BOEING

THE BOEING COMPANY
2019 GLOBAL ENVIRONMENT REPORT

THE FUTURE IS BUILT HERE

SUSTAINABLE FUELS FOR REDUCING LIFE CYCLE EMISSIONS

Boeing's achievements in developing sustainable aviation fuel involve collaborations with airlines, fuel companies, governments and others around the world.

In October 2018, a Virgin Atlantic Airways 747 flew the world's first passenger flight using a blend of traditional fuel and biofuel made from steel mill waste gases. Three months later, an Etihad Airways 787 flew the world's first passenger flight powered partly with biofuel made from seawater-irrigated desert plants.

These collaborations represent Boeing's work with international stakeholders to develop scalable, cost-competitive biofuel supplies.

In March 2019, Boeing announced that customers will be offered the option of using biofuel on delivery flights from the Renton and Everett delivery centers in Washington State.

BUILDING BETTER ECONOMIES WITH BIOFUEL AND BUSINESS

From 2016–2018, Boeing Global Engagement provided grants to South Africa's micro-, small- and medium-sized businesses to help them participate in the emerging green economy and build a local, sustainable aviation fuel market.

Grants were also awarded to the World Wildlife Fund in South Africa and the Roundtable for Sustainable Biomaterials in Geneva, Switzerland, to help evaluate the impacts of sustainable fuel feedstocks and engage with small farmers to build capacity and integrate sustainability into their operations.

The funding led to a better understanding of the most promising African locations to support the production of sustainable aviation fuel and built a foundation for scaling up supply.

We are building a more sustainable future for our industry and our planet.

Aviation contributes to a more sustainable planet by facilitating tourism and trade, generating economic growth, providing jobs and improving living standards for people around the world. An economic growth engine like this requires responsibility — one that Boeing and the aviation industry have proactively taken on by setting and implementing ambitious goals to sustainably grow the industry. From the beginning, Boeing has supported the goals established through the Air Transport Action Group, and Boeing's market-leading, fuel-efficient airplanes continue to help the industry stay on track.

Commercial Aviation Carbon Reduction Goals

Goal	Progress Details
2010 **1.5% per year fuel efficiency** Working toward carbon-neutral growth	Commercial aviation industry is ahead of goal, exceeding 2 percent fuel efficiency improvement per year since 2009. Our newest airplane models, like the 777-9, ensure fuel efficiency improvements can continue into the future across the global air transport system.The ecoDemonstrator program continued its success in 2018, completing a test program of 37 technologies on a FedEx 777 Freighter, including a compact thrust reverser design to support Boeing's future airplane programs.
2020 **Carbon-neutral growth** Implementation of global sectoral approach	Progress continues on implementing a key component of aviation's strategy to address global climate change. In January this year, all airlines worldwide flying international routes began formal monitoring and reporting of their emissions as part of the historic Carbon Offset and Reduction Scheme for International Aviation (CORSIA), adopted by the United Nations' International Civil Aviation Organization (ICAO) in 2016. With CORSIA in place, the industry expects to offset 75 percent of the growth in global aviation CO_2 emissions from 2020. Boeing supports the program, including tools and services from Boeing Global Services to help our customers with their CORSIA reporting needs.
2050 **Reduce carbon emissions by 50%** Half the net aviation CO_2 of 2005	Achieving this long-term goal requires research and development efforts in all areas of an airplane and its operation: from innovative new airframes, engines and materials technology for airplanes of the future — including hybrid and electric-powered airplanes — to researching new pathways and scaling up sustainable aviation fuel production. Boeing continues making technology and innovation investments and working in collaborative partnerships across the globe in all of these areas to enable the airplanes of the 2050 global fleet to operate with lower life-cycle emissions.

Environmental leadership is crucial to our being the best in aerospace and a global industrial champion. Stopping climate change requires credible actions and solutions.

After launching our new Global 2025 Environment Strategy in June 2018, we made progress by advancing environmental initiatives on many fronts. Our environment strategy addresses risks and opportunities through its three-part focus on product innovation, sustainable operations and global collaboration.

Global 2025 Strategy for Environmental Leadership – 2018

Strategy Pillar	Progress	Progress Details
Innovate for Performance	→	Innovation is crucial throughout Boeing, from design and manufacturing to operations and services. Addressing our environmental footprint from the beginning to the end of service is important for environmentally responsible manufacturing solutions, including energy efficiencies, while also working toward eliminating hazardous chemicals in production. In 2018, Boeing's investments in research and development were essential for advancing technology and launching ventures like Boeing NeXt, which explores possibilities for future efficiencies.
Excellence in Sustainability	—	Boeing factories finished 2018 1 to 7 percent better than plan toward the 2025 goals for greenhouse gas emissions, energy use and solid waste to landfill. Water and hazardous waste reductions remain challenging, however, requiring increased initiatives, innovations and research. The CDP (formerly called the Carbon Disclosure Project), the industry standard for environmental reporting, recognized Boeing with an A– rating for our CO_2 emissions reduction and transparent reporting.
Inspire Global Collaboration	→	Building on previous efforts between Boeing and organizations like The Nature Conservancy, Southern California's TreePeople and the Lowcountry Land Trust in South Carolina, 2018 saw progress in promoting habitat restoration, advancing green stormwater infrastructure, improving the science associated with waterway cleanups and bettering communities around the world.

Employees are making big strides in conservation, but water and hazardous waste remain challenging.

Employee conservation efforts hit an all-time high in 2018 as the company removed barriers to enable environment-forward conservation behaviors. Boeing continues to work at reducing water consumption and hazardous waste. The company is exploring innovative ways to cut water use, even as airplane production increases.

Due to an increased work scope in 2018, Boeing did not meet our challenging hazardous waste reduction goals. However, our teams are researching innovations to make great strides and redouble 2019 efforts to stay on track for future goals.

Progress Toward 2025 Goals (From 2017 Baseline)

2025 Reduction Goals	Progress Details
Reduce greenhouse gas emissions by 25%	**2.5 percent better** for full year 2018
Reduce water consumption by 20%	**1.3 percent behind** for full year 2018
Reduce solid waste to landfill by 20%	**7.3 percent better** for full year 2018
Reduce energy consumption by 10%	**1.2 percent better** for full year 2018
Reduce hazardous waste by 5%	**1.9 percent behind** for full year 2018

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When the 777X enters service in 2020 it will be the **largest and most fuel efficient twin-engine jet in the world**.

In 2018, Boeing donated **$2.5 million for West Coast reforestation efforts**.

Boeing finished 2018 better against **zero-growth targets** for greenhouse gas emissions, energy use and solid waste to landfill.

Scan code for Boeing's 2019 Global Environment Report.

In 2019, an Etihad Airways 787 flew the world's first passenger flight powered partly with **biofuel made from desert plants irrigated with seawater.**

More than one million pounds (454,000 kg) of excess carbon fiber will stay out of the landfill thanks to a new partnership with U.K.-based ELG Carbon Fibre.

The commercial aviation industry is ahead of the goal to **improve fuel efficiency by 1.5% per year by 2020.**

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