

# Environment

Progress, action, impact



October 2024



**Bombardier**



# Vision

**Bombardier is firmly committed to a sustainable and financially resilient future. Our vision is to be the leader of sustainable business aviation with the most advanced and environmentally responsible products, and with our creative, diverse and engaged employees.**

As a leading manufacturer and servicing company for business aircraft, it is essential for Bombardier's long-term success that it leads the way in driving decisive actions that will contribute to the achievement of the business aviation industry's net zero target by 2050.



At Bombardier, we have the talent, the motivation and the responsibility to build a more sustainable future for business aviation. Our team members around the world are very proud that our innovations are part of the solution.



ÉRIC MARTEL  
President and Chief Executive Officer





# Achievements

**Bombardier's achievements are already contributing to reducing the environmental impact of the business aviation industry.**

## 2023–2024

- ▶ Bombardier became the first and only business aircraft manufacturer to publish **Environmental Product Declarations (EPDs)** for all in-production aircraft. Each EPD rigorously evaluates the environmental impact of a product during its life cycle from sourcing to recyclability.
- ▶ The groundbreaking Bombardier **EcoJet research project** aims to demonstrate the potential for reducing aviation emissions by up to 50%. In 2023, a second testing phase ramped up with the flight of an 18-foot-wide prototype. This generated significant data which will accelerate the introduction of new, more environmentally responsible aviation technologies.
- ▶ The **Bombardier Aircraft Assembly Centre** in Toronto (Canada) recently commenced operations. By focusing on natural, more efficient lighting and heating methods, as well as updated processing systems that will lower greenhouse gas (GHG) emissions, the new facility is expected to reduce energy consumption by 40% compared to the previous Toronto site.
- ▶ Bombardier covers all its flight operations with **a blend of approximately 30% SAF**. A multi-year agreement with Signature Aviation facilitates the purchase of SAF through the global Book-and-Claim system, which is reducing carbon emissions.



# Raising sustainability standards through in-depth analysis

## Designing innovative products is key to creating a sustainable aviation future.

Bombardier is committed to developing products that support sustainability, which is why it is the first and only manufacturer to achieve an Environmental Product Declaration (EPD) for all in-production aircraft.

An EPD is an assessment that scientifically analyzes a product's environmental impact throughout its life cycle. Guided by Product Category Rules (PCRs), these independent third-party guidelines describe how to measure and report a product's environmental effect and are undertaken in conjunction with ISO 14044 standards. The data generated provides insights on how to apply sustainable strategies, from sourcing to recyclability. The subsequent document reports the information gathered and ensures transparency in environmental communication following ISO 14020.

Independently verified by a third party, the Bombardier *Global 7500* aircraft's EPD was the first to be published. Subsequently, a team of internal experts was built to develop EPDs for the entire fleet. Implementing the Bombardier product innovation life cycle strategy, the team analyzed the significance of different design options, techniques and materials to understand the overall environmental impact. The Bombardier *Challenger 3500* EPD was published in 2022, with the EPDs for the Bombardier *Global 6500* and the Bombardier *Global 5500* aircraft confirmed a year later. In March 2024, confirmation of the Bombardier *Challenger 650* EPD completed the family.

The EPD process enables the identification of areas with room for improvement. Using these standardized key metrics, data gathering, validation and analysis techniques, enables collaboration with suppliers and peers to foster a continued transition to a lower carbon economy.

[View EPDs](#)



### Bombardier *Challenger 3500*

- EPD publication date: May 5, 2022



### Bombardier *Challenger 650*

- EPD publication date: March 26, 2024



### Bombardier *Global 5500*

- EPD publication date: May 2, 2023



### Bombardier *Global 6500*

- EPD publication date: May 2, 2023



### Bombardier *Global 7500*

- EPD publication date: June 6, 2020





# Infrastructure for the future

## **Bombardier recently moved to its new state-of-the-art Global Aircraft Assembly Centre in Toronto.**

Demonstrating commitment to incorporating sustainable strategies, literally from the ground up, Bombardier has transitioned assembly from an outdated facility to the new Pearson site to improve production efficiency. The move reiterates Bombardier's focus on reducing its environmental impact.

The state-of-the-art facility optimizes intelligent building systems which are anticipated to reduce energy consumption by more than 40%. More efficient lighting, increased natural light and modern heating methods, as well as contemporary processing systems, support environmentally responsible production.

Onsite transport includes maximizing the benefits of electric vehicles. Bombardier employees choosing to drive electric and hybrid vehicles can utilize one of the 40 EV chargers that are available at the new location.

The environmental credentials of the flagship production site are complemented by a global strategy to optimize energy consumption, reduce waste generated and lower water utilization.

### AROUND THE WORLD IN 2023

15%

Amount of electricity used at the Singapore Service Centre generated by its solar panels

23%

Overall reduction in total waste generated compared to 2019

44%

Reduction in water consumption compared to 2019

72%

Renewable share of Bombardier's electricity consumption



# Increasing SAF adoption

**Bombardier is the first business aviation manufacturer to cover all operational flights with a blend of approximately 30% neat sustainable aviation fuel (SAF).**

Recognizing that using SAF is an effective way to reduce aviation emissions right now, Bombardier has signed a multi-year agreement with Signature Aviation for the purchase of SAF through the Book-and-Claim solution. This ensures rigorous accounting of SAF quantity and related GHG emissions. The convenient, reliable system allows the Bombardier fleet to always operate using an SAF blend, no matter what the mission is or where in the world it is flying.

In 2023, Bombardier purchased 2.5M U.S. gallons of SAF with a blend of approximately 30% neat SAF and 70% conventional fuel, the blend currently available in North America.

Using SAF can contribute to an 80% reduction in carbon emissions through the fuel cycle when compared with conventional fuel. All Bombardier aircraft are certified to use SAF in a proportion of up to 50% SAF and 50% conventional fuel, and the use of SAF is explained to operators in the Aircraft Flight Manual (AFM) for each model.

Bombardier works closely with industry bodies including the General Aviation Manufacturers Association (GAMA), International Civil Aviation Organization (ICAO) and the Aerospace Industries Association of Canada (AIAC) committees, the International Business Aviation Council (IBAC), and the local C-SAF initiative, to lead the way for SAF development and use.

Bombardier is committed to generating demand for the ramp-up of SAF production on a global basis.

## What is Sustainable Aviation Fuel?

SAF is a blend of conventional jet fuel and fuel derived from approved sustainable sources such as used cooking oils or forestry and agricultural residues. Approved sources cannot come from lands with high biodiversity or carbon stocks, cannot compete with the food chain and must provide a social benefit. The reduction of GHG emissions associated with SAF is achieved throughout its production life cycle.

## What is Book-and-Claim?

The Book-and-Claim system allows an aircraft operator to order and pay for SAF without needing to transport it over long distances from where it is available. The paying operator can claim the GHG emissions reductions associated with the use of SAF. The operator that uses SAF pays for the cost of regular jet fuel and does not claim the reduction in GHG emissions. The system requires a rigorous accounting of SAF quantity and related GHG reductions.





# Sustainability does not happen in isolation

**Bombardier believes collaboration is essential to reduce the global carbon footprint of civil aviation. Its expertise in sustainability is shared with many organizations, with the common goal of supporting initiatives that encourage the adoption of new technologies, tools and opportunities to positively influence partnerships with industry, regulatory and government bodies.**

Bombardier has been actively involved with the Air Transport Action Group (ATAG) since 2007 and participates in numerous international and Canadian organizations and committees, including IAEG, IBAC, ICCAIA, GAMA, as well as Aéro Montréal, AIAC and C-SAF. A team of dedicated industry professionals participates in six working groups at the ICAO Committee on Aviation Environmental Protection (CAEP).

The ideas generated become valuable when realized, which is why Bombardier supports the Business Aviation Commitment on Climate Change (BACCC). The BACCC addresses industry emissions through three main objectives which aim to achieve net zero carbon emissions by 2050, continue to improve fuel efficiency and maintain carbon-neutral growth.

By adhering to the four pillars which form the foundations for practical solutions to meet the BACCC goals, Bombardier is evolving new technologies through research and development, adapting operations, developing more environmentally friendly infrastructure and optimizing SAF for all its flights.

Bombardier believes that if the industry joins together, communal goals can be achieved.

## BUSINESS AVIATION COMMITMENT ON CLIMATE CHANGE (BACCC)

Developed in 2009 by the General Aviation Manufacturers Association (GAMA) and the International Business Aviation Council (IBAC) on behalf of the manufacturers and operators of Business Aviation worldwide, the Business Aviation Commitment on Climate Change (BACCC) represents an aggressive strategy for CO<sub>2</sub> emissions reductions to 2050.

<https://www.generalaviation.eu/baccc/>

### OBJECTIVES

- Continue to improve fuel efficiency
- Maintain carbon-neutral growth
- Achieve net zero carbon emissions by 2050

### FOUNDATIONAL PILLARS

- Technology
- Alternative fuels
- Infrastructure and operations
- Market-based measures



# Innovation at new heights

**The Bombardier EcoJet research project is playing a major part in shaping the future of sustainable aviation. It exemplifies Bombardier's commitment to investing in long-term research and development to evolve environmentally conscious aircraft technologies.**

The streamlined blended wing-body airframe is essentially a test platform from which original technologies are evolving. The first flight of our 8-foot-wide prototype in 2017 enabled data collection that was leveraged to support the inaugural flight of a second 18-foot-wide prototype, in 2023. The results advanced insight and enhanced understanding, demonstrating that it is possible to reduce emissions by up to 20% compared with current aircraft designs.

The research team is also studying the benefits of hybrid propulsion systems, as well as modelling capabilities to explore the potential for optimized energy demand and accelerated introduction of new technologies.

Maintaining aviation sustainability requires a unified vision supported by collaboration. Bombardier's relationship with Quaternion Aerospace is core to the EcoJet flight test program as its ability to create scaled test vehicles complements Bombardier's long-standing experience as a business aircraft manufacturer that enables novel design and development.

Collaboration with pan-Canadian, multidisciplinary teams stimulates coast-to-coast skill transfer and development. The research and technology team works in partnership with the University of Victoria Centre for Aerospace Research (CfAR) to support research aiming to create the next generation of transonic wings for increased energy efficiency. With this relationship, Bombardier is inspiring a future workforce that is actively engaged with the industry.

By collaborating with a diverse set of partners and sharing aerospace heritage, Bombardier is enabling a sustainable aviation future.



## Innovating for the future

“In our journey to create more sustainable aircraft, we are looking at innovation holistically. And the beauty of our EcoJet project resides in its potential to deliver new technology for the short-, mid- and long-terms. Aerodynamics simulation, structural optimization, alternative propulsion architecture are some examples of fields we are exploring with our partners, much of which could eventually benefit our in-service fleet. We see a sustainability mindset as inseparable from business growth.”

STEPHEN M'CULLOUGH  
Senior Vice President of Engineering  
and Product Development at Bombardier





# Bombardier

**Bombardier designs, builds and maintains the world's best-performing aircraft for the world's most discerning people, businesses and governments. That means not simply exceeding standards, but understanding customers well enough to anticipate their unspoken needs.**

For them, Bombardier's talented teams are committed to pioneering the future of aviation – innovating to make flying more reliable, efficient and sustainable. And they are passionate about delivering unrivaled craftsmanship and care, giving their customers greater confidence and the elevated experience they expect. Because people who shape the world will always need the most productive and responsible ways to move through it.

Bombardier customers operate a worldwide fleet of more than 5,000 aircraft, supported by a vast network of Bombardier team members worldwide and 10 service facilities across six countries. Bombardier's performance-leading jets are proudly manufactured in aerostructure, assembly and completion facilities in Canada, the United States and Mexico.



## **Bombardier Inc.**

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## PROGRESS, ACTION, IMPACT

- ▶ Bombardier supports the industry goal of reaching **net zero carbon emissions** by 2050.
- ▶ Bombardier has a target of **25% reduction in GHG emissions** (scope 1 and 2) by 2025 compared to 2019.
- ▶ Bombardier's **EcoJet research project** aims at maturing and delivering technologies to reduce aircraft CO<sub>2</sub> emissions by up to 50% through a combination of low-emissions propulsion technology, redefined fuel systems and advanced aerodynamic features.
- ▶ **72% of energy purchased** by Bombardier is from renewable sources.
- ▶ **An electric vehicle** is being used to ship parts between Bombardier sites in Quebec.
- ▶ **100% of Bombardier flight operations** use SAF.