

Aviation

EH Energy Fuel Cell Power: High-power-density, zero-emission fuel cell power for hydrogen-electric flight.

The Challenge

Aviation has to cut its CO₂ and NO_x, but the physics make it the hardest transport sector to decarbonize. **Batteries are far too heavy** for meaningful flight: their energy per kilogram is a fraction of liquid fuel, so a battery-electric aircraft trades away range and payload almost immediately. **Hydrogen combustion** in a modified gas turbine avoids the weight problem but still burns fuel - and still produces NO_x. Sustainable aviation fuels help but are supply-constrained and costly.

What the sector actually needs from a clean powertrain is **very high power-to-weight**, true zero-emission operation and - critically - a realistic route through **airworthiness certification**, which is long, expensive and safety-critical. The requirement spans a wide range of aircraft, from unmanned aircraft and urban air mobility up to regional airliners, and no single technology point serves all of them. Hydrogen's very high energy density per kilogram is the key enabler, but it requires aircraft to be designed around larger fuel tanks, and it depends on airport hydrogen infrastructure that is still emerging. Aircraft developers therefore need a **power-system partner** who can tune the technology to each platform and move with them toward certification.

The EH Energy Solution

EH Energy provides the **fuel cell stack and power system at the heart of the hydrogen-electric powertrain**, engineered to each aircraft's power, weight and altitude targets. The systems convert hydrogen to electricity electrochemically, emitting only water.

EH Energy's platform spans the aircraft range through **two technology modes**. **Low-temperature PEM (LT-PEM)** serves unmanned aircraft, urban air mobility and smaller regional aircraft today. **High-temperature PEM (HT-PEM)** is under development for larger aircraft, where a higher operating temperature reduces the heat that must be rejected and therefore the cooling-drag penalty at scale. EH has commenced stack development for propulsion up to the ~110-passenger class across both modes.

Because the **patented cell structure can be modified quickly at the cell level**, stacks can be tuned to a program's power, weight, voltage and altitude requirements, and packaged with the balance of plant (air supply, hydrogen and anode management, thermal management, power electronics and controls). EH Energy engages as a **co-development partner** to aircraft OEMs and integrators, provides technical support through test campaigns and pursues **airworthiness certification** through partnership with major aerospace players.

(Aviation is a development sector for EH Energy: hardware supplied to date is for ground testing and prototype integration, and no aviation type certificate is held today.)

Key Differentiators

High power-to-weight

Compact, patented stack architecture; the decisive metric for anything that flies, with system design focused on usable net power.

Zero-emission and clean

Emits only water; no CO₂, NO_x, SO_x or particulates, and - unlike hydrogen combustion - no NO_x.

Low acoustic and thermal signature

Valuable near communities and for defense low-observability missions.

Endurance and range beyond batteries

Leveraging hydrogen's high gravimetric energy density for long-duration, long-range missions.

Scalable across the aircraft range

One cell/stack architecture from single-kW UAVs to hundreds of kW per stack and modular propulsion powertrains.

Two technology modes

LT-PEM now, HT-PEM in development - positioning across the full civil aircraft range.

Rapid, program-specific design

The cell can be tailored quickly to a platform's requirements.

Deep OEM partnership

With a defined certification pathway.

Where It Fits

Unmanned aircraft · urban air mobility / eVTOL · cargo and fixed-wing drones · regional aircraft propulsion - from single-kW systems to regional-aircraft powertrains, with early civil programs in the smaller and regional-aircraft classes.

Why EH Energy for Aviation?

High power-to-weight, the metric that decides flight.

EH's compact, patented stack architecture delivers strong gravimetric and volumetric power density, with system design focused on maximizing usable net power after parasitic loads. Weight is minimized at the cell, stack and cooling-system levels.

Zero-emission and quiet.

EH's fuel cells convert hydrogen to electricity electrochemically, emitting only water - no CO₂, NO_x, SO_x or particulates, and unlike hydrogen combustion, no NO_x. Their low acoustic and thermal signature is valuable for civil operations near communities and for defense missions requiring low observability.

Endurance and range beyond batteries.

For UAVs and cargo drones, fuel cells provide greater endurance and range than battery-only architectures, leveraging the high gravimetric energy density of hydrogen for long-duration and long-range missions.

Scalable across the aircraft range.

A common cell and stack architecture scales from single-kW UAV systems to hundreds of kW per stack and into modular propulsion powertrains - supporting UAVs, urban air mobility, cargo and fixed-wing drones and regional aircraft.

Two technology modes.

LT-PEM serves UAVs, UAM and smaller regional aircraft today; HT-PEM is under development for larger aircraft, where reduced heat rejection lowers cooling-drag penalties. EH's platform is being developed to address both, positioning it across the full civil aircraft range.

Rapid, program-specific design iteration.

EH's patented cell structure enables quick, application-specific modification at the cell level, so stacks can be tuned to a program's power, weight, voltage and altitude targets - an advantage in fast-moving aircraft development.

Deep engineering partnership and a certification pathway.

EH works as a co-development partner to aircraft OEMs, developers and integrators, pursuing airworthiness certification through partnership with major aerospace players.