Info Day - Call 2025

22 January 2025 - Brussels

Info Day – Call 2025 Pitch Slides

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Isabelle-Louise **Aabel**

Port of Kristiansand/ Hydrogen Valley Agder

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The Southern Norway Hydrogen Valley is powered by hydropower, making it entirely clean and green. This hydrogen will be distributed to three hubs: a port, an airport, and a logistics center for heavy transport and trucks. Thanks to our unique geographical location on the southern coast of Norway, this hydrogen valley will help unlock a greener maritime industry, ensure an open market for hydrogen in heavy transport and passenger vehicles, and enable the airport and port to operate emission-free with hydrogen-powered vehicles. Welcome to the hydrogen gateway between Norway and Europe.

South Norway Hydrogen Valley
Our valley is geographically placed at south tip of Norway, closest to the European continent.

1. **Clean Energy Production:** Hydrogen produced through hydropower offers a green and sustainable solution.
2. **Hubs for Distribution:** Three main hubs (maritime, aviation, logistics) ensure efficient storage and distribution of H_2 and NH_3.
3. **Subsea Storage:** Innovative underwater storage for hydrogen and ammonia near production sites and the harbor.
4. **Integrated Ecosystem:** Strategic hubs enable seamless hydrogen flow from production to end users.

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Dr. David **Armstrong**
Fraunhofer UK

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Stand-off detection of Hydrogen

- Applications include, safety, fugitive emissions monitoring, leak detection, and prospecting for natural hydrogen
- Stand-off sensing has advantages over point sensing – wider picture of hydrogen presence
- Fraunhofer UK is developing laser based stand-off sensing of Hydrogen
  - Provides a map of hydrogen location and concentration
  - Can also sense other gases
- Working with BP in the energy sector on leak detection
- Field trials planned (already deployed in nuclear sector)

- TC1-08 – evaluation of natural hydrogen potential
- TC2-01 – monitoring of migration of hydrogen
- TC5-03 – safety monitoring

Organisational Capabilities

- Fraunhofer UK is a UK not for profit research and technology organisation
- Legally independent affiliate of the Fraunhofer Gesellschaft
- Previous experience of EU projects
- Extensive network of contacts, both industrial and academic in UK and rest of Europe

Administrative Information

We would prefer to be a partner.
Contact:
David.Armstrong@fraunhofer.co.uk

Dr David Armstrong
Fraunhofer UK

PIC 952487039

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Prof. Uros **Cvelbar**

Jozef Stefan Institute

Clean Hydrogen Partnership

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Jožef Stefan Institute
Ljubljana, Slovenia

Prof. Uroš Cvelbar (uros.cvelbar@ijs.si)

gaseouselectronics

Joint Upgrade in Hydrogen Permeation **for Optimised Storage and Transport (JUNO)**

Revolutionizing Hydrogen-Facing Materials for Industrial Applications

What We Offer

Innovative in-situ gas treatments and nanocoatings (on demand) for hydrogen-facing materials and components, enabling **superior performance** for pipelines, storage tanks, shipping containers, and infrastructure.

Looking for Partners

Seeking collaborations with:

- Pipeline operators
- Hydrogen storage and transport companies
- Shipping and infrastructure providers

Focus: Organizations working with **steel for hydrogen applications**.

Key Advantages of Our Technology

1. **Exceptional Hydrogen Permeation Resistance -** Reduces or even superblocks leakage, prolongs material lifespan, high-T stability and enhances safety.
2. **Cost-Effective, In-Situ Application -** Treatments and coatings can be applied to existing structures, can be done repeatedly, not confined to manufacturing time processes, avoiding costly replacements.
3. **Adaptability to Industry-Standard Materials -** Compatible with steel and other common hydrogen-facing materials used in pipelines and storage.

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Jorge **Dinis**
HyLab

Clean Hydrogen Partnership

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HyLab

Green Hydrogen Collaborative Laboratory

Shareholders

Industry

edp galp REN

BONDALTI CTGI SMARTENERGY

Research and Academia

TÉCNICO LISBOA · U.PORTO · LNEG · inegi · INESCTEC · CEiiA · INL · ITQB NOVA

Sines – Portugal

Jorge.dinis@hylab.pt

HORIZON-JU-CLEANH2-2025-02-01

Development of mined, lined rock cavern for gaseous hydrogen storage

Concept

Geological and mechanic effect of the intermittent storage mines/caverns

Renewable H_2 production and management	Multiphasic flows on the gaseous storage sites	Microbiological evolution and effects	Hydrogen purification	Hydrogen end-use

Demo site:

Salt cavern

Missing:

Different geological demo sites
Development of regulation codes and standards

Other topics of interest:

TC 01-01 TC 01-02 TC 01-04 TC 01-05 TC 02-02 TC 02-03 TC 03-03 TC 04-01 TC 05-01 TC 05-03 TC 06-01 TC 06-02

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Guillermo **Figueruelo**
Fundacion Hidrogeno Aragon

Clean Hydrogen Partnership

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PIC: 997456918 **https://hidrogenoaragon.org/en/** **gfigueruelo@hidrogenoaragon.org**

33 projects in the Clean Hydrogen JU

FHA is your partner for **communication** and also for **S- LCA** & **training acti**

HTP Hydrogen Territories Platform

FHA is your partner for **hydrogen valleys replication**

Hydrogen Europe Research

I am **Hydrogen Valleys Cross-Technical Committee Leader**

FHA is your partner for **component and system level technology validation at TRL 4 to 6**

650 kW wind
150 kW PV

AEL 20 & 250 kW, test bench
AEL 48 kW, 8 Nm³/h @8 bar
PEMEL 5 kW, 1 Nm³/h @6 bar
AEMEL 15 kW, 2 Nm³/h @35 bar

7 kg @35 bar
23 kg @350 bar
60 kg @500-900 bar
700 kg LH2

HRS 200
HRS 300
HRS 700

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Laurence **Grand-Clement**
Hyggle

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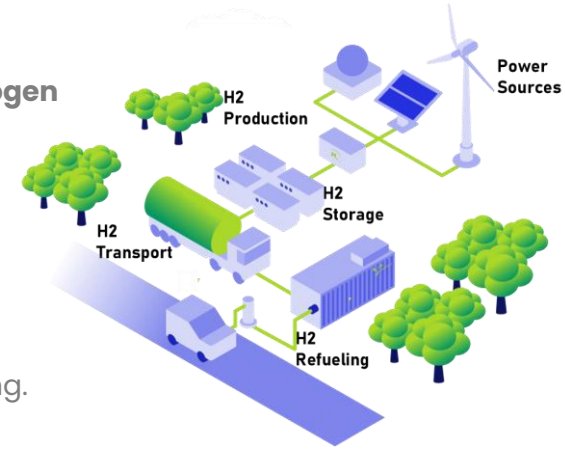
HYGGLE
smarter hydrogen operations

Hyggle – Empowering Hydrogen operators (and valleys) with Next-Gen Digital Solutions.

Hyggle is a cutting-edge SaaS platform designed to **optimize the management of hydrogen infrastructure**. We enable operators in hydrogen to achieve cost-efficient, low-carbon hydrogen production and distribution by leveraging:

- **Advanced digital monitoring** for real-time operational insights.
- **AI-powered predictive maintenance** for electrolysers to reduce costs.
- **Dynamic optimization algorithms** to balance production, storage, and power sourcing.



Demonstrate in a relevant environment the tangible benefit of Next-Gen Digital Solutions

Achieve a **25% improvement in green hydrogen output**

Extend **infrastructure life**

Reduce operational costs by 15-20%

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Dr. Sangwon **Kim**
KIST-Europe

Clean Hydrogen Partnership

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the Korea Institute of Science and Technology European Branch

Contacts : [KIST Europe] Dr. Jungtae Kim (tais@kist-europe.de)
[KIST Europe] Dr. Sangwon Kim (sangwon.kim@kist-europe.de)
[KIST] Dr. Jin-Yoo Suh (jinyoo@kist.re.kr)

❑ Introduction of the Institute

- **KIST Europe** was established in 1996 by the German-Korea national treaty as a **German Legal Entity** and the only overseas research institute under the **National Institute of Science and Technology (NST)** of Korean Government.
- **KIST Europe** is collaborating with **Forschungszentrum Jülich, Karlsruhe Institute of Technology, Saarland University** in the field of Hydrogen, Electrolyzer, Fuel cells and Redox Flow Batteries, Next Generation Secondary Batteries.

❑ Research specialties

- Solid State Materials for Safe **Hydrogen Storage**
- Functional **Ionic Liquids(ILs)** synthesis/application
- Proton conducting ILs for High Temp. PEMFC
- Electrochemical Window Tuning using ILs

Dr. Jungtae Kim

Dr. Jin Yoo Suh

Dr. Suk Woo Nam

Prof. Kwan-Young Lee

Dr. Hae Jin Kim

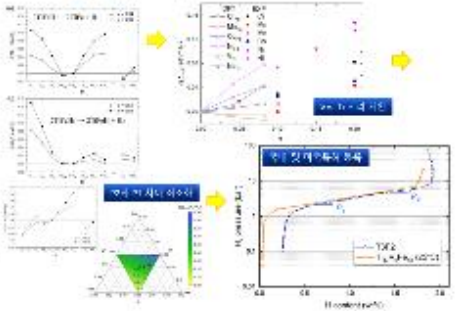
❑ Project strategies

- Korea became an **Associate Member Country** in EU Horizon Europe in 2025
- Korea is very **Strong in H2 Industry and Research**.
- KIST Europe is a great link for **European researchers to collaborate with Korean researchers.**
- **KIST Seoul, Clean Hydrogen Institute**
- **Korea Basic Science Institute (KBSI)**
- **Korea Institute of Energy Research (KIER)**
- **Korea Research Institute of Chemical Technology (KRICT)**

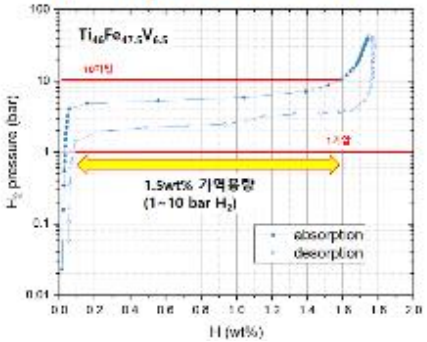
Dr. Sangwon Kim
Research Coordinator
Energy/Environment

- Design and development of Ti-based hydrogen metal hydride
- Optimization of process / operation

Material design by computational materials science



Operating between 1 to 10 bar



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John **Lindegård Kjær**
Danish Technological Institute (DTI)

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Three types of services within Hydrogen & Power-to-X

Development

Technologies and technological solutions through tests and trials in our state-of-the art technology infrastructures.

Validation

We run extensive research projects and develop pioneering technological solutions.

Integration

We integrate and implement technological solutions aligned with market, organisation, environment and culture.

Areas:

- **Electrolysis**
- **Synthesis/Fuel production**
- **Engine and Power units**
- **Industrial combustion & decarbonization**
- **Excess heat and oxygen utilization**
- **Water technology**
- **Material analysis, development and test**
- **Energy storage and design**

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Dr. Lucas **Marcon**
INEGI

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inegi driving science & innovation

332 - Staff

12 - Nationalities

- Composite Materials and Structures
- Product and System Development
- Advanced Manufacturing Technologies
- Advanced Monitoring and Structural Integrity
- Underwater Systems and Technology

TC1-04: Efficient electrolysis coupling with variable renewable electricity and/or heat integration

- Predictions wind and solar power
- Improving thermal management within electrolysis plants

M2N - Agenda galp *on ongoing project*

Simulation tool hydrogen production

EMB3Rs 2019-2023

Platform for integrated waste heat recovery

Financiamento: PRR, República Portuguesa, Financiado pela União Europeia

Others Topics:
TC1-03; TC2-01; TC2-02; TC2-03; TC5-03

TC4-01: Demonstration of stationary fuel cells in renewable energy communities

- Identification and applicable business models, legislation and regulations;
- Decarbonisation pathways based on the industrial and communities integration for hydrogen use.

COME RES 2020-2023

Analysis of the legal, political, social, and economic factors associated with implementation in Portugal.

Lucas Marcon
lmarcon@inegi.up.pt

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Marianela Martín **Betancourt**
Inerco

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Solid Oxide Technology and Applications

OUR CAPABILITIES

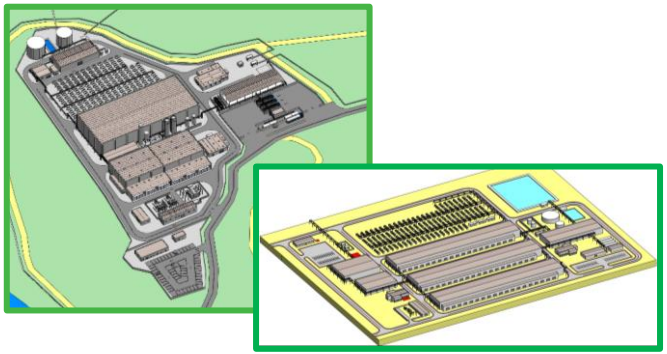
- ✓ Engineering design, procurement, construction and testing of **Solid Oxide Technology** (electrolysis, fuel cell, co-electrolysis, etc.) and **heat integration with other processes.**
- ✓ Conceptual/Basic/FEED and EPC for **green H_2/NH_3/CH_3OH industrial projects.** PEM and AEL technologies.

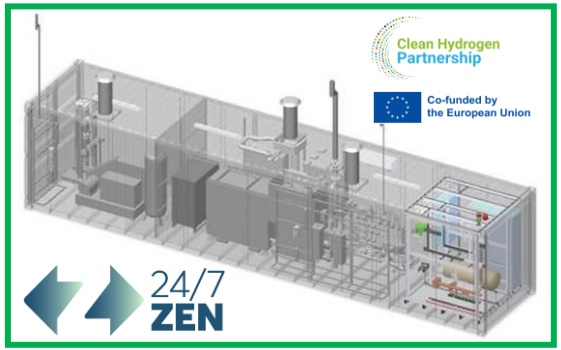
OUR EXPERIENCE

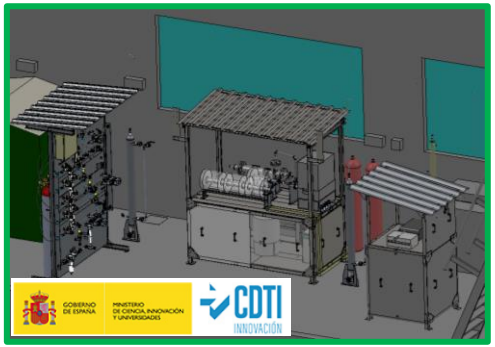
- ✓ More than **100 R&D Projects (+ 30 European projects).**
- ✓ **Two Solid Oxide R&D Projects** (24/7 ZEN and ATMOSPHERE).
- ✓ More than **55 green H_2/NH_3/CH_3OH industrial projects**. PEM and AEL technologies.

OUR INTEREST

- ✓ **TC1-05:** Innovative **co-electrolysis** systems and integration with downstream processes.
- ✓ **TC4-01:** Stationary **fuel cells** for resilience of remote energy communities.
- ✓ **Areas of interest:** System integration (**BoP, containerization**, etc.), **LCA** and **safety** analysis.







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Dr. Christopher **Nahed**
CEA-Saclay

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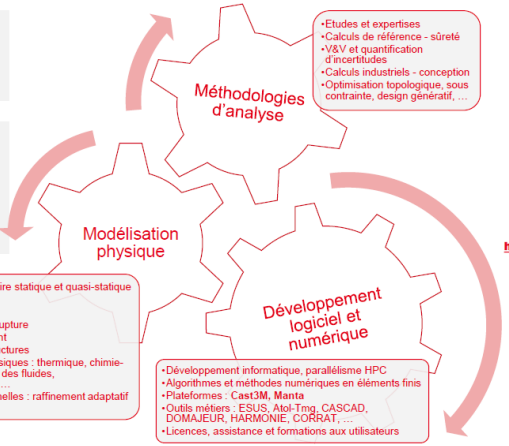
Laboratoire de Mécanique pour la Simulation des Structures

17 Ingénieurs
1 Assistante
7 Doctorants
+ TMA codes

Interactions
- **DM2S**
- **DRMP**
- **DEC**
- **DTN**
- **Industriels**

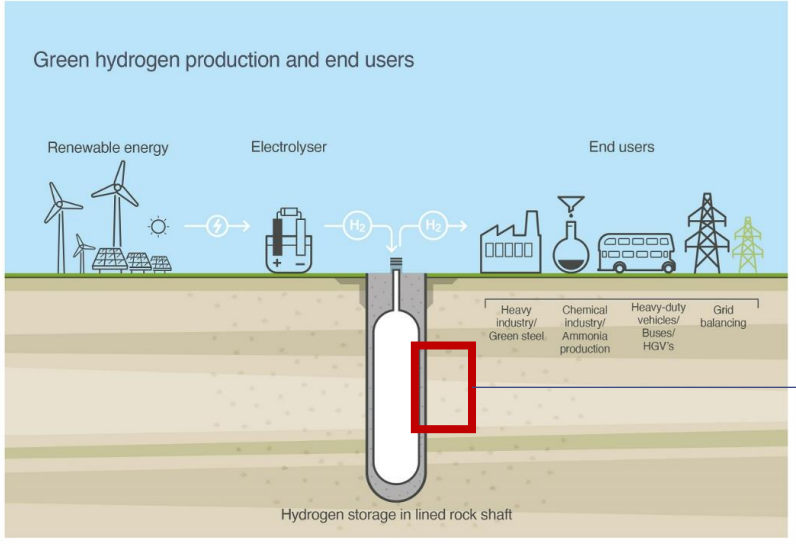


Activité 100% numérique

https://www-cast3m.cea.fr/

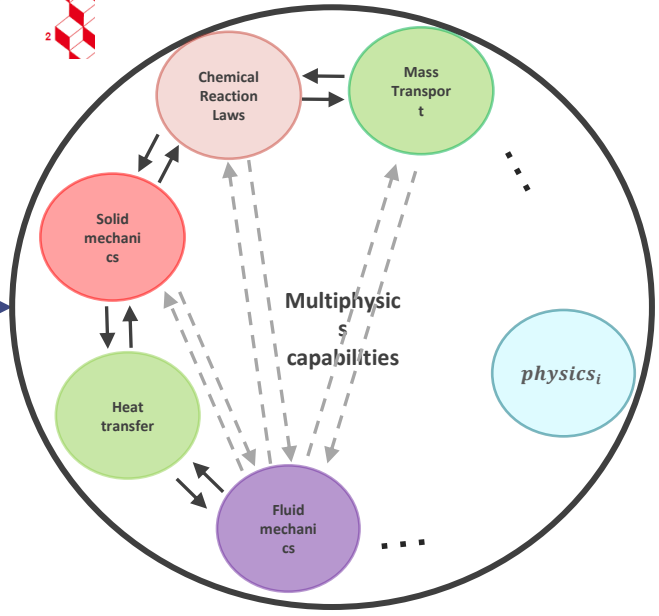
MANTA

2



Modeling and Simulation of Gas-Liner-Concrete-Shaft interactions

Our collective expertise can offer deeper insight into both the local and global mechanisms that define certain phenomena !



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Jevgenija **Nikitina**
JSC RIGAS SILTUMS

Clean Hydrogen Partnership

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PowerToGas RIGA project - SNG production from RES

Summer/winter heat loads
- heat loads of thermal sources

Availability and cost of fuel
- Woodchips
- Gas
- Electricity

Possibility of energy storage
- Gas
- Electricity
- Thermal energy
- Woodchips

The goals of Rigas Siltums
- Decarbonization
- Energy Independence

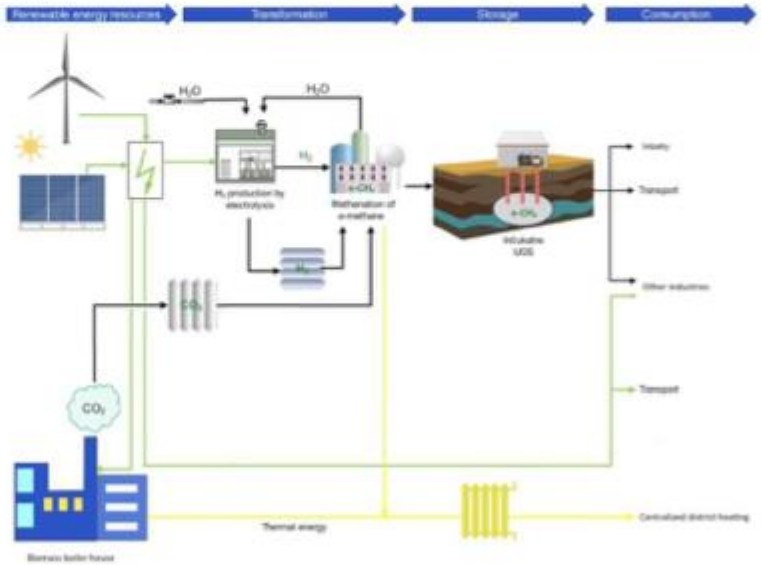
JSC «RĪGAS SILTUMS» main numbers:

- The largest district heating company in Baltic countries;
- Thermal energy supplied per year to customers - 3 TWh/year;
- Length of heating network ~800 km.

«PowerToGas RIGA» project

- ✓ 2 case scenario «big» and «small»;
- ✓ Attraction of EU funds;
- ✓ Main technologies:
  - Electrolyzer up to 290 kg/h of H_2 (up to 74 MW_{el})
  - CO_2 capture up to 62 000 t/a CO_2 capacity
  - Methanation CO_2 and H_2 methanation (up to 36 MW_{CH4})

PowerToGas Riga project concept



AKCIJU SABIEDRĪBA
RĪGAS SILTUMS

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Marta **Rubio Martinez**
Leitat

Clean Hydrogen Partnership

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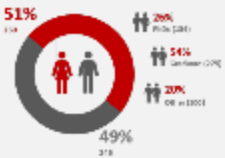
ABOUT LEITAT



3rd Spanish Tech center with a higher Impact in HE calls

506	22	48 M€	+3000
Employees	Nacionalities	Revenue	Customers

LEITAT, AN INTERNATIONAL REFERENCE IN
APPLIED R&D, PROJECT MANAGEMENT AND LEADERSHIP

MORE INFO ABOUT OUR H_2 PROJECTS

104
R&D European projects

PROJECTS RELATED TO HYDROGEN

genesis · BIOCON-CO2 · Robinson · FLOW PHOTO CHEM · NEFERTITI · GH2 · ANEMEL · LUPYPLAST · STACKAEM · Fuels-C · SH2AMROCK

EOI FOR CHP JU 2025 TOPICS

➢ *TC1-01: Improvements in the lifetime and cost of low-temperature electrolysers by introducing advanced materials and components in stacks and balance of plant*

• Development of membranes, catalyst and electrodes based on carbon nanofibers doped with metals
• Support on the development of membranes electrodes, assembled electrodes, bipolar plates and/or other cell and stack components by additive manufacturing (3D printing) (polymers and metals). Electrochemical characterization of membranes and electrodes (HER, OER), electrochemical stability tests of electrodes, membranes and MEAs
• Support on AEM cell and stack design, operation and characterization of AEM cell and stack devices (up to 5 kW stack)
• LCA, LCC, s-LCA, safe and sustainable by design platform available to monitor Health and safety

Projects related: **H2UPSCALE** (EU, HE 2025-2027, Clean hydrogen BOP components H2 ejector); ANEMEL (EU, EIC-Pathfinder AEM membranes); **X-SEED** (EU, JTI-CLEANH2, catalyst, electrode, stack development LCA, LCC, s-LCA); **STACKAEM** (ESP, PCPP, AEM stack development); **LUPYPLAST** (ESP, PCPP, catalyst for AEM EL); **ENDURION** (EU, HE, Clean hydrogen, EM EL membranes and electrodes); **PROMISERS** (EU, HE, Clean hydrogen, PEM EL and PEMFC non PFAS components); **NAVHYS** (EU, HE, Clean hydrogen, LCA); ASTERISK (EU, HE, Clean hydrogen, AEMEL)

➢ *TC1-02: Improved lifetime and cost of high-temperature electrolysers through innovative materials and components in stacks and BoP*

- Protective coatings for BoP components and seeling materials
- Design, development and fabrication of optimized and consolidated stainless-steel metallic interconnect plates through AM. R&D of new tools and strategies for generative, automated and optimized design for additive.
- Development of cost-efficient, high-performance catalysts for high-temperature electrolyzers by integrating recycled materials (e.g., Ni, Co) addressing critical raw materials concerns.
- LCA, Safe and sustainable by design platform available to monitor Health and safety

Projects related: **H2UPSCALE** (EU, HE 2025-2027, Clean hydrogen BOP components), **X-SEED** (EU, JTI-CLEANH2, high temperature catalyst, electrode, stack development LCA, LCC, s-LCA); **H2ENRY** (ESP, RED CERVERA, membranes and catalyst for SOEL)

➢ *TC1-05: Innovative co-electrolysis systems and integration with downstream processes*

- Additive manufacturing: Thermal management components through additive manufacturing. Weight reduction, system customization, etc. Increased performance and lifetime from design and materials advancements (reduction of hydrogen embrittlement)
- Research into hydrogen barrier coatings for prevention of hydrogen embrittlement and leakage
- Catalyst research for optimizing electrolyzer performance (efficiency/cost) using CNF and catalytic coatings, focusing on achieving the desired H2/CO ratio while preventing coke formation and considering pressure, temperature, and reactant purity at all system levels.
- LCA and LCC

Projects related: **Robinson** (EU, H2020, energy efficient); **NET-FUELS** (EU, HE); **SH2AMROCK** (EU, JTI-CLEANH2, Hydrogen valley- LCA, SLCA); **H2UPSCALE** (EU, HE, Clean hydrogen Additive manufacturing components, **X-SEED** (EU, JTI-CLEANH2); **Fuels-C** (EU, HE 2024-2028)

➢ *TC7-02: Small-scale Hydrogen Valley*

- LCA, LCC: licenses of the two most recognized LCA software: SIMAPRO, professional LCA software tool to collect, analyze and monitor the sustainability performance of products and services. different impact methods according to European guidelines: ILCD method, CML, ReCiPe, among others.
- Water purification technologies for inlet water of PEM cell
- Conduct replicability and benchmark studies to integrate sustainability measures into future projects and enable commercial exploitation

Projects related: **VIVALDI** (2021-2025), **SH2AMROCK** CHP JU - (2023-2027), **FUELS-C** – HORIZON (2024-2028), **GENESIS** - H2020 (2018-2021), **GH2** - EIC (2020-2023), **ROBINSON** - H2020 (2020-2024), **LULYPLAST** – PCPP ESP (2023-2026), **NIMBI** PCPP ES (2023-2026), **BIOCONCO2** H2020 (2018-2021)

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Ian **Russell**
Oxford nanoSystems Ltd

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nanoFLUX®: a Low-cost Electrode Coating that Promotes Bubble Release

The Problem

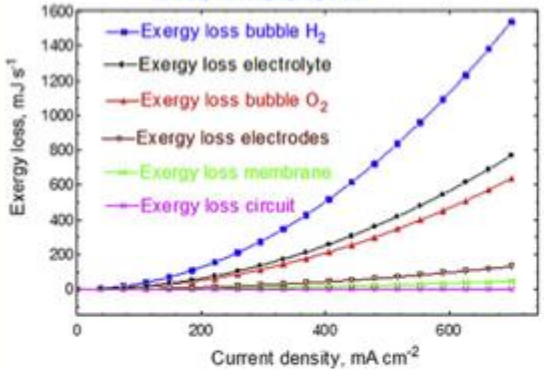


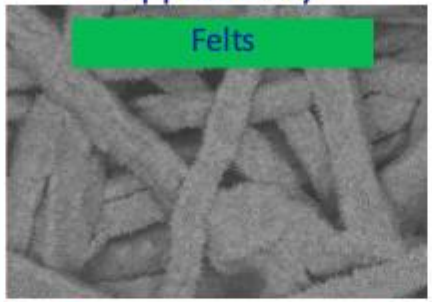
Fig. 8 – Comparison of the exergy destruction of the effect of various resistance parameters.

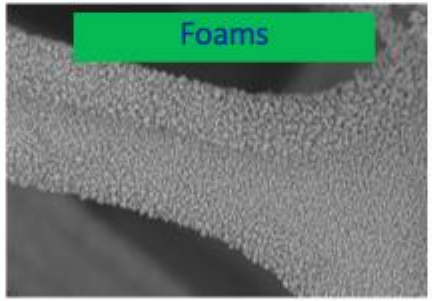
Bubble resistance is a major cause of losses with alkaline electrolysers

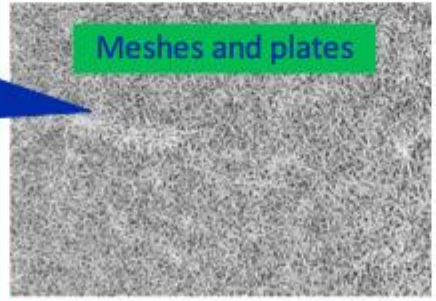
The Solution

nanoFLUX™ is a low-cost, high porosity, high surface area coating with a dendritic structure that enhances bubble nucleation and release

Applicability

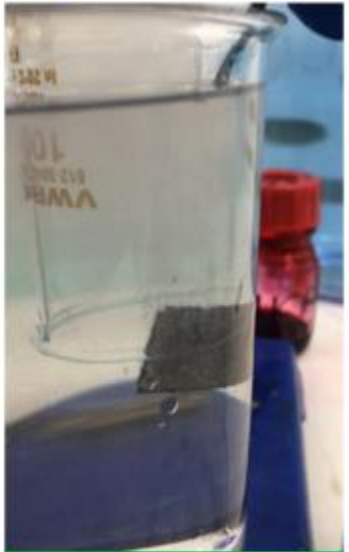






The Result

Raney Nickel



nanoFLUX + Nickel

The Ask

- OnS is seeking catalyst, electrode and electrolyser technology partners for collaborative R&D projects

ONS
Oxford nanoSystems

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Jasmin **Schiefer**
Wien Energie

Clean Hydrogen Partnership

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HyHOPE – Hydrogen Valley for the Heart of Europe

Region

Eastern part of **Austria** and Western part of **Slovakia** and **Hungary:**

- Huge **hydrogen demand** due to important industrial companies
- Strong **dependency** on Russian gas- need for (climate neutral) alternatives
- Great **renewable energy potential**
- Well-established **gas infrastructure**→ future gas hub
- Region with **innovative** character.

Goal

Covering the **whole value chain** in the region and use the synergies of all partners to establish **hydrogen projects** and to **accelerate the hydrogen economy** in the heart of Europe

USP of the valley

- **First-of-its kind** valley in countries which have a long-standing tradition of working together
- Historical role as a gas hub means the region has the potential to act as an **intersection for hydrogen across the whole of Europe**

Core Consortium

WIEN ENERGIE
WIENER STADTWERKE GRUPPE

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

ENASCO

SIEA
SLOVAK INNOVATION AND ENERGY AGENCY

Final and complete consortium will cover the whole hydrogen value chain

Hydroeconomy Technology Cluster

Contact: jasmin.schiefer@wienenergie.at

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Jitka **Spolcova**
ETN Global

Clean Hydrogen Partnership

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ETN Global

Safe, secure, affordable and dispatchable carbon-neutral energy solutions

ETN Global – Key facts

Who are we?

A few numbers

- **140 member organisations**
- **22 countries**
- **4 continents**

ETN Global – Communication and dissemination partner

Our network – our biggest asset

- **300 members** in our H_2 working group
- **2.000** newsletter **subscribers**
- **5 EU-funded projects**
- **3 H_2-related projects**

FLEX4H2 HyPowerGT InsigH2t

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Paolo **Tavella**
Baker Hughes

Clean Hydrogen Partnership

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Baker Hughes

ABOUT
BAKER HUGHES

~58,000
employees

$25.5B
in revenue

120+
countries where we conduct business

People & culture

Advanced technology

Low carbon & sustainability

Solutions & scale

Bringing state of the art **Hydrogen technologies** to market:

H_2/NG pipeline — Italy

Baker Hughes and SNAM successfully completed testing of the **world's first hybrid hydrogen turbine** designed for a gas network.

Green H_2—NEOM, KSA

Providing advanced hydrogen **compression technology**

Blue H_2 — Canada

Providing **100% hydrogen fueled NovaLT™16** gas turbine technology

Hydrogen Economy

Enabling the Hydrogen economy by investing in **Green** (AEM & SOEC) and **Turquoise H2 production**, H_2 **compression** and solution **modularization**

Partnering with world hydrogen industry leaders to lower production costs and accelerate adoption of hydrogen as a zero-carbon fuel

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Sem **van der Linden**

Oost NL

Clean Hydrogen Partnership

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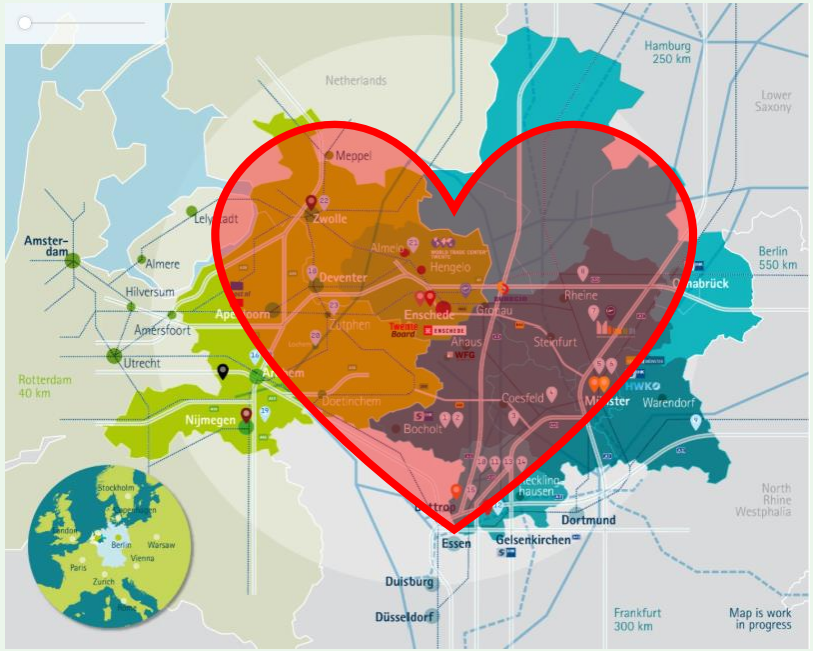
H_2EART

Hydrogen Economy Assisting Regional Transition

- First North-West Europe cross-border Hydrogen Valley.
- Excellent position located in the heart of Europe's transport and energy corridors
- Preparing the regions to connect to the EU Hydrogen Backbone, also investigating downstream connections
- Investigating cross border Hydrogen connections in addition to the EU Hydrogen backbone
- Investigating import of green Hydrogen (and its derivatives) through the pipeline and virtual pipelines
- Boosting the on-going development of smart energy/hydrogen hubs as an instrument to manage grid congestion
- Strengthening the regions interregional Hydrogen Network.
- Supporting highly innovative SME's that can support Europe's Hydrogen Ecosystem.
- Building on the regions highly developed human capital agenda for hydrogen.



A collaboration initiative of the regions Gelderland (NL), Overijssel (NL), Münsterland (GE) & Emscher Lippe (GE)

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Emad **Yaghmaei**
YAGHMA B.V.

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YAGHMA Services for clean hydrogen

- Identification of social and ethical **impacts and risks**
  - SSH methods
  - Quantification
  - LLM based
- **Stakeholder** analysis

- **Resilience** assessment
- **Trustworthiness** assessment
- Support for development of **decision systems**

- Development of **policy frameworks** with change indicators
- **Scenario** building
- Identification of **interdependencies**

Call for proposals 2025

Find out more at

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