



Passion to create a sustainable future

As the world's priorities change to focus on environmental impact, Embraer is doing everything possible to make sure E-jets are some of the most sustainable aircraft in the sky – and have been doing so for some time. It is not just the aircraft – the commitment to sustainability is at the core of Embraer's entire production chain, from processes,

facilities, to the supply network. It was the first company in the aviation industry to achieve the ISO 14001 in Dow Jones Sustainability Index standard certification for its Environmental Management System in principal facilities and continues to lead with some of the industry's most robust ESG goals to date.



Innovation is in our DNA

Embraer believes that the transition to a low-carbon economy and the need to adapt air transportation to this new model represents a great opportunity. The aircraft manufacturer is stepping up the efforts to minimise the carbon footprint by remaining dedicated to innovative

solutions that have a broader impact on customers, local communities, and on the aircraft. Embraer aims to decarbonise its direct and indirect operations by focusing mainly on carbon reduction and efficiency. Excluding product use, the Scope 1 and 2 emissions are estimated to account for close to 75% of the company's footprint

which is why it is the priority in this space. On top of that, considering product use, since the aircraft that we design and build account for meaningful carbon emissions, it's imperative to innovate designs and technologies with sustainability in mind. Toward this goal, we aim to bring best-in-class aircraft to market at an accelerated pace to help customers and partners meet their climate goals. This is a team effort, and we must work across industries and borders to address the climate crisis. – said Daniel Galhardo Gomes, Product Strategy Director at Embraer Commercial Aviation.

Design for Environment is an important driver of innovation at Embraer. It prioritises resources and processes with low environmental impact, minimises energy consumption and materials used, optimises product and materials lifecycle, and facilitates disassembly for reuse and recycling as part of a circular economy. Multidisciplinary Design Optimization is Embraer's key performance indicator approach to aircraft design which has an eye towards efficiency and reducing carbon footprint. This process ensures optimal performance and is built into every design from the start with aerodynamics, aero-propulsion optimum integration, and light-weighting of airframes as part of Embraer's core multidiscipline design optimisation process that drives down aircraft energy usage and improves CO₂ emissions savings. The company also cuts emissions by eliminating the autoclave process for its thermoplastic composite materials, which can save up to 40% of energy consumption during the manufacturing process.

EMBRAER CHALLENGE. CREATE. OUTPERFORM.

SUSTAINABILITY IN ACTION.

Net zero carbon emissions by 2050. Making regional aviation cleaner and quieter. Our sustainability roadmap and product development plan have been constructed to help us achieve these goals. Our new generation E2 is the most fuel efficient single-aisle aircraft in the market today with a potential reduction of CO₂ emissions up to 30%. In 2025 we are planning the first flight of our hydrogen-powered electric demonstrator.

Between 2027 and 2030 expect to see our next generation turboprop and E2 flying 100% SAF compatible. By the mid-2030s we are planning to introduce the sustainable Energia family of aircraft, powered by revolutionary propulsion architectures. 2045 will likely see the flight of our first hydrogen-powered turboprop and finally, in 2050, a hydrogen-powered E2 or similar sized aircraft will take to the skies.

Undoubtedly these are bold and ambitious steps, but with over 50 years of market knowledge and expertise behind us, we are confident that we will deliver what we set out to do, transforming the way we all fly.

Timeline milestones:
 - TODAY: E2 – Most efficient single-aisle aircraft
 - 2025: NG Turboprop 100% SAF
 - 2030: E2 100% SAF
 - 2035: Energia Hybrid, Energia Electric
 - 2040: Energia H2 Fuel Cell, Energia H2 Gas Turbine
 - 2045: NG Turboprop H2
 - 2050: E2 H2

Disruptive technology, radical new aircraft, and electric propulsion

While there has been a 2% per year fuel burn reduction since 1970, combustion engines are reaching their fuel efficiency limit. To design for the lowest carbon propulsion, we cannot rely on just swapping equipment or fuels in current aircraft designs. Rather, Embraer is taking a system-thinking approach to go beyond 'tubes and wings' to a whole redesign of what the future of aircraft can be. Right size, right weight, right propulsion – Embraer is engineering a full revision of what aircraft of the future can and should be to truly advance a climate-neutral pathway for flight.

Embraer joined the Target True Zero initiative launched by the World Economic Forum (WEF) as part of the commitment to achieve zero-emissions aviation goals through new propulsion and fuel technologies. The initiative will identify ways to accelerate the deployment of zero-emissions aviation by leveraging electric and hydrogen technologies.

Small aircraft, meaningful impact It will take an all-in approach when considering efficiency technology, so it's important to align the best energy alternative with the appropriate design. This alignment will maximise carbon savings, dependent on aircraft size and type, to drive peak performance and optimal footprints. Embraer believes it can make the most significant impact in small and regional aircraft with that in mind.

- Regulations have changed, allowing small airplanes to move to electric, so Embraer is working to bring this technology to market.
- The new era of electric aviation should start with small and regional aircraft rather than larger jets.

- Embraer has a strong record of safety, proven technological capability, and know-how to get equipment certified for use faster.
- Embraer believes that electrification is another way to facilitate the opening of new markets with intercity mobility and open more doors to underserved economies.

Prioritising the energy transition of regional aircraft can offer gains in efficiency while reducing emissions and costs that make it possible to provide additional routes while creating access to underserved communities and rural areas. In the U.S., over 5,000 regional airports are not in active use as current fleets in the marketplace are not cost-effective with the business-as-usual model. Using existing infrastructure to reinstate more regional service, Embraer aims to revolutionise the market with new technology and fleet options that can enable more efficient routes – reducing total overflown miles and associated fuel usage – all while allowing airlines to stay cost-competitive and profitable.

Research collaborations on SAF

Until future technologies are available on the market, SAF will play a key role in reducing aviation emissions in the short and medium term. Embraer has a history of alternative fuel innovation, with our first ethanol-powered aircraft certified back in 2004. The manufacturer promotes the development and adoption of biofuels, mainly SAF, by sponsoring research and development through multi-partner engagements. We partner with BioValue and BECOOL multi-stakeholder conveners of academia, the private sector, and research laboratories to help make our aspirations into realities. Together, we have advanced biofuels, SAF, and the



technical, economic, environmental, and social assessment of various biomass production systems and biorefinery configurations. Embraer had begun the use of SAF in its U.S. operations starting in 2021.

Embraer's goals to shape the green future of aviation

Carbon Neutral operations by 2040 – Scope 1+2:

- Aligned with Paris Agreement goal to limit global warming to 1.5 degrees Celsius.
- 50% reduction in net carbon emissions by 2040 from a 2018 Baseline.
- 100% energy from renewable sources by 2030 and intermediate goal of at least 50% renewable by 2025.
- Begin using Sustainable Aviation Fuel (SAF) in 2021 and aim for at least 25% by 2040.
- Offsetting any residual emissions that will not be reduced through efficiency

Embraer aims to revolutionise the market with new technology and fleet options that can enable more efficient routes.

projects, available alternative energy or advancing technology.

Carbon-Neutral Growth from 2022 (2021 baseline) – Scope 1+2:

- Commit to capping carbon emissions to 2021 levels while growing operations.

Net Zero Aviation by 2050 (Scope 3) will be achieved by:

- Developing products, services, and disruptive sustainable technologies including electrification, hybrid, biofuels including SAF and other innovative energy alternatives.
- Working together with suppliers to make our current aircraft compatible with the use of 100% SAF.
- Actively working with the supply chain to expand the global SAF production scale.
- Continuously improving the efficiency of our current aircraft until the certification of new technologies.

Launch zero-emission eVTOL aircraft by 2026. [🌐](#)