

Drones

EH Energy Fuel Cell Power: Longer endurance, high power-to-weight and low signature for unmanned aerial systems.

The Challenge

Battery-electric drones hit a hard ceiling that no amount of clever airframe design fully removes: the **energy density of the cells**. Batteries hold relatively little energy per kilogram, so every extra minute of endurance is bought with added battery weight - which comes straight out of the **payload budget**. The result is the familiar trade-off: fly longer or carry more, not both.

Turnaround is the second limitation. Between flights, a battery drone has to **recharge or swap packs**, which takes time (and spare batteries and chargers). That downtime caps how many missions a single aircraft can fly in a day - its **sortie rate** - and therefore how much ground it can cover or how continuously it can keep something under watch.

For the missions where drones create the most value - **long-endurance Intelligence, Surveillance and Reconnaissance (ISR) and persistent surveillance, logistics and cargo delivery, survey, mapping and inspection** - these limits bite hardest. Defense and commercial operators alike need **more time aloft, more payload and faster turnaround, without adding weight**, and often with a **low acoustic and thermal signature** so the aircraft is hard to detect. Combustion engines give endurance but are heavy, hot, loud and emitting - the opposite of what these missions want.

The EH Energy Solution

EH Energy provides the **fuel cell stack and power system at the heart of a hydrogen-electric drone**. The architecture is deliberately lightweight and air-cooled - fans supply cathode air and cooling, removing the mass of a separate liquid-cooling loop - and is **hybridized with a small battery** that absorbs power spikes and handles start-up while the fuel cell carries sustained load. It runs on **compressed hydrogen** (the integrator provides and mounts the tank), converting it to electricity in flight with **only water** as a by-product.

Hydrogen's high energy per kilogram is what breaks the battery trade-off: for the same all-up weight, a fuel-cell drone can stay aloft **substantially longer or carry more payload**, and it **refuels in minutes** rather than waiting on a recharge - lifting sortie rate and operational tempo. The compact, patented stack architecture gives high **power-to-weight**, so more of the weight budget goes to the mission, and the electrochemical (non-combustion) conversion keeps the **acoustic and thermal signature low** - valuable for ISR and low-observability work and for noise-sensitive civil operations.

Because the **cell can be modified quickly** and its cooling is decoupled, the stack can be reshaped to fit the airframe without sacrificing performance, and it is engineered to hold power on **low-pressure ("thin") air**, for less power loss as altitude rises. EH Energy engages as a **stack and power-system co-development partner**, taking a platform from prototype to series production, with unit costs falling as volume grows. *(Airworthiness is addressed with the integrator under the applicable UAS framework.)*

Key Differentiators

Far longer endurance and range than batteries

Hydrogen carries much more energy per kilogram, so the same weight buys substantially more flight time or payload.

High power-to-weight

Strong gravimetric and volumetric power density at stack level, so more of the weight budget goes to payload.

Low acoustic and thermal signature

Quiet and cool, for ISR and low-observability missions and noise-sensitive civil work.

Rapid refueling in minutes

Higher sortie rate and operational tempo versus battery recharge.

Form-factor flexibility

The stack can be reshaped to fit varying airframes without sacrificing performance.

Strong at altitude

engineered to perform on low-pressure air, for less power loss as altitude rises.

Hybrid architecture

a small battery handles transients, peaks and start-up; the fuel cell provides sustained endurance power.

Zero-emission

only water out.

Prototype-to-production partner

co-development with a scalable production process that drives unit cost down at volume.

Why EH Energy for Drones?

Endurance and range beyond batteries.

Hydrogen's high energy density lets EH -powered drones fly substantially longer or carry more payload than battery-only platforms for the same mission - the single biggest limitation of electric UAS.

High power-to-weight.

EH 's compact, patented stack architecture delivers strong gravimetric and volumetric power density, with air-cooled configurations that remove the liquid-cooling loop to minimize mass, and system design focused on usable net power.

Low signature, clean and quiet.

Electrochemical conversion means low acoustic and thermal signature and zero emissions - only water - valuable for ISR and low-observability missions and for emissions- or noise-sensitive civil operations.

Rapid refueling for high sortie rates.

Field refueling in minutes, rather than waiting for battery recharge, keeps platforms flying and maximizes operational tempo.

Hybrid architecture for dynamic loads.

Pairing the fuel cell with a small battery handles fast transients, peak power and start-up, while the fuel cell provides sustained endurance power.

Rapid, platform-specific engineering.

EH 's patented cell structure enables quick, application-specific stack modification, so systems can be tuned to a platform's power, weight, endurance and altitude targets - an advantage in fast-moving drone development.

A partner from prototype to series production.

EH works as a stack and power-system co-development partner, with a scalable production process that drives unit costs down at volume - supporting the transition from prototype to fielded fleet.