Start-up Pitches from the H2UB #HYDROVERSE

#HYDRO

GENTEAM

WORK







HYDROVERSE CONVENTION #2024

SAVE THE DATE

THE EUROPEAN HYDROGEN START-UP EVENT OF THE YEAR



June 18, 2024

www.hydroverseconvention.com



(12) Point Twelve

Continuous carbon intensity certification, made possible

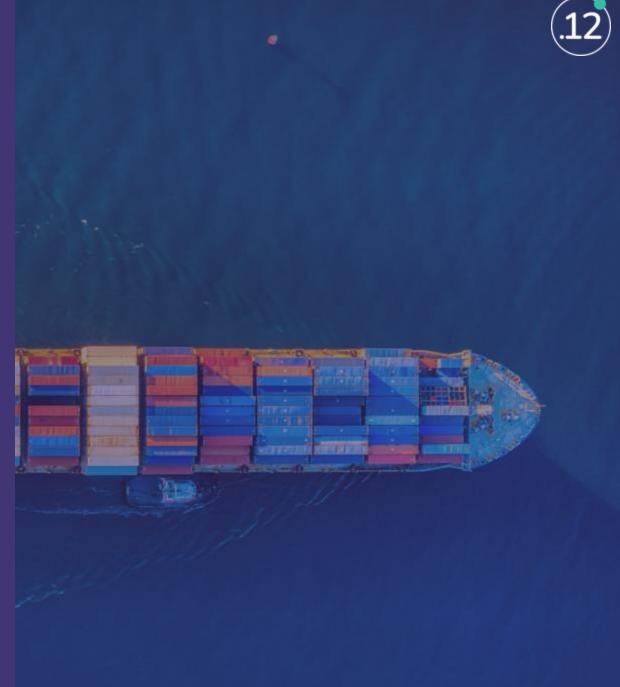
www.point-twelve.energy

"Certified Green" has become a license to operate in our economy.

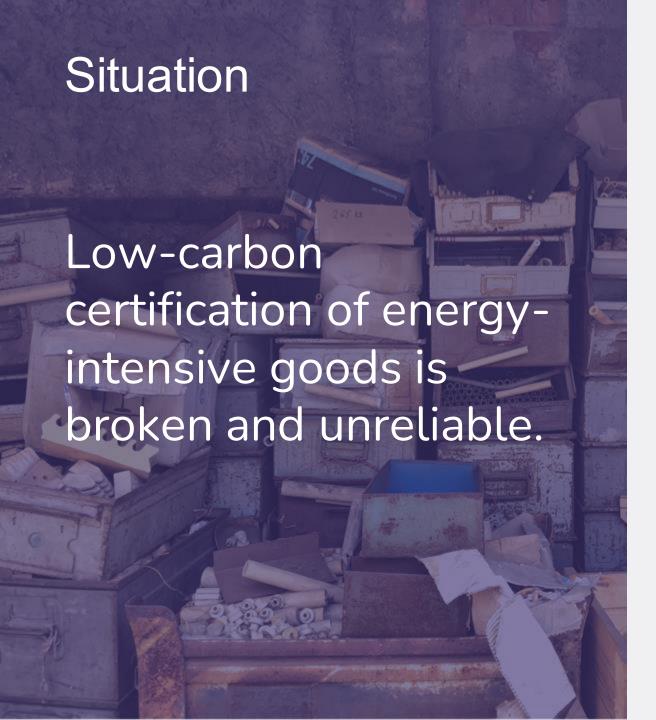


Businesses calling green what isn't won't survive long.

Businesses who call green the products they can demonstrate as being really green conquer the world and earn money.







Today's processes are:

→ Tedious, manual, non-scalable

→ Costly

 \rightarrow Prone to fraud



The problem

Today, energy-intensive goods producers cannot show reliably that what they consume & produce is low-carbon.

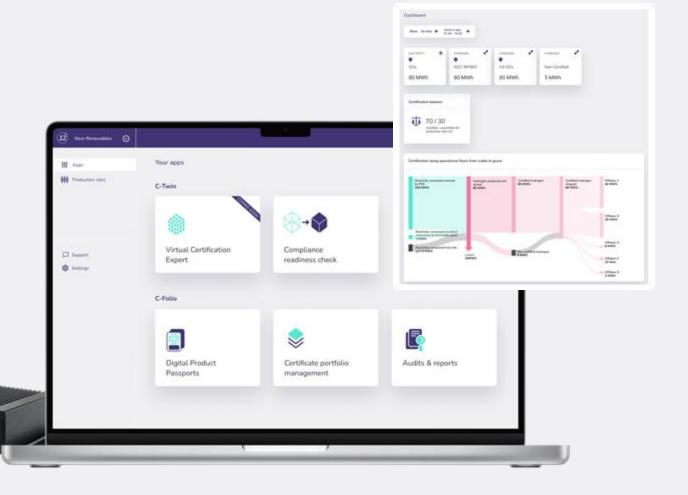


So they can't monetize their decarbonisation.



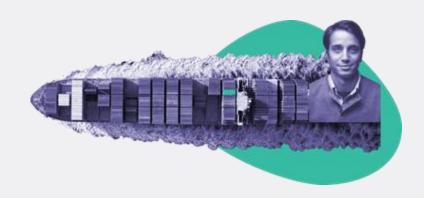
The solution

Point Twelve is the IoT + SaaS platform that enables energy-intensive goods producers to easily and continuously certify their production as green, saving up to 90% time in the process.



Hydrogen is the energy-intensive good for which the need for proof of sustainability is most acute, today

Customer expectation



"I want low carbon product backed by trustworthy certificates"

Regulator demand

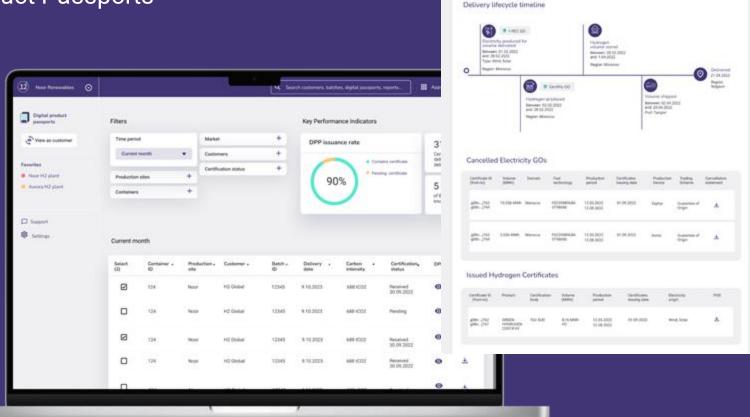


"Prove the renewable origin of every product batch. Monthly for now, hourly from 2029."



Product features

- Calculate carbon intensity based on operational data
- Prove renewable origin of energy
- ✓ Issue Digital Product Passports

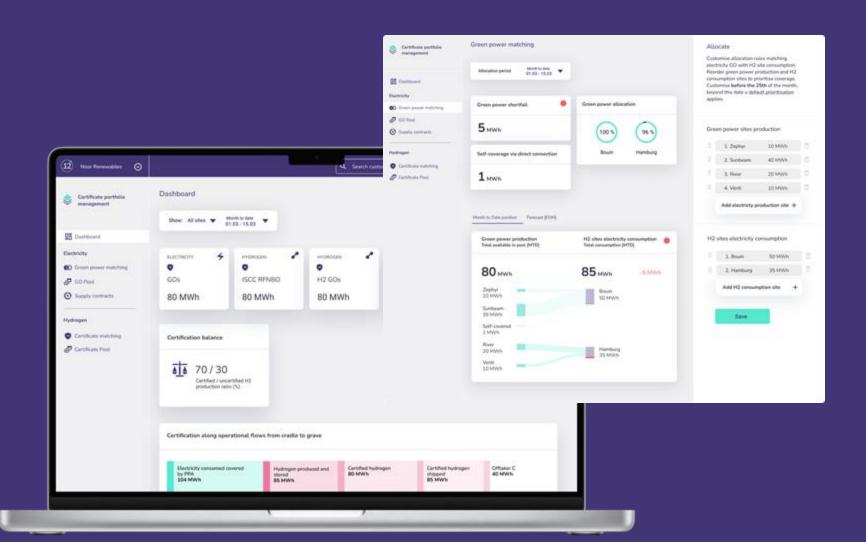


Delivery carbon content

34 003360, 4 903958



Product features



- Obtain certificates, automatically
- Manage portfolio of certificates at scale & across borders

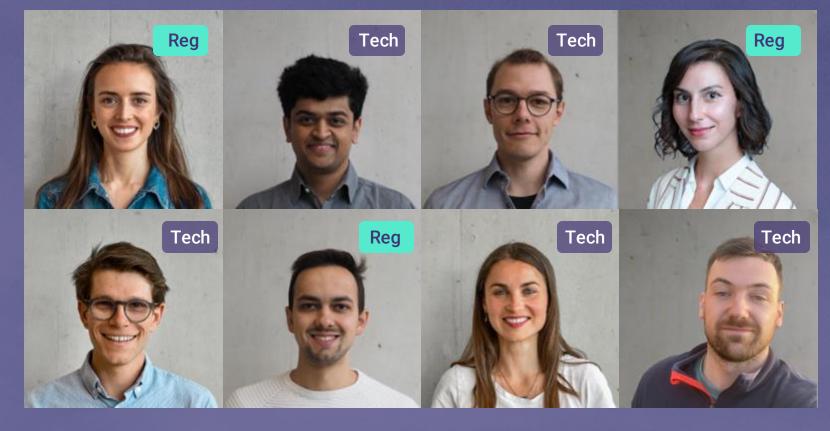


Pre-operations: Certification Readiness Check









We partner with...

We worked at...



























Book a demo!



Connect

Flore de Durfort | CEO

flore@point-twelve.energy



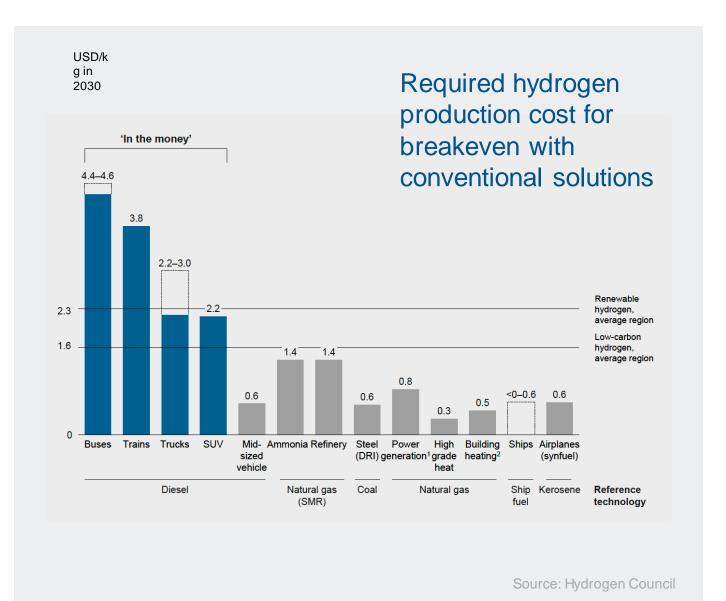
#HYDROVERSE





The Problem: Green hydrogen as a decarbonization solution for industry and energy...

is only economic
 at hydrogen
 production cost well
 below 2 EUR/kg.



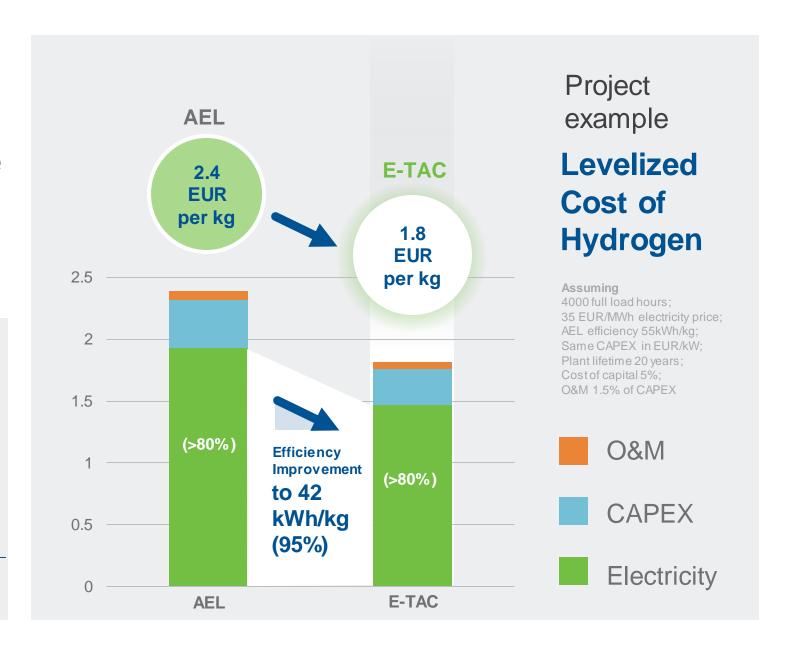


The Solution:

Increasing efficiency to reduce electricity cost

Efficiency

is one key enabler to unlock affordable green hydrogen.





How do we revolutionize water splitting?

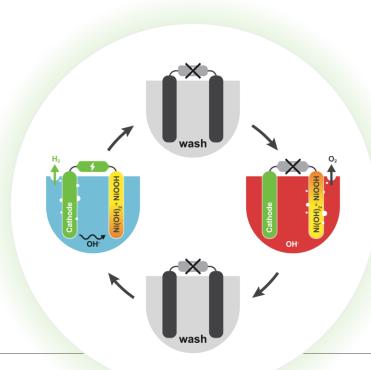
Proprietary 2-phase process: E-TAC

(Electrochemical – Thermally Activated Chemical) with time-separated H₂ and O₂ production

Phase 1 E-TAC

Electrochemical

- Electrochemical production of H₂
- Ambient temperature
- Anode (made of Nickel-hydroxide) is charged



Phase 2 E-TAC

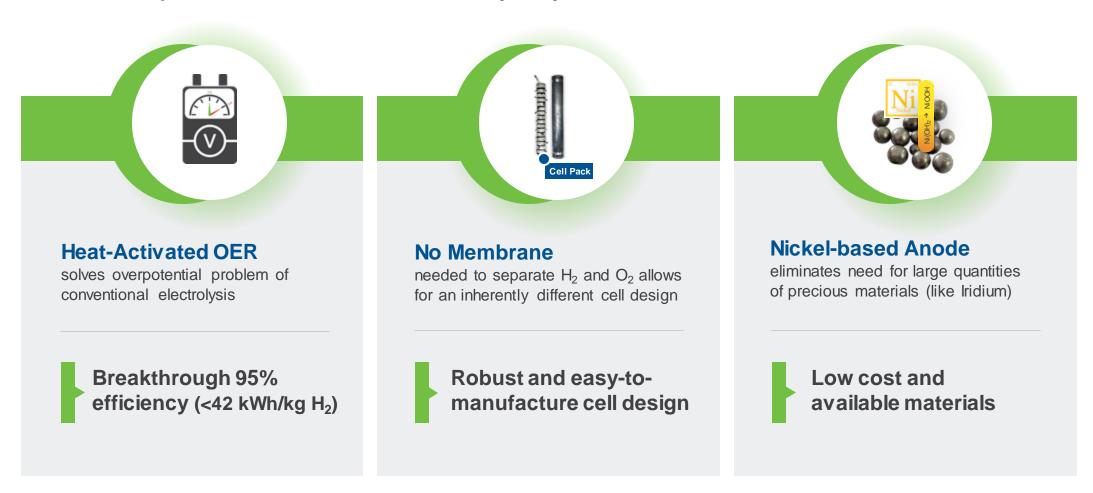
Thermally Activated Chemical

- Heat-Activated O₂ production (no electricity)
- Warm temperature (produced by exothermic reaction)
 - Anode discharges



What does this mean for our electrolyzer system?

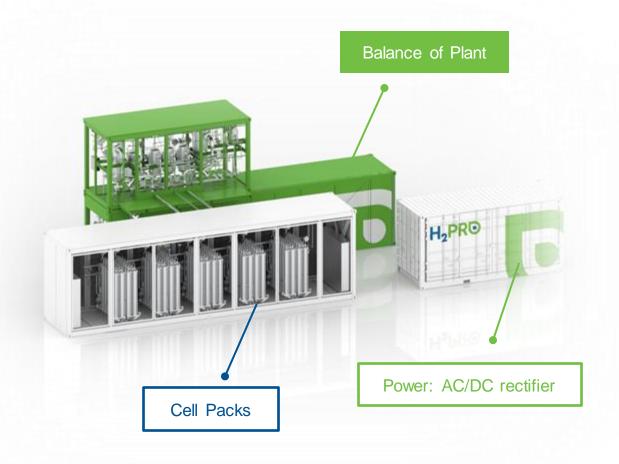
This novel process is distinct in three key ways:

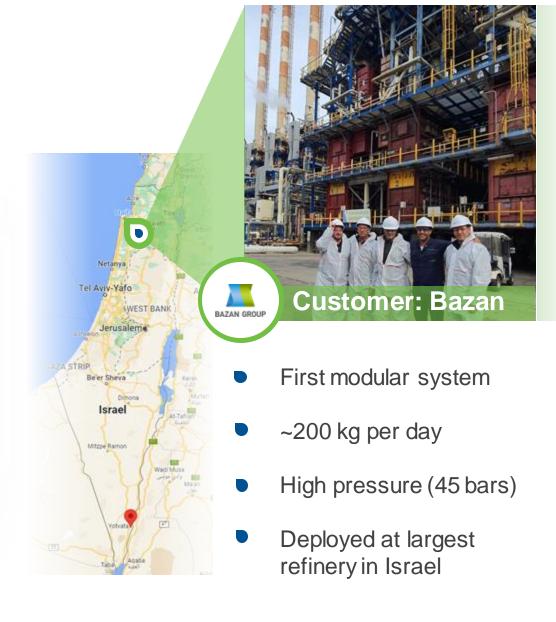






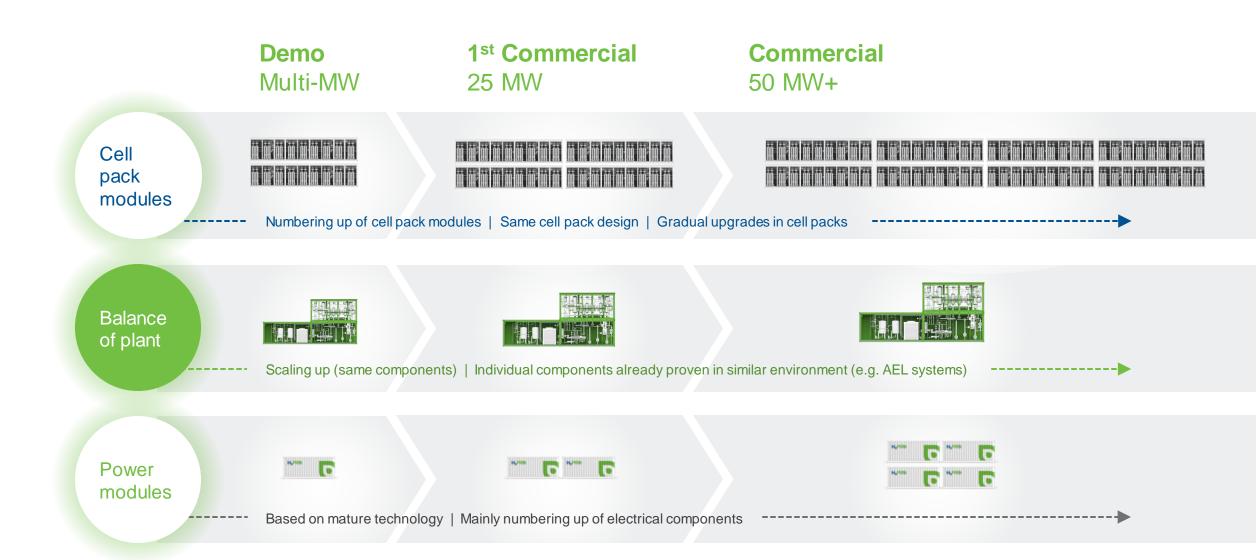
Pilot System 0.4 MW







Modular scale up strategy to commercial systems





H2Pro the company

- Established 2019 based on research at Technion
- Headquartered in Caesarea, Israel
- Circa 100 employees
- Raised over \$100 Million





Investors































H₂PRO thank you!











Philipp Lückerath, VP Commercial, philipp@h2pro.co Proprietary & Confidential. Copyright © 2023 H2Pro, Ltd

www.h2pro.co













1/2 Electrolysis stack CAPEX

30 % less kWh/kg of H₂

1 Stack replacement instead of 3

\$1s1 Energy



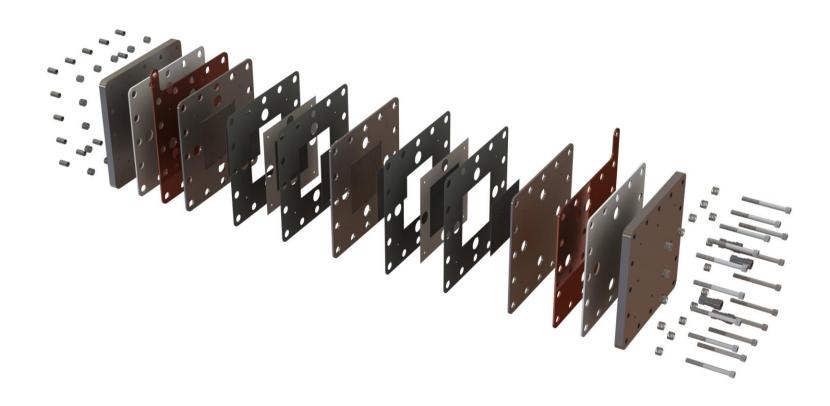


Changing the rules of the PEM game

More Efficient Cell

10 X Less PGMs

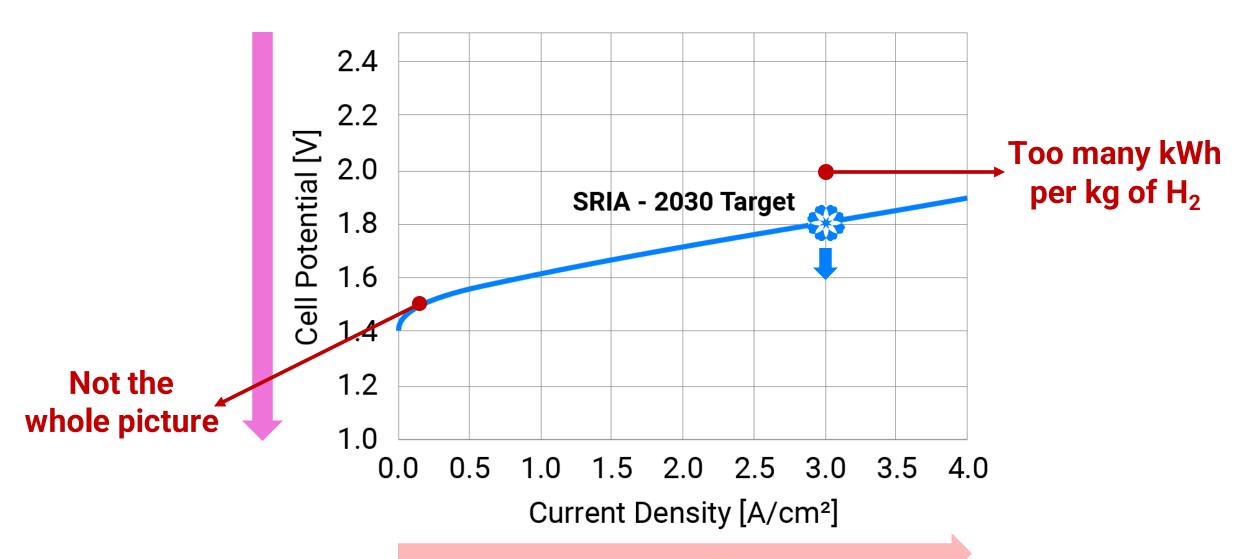
More Robust





Polarization curve







Pilots to build a customer pipeline

1 MW Module (550 kg of H₂/day)









Components

Corporate Partners

| lonomer | Nikkei 225 chemical company European fuel cell company |
|----------|---|
| Catalyst | Market leading precious metal company |
| Membrane | S&P global 100 index chemical company |









Previous exit & technology licensing

45+ granted patents

150+ publications





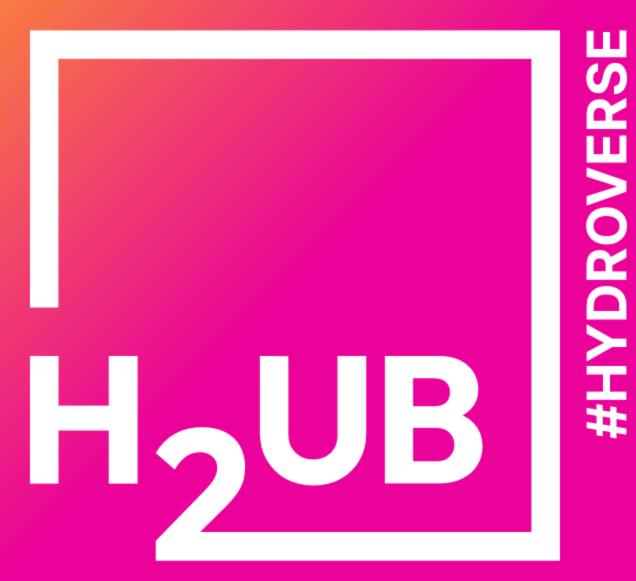
1s1 Energy PORTUGAL

300 MW/year Manufacturing Capacity





Thiago Figueiredo





Carbon Atlantis

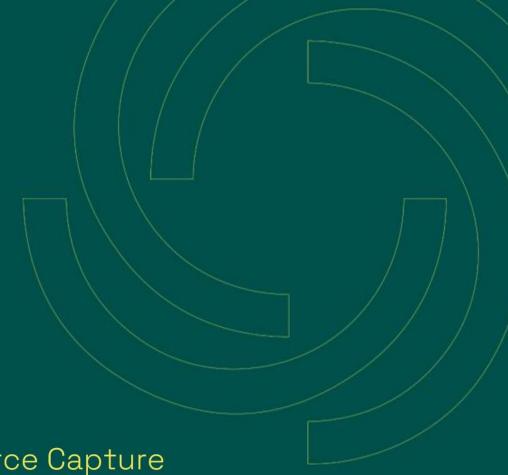
Ultra low-cost, Direct Air Capture and Point Source Capture

TRUSTED BY

→ Frontier stripe









Gigatonnes of Carbon Capture and Removal are imperative

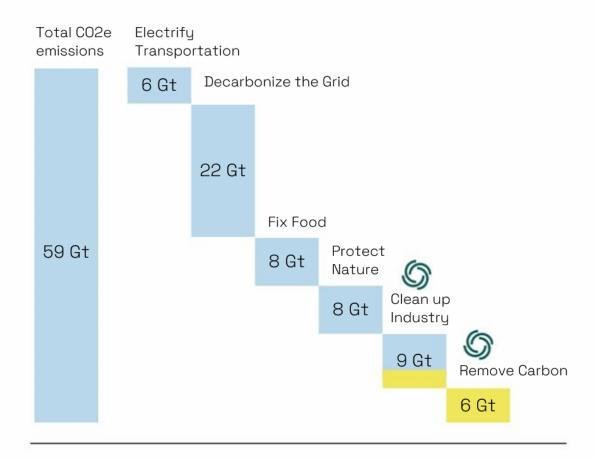
85%

Reduction of CO2 by 2050

15%

from Carbon Capture & Carbon Removals

The stairway to carbon neutrality





Conventional, thermal Direct Air Capture approaches are too costly.

CO2 Bases + CO2 Acids

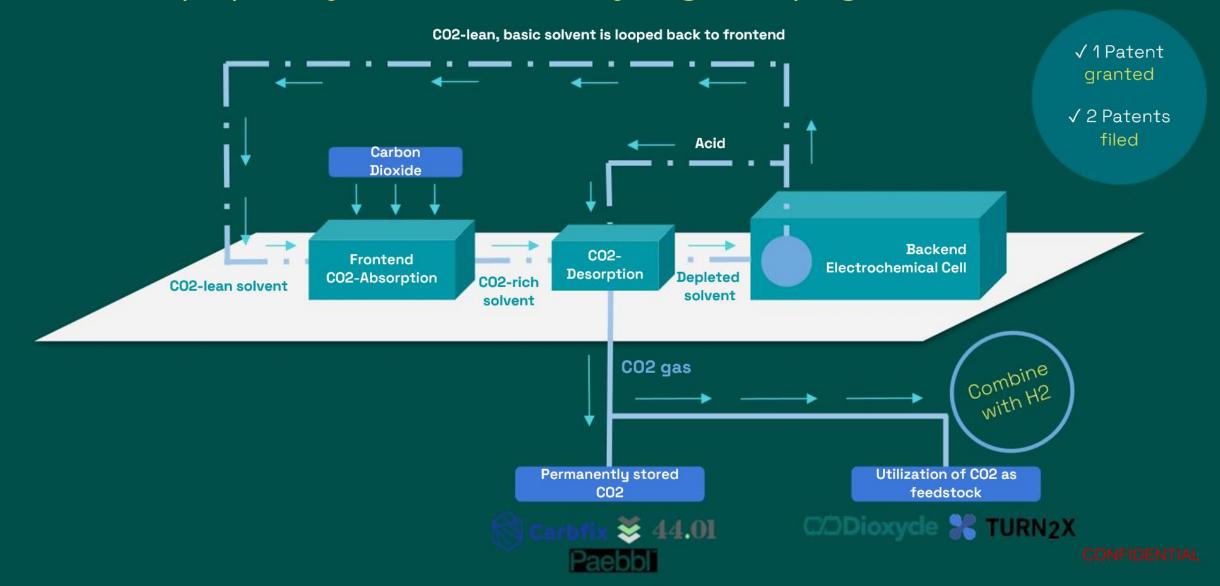


A new electrolyzer for <u>low-cost</u> acid & base production for DAC





We have developed a low-cost, modular electrochemical carbon capture system built on our proprietary electrochemical hydrogen-looping cell







A team with experience of working together, combining deep domain and technical expertise with entrepreneurial spirit



Paul Teufel CTO

Engineering & Robotics at TUM
Research at Harvard
2+ years software engineering



Malte Feucht CEO

Robotics & Business at TUM

2+ years construction robotics

Started and bootstrapped

company before



Steffen Garbe CSO

PhD Electrochemistry at ETH Zurich Research Focus: PEM Electrolysis Industry experience at Merck



Team (7 FTE, 4 PTE)

Team of motivated scientists, engineers and entrepreneurs with with industry experience and deep scientific domain knowledge.





















We have moved fast and capital efficient over the past 12 months

RAISED

EUR >2.1 Million BUILT

1t-CO2/y. prototype

GRANTED

multiple patents SOLD

> \$500k credits

FUNDED BY



PART OF







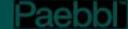


WORKING WITH













#HYDROVERSE





Decarbonate Gas...

...Now!

© 2023 Sakowin CONFIDENTIAL





Gigantic Dimension





Gigantic Dimension



High energy efficiency





Gigantic Dimension



High energy efficiency



Circularity is essential





Gigantic Dimension



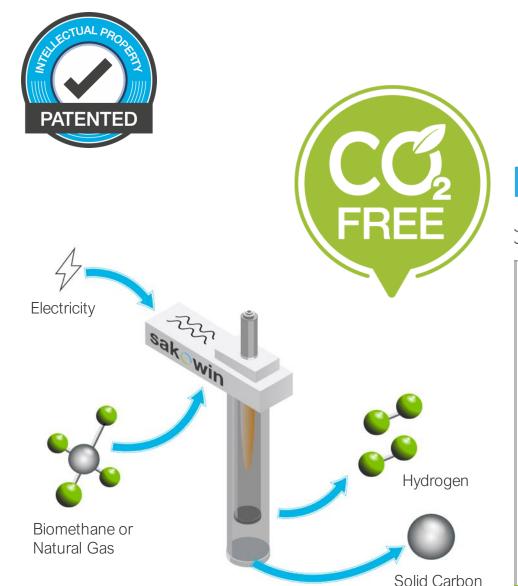
High energy efficiency



Circularity is essential

... INNOVATION is key to ACCELERATE energy transition.





METHANE PLASMALYSIS



Microwave Plasma



High energy efficiency



CH₄ DECOMPOSITION MAXIMIZED TOWARDS HYDROGEN PRODUCTION by a specific reactor design



HIGHLY EFFICIENT MICROWAVE PLASMA

~ 100% of microwave power is directly transferred to the gas



INDUSTRIAL GRADE HIGHLY RELIABLE 20 YEARS LIFETIME. magnetron replacement every 7 000 hours, commonly available materials and components



HIGHLY SCALABLE, No catalyst, no electrodes, very pure carbon



South Beach scalability





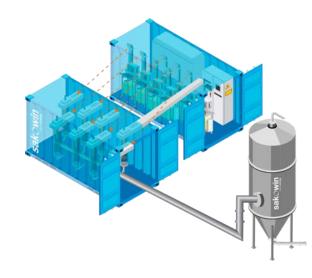
On-Site

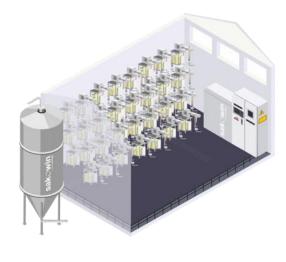




On-Demand







South Beach 100 kW, 1 module

≈ 500 kW electrolysis

Production of ~200 kg/day

South Beach 800 kW, 8 modules

≈ 4 MW electrolysis

Production of ~1.6 t/day

Custom made scale-up 10 / 50 / 100 MW or more

≈ 50 / 250 / 500 MW electrolysis

Production of several hundreds t/day





Booth J30

Lydia ALTES 109 en

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+33 766 687 683

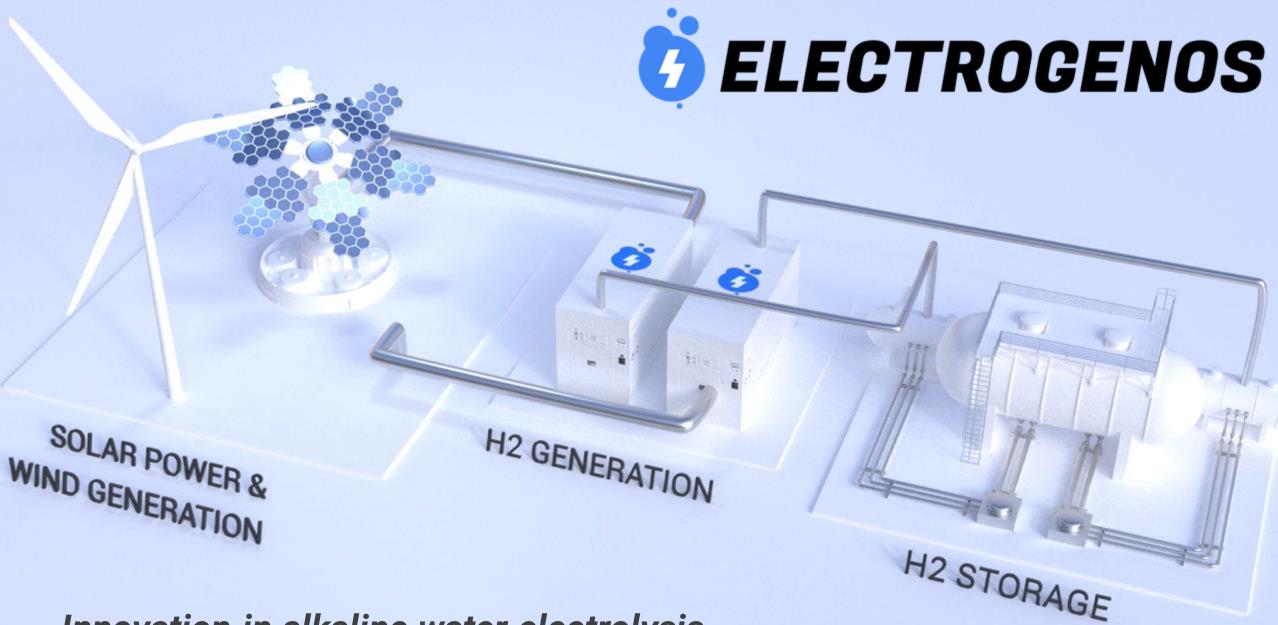






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Innovation in alkaline water electrolysis



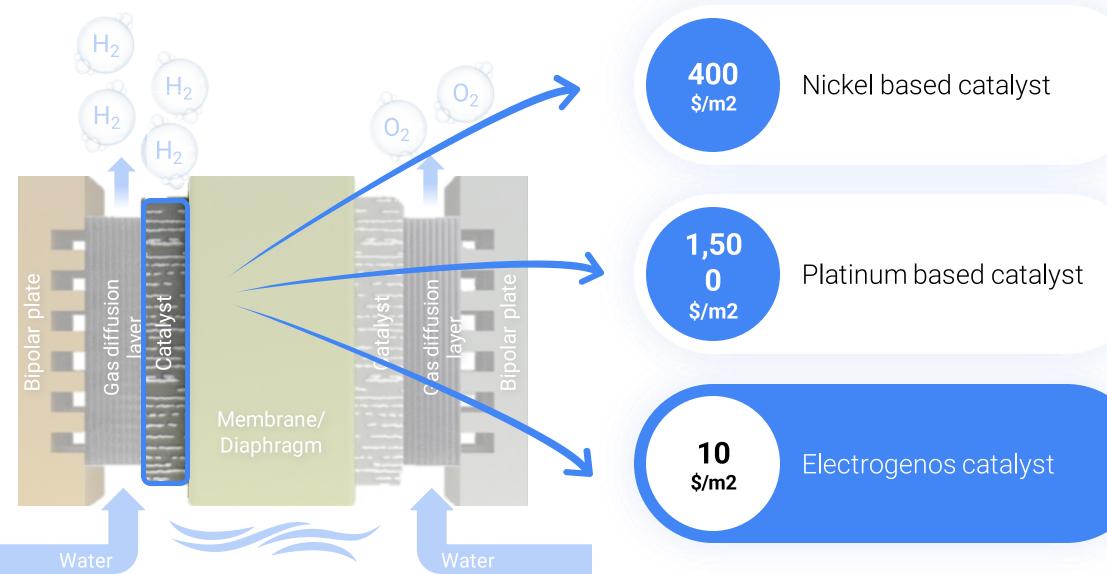
Find the common feature







Tackling the First Challenge: Cost





Deciphering the Scale-Up Conundrum



High CAPEX

Heavy machining

Batch processing

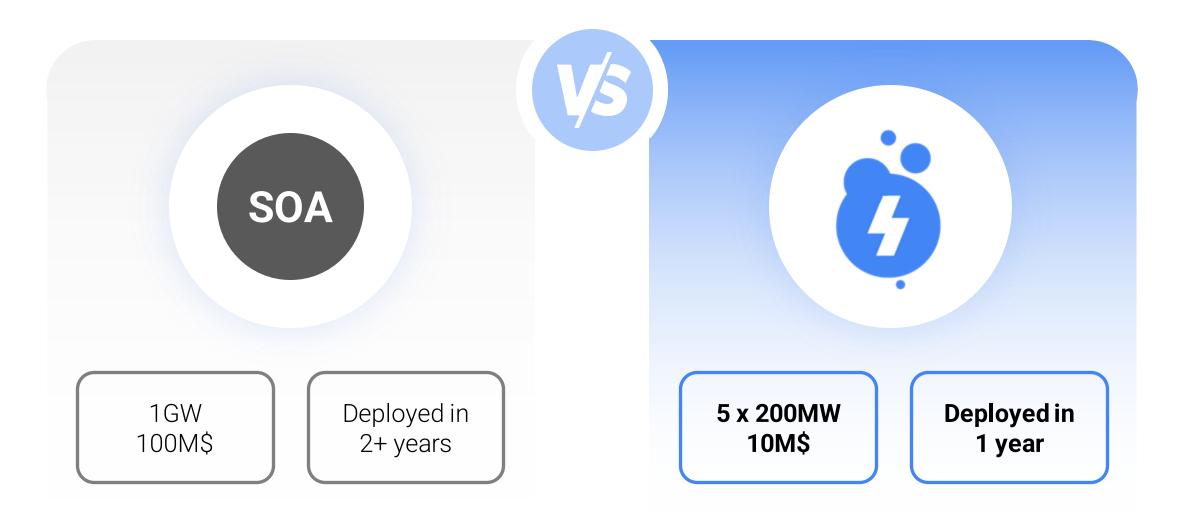
Low CAPEX

Soft tooling techniques

Continuous manufacturing



Overcoming the Second Challenge: Time





The Electrogenos solution

We are disrupting the green H₂ industry by developing advanced alkaline electrolysers, which offer:



Reduced capital and operational costs of electrolysers



Increased manufacturing and green H₂ production efficiency



Improved electrolyser material durability



Our game-changing electrolyser technology will revolutionise H₂ production



Design: Revamped stack architecture - a synergy of efficiency, manufacturability, and affordability.



Manufacturing: Soft tooling allows seamless, automated production chain.



Price: Outclasses Raney Ni and Pt-based catalysts in affordability.



Performance: Operates efficiently at 1.7V and 0.5 A/cm², or at 2V and 1.5 A/cm², surpassing traditional benchmarks.



Durability: Designed to resist industry challenges like Chromium or Iron poisoning.

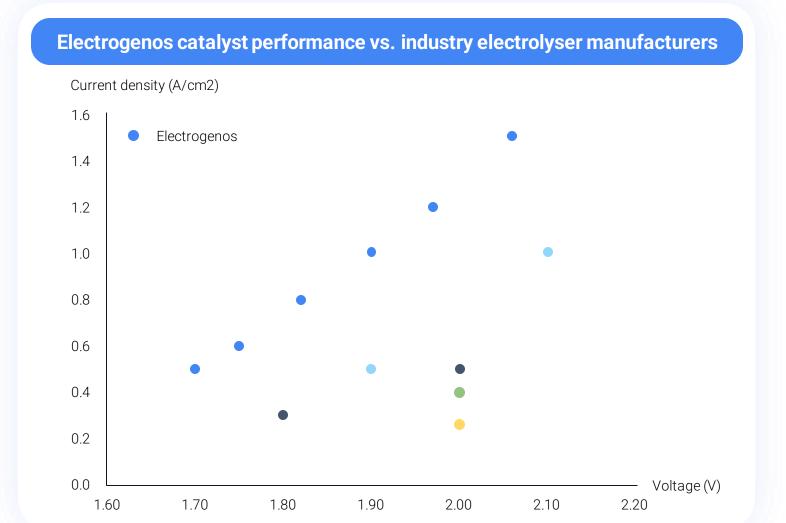


Scalability: Stack size is flexible, can scale up and down rapidly to suit user





Our electrolysers are more efficient than leading AE manufacturers





Performance compared in **controlled conditions**



Electrogenos catalyst shows **significant advantage in efficiency** compared with industry competitors



Testing conducted postdurability test - results are **highly conservative**



Research and development is ongoing to **further increase efficiency in 2024**





We are aiming to launch our first commercial plants in 2025...

Sept 2022 - May 2023

Jun - Sep 2023

Oct - Dec 2023

End 2024

End 2025



Pre-Seed Round Led by Atlantic Labs

Graduated at TechX



3 Patent drafts

Team of 10 People

Pilot plant design

Custom **R&D Facility**



Open next round

Build **4kW** demonstrator

Pilot plant development



5MW POC

Start of **10,000 Hours** with industrial partner



Pre-orders

Delivery of 1st commercial plant





FOLLOW US



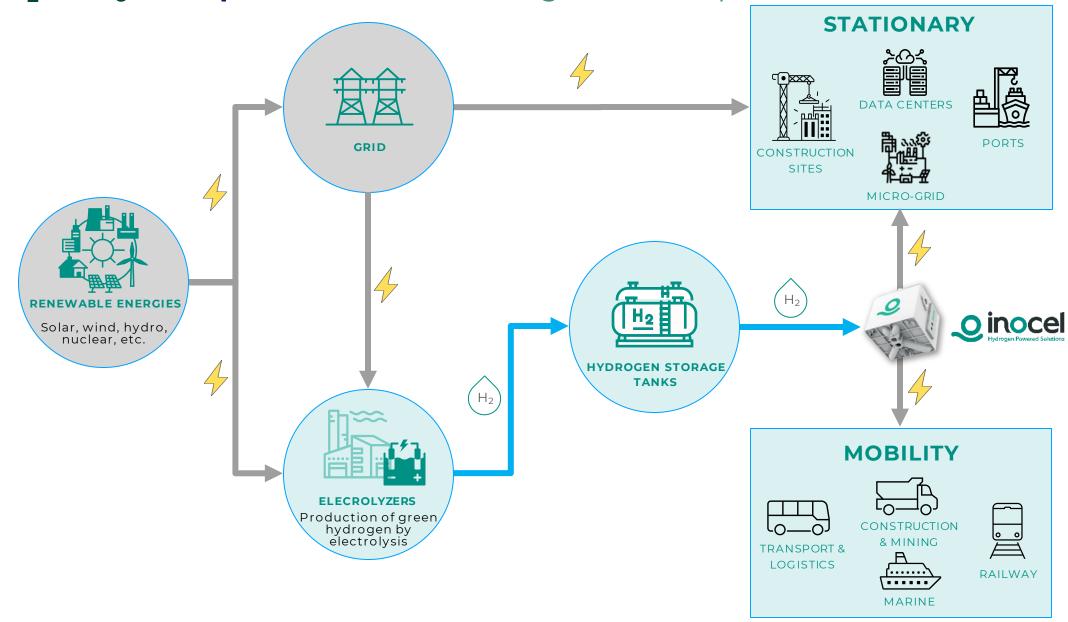
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H₂ Ecosystem | Production → Storage → Transport → Use



INOCEL Z300 | A High-Power Fuel Cell for Stationary Markets

→I← Compactness

Dimensions: 1360 x 755 x 690mm

Volume: 708 I Mass (dry): <300 kg



🏮 Efficiency

50% @ Nominal Power (150kW) 47,5% @ Max Power (200kW)

Reactivity

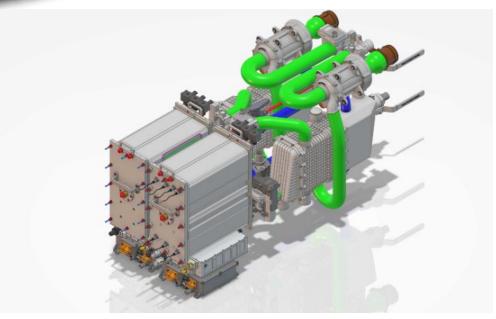
Dook power < 15 s No batto

Peak power < 1,5 s. No battery pack needed.

Embedded software

To further improve performance, efficiency and durability

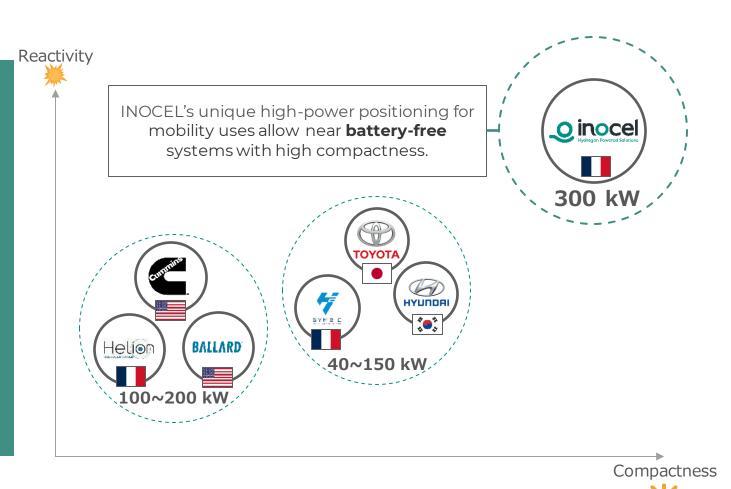




The global market for FC systems | A complementary positioning

The **INOCEL Z300** Fuel Cell is:

- An alternative to fossil fuels
- Capable of being the primary energy generation in a hybrid FC system
- The only high-power mature technology with this level of compactness.



Implantation | 2 Dedicated Sites for R&D & Production

Grenoble



R&D Center

Development Platform

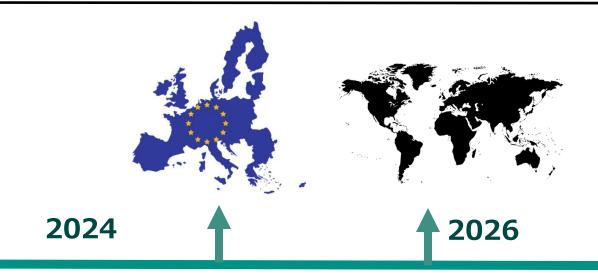
Prototyping and Testing Facilities

Belfort



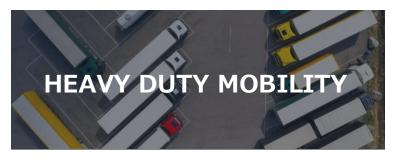
Giga factory of 15 000 m²
Industrialization Team
Annual Production of 30 000 Units by 2030

Roadmap | Targeted Sectors



2027







Power GenerationOff-Grid & On-Grid Power Supply

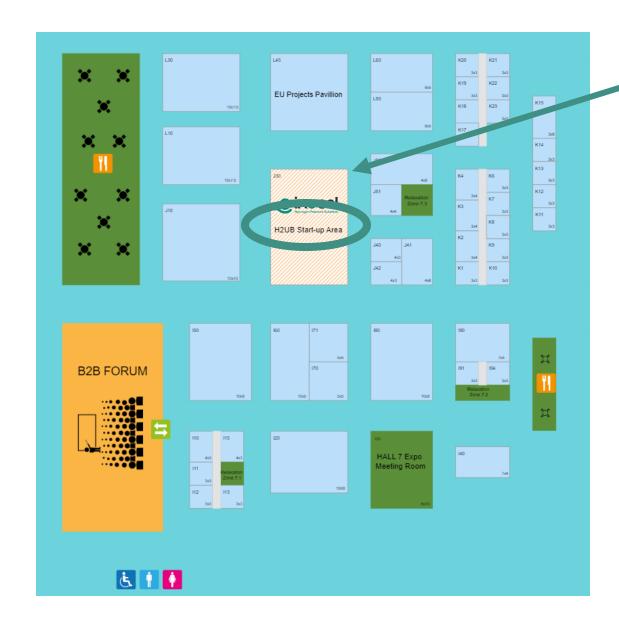
Heavy Duty Vehicles
Off-Road & On-Road

Leisure Boats

Back-up Power

Rail Mobility

Passenger Boats



Come to visit us in the start up Area (J30)!

Contact us

info@inocel.com

8 Rue de Rochepleine, Saint-Egrève FRANCE

www.inocel.com







SOUTHERN LIGHTS

The digital layer of green hydrogen

Southern Lights increase your competitivity by enabling your team to improve in precision and agility in green hydrogen development

Billions are being wasted in the non digitized hydrogen market



Average spend on the planning of a single green hydrogen project before financial approval and construction.

Developing green hydrogen projects is risky and expensive

Complex engineering

Low success rate

Cumbersome workflow

Southern Lights is the Co-Pilot for Green Hydrogen Project Success

1

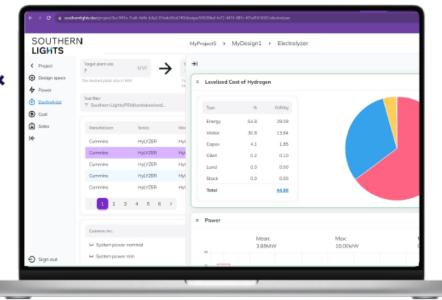
Advanced engineering designs and operational models

2

Swiftly get accurate technical performance & time-series forecasts

3

Generate and tune financial models to ease M&A auditability and increase profits





Southern Lights boosts hydrogen development

85% Reduction on internal engineering hours per project development

20% Precision increase

in project performance

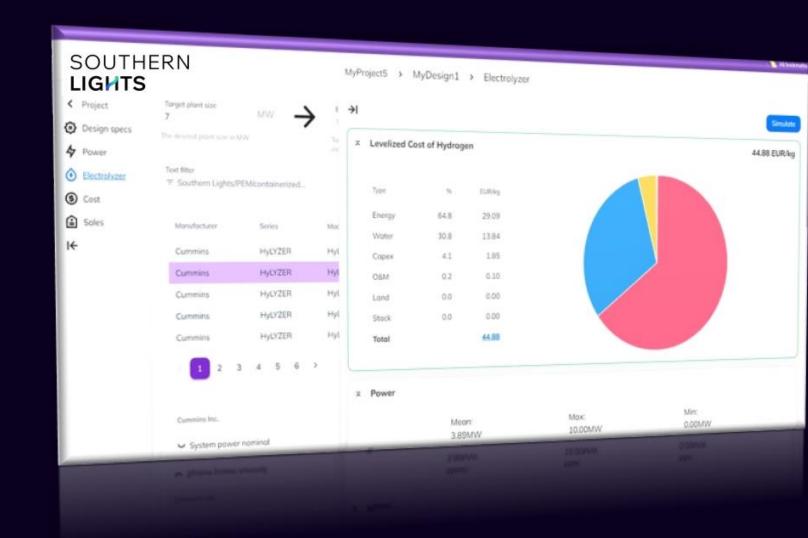
Feasibility studies

Due-diligences

M&A

Optimal sizing

Site prospection





Use the Software

Get the Service

Who trust us

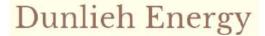
Customers



















Supported by



















Mario Gomez
CEO of TCI Gecomp, Spain

"We can now easily assess feasibility and make betterinformed decisions in a fraction of the time"

Let's talk

Felipe Gallardo

Founder & CEO

felipe@southernlights.io

+46734101036

www.southernlights.io





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Problem







Compressed at 350 – 700 bar

Low energy density

Highly explosive

Inefficient & complex infrastructure (compressor, cooling...)





Liquid Hydrogen

Cooled at -253°C





Liquid Ammonia

Compressed at 10 bar $\& 25^{\circ}\text{C}$ 3.5x more energy than GH_2 per volume Hard to ignite

2nd most produced chemical

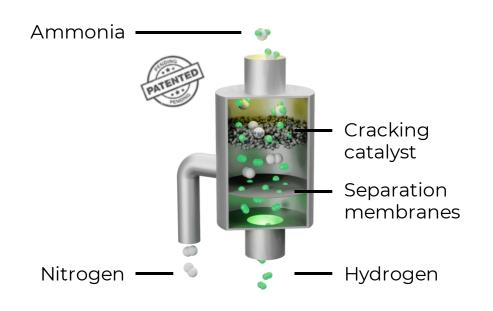
Solution

Ammonia to hydrogen generation

Technology

Product

Use cases





AHGS
Ammonia to Hydrogen Generation System



Stationary application



Mobile application

Achievements

Financing, Milestones & Impact

2022-2023

Past expenditures EUR 0.7m Current cash EUR 0.3m 2024

EUR 3.5m Seed 202

2024 Q1

2025 and onwards

EUR 17m Series A 2025 Q3













Prototyping, Facilities & Traction







Demonstrations & MVP scale-up





Pilots & Industrialization





5 LOIs signed

4 pilot sales in discussions

400 tons of CO2e avoided in 2024

>200 Mt of CO2e avoided by 2034!

Thank You





Get in touch





aris.maroonian@neology.ch

Innovation cheque supported by



Swiss Confederation

Innosuisse - Swiss Innovation Agency





















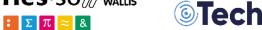


POUR INNOVER











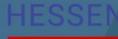
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Hydro Technology Motors GmbH

Future of Hydrogen Mobility





Gefördert durch:

Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen

Gefördert durch



Rheinland Dfalz

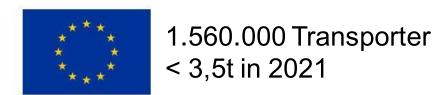
MINISTERIUM FÜR KLIMASCHUTZ, UMWELT, ENERGIE UND MOBILITÄT

Markets

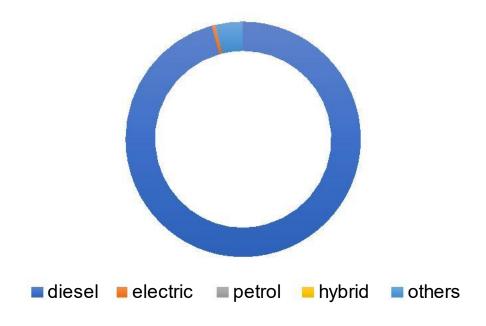


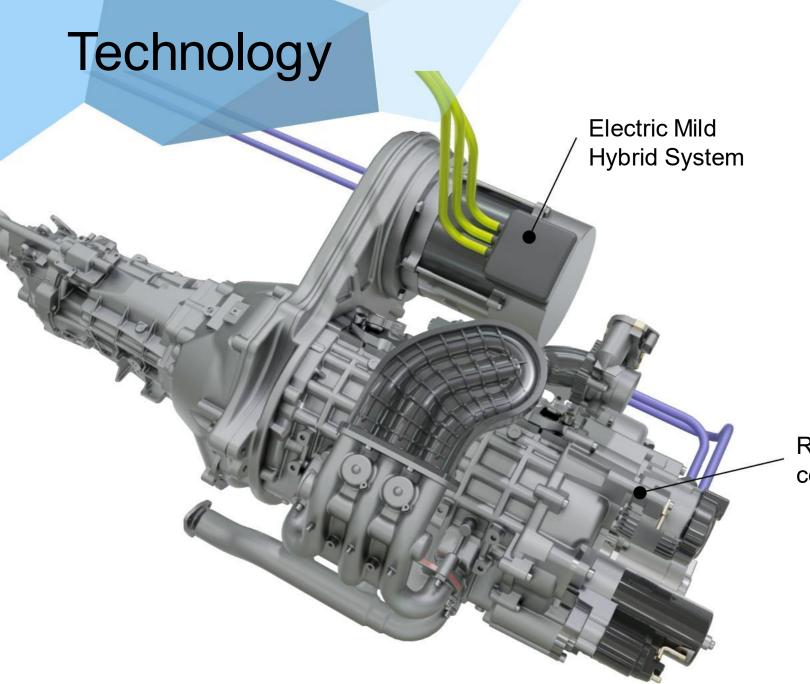


High potential for alternative options!



Powertrain commercial vehicle 2021







- hydrogen powered
- modular structure
- power range from 40 180 kW
- versatile usage options in various mobile applications
- high peak loads possible

Rotary hydrogen combustion engine

Special powertrain control algorithm



HTM On-Road - Transporter Retrofitting



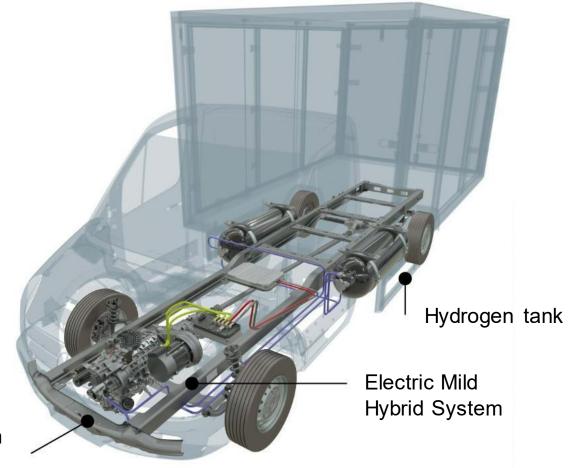


- Low weight high pay-load possible
- Near Zero Emissions
- Highly sustainable
- Low costs / optimal TCO for common use cases
- High range possible
- Fast refueling < 5 min

Transporter Retrofitting

| Hydrogen Combustion Engine | 0 | 2 disc rotary engine / turbocharged 80 kW |
|-------------------------------|---|---|
| Electric Hybrid System | 0 | electric mild hybrid system 20-40 kW |
| Range | 0 | 500-600 km |
| Pay load | 0 | > 1.000 kg |
| Emission | 0 | NOx and CO ₂ near zero |
| Cost | 0 | 15.000 – 30.000 Euro per conversion |

Rotary hydrogen combustion engine

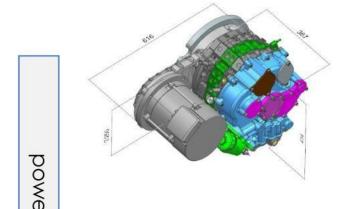




HTM Off-Road

powertrain for special vehicles









| Hydrogen |
|-------------------|
| Combustion Engine |
| |

- o 1-3 disc rotary engine / turbocharged
- o 40-120 kW

Electric Hybrid System

- 5 48 -96 volt electric hybrid system
- o 15-60 kW
- o Power and battery capacity can be adjusted according to customer usecase



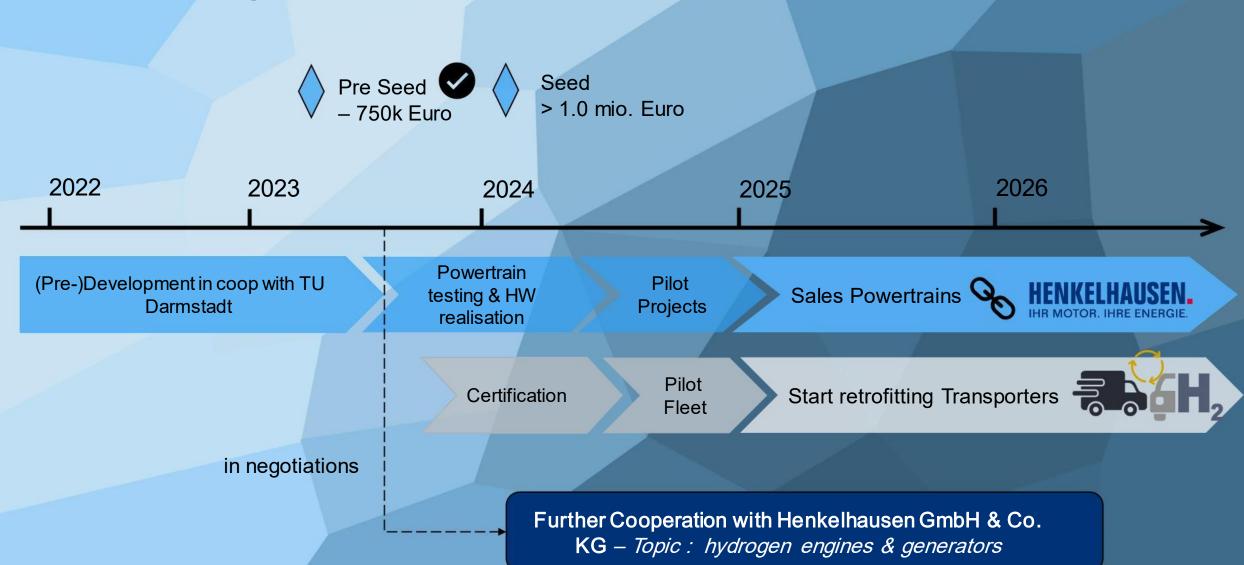
- High flexibility in usage
- High peak loads possible
- Retrofitting possible
- 24/7 operation possible
- Fast refueling

in collaboration with



Roadmap





Partner

Contact

HENKELHAUSEN. IHR MOTOR, IHRE ENERGIE.

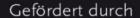














Rheinland Dfalz

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Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen





VERSCHLUSSTECHNIK & SONDERKONSTRUKTIONEN







HYDROVERSE CONVENTION #2024

SAVE THE DATE

THE EUROPEAN HYDROGEN START-UP EVENT OF THE YEAR



June 18, 2024

www.hydroverseconvention.com



Thanks for joining us!

See you
Thursday (10-11 am)

Start-up Pitches!





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