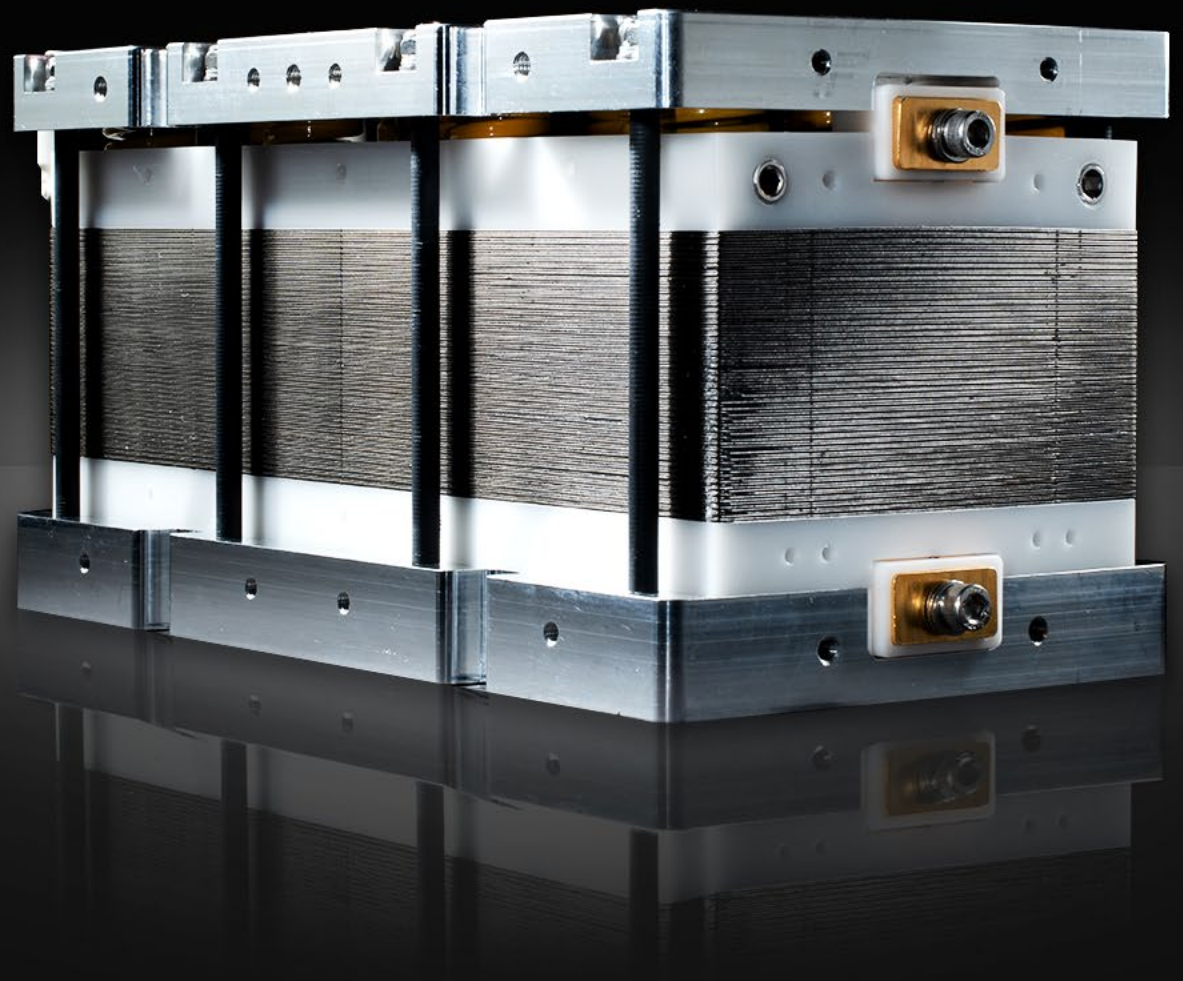
EH GROUP®

Clean Energy Generation

The leader in hydrogen fuel cell technologies and services.



www.ehgroup.ch

Our Mission

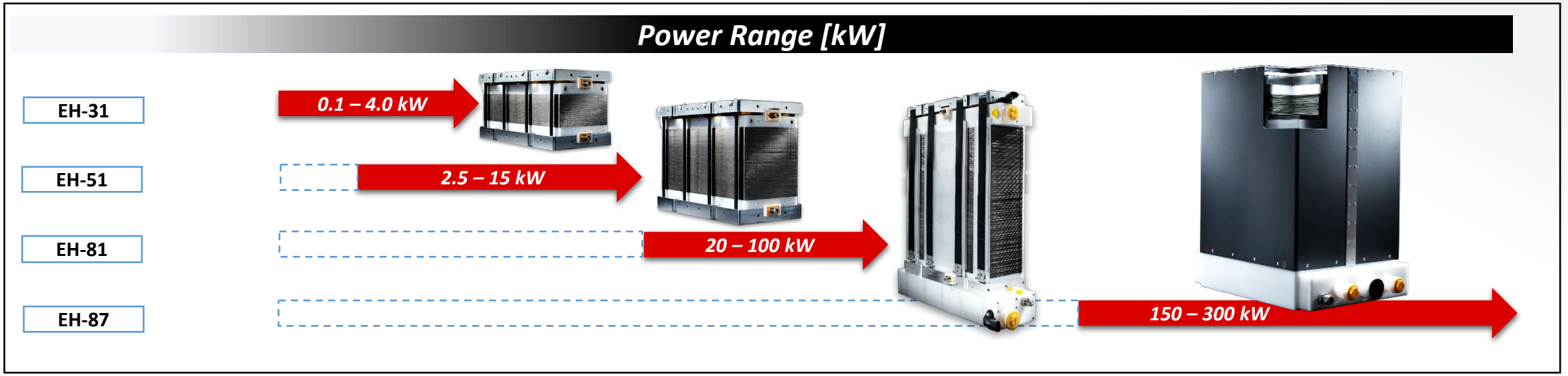
DECARBONISING
AVIATION, HEAVY-DUTY MOBILITY
& STATIONARY POWER

Fuel Cell Technology

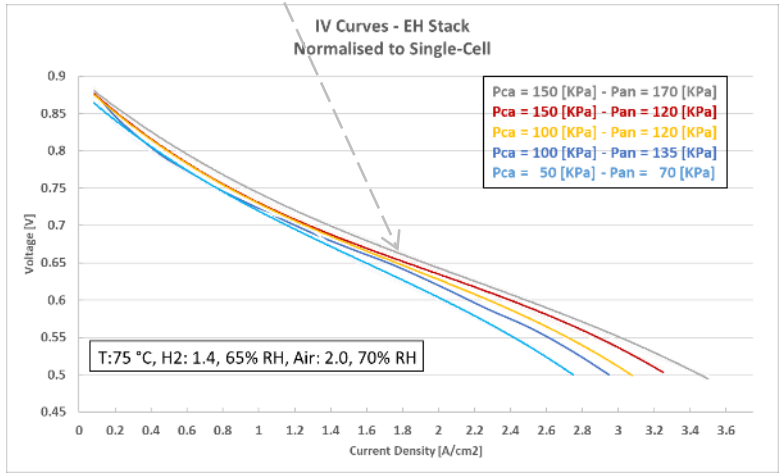
Uniquely re-designed fuel cell stack microstructure

- **Unrivalled Power Density** – compact & lightweight
- **Stack design flexibility** – materials, higher power
- Simplified FC system architecture – **greater efficiencies**
- **Radical cost reduction** by Design for Manufacturing

Fuel Cell Stacks



*High Power Density at **lower** pressure*



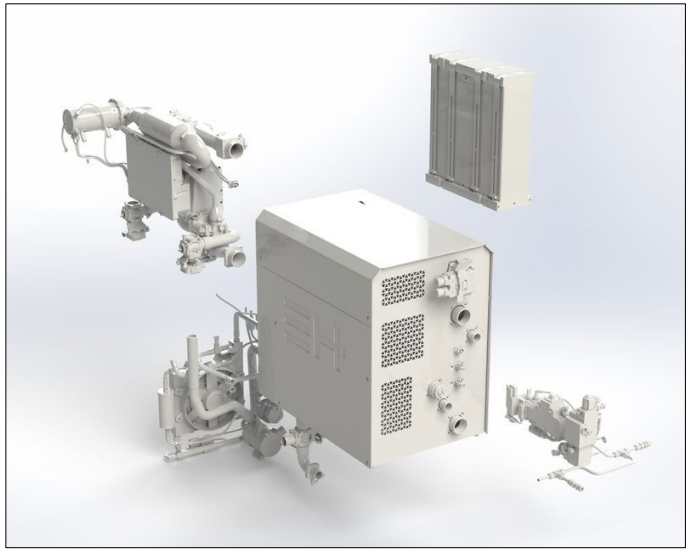
Operates with **<u>minimal effects of gravity</u>** & in any orientation - great candidate for mobile applications

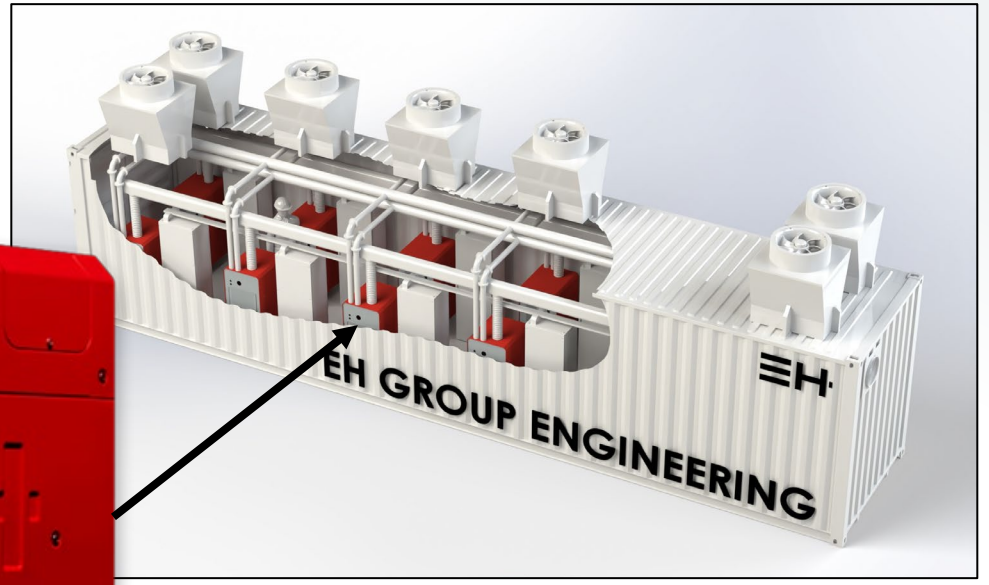
Technology Comparison

Parameters	Toyota (MIRAI)	Honda	PowerCell	Ballard	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

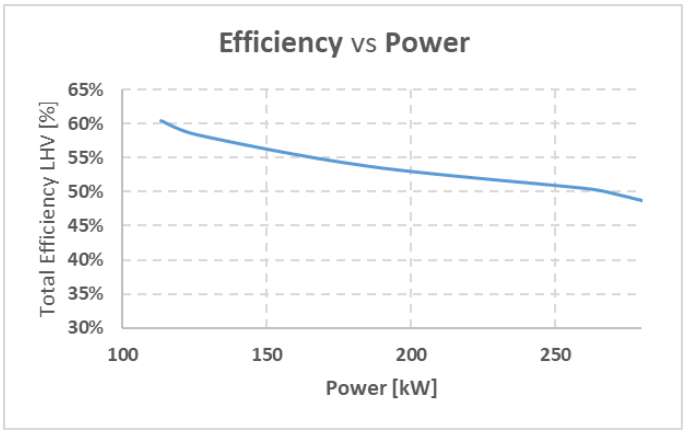
Fuel Cell Systems & Solutions





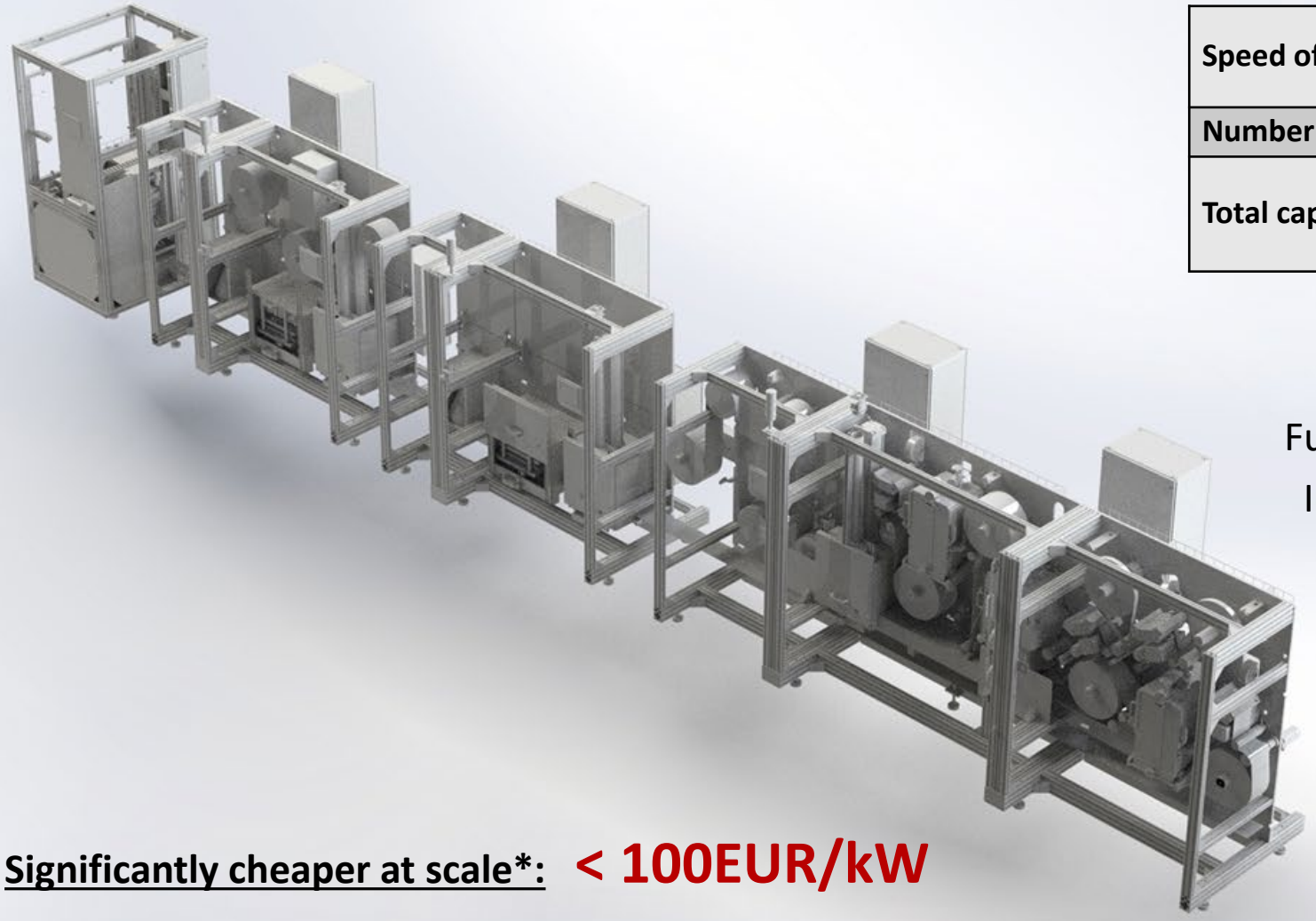
EH-TRACE

Total System Efficiency vs. Power output



Simplified Architecture
20kW – 250kW Range
Modular for multi-MW Power
Flexible and responsive control system
Higher overall system efficiency
Design for Serviceability

FC Automated Production Innovation



Speed of production	**100kW → 20min 60kW → 12min**
Number of Stack Platforms	**4 (Up to 300kW)**
Total capacity	**40,000 (100kW stacks) ~4 GW/year**

Fully automated process - high micro-precision

Integrated quality control & laser serialisation

Two modules already commissioned

Final assembly H2 2023

Significantly cheaper at scale*: **< 100EUR/kW**

***100,000 units per year**

Intellectual Property

Item	Existing FC Technology	EHG Approach
Plate manufacturing	Stamping	**New Approach (IP)**
Plates joints	Laser welding	**No laser welding**
Sealing	Dispensing	**No dispensing (IP)**
Assembly	Layer-by-Layer	**2D printing (IP)**
Gas Diffusion Layer	Carbon-fibre	**New approach (IP)**

FTO (Freedom To Operate) has been conducted

4 patents filed Worldwide on our core stack technology

- WO 2020/008387 A1
- WO 2020/161668 A1
- WO 2021/190757 A1
- WO 2021/213613 A1

Further 5 patents in pipeline including assembly process

WIPO PCT The International Patent System

WORLD INTELLECTUAL PROPERTY ORGANIZATION

Receipt of Electronic Submission

The Receiving Office (RO/IB) acknowledges the receipt of a PCT International Application filed electronically online. An Application Number and Date of Receipt have been automatically assigned (Administrative Instructions, Part 7).

Submission Number:	050962		
Application Number:	PCT/IB2020/050962		
Date of Receipt:	06 February 2020		
Receiving Office:	International Bureau of the World Intellectual Property Organization		
Your Reference:	P3390PC00		
Applicant:	EH GROUP Engineering AG		
Number of Applicants:	1		
Title:	FUEL CELLS		
Documents Submitted:	eolf-abst.txt	669	06 February 2020 15:52:28
	eolf-appb-P000001.pdf	1763626	06 February 2020 14:35:26
	eolf-appb.xml	898	06 February 2020 15:52:28
	eolf-fees.xml	1945	06 February 2020 15:52:28
	eolf-othd-000001.pdf	511497	06 February 2020 14:34:54
	eolf-othd-000002.zip	3528267	06 February 2020 14:35:38
	eolf-poat-000001.xml	1517	06 February 2020 15:52:28
	eolf-requ.xml	3995	06 February 2020 16:12:42
	eolf-vlog.xml	1348	06 February 2020 15:52:28
Submitted by:	GROSFILLIER, Philippe		
Signed by:	CN=Philippe Grosfillier 7625		
Timestamp of Receipt:	06 February 2020 16:15 UTC+1 (CET)		
Official Digest of Submission:	BD:FB:82:65:6D:9F:4B:EC:55:07:A3:53:74:91:D5:28:07:0C:67:9D		

/Geneva, RO/IB/

Fuel Cell Deployments - Mobility

5 – 10kW

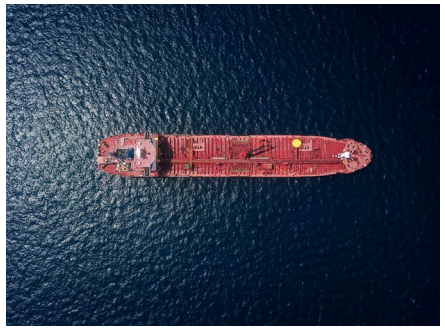
20 - 40kW

40 – 250kW

2020	2021	2022	2023

Light commercial vehicles

Forklifts



Maritime

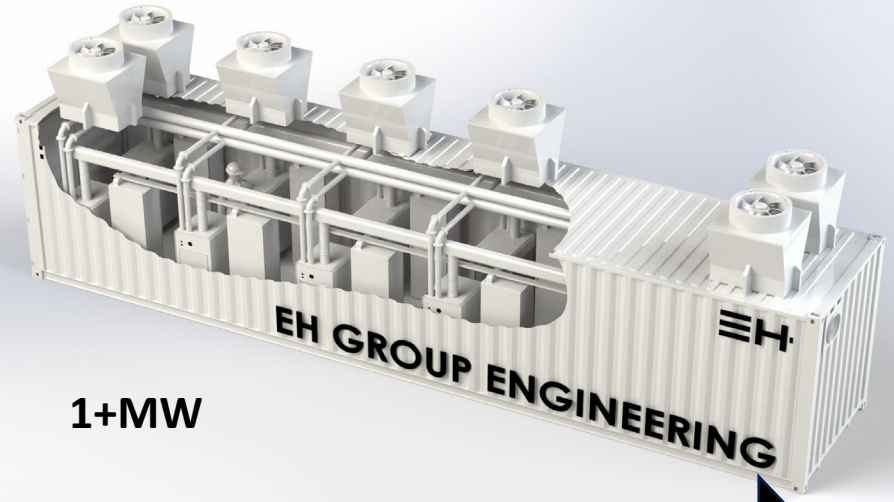
Aviation

Mining

Fuel Cell Deployments - Stationary

20kW

250kW



1+MW

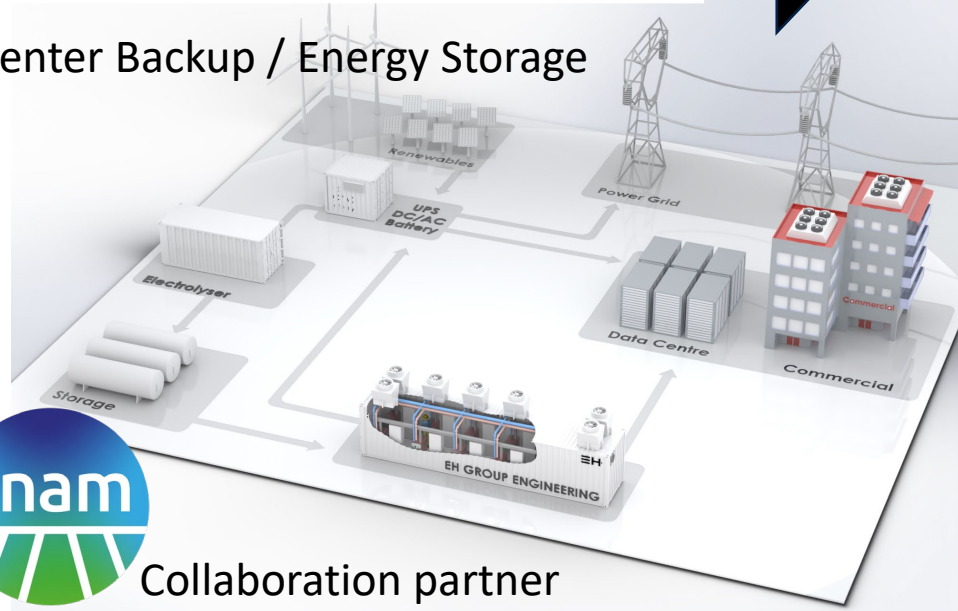
2020	2021	2022	2023

Micro-Grid

EPFL

Backup Power / EV supercharger

Data Center Backup / Energy Storage



snam

Collaboration partner

Fuel Cell Data Science

Monitoring Dashboard

Remote Support & Predictive Maintenance

0D/1D Calculations

Controller Performance Monitoring

Alarm Management

Data Visualization

Equipment Condition Monitoring

Process Anomaly Detection

Cloud Database

EH ECU Measurement & Calibration

Cloud Services

MATLAB Web App Server

Edge ECU

Data Science

EH HIL for FCPS Testing

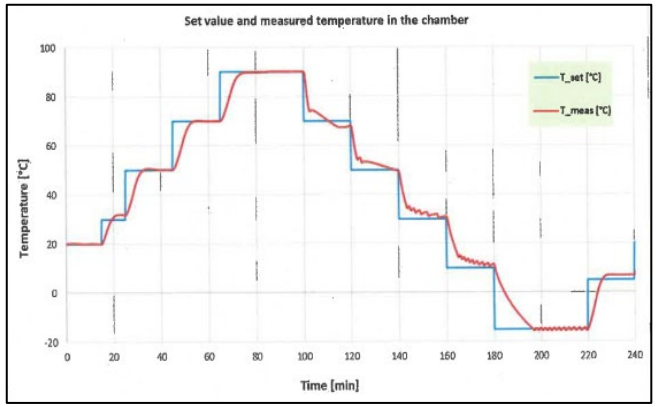
EH HIL for Controller V&V

Cloud-based Data Telemetry

Digital Twin & vehicle simulations

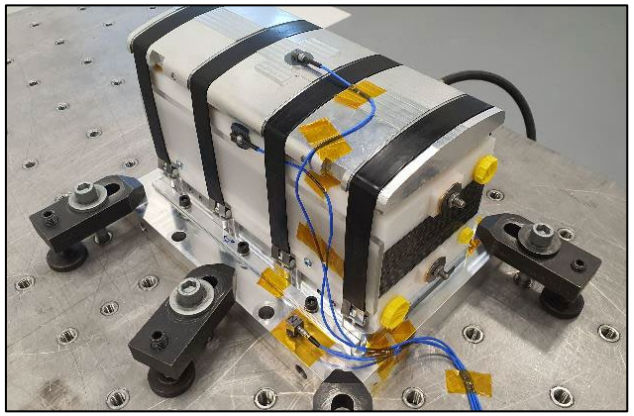
External Testing

esa business incubation centre Switzerland



Thermal tests

Empa Materials Science and Technology

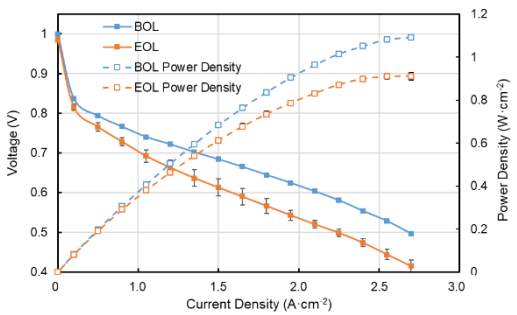


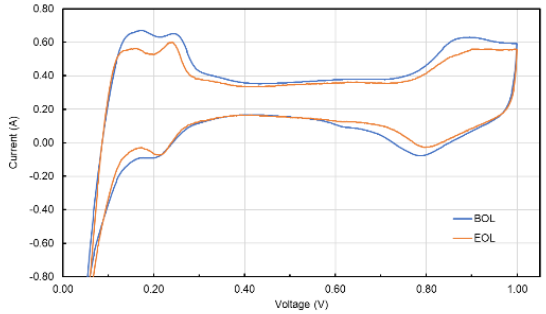
Vibration tests to 15g in space labs

RUAG

NFCRC NATIONAL FUEL CELL RESEARCH CENTER UNIVERSITY OF CALIFORNIA • IRVINE

Degradation Test Results





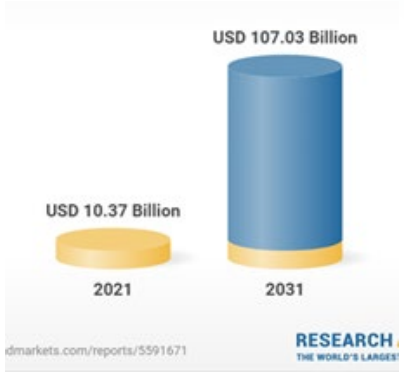
Test Protocols Defined by
DoE *(US Department of Energy)*

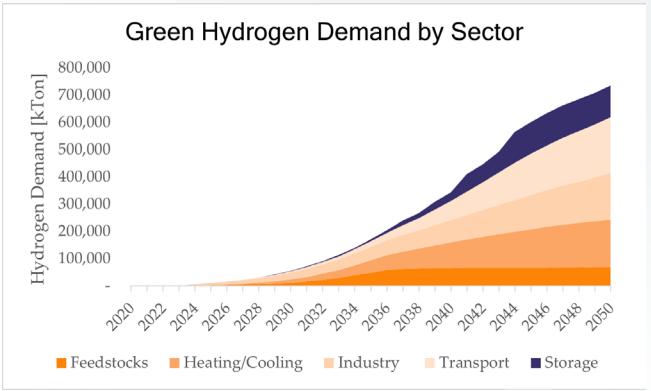
- *30,000 cycles*
- *Catalyst mass activity loss*
- *Electrochemical surface loss*
- *Voltage decrease*

Fuel Cell Market Opportunity

Policy landscape <u>highly</u> supportive –

- US – Inflation Reduction Act
- EU – Green Deal, Fit-for-55, REPowerEU
- China, India, Japan, Australia – national hydrogen strategies

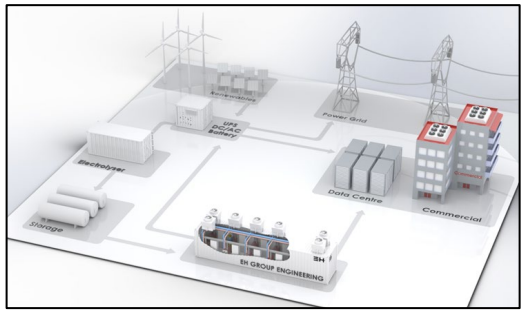


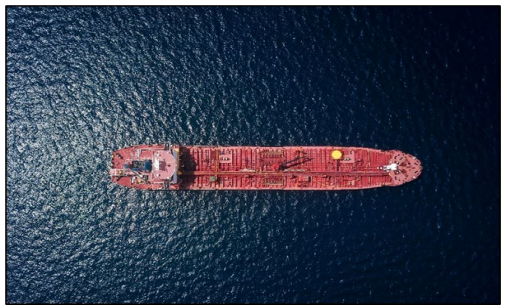


FC Market expanding rapidly - CAGR 40+% till 2030

<u>Our Target Markets:</u>

- **Stationary:** data-centres, backup power, long duration storage
- **Mobility:** aviation, off-highway vehicles, maritime vessels





<u>Competitors</u>

- **Incumbents:** Ballard, PowerCell, PlugPower
- **Tier-1 automotive:** EKPO, Bosch, Symbio
- **Mobility OEMs:** Toyota, Cellcentric, Hyundai
- **Chinese:** REFIRE

'Conventional' FC technology

Lower performance, less design flexibility & costlier

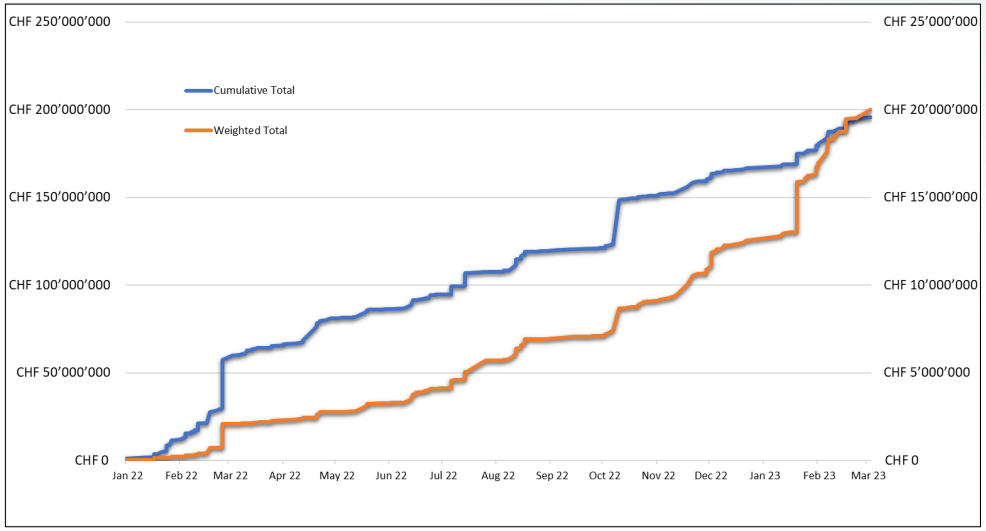
Business Model

Direct B2B Sales :

- FC Stack & FC System supplier to clients
- OEMs, system integrators, Tier-1 suppliers
- Project developers, engineering & energy groups

Joint FC Development in specialised sectors :

- Maritime
- Off-Highway vehicles
- Aviation



2022-23 Commercial Offers:

- Targeting key participants in each major sector
- 120+MW of projects under negotiation
- Cumulative Total >200Mio CHF
- Sales cycle 9-12 months – largely first-time buyers
- Conversion rates accelerating

Leadership Team

Dr Mardit Matian
- Founder/Director
- PhD - Imperial College London
- 20+ years fuel cells & hydrogen production
- Technical lead

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

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

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

Supported by a Fuel Cell Squad of 20+ talented engineers

Partners

Scientific Advisory Board

Dr 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

Senior 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

Selected Investors, Clients & Partners:

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

SAFRAN ExploreH2 Program

THE UNIVERSITY OF CALIFORNIA · IRVINE ·

CalSEED

THIRD DERIVATIVE

European Innovation Council

snam

W.A. DE VIGIER STIFTUNG SINCE 1987

FIT fondation pour l'innovation technologique

VAUD

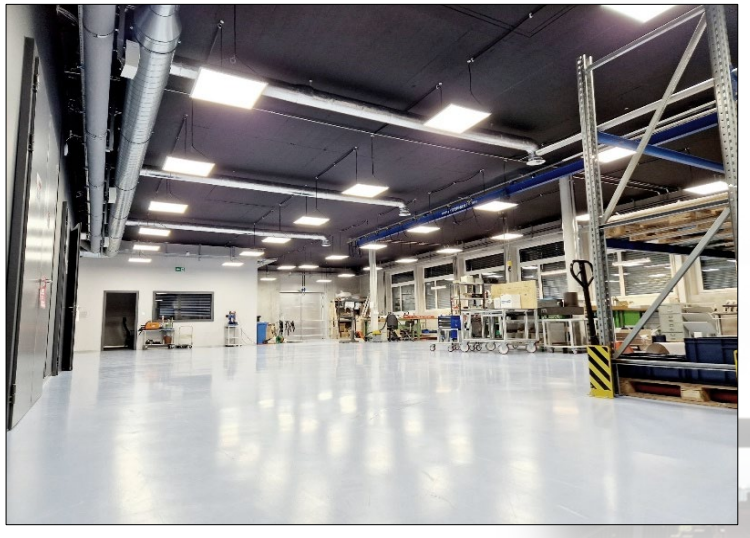
Facilities

Multiple test bench facilities to 300kW

Dedicated Hydrogen Supply

Testing labs & Production facilities

2000m^2 of customized lab space

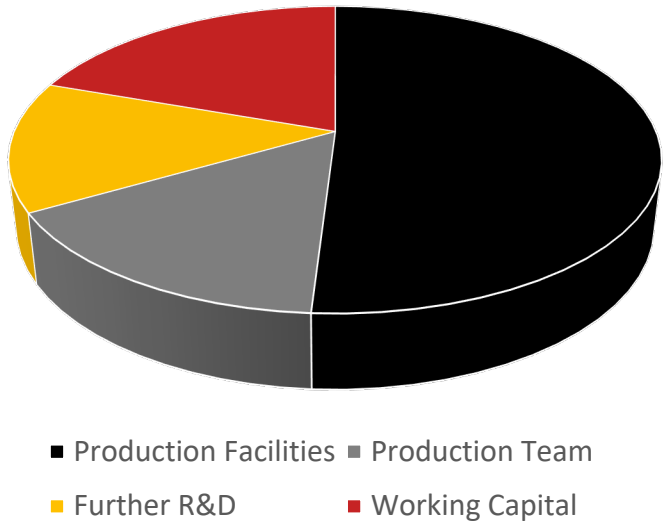


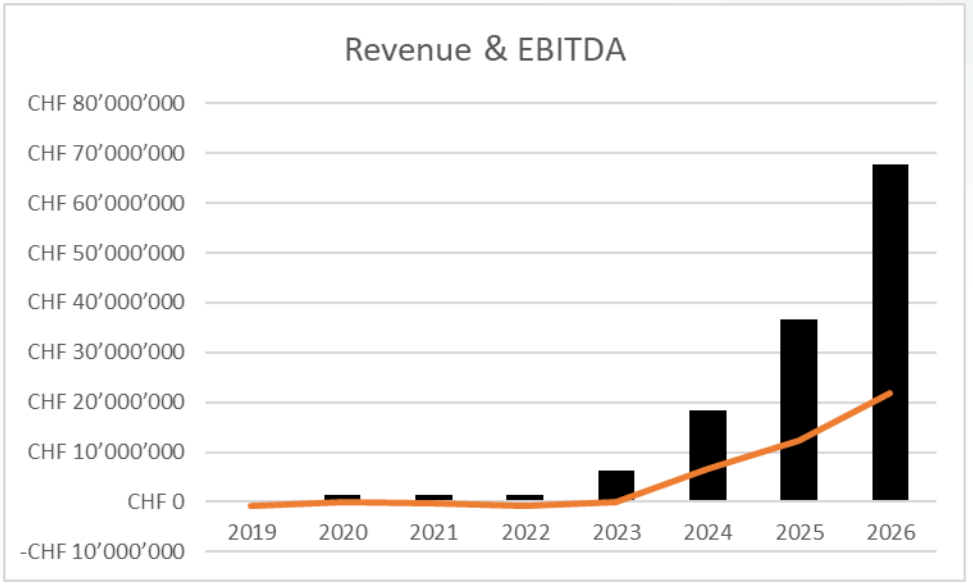
Technology and Financing Roadmap

Date	Major Milestones	Financing
2017-2018	- Stack v1 (POC) - Patents - Stack v2 (3kW)	CHF 1.2M Seed
2019-2020	- Automation Machinery Concept Devt - FC system 20kW - Stack v3	CHF 2.7M Grants
2021	- FC Stack Devt 250kW - New Laboratory Facilities - FC system 40kW	CHF 2.5M Lease Financing CHF 5.5M Convertible Note
2022	- FC system 200kW development - Establish India FC Control Lab	
2023	- **Production Facilities established in CH** - **Stack Production Machinery Finalised**	**12-14M CHF Series A (Equity + Debt)**
2024-25	- **Establish EU-based FC system assembly** - **Localisation of FC system production in USA**	**Series B**

12 Mio CHF Raised To Date

Series A





Conservative Scenario

- Raising 12-14 Mio CHF (equity + debt)
- Expand team to total 40+ FTEs
- Setup production facilities
- Complete FC assembly machinery
- Further R&D program & working capital

Year	2022	2023	2024	2025-
Fuel Cell Products	1.2MW	4MW	20MW	80MW
FTEs	17	25-37	37-69	69-125
CAPEX	1.5M CHF	4 M CHF	6.8M CHF	7.5M CHF

Contact

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