

CBI Innovation & Awards

Pb 2025

Dr Carl Telford // Research & Innovation Director, CBI

Pb 2025// Amsterdam

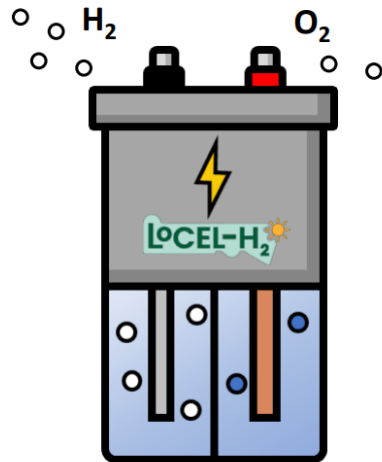


Lead batteries: Surprising innovation...

Lead battery-electrolyser: Award-winning hydrogen innovation

Lead acid battery technology allows the cell to charge and discharge as a battery

Electrolysis occurs when the cell is over charged – splitting water from the electrolyte into H_2 and O_2 gas.



Hydrogen gas is collected at the negative electrode as a method of chemical energy storage during excess renewable energy production

Renewable energy is stored either as electrical energy in the battery or chemical energy as hydrogen gas



Aftrak: Prize-winning electric micro-tractor-grid



Project Delivery Highlights:

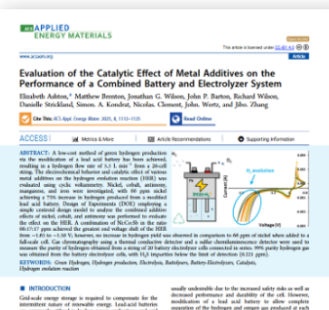
LoCEL-H2 is driving development of battery-electrolyser

Awards:

- Innovation in STEM Industries Award
Leicestershire innovation awards | March 2024
- Sustainable Hydrogen Production Award
ASHREA UK Technology Awards | May 2024
- Innovation and Technology Award
Next generation awards | May 2024
- International Award for Academic Excellence and Internation Collaborations in Hydrogen
Hydrogen Awards | Feb 2024
- 1st place poster
10th UK Catalysis Conference | Jan 2024

Publications:

2 journal papers, 4 conference papers +2 invited papers under review



>99 % **99 %** **21.5 kWh** **20 Lmin⁻¹** **>1862**

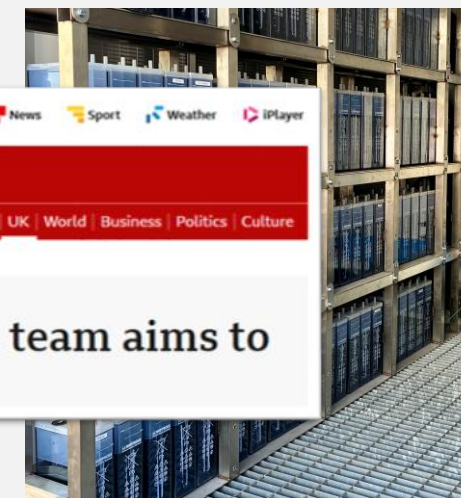
Hydrogen purity,
even at low load
factor

Recyclable
materials

Total capacity
from 160 cells

Flow rate of Hydrogen
from 160 cells at max
power

Cycles of cell as an
electrolyser



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Zero carbon research team aims to change the world

Electrolyser passed **1862 cycles** mark, old battery electrolyser cell design 341, new design 171 cycles

Project Delivery Highlights



Designing and Integrating a Battery-Electrolyser Energy System for Communities in Sub-Saharan Africa

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Abstract: Reliable energy access continues to be a challenge for off-grid communities in sub-Saharan Africa. This paper presents the design and integration of a hybrid battery-electrolyser energy system at a rural hospital in Malawi, with future deployments in Zambia and Côte d'Ivoire. Designed to work alongside solar power, the system combines battery storage with hydrogen production to support both electricity requirements and clean cooking. Early testing has shown the system can operate reliably and produce 99% purity hydrogen. The study explores the potential of this integrated system to


Cooking practices further highlight the depth of the energy crisis. Approximately 85% of the population in sub-Saharan Africa relies on firewood, charcoal, or other biomass for cooking [2]. These fuels contribute heavily to indoor air pollution, which is responsible for over 700,000 premature deaths annually in Africa, disproportionately affecting women and children [3]. In addition to health concerns, biomass fuel use accelerates deforestation and contributes an estimated 1.69 gigatons of CO₂ emissions each year—surpassing emissions from the entire global aviation sector [4].



Project Delivery Highlights:

Aftrak is a startup company; wins *The Engineer* Grand Prix Award






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AFTRAK LTD

Company number **15716471**

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Company status

Active

Company type

Private limited Company

Incorporated on

13 May 2024

Accounts

First accounts made up to **31 May 2025**
due by **13 February 2026**

Confirmation statement

Next statement date **29 April 2026**
due by **13 May 2026**

Last statement dated **29 April 2025**

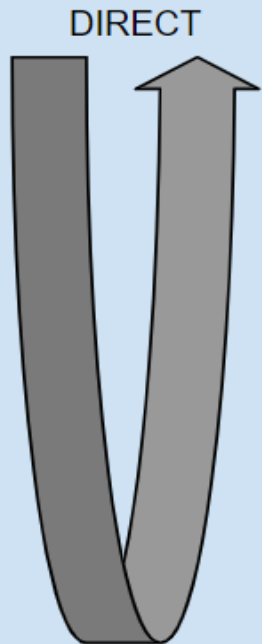
Nature of business (SIC)

27900 - Manufacture of other electrical equipment

CBI has seen success in gaining funding & recognition

Both research & innovation and funding via member states

Phase of Research & Innovation Activity



INFLUENCE

ANALYSE

ENGAGE

CONCEPT

BID

MANAGE

Achievements by 2025

- **7 Bids submitted**
 - 3 funded government-funded projects won
 - ~\$15-20m for consortia in total
 - Several new bids & opportunities in progress
- **10+ peer-reviewed publications by project partners**
- **Multiple international awards & recognition**
 - *The Engineer* Grand Prix Award
 - International Hydrogen Award
 - Milken-Motsepe Prize 2024
- **New startup company formed from a project**
- **Advocacy boost incl. speech at EFM (EU Parliament)**

Thank you

Dr Carl Telford // Research & Innovation Director // CBI

October 2024

