

Electric Planes Are Coming Sooner Than You Think

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What will electric aviation look like? Think smaller planes, shorter flights, and lightweight batteries.

You may be boarding an electric plane sooner than you think. The [first rollouts for a major airline—with United—are due in 2026](#), and countries like [Denmark](#) and [Sweden](#) have announced plans to make all domestic flights fossil fuel-free by 2030.

The past year has propelled the aviation industry ever closer toward a goal of viable commercial electric aircraft. United Airlines announced in July that it's buying 100 19-seater, zero-emission electric planes from Swedish startup Heart Aerospace; they are set to take flight for short hops in the United States in 2026.

Over in Europe, EasyJet's partnership with U.S. startup Wright Electric has led to development plans for the Wright 1, an all-electric, 186-seat commercial passenger jet with an 800-mile range that's [targeted to enter service around 2030](#). Up sooner still, Wright Electric additionally announced in November plans for an electric 100-seater, the Wright Spirit, due out in 2026.

While those are some of the front-runners, a host of aviation companies—from fledgling startups to industry titans and government agencies like [NASA](#)—are actively pursuing electric commercial planes in hopes of achieving carbon emissions-free flight. Experts say the trajectory is an environmental necessity in the face of a worsening climate crisis.

“We know that transportation is the single largest contributor to carbon emissions and to global warming right now. And flying is a big part of that,” says Jeff Engler, CEO of [Wright Electric](#).

Lukas Kaestner, cofounder of [Sustainable Aero Lab](#), an accelerator in Germany that mentors global sustainable aviation startups, says the industry's current fervor is representative of "the new zeitgeist, where global warming has become an issue that a growing number of people care about, and an issue people want to see addressed through action."

Swiss bank UBS estimates a full quarter of the civil aviation industry will be hybrid or fully electric by 2035. The race to get electric commercial flight off the ground is on—here are where things stand.

Why electric aviation is taking off now

The aviation sector pumped about a [billion tons of CO2 into the atmosphere annually](#), prepandemic, or about 3 percent of the world's carbon dioxide emissions. If left unchecked on its current fast-paced-growth trajectory, the amount of carbon from airplanes [is projected to triple by 2050](#).

That puts the industry at odds with the [net-zero carbon emissions deadline for 2050 set by the U.N.](#) In October, [most major global airlines signed on to meet that target](#), but the limitations of current fossil-fuel-reliant aircraft technology is a setback for such decarbonization goals.

Venkat Viswanathan, a Carnegie Mellon University mechanical engineering professor and [aviation battery expert](#), says that electric battery power is "going to give an avenue for addressing emissions, at least for a significant portion of aviation." Yet he adds a caveat that it alone won't resolve the carbon crisis: "I think there has to be many other pieces—many other competing technologies—that have to be considered for the full arc of the future of aviation."

Aviation's reach toward clean energy is coinciding with other areas of transportation, too. "The inevitable shift that's already happened in the automotive world, that's happening in the maritime world, we see the same trends in aerospace," explains Engler, of Wright.

At the same time, governments are increasingly establishing policies to usher in a greener era for aviation. Scandinavia is leading the charge: Denmark and Sweden will make all domestic flights fossil fuel-free by 2030; in [Norway, it's 2040](#). France and Austria, meanwhile, have recently enacted [bans on some domestic short-haul flights](#).

In the United States, the Biden administration is also [making a push for slashing emissions](#), with an emphasis on a clean-energy transportation sector. Yet climate activists like Charlie Cray of Greenpeace say U.S. policies “are only just starting down the runway.” Cray says that the administration has focused too much on [sustainable aviation fuels](#) and rather “needs to prioritize the introduction and adoption of electric engine technologies for shorter passenger routes and cargo aircraft.”

What electric flight will look like

Electric planes, like electric cars, rely on battery-generated electricity for power, rather than standard liquid jet fuel. Yet today's batteries aren't nearly as energy-dense as jet fuel, requiring bulk and weight that pose significant aerodynamic challenges.

While batteries that are lightweight yet powerful enough for smaller electrified planes, operating shorter ranges, are increasingly viable, Viswanathan says that for larger airplanes, more significant battery breakthroughs—or alternative technologies—are needed. “You probably need like three, four times the weight of the airliner [in batteries] to be able to power that, which is why you can't make them,” he explains.

Accordingly, the budding industry is most immediately targeting short-distance regional flights on smaller planes, which syncs up with a sizeable segment of aviation: About half of the flight routes operated worldwide today are less than 500 miles.

Electric planes are proving to be more economical for airlines, too, with reduced expenses around fuel and maintenance. Engler says, “For the airlines, we expect lower costs over time, and they can pass those savings on to consumers.”

Michael Leskinen, president of United Airlines Ventures—the airline’s corporate venture fund—says the ES-19 planes it is purchasing from Heart Aerospace are 100 times less expensive to maintain, which offers “operational savings that can be passed on to our customers.”

Those lowered operation costs mean electric planes have the potential to revive short-haul routes to smaller regional airports, too, that were previously abandoned due to unprofitability. “Nineteen-seater aircrafts were the norm until a few decades ago for regional flights, until costs drove the industry to use larger planes,” explains Leskinen. He says the airline intends to use the ES-19s on more than 100 of United’s regional routes, out of most of its hubs.

Who the main players are

An estimated 200 global companies are currently pursuing electric plane projects, several of which have already made short and successful test flights. It’s a diversified competitive landscape where startups may have an edge—Sustainable Aero Lab’s Kaestner says that startups “are faster moving and much more flexible than the industry heavyweights.”

Smaller two- to four-person electric planes for private, corporate, and air taxi-type service—primarily via eVTOL (electric vertical take-off and landing) aircraft—are already rolling out, with the first-generation technology backed by big names like Boeing, Airbus, NASA, and Toyota, along with a host of buzzy startups, including California’s Archer Aviation and Joby Aviation, Germany’s Lilium, and the U.K.’s Vertical Aerospace. [United](#), [American Airlines](#), [Virgin Atlantic](#), and [Japan Airlines](#) are among a growing number of airlines that have eVTOL orders on the books, with plans to debut a new kind of air taxi service as soon as 2024.

“Ten years from now, the flight from LAX to JFK will still not be electric, but you will probably be able to fly to the airport by electric air taxi at a very reasonable cost and emissions-free,” Kaestner says.

Six- to nine-passenger planes are also close to liftoff. Israel’s Eviation has developed a nine-seat electric plane called Alice, which [regional U.S. carrier Cape Air is set to fly starting next year](#). Alice’s electric propulsion engine was built by its sister company MagniX, based in Washington State. Canadian seaplane carrier [Harbour Air is also testing the MagniX system](#) to retrofit its fleet, with hopes of debuting commercial service on the newly electric seaplanes later this year.

United’s larger 19-seat planes from Heart Aerospace are planned for short-haul domestic routes, out of hubs like Chicago and San Francisco, in 2026; regional U.S. airline [Mesa Airlines](#) and Finland’s [Finnair](#) have also signed on to purchase Heart’s ES-19s.

The largest electric plane in the works is Wright Electric’s 186-seat Wright 1, which EasyJet intends to operate as soon as 2030. Wright also announced plans in November for its 100-passenger Wright Spirit, which will retrofit BAe 146 planes (from British aerospace company BAE Systems) with electric batteries.

Retrofitting existing planes with battery technology is considered to be a significantly quicker path through certification than starting from scratch. “It allows us to get to market much faster and start to impact the carbon footprint of the industry much earlier,” Engler says. He estimates the retrofit will reduce the federal certification process to half the time, if not less.

Where things go from here

Apart from the engineering hurdles around batteries, experts see other barriers against the widespread adoption of electric planes. There are stringent and

lengthy certification processes with regulators, funding challenges, and an acclimation period for the public to consider the new technology as safe.

And then there is the issue that electric aviation, targeting smaller planes and shorter routes, won't ultimately put the kind of dent that's needed into the industry's emissions reduction goals. "On the emissions side, 95 percent of the carbon footprint of the industry is airplanes larger than 100 passengers," Engler says, explaining Wright Electric's decision to target the development of bigger planes.

Kaestner notes that since "transcontinental or even true long-haul operations are still out of scope for the foreseeable future," cleaner emerging energies like sustainable aviation fuels and, further afield, hydrogen power, must be the industry focus for longer routes.

Hybrid-electric technology, which combines batteries with traditional jet fuel engines, is another promising strategy, with companies like California-based startup Ampaire and France's VoltAero already developing hybrid planes.

"I think that hybrids are going to be an important bridge to hopefully, overall, all electric further down the road," says Viswanathan, who explains that hybrids would offer fuel and energy savings, emissions reductions, and help get the public comfortable with electric flight, similar to what cars like the Toyota Prius have done for the automotive industry.

Experts say that consumers, too, hold the purchasing power to help drive a greener aviation industry. Overall, Engler says, "Customers are demanding cleaner, greener, quieter, lower-cost ways to fly."

Herwig Schuster, of Greenpeace, says that environmentally conscious travelers should think twice before flying and suggests more immediate policy measures are needed "to tackle the out-of-control emissions from the aviation sector," like flight reductions, short-haul flight bans, and investment in alternative greener modes of transport, such as rail. Without more urgent action, he cautions,

“Greener fuels or electric planes will only provide emissions cuts that are far too little or far too late for today’s demand.”