aviation, encouraging further discussion amongst the member states on accelerating regional cooperation.

- UK:** Boeing hosted the seventh Jet Zero Council meeting in its offices, presenting its Cascade tool to the Secretary of State for Transport and Secretary of State for Energy and Net Zero. The work of the council is crucial for the UK Jet Zero Strategy. Boeing was appointed co-chair of the Defence Supplier Forum Climate Change and Sustainability Aviation Group with the Royal Air Force. Boeing also leads a NATO group on behalf of the UK focused on accelerating military adoption of SAF to support defence sustainability and energy security.



- U.S.:** The SAF Grand Challenge engages federal government agencies to develop a comprehensive strategy for scaling up new technologies to produce SAF on a commercial scale from renewable or waste resources. Objectives include: expanding SAF supply and end use; reducing its cost; enhancing its sustainability; supplying at least 3 billion gallons of SAF annually by 2030; and sufficient SAF to meet 100% of aviation fuel demand by 2050, which is projected to be around 35 billion gallons per year.

What's next: Boeing will continue to work closely with governments, customers and decision-makers globally to achieve our shared goal in 2023 and beyond, including:

- Partnering on SAF road maps across the APAC region, including Australia, New Zealand, Southeast Asia and Japan.
- Helping to develop Australian Jet Zero Council.
- Advocating to policymakers, the finance community and suppliers through regional workshops with FMC around the world to build local capacity for SAF supply, enhance demand commitments and unlock commercial challenges.
- Supporting the release of global SAF guidance on future supply and demand issues for buyers and sellers.
- Working closely with the UAE government on shaping sustainable transport agenda at COP28.

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Gonzaga University Senior Design students receive the Adient Aerospace Ovation seating; left to right in photo: Hannah Dunn, Micah Donald, Brady Jurgens, Emily Andresen. (Zack Berlat, Gonzaga photo)

Lighter seats lift efficiency

Boeing's Cabin and Interiors and Payloads Engineering teams are finding innovative ways to reduce waste, emissions and weight during the product life cycle for complete customer solutions that promote sustainability. One of those ways involves a group of college students in Spokane, Washington. Boeing and joint venture aircraft seating partner, Adient Aerospace, joined with Gonzaga University's School of Engineering and Applied Science students to support a sustainability-focused research initiative. The students are using Adient Aerospace's Ovation seat prototype to study cabin product design, manufacturing and maintenance to find new approaches to increase sustainability measures.



Gonzaga University senior design students Brady Jurgens, Hannah Dunn, Emily Andresen and Micah Donald study Ovation seat design and structure. (Zack Berlat, Gonzaga photo)

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Habitat restoration along the Lower Duwamish Waterway in Seattle. (Boeing photo)

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Quality

We design quality into every aspect of our business and drive personal accountability to ensure quality in everything we do and in every product we deliver. We promote quality with our people, our culture, metrics and oversight.

The Boeing Quality Management System (QMS) has a foundation in AS9100, which is the internationally recognized and premier aerospace QMS standard. Boeing aims to flow down AS9100 certification and compliance to its suppliers in order to enable effective and efficient processes that meet multiple customer, statutory and business requirements.

QMS and the company's Safety Management System (SMS) work together and are built into the company's organizational structure, policies, processes, procedures and resources. Our customers and our regulators have extremely high expectations of Boeing, and these systems help to operationalize safety and quality in order to meet those expectations.

We incorporate safety and quality metrics into our primary annual incentive structures, further driving our focus across the enterprise at every level of the organization. We operate with four enterprise-wide operations councils focused on strengthening quality, manufacturing, supply chain and program management in every program. We deliver quality through a relentless commitment to integrity, safety and sustainability, which is fundamental to our mission.

[Learn more about our approach to quality.](#)



The T-7A Red Hawk is manufactured with a new proactive quality tool called Requirements Consumption Review. (Boeing photo)

A sustainable approach to supplier quality success

Boeing is expanding a new proactive quality tool called Requirements Consumption Review (RCR) to ensure suppliers fully understand all requirements prior to building a product — and it's significantly reducing waste and rework down the line to enable first-time quality.

Why it matters: The program is having a positive impact on quality.

- Boeing conducts the review for newly designed products or products that have moved to a new supplier and that may generate a defect, for example, given the part's complexity.
- RCRs have resulted in a 95% first-time quality yield, compared to 60% for similar parts that did not involve the tool.
- First deployed across Boeing's Defense, Space & Security business, RCRs are now being implemented across Commercial Airplanes and Global Services as well.

"When we send a purchase order to a supplier, it can be a detailed process to ensure we receive high-quality products that meet our exacting requirements. This early involvement approach involves a cross-functional team that works proactively with the supplier to go through the purchase order together, including all the critical technical requirements, and establish confidence and clarity from the start. It also demonstrates that we are invested in their success."

Doug Ackerman, vice president of Supplier Quality

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Digital factory of the future

Boeing is utilizing an industry-leading technology to transform the way we design, test and build airplanes. Today, Boeing engineering teams are studying how recent lessons learned from across the company could shape the factory of the future — with digital transformation as a major driver.

Why it matters: Stability and optimized performance is happening.

- Boeing's T-7A Red Hawk team was able to build the first several aircraft in simulations before production even started and then join the aft and forward fuselages in less than a half-hour, a process that would normally take days.
- Although commercial airplanes are larger and production requirements are different from military aircraft, Boeing teams will apply those learnings to future programs. That knowledge, combined with more than a century of development experience on other programs, will guide future production.

It comes down to this: This will enable Boeing to predict performance of the production system and see how changes in the airplane design affect that performance, or vice versa. It will also allow teams to “build” the first several aircraft in a simulation, flattening the learning curve. Supplier readiness and success around first-time quality enables Boeing to operate more sustainably as a business.

By driving quality within the supply chain, Boeing demonstrates its commitment to sustainability by reducing rework and/or delayed parts in the value stream to minimize time lost and waste.

 [Video: Take a look at our future factory.](#)



“Creating a digital twin of our factory operations will help to increase stability and optimize performance prior to physically building a product. We have long used models to predict aircraft performance and refine them with test data as it comes available. Similarly, we will build models to predict production system performance and refine them as systems come online.”

Howard McKenzie, chief engineer and executive vice president of Engineering, Test & Technology

A simulated view of what a future commercial factory could look like. The concept builds off of lessons learned from how the T-7A program operates in St. Louis — no fixed tooling, no holding fixtures. The part becomes the tool, which is a revolutionary concept. (Boeing image)

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Sustainable Operations

Boeing appreciates sustainable aerospace starts inside our four walls. We are focused on continuous improvements in pursuit of the sustainable product life cycle across key elements including greenhouse gas emissions (Scope 1 and Scope 2), energy usage, water and waste management. We take action to decrease our impact through renewable energy procurement, targeted infrastructure and equipment investments, efficiency standards and conservation initiatives that include deployment of best practices and employee engagement strategies. Core to this strategy is the ongoing engagement of our employees each year through education and initiatives focused on ways in which they can reduce their environmental impact at work, and at home. Boeing's environmental strategy is guided by a comprehensive review and assessment of the most significant environmental challenges and risks facing the company, and our environmental priorities are set with internal and external stakeholders. The analysis includes direct input and perspectives on industry best practices and community requirements from diverse stakeholders, such as customers, environment-focused nongovernmental organizations (NGO) and the company's global leadership. The information helps Boeing identify and update our understanding of current and emerging sustainability issues that are critical to the company and our stakeholders. It also informs our next-generation environmental strategy and targets.

Since 2020, Boeing has achieved net-zero GHG emissions at manufacturing and work sites by expanding conservation and renewable energy use while securing carefully selected, third-party-verified offsets for the remaining greenhouse gas (GHG) emissions.



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Operational Targets Progress

Performance Area ¹	2025 Targets vs. 2017 ²	2022 Progress Toward 2025 Targets and Drivers	2030 Targets ³
 Greenhouse Gas Emissions	Reduce emissions by 25% ¹	31% Reduction Procurement of renewable energy and renewable energy credits, low commercial production activity and infrastructure investments.	<ul style="list-style-type: none"> Net-zero emissions.⁴ 55% GHG reduction from 2017. 100% renewable electricity.
 Energy ⁵	Reduce energy consumption (natural gas, other fuels and electricity) by 10%	11% Reduction Conservation initiatives, infrastructure investments, remote working conditions and reduced production activity.	<ul style="list-style-type: none"> 10% energy reduction from 2025.
 Water ⁶	Reduce water withdrawal by 20%	19% Reduction Increased water intake efficiencies and low production activity.	<ul style="list-style-type: none"> 5% reduction from 2025.
 Solid Waste ⁷	Reduce solid waste to landfill by 20%	40% Reduction Conservation initiatives, vendor management and remote working conditions.	<ul style="list-style-type: none"> 30% reduction in solid waste produced from 2025. Over 90% diversion from landfill or incineration. Zero solid waste to landfill certification where applicable at major sites.
 Hazardous Waste ⁸	Reduce hazardous waste by 5%	9% Reduction Projects to reduce unused and expired materials, and partnerships to reduce waste generation.	<ul style="list-style-type: none"> 5% hazardous waste reduction from 2025.

1. Operational goals shown are absolute targets and not indexed to production levels or growth. 2022 performance was affected by changes associated with occupancy and operations during the COVID-19 pandemic, as well as conservation and changes in how Boeing purchases energy. The targets were established against a 2017 base year. The 2025 goals will act as a milestone to guide actions and progress to the 2030 goals.

2. All 2025 reduction goals were set with an operational boundary of the Core Metric Sites, which represent the majority (70%) of Boeing's operations, and includes emissions from electricity use and natural gas.

3. The 2030 reduction goals set with an operational boundary of The Boeing Company and includes all Scope 1 and Scope 2 emissions.

4. The net-zero achievement covers Scope 1 and Scope 2 emissions for all manufacturing and work sites within the company's operational control as well as Scope 3, business travel. This is achieved by expanding conservation and renewable energy use while securing carefully selected, third-party-verified offsets for the remaining greenhouse gas (GHG) emissions.

5. Energy includes natural gas, other fuels and electricity.

6. Water data represents approximately 84% of operations square footage.

7. Solid waste numbers represent values determined from scale-weighed containers as well as calculated weights. Nonhazardous solid waste is sent to landfill for disposal. This measure applies to all waste streams where Boeing is responsible for waste disposal service as a normal part of daily operations (excludes remediation and construction-related waste).

8. Hazardous waste is determined from U.S. EPA hazardous manifest or equivalent government shipping documents. All types of hazardous wastes that are generated at a facility and are discarded from the site for disposal, and would be considered part of the environmental footprint of the site. Actual tons of all Production or routine wastes shipped as hazardous waste (excludes remediation and construction-related waste).

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Addressing Climate Change

We consider climate change to be an urgent issue. We support the goals of the Paris Agreement and encourage our value chain partners to do the same. Boeing achieved net-zero carbon emissions at manufacturing and other work sites and in business travel in 2022 for the third consecutive year, by expanding conservation and renewable energy use while securing carefully selected, third-party-verified offsets for the remaining greenhouse gas (GHG) emissions. Boeing strives to reduce operational GHG emissions, both during times of growth and during times of challenge. Our strategy for Scope 1 and Scope 2 emissions, which we detail in the following section, aligns to a 1.5 degrees Celsius global warming potential scenario, in support of the global climate goals.

To achieve our goals related to the climate and to GHG, we actively monitor emissions, fuel use and energy efficiency. We have set 2030 targets for performance in each of these areas that aim to reduce absolute emissions, maintain net-zero emissions for Scope 1 and Scope 2, and increase our adoption of renewable energy sources. As part of Boeing's business continuity program, we also monitor the length and severity of business interruptions. The scope of monitoring includes damaging weather, natural disasters, pandemics and public health crises. It helps us understand how to increase resiliency in light of a changing climate.

Enterprise GHG emissions from operations are calculated after the conclusion of the reporting year. However, the emissions from natural gas and electricity usage at Core Metric Sites are calculated and monitored on a monthly basis 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. The energy data and emissions factors are verified as part of a third-party limited assurance process.

For the third year in a row, Boeing has achieved net-zero GHG emissions at manufacturing and work sites by implementing high-impact conservation investments, emphasizing and incentivizing conservation practices by employees, and increasing renewable electricity use while securing carefully selected, third-party-verified offsets for the remaining GHG emissions.

In 2022:

- **2025 GHG Target Progress:** Boeing had a 31% reduction in GHG emissions compared to 2017. GHG emissions were 8% lower than anticipated for the year. Procurement of renewable energy and renewable energy credits, low commercial production activity and infrastructure investments contributed to reduction in emissions from the operational footprint. The implementation of long-lasting infrastructure improvements and the contracting of renewable energy allow us to build on emissions reductions each year.
- **2025 Energy Reduction Target Progress:** Boeing had a 11% reduction in energy consumed compared to 2017. Energy consumption was 6% lower than anticipated for the year due to the impact of conservation initiatives, infrastructure investments, remote work and reduced production activity.



Boeing's Pollinator Prairie in Kansas. (Boeing photo)

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Boeing facilities prioritize conservation, energy efficiency and renewable energy

As energy consumption gives rise to GHG emissions, conservation and energy reduction measures help achieve both energy and GHG reductions.

Creating sustainable facilities:

Germany: Boeing's new distribution center in Hamburg meets high sustainability standards and will be seeking Gold certification from the German Sustainable Building Council. To minimize the environmental footprint, the building is equipped with a heat pump and a photovoltaic system will be installed on the roof in the later half of 2023.

U.S.:

- Mesa, Arizona, recently completed construction of a new composites manufacturing facility. A quarter of the electricity used at the site is solar power. This partnership between Boeing and the Salt River Project brings the company closer to achieving its 2030 goal of 100% renewable electricity.
- Switching to LED lighting in Boeing's Everett, Washington; Frederickson, Washington; and El Segundo, California, facilities is driving an annual recurring savings of 25.3 million kilowatt-hours, which is equivalent to powering more than 2,300 U.S. homes per year.

India: Boeing's new engineering and technology campus in Bengaluru will leverage multiple design elements, including efficient ventilation systems, LED lighting, rainwater recovery and solar power generation.

"Sustainability is something everyone should be thinking about. What kind of planet do you want to leave behind for future generations?"

Gregory Kurth, Mesa site facility maintenance engineer, Facilities & Asset Management

Boeing expanded its strong presence in Europe with a new state-of-the art distribution warehouse near Hamburg, Germany. (Boeing photo)

It comes down to this: Boeing will continue to invest in conservation and renewable energy projects to advance the company's operational environmental goals.

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Conserving Resources

Engaging Employees in Conservation

Boeing has implemented multiple approaches to encourage the workforce to support conservation by fostering sustainable behaviors. Employees are a source of innovation; champions of projects and their combined actions contribute to achieving Boeing's goals.

The programs that Boeing utilizes to get employees involved and contribute to the enterprise sustainability goals are designed to reach all aspects of the workforce ([Page 12](#)). Elements of sustainability are embedded within the Boeing Production system content and linked to Lean methodologies that eliminate waste and promote more efficient, sustainable practices within operations. Additionally, Boeing provides behavior change training and encourages recognition programs to help employees develop sustainable habits and reward them for their efforts.

The approaches used include elements of gamification, which involves turning sustainable behaviors into fun and engaging programs. Key employee engagement avenues include:

- **The Conservation Best Practices program**, which is deployed across the enterprise to prioritize reducing energy, water and waste at our largest areas of operation.
- **The Energy Star Battle of the Buildings** competition to encourage employees to work together toward our sustainability goals and promote a culture of environmental stewardship.
- **Aerospace Sustainability Foundations Training**, an internal credential training that allows employees to learn more about sustainable aerospace and practices and how they can incorporate them into their work.

By emphasizing employee engagement throughout the sustainability programs, Boeing is benefiting local communities and utilizing the capabilities of its diverse workforce to achieve its operational sustainability goals.

Earth Month photo contest winners

Boeing's Earth Month celebrations included a photo contest. Participants had the opportunity to submit a photograph with a description of what sustainability means to them.



**Winner: Kaitlin Brush
Brevig, BCA, Interiors
Responsibility Center**

For Kaitlin, sustainability means being able to find secret beauty in nature, without negatively affecting it. Photo entitled "Fog Camano," located in the Puget Sound.



**Runner-Up: Katie Ziegler,
777 Fleet Chief Office**

For Katie, sustainability includes protecting the honey bees that pollinate plants, sustaining food sources for humans and animals. Factors threatening honey bees include pesticides, disease and their natural predators like the giant hornet. Making honey bees a regulatory and lifestyle priority is critical.

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Employees more than double goal in annual conservation competition

While Boeing focuses on conservation every day, the company hosts an annual competition starting on Earth Day in April to encourage Boeing employees to take daily actions that advance sustainable operations.

Employees across the globe took more than 231,000 60-second actions for the environment from Earth Day on April 22 to May 31, 2022. This was the equivalent of

reducing carbon emissions by not driving 7.8 million miles (12.6 million kilometers). Top 60-second actions included using refillable water bottles, recycling and turning off equipment not in use.

Winners from across the globe:

The Battle of the Buildings competition among sites was based on the number of actions per capita and the winners in each category were:

- BGS
- Everett, Washington
- San Antonio
- Winnipeg, Canada
- Seattle Spares Distribution Center
- Berlin

“When employees engage in taking 60 seconds for the environment, we know it cuts costs, helps protect the environment and gives employees a sense of belonging, drive and purpose.”

Steve Shestag, director, Sustainable Operations, Global Enterprise Sustainability



Always with quality and pride, the Boeing Spares Distribution Center employees in SeaTac, Washington, step up as Battle of the Buildings winners, including (left to right): April Nelson, Steven Yaummarath, Jo Dollente, Brandon Stanfield, Justin Roberts, Brett Nichols and AJ Flores. (Boeing photo)

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Reducing Waste

Boeing is making strides to protect the land, water and air in our communities by reducing waste from work sites and our supply chain. Waste streams are as complex as our facilities, which range from office space to part fabrication to assembly of aircraft and space vehicles. Solid waste includes material that has been discarded or abandoned or that is no longer useful or usable and has been designated for removal. Items that are reused or reclaimed are excluded from solid waste. Boeing has dedicated teams working to prevent waste from going to landfills and to assess opportunities to return or reuse packaging for parts.

Boeing generates hazardous waste primarily from a variety of research, manufacturing and facilities maintenance processes. Hazardous waste may be recycled upstream or downstream, as on-site or off-site reclamation and avoided generation through processes that extend useful life of consumable chemicals to avoid hazardous waste. We look to reduce hazardous waste in upstream activities by preventing or reducing the amount of hazardous waste generated through extending system life through contaminant removal. Downstream, we look at hazardous waste generated from site operations. We implement several recycling and recovery activities to reduce the need for new chemicals.

Progress Toward 2025 Hazardous and Nonhazardous Waste Goals

- **Solid Waste – 40%** reduction compared to 2017. The continued trend of increased remote working conditions influences the overall reduction in solid waste. Conservation initiatives and vendor management continue to be opportunities to drive further reductions.
- **Hazardous Waste – 9%** reduction compared to 2017. Hazardous waste was 1% higher than anticipated during the year. Benefits from implementing conservation initiatives were outweighed by key events across the enterprise, including a historical flood event in St. Louis, which caused an unplanned increase in hazardous waste disposal from a water treatment system.

The Stingray gets Lean

As the U.S. Navy's uncrewed aerial refueler, the MQ-25 Stingray is a model of efficiency, in the air and on the production line.

The digitally engineered aircraft features a highly efficient engine and lightweight composite skin, allowing it to stay in the air much longer, using little fuel itself to complete its mission.

Within the factory setting, robotic automation and advanced assembly techniques eliminate the need for drilling during aircraft assembly.

Now, the futuristic aircraft is setting new standards for efficiency with a renewed focus on reducing waste through Lean manufacturing.

Across Boeing's production system, teams are building momentum with Lean principles. The MQ-25 is the first program within Boeing Defense, Space & Security to undergo a renewed focus on Lean.

A focus on the customer: "We know what Lean means to our Navy customer — operational excellence, stability and execution," Troy Rutherford, MQ-25 vice president and program manager. "When we focus on removing waste from the system and listening to those who do the work, then production, innovation and creativity all take a huge leap forward. We're excited to be the first program to engage with the Lean workshops."

What is Lean? Lean is a way of thinking and acting that enables us to solve problems and continually improve. It is the foundation of Boeing's production system and embraces just-in-time delivery, error-free production and continuous flow. Lean helps spot and eliminate waste, wherever it is found, which also reduces costs.

The MQ-25 Stingray is an uncrewed aircraft system, designed for the U.S. Navy, providing robust refueling capability. (Boeing photo)



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Facilities & Asset Management Reclamation team member Jon Kelley is Boeing's 2022 Environment Champion.
(Boeing photo)

Boeing Recognizes 2022 Environment Champion

Jon Kelley, Facilities & Asset Management Reclamation team member, brings heart, commitment and skill to reduce waste to landfill, conserve valuable resources and ensure the company is compliant with regulations that protect the environment and the public.

In 2022, Kelley was recognized as the Environment Champion for his environmental passion and 40 years of commitment to Boeing. Throughout his career, Kelley has done more than his job required for conservation and protection of the environment and public safety. By doing this, he has helped Boeing's Puget Sound sites maximize the conservation of materials and properly handle regulated materials, while providing guidance to business partners.

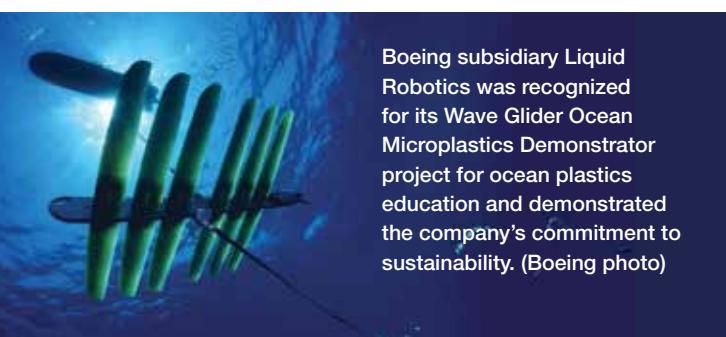
Kelley constantly redefines his job by raising the bar of efficiency and standard of quality. Leaning on his decades of experience, Kelley has helped to develop tools and training methods to increase his team's efficiency without compromising safety or quality. He further demonstrates his commitment to sustainability by training and inspiring employees to prioritize conservation and cross-functional collaboration.

Kelley humbly describes his work as simply: "Doing the right thing to keep things out of the landfill."

Boeing honors employees who embrace environment

Employee innovation recognized: Below is a sampling of the 15 environmental leader winners in six categories that focused on reducing waste, energy and water use.

- **In Everett, Washington**, 260 Boeing employees from 40 organizations generated 1,800 sustainability ideas to consider for future products in a "sustainability lab."
- **Seattle** employees reclaimed about 2,500 gallons of water per day at the Seattle Developmental Center by reconfiguring piping and installing a more efficient system.
- **Winnipeg** employees conserved electricity equivalent to 60 homes' annual use by installing occupancy sensors and upgrading LED lights, saving almost 720,000 kWh yearly.
- **A Mesa team** worked with the local utility company to lessen demand on high peak utility days during summer months by programming the Building Automation System to improve processes and generate 5,400 kWh, which earned rebates of \$30,000 annually.
- **An Everett team** reduced the amount of solvents required to flush paint pumps by removing filter housing. The result cut solvent use by 12 gallons per airplane and more than 10,000 pounds per year, saving almost \$19,000.
- **In Chennai, India**, employees reduced GHG emissions by consolidating shipments and transitioning from air to sea shipments for India suppliers.



Boeing subsidiary Liquid Robotics was recognized for its Wave Glider Ocean Microplastics Demonstrator project for ocean plastics education and demonstrated the company's commitment to sustainability. (Boeing photo)

Reducing water consumption

Boeing sets rigorous water use reduction targets at our manufacturing sites to preserve this natural resource for the environment and our communities. Boeing's water is sourced from local public utilities (surface, ground and reclaimed water) and company generation (on-site well, on-site reclamation and rain capture). This sourced water supports manufacturing, sanitation, drinking water, cooling and irrigation across the company. The majority of our water is from public water supply systems, and most consumption measurement is from water system revenue-grade meters. Water used within our facilities is discharged to public sanitary sewer systems. In some cases, Boeing pre-treats wastewater before discharging it to public sanitary sewer systems, in compliance with regulatory requirements. Boeing does not set voluntary effluent discharge standards beyond those set by regulation.

Boeing specialists work to identify efficiencies, best practices and new technologies to reduce water use and identify alternatives. We monitor irregularities that may require action and created a Conservation Best Practice program to minimize water use, applying many water management techniques endorsed by the U.S. Environmental Protection Agency.

In 2022, we achieved a 19% reduction compared to consumption in 2017. Water consumption was 7% lower than anticipated with sites implementing conservation initiatives to increase water intake efficiencies and with production activity remaining low. Building off the reductions seen by 2025, Boeing will transition to an absolute reduction goal to focus on the most water-intensive processes across the company.

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Biodiversity and Environmental Compliance

Boeing owns thousands of acres of habitat across five locations that are being protected or restored. Each habitat is actively managed and maintained by site employees, nonprofit organizations or contract biologists. For some locations, additional agreements and monitoring are in place to ensure all legal, contractual and certification requirements are met.

Each habitat is certified by the Wildlife Habitat Council (WHC), with three certified at the Gold level. The WHC's certification program is the only voluntary sustainability standard designed for broad-based biodiversity enhancement and conservation education activities on corporate landholdings.



- **Avian Project Award:** Awarded to Boeing for monitoring targeted species and food sources — and being managed by adapting to the environment. The Grasshopper Sparrow is also a happy recipient.
- **Grasslands Project Award:** Awarded to Boeing for monitoring of vegetation, wildlife use of vegetation, wildlife use and evaluation to create next steps for the project.
- **Pollinator Project Award:** Awarded to Boeing for monitoring targeted species and food sources yearly, and recognizes a policy integrated into overall site operations to minimize, eliminate or apply responsible use practices of pesticides and herbicides.

Sustaining biodiversity from Seattle to Charleston

The big picture: The WHC helps companies like Boeing advance biodiversity, sustainability, employee engagement and community relations goals with programs that translate sustainability goals and objectives into tangible and measurable on-the-ground actions. WHC Awards recognize programs and projects that demonstrate excellence in corporate conservation. Boeing's restored Emery Landfill in Wichita, Kansas, was recognized with three awards in 2022 (see left column for details).



5.85 acres of marine habitat,
Boeing Plant 2, Seattle, Washington



1.5 acres of pollinator
gardens, Pollinator Prairie,
Olathe, Kansas



2,668 acres of diverse habitat,
Santa Susana, Canoga Park, California



3,923 acres, Keystone/Fairlawn
Project, North Charleston, Boeing South
Carolina (including 2,025 acres of wetland)



82 acres, Emery Landfill, Wichita,
Kansas (including 56.5 acres of grassland)

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Boeing biodiversity efforts are virtual with real impact

Boeing encouraged virtual volunteering for employees during the pandemic, including, Zooniverse — the largest platform for people-powered research where over a million volunteers assist professional researchers to amplify their biodiversity, and other work, to advance science and the humanities.

Why it matters: Organizations like Zooniverse accelerate important research by volunteers and professionals making real discoveries together. Boeing volunteers access photos captured in various habitats to identify species and their activities. The goal is to enable

research that would not be possible, or practical, otherwise. 2021 Environment Champion, Kristin Marshall, has organized monthly online Zooniverse events with employees.

Engagement in 2022: In 2022, 186 employees volunteered 420 hours through Zooniverse, spotting and identifying animals, and generating thousands of dollars in gift-matching by Boeing's gift-match program.

It comes down to this: A wide range of animals, plants and microorganisms create the healthy ecosystems that all living beings depend on for clean air, land and water. This research results in new discoveries, data sets useful to the wider research community and many publications.

"Boeing's work with Zooniverse underscores two important lessons. Many hands make light work and biodiversity reminds us that we're part of something bigger than ourselves."

Chris Raymond, Chief Sustainability Officer



Wildwatch Kenya tracks giraffes in Northern Kenya conservation areas, along with the other animals that share the habitat, like the plains zebra, to better understand the behavior, movements and population numbers of the wildlife found there. (Adobe photo)

Environmental Compliance is Good for Business, People and the Planet

A fundamental element of Boeing's environmental policy is to maintain regulatory compliance. When noncompliance is identified in our environmental management systems, Boeing evaluates and analyzes the incident, implements corrective actions and shares process improvements to build the learning into the organization.

Boeing paid one significant environmental penalty in 2022, where "significant" is determined by a fine greater than \$10,000. At the end of 2021, stormwater samples collected at the Santa Susana Field Lab exceeded the site-specific permit limits for copper, chronic toxicity, iron, manganese, dioxin (TCDD), and biochemical oxygen demand (BOD) at one or more outfalls. The penalty incurred was \$22,000. The site experienced high-intensity rain events in the fourth quarter of 2021 that resulted in higher-than-normal rates of erosion from the site; the excess levels are believed to be attributable to natural sources — such as increased erosion of natural soils, decaying vegetation or waterfowl waste — and nonindustrial sources — such as road runoff and soils adjacent to telephone/utility poles. Excess copper and chronic toxicity were not attributed to an identifiable source and were episodic in nature where laboratory error was suspected.

On July 26, 2022, a significant rainfall event in the St. Louis region caused flooding that impacted the St. Louis site Industrial Wastewater Treatment Plant (IWTP). Floodwaters overtopped the IWTP, resulting in a release of untreated wastewater and associated sludges, as well as approximately 100 gallons of diesel fuel from a ruptured above-ground storage tank. The release was reported to the Missouri Department of Natural Resources, the National Response Center, and the St. Louis Metropolitan Sewer District, and appropriate response actions were completed after the flooding subsided.

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Responsible Supply Chain

Responsible supply chain practices are key to advancing industry sustainability standards. It requires transparency about business processes and supplied goods, meeting stakeholder expectations, addressing regulations, and creating positive environmental and social impact. Boeing is driving a holistic approach to responsible supply chain practices that align with the Organisation for Economic Co-operation and Development's Due Diligence Guidance for Responsible Business Conduct.

In 2021, we co-founded an industry effort through the International Aerospace Environmental Group (IAEG) to establish a voluntary sectoral framework for ESG engagement, including assessment and awareness, throughout the aerospace manufacturing industry.

Ethical, responsible and sustainable business conduct is at the core of how Boeing operates. These core principles extend to our suppliers. The Boeing Supplier Code of Conduct, based on the International Forum on Business Ethical Conduct for the Aerospace and Defense Industry's model code, provides suppliers with a set of responsible business conduct expectations consistent with our policies, principles and sustainability efforts.

[Read our Supplier Code of Conduct here.](#)

Stepping up for sustainability: Boeing deploys supplier assessments

Boeing is taking the next step to advance sustainability efforts by deploying an industry voluntary approach to sustainability assessments established by the IAEG and implemented by EcoVadis. This allows Boeing to address sustainability considerations in procurement processes and manage risk in its supply chain.

Why it matters:

- Boeing has an opportunity to help influence and drive positive sustainability change because of the size of its supply chain with more than 11,000 Tier-1 suppliers around the globe.

"Boeing seeks to ensure that our supply chain operates ethically, sources responsibly and creates economic opportunities for diverse communities. An industry voluntary approach is key for efficiency and demonstrating ESG maturity to customers, investors and regulators."

William Ampofo, chair, Boeing Supply Chain Operations Council, and vice president, Parts & Distribution Services and Supply Chain, Boeing Global Services

- As an IAEG founding member, Boeing played a fundamental role in the selection of EcoVadis, a sustainability rating platform, to power an industry sustainability assessment approach.
- IAEG member companies participating in the sector initiative can access completed assessments to benchmark their suppliers' sustainability performance.
- Boeing's engagement in this industry approach reduces the supplier burden to complete multiple, unique assessment requests. Suppliers also can access educational materials to help drive sustainability improvements.

It comes down to this: Boeing is demonstrating its commitment to responsible aerospace in a collaborative manner and will continue to partner with industry associations to advance its responsible supply chain practices and deliver innovative solutions that will usher in the next era of sustainability progress.



Boeing Logistics Analyst Omur Muhittinoglu develops new processes and solutions to streamline the supply chain. (Boeing photo)

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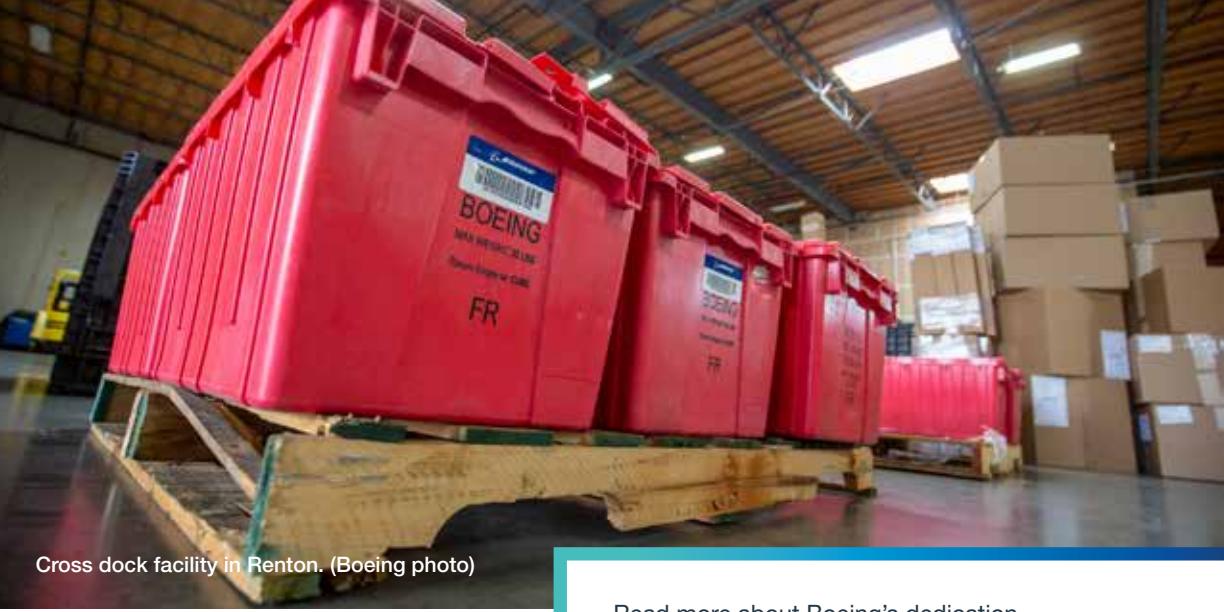
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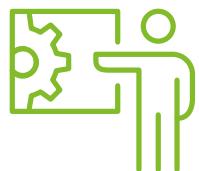
Responsible supply chain: Advancing sustainability together

The big picture: How suppliers operate is just as important as how Boeing operates. Boeing is driving supply chain sustainability awareness and advances by collaborating with its supplier network and promoting responsible business practices.



Cross dock facility in Renton. (Boeing photo)

Read more about Boeing's dedication to [driving sustainability progress](#) in the aerospace supply chain.



Lead through industry

- Founding member of the International Aerospace Environmental Group.
- Demonstrated commitment to collaborate, adopt and amplify industry solutions.



Lead by engagement and education

- Creating understandable, actionable educational materials.
- Driving enduring change by transparently addressing key topics, risks and opportunities.



Lead with commitment and reporting

- Benchmarking through voluntary standard assessments.
- Setting expectations for supplier sustainability performance.

11,000+ Tier-1 suppliers

229 tons of packaging waste diverted from landfill (2022)

114M pounds (51.7M kilograms) recycled aerospace titanium (2013-2022)

Global network and Tier-1 suppliers



Africa:
5+

Asia:
215+

Australia:
900+

Europe:
570+

Middle East:
40+

North America:
(Non-U.S.)
515+

South America:
1

U.S.:
8,800+

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Boeing ships, stores and manages parts and supplies sustainably

Why it matters: Getting supplies from point A to point B in a large supply chain takes expertise. Add a passion for reducing waste, maintaining quality, preventing workplace injuries and saving money, and you've got what motivates Boeing's Transportation, Warehousing & Logistics (TWL) team.

In 2022, TWL team members:

- Eliminated packaging waste by converting from single-use and disposable packaging to reusable containers, preventing waste, which resulted in 234 metric tons diverted from landfills. For example, certain 787 parts previously came in a roughly built, wooden crate that took six people to unload. TWL's new reusable container is safer, allows faster processing and will prevent damage to parts. These 787 packaging improvements will result in 161 metric tons of crating wood diverted from landfills annually once fully implemented.

- Repurposed and refurbished containers and carts saved 26 metric tons of containers and packaging materials.
- Prevented 18,500 cardboard boxes from being shipped to Puget Sound factories, saving time and eliminating material waste. Consolidation centers continue to enable the use of generic reusable containers, such as shipping reusable containers through Southern California.
- Boeing also began using cross-docking — a logistics procedure where products from a supplier or manufacturing plant are distributed directly to a customer with marginal to no handling or storage time. Cross-dock benefits include reduced transportation costs, fewer lost or damaged parts, and predictable pickup and delivery schedules. As a result, 145 suppliers and Boeing sites across Commercial, Services and Defense businesses reduced transportation costs, standardized pickups and optimized transportation routes using cross-docks.
- Reduced GHG emissions — Regional truck pickups consolidated shipments at the sorting center to better use long-haul trucks while reducing less-than-full shipments and transit time, which reduces GHG emissions.

What's next: The team continues to optimize the Boeing logistics network by analyzing shipment volume, truck utilization, supplier distance from cross-docks, identifying consolidation opportunities and route changes on shipments from overseas suppliers.

Boeing partners with service provider Universal Logistics at their cross-docking facilities in Renton, Washington; Compton, California; and Charleston, South Carolina, to provide the most efficient pickup and delivery of parts to enable manufacturing and assembly of aircraft. Universal Logistics employee Matthew Chea moves a recyclable wooden crate in Renton. (Boeing photo)



Edison Energy's Chris Rader (senior Clean Energy adviser) and Julia Berg (director, Business Development) are part of the team that provides strategic sustainability services, energy management and clean energy supply advisory to Boeing. (Edison Energy photo)

2022 Sustainability Supplier of the Year: Edison Energy

Edison Energy received Boeing's inaugural Sustainability Supplier of the Year award for its demonstrated leadership and partnership to help Boeing achieve its renewable energy and GHG emissions reductions. This partnership:

- Supported Boeing's renewable procurement strategy, resulting in Boeing using 35% renewable electricity in 2022.
- Enabled several Power Purchase Agreements that will increase Boeing's renewable energy use.
- Helped develop a 15-year purchasing plan for energy purchases — with renewable energy being a requirement.

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Supplier's landmark delivery milestone showcases Boeing's commitment to "Make in India"

Rossell Techsys, a supplier in Bengaluru, India, completed 120,000 deliveries of wire harnesses, electrical panels and modification kits for multiple Boeing defense programs. Boeing's continued collaboration with suppliers and investment in India's aerospace and defense ecosystem has helped build local infrastructure, capabilities, workforce development and partnerships, while harnessing the strength of Indian talent and its growing network of more than 300 suppliers.

Why it matters:

It's producing positive results.

- Diverse suppliers¹ and small businesses² are vital to Boeing; their innovation, agility and ability to provide creative product and service solutions are essential to delivering greater value to customers.
- Boeing's partnership with Rossell Techsys demonstrates its commitment to small and diverse¹ businesses.

"Indian suppliers are integral to Boeing's global supply chain. We work closely with our suppliers in India to support supply chain health, identify new ways to drive innovation and deliver greater value to our customers."

Ashwani Bhargava, senior director,
Supply Chain Management, Boeing India

- Rossell Techsys, the Aerospace & Defense division of Rossell India Limited, was established in 2011, and is a key supplier in India's "Aatmanirbhar Bharat" vision, promoting people native to the area and self-reliance in defense manufacturing.

- The company was the inaugural partner for Boeing's "Skill India" initiative to train and develop Indian workers and students in aerospace skills. They also provide development opportunities for individuals with disabilities.
- Rossell Techsys received a Boeing Supplier of the Year Award in 2016 and 2019.

Next steps: Boeing will continue to collaborate with suppliers around the globe to create an agile and resilient aerospace supply chain, and support a healthy, stable supply base reflective of the company's global customers and communities.



Rossell Techsys Quality Control Inspector, Sandeep D., inspects a wiring harness. A startup company in 2011, Rossell Techsys has now become a key supplier in India's "Aatmanirbhar Bharat" vision. (Rossell Techsys photo)

Supplier diversity is essential to Boeing

Supplier diversity and small business utilization are key elements in responsible and sustainable supply chain practices. Boeing is committed to collaborating with and providing opportunities to diverse suppliers (including women-owned, veteran-owned and minority-owned businesses) and small businesses.

2022 Highlights

5,240

Total Diverse Suppliers¹
and Small Businesses²

\$4.6B

Total Amount Spent with Diverse
Suppliers and Small Businesses



770
Women
Owned



420
Veteran
Owned



550
Minority
Owned

560+

New Diverse Suppliers and
Small Businesses Onboarded

1. Diverse suppliers refer to women-owned, veteran-owned, minority-owned, LGBT-owned and disability-owned businesses (whether small or large).

2. Small business refers to a business that is independently owned and operated, is not dominant in the field of operations in which it is bidding and meets the North American Industry Classification System (NAICS) size standards and Code of Federal Regulations, Title 13, Part 121.

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Enterprise Security and Data Privacy

Boeing's Global Privacy Office is responsible for overseeing the management, use and security of personal information held by the company, including personal data from employees, customers and suppliers. Our privacy program focuses on protecting data, respecting privacy and enabling trust. To safeguard personal information, we employ a principles-based approach to data privacy that aligns with key privacy laws and frameworks in the U.S., European Union and other jurisdictions.

Boeing has also established a Global Security Governance Council to further strengthen governance and enhance coordination of our security activities. Learn more about the work of our council in our [Proxy Statement](#).

Boeing Enterprise Security is critical to Boeing's operations around the world, and we continue to employ industry-leading security practices, while leveraging software and product security engineering to protect our people, property, networks, systems and information from physical and cyber threats. Boeing's security strategy prioritizes detection, analysis and response to known, anticipated or unexpected threats, effective management of security risks and resiliency against incidents. In order to protect both commercial and defense-related businesses and support our production operations, Boeing has adopted security principles that align with global security standards, such as the National Institute of Standards and Technology Cybersecurity Framework, and adheres to contractual and regulatory security requirements.

Boeing self-phishing program helps reduce security threats

Boeing Enterprise Security's Self-Phishing Program educates employees about phishing, which involves sending simulated emails to create a "sense-of-urgency" response to click on a link, enter sensitive information, or, best-case scenario, report the "fake" phishing scam.

2022 by the numbers:

- 22% drop in employee clicks on phishing simulations from 2021.
- 17% improvement from 2021 in simulated suspicious email reporting.

It comes down to this: Phishing is the most typical way companies are hacked. It's important for employees to be vigilant against cyberattacks to protect the business and personal data.

Security News

MY RATING

LEADERBOARD NEWS 2



Status: Cleared For Take-
Off

No Action Required

Have A Great Flight!

Question or Issue? Check out the [FAQ](#) page.

[VIEW DASHBOARD](#)

"Phishing is one of the most effective ways threat actors exploit people and companies. It relies on pushing a high volume of phishing-related content and distraction — the worst condition in the modern workplace today. If users aren't careful and trained to spot a phishing email, they may carelessly click on a link or attachment, thus placing Boeing at risk."

Richard Puckett, chief security officer and vice president, Boeing Enterprise Security

Employees get ongoing updates on their phishing results on the company's internal website.

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Jacqueline Mercier, Defense Procurement. (Boeing photo)

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2022 Community Engagement Highlights

Through purposeful investments, employee engagement and advocacy efforts, Boeing supports partnerships and programs that align with our business, create value and help build better communities worldwide. We have an opportunity and a responsibility to be a positive force for change in the places we call home. Boeing focuses on opportunities that inspire our future, empower our heroes and strengthen our homes, with an emphasis on advancing racial equity and social justice, and protecting the environment.

Learn more about our community engagement work in the [Boeing 2023 Community Impact Portfolio](#).

1. Funds represent direct donations by employees and matched funds from the Boeing Company, through the [Employee Match Program](#).

Invested approximately

\$2B in Boeing communities over the last 10 years



Contributed

\$80M in charitable grants in 52 countries in 2022



Boeing and its employees invested

\$197M+ to help build better communities worldwide in 2022

Employees donated

\$63M+¹ and 366,000 volunteer hours to charitable causes in 2022

Invested

\$50M across 444 grants in support of STEM education and workforce development programs in 2022



Partnered with

13,000+ community partners globally in 2022



Tiffania Ham Fayall, Government Operations. (Boeing photo)



Read about: [Boeing Global Engagement 2023 purposeful partnerships and giving](#).

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Boeing employees help build homes for veterans

On a sunny, but chilly December day in 2022, more than a dozen Boeing volunteers learned the trade of home construction with Boeing's community partner in St. Louis, Veterans Community Project (VCP).

They helped cut, measure and install siding on a tiny home in the new VCP Village, where approximately 50 tiny homes and a community center for homeless veterans are currently under construction.

Why it matters: Boeing helps veterans and their families after their military service has ended, investing more than \$14,100,000 in 2022 in support of skills development and job training, and recovery and rehabilitation programs. Since 2021, Boeing has invested \$150,000 with VCP to help with home construction and education programs.



Boeing employees volunteered to help build tiny homes for veterans experiencing homelessness in St. Louis. (Boeing photo)

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Boeing supports environmental sustainability in communities around the globe

Why it matters: Boeing is working to build better, more equitable communities through corporate investments, employee engagement programs and advocacy efforts, which include support to protect the environment around the world. Boeing contributed \$5 million in support of environmental programs in 2022.

Americas

- U.S.:** Boeing supports the National Forest Foundation's Project Green Drone, an educational program dedicated to strengthening the STEM pipeline in the Phoenix area. Together with the Ecoculture Team at Northern Arizona University and other local partners, the National Forest Foundation engages more than 500 local middle and high school students in STEM-focused activities to address real-world environmental projects, including a watershed restoration project on the Lower Salt River. The project is diversifying the pipeline for conservation talent while working on protecting fresh water supplies and using innovative technology to preserve public lands.
- Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico and Panama:** Boeing is supporting the Pan American Development Foundation (PADF) that is active in eight countries, working with teachers, and primary and university or post-university students to find solutions to local environmental issues. For example, in Bolivia, PADF works with partners to develop a curriculum about alternative energy, waste management, natural resources



Boeing supports the Korea Green Foundation in a program teaching children about healthy food and how and where it comes from in a local food market engagement. (Korean Green Foundation photo)

and identifying local solutions. In Ecuador and Mexico, local partners will work with teachers to design lessons that address local needs such as reducing pollution, using plastic alternatives or storing electricity.

Asia

- Korea:** Boeing supports the Climate Science Class program, which is part of Korea Green Foundation, benefiting 550 young leaders. The goal of the program is to foster next-generation green leaders who will solve climate change problems, including biodiversity loss and forest destruction. It also examines human influence and regional environmental issues and technology solutions. Climate change, in particular, is a broad and complex phenomenon and is a suitable subject for implementing the purpose of modeling-based learning, which constitutes an explanatory framework based on a variety of data.

Europe

- Italy:** "School Cleaning Day" is an environmental education program — organized by ScuolAttiva Onlus with support from Boeing — that works to encourage Italian students and

teachers to adopt ecological models of behavior and awareness of sustainable development and environmental protection. The initiative provides Italian youth in kindergarten through sixth grade with early access to learning about sustainability and developing a sense of responsibility. By discovering the best practices of environmental protection around the world, students understand the impact of their actions on the future of our planet.

Middle East and Northern Africa

- Türkiye:** With Boeing's support, the Istanbul Technical University Foundation's Enhanced Training Content program within the Aviation Sustainability Alliance Türkiye raises awareness about and supports the creation of sustainability developments in aviation through three signature programs. The training program, tailored for specific audiences, provides educational content to students, teachers and aviation professionals; the Hackathon encourages students to think creatively about how to help lessen the environmental impact of aviation; and the Innovation Conference brings together students, academics, industry experts and others to explore innovative ideas in aviation sustainability.

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Boeing grant teaches students about stormwater stewardship

With support from a Boeing grant in 2022, EarthGen engaged 2,000 students across four Puget Sound school districts in its Stormwater Stewards program.

Why it matters: Middle and high school students learned about watersheds and the impact of stormwater runoff, investigated their local watersheds and then designed and implemented green stormwater infrastructure projects to improve water quality in their community. Students cared for and maintained these rain gardens as part of the program.

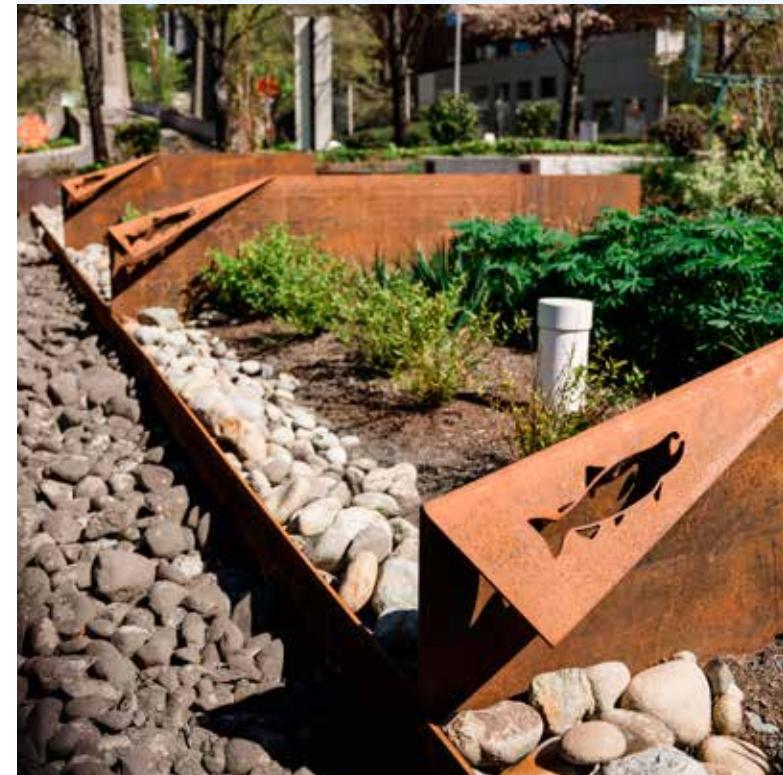
Middle school students plant in their rain garden in the Seattle suburb of Burien. (EarthGen photo)

Go deeper: A 2021 grant from Boeing helped EarthGen expand the Stormwater Stewards program into two additional Puget Sound school districts, which worked to add sustainable treatment for approximately 625,000 gallons of water.

Rain gardens under busy Seattle bridge filter water, protect salmon

The Aurora Bridge Bioswale project was designed to clean up polluted stormwater coming off this Seattle bridge. Runoff passes through a series of rain gardens below. The project serves as a model for others that The Nature Conservancy and its partners support, such as the I-5 Ship Canal stormwater park, which is currently being planned with funding from Boeing.

(Photo: Courtney Baxter/The Nature Conservancy)



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Boeing and Amideast partner to expand STEM access

At the UN Climate Change Conference COP27 held in Sharm El-Sheikh, Egypt, Amideast and Boeing announced an expanded partnership to support more Egyptian young people through STEM education with a focus on sustainability.

Go deeper: The expanded partnership will include STEM programs in robotics, graphics, animation, 3D printing, programming and web development; a STEM entrepreneurship competition; and a new STEM Program for Climate Sustainability, including advocacy efforts like STEM Talks and a sustainability podcast.

Why it matters: This grant from Boeing helps Amideast align STEM activities with Egypt's sustainable development strategy. In line with the UN Sustainable Development Goal (SDG) 4, Quality Education, STEM education fosters creativity and empowers young people to become critical thinkers and problem solvers who can address global challenges.



Boeing and Amideast have supported **22,000+** students in Egypt since 2007

Kuljit Ghata-Aura, Boeing president in the Middle East, Türkiye and Africa, and Shahinaz Ahmed, Amideast country director in Egypt (pictured, center), announce an expanded partnership between Boeing and Amideast. (Boeing photo)



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This Sustainability Report has been prepared in alignment with the GRI 2021 Standards. The GRI Index below indicates the location of each GRI disclosure within this Sustainability Report, on our external website or other Boeing reports, or it states the information directly. In the SASB Index and TCFD Index, we have aligned our disclosures with the recommended disclosures and metrics in the SASB Aerospace & Defense Standard and the TCFD framework. We will continue to evaluate our disclosure approach moving forward to ensure we are providing relevant information in an efficient and effective manner.

All data within Key ESG Data, GRI, SASB and TCFD indexes is for the period from Jan. 1, 2022, through Dec. 31, 2022, unless otherwise noted.



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		2022		2021		2020	
	Energy¹	Megawatt hours	Terajoules	Megawatt hours	Terajoules	Megawatt hours	Terajoules
Natural gas	1,928,000	6,941		1,712,000	6,163	1,686,000	6,070
Jet kerosene	861,000	3,100		804,000	2,894	544,000	1,958
Fuel oil #2	127,000	457		153,000	551	149,000	536
Motor gasoline	24,000	86		21,000	76	21,000	76
Propane	11,000	40		10,000	36	12,000	43
Liquefied petroleum gas	2,000	7		1,000	4	—	—
Total nonrenewable fuels	2,953,000	10,631		2,701,000	9,724	2,412,000	8,683
Sustainable aviation fuel	9,000	32		4,000	14	2,000	7
Total renewable fuels	9,000	32		4,000	14	2,000	7
Purchased nonrenewable electricity	1,350,000	4,860		1,482,000	5,335	1,686,000	6,070
Purchased renewable electricity ²	720,000	2,592		574,000	2,066	392,000	1,411
Total purchased electricity	2,070,000	7,452		2,056,000	7,402	2,078,000	7,481
Total energy use	5,033,000	18,119		4,761,000	17,410	4,492,000	16,171

1. Data represents 100% of the company.

2. Renewable electricity data excludes any renewable energy that is part of the grid by default, in alignment with SASB and other frameworks. Notably, Boeing operates in a number of grids that rely significantly on renewable sources.
• Boeing did not sell any electricity, heating or cooling energy.

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	Emissions¹	Tons CO₂e	Metric tons CO₂e	Tons CO₂e	Metric tons CO₂e	Tons CO₂e	Metric tons CO₂e
Scope 1 GHG ^{2,3}	708,000	642,000		675,000	612,000	611,000	554,000
Scope 2 GHG — location-based ^{2,3}	859,000	779,000		830,000	753,000	840,000	762,000
Scope 2 GHG — market-based ^{2,3}	442,000	401,000		493,000	447,000	580,000	526,000
Scope 3 GHG — business travel	205,000	186,000		97,000	88,000	101,000	92,000
Scope 3 GHG — use of sold products (Commercial Airplanes) ^{3,6}	400,000,000	363,000,000		306,000,000	278,000,000	246,000,000	223,000,000
Scope 3 GHG — use of sold products (Defense, Space & Security) ^{3,6}	24,000,000	22,000,000		24,000,000	22,000,000	22,000,000	20,000,000
Total calculated GHG excluding sold products	1,355,000	1,229,000		1,264,000	1,147,000	1,292,000	1,172,000
Core metrics sites GHG — location-based ⁴	724,000	657,000		702,000	637,000	713,000	647,000
Core metrics sites GHG — market-based ⁴	323,000	293,000		376,000	341,000	452,000	410,000
GHG Intensity⁵		\$0.00002			\$0.00002		\$0.00002

1. Emissions (Enterprise Scope 1, Scope 2, and Scope 3 Categories 6 and 11) data is verified by an accredited independent third party to the level of limited assurance, see [assurance statements](#).

2. Scope 1 and Scope 2 data represents 100% of the company.

3. For Scopes 1, 2 and 3, we calculate emissions from CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃ for this data set.

4. Core metrics sites data represents emissions of CO₂, CH₄ and N₂O where we track a subset of emissions from natural gas combustion and purchased electricity associated with sites that represent the majority (70%) of Boeing operations.

5. GHG intensity includes Scope 1 and Scope 2 (market-based) GHG (CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃).

6. Use of sold products emissions are based on estimated lifetime emissions of Boeing Commercial Airplanes and Boeing Defense Services product deliveries in 2022, including direct emissions from combustion of fuel (335M tonnes) and indirect emissions from production of fuel (50M tonnes).

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		2022		2021		2020			
	Water ¹	Kilogallons	Megaliters	Total water withdrawal from water-stressed areas ²	Kilogallons	Megaliters	Total water withdrawal from water-stressed areas ²		
OFF-SITE WATER SOURCES									
Surface water withdrawal	687,256	2,601	—%	639,501	2,421	—%	639,167	2,420	—%
Combination of surface water and groundwater withdrawal	405,788	1,536	22%	366,460	1,387	21%	423,353	1,603	22%
Groundwater withdrawal	110,671	419	31%	89,855	340	30%	83,596	316	31%
Reclaimed water (not withdrawn)	2,585	10	—%	3,114	12	—%	2,778	11	—%
Total water withdrawal	1,203,715	4,556	10%	1,095,816	4,148	10%	1,148,894	4,350	10%
ON-SITE WATER SOURCES³									
On-site well water use	2,243	8	100%	4,755	18	100%	2,352	9	100%
On-site water reclamation	10,321	39	—%	9,576	36	—%	10,508	40	—%

Boeing does not use seawater.

1. Water data represents approximately 84% of operations by square footage.

2. Water-stressed areas are those with high or extremely high water stress in the World Resources Institute Aqueduct Model.

3. Two locations have on-site water sources — Palmdale (well) and Portland (reclamation).

		2022	2021	2020
	Waste ¹	Metric tons	Metric tons	Metric tons
Hazardous waste incinerated for energy recovery	661	590	747	
Hazardous waste incinerated without energy recovery	701	843	1,019	
Hazardous waste sent to landfill	2,473	1,977	2,143	
Hazardous waste otherwise disposed	3,435	2,651	1,744	
Percentage of hazardous waste recycled	0.1%	1.0%	0.4%	
Total hazardous waste generated²	7,276	6,122	5,674	
Nonhazardous waste incinerated for energy recovery	155	286	147	
Nonhazardous waste incinerated without energy recovery	81	365	76	
Nonhazardous waste sent to landfill	151	149	343	
Nonhazardous waste otherwise disposed	7,339	11,138	6,294	
Percentage of nonhazardous waste recycled	0.5%	0.4%	1.2%	
Total nonhazardous waste generated	7,765	11,981	6,943	

1. Waste data represents approximately 83% of operations by square footage.

2. Hazardous waste is determined from U.S. EPA hazardous manifest or equivalent government shipping documents, with profile waste designations determining the type of waste and Management codes determining the disposal method.

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Environmental Data		2022	2021	2020
Introduction	Waste	Metric tons	Metric tons	Metric tons
	Universal waste incinerated without energy recovery	15	2	1
Approach & Governance	Universal waste incinerated for energy recovery	—	2	1
	Universal waste sent to landfill	13	11	10
People	Universal waste otherwise disposed	880	123	153
	Percentage of universal waste recycled	2%	10%	9%
Products & Services	Total universal waste generated³	930	155	180
	Solid waste incinerated for energy recovery	2,094	2,291	2,633
Operations	Solid waste sent to landfill	9,509	7,801	8,888
	Percentage of solid waste recycled, reused and composted	82%	78%	72%
Communities	Total solid waste generated (includes all recycled, reused and composted materials)	64,119	44,959	41,137
	Total waste incinerated for energy recovery	2,910	3,171	3,527
Reporting	Total waste incinerated without energy recovery	797	1,210	1,095
	Total waste sent to landfill	12,146	9,938	11,384
Key ESG Data	Total waste otherwise disposed	11,654	13,912	8,191
GRI Index	Percentage of total waste recycled	66%	55%	55%
SASB Index	Total waste generated³	80,090	63,217	53,934
TCFD Index	Waste — Spills			
U.N. Sustainable Development Goals	Number of aggregate spills (all operations) ⁴	1	1	0
Awards and Recognition	Quantity spilled (all operations)	40,418 kg	203 kg	0
Select Memberships and Partnerships	Quantity of spilled material recovered (all operations)	—	—	—
Forward-Looking Statements	Waste — Penalties			
	Incidents incurring a penalty over \$10,000 (all operations) ⁵	1	1	1
	Total of penalties over \$10,000 (all operations)	\$22,000	\$16,450	\$17,410

3. Total waste generated includes all recycled, reused and composted material.

4. Data represents number of federally reportable aggregate spills.

5. See Page 61 of this report for further details about this incident and penalty.

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		2022	2021	2020
Health and Well-Being				
Fatalities as a result of work-related injuries ¹	0	0	0	
Lost workday case rate, includes COVID-19 cases ²	1.2	0.53	0.43	
Near-miss/hazard ratio to recordable injuries ³	44:1	39:1	24:1	
Found/fixed metric ³	98%	98%	98%	
Health and Safety training courses available	1,096	1,026	950	
Global Equity, Diversity and Inclusion¹				
Employee Representation				
Total Boeing employees	156,000	142,000	141,000	
Non-U.S. employees	13%	11%	11%	
Total Boeing employees covered by collective bargaining agreements	33%	33%	33%	
U.S. employees who are veterans ⁴	14.6%	14.6%	14.8%	
Female Representation ^{5,6}				
Overall (Companywide)	24.10%	23.60%	23.20%	
Overall (U.S.)	23.80%	23.20%	22.90%	
Overall (Non-U.S.) ⁷	24.70%	24.60%	24.30%	
Board of Directors	25.00%	25.00%	25.00%	
Executive Council ⁸	19.00%	19.00%	13.60%	
Executives	33.20%	33.50%	31.80%	
Managers	23.70%	22.80%	22.20%	
New hires	25.40%	23.90%	22.00%	
Racial and Ethnic Minority Representation ⁹				
Overall	35.30%	32.70%	31.20%	
Board of Directors	25.00%	25.00%	16.70%	
Executive Council ⁸	21.10%	33.30%	35.00%	
Executives	21.80%	22.50%	20.80%	
Managers	27.10%	24.30%	23.00%	
New hires	47.50%	42.50%	37.20%	
Employee Training^{10,11}				
Total hours employee training	5,800,000	3,600,000		
Average employee training hours per learner	33.1	23.6		
Total mandatory employee training hours	1,800,000.00	1,000,000.00		

Employee Health and Well-Being footnotes

1. Represents U.S. data.
2. Represents U.S., Canada, Australia and UK data.
3. Represents global data.

For all Global Equity, Diversity and Inclusion data:

Unless otherwise indicated, data presented are snapshots taken in December of the year referenced.

4. Veteran data reflects the U.S. workforce only based on voluntary, confidential self-identification. A veteran is defined as a person who served in the active military, naval, or air service and who was discharged or released therefrom under conditions other than dishonorable.

5. All data on gender is collected globally.

6. Numbers for gender may not total 100% due to team members who identify as nonbinary or who choose not to disclose.

7. Non-U.S. indicates team members outside the U.S.

8. Executive Council gender data includes both U.S. and non-U.S. leaders.

9. Race and ethnicity data reflects the U.S. workforce only. Numbers may not total 100% due to inclusion of people who choose not to disclose or due to rounding. Racial and ethnic minority representation includes Asian, Black, Hispanic/Latino/a/x, Native American, Pacific Islander and Two or More Races as defined by the U.S. Equal Employment Opportunity Commission.

10. Mandatory and voluntary employee training hours represent different types of learning that are stored in separate data sources. Training data residing in Boeing's Learning Management System (LMS) includes mandatory and compliance training. Voluntary training is not considered mandatory and represents hours spent participating in learning tracked outside of our LMS.

11. Data was first reported in 2021.

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People

	2022	2021	2020
Employee Training			
Average mandatory employee training hours per learner	10.6	6.8	
Average voluntary employee training hours	25.6	17	

Communities

	2022	2021	2020
Community Engagement			
Community giving ¹	\$185,700,000	\$187,100,000	\$234,000,000
Total volunteer hours	366,000	290,000	250,000
Number of community partners	13,371	13,957	13,400
Contributions supporting STEM education and workforce development programs	\$61,300,000	\$56,300,000	\$50,000,000
Total number of organizations receiving contributions supporting STEM education and workforce development programs	682	648	415
Contributions to veterans organizations	\$14,100,000	\$ 18,700,000	\$14,200,000
Total organizations receiving contributions supporting veterans programs	354	416	97
Contributions to organizations supporting racial equity and social justice	\$17,557,697	\$15,300,000	\$15,600,000
Total number of countries where contributions were made	64	70	51
Total international partners receiving contributions	473	459	590
Approximate students reached through Boeing's hands-on STEM learning program FUTURE U	518,229	645,963	5,000,000
Total number of contributions supporting environmental programs	489	482	31

Governance²

	2022	2021	2020
Ethics Metrics			
Inquiries ³	2,405	2,167	3,181
Conflict of interest determinations	2,120	1,730	1,864
Investigative requests	3,132	3,503	4,786
Total contacts to Ethics & Business Conduct	7,657	7,400	9,831
Investigative requests with enough information to investigate	2,507	2,896	3,561
Percentage of investigated requests that were substantiated ^{4,5}	47%	51%	47%

Community Engagement footnotes

1. Community giving is inclusive of Boeing and employee giving.

Ethics Metrics footnotes

2. Data reflects the reporting period of November 2021 through October 2022.

3. Inquiries comprise Requests for Guidance and Information Requests. Requests for Guidance are situations where employees are seeking guidance when facing ethical dilemmas or when they need assistance in understanding company policies or expected behaviors. Information Requests are situations where employees are seeking general information. Both demonstrate awareness of Boeing's Compliance and Ethics program, but Requests for Guidance are viewed as the most positive types of contact.

4. Investigated matters are considered unsubstantiated when investigation findings demonstrate that no misconduct occurred or where there is a lack of evidence to support a finding of misconduct.

5. Ongoing evaluations demonstrate that Boeing's substantiation rate is slightly higher than other published benchmarks, indicating an effective investigation process and informed reporting by company employees.

GRI Index

Contents

Boeing has reported in alignment with the GRI Standards for the period of 1/1/2022-12/31/2022.

AR = 2022 Annual Report

PS = 2023 Proxy Statement

Introduction

	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)
GRI 2: General Disclosures				
Approach & Governance	2-1	Organizational details	Company Profile, Page 10	The Boeing Company is a publicly traded corporation. Our headquarters are located at 929 Long Bridge Drive, Arlington, VA 22202 Boeing Global PS , Page 36
People	2-2	Entities included in the organization's sustainability reporting		This report includes the operations of The Boeing Company and its subsidiaries. This is consistent with the financial reporting contained in Boeing's 2022 Form 10-K. AR , Exhibit 21 to 10K
Products & Services	2-3	Reporting period, frequency and contact point		Boeing's sustainability report is published annually, with a reporting period from 1/1/2022-12/31/2022 (unless otherwise noted). The reporting period for Boeing's financial reporting aligns with the period for its sustainability reporting. This report was published on 6/14/2023 Boeing Communications Email: media@boeing.com Mailing Address: 929 Long Bridge Drive, Arlington, VA 22202
Operations	2-4	Restatements of information		None.
Communities	2-5	External assurance		Select environmental data have been externally verified by DNV GL. See statement
Reporting				
Key ESG Data	2-6	Activities, value chain and other business relationships	Company Profile, Page 10 ; Responsible Supply Chain, Pages 62-65	GRI Sector: Aerospace and Defense AR , Pages 1, 5, 16, 20, 136-144 PS , Pages 30-32 Boeing Overview Boeing Weapons Statement Boeing Commercial Orders & Deliveries Commercial Services In 2022, Boeing's headquarters relocated from Chicago to Arlington, Virginia
GRI Index	2-7	Employees	Global Equity, Diversity and Inclusion, Pages 24-25 ; Key ESG Data, Pages 77-78	Boeing 2023 Global Equity, Diversity & Inclusion Report Boeing EEO-1 report Boeing Overview Boeing uses headcount reporting for its global equity, diversity and inclusion data. December data is used for any headcount or representation numbers, and full-year data is used for any promotions, hiring and exits numbers. For our Executive Council and Board of Directors, 2023 data is utilized.
SASB Index	2-8	Workers who are not employees		Information unavailable/incomplete.
TCFD Index	2-9	Governance structure and composition	Approach & Governance, Pages 9-17 ; Governance and Risk Management, Pages 13-14 ; Global Aerospace Safety, Pages 28-30	Boeing Corporate Governance PS , Pages 6-7, 15-17

Contents	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)
Introduction	2-10	Nomination and selection of the highest governance body	Governance and Risk Management, Pages 13-14	Board Governance Director Independence Standards Corporate Governance Principles PS, Pages 5-7
Approach & Governance	2-11	Chair of the highest governance body		The Board chair is not an executive officer of the company. PS , Page 15 Board Chair Profile
People	2-12	Role of the highest governance body in overseeing the management of impacts	Governance and Risk Management, Pages 13-14 ; Innovation and Clean Technology, Pages 33-48 ; Advancing Our Sustainability Journey, Page 11	PS , Pages 16-17; 19-20; 27 Governance & Public Policy Committee Charter CDP1 Climate Change Submission, C1 series CDP Water Security Submissions, W6 series
Products & Services	2-13	Delegation of responsibility for managing impacts	Governance and Risk Management, Pages 13-14	PS , Pages 16-17; 19-20; 27 Governance & Public Policy Committee Charter Audit Committee Charter CDP1 Climate Change Submission, C1 series CDP Water Security Submissions, W6 series
Operations	2-14	Role of the highest governance body in sustainability reporting	Governance and Risk Management, Pages 13-14	PS , Page 27 Boeing's sustainability report is reviewed by Boeing's Executive Council, Board of Directors, and the Global Sustainability Council, which comprises leaders across business units within Boeing.
Reporting	2-15	Conflicts of interest	Ethical and Compliant Business, Pages 16-17	PS , Pages 22; 24-25 Code of Ethical Business Conduct for Members of the Board of Directors
Key ESG Data	2-16	Communication of critical concerns	Ethical and Compliant Business, Pages 16-17 ; Key ESG Data, Page 78	PS , Pages 24-25 Ethical Business Conduct Guidelines Audit Committee Charter Contacting Ethics Critical concerns submitted through external and internal reporting portals are reported by the Chief Compliance Officer to the Chief Executive Officer, Chief Legal Officer, Audit Committee and Board of Directors. For critical concerns, the issue details, findings and response are disclosed. In addition, the data identifies case trends, including reporting channels, case categories, organizations, locations and types of corrective actions taken.
GRI Index	2-17	Collective knowledge of the highest governance body	Governance and Risk Management, Pages 13-14	PS , Pages 5-7; 19; 27 Governance & Public Policy Committee Charter
SASB Index	2-18	Evaluation of the performance of the highest governance body		PS , Pages 21-22 Corporate Governance Principles
TCFD Index	2-19	Remuneration policies	Advancing Our Sustainability Journey, Page 11	PS , Pages 36-55 Corporate Governance Principles
U.N. Sustainable Development Goals	2-20	Process to determine remuneration	Enhancing a Sustainability Culture, Page 15	PS , Pages 39-42

1. Boeing participates annually in the CDP Climate Report. Our most recent response is available on our website here in accordance with the CDP reporting schedule.

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	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)
Introduction	2-21	Annual total compensation ratio		PS, Page 66 PS 2022, Page 67 2021 estimated ratio: 169 to 1 2022 estimated ratio: 154 to 1 Change in ratio from 2021 to 2022: Nearly a 9% decrease
Approach & Governance	2-22	Statement on sustainable development strategy	President and CEO Message, Pages 3-4	PS, Page 66
People	2-23	Policy commitments	Ethical and Compliant Business, Pages 16-17	Our Principles Our Values Ethical Business Conduct Guidelines Code of Ethical Business Conduct for Members of the Board of Directors Anti-Corruption Program Boeing Code of Conduct Supplier Principles Supplier Code of Conduct Conflict Minerals Policy Code of Basic Working Conditions and Human Rights Boeing Australia Modern Slavery Statement Boeing UK Modern Slavery Statement Precautionary Principle: Boeing has a robust enterprise risk management (ERM) process, which is described in the Governance and Risk Management section. While the Precautionary Principle is not specifically applied as part of our ERM, we do consider environmental protection as a fundamental part of our approach to business. For example, the Due Diligence program conducts reviews designed to reduce risks and to facilitate efficient environment, health and safety integration of acquired properties and business operations. Environmental considerations are also included in our life cycle assessments of products and projects. Life cycle assessments are discussed further in the Products & Services section of this report.
Products & Services				
Operations				
Communities				
Reporting				
Key ESG Data				
GRI Index				
SASB Index				
TCFD Index	2-24	Embedding policy commitments	Advancing Our Sustainability Journey, Page 11	PS, Pages 27-33 Our Principles Our Values Ethical Business Conduct Guidelines Code of Ethical Business Conduct Code of Ethical Business Conduct for Members of the Board of Directors Anti-Corruption Program Boeing Code of Conduct Supplier Principles Supplier Code of Conduct Conflict Minerals Policy Code of Basic Working Conditions and Human Rights Boeing Australia Modern Slavery Statement Boeing UK Modern Slavery Statement
U.N. Sustainable Development Goals				
Awards and Recognition				
Select Memberships and Partnerships				
Forward-Looking Statements				

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	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)
Introduction	2-25	Processes to remediate negative impacts	Ethical and Compliant Business, Pages 16-17 ; Advancing Our Sustainability Journey, Page 11 ; Communities, Pages 67-72	PS , Pages 16-17 Integrity Counts – Confidential & Anonymous Reporting System Contacting Ethics Ethical Business Conduct Guidelines Audit Committee Charter Remediation
Approach & Governance	2-26	Mechanisms for seeking advice and raising concerns	Ethical and Compliant Business, Pages 16-17	PS , Page 32 Integrity Counts – Confidential & Anonymous Reporting System Contacting Ethics Ethical Business Conduct Guidelines Audit Committee Charter
People	2-27	Compliance with laws and regulations	Biodiversity and Environmental Compliance Pages 60-61 ; Key ESG Data, Pages 74-78	Boeing paid one federal reportable penalty in 2022. At the end of 2021, stormwater samples collected at the Santa Susana Field Lab exceeded the site-specific permit limits for copper, chronic toxicity, iron, manganese, dioxin (TCDD), and biochemical oxygen demand (BOD) at one or more outfalls. The penalty incurred was \$22,000. The site experienced high-intensity rain events in the fourth quarter of 2021 that resulted in higher than normal rates of erosion from the site; the excess levels are believed to be attributable to natural sources — such as increased erosion of natural soils, decaying vegetation or waterfowl waste — and nonindustrial sources — such as road runoff and soils adjacent to telephone/utility poles. Excess copper and chronic toxicity were not attributed to an identifiable source and were episodic in nature where laboratory error was suspected. Boeing paid \$27,275 in fines regarding environmental noncompliance that occurred in the current reporting cycle; Boeing paid \$3,000 in fines regarding environmental noncompliance that occurred in a previous reporting cycle.
Products & Services	2-28	Membership associations	Select Memberships and Partnerships, Page 98	2022 Trade Association Memberships CDP climate report C12.3b
Operations	2-29	Approach to stakeholder engagement	Advancing Our Sustainability Journey, Page 11 ; Approach & Governance, Pages 9-17	PS , Pages 4, 27-32 Boeing considers stakeholders' interests to identify and prioritize the most relevant issues and to assess the most significant challenges and risks facing the company. Throughout our company disclosures and reports, we compile and share a broad set of data, information and operating examples for our stakeholders, including our employees, customers, industry partners, investors, regulatory authorities, communities and others. These diverse groups of stakeholders have been identified by Boeing as being key to the business because of their potential to influence or be affected by Boeing's mission to protect, connect, and explore our world and beyond.
Communities	2-30	Collective bargaining agreements		AR , Page 2 Approximately 32% of Boeing's total workforce are covered by collective bargaining agreements.
Reporting				
Key ESG Data				
GRI Index				
SASB Index				
TCFD Index				
U.N. Sustainable Development Goals				
Awards and Recognition				
Select Memberships and Partnerships				
Forward-Looking Statements				

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	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)
GRI 3: Material Topics				
Introduction	3-1	Process to determine material topics	Advancing Our Sustainability Journey, Page 11	
Approach & Governance	3-2	List of material topics	Advancing Our Sustainability Journey, Page 11	There are no changes to our list of material topics compared to the previous reporting period.
People	3-3	Management of material topics	Company Profile, Page 10 ; Advancing Our Sustainability Journey, Page 11 ; Governance and Risk Management, Pages 13-14 ; Ethical and Compliant Business, Pages 16-17 ; People, Pages 18-26 ; Workplace Safety, Pages 19-20 ; Global Equity, Diversity and Inclusion, Pages 24-25 ; Global Aerospace Safety, Pages 28-30 ; Sustainable Product Life Cycle, Pages 31-32 ; Innovation and Clean Technology, Pages 33-48 ; Sustainable Operations, Pages 52-61 ; Addressing Climate Change, Pages 54-55 ; Biodiversity and Environmental Compliance, Pages 60-61 ; Responsible Supply Chain, Pages 62-65 ; Communities, Pages 67-72 ; Key ESG Data, Pages 74-78	PS, Pages 6-19, 21-22, 39-42 AR, Pages 2-3, 8-9, 16, 20-21, 28, 35, 37-38, 39 GRI 201: Economic Performance Corporate Governance ; Approach to Taxes GRI 203: Indirect Economic Impacts Community Engagement ; 2023 Community Engagement Portfolio GRI 204: Procurement Practice Supplier Code of Conduct GRI 205: Anti-Corruption Anti-Corruption Program GRI 301: Materials Environment ; Airplane and Carbon Fiber Recycling Factsheet ; Conflict Mineral Policy GRI 302: Energy Environmental Policy GRI 303: Water Environmental Policy ; CDP Water Report GRI 304: Biodiversity Environmental Policy GRI 305: Emissions Environmental Policy ; CDP Climate Report ¹ C2.3a and C1 GRI 306: Waste Environmental Policy ; 76% of Boeing operations are covered, based on square footage. All major manufacturing sites are covered by ISO14001 external certification GRI 307: Environmental Compliance Environmental Policy ; Environmental: ISO14001 Certifications ; 76% of Boeing operations are covered, based on square footage. All major manufacturing sites are covered by ISO14001 external certification GRI 308: Supplier Environmental Assessment Supplier Code of Conduct GRI 401: Employment Working Here GRI 403: Occupational Health and Safety Safety Management System Policy ; Safety at Boeing GRI 404: Training and Education Careers ; Benefits GRI 405: Diversity and Equal Opportunity PS, 6-7; 8-14; Boeing 2023 Global Equity, Diversity & Inclusion Report ; Boeing EEO-1 report GRI 406: Nondiscrimination Boeing 2023 Global Equity, Diversity & Inclusion Report GRI 407: Freedom of Association and Collective Bargaining Human Rights ; Code of Basic Working Conditions and Human Rights GRI 413: Local Communities Community Engagement GRI 414: Supplier Social Assessment Supplier Code of Conduct ; Boeing Australia Modern Slavery Statement ; Boeing UK Modern Slavery Statement GRI 416: Customer Health and Safety 2023 Chief Aerospace Safety Officer Report ; Aerospace Safety Committee Charter ; Safety at Boeing ; Supplier Quality
Reporting	GRI 201: Economic Performance			
Key ESG Data	201-1	Direct economic value generated and distributed	Company Profile, Page 10 ; 2022 Community Engagement Highlights, Page 68 ; Key ESG Data, Page 78	AR, Pages 2-3, 16, 53-58
Awards and Recognition	201-2	Financial implications and other risks and opportunities due to climate change	Innovation and Clean Technology, Pages 33-48 ; Addressing Climate Change, Pages 54-55	CDP Climate Report ¹ C2.3a, C2.4a AR, Pages 4, 15

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	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)
Introduction	201-3	Defined benefit plan obligations and other retirement plans	2022 Community Engagement Highlights, Page 68 ; Key ESG Data, Pages 77-78	AR , Pages 25, 44, 63, 90-99 Benefits
	201-4	Financial assistance received from government		AR , Pages 85-86
Approach & Governance		GRI 203: Indirect Economic Impacts		
People	203-1	Infrastructure investments and services supported		Boeing's U.S. Footprint: Interactive Map
Products & Services	203-2	Significant indirect economic impacts	CSO Message, Pages 5-6 ; Advanced Technology, Pages 42-44 ; Innovation and Clean Technology, Pages 33-48	Boeing's U.S. Footprint: Interactive Map In 2022, Boeing announced its Aatmanirbhar Bharat strategy for India's defense industry, This project has the potential economic impact of \$3.6 billion over 10 years for the Indian economy. This was rolled out as part of Boeing's Make in India initiatives, building on a successful track record of contributing to India's indigenous aerospace and defense ecosystem. Boeing Australia's partnership with the Indigenous Defence and Infrastructure Consortium (iDiC) was recognized by Australia's Supply Nation as the 2022 Supplier Diversity Partnership of the Year. Boeing Defence Australia has achieved more than 17 million Australian dollars in accumulated Indigenous supply chain spend since 2012. One of many milestones was the first Indigenous-owned business in Australia to become qualified to audit or certify under AS9100.
Operations				
Communities				
Reporting		GRI 204: Procurement Practices		
Key ESG Data	204-1	Proportion of spending on local suppliers		89% of our suppliers are local to our significant locations of operations, and spend with these local suppliers comprised 81% of our supplier spend. Local suppliers are defined as domestic in relation to the location of operation; significant locations of operation are defined as major operational areas as determined by square footage.
GRI Index				
SASB Index				
TCFD Index				
U.N. Sustainable Development Goals	205-2	Communication and training about anti-corruption policies and procedures	Ethical and Compliant Business, Pages 16-17	Anti-Corruption Program
Awards and Recognition				
Select Memberships and Partnerships	301-1	Materials used by weight or volume	Sustainable Product Life Cycle, Pages 31-32 ; Responsible Supply Chain, Pages 62-65	AR , Pages 4-5
Forward-Looking Statements	302-1	Energy consumption within the organization	Key ESG Data, Page 74	CDP Climate Report ¹ C8.2a

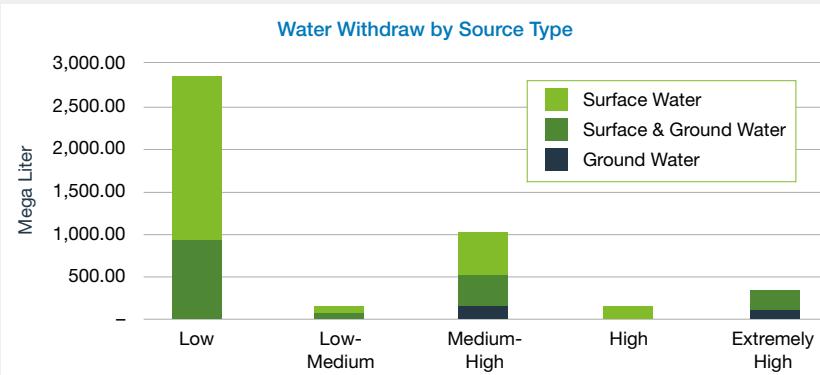
1. Boeing participates annually in the CDP Climate Report. Our most recent response is available on our website here in accordance with the CDP reporting schedule.

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	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)
Introduction	302-3	Energy intensity	Key ESG Data, Page 74	CDP Climate Report ¹ The energy intensity ratio includes total energy use divided by revenue. This figure represents purchased renewable energy and purchased nonrenewable energy, including: natural gas, electricity, No. 2 petroleum diesel, No. 5 petroleum oil, No. 6 residual fuel oil, motor gasoline, jet fuel, propane, aviation gasoline, liquefied petroleum gas, diesel oil and sustainable aviation fuel. This ratio includes energy from sites considered within our “operational control,” following GHG Protocol in defining our organizational boundary.
Approach & Governance				
People	302-4	Reduction of energy consumption	Key ESG Data, Page 74 ; Sustainable Operations, Pages 52-61	CDP Climate Report ¹ Boeing's switch to LED lighting in its Everett, Washington; Frederickson, Washington; and El Segundo, California, facilities is driving an annual recurring savings of 25.3 million kWh.
Products & Services	302-5	Reductions in energy requirements of products and services	Key ESG Data, Page 74 ; Advanced Technology, Pages 42-44 ; Sustainable Operations, Pages 52-61	CDP Climate Report ¹ SASB RT-AE-410a.1; RT-AE-410a.2
Operations	GRI 303: Water and Effluents			
Communities	303-1	Interactions with water as a shared resource	Sustainable Operations, Pages 52-61 ; Communities, Pages 67-72	CDP Water Report Key to Boeing's water stewardship efforts is our internal Conservation Best Practices program that engages all employees from the shop floor to our C-suite. Conservation Best Practices are low-cost, proven initiatives that reduce resource use by Boeing operations. In 2022, Boeing focused water reduction efforts on improving process efficiencies across the company. We utilize monthly metrics to identify irregularities that may indicate an impact on water consumption that requires action, as well as the Conservation Best Practice (CBP) program to minimize on-site water use. Boeing utilizes many of the water management techniques endorsed by the U.S. EPA in this CBP program, which include: Meter/Measure/Manage; Optimize Cooling towers; Replace Restroom Fixtures; Eliminate Single Pass Cooling; Use Water-Smart Landscaping and Irrigation.
Reporting				
Key ESG Data				
GRI Index				
SASB Index				
TCFD Index				
U.N. Sustainable Development Goals				
Awards and Recognition	303-2	Management of water-related impacts	Sustainable Operations, Pages 52-61	CDP Water Report

1. Boeing participates annually in the CDP Climate Report. Our most recent response is available on our website [here](#) in accordance with the CDP reporting schedule.

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	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)												
Introduction	303-3	Water withdrawal	Sustainable Operations, Pages 52-61 ; Key ESG Data, Page 75	<p>CDP Water Report W1.2 Boeing utilized the Aqueduct project of the World Resources Institute (WRI) to systematically evaluate each location to determine whether a facility is located in a water-stressed area.</p>  <table border="1"> <caption>Water Withdrawal by Source Type</caption> <thead> <tr> <th>Category</th> <th>Mega Liter</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td>~2,800</td> </tr> <tr> <td>Low-Medium</td> <td>~100</td> </tr> <tr> <td>Medium-High</td> <td>~100</td> </tr> <tr> <td>High</td> <td>~100</td> </tr> <tr> <td>Extremely High</td> <td>~100</td> </tr> </tbody> </table> <p>Source: Third-party data, municipal water meters Boundary: 4-Walls Metric Sites, 84% of Company Population</p>	Category	Mega Liter	Low	~2,800	Low-Medium	~100	Medium-High	~100	High	~100	Extremely High	~100
Category	Mega Liter															
Low	~2,800															
Low-Medium	~100															
Medium-High	~100															
High	~100															
Extremely High	~100															
Approach & Governance																
People																
Products & Services																
Operations																
Communities																
Reporting																
Key ESG Data																
GRI Index																
SASB Index																
TCFD Index																
U.N. Sustainable Development Goals																
Awards and Recognition																
Select Memberships and Partnerships																
Forward-Looking Statements	303-4	Water discharge	Key ESG Data, Page 75	CDP Water Report												
	303-5	Water consumption	Key ESG Data, Page 75	CDP Water Report												
GRI 304: Biodiversity																
	304-3	Habitats protected or restored	Biodiversity and Environmental Compliance, Pages 60-61	Duwamish Waterway Santa Susana												

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	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)
GRI 305: Emissions				
Introduction	305-1	Direct (Scope 1) GHG emissions	Key ESG Data, Page 75	CDP Climate Report ¹ C6.1 GHG Supplement
Approach & Governance	305-2	Energy indirect (Scope 2) GHG emissions	Key ESG Data, Page 75	CDP Climate Report ¹ C6.3 GHG Supplement
People	305-3	Other indirect (Scope 3) GHG emissions	Key ESG Data, Page 75	CDP Climate Report ¹ C6.5 GHG Supplement
Products & Services	305-4	GHG emissions intensity	Key ESG Data, Page 75	CDP Climate Report ¹ C6.10 GHG Supplement
	305-5	Reduction of GHG emissions	Sustainability Goals, Page 12 ; Operational Targets Progress, Page 53	CDP Climate Report ¹ C4 GHG Supplement
GRI 306 (2016): Effluents and Waste				
Operations	306-3	Significant spills	Key ESG Data, Page 76 ; Operations, Page 61	
Communities	GRI 306: Waste			
Reporting	306-1	Waste generation and significant waste-related impacts	Key ESG Data, Pages 75-76	Boeing generates nonhazardous solid waste through a number of activities: Manufacturing, production and design of products; Packaging from materials received at facilities; On-site facility maintenance activities; Employee-generated office waste; Food-related waste (cafeterias, employee lunches and vended products); and Construction projects.
Key ESG Data	306-2	Management of significant waste-related impacts	Key ESG Data, Pages 75-76 ; Operational Targets Progress, Page 53	Airplane and Carbon Fiber Recycling Fact Sheet Boeing has dedicated internal teams to prevent waste from going to the landfill. Our reclamation team works to capture and collect materials across the company, while our investment recovery team repurposes materials, facilitates donations and sells scrap materials. Our packaging team assesses opportunities to return or reuse packaging for parts and materials. Packaging engineers have developed standards for reusing containers with our suppliers. Our employees also develop processes to reuse and repurpose incoming packing materials, helping to reduce waste and cost. The Boeing Supplier Code of Conduct, based on the International Forum on Business Ethical Conduct for the Aerospace and Defense Industry's model code, provides suppliers with a set of responsible business conduct expectations consistent with our policies, principles and ESG efforts.
GRI Index	306-3	Waste generated	Key ESG Data, Pages 75-76	
SASB Index	306-4	Waste diverted from disposal	Key ESG Data, Pages 75-76	

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	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)
Introduction	306-5	Waste directed to disposal	Key ESG Data, Pages 75-76	Generally, third-party vendors handle transport and disposal of Boeing waste. The company contracts with vendors who provide waste-to-landfill, waste-to-energy, recycling and composting services. Vendors provide disposal data, and in the absence of weight-based data, Boeing calculates weight using a parametric approach. Hazardous waste is determined from U.S. EPA hazardous manifest or equivalent government shipping documents. With profile waste designations determining the type of waste and Management codes determining the disposal method.
Approach & Governance				
People		GRI 308: Supplier Environmental Assessment		
Products & Services	308-1	New suppliers that were screened using environmental criteria		Boeing does not screen suppliers using environmental criteria.
Operations		GRI 401: Employment		
Communities	401-1	New employee hires and employee turnover		AR , Page 3
Reporting	401-3	Parental leave		Benefits In 2022: <ul style="list-style-type: none"> • 98,821 employees were eligible for paid parental leave: 25,657 women, 72,644 men and 520 people of unknown gender. • 4,305 employees took paid parental leave: 834 women, 3,451 men and 20 people of unknown gender. • 4,140 employees returned from paid parental leave: 769 women, 3,351 men and 20 people of unknown gender. 3,991 employees who took paid parental leave in 2022 were still employed as of May 15, 2023: 776 women, 3,196 men and 19 people of unknown gender.
Key ESG Data				
GRI Index				
SASB Index		GRI 402: Labor/Management Relations		
TCFD Index	402-1	Minimum notice periods regarding operational changes		We provide advance notice in accordance with all applicable legal and/or contractual requirements in the different locations where we operate.
U.N. Sustainable Development Goals		GRI 403: Occupational Health and Safety		
Awards and Recognition	403-1	Occupational health and safety management system	Workplace Safety, Pages 19-20 ; Key ESG Data, Pages 77-78	
Select Memberships and Partnerships	403-2	Hazard identification, risk assessment and incident investigation	Workplace Safety, Pages 19-20	
Forward-Looking Statements	403-5	Worker training on occupational health and safety	Workplace Safety, Pages 19-20 ; Key ESG Data, Pages 77-78	
	403-6	Promotion of worker health	Workplace Safety, Pages 19-20 ; Employee Well-Being, Pages 21-23	

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	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)
Introduction	403-8	Workers covered by an occupational health and safety management system	Workplace Safety, Pages 19-20	
Approach & Governance	403-9	Work-related injuries	Workplace Safety, Pages 19-20 ; Key ESG Data, Page 77	
	403-10	Work-related ill health	Key ESG Data, Page 77	
People		GRI 404: Training and Education		
	404-1	Average hours of training per year per employee	Key ESG Data, Pages 77-78	AR , Page 3
Products & Services	404-2	Programs for upgrading employee skills and transition assistance programs		Benefits
Operations		GRI 405: Diversity and Equal Opportunity		
	405-1	Diversity of governance bodies and employees	Key ESG Data, Page 77	PS , Page 7 Boeing 2023 Global Equity, Diversity & Inclusion Report
Communities		GRI 406: Nondiscrimination		
	406-1	Incidents of discrimination and corrective actions taken	Ethical and Compliant Business, Pages 16-17 ; Key ESG Data, Pages 77-78	Boeing 2023 Global Equity, Diversity & Inclusion Report
Reporting		GRI 407: Freedom of Association and Collective Bargaining		
Key ESG Data	407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk		AR , Page 17
GRI Index		GRI 413: Local Communities		
SASB Index				
TCFD Index	413-1	Operations with local community engagement, impact assessments and development programs (percentage of operations)	Communities, Pages 67-72	2023 Boeing Global Engagement Portfolio Boeing's U.S. Footprint: Interactive Map
U.N. Sustainable Development Goals	413-2	Operations with significant actual and potential negative impacts on local communities	Communities, Pages 67-72	Boeing's U.S. Footprint: Interactive Map Remediation
Awards and Recognition		GRI 414: Supplier Social Assessment		
Select Memberships and Partnerships	414-1	New suppliers that were screened using social criteria		Boeing does not screen suppliers using social criteria.
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	Disclosure	Disclosure Title	Sustainability Report Section(s)	Additional Reference(s)/Link(s)
GRI 416: Customer Health and Safety				
Introduction	416-1	Assessment of the health and safety impacts of product and service categories	Global Aerospace Safety, Pages 28-30	Statistical Summary of Commercial Jet Airplane Accidents
Approach & Governance	416-2	Incidents of noncompliance concerning the health and safety impacts of products and services	Global Aerospace Safety, Pages 28-30	SASB RT-AE-250a.3 Statistical Summary of Commercial Jet Airplane Accidents
GRI 418: Customer Privacy				
People	418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	Enterprise Security and Data Privacy, Page 66	SASB RT-AE-230a.2
Products & Services				
Operations				
Communities				

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Accounting Metric	Code	Boeing Metric or Qualitative Disclosure(s) and Disclosure Location(s)
Energy Management		
Total energy consumed	RT-AE-130a.1	Key ESG Data, Page 74 CDP Climate Report ¹
Percentage of grid electricity	RT-AE-130a.1	Key ESG Data, Page 74
Percentage of renewable energy	RT-AE-130a.1	Key ESG Data, Page 74 ; Sustainability Goals, Page 12
Hazardous Waste Management		
Amount of hazardous waste generated	RT-AE-150a.1	Key ESG Data, Pages 75-76
Percentage of hazardous waste recycled	RT-AE-150a.1	Key ESG Data, Pages 75-76
Number and aggregate quantity of reportable spills	RT-AE-150a.2	Key ESG Data, Page 76
Quantity recovered from reportable spills	RT-AE-150a.2	Key ESG Data, Page 76
Data Security		
Description of approach to identifying and addressing data security risks in company operations	RT-AE-230a.2	We rely extensively on information technology systems and networks to operate our company and meet our business objectives. As cyber threats increase in volume and sophistication, the risk to the security of these systems and networks — and to the confidentiality, integrity and availability of the data they house — continues to evolve, requiring constant vigilance and concerted, companywide risk management efforts. Boeing takes a risk-based approach to managing the security of its data and has a documented low-risk appetite for cybersecurity and data protection, while recognizing that business requirements may necessitate adjustments to that risk tolerance. To address these risks, we maintain an extensive network of technical security controls, policy enforcement mechanisms, monitoring systems and management oversight. We also have established a Security Council to strengthen governance and coordination of cyber and physical security activities. While these measures are designed to prevent, detect and respond to unauthorized activity, there is no guarantee that they will be sufficient to prevent or mitigate the risk of a cyberattack or data loss or the potentially serious reputational, operational or financial impacts that may result. A strong partnership exists between IT, Enterprise Security, Corporate Audit, and Legal to ensure identified issues are addressed in a timely manner and incidents are reported to the appropriate regulatory bodies as required.
Description of approach to identifying and addressing data security risks in products	RT-AE-230a.2	Product Security Engineering provides a disciplined approach to the development and sustainment of our products, which is essential to ensuring mission assurance, resiliency and security. Security is integrated into our engineering processes, starting from concept development, ensuring that we develop products that are secure by design. Key cyber attributes and adversity (or threat) to the system are identified during requirements engineering, allocated throughout design, implemented and validated during development, fully tested and supported during sustainment. Additionally, Boeing works to ensure that our products are designed to anticipate, withstand, recover and adapt to cyberattack. Specifically, our security processes ensure that we have high-level requirements to baseline and monitor data flow and system behavior, detect anomalies and actively manage system configuration. The ability of our systems to understand normal operations and rapidly detect and mitigate the abnormal, combined with the security engineering focus of our development processes, provides Boeing's programs with a proactive approach to risk management. Product Security is also integrated into the Boeing enterprise Incident Response process, and we work seamless with stakeholders to rapidly identify, analyze, and mitigate vulnerabilities and breaches across our portfolio.

1. Boeing participates annually in the CDP Climate Report. Our most recent response is available on our website [here](#) in accordance with the CDP reporting schedule.

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Accounting Metric	Code	Boeing Metric or Qualitative Disclosure(s) and Disclosure Location(s)
Product Safety		
Number of Airworthiness Directives received	RT-AE-250a.3	53 (see the FAA Dynamic Regulatory System) Statistical Summary of Commercial Jet Airplane Accidents
Fuel Economy and Emissions in Use-Phase		
Revenue from alternative-energy-related products	RT-AE-410a.1	Per ASTM standards, all commercial turbojet airplanes are certified to fly revenue passengers with a blend of up to 50% sustainable aviation fuels derived from biomass and other sustainable sources that can reduce CO ₂ emissions by up to 80% over conventional fossil jet fuel on a life cycle basis. Boeing Commercial Airplanes 2022 revenues were \$25,867 million USD and are listed in our AR , Page 22; CDP ¹ C4.5a.
Description of approach and discussion of strategy to address fuel economy and GHG emissions of products	RT-AE-410a.2	Global Aerospace Safety, Pages 28-30 Innovation and Clean Technology, Pages 33-48 Sustainable Product Life Cycle, Pages 31-32
Materials Sourcing		
Description of the management of risks associated with the use of critical materials	RT-AE-440a.1	AR , Pages 4-5 We are highly dependent on the availability of essential materials, parts and subassemblies from our suppliers and subcontractors. The most important raw materials required for our aerospace products are aluminum (sheet, plate, forgings and extrusions), titanium (sheet, plate, forgings and extrusions) and composites (including carbon and boron). Although alternative sources generally exist for these raw materials, qualification of the sources could take a year or more. During 2022, as a result of the Russia-Ukraine war, we suspended purchasing titanium from Russia. This has not disrupted our operations as we have been able to use inventory on hand and identify alternative sources. Many major components and product equipment items are procured or subcontracted on a sole-source basis. We continue to work with a small number of sole-source suppliers to ensure continuity of supply for certain items.
Business Ethics		
Discussion of processes to manage business ethics risks throughout the value chain	RT-AE-510a.3	Ethical and Compliant Business, Pages 16-17 Ethics and Compliance Anti-Corruption Suppliers: Suppliers are encouraged to model their ethics program in accordance with the Federal Sentencing Guidelines and industry best practices. Boeing believes that our suppliers and partners share the goal of maintaining the highest standards of business conduct as defined in our Boeing Supplier Code of Conduct . This shared goal helps enable compliant company performance across all geographic locations. We also recognize that continued, collaborative partnership between our company, suppliers and other third parties leads to relationships built on trust and respect — which leads to enhanced business performance. Suppliers: https://www.boeingsuppliers.com/supplier_principles.html#/ethics
Activity Metrics		
Production by reportable segment	RT-AE-000.A	AR , Pages 136-144 Orders and Deliveries Patents: 3,938 in 2022 (U.S. and non-U.S.); 60,239 since 1962 (U.S. and non-U.S.)
Number of employees	RT-AE-000.B	156,000 Key ESG Data, Page 77

1. Boeing participates annually in the CDP Climate Report. Our most recent response is available on our website [here](#) in accordance with the CDP reporting schedule.

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AR = 2022 Annual Report
PS = 2023 Proxy Statement

	Disclosure	TCFD Recommended Disclosure	Sustainability Report Section(s)	Additional Reference(s)
Introduction		Describe the Board's oversight of climate-related risks and opportunities	Governance and Risk Management, Pages 13-14 ; Addressing Climate Change, Pages 54-55	CDP Climate Report ¹ 1.1.b
Approach & Governance	Governance	Describe management's role in assessing and managing climate-related risks and opportunities	Governance and Risk Management, Pages 13-14 ; Addressing Climate Change, Pages 54-55	CDP Climate Report ¹ C1.2
People		Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term		CDP Climate Report ¹ C2.3a, C2.4a
Products & Services	Strategy	Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy and financial planning		CDP Climate Report ¹ C2.3a, C2.4a, C3.3, C3.4
Operations		Describe the potential impact of different scenarios, including a 2 degree Celsius scenario, on the organization's businesses, strategy and financial planning		CDP Climate Report ¹ C3.2.a
Communities		Describe the organization's process for identifying and assessing climate-related risks	Governance and Risk Management, Pages 13-14	CDP Climate Report ¹ C2.1, C2.2, C2.2a
Reporting		Describe the organization's processes for managing climate-related risks	Governance and Risk Management, Pages 13-14	CDP Climate Report ¹ C2.1, C2.2
Key ESG Data	Risk Management	Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management	Governance and Risk Management, Pages 13-14	CDP Climate Report ¹ C2.1, C2.2
GRI Index				
SASB Index				
TCFD Index		Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk-management process		CDP Climate Report ¹ C4.1, C4.2, C9.1
U.N. Sustainable Development Goals		Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 greenhouse gas (GHG) emissions and the related risks	Key ESG Data, Page 74	CDP Climate Report ¹ C6.1, C6.3, C6.5
Awards and Recognition	Metrics and Targets	Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets	2030 Goals, Page 12 ; Addressing Climate Change, Pages 54-55 ; Sustainable Operations, Pages 52-61	CDP Climate Report ¹ C4.1, C4.1a, C4.2, C4.2b
Select Memberships and Partnerships				
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1. Boeing participates annually in the CDP climate report. Our most recent response is available on our website [here](#) in accordance with the CDP reporting schedule.

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U.N. Sustainable Development Goals (SDG) are a universal call to action to end poverty, protect the planet, and improve the lives and prospects of everyone, everywhere.¹ Boeing supports all 17 SDGs and has identified 10 goals of focus, listed below and on the following pages, in which we are committed to outcomes that make the world a better place for all.

Goal	Key SDG Sub-Indicators	2023 Progress
Good Health and Well-Being	3.3 3.7 3.9	<ul style="list-style-type: none"> Boeing is celebrating 10 years of our Go for Zero initiative, which prioritizes workplace safety. Since Go for Zero's introduction in 2013, Boeing has seen significant reductions in serious safety accidents and injuries. Boeing's Lifesaving Rules are intended to reduce or eliminate risks created when around or performing processes recognized as High Hazard Processes, preventing life-critical incidents. In 2022, Boeing hosted more than 60 well-being webinars, with 20,000+ employees attending. Topics included work/life balance, health and well-being for various minority groups, fertility wellness, and physical and mental health.
Quality Education	4.3 4.4 4.7	<ul style="list-style-type: none"> Amideast and Boeing announced an expanded partnership to support more Egyptian young people through STEM education with a focus on sustainability. The expanded partnership will include STEM programs in robotics, graphics, animation, 3D printing, programming and web development; a STEM entrepreneurship competition; and a new STEM Program for Climate Sustainability. In 2022, about 10,000 employees received tuition assistance for degree and nondegree programs. In 2022, Learn@Boeing was leveraged by 77,000 employees to develop knowledge and skills for their current role or to prepare for a future role.
Gender Equality	5.5.2	<ul style="list-style-type: none"> 90% of candidate interview slates for manager- or director-level roles included at least one woman globally, or at least one woman or racial/ethnic minority in the U.S., showing that specific, measurable and financially relevant accountability has an effect on incentivizing the right behaviors that naturally lead to more diverse outcomes. Our 2023 target is to increase participation to 92%. Boeing's office in Saudi Arabia has doubled representation of women over the past six years in line with Saudi Arabia's Vision 2030, which aims to increase gender diversity in the country's workforce. Boeing continues to support workforce diversity locally by partnering with nonprofits that help women from underserved communities join the labor market, and by funding research with Saudi universities such as Princess Nora University, the largest all-women university in the world. In partnership with the Boeing Women Inspiring Leadership Business Resource Group (BRG), supplier Mitsubishi Heavy Industries (MHI) hosted workshops in Vietnam and Japan to increase awareness of gender gaps and inspire leaders to take ownership for equity in the workplace. After the success of the workshops, both companies have agreed to collaborate on more events in 2023, including quarterly roundtable discussions.
Clean Water and Sanitation	6.6	<ul style="list-style-type: none"> Boeing's Aurora Bridge Bioswale project was designed to clean up polluted stormwater coming off the bridge, filtering the water and protecting the salmon in the canal below. It is one of 10 enhanced rain gardens at Boeing sites across Washington state. Boeing partners with River LA's Resilient Rio 51 program (RR51) to engage low-income, disadvantaged urban youth with the LA River through recreational activities combined with river-oriented curricula and leadership development. The program fosters river stewardship and teaches students how to advocate for and apply sustainability practices to their lives. Boeing's partnership with DigDeep on the Navajo Water Project brings safe, clean running water to homes in the Navajo nation, as well as septic systems, education and skilled job creation.
Affordable and Clean Energy	7.2 7.3	<ul style="list-style-type: none"> Boeing is collaborating with suppliers to ensure all commercial airplanes we deliver by 2030 will be compatible with 100% sustainable aviation fuel (SAF). In 2022, we purchased 5.6 million gallons (21.2 million liters) of blended SAF to support our commercial operations. Boeing and NASA continued their partnership testing the emissions of SAF. This year, the team conducted tests on the 2022 Boeing ecoDemonstrator, a 777-200ER (Extended Range) with Rolls-Royce Trent 800 engines and a 787-10 with GEnx-1B engines. Boeing has set a goal of achieving 100% renewable energy in operations by 2030. We achieved 35% renewable electricity in 2022 by increasing use of renewable electricity and purchasing renewable energy credits.

1. Source: <https://www.un.org/sustainabledevelopment/development-agenda/>

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	Goal	Key SDG Sub-Indicators	2023 Progress
Introduction		Decent Work and Economic Growth 8.2 8.3 8.4	<ul style="list-style-type: none"> Through the Boeing Technical Apprenticeship Program (BTAP) we are striving to place at least 1,000 technical apprentices into high-skill, technical roles by 2025. The first Cybersecurity apprenticeship pilot cohort graduated in 2022, and 100% of participants are being placed in Boeing jobs. Boeing and its employees donated \$185.7 million and contributed 366,000 volunteer hours to 13,371 community partners in 2022 to help build better communities worldwide. Boeing contracts with approximately 11,000 Tier-1 suppliers globally. In 2022, we spent nearly \$4.6 billion with diverse suppliers and small businesses.
Approach & Governance		Industry, Innovation and Infrastructure 9.1.2 9.3.1 9.4.1 9.5.1 9.5.2 9.B.1	<ul style="list-style-type: none"> Boeing debuted The Boeing Cascade Climate Impact Model (Cascade) at the Farnborough International Airshow in 2022. This web application uses digital technical data pulled from across the world to visualize how introducing various sustainable aviation options would impact global emissions, providing a data-driven way for our stakeholders to make informed decisions about how to reach the commercial aviation industry's net-zero 2050 ambition. Boeing's Wisk technology joint venture announced the world's first self-flying, all-electric four-passenger vertical takeoff and landing (eVTOL) air taxi in October, following the securing of \$450 million from Boeing to advance certified autonomous electric flight in January. Wisk will be the first candidate for certification of an eVTOL aircraft in the U.S. In January, GE Aviation announced it had selected Boeing and Aurora to support flight tests of its hybrid electric propulsion system, a big step forward in exploring electric for the future of commercial flight to reduce carbon emissions.
People		Reduced Inequalities 10.2.1 10.3.1 10.B.1	<ul style="list-style-type: none"> Since Boeing and the Thurgood Marshall College Fund (TMCF) began their partnership in 2018, Boeing has quadrupled the number of interns — many of whom return for a full-time position — hired through partner Historically Black Colleges and Universities (HBCUs) and extended the company's reach to more than 6,800 HBCU students. In 2022 we announced a new \$8 million, multiyear partnership that will support campus recruitment initiatives, career immersion activities, TMCF Leadership Institute programming and student scholarships through 2026. For the second year in a row, we saw exit rates for women, men and teammates of all races all within a point of each other. Our 2025 Aspiration is to "achieve parity in retention rates of all groups," and we have been pleased to see our resignation rates are at parity across genders and U.S. racial/ethnic identities in light of the "great resignation" other companies are seeing, particularly among women. As of March 2023, 3,300 teammates from 33 countries registered to be Inclusion Ambassadors, committed to advancing inclusion on their own teams. These Inclusion Ambassadors join a monthly call where they learn together, adopt new inclusion tools, share insights and commit to taking action.
Products & Services		Responsible Consumption and Production 12.2 12.4 12.5 12.6 12.7	<ul style="list-style-type: none"> Boeing has set targets for reducing Scope 1 and Scope 2 greenhouse gas (GHG) emissions by 25%. In 2022, we achieved a 31% reduction in GHG emissions compared to 2017. GHG emissions were 8% lower than anticipated for the year. Employees across the globe took more than 231,000 60-second actions for the environment for Earth Day on April 22 to May 31. Boeing looks at every stage of the product life cycle through a sustainability lens, from design through to how materials are recycled after an aircraft is retired. Ninety percent of the parts and materials in Boeing aircraft are reused and recycled across aerospace and other industries.
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	Goal	Key SDG Sub-Indicators	2023 Progress
Introduction			
Approach & Governance	 Climate Action	13.1 13.3	<ul style="list-style-type: none"> Boeing achieved net-zero GHG emissions at manufacturing and other work sites and in business travel in 2022 for the third consecutive year, by expanding conservation and renewable energy use while securing carefully selected, third-party-verified offsets for the remaining greenhouse gas (GHG) emissions. With support from a Boeing grant in 2022, EarthGen engaged 2,000 students across four Puget Sound school districts in its Stormwater Stewards program. The students learned about watersheds and the impact of stormwater runoff, investigated their local watersheds and then designed and implemented green stormwater infrastructure projects to improve water quality in their community. Boeing supports the commercial aviation industry's net zero ambition and is working with decision-makers and policy institutions globally to create tailor-made paths forward to decarbonize aerospace. The industry's ambition of net-zero carbon emissions by 2050 has multiple levers to work toward meeting this target.
People			
Products & Services			
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Communities	 Partnerships for the Goals	17.16 17.17	<ul style="list-style-type: none"> In July, Boeing became the founding member, in partnership with the University of Sheffield, of the Energy Innovation Center to drive SAF development. In early 2023, the EIC was announced as the UK's SAF Clearing House, in partnership with the University of Dayton, reinforcing the critical role that this key facility, with Boeing's support, will play in the global ecosystem that is seeking to accelerate SAF development. Boeing and Mitsubishi Heavy Industries agreed to study sustainable technologies for a low-carbon society. Their focus areas include green hydrogen, carbon capture, electrification, sustainable materials, zero emissions technologies, new aircraft design concepts, and new feedstocks and technologies for SAF production. Boeing is supporting the Pan American Development Foundation (PADF), which is active in eight countries, working with teachers, and primary and university or post-university students to find solutions to local environmental issues. In Bolivia, PADF works with partners to develop a curriculum about alternative energy, waste management, natural resources and identifying local solutions. In Ecuador and Mexico, local partners will work with teachers to design lessons that address local needs such as reducing pollution, using plastic alternatives or storing electricity.
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- AAEOY recognized Vishwa Uddanwadiker as Asian American Executive of the Year in 2022
- Career Communications Group Inc. Top Supporters of HBCU Engineering Schools – Industry (No. 4 in 2022)
- DiversityInc Top 50 Companies for Diversity (No. 12 in 2023)
- DiversityInc Top Companies for Veterans (No.1 in 2023)
- DiversityInc Top Companies for Black Executives (No. 26 in 2023)
- DiversityInc Top Companies for Native American/Pacific Islander (NAPI) Executives (No. 21 in 2023)
- DiversityInc Top Companies for Board of Directors (No. 20 in 2023)
- DiversityInc Top Companies for People With Disabilities (No. 7 in 2023)
- DiversityInc Top Companies for Sponsorship (No. 16 in 2023)
- DiversityInc Top Companies for Environmental, Social & Governance (ESG) (No. 18 in 2023)
- DiversityInc Top Companies for Executive Diversity Councils (No. 11 in 2023)

- DiversityInc Top Companies for Mentoring (No. 11 in 2023)

- DiversityInc Top Companies for Talent Acquisition for Women of Color (No. 12 in 2023)

- Inclusion in Bloomberg's 2023 Gender-Equality Index

- LinkedIn Top Companies – United States (No. 11 in 2023)

- National Organization on Disability – Leading Disability Employer

- Scored 100% on the Disability:IN – Disability Employment Index (DEI) for the seventh consecutive year

- Scored 100% on the Corporate Equality Index – Human Capital Index

- Woman Engineer Magazine's annual Top 50 Employer list (No. 12 in 2022)

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- Best Commitment to Education Program by U.S. Chamber of Commerce
- Best Global Engagement Support Provider Award
- Forbes' America's Best Employers for Veterans (No.10 in 2022)
- Housing Hope Partner Award
- Military Friendly Employer list's >\$5B category for 2023 (Gold Award – No. 8)

- Military Times Best for Vets: Employers (No. 11 in 2022)

- U.S. Department of Labor Hire Vets Medallion – HIRE Vets Platinum Medallion Award

- Vets in Tech Educated Award

- WayUp's Top 100 Internship Programs for 2022

Products & Services

- Airforce Technology Excellence Awards and Rankings 2022
- Cisco 2022 Fast Future Innovation Awards Enterprise West (No. 1 for The Future of Risk Management)
- Clarivate Top 100 Global Innovators 2023
- Popular Science 2022 Best of What's New Award for Starliner

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- Australia's Supply Nation Supplier Diversity Partnership of the Year between Boeing and the Indigenous Defence and Infrastructure Consortium
- Executive Flight Operations received the Sustainable Flight Department Accreditation from the National Business Aviation Association
- Gold Wildlife Habitat Council certification for Pollinator Prairie remediation site

- Military Friendly Top 10 Supplier Diversity (No. 1 in 2022)
- National Veteran Small Business Coalition (NVSBC) Champion of Veteran Enterprise Award (2022)
- U.S. Environmental Protection Agency (EPA)
- Green Power Partnership Fortune 500 Partner List (No. 26 in 2022)
- EPA ENERGY STAR Partner of the Year Award for Sustained Excellence
- Wildlife Habitat Council awards for Wichita Emery Landfill



Executive Flight Operations received the Sustainable Flight Department Accreditation from the National Business Aviation Association.



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- Aerospace Chromate (and Cadmium) Elimination Team
- Aerospace Industries Association of America Inc
- Air Line Pilots Association, International
- Air Transport Action Group
- Aircraft Fleet Recycling Association
- Alliance of Western Energy Consumers
- American Indian Science and Engineering Society
- American Institute of Aeronautics and Astronautics
- APEX Accelerators
- Association for Unmanned Vehicle Systems International
- Association of Certified Fraud Examiners
- Association of International Risk Intelligence Professionals
- Association of Public-Safety Communications Officials — International
- Association of Threat Management Professionals
- Association of Washington Business
- Aviation-Information Sharing and Analysis Center
- Billon Dollar Roundtable
- Brazil-U.S. Business Council
- Business Roundtable
- California Chamber of Congress
- Canadian Aboriginal Minority Supplier Council
- Cargo Compartment Halon Replacement Advisory Group
- Centre for Information Policy Leadership
- Contrail Impact Task Force
- Corporate Eco Forum
- Dallas Regional Chamber
- Defense Industry Initiative
- Disability:IN
- Domestic Security Alliance Council
- Domestic Security Partnership
- Embry-Riddle Aeronautical University
- Ethics and Compliance Initiative
- FIRST Robotics
- Flight Safety Foundation
- General Aviation Manufacturers Association
- Global Privacy Alliance
- Greater Seattle Chamber of Commerce
- Halon Alternatives Research Corporation
- Halon Recycling Corporation
- Hostage US
- HUBZone Contractors National Council
- Institute of Business Ethics
- International Aerospace Environmental Group
- International Air Transport Association
- International Association of Privacy Professionals
- International Aviation Womens Association
- International Civil Aviation Organization
- International Coordinating Council of Aerospace Industries Association
- International Federation of Airline Pilots' Associations
- International Forum on Business Ethical Conduct
- MIT Climate & Sustainability Consortium
- MIT Zero Impact Aviation Alliance
- National 8(a) Association
- National Association of Manufacturers
- National Center for American Indian Enterprise Development
- National Defense Industrial Agency
- National Defense-Information Sharing and Analysis Center
- National Minority Supplier Development Council
- National Society of Black Engineers
- Newton Europe
- Out in Science, Technology, Engineering, and Mathematics
- Overseas Security Advisory Council
- Professional Background Screening Association
- Renewable Energy Buyers Alliance
- Responsible Business Alliance
- Roundtable on Sustainable Biomaterials
- SAE International
- Society for Corporate Governance
- Society of Asian Scientists and Engineers
- Society of Corporate Compliance and Ethics
- Society of Hispanic Professional Engineers
- Society of Women Engineers
- St. Louis Regional Chamber of Commerce
- Sustainability 50/World 50
- The Conference Board
- U.S. Chamber of Commerce
- United Service Organization
- United States Council for International Business
- Villanova Resilient Innovation Through Sustainable Engineering Forum
- Washington Roundtable
- WEConnect International
- Wildlife Habitat Council
- Women in Aviation International
- Women's Business Enterprise National Council
- World Economic Forum
- Yale Center for Natural Carbon Capture

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Caution Concerning Forward-Looking Statements

Certain statements in this report may be “forward-looking” within the meaning of the Private Securities Litigation Reform Act of 1995. Words such as “may,” “should,” “expects,” “intends,” “projects,” “plans,” “believes,” “estimates,” “targets,” “anticipates” and similar expressions generally identify these forward-looking statements. Examples of forward-looking statements include statements relating to our future plans, business prospects, financial condition and operating results, as well as any other statement that does not directly relate to any historical or current fact. Forward-looking statements are based on expectations and assumptions that we believe to be reasonable when made, but that may not prove to be accurate. These statements are not guarantees and are subject to risks, uncertainties and changes in circumstances that are difficult to predict. Many factors could cause actual results to differ materially and adversely from these forward-looking statements. Among these factors are risks related to: (1) general conditions in the economy and our industry, including those due to regulatory changes; (2) our reliance on our commercial airline customers; (3) the overall health of our aircraft production system, planned commercial aircraft production rate changes, our ability to successfully develop and certify new aircraft or new derivative aircraft, and the ability of our aircraft to meet stringent performance and reliability

standards; (4) changing budget and appropriation levels and acquisition priorities of the U.S. government; (5) our dependence on our subcontractors and suppliers, as well as the availability of highly skilled labor and raw materials; (6) competition within our markets; (7) our non-U.S. operations and sales to non-U.S. customers; (8) changes in accounting estimates; (9) realizing the anticipated benefits of mergers, acquisitions, joint ventures/strategic alliances or divestitures; (10) our dependence on U.S. government contracts; (11) our reliance on fixed-price contracts; (12) our reliance on cost-type contracts; (13) contracts that include in-orbit incentive payments; (14) unauthorized access to our, our customers' and/or our suppliers' information and systems; (15) potential business disruptions, including threats to physical security or our information technology systems, extreme weather (including effects of climate change) or other acts of nature, and pandemics or other public health crises; (16) potential adverse developments in new or pending litigation and/or government inquiries or investigations; (17) potential environmental liabilities; (18) effects of climate change and legal, regulatory or market responses to such change; (19) changes in our ability to obtain debt financing on commercially reasonable terms, at competitive rates and in sufficient amounts; (20) substantial pension and other postretirement benefit obligations; (21) the adequacy of our insurance coverage; (22) customer and aircraft concentration in our customer financing portfolio; and (23) work stoppages or other labor disruptions.

Additional information concerning these and other factors can be found in our filings with the Securities and Exchange Commission, including our most recent Annual Report on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K. Any forward-looking statement speaks only as of the date on which it is made, and we assume no obligation to update or revise any such statement, whether as a result of new information, future events or otherwise, except as required by law.



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