

INNOVATIONS

These planes are battery operated. Will that fly?

Battery-powered planes are gaining traction with airlines and some are slated to be in the air by 2028. But big hurdles remain.

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For years, scientists have clamored for quiet, climate-friendly airplanes that rely on batteries instead of jet fuel. Now, they're closer to putting them into the skies.

A handful of airlines, including United, Mesa and Air Canada have started putting orders in for a battery-operated aircraft called the Heart Aerospace ES-30. The Swedish-made four-propeller, battery-powered plane seats up to 30 people and could fly short-haul routes such as Palm Springs to Los Angeles or Denver to Aspen without emitting any carbon. It's slated to be in the air by 2028.

Meanwhile, tiny single-passenger electric planes are also getting the green light to fly, with some [used by militaries](#) in Europe. Electric seaplanes are being tested and used in Canada. And analysts at the U.S. National Renewable Energy Laboratory are now projecting that hybrid electric 50- to 70-seater planes could be in service within a decade.

Electric planes could solve major headaches for airlines, manufacturers and industry experts say. They could help companies achieve promises to cut emissions and make shorter plane routes financially feasible by minimizing fuel and maintenance costs.

But major challenges remain, starting with battery technology, which needs to advance rapidly to make commercial travel viable. On top of that, the planes will need regulatory approvals, and airlines will need to convince passengers that flying thousands of feet in the air on battery power is safe, too.

"We haven't done anything this new with aircraft since forever," said Gökçin Çınar, an assistant professor of aerospace engineering at the University of Michigan. But "there's definitely a lot that we need to work on still."

Globally, commercial aviation accounts for 2.4 percent of the world's climate emissions, but that could increase to 22 percent by 2050 if no changes are made, European government [data](#) shows.

Anders Forslund, founder and chief executive of Heart Aerospace, started his company in 2018 and designed the ES-19, a 19-seat electric plane. Last week, the company announced a plane that could seat 30 people, the ES-30.

The aircraft, company officials say, can fly up to 124 miles fully on batteries and emit zero emissions. It is powered by more than 5 tons of lithium ion batteries stored in its underbelly, near the landing gear, Forslund said. The plane would charge in roughly 30 minutes.

Air Canada has put in orders for 30 of these planes. United Airlines and Mesa Airlines have put in orders for 100 each.

The ES-30 has a maximum range of nearly 500 miles, though any flight more than 124 miles requires the help of a sustainable aviation-fuel-using generator on board. In hybrid mode, the plane would emit carbon emissions at a rate 50 percent less than its solely jet-fueled counterparts, Forslund said. The cabin noise would be far lower than what commercial passengers are used to, he added.

The plane is projected to have a per-seat operating cost similar to a 50-person propeller plane, the company said, which airlines could find financially appealing. Making electric planes that are economically attractive to airlines is central to getting widespread adoption and putting a dent in climate emissions, Forslund said.

“If you can only make [the plane] work technically but not commercially,” he said, “then the climate proposition is going to be minor.”

Experts caution that the sky is unlikely to be filled with all-electric-powered planes anytime soon.

Scientists will have to push lithium-ion technology to unknown limits or make batteries using other chemistry. And the Federal Aviation Administration has not finalized how it will certify electric planes as safe for passenger flight. The FAA is working on creating these regulations, but it is unclear whether they will be ready before 2028, Çınar said.

“Usually, our industry doesn’t do big changes. You do minimal changes over time,” she said. “So there’s high risk, but there’s high reward.”