



EH GROUP ENGINEERING



www.ehgroup.ch

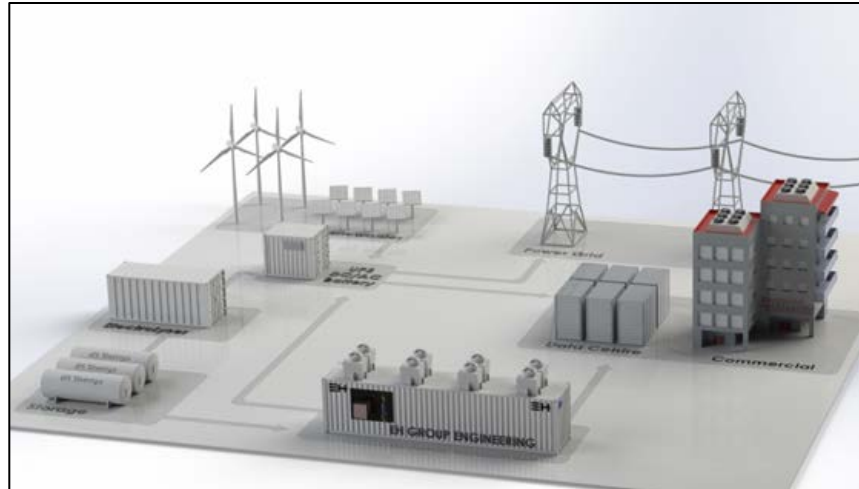
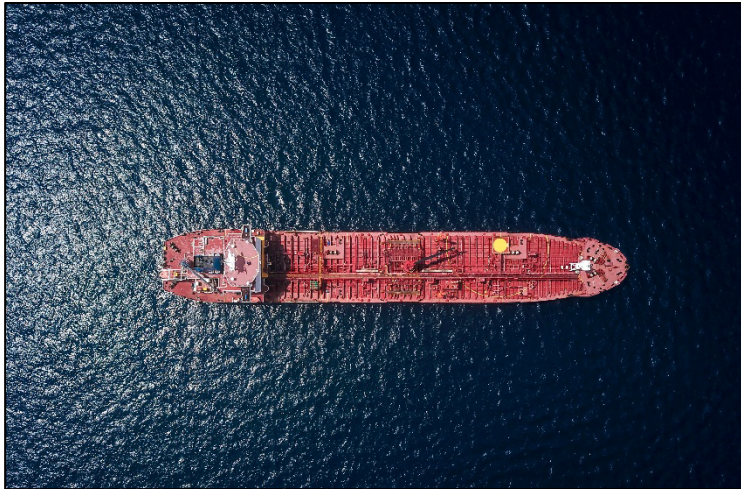


THE CHALLENGE

DECARBONISING HEAVY DUTY MOBILITY & LARGE POWER UNITS

OVERCOME THE LIMITATIONS OF BATTERIES

REDUCE THE COST & COMPLEXITY OF HYDROGEN FUEL CELLS



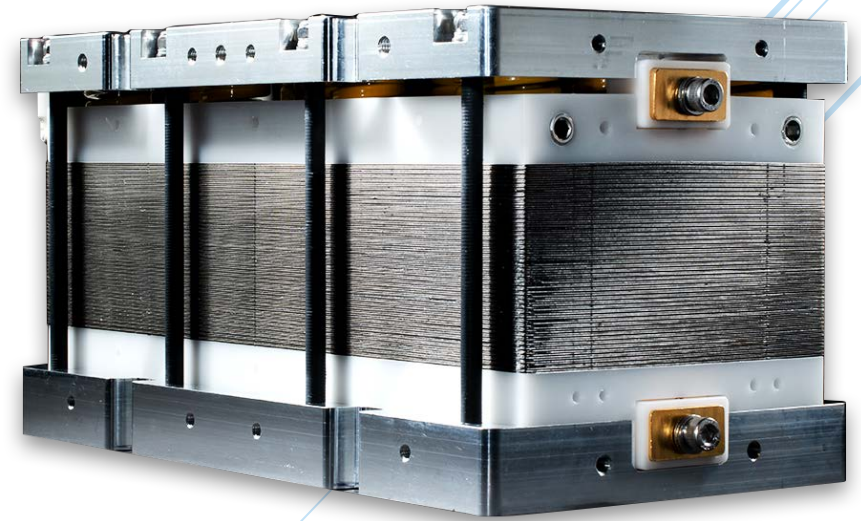


EH Group Fuel Cell Technology

- Uniquely re-designed fuel cell stack at the microstructure level - more **compact, lightweight and efficient**.
- New concept of continuous FC production process
 - Unique machinery with fully integrated assembly
 - **Significantly faster & cheaper at scale***: **< 100EUR/kW**
- Operates with **minimal effects of gravity** & in any orientation - great candidate for mobile applications;
→ Collaboration with



* At scale refers to 100,000+ units per annum



EU GA945810 – EHSTACK.

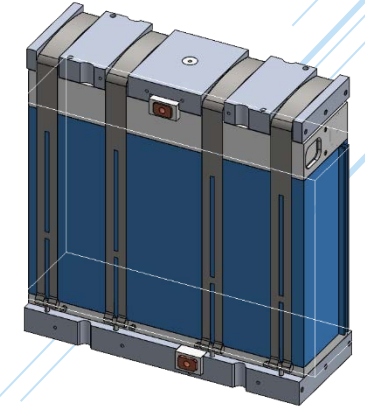


Our Technology Edge

Technology Comparison

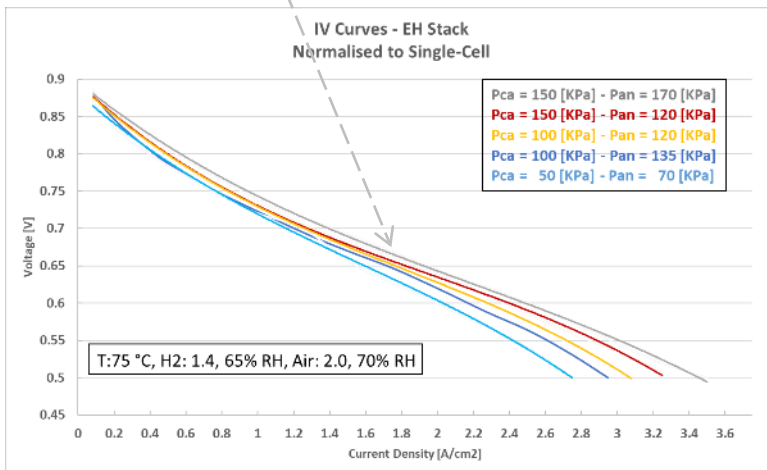
Parameters	Toyota (MIRAI)	Honda	PowerCell	Ballard (High Performance FC)	EHG FC STACKS
Volume Power Density [kW/L]	5.4	3.1	4.8	4.3	8.0
Weight Power Density [kW/kg]	3.0	2.0	2.9	2.7	4.0
Cell Pitch [mm]	~1.0	~1	~1.0	N/A	<0.8

NOTE: data from other suppliers are collected from the public domain and EHG doesn't guarantee 100% accuracy



Example of Performance Curve

High Power Density at **lower** pressure



The Edge

STACK:

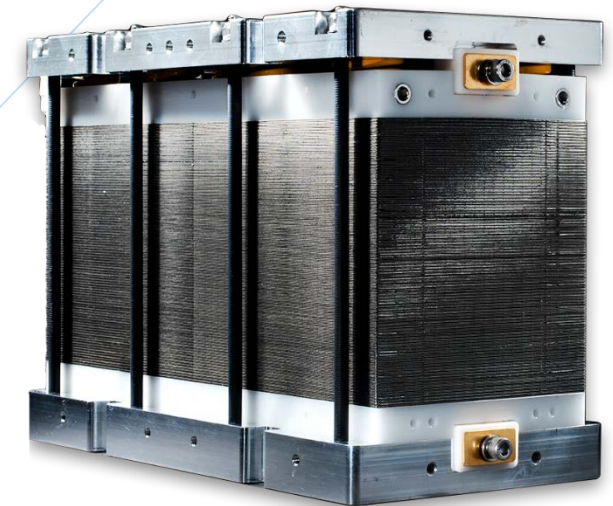
- Higher Power Density
- Power range: **1.0 – 300 [kW]**

SYSTEM

- Compact design
- Higher fuel efficiency

SOLUTION

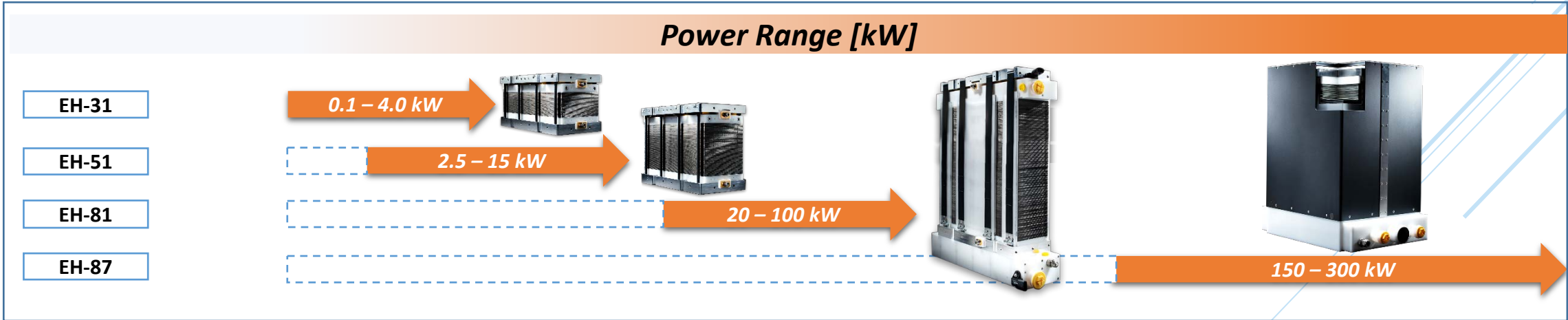
- Scalable
- Reliable
- Customisable



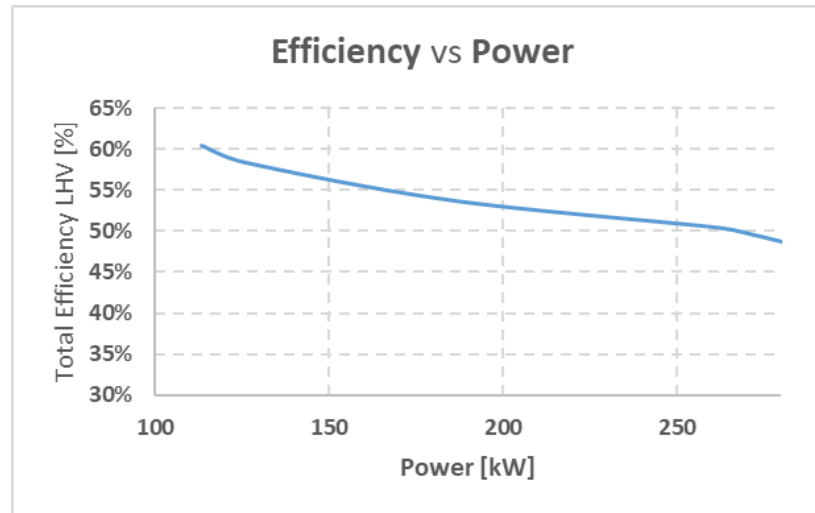


EHG Fuel Cell Products

Fuel Cell Stack & System Platforms



Total System Efficiency vs. Power output





EH Fuel Cell - Mobile Applications

Stacks & systems deployed since early 2020

- Electric vehicles – commercial & off-road
- Forklifts
- Marine projects
- Mining Sector

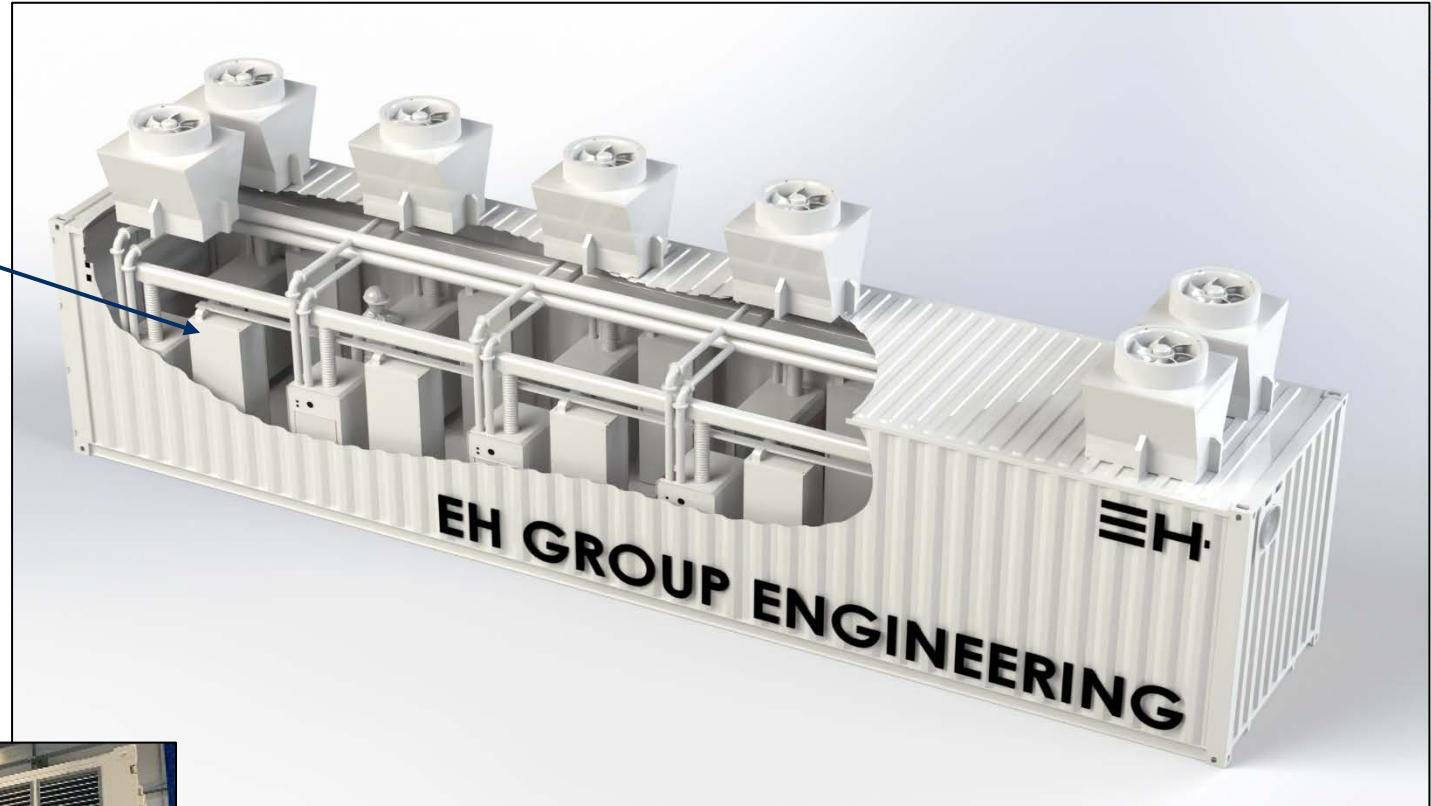




EHG Fuel Cell - Stationary Applications



EHG 200kW FC module



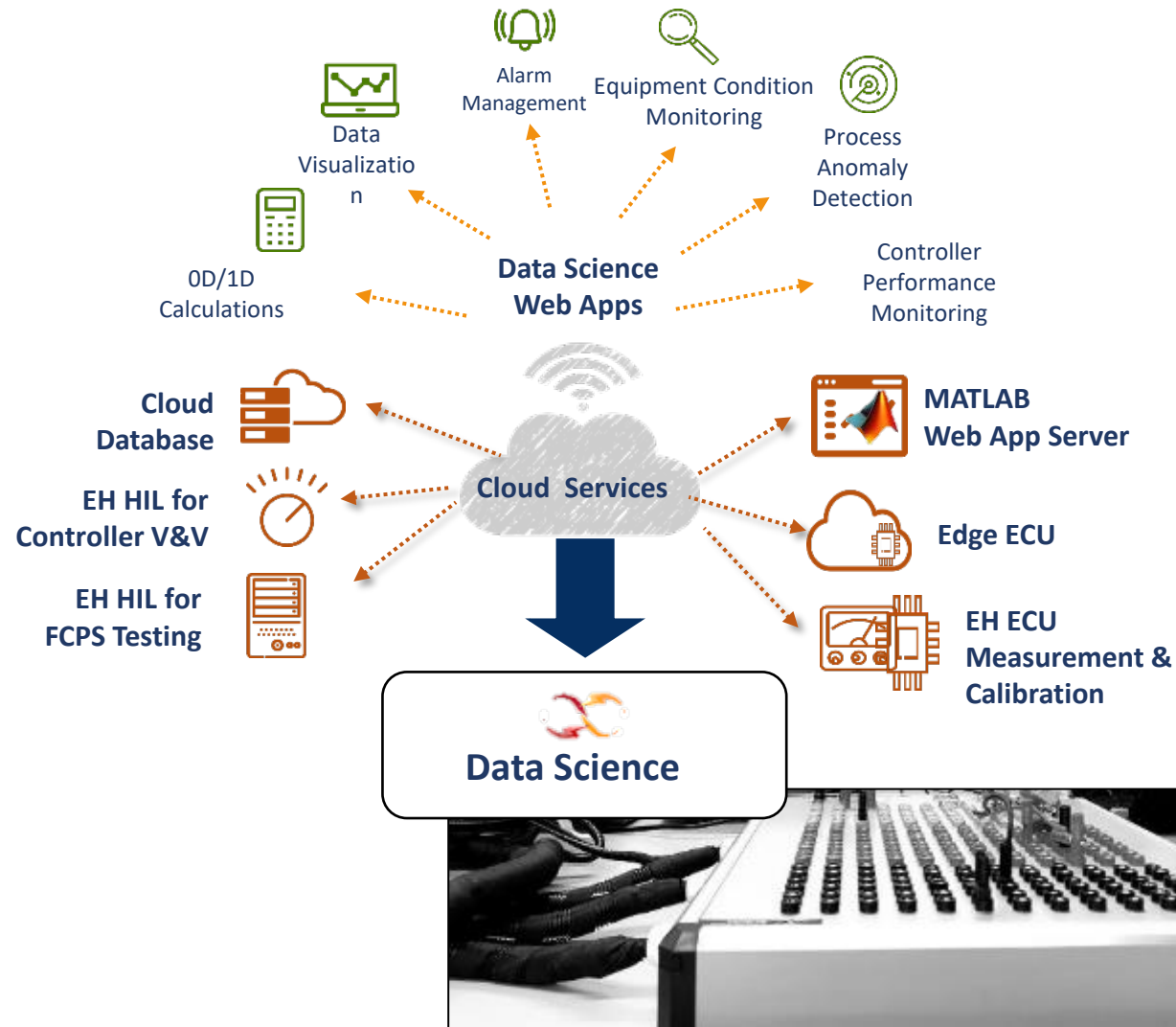
Backup Power & EV Supercharger



Collaboration with SNAM –
Europe's largest gas grid operator



EHG Fuel Cell Data Science



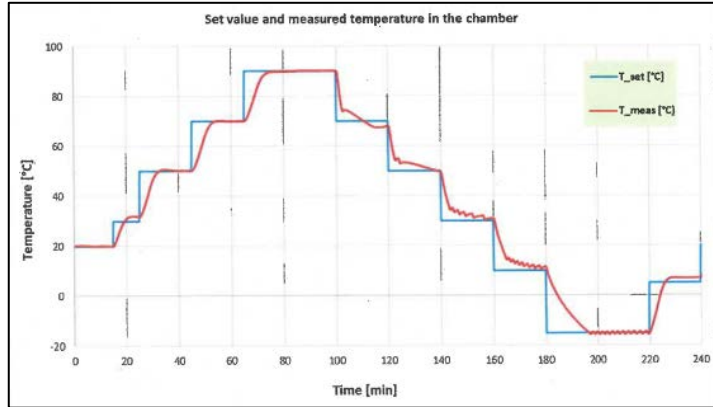
- Process Control Automation Cloud-based Data Telemetry with **Edge ECU**
- **FCPS Dashboards** for monitoring



- **Cloud services -**
 - Remote Support
 - Predictive Maintenance
- **EH FCPS Digital Twin**
- **FCPS & vehicle simulations**



External Testing



Thermal tests

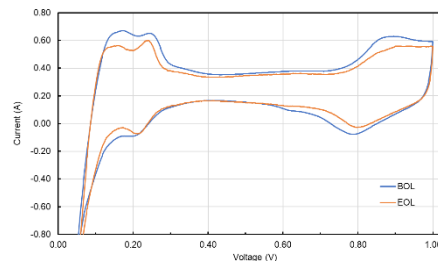
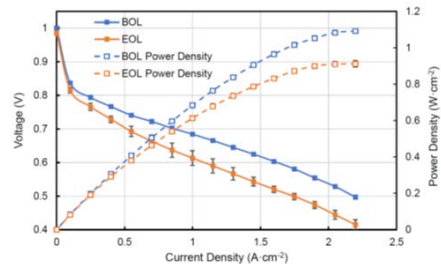


Vibration tests in space labs



RUAG

Degradation Test Results



Test Protocols Defined by
DoE (US Department of Energy)

- Positive results on durability and degradation



The Impact

validated in April 2022
validation id:

SL#434

Verifiable at
www.impact-forecast.com

EH GROUP ENGINEERING 1 MW FC SYSTEM

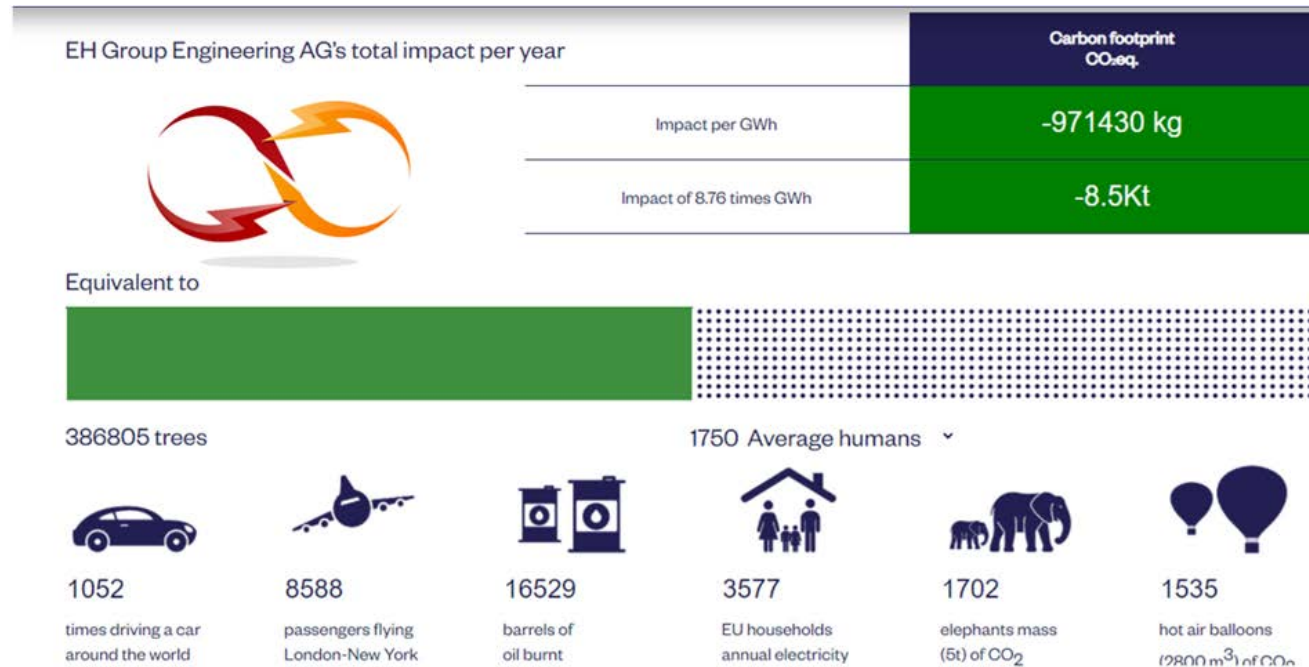
Mitigates climate change with an impact reduction potential of:

-8,5 KtCO₂eq / year

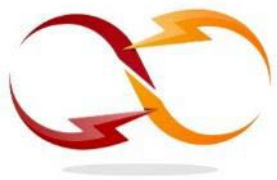
Validity of forecast
Valid

Impact compared to baseline
Positive

Magnitude of impact
Significant



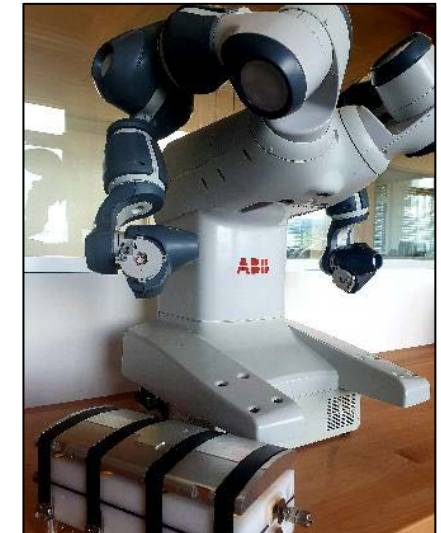
Source: Impact Forecast - Dutch impact software & services company with a scientific team to apply science-based impact assessments (<https://impact-forecast.com/>)

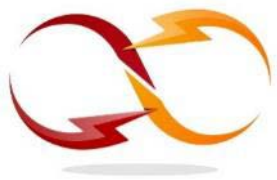


FACILITIES



- Multiple test bench facilities for testing up to 250kW
- Dedicated Hydrogen Supply
- Testing labs & Production facilities
- 2000m² of customized lab space





Leadership Team



Dr Mardit Matian

- Founder/Director: Technical lead
- PhD - Imperial College London
- 18+ years fuel cells, H2 production



Christopher Brandon

- Co-Founder/Director: Finance & strategy
- MA Economics (Hons) – Univ Edinburgh
- 23+ years finance & entrepreneurship



Anand Vasappanavara

- Senior Control/Automation Engineer
- MSc Mechanical Engineering, Controls
- 10+ years in fuel cell applications



Alexandre Chainho

- Mechanical designer/integrator
- 14+ year experience FC assembly, system design and prototyping.



Alice Maffezzoli

- Business Development Manager
- MSc Electrical Engineering, MBA
- 10 years business management



Dr Isabel Vazquez

- PhD Chemistry Queens University
- Electrochemist & Material Scientist
- 5+ years PEMFC Characterisation

Supported by more than 20 talented engineers

Scientific Advisory Board



Prof. Jan Van Herle



EPFL Switzerland
Senior lecturer and researcher
Fuel Cells, catalyst contamination



Prof. Nigel Brandon



Imperial College London
Professor of Electrochemistry
Dean, Faculty of Engineering ICL

Advisory Board



Bernard Sabrier



Group Chairman of Unigestion
CEO Unigestion Asia Pte Ltd
Leading European PE & alternatives manager
Swiss Entrepreneur & philanthropist



Carl-Peter Forster



Former Group CEO Tata Motors
Chairman & Managing Director Opel AG
President General Motors Europe
Board Member - Geely Automobile & Volvo Cars

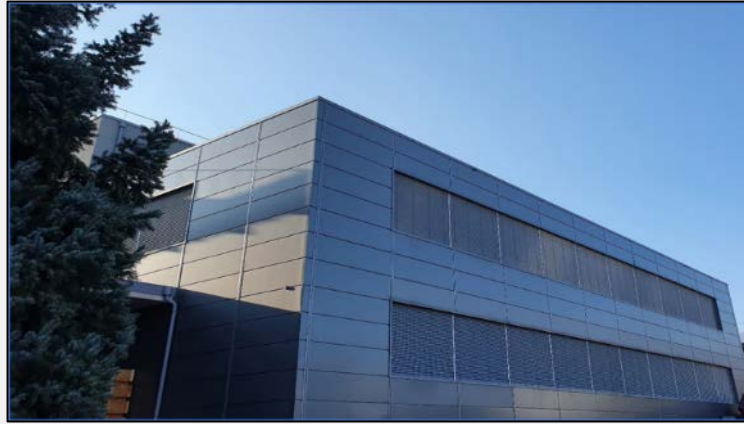


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Some of our selected partners:

