The Future of Electric Aircraft and eVTOLs

2nd Edition

The Future of Electric Aircraft and eVTOLs is a new report from Berg Insight analysing the latest developments on the electrification in aviation. This strategic research report from Berg Insight provides you with 170 pages of unique business intelligence, including 25-year industry forecasts, expert commentary and real-life case studies on which to base your business decisions.

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The electric aircraft and eVTOL market is set for long-term growth

There are many large-scale industrial projects worldwide aimed at developing electric aircraft and eVTOLs. At the same time, the electrification of the aviation industry represents a challenge as the industry is heavily regulated and strongly committed to safe operations and redundant systems. Electric aircraft and eVTOLs will enable new connectivity within large urban areas, between cities, from rural regions to cities and between rural areas. There are many suitable use cases ranging from passenger transportation to cargo transport, surveillance, healthcare and firefighting. Some electric aircraft and eVTOL projects have been paused or discontinued in recent years. Despite this, other actors are progressing towards certification and market entry.

More than a thousand eVTOL design concepts have been introduced worldwide. Some companies focus on one or two-seat eVTOLs for private use, while others develop larger aircraft for commercial use cases such as air taxi services. Many of the commercial eVTOLs are large vehicles with wingspans of 10–15 metres, which need to be considered when developing ground infrastructure as well as working with city planning, passenger processing and safety issues. Some eVTOLs are also intended to fly autonomously without a pilot. Examples of commercial eVTOL vendors include Aerofugia, Archer, Beta Technologies, EHang, Eve Air Mobility, Joby Aviation, Volocopter, Vertical Aerospace and Wisk. Companies developing eVTOLs for personal mobility include AIR, Aridge, Jetson, LEO Flight, Pivotal and Skyfly.

There are also several companies working on electric and hybrid-electric aircraft. The market is characterised by having both established aviation companies developing vehicles and solutions as well as start-ups and tech companies doing the same thing. These companies address the challenge in different ways, leading to several possible solutions and design pathways. Examples of battery-electric aircraft vendors include Beta Technologies, Bye Aerospace, Cosmic Aerospace, Electron Aerospace, Elysian, MD Aircraft, Pipistrel and Vaeridion. Companies focusing on hybrid-electric aircraft include Electra, Heart Aerospace, Maeve Aerospace and VoltAero.

In addition, several companies develop powertrain solutions for battery-electric, hydrogen-electric and hybrid-electric aircraft and eVTOLs. Most actors in this segment produce a complete setup of electric propulsion systems comprising electric motors, energy storage solutions and related components. Electric propulsion systems can be used in both newly developed aircraft and retrofitted in existing aircraft. Examples of companies in this segment include Ampaire, Evolito, MagniX, Safran and ZeroAvia.

Before 2030 we will see some of the first piloted eVTOLs in commercial use. Between 2036–2040 the ecosystem and acceptance will develop and we might see around 7,500 vehicles being delivered globally. Fewer if costs are high and certification is taking longer than anticipated. In the high scenario we see that the total number of deliveries could reach approximately 45,000 vehicles between 2026–2050. The high scenario is based on a favourable regulatory environment where the long-term airspace management has been solved as well as the approval for autonomous flights.

The private eVTOL market can be potentially much larger than the commercial market in terms of the number of vehicles. The first eVTOLs for private use have already been delivered. Under favourable conditions in the high scenario, the total market might reach almost 100,000 vehicles delivered by 2050. Most of these will be small one or two-seaters and the majority of them will be delivered in the latter part of the forecast period. These vehicles will need advanced avionics, connectivity, and avoid and detect technology but at the same time need to be cost-efficient solutions.

Electric aircraft will vary considerably in size and performance and will be powered by either batteries, hydrogen or hybrid-electric propulsion. The forecast is based on three market segments: battery-electric aircraft with one to four passenger seats; aircraft with five to nine passenger seats powered by battery, hydrogen or hybrid-electric propulsion; and aircraft with ten or more passenger seats powered by battery, hydrogen or hybrid-electric propulsion. For all segments, we estimate total shipments of around 10,000 aircraft between 2026–2050 in the high scenario. The first battery-electric aircraft models with one to four passenger seats have been certified and shipped. Due to the complex certification pathway and the dependence of new ground and charging infrastructure, we forecast that only a few hundred aircraft will be delivered before 2030. Some of the addressable market for electric aircraft is based on the replacement of the current fleet of small-sized aircraft. This is however a comparatively small market. It is also a new market for regional air mobility which will take some time to develop. It will take time to build production capacity and solve ground infrastructure challenges, but with more efficient drivetrains the use case and economics look reasonably favourable in the longer term.

Electric aircraft and eVTOLs will need advanced connectivity. There is also a market for different kinds of autonomous vehicle technology solutions which will need to be incorporated in the vehicles. Cellular connectivity is one of the prominent technologies available to support the use cases in urban areas. Satellite systems can also complement the ground-based architectures, particularly the LEO (Low Earth Orbit) satellite constellations. The number of connected electric aircraft and eVTOLs will take off from 2035 and then increase steadily. We estimate around 10,000 connected vehicles for passenger use by 2035 and around 60,000–140,000 in 2050.

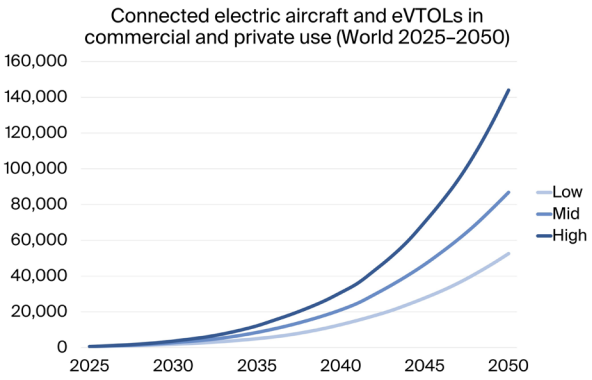

Table of contents

Executive Summary

1 Introduction

1.1 The aviation market
1.2 The concept of electric aviation
1.3 Drivers behind the electrification of aircraft and eVTOLs
1.3.1 Reduced costs
1.3.2 Regional travel market
1.3.3 Emissions reductions
1.3.4 Noise reductions
1.3.5 Increased accessibility
1.3.6 Economic development

2 Electric Aircraft and eVTOLs

2.1 Electric aircraft
2.1.1 Retrofit
2.1.2 Traditional design
2.1.3 New design
2.1.4 Size versus range
2.1.5 Battery-electric, hydrogen-electric versus hybrid-electric aircraft
2.2 eVTOLs
2.2.1 Wingless multicopter
2.2.2 Lift-and-cruise (fixed wing)
2.2.3 Tilted wing and/or propellers
2.3 Risk assessment regarding eVTOLs
2.3.1 Certification
2.3.2 Infrastructure
2.3.3 Technology
2.3.4 Operations
2.3.5 Public awareness

3 Technology Overview

3.1 Battery-electric
3.2 Hydrogen-electric
3.3 Hybrid-electric
3.4 Airframes
3.5 Communications technology and autonomous flight
3.5.1 Navigation and communications systems
3.5.2 IoT connectivity
3.5.3 A possible pathway to autonomous flights

4 Ecosystem and Regulatory Framework

4.1 Ecosystem
4.1.1 Charging
4.1.2 Battery power challenges
4.1.3 Hydrogen power challenges
4.1.4 Take-off and landing infrastructure – vertiports
4.1.5 Airport infrastructure
4.1.6 MRO
4.2 Regulatory framework
4.2.1 Certification and standardisation
4.2.2 Safety
4.2.3 Airspace management
4.2.4 Sustainability

5 Regional and Urban Air Mobility

5.1 Regional Air Mobility – possible market development and use cases
5.1.1 How will the RAM market evolve – different scenarios
5.1.2 User experience
5.2 Urban Air Mobility – possible market development and use cases
5.2.1 How will the UAM market evolve – different scenarios
5.2.2 User experience
5.3 Implications for regional and city planning
5.3.1 Education
5.3.2 Permits
5.3.3 Short-term city planning
5.3.4 Long-term city planning
5.3.5 Regional planning
5.3.6 Transport planning and integration

6 Company Profiles and Strategies

6.1 eVTOLs
6.1.1 Aerofugia
6.1.2 AIR
6.1.3 Archer
6.1.4 Aridge (XPeng AeroHT)
6.1.5 AutoFlight
6.1.6 CityAirbus NextGen
6.1.7 EHang
6.1.8 Eve Air Mobility
6.1.9 Horizon Aircraft
6.1.10 Jetson
6.1.11 Joby Aviation
6.1.12 LEO Flight
6.1.13 Lilium
6.1.14 Pivotal
6.1.15 Sambo Motors
6.1.16 SkyDrive
6.1.17 Skyfly
6.1.18 Supernal
6.1.19 V-Space
6.1.20 Vertical Aerospace
6.1.21 Volocopter
6.1.22 Wisk
6.2 Electric aircraft
6.2.1 Beta Technologies
6.2.2 Bye Aerospace
6.2.3 Cosmic Aerospace
6.2.4 Electra
6.2.5 Electron Aerospace
6.2.6 Elysian
6.2.7 Eviation Aircraft
6.2.8 Heart Aerospace
6.2.9 Maeve Aerospace
6.2.10 MD Aircraft
6.2.11 Pipistrel
6.2.12 Vaeridion
6.2.13 VoltAero
6.3 Electric propulsion systems
6.3.1 Ampaire
6.3.2 Evolito
6.3.3 H55
6.3.4 MagniX
6.3.5 Safran
6.3.6 Wright Electric
6.3.7 ZeroAvia

7 Market Forecasts and Scenarios

7.1 Market segmentation
7.2 Market size
7.2.1 Commercial eVTOLs
7.2.2 Privately owned eVTOLs
7.2.3 Battery-electric aircraft with 1–4 passenger seats
7.2.4 Battery, hydrogen and hybrid-electric aircraft with 5–9 passenger seats
7.2.5 Battery, hydrogen and hybrid-electric aircraft with 10 or more passenger seats
7.2.6 The current non-binding and firm order stock of electric aircraft and eVTOLs
7.2.7 IoT connectivity
7.3 Market value
7.3.1 Market value of eVTOLs
7.3.2 Market value of electric aircraft
7.4 Business models and use cases
7.5 Concluding remarks

Glossary

Hightlights from the report

Insights from numerous executive interviews with market leading companies.

Comprehensive description of the electric aircraft and eVTOL value chain and key use cases.

Analysis of the ground infrastructure needed and how eVTOLs will be handled in the airspace.

In-depth analysis of market trends and key developments.

Detailed profiles of 42 electric aircraft, eVTOL and electric propulsion system manufacturers.

Summary of the certification process and handling of safety concerns.

Market forecasts and scenario analysis lasting until 2050.

This report answers the following questions

- What are the drivers behind the electrification of aircraft and eVTOLs?
- Which are the main challenges when electrifying airborne vehicles?
- Which are the main risks and safety aspects and how will they be handled?
- What are the strategies and timelines for some of the leading vehicle developers?
- How do technology and powertrain solutions differ across eVTOL and aircraft concepts?
- What is the roadmap and timeline for the implementation of autonomous flights?
- What IoT connectivity solutions are needed for these new vehicles?
- How will the aircraft and eVTOLs be certified?

About Berg Insight's IoT market research

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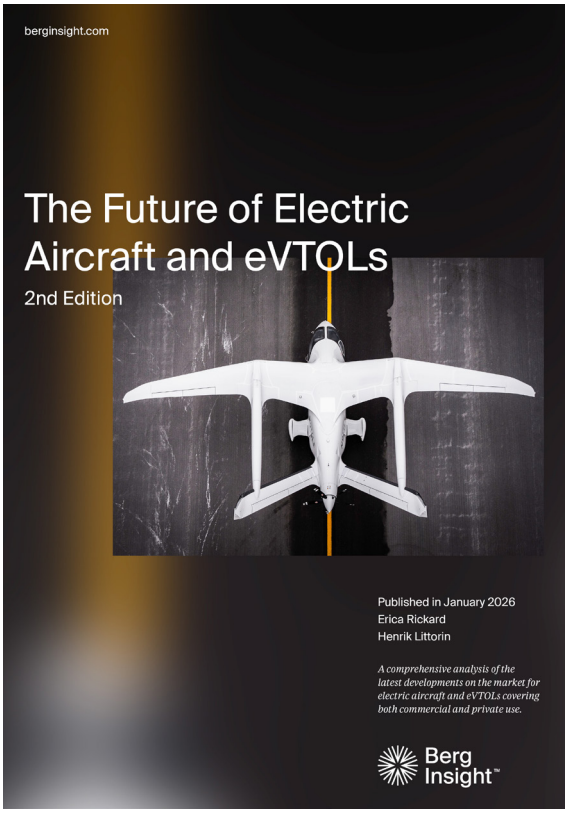

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The Future of Electric Aircraft and eVTOLs

How will the market for electric aircraft and eVTOLs evolve in the next 25 years? The total market value of electric aircraft and eVTOLs (commercial and private use) during the time period 2025–2050 is forecasted to reach in the range of € 100–300 billion. Get up to date with the latest information about vendors, technology developments, regulations and markets.

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Who should read this report?

The Future of Electric Aircraft and eVTOLs is the foremost source of information about the electrification trend in aviation. Whether you are an aircraft manufacturer, telecom operator, investor, consultant, civil aviation authority, municipality or government agency, you will gain valuable insights from our in-depth research.

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Erica is an IoT analyst covering IoT applications mainly in the automotive, electric aircraft and micromobility sectors. She performs strategic analysis of OEM and aftermarket telematics services, including carsharing telematics and telematics for rental and leasing fleets as well as bike and scootersharing telematics. Erica holds a Master's degree in Quality and Operations Management from Chalmers University of Technology and joined Berg Insight in 2024.

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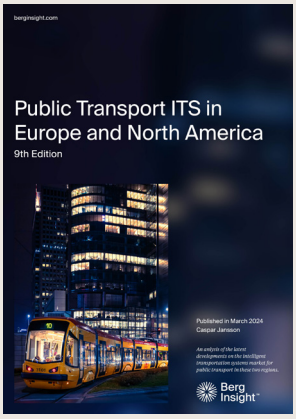

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