

Intelligent Energy: zero-emission fuel cell products



30 years experience in the development and manufacture of H₂ fuel cells

Based in the UK, with operations in the US, Japan, South Korea and China.

Our Mission

Powering the hydrogen future® with our outstanding fuel cells and service.

Over **1,000** patents







Finalising plans to construct a **GW**scale global fuel cell manufacturing
centre

A range of fuel cell products from **sub- 1kW to 100kW** based on IE's **patented** (PEM) fuel cell technology





Credited with ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 and IATF16949



Meet the team

240 Employees

70 in Operations

121 in Engineering

14 in Commercial



Ownership

• The company is part of the Meditor group, a global investment business with interests across a range of industries from energy to pharmaceuticals



Our Charitable Trust

- The Charitable Trust, launched in 2019, donates £100,000 each year to local community groups and organisations in the Charnwood area
- Established to support local causes in need of financial assistance which, support and aid, amongst others; community groups, young people, sport and lifelong learning

Management Team



David WoolhouseChief Executive Officer

David started at Intelligent Energy in October 2018. Experience in leading different engineering and manufacturing businesses. He has set-up and led multi-site operations in the UK, Middle East and China and has experience in successfully growing complex engineering concerns with over 1,000 employees.



Chris Dudfield

Chief Technology Officer

Chris has held roles in Intelligent Energy since 2001 and has extensive knowledge and expertise of fuel cell and $\rm H_2$ generation technologies.



Martin Schaefer

Operations Director

Martin started with Intelligent Energy in 2019. He has held leadership roles in Operations Management for over 15 years in the Marine and Automotive sectors.



Greg Harris

Chief Commercial Officer

Greg joined Intelligent Energy in 2021 with over 20 years of experience in the automotive industry.



Lauren Gurney

Human Resources Director

Lauren has worked at Intelligent Energy since 2012, leading the HR department since 2016.



Helen Williams

Interim Head of Finance

Helen has worked at Intelligent Energy for over 3 years and has over 10 years' experience in the energy sector.



Ashley Kells

Programme Director

Ashley has worked at Intelligent Energy since 2002 where he has held both technical and programme management roles.



Simon Read

Head of Legal

Simon joined Intelligent Energy in 2022 and has 20 years' legal experience, with 12 years working inhouse in the aerospace and automotive sectors.



Company Milestones



2005 1st fuel cell motorbike



2008 First manned fuel cell aircraft with Boeing



2010 First PEM fuel cell taxi



2011 First fully road approved fuel cell scooter



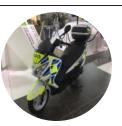
2012 Fuel cell taxis **London Olympics**



2015 High power system



2016 Fuel cell power for UAVs



2018 Fuel cell scooter Met Police fleet trial



2017 Meditor acquisition



2018 IE-LIFT 802/4 launched



2018 IE-LIFT 801 launched



2019 Launch of Charitable Trust



2019 UAV world record achieved with customer



2019 Fuel cell welfare cabin for the construction industry



2019 2.4kW UAV module launched



2019 IE joins Project ESTHER



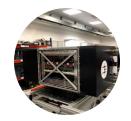
2021 IE joins H2GEAR



2021 IE joins StasHH



2021 IE-LIFT 1T/1U module launched



2022 single auto stack



2022 160kW achieved from BMW introduces fuel cells to AGV fleet

Intelligent Energy



2022 Shell use fuel cells for pipeline inspection



State of the art research, development and production facilities



Close partnerships with 3rd party test houses



1500sqm of fully hydrogen enabled test space



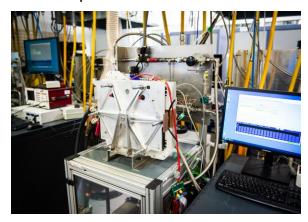
Next generation full automated **production capability** in development



8 environmental chambers, including 2 walk in and acoustic chamber facility



Semi-automated stack production lines



90 test stations suitable for a range of products



Our partners and customers















































What is a fuel cell?

A fuel cell is a device that **generates electricity** through an environmentally friendly **electrochemical** reaction.

Hydrogen is combined in the fuel cell with oxygen from the air to produce electricity and pure water, creating a **zero-emissions** solution.

As long as you have hydrogen and air, you can keep generating electricity

No combustion is involved.



Fuel cell solutions developed across multiple sectors

















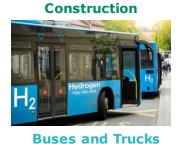


















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eVTOL

Cars



Small Aircraft

Large Aircraft





Benefits of IE-SOAR for the UAV market

- **3 to 5 times** the flight time over batteries
- Minimal maintenance
- Electrical fans only moving parts no mechanical maintenance required and no risk of mechanical failure
- Negligible noise from fans and zero-emissions
- 2-3 minute refueling

Application include:

Pipeline & Power Line Inspection, Surveying & Mapping, Cinematography & TV, Agriculture, Parcel Delivery, Security & Defence





Benefits of IE-LIFT

- Offer **zero-emission** energy solutions
- Small and compact
- Modular, scalable and easy to integrate
- Wide environmental envelope
- Robust against high shock and vibration incidence
- **Configurable** for wide range of applications

Applications include:

• Stationary Power Generator, Materials Handling Equipment, Construction, Range Extenders, Telecom Towers, Micro Grids













Benefits of IE-DRIVE for automotive and industrial markets

- A **modular** fuel cell system, suitable for a range of applications
- **High power** fuel cell systems
- **IE's patented** evaporative cooling technology
- Continuous power up to 100kW
- Modular **'one-box'** design, scalable to 500kW+





Application include:

Trucks, Vans, Bus / Coach, Rail, Marine, Construction and Stationary Power











Scaling up: IE's 2GW global manufacturing centre

• State-of the-art **Gigafactory** facility (2GW pa) to **support volume** manufacture of IE fuel cells

 Production capacity for 20,000 auto, 2000 aero and 50,000 MHE, Stationary Power and UAV products

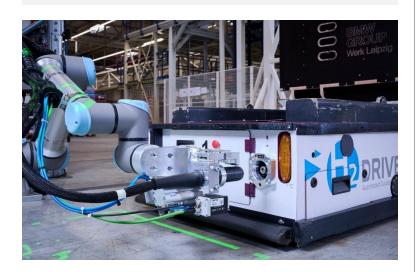
- Manufacturing fuel cell stack modules and fully integrated fuel cell systems across all application areas
- IE personnel growth to ~800 staff and indirect supply chain growth of 1,000+ personnel



News

BMW Group

- German automotive manufacturer, BMW, choose Intelligent Energy's fuel cell modules to power Leipzig factory.
- The Leipzig factory will have a fleet size of 27 hydrogen powered AGVs by the end of 2022.
- The AGVs are powered by FES' H2 E-Pack and our IE-LIFT™ 1T.



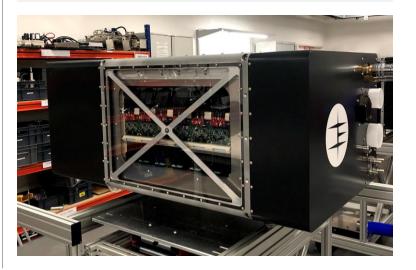
Shell

- Shell Pipeline Company choose IE hydrogen fuel cells for pipeline inspection operations in the North-eastern United States.
- Using Intelligent Energy's IE-SOAR™
 2.4kW on a Harris Aerial H6 airframe, the company was able to compare fuel cells with ICE hybrid technology.



160kW milestone

- Our IE-DRIVE™ HD fuel cell stack hit 160kW, a milestone figure from a single auto stack.
- We are working with partner, Hogreen Air, to assemble HD modules under licence for South Korea and other Asian countries with an initial order for one hundred 100kW IE-DRIVE HD fuel cell systems starting in 2024.





Automotive Applications by Intelligent Energy

London Taxi

- Intelligent Energy led an industry consortium with London Taxi Co. to develop and trial the world's first zero emission hybrid fuel cell black cab.
- Ready for London Olympics (venue transport service for the Mayor's VIP quests); London running for 4 years and 400,000+kms





Alexander Dennis

- Intelligent Energy and Alexander Dennis are partners in the UK funded project ESTHER.
- The project is looking at the integration of fuel cells into buses and aim at establishing a UK fuel-cell production for large passenger cars, buses and heavy-duty transport.





Tri-Ring (China)

- IE signed an MOU in 2019, with the Hubei Tri-Ring Truck & Motor Group
- Agreement to collaborate in the Chinese automotive (truck) market to deliver zero emission heavy duty trucks for freight transport

Changan (UK-China)

- Working with Changan's UK R&D Centre, Intelligent Energy is developing high specific power fuel cell for passengers vehicle
- The IE-DRIVE P100 system will be installed into a Changan SUV in the second half of 2023











Aerospace applications by Intelligent Energy

Boeing

- First manned fuel cell flight achieved in 2008
- IE developed and installed a lightweight 25kW EC fuel cell system
- IE engaged with both Boeing Phantom Works and Boeing Spain (BRTE)





ENFICA-FC

- The 'ENFICA-FC' aircraft completed flights out of Reggio Emilia airport, Italy
- Established new speed and endurance records for electric powered class C airplanes
- Take off & climb 36kW, Cruise 18kW, 30-40 min level flight





Airbus

- IE developed a multifunctional fuel cell APU for evaluation by Airbus.
- Airbus won the German Aviation Innovation Award in 2018 thanks to a concept demonstrator developed with Intelligent Energy





Project H2GEAR

- IE partnered with GKN Aerospace in an ATI project which involves the development of a groundbreaking hydrogen powertrain for regional and sub-regional aircraft.
- Entry-into-service of hydrogenpowered aircraft could be as early as 2026







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