# STARTING SOON…

# Horizon Europe- Clean Hydrogen Community Building and Brokerage Event

# 1st February 2024

## Opportunities in Horizon Europe: The Energy Series
## #EnergyHorizon

**Host: Conall McGinley**
**National Contact Point for Horizon Europe (Energy) for the UK**

# Introduction

## 1 Why are we here?

- What is Horizon Europe?
- What is the Clean Hydrogen Partnership and the ‘Call Topics’?
- Who (UK and international) is interested in collaborating?
- What support is there to help me start building a Horizon Europe project consortium?


UKRI Innovate UK

# Introduction

## 2 Agenda

**09:30 – Welcome & Aims of the Day**
**09:40 – Introduction & Call Topic Overview – Nikos Lymperopoulos, Project Officer at Clean Hydrogen Partnership**
**10:00 – Hydrogen R&D Landscapes in the UK, and focus countries (5 mins each) & Panel Discussion**

Netherlands – Achim Eberspacher, Energy NCP
Germany – Nathan Antonels, Scientist in Funding Administration at Forschungszentrum Jülich GmbH,
UK – Avi Kharel, Knowledge Transfer Manager – Hydrogen at Knowledge Transfer Network
Czech Republic – Daniel Minarik, Chairman of the Board at Moravian-Silesian Hydrogen Cluster

**10:30 (5 min) – Break.**
**10:35– How to get ready for Horizon Europe and find the right partners?**

National Contact Point to cover where applicants can find help and support within their respective country

**10:50 – Case Study – Dennis Hayter - Vice President, Business Development at Intelligent Energy Ltd**
**11:00 - Q&A**
**11:10– Pitching Session – Andrew Stewart at KTN to facilitate**
**11.45 (5 min) – Closing Remarks**

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# Introduction

## 3 House Keeping

- **Microphone off** unless speaking please.
- Please post Q using the **Q&A FUNCTION.**
- **Save the zoom chat** – we will not be sharing this.
- Please message **Michael Foster** in the Zoom chat if you are having technical issues.
- **The webinar is being recorded** and will be shared with the slides afterwards.

UKRI Innovate UK

# Introduction

## 4 Upcoming Opportunities

**OPEN** - £700 European Travel Awards

# Introduction

## 5 Enjoy!

Innovate UK

Innovate UK

# Nikolaos Lymperopoulos, Project Officer at the Clean Hydrogen Partnership

Clean Hydrogen Partnership



# Overview of Clean Hydrogen Partnership 2024 call topics

**N. Lymperopoulos**

**Project Officer**

**1st February 2024**


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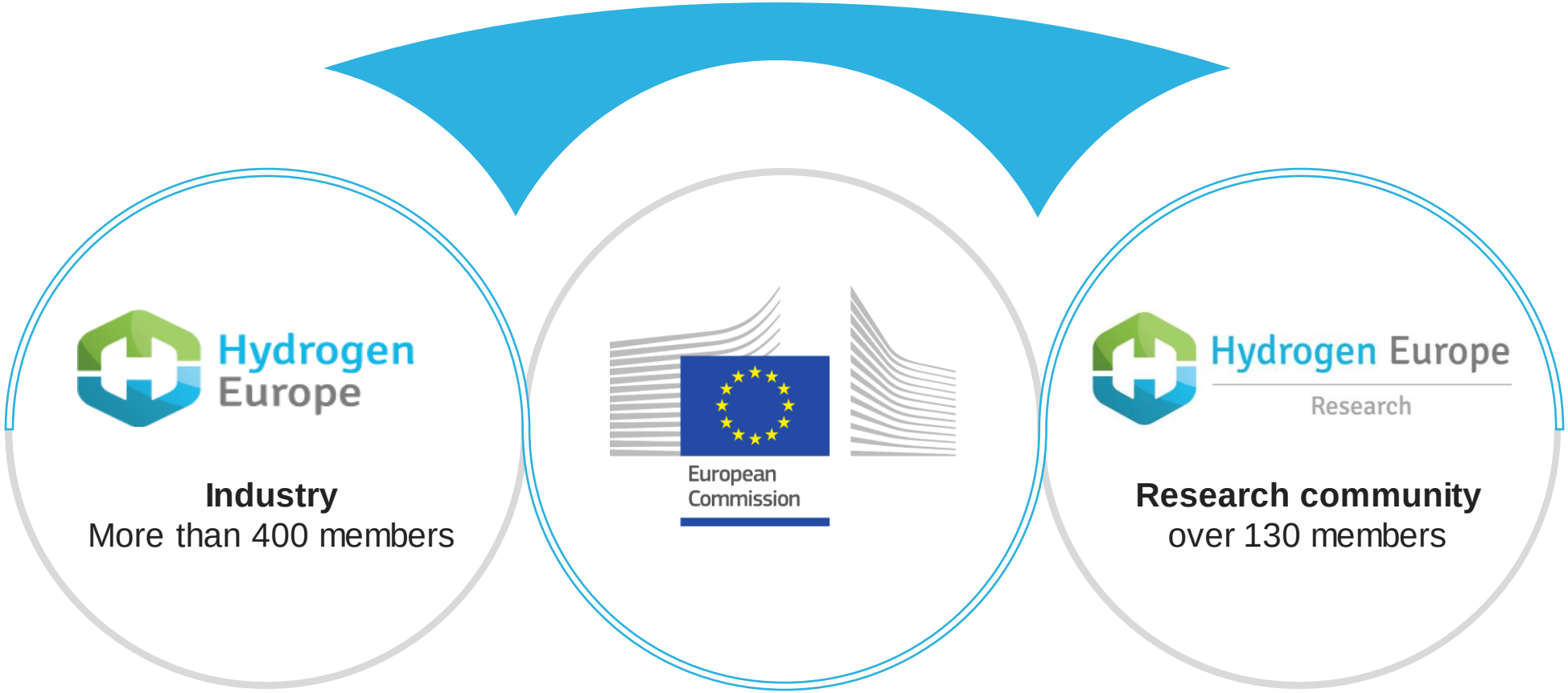
# Clean Hydrogen Joint Undertaking

EU Institutional Public-Private Partnership (IPPP) **2021-2027**




**1 billion EURO from Horizon Europe*** to implement R&I activities and facilitate the transition to a greener EU society through the development of hydrogen technologies

**** additional 200 million EURO for Hydrogen valleys (under RePowerEU)***



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# Clean Hydrogen JU Programme (incl FCH JU legacy)

Clean Hydrogen Partnership

**$H_2$ Valleys**

14 Projects

€ 169 mill

**$H_2$ End Use: Clean Heat and Power**

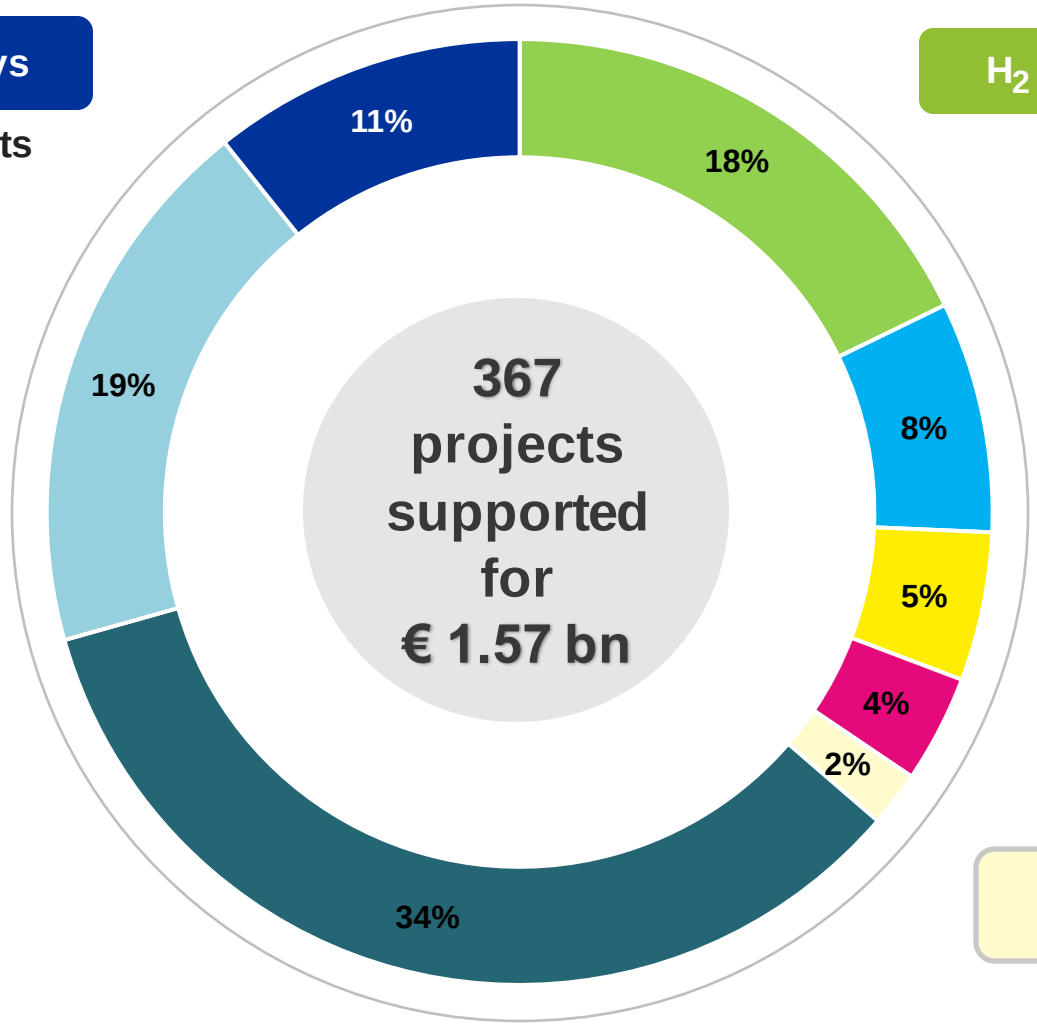
85 Projects

€ 293.6 mill

**$H_2$ End Use: Transport**

78 Projects

€ 540.5 mill




**$H_2$ Production**

78 Projects

€ 280.3 mill

**$H_2$ Storage & Distribution**

37 Projects

€ 124.4 mill

**Cross-cutting**

54 Projects

€ 80.1 mill

**Supply Chain**

18 Projects

€ 58 mill

**Strategic Research Challenge**

3 Projects

€ 29.6 mill

EUROPEAN PARTNERSHIP

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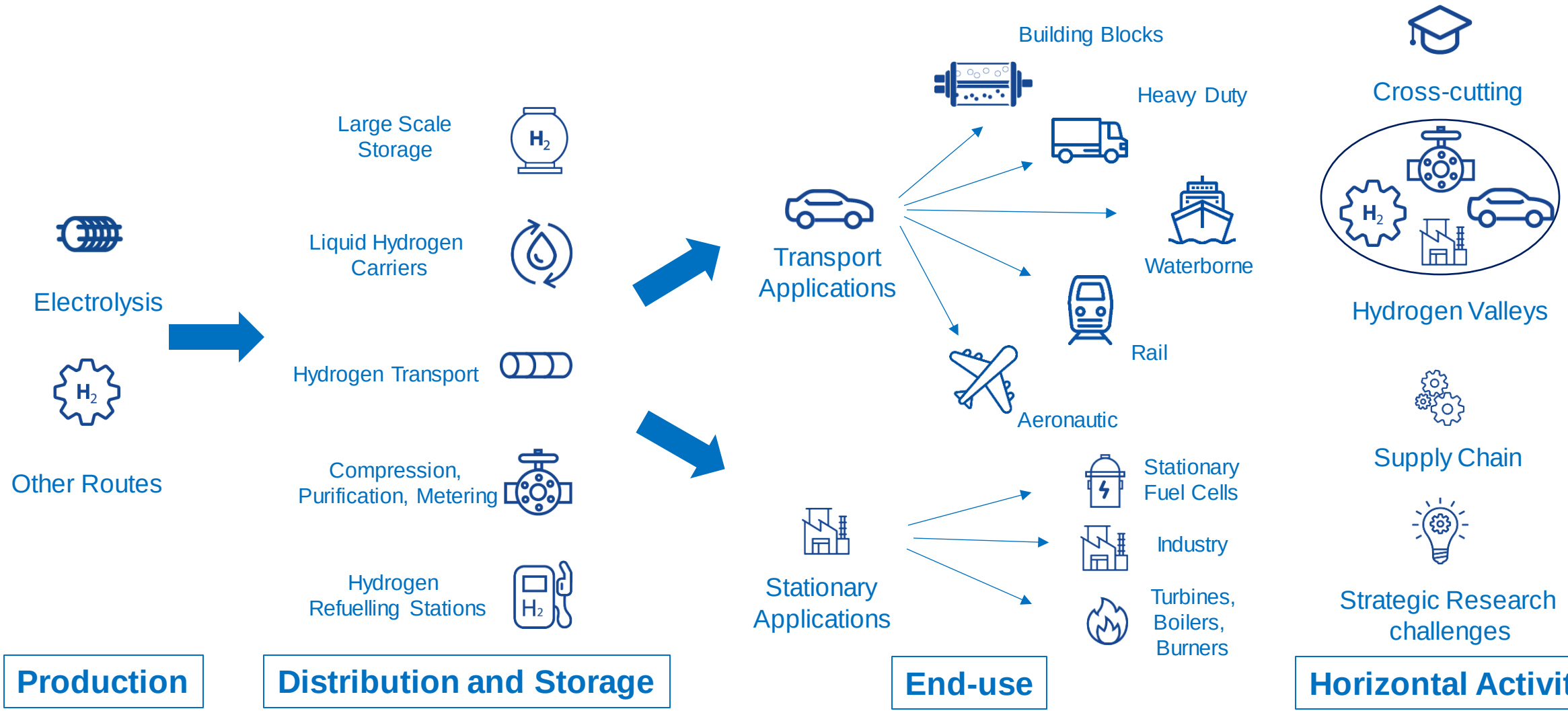
**It excludes some call 2023 grants – still under preparation*

# Clean Hydrogen JU Strategic Research and Innovation Agenda 2021 – 2027



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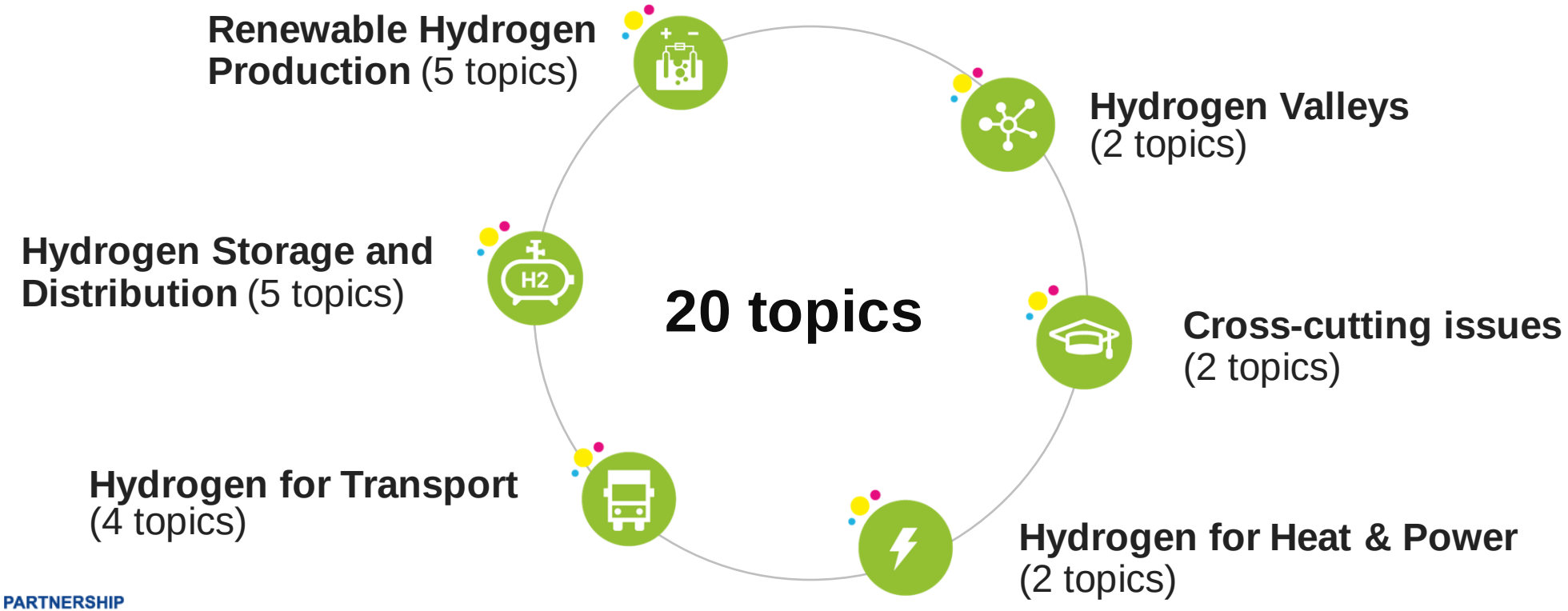
# Call for proposals 2024

**Total budget**: 113.5 M€
**Publication date**: 17 January 2024
**Deadline**: 17 April 2024
**Info Day Presentations**: here



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# 8 months for time to grant, from call deadline to signature of the grant agreement

Admissibility Check → Eligibility Check → Evaluation of Proposals → Grant Preparation → Grant Signature

| **Call deadline** | | **Signature of Grant Agreement** |
|---|---|---|
| 17 April 2024 | ➔ | 17 December 2024 |

## Quality of the proposal is key !

- The experts evaluate each proposal as submitted
- The experts do not recommend substantial modifications
- If the experts identify significant shortcomings, they must reflect those in a lower score for the relevant criterion



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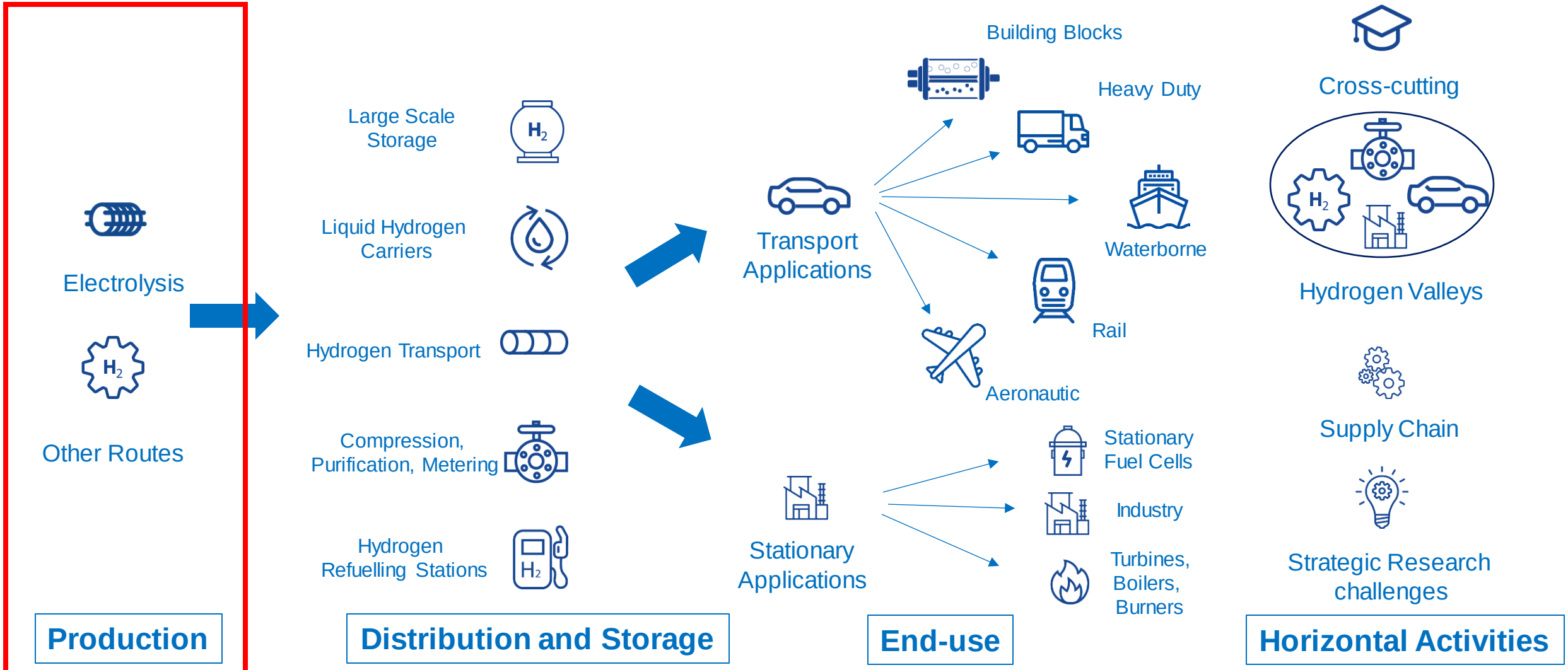
# Clean Hydrogen JU Strategic Research and Innovation Agenda 2021 – 2027



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# Renewable Hydrogen Production Overview

## Main Focus

- Electrolysers:
  - Improving PCCEL and AEMEL
  - Revisiting monitoring & diagnostic tools for electrolysers
- Circular Hydrogen production
  - Optimal integration of hydrogen production in industry

## What is new

- Direct sea water electrolysis



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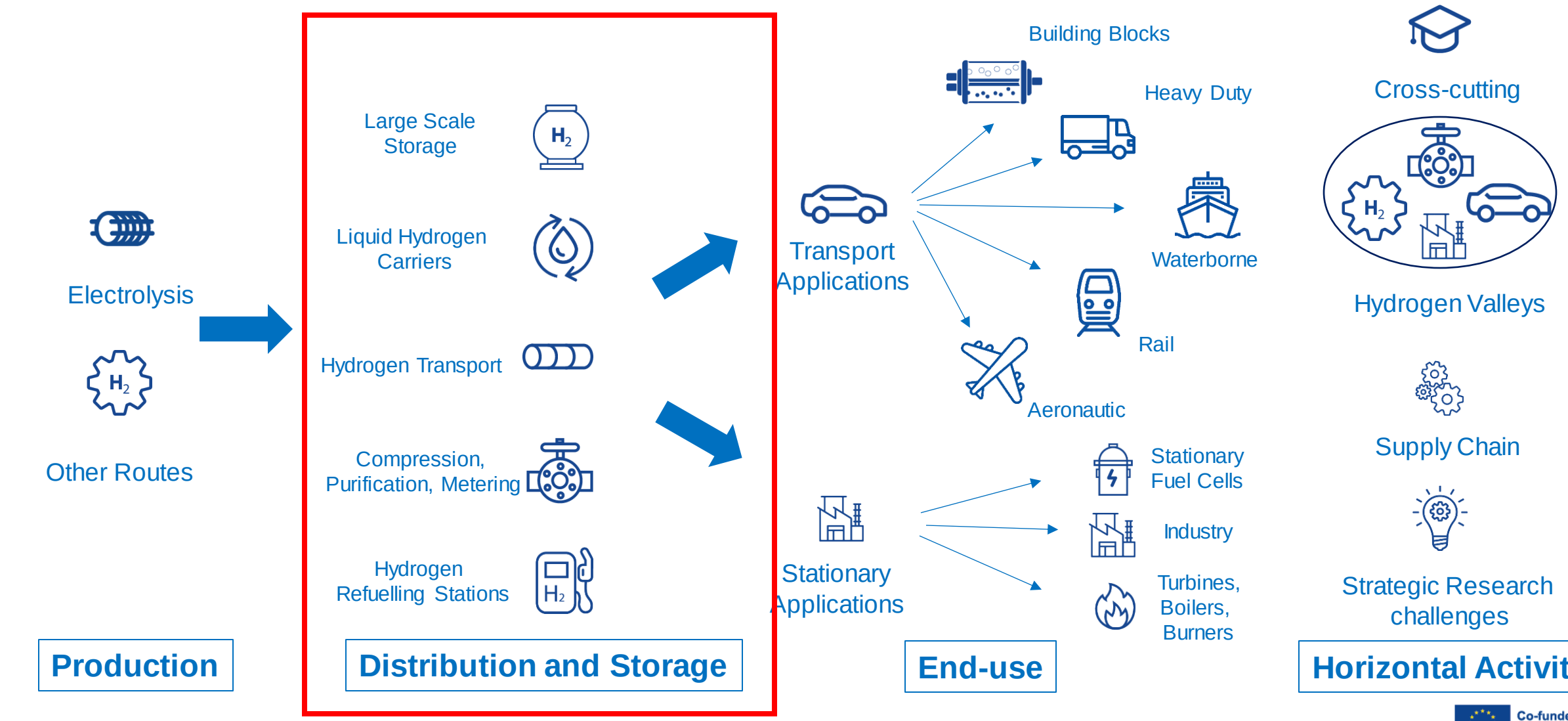
# Renewable Hydrogen Overview

| Topic | Type of Action | Ind. Budg (M€) |
|---|---|---|
| HORIZON-JTI-CLEANH2-2024-**01-01**: Innovative proton conducting ceramic electrolysis cells and stacks for intermediate temperature hydrogen production | RIA | 3 |
| HORIZON-JTI-CLEANH2-2024-**01-02**: Advanced anion exchange membrane electrolysers for low-cost hydrogen production for high power range applications | RIA | 4 |
| HORIZON-JTI-CLEANH2-2024-**01-03**: Development of innovative technologies for direct seawater electrolysis | RIA | 4 |
| HORIZON-JTI-CLEANH2-2024-**01-04**: Development and implementation of online monitoring and diagnostic tools for electrolysers | RIA | 4 |
| HORIZON-JTI-CLEANH2-2024-**01-05**: Hydrogen production and integration in energy-intensive or specialty chemical industries in a circular approach to maximise total process efficiency and substance utilisation | IA | 10 |

# Clean Hydrogen JU Strategic Research and Innovation Agenda 2021 – 2027



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# Hydrogen Storage and Distribution Overview

## Main Focus

Hydrogen Storage

- Microbiological interactions in $H_2$ underground storage in porous media
- Next generation aboveground storage solutions

Hydrogen Distribution

- Scaling up and demonstrating purification prototypes
- Flexible compressor coupled to RES

## What is new

- Multi-purpose HRS up to 3,000kg$H_2$/day



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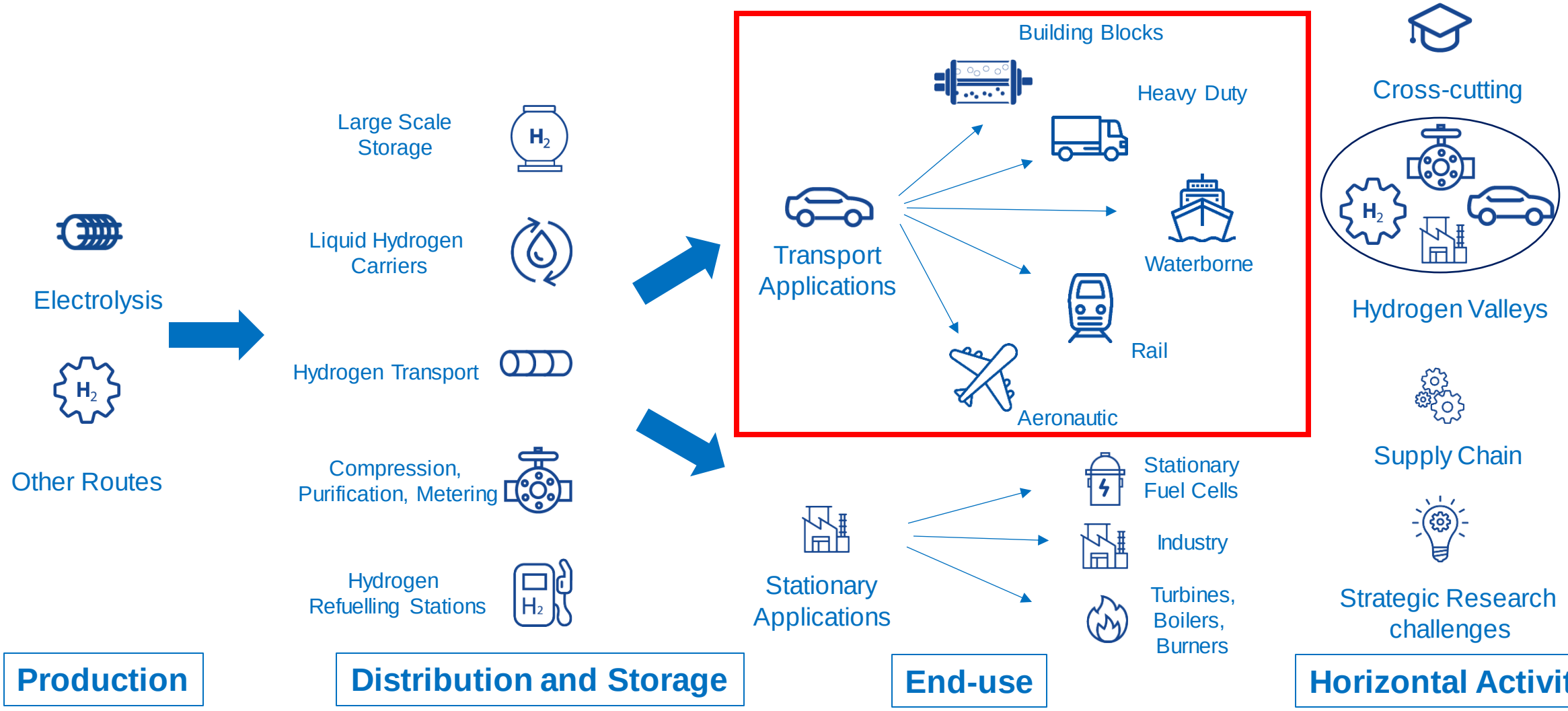
# Hydrogen Storage and Distribution Overview

| Topic | Type of Action | Budget (M€) |
|---|---|---|
| HORIZON-JTI-CLEANH2-2024-**02-01**: Investigation of microbial interaction for underground hydrogen porous media storage | RIA | 3 |
| HORIZON-JTI-CLEANH2-2024-**02-02**: Novel large-scale aboveground storage solutions for demand-optimised supply of hydrogen | RIA | 4 |
| HORIZON-JTI-CLEANH2-2024-**02-03**: Demonstration of hydrogen purification and separation systems for renewable hydrogen-containing streams in industrial applications | IA | 6 |
| HORIZON-JTI-CLEANH2-2024-**02-04**: Demonstration of innovative solutions for high-capacity, reliable, flexible, and sustainable hydrogen compression technologies in commercial applications | IA | 6 |
| HORIZON-JTI-CLEANH2-2024-**02-05**: Demonstration and deployment of multi-purpose Hydrogen Refuelling Stations combining road and airport, railway, and/or harbour applications | IA | 8 |

# Clean Hydrogen JU Strategic Research and Innovation Agenda 2021 – 2027



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# Hydrogen End Uses: Transport Applications Overview

## Main Focus

- Maritime and Heavy-Duty (with spill over to other applications);
- Balance of Plant (BoP design, architectures and operational strategies);
- Integration and demonstration for maritime application;

## What is new

- Scale up of BoP components
- New storage solutions for maritime applications;
- Synergy between topics of the same call and existing projects (StaSHH)



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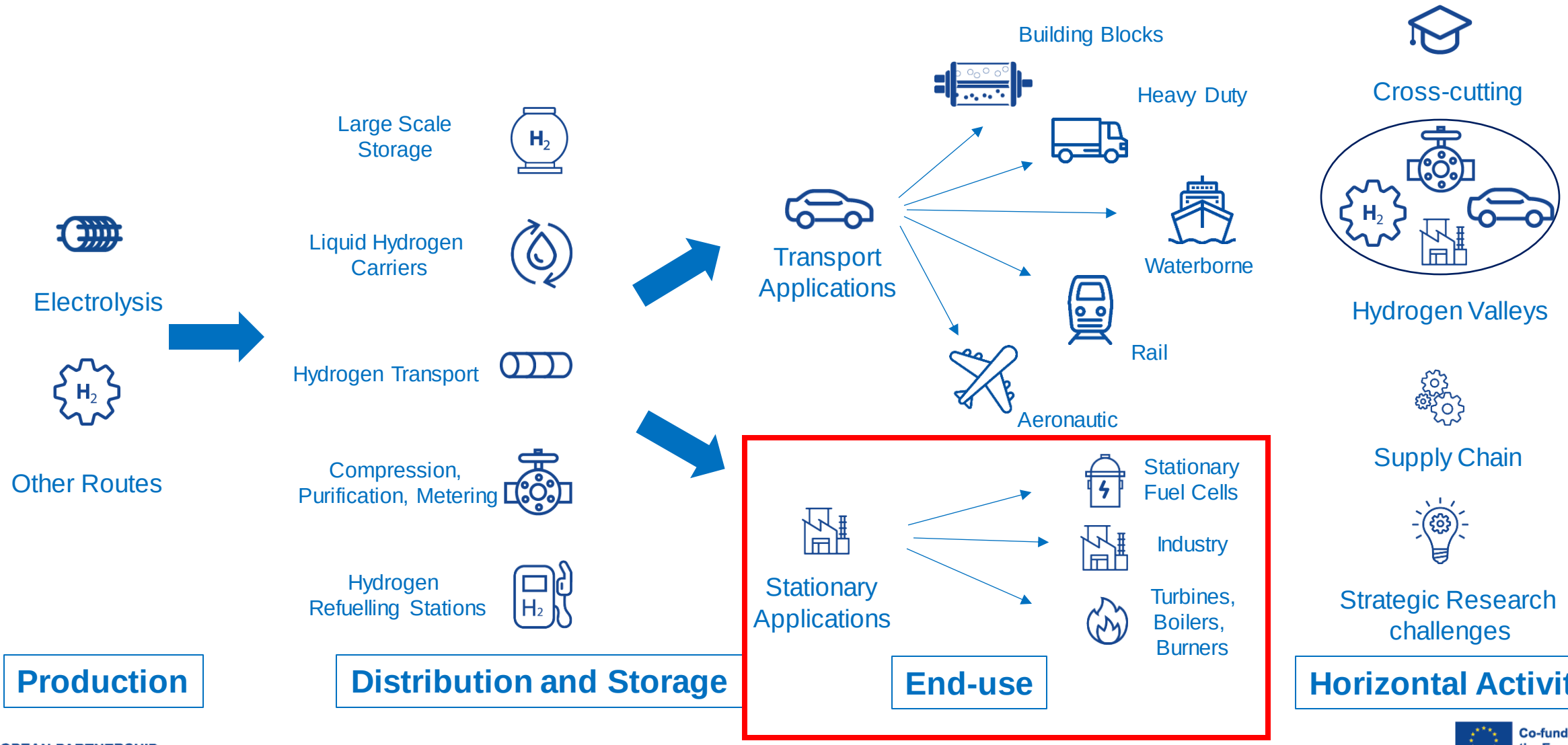
# Transport Applications Overview

| Topic | Type of Action | Ind. Budget (M€) |
|---|---|---|
| HORIZON-JTI-CLEANH2-2024-**03-01**: Balance of plant components, architectures and operation strategies for improved PEMFC system efficiency and lifetime | RIA | 4 |
| HORIZON-JTI-CLEANH2-2024-**03-02**: Scaling-up Balance of Plant components for efficient high-power heavy-duty applications | RIA | 4 |
| HORIZON-JTI-CLEANH2-2024-**03-03**: Next generation on-board storage solutions for hydrogen-powered maritime applications | RIA | 5 |
| HORIZON-JTI-CLEANH2-2024-**03-04**: Demonstration of hydrogen fuel cell-powered inland or short sea shipping | IA | 6 |

# Clean Hydrogen JU Strategic Research and Innovation Agenda 2021 – 2027



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# Hydrogen end uses: Clean heat & power Overview

## Main Focus

- Next generation fuel cell: Portable robust and long-term autonomous FC systems for quick integration into the power system of a critical user, providing backup power in an uninterruptible manner
- Hydrogen-fired Gas Turbines

## What is new

- Portable FC to power critical infrastructures under demanding operational conditions
- Covering knowledge gaps on premixed hydrogen combustion at high pressure



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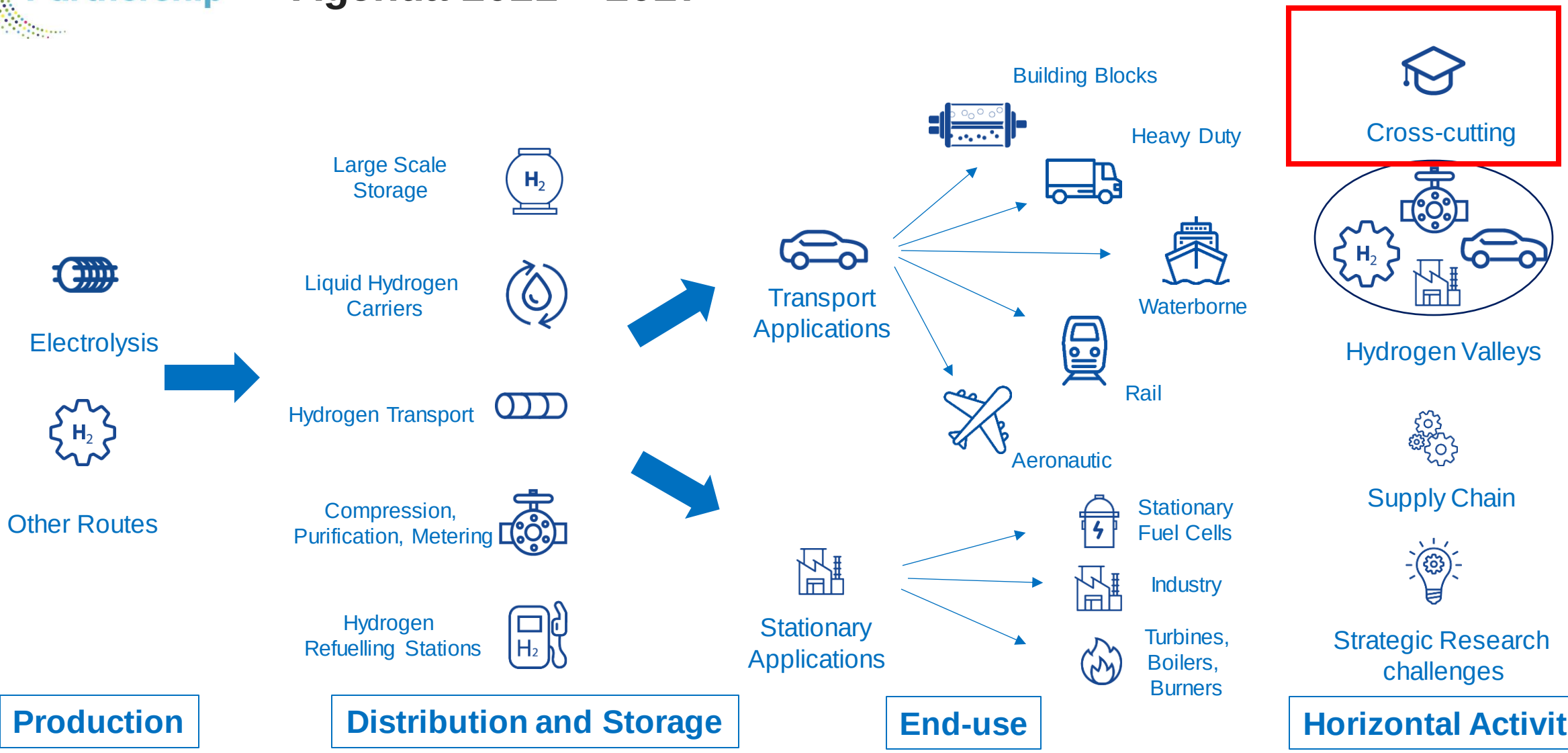
# Clean Heat & Power - Overview

| Topic | Type of Action | Ind. Budget (M€) |
|---|---|---|
| HORIZON-JTI-CLEANH2-2024-**04-01**: Portable fuel cells for backup power during natural disasters to power critical infrastructures | IA | 5 |
| HORIZON-JTI-CLEANH2-2024-**04-02**: Improved characterisation, prediction and optimisation of flame stabilisation in high-pressure premixed hydrogen combustion at gas-turbine conditions | RIA | 4 |

# Clean Hydrogen JU Strategic Research and Innovation Agenda 2021 – 2027



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# Cross-cutting Issues Overview

## Main Focus

- Continue raising the environmental sustainability of fuel cell and hydrogen (FCH) systems by developing bespoke guidelines
- To research novel materials environmentally friendly for PEM-based hydrogen technologies

## What is new

- Development of ‘safe and sustainable-by-design’ (SSbD) guidelines for systems across the hydrogen value chain
- Development of non-fluorinated components



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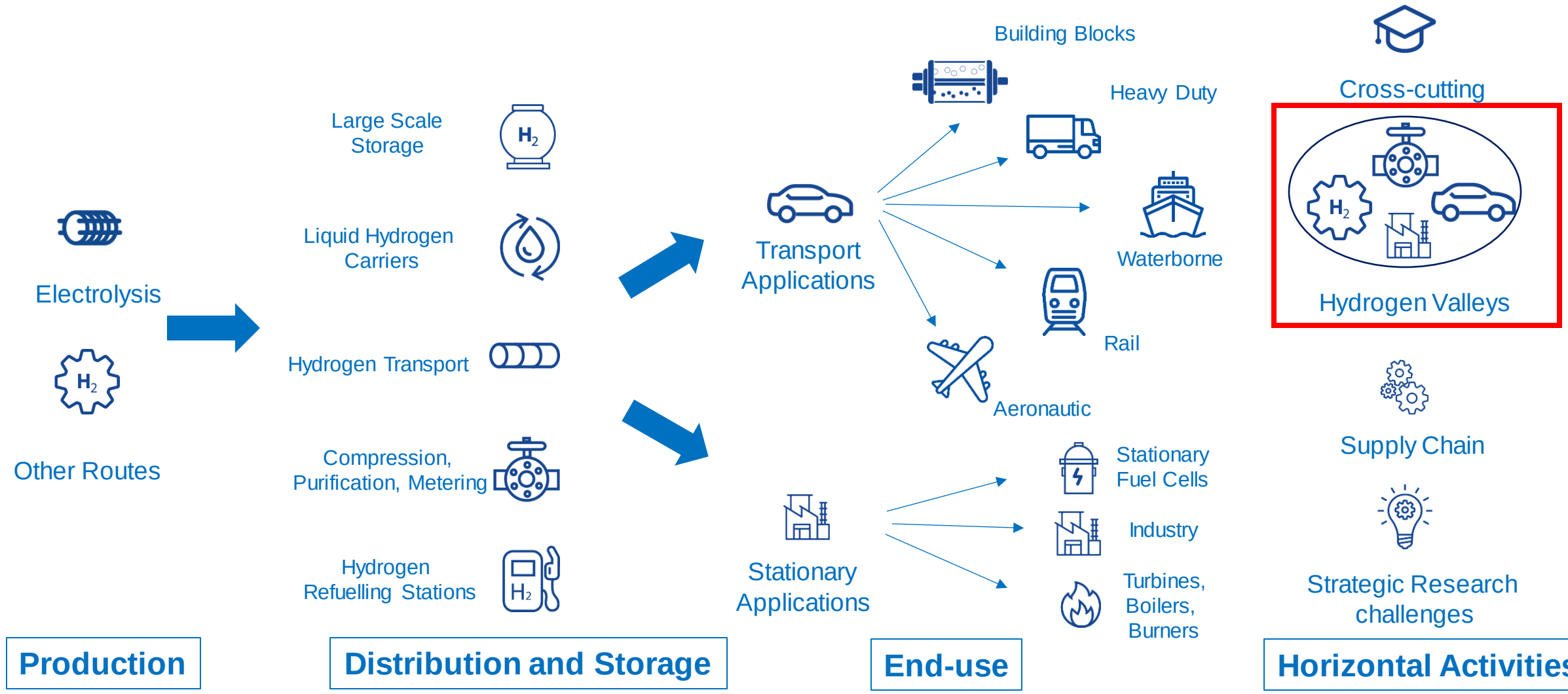
# Cross-cutting Issues Overview

| Topic | Type of Action | Ind. Budget (M€) |
|---|---|---|
| HORIZON-JTI-CLEANH2-2024-**05-01:** Guidelines for sustainable-by-design systems across the hydrogen value chain | CSA | 1.5 |
| HORIZON-JTI-CLEANH2-2023-**05-02**: Development of non-fluorinated components for fuel cells and electrolysers | RIA | 3 |

# Clean Hydrogen JU Strategic Research and Innovation Agenda 2021 – 2027



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# Hydrogen Valleys - Overview

## Main Focus

- Demonstrate an ecosystem built on the complete value chain of hydrogen;
- Large and small-scale hydrogen valleys acting as testbeds to showcase first regional "hydrogen economies";
- Topic open to foster the emergence of the widest possible array of valleys configurations;
- Innovation in Hydrogen Valleys is not about the technology development of an application, but on system integration of hydrogen production, its distribution and storage, and its subsequent use (TRL >=6-8)

## What is new

- FAQs on Hydrogen Valleys available

# Hydrogen Valleys - Overview

| Topic | Type of Action | Ind. Budget (M€) |
|---|---|---|
| HORIZON-JTI-CLEANH2-2023-**06-01**: Hydrogen Valleys (large-scale) | IA | 20* |
| HORIZON-JTI-CLEANH2-2023-**06-02**: Hydrogen Valleys (small-scale) | IA | 9* |

*For the Call for Proposals 2024, up to 60 MEUR additional budget is available to top-up the allocated budget for hydrogen valleys under the Call for Proposals 2024. More than one (Hydrogen Valley) project per topic will be funded, according to the final ranking at the end of the evaluation process.

**The maximum JU contribution that can be requested is an eligibility criteria !!**

# Participation of UK organisations

- As of 1st January 2024 the UK is associated to Horizon Europe
- The entities established in the UK can participate under equivalent conditions as those applicable to entities established in the Union in all calls or contests implementing the programme's budget of 2024 and onwards
- As beneficiaries, they are able to lead project consortia if so decided by the consortium. They also count towards the minimum number of countries requirement in calls for transnational projects
- FAQ on UK participation

# JU Governance - Stakeholders Group

## New Call for Expression of Interest **OPEN**
## **UK participation welcome***

The **Stakeholders Group** is an official advisory body, part of the governance structure, to be consulted on various horizontal issues or specific questions in areas relevant to the work of the Clean Hydrogen JU.

**ELEGIBILITY CRITERIA**

Being a registered organisation in one of the sectors of the hydrogen value chain

Being a representative organisation of the scientific community

Being an organisation representing another relevant European partnership

**DEADLINE EXTENDED** 15 February 2024

All information:
https://www.clean-hydrogen.europa.eu/about-us/organisation/stakeholders-group_en

* UK participation cannot bring a decision-making vote on matters agreed prior to the accession in HE ( 01.01.2024)



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# Get support - 1

Please read carefully all provisions below before the preparation of your application

**Lump Sums Guidance**

- Guidance: "Lump sums - what do I need to know?"
- Comprehensive information on lump sum funding in Horizon Europe

**FAQ**

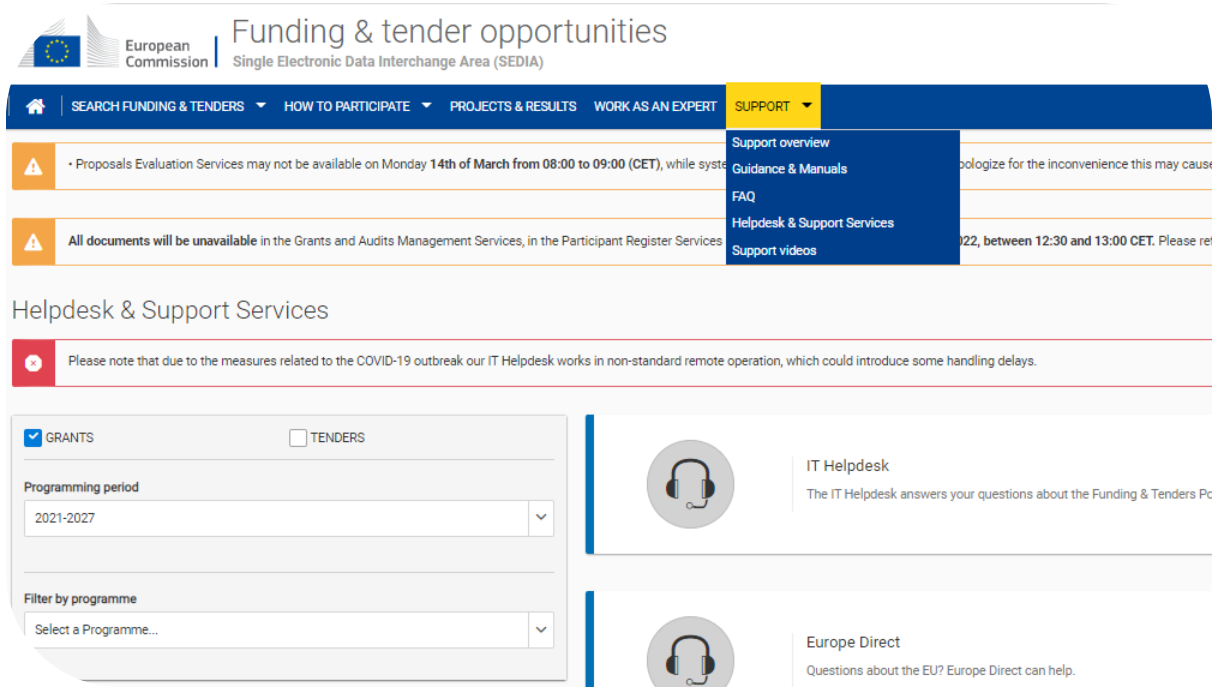
- Mailbox for submitting questions: PROJECTS@clean-hydrogen.europa.eu
- Specific FAQ for call HORIZON-JTI-CLEANH2-2024

# Get support - 2

## Funding and Tenders Opportunities Portal

### Get Support

- Online Manual is your guide on the procedures from proposal submission to managing your grant
- IT How To wiki (guide for IT processes)
- Funding & Tender Portal FAQ find the answers to most frequently asked questions on submission of proposals, evaluation and grant management
- Research Enquiry Service enquiries about the validation process of the legal entities



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Clean Hydrogen Partnership

**Please address your questions to:**

PROJECTS@clean-hydrogen.europa.eu


**For further information**
https://www.clean-hydrogen.europa.eu/


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# Clean Hydrogen Landscapes

Netherlands – Achim Eberspächer, Horizon Europe NCP for the Netherlands (Energy)

Germany – Nathan Antonels, Scientist in Funding Administration at Forschungszentrum Jülich GmbH

UK – Avi Kharel, Knowledge Transfer Manager for Hydrogen at Knowledge Transfer Network

Rijksdienst voor Ondernemend Nederland


# Hydrogen R&D in the Netherlands

Achim Eberspächer

National Contact Point Horizon Europe for Energy in the Netherlands

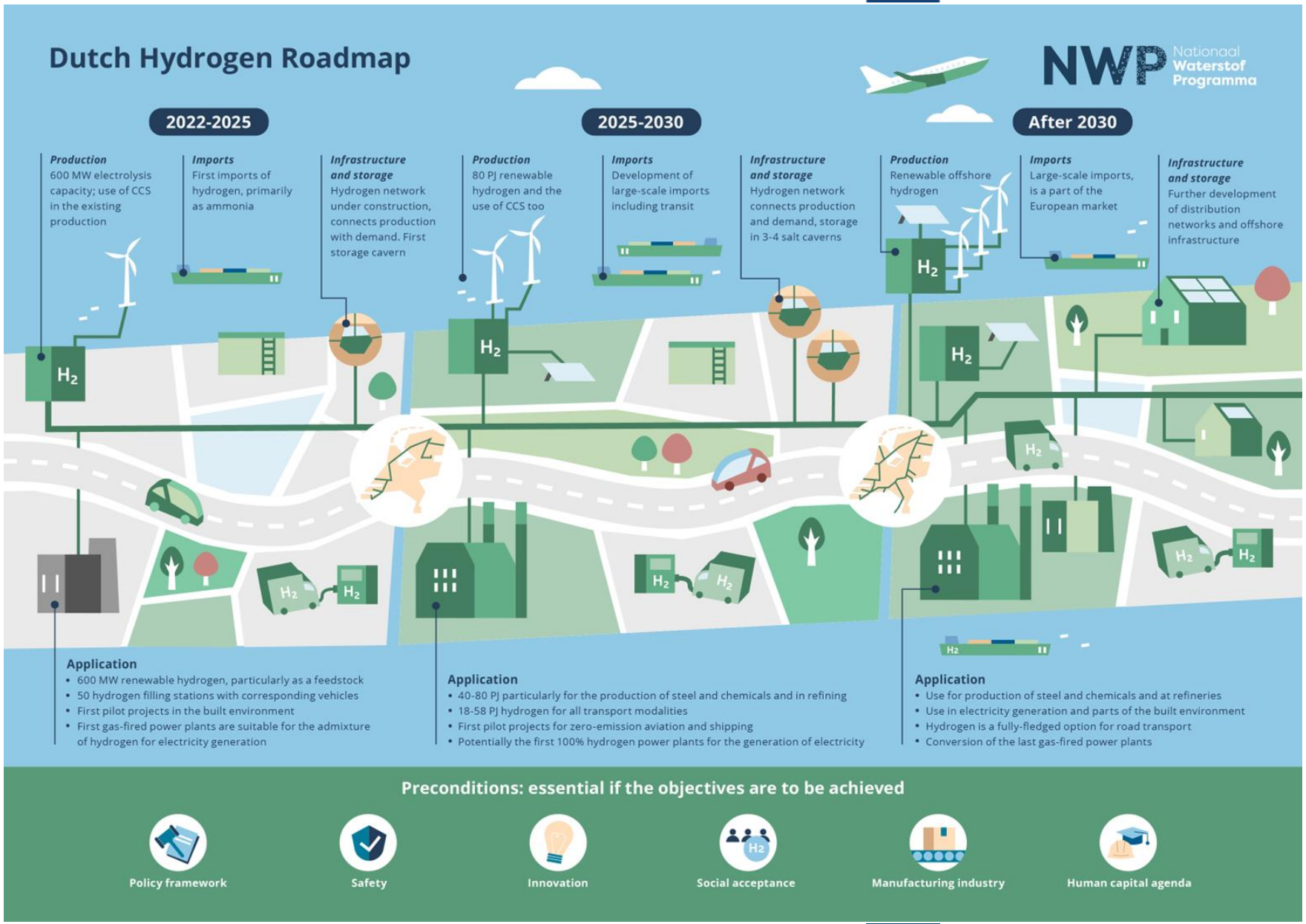
1st of February 2024

# Dutch strengths

Being an import hub for (continental) Europe

Dealing with the North Sea

Winning, processing and circulating natural gas




# Public investments in hydrogen

- IPCEI hydrogen: 4 waves with a budget of 1.6 billion euros altogether
- National Growth Fund Groenvermogen with a budget of 338 million euros
- Altogether public funds of more than 10 billion euros in mostly technology neutral schemes

# The Dutch hydrogen landscape

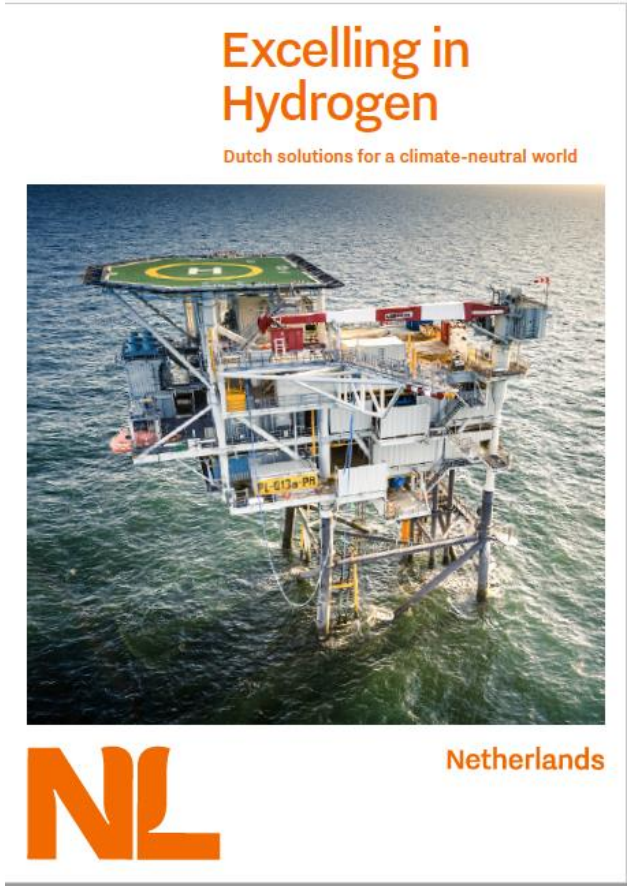
- LOHC: Puffin
- Offshore Electrolysis: PosHydon
- Underground storage: HyStoreReact
- Hydrogen Valley: HEAVENN

# Finding R&D partners on $H_2$ in the Netherlands

- Use the Dutch Hydrogen Guide with 155 profiles of organisations from the Netherlands active in $H_2$
- Contact the National Contact Points for the FCHJU in the Netherlands

Achim Eberspächer
achim.eberspaecher@rvo.nl

Pieter Houttuin
pieter.houttuin@rvo.nl



Projektträger Jülich
Forschungszentrum Jülich

ERKENNEN. FÖRDERN. GESTALTEN.

# GERMAN HYDROGEN R&D ACTIVITIES

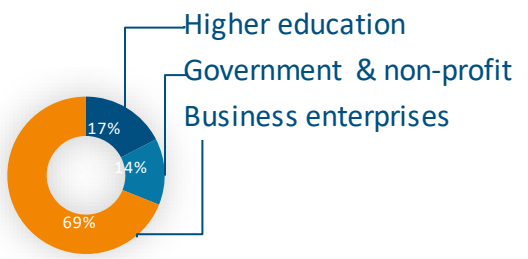
Dr. Nathan Antonels, Project Management Jülich, Germany

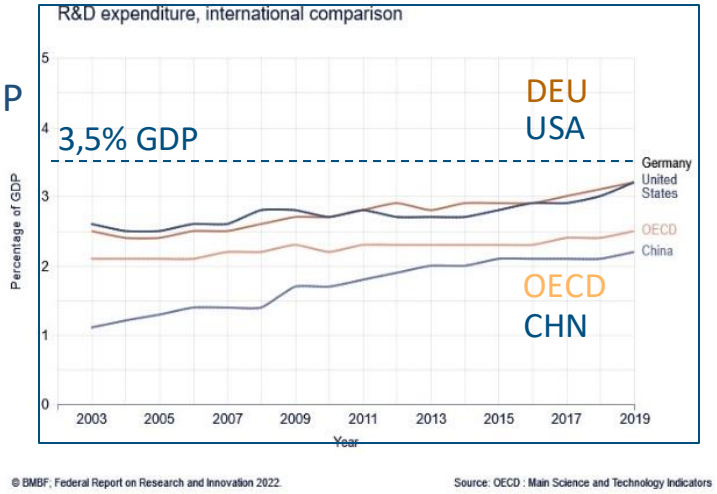
# EXPENDITURE AND $H_2$ RESEARCH THEMES

## R&D expenditure

2019: 110 bn € / 3.2% GDP

2025: 3.5% GDP (goal)




## Green electricity production

- Wind
- Solar

## $H_2$ production

- Alkali Electrolysis
- PEM Electrolysis
- Solid Oxide Electrolyis Cell

## $H_2$ distribution and storage

- Caverns
- Storage vessels
- Pipelines
- Land-based Transport
- Shipping

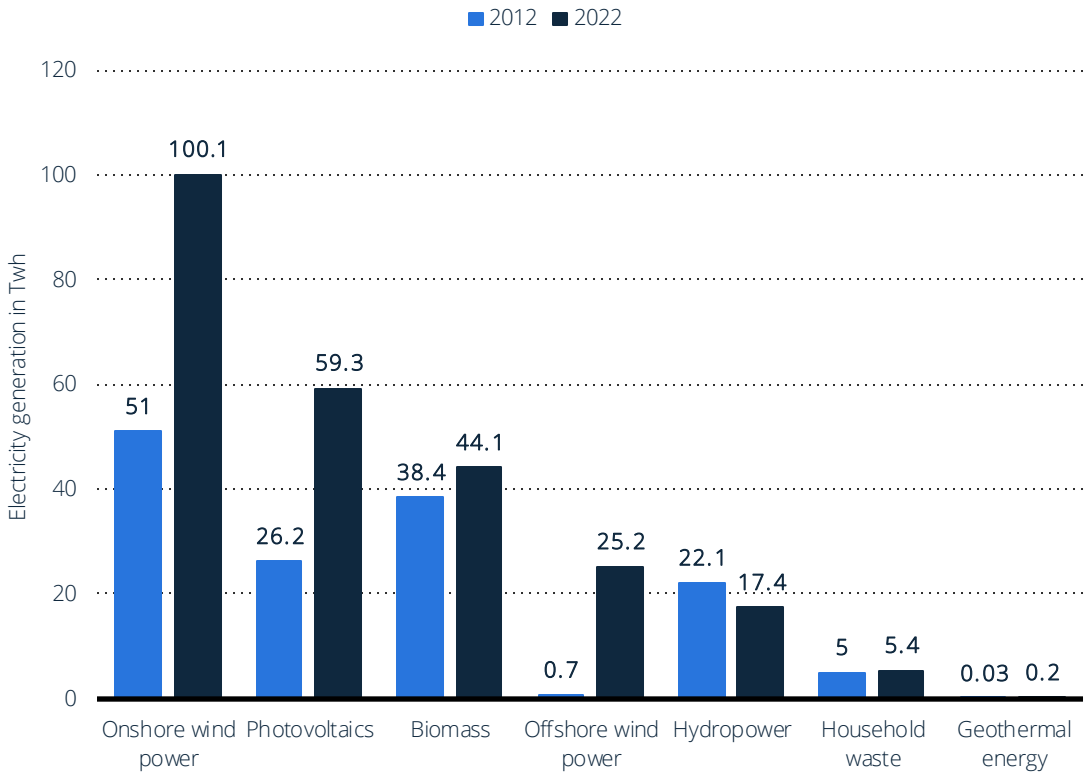
## Hydrogen applications

- Mobility
- Decarbonisation
- Chemicals
- Electricity generation
- Heat generation

**Source(s):;**
*https://www.datenportal.bmbf.de/portal/en/index.html*
*https://wasserstoffwirtschaft.sh/de/h2-im-gesamtsystem*

# GREEN ELECTRICITY PRODUCTION

- Establishment of renewable energy generation long-term focus
- Ensure supply into grid for various applications
- Various companies RWE, BayWa, Altus (Karlsruhe) etc.
- Projects and programs: $H_2$Mare, AquaVentus etc.



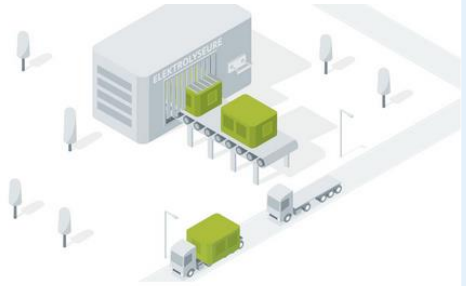

**Source(s):**
https://www.statista.com/statistics/583195/electricity-generation-from-renewable-energy-by-source-germany/
BDEW; ZSW; AGEB; BMWK; Statistik der Kohlenwirtschaft; Statistisches Bundesamt; ID 583195

# ELECTROLYSER - $H_2$ PRODUCTION

- Currently: ~173.4 MW electrolysis capacity.
- Goal: 10 GW electrolysis capacity by 2030.
- Some programs in Germany:

*Grafik: Projektträger Jülich im Auftrag des BMBF*

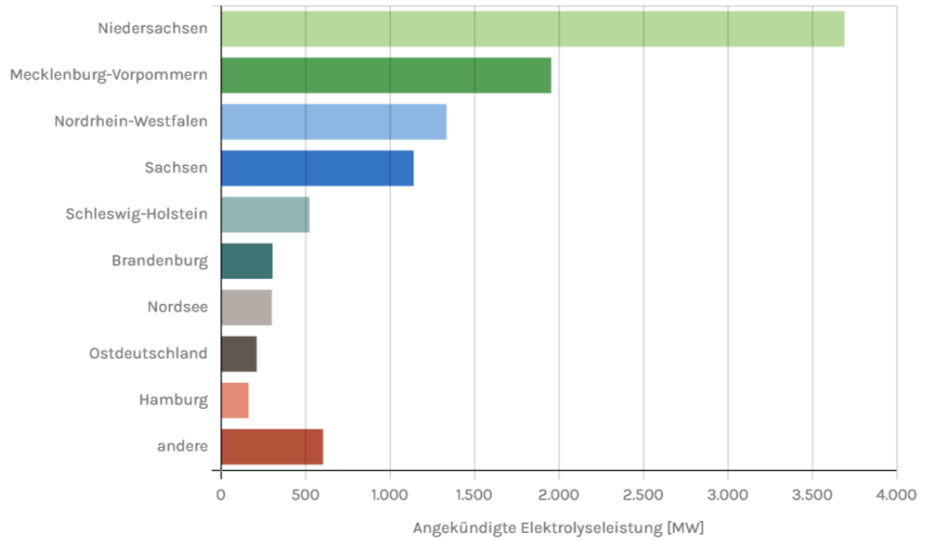
**$H_2$Mare**
Discovers **offshore generation** of green hydrogen and other P2X products



*Grafik: Projektträger Jülich im Auftrag des BMBF*

**$H_2$Giga**
Supports **series production** of **electrolyzer**

**Bis 2030 geplante Elektrolysekapazitäten in Deutschland nach Bundesländern**
Nicht alle Projekte sind eindeutig räumlich zu verorten. Für manche Projekte steht noch kein Standort fest. Diese sind in dieser Darstellung nicht aufgeführt.

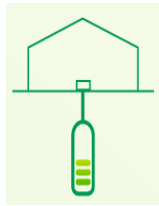



Copyright: acatech/DECHEMA

*Sources:*
*https://www.wasserstoff-kompass.de/en/elektrolyse-monitor*
*https://www.wasserstoff-kompass.de/*

# $H_2$ DISTRIBUTION AND STORAGE

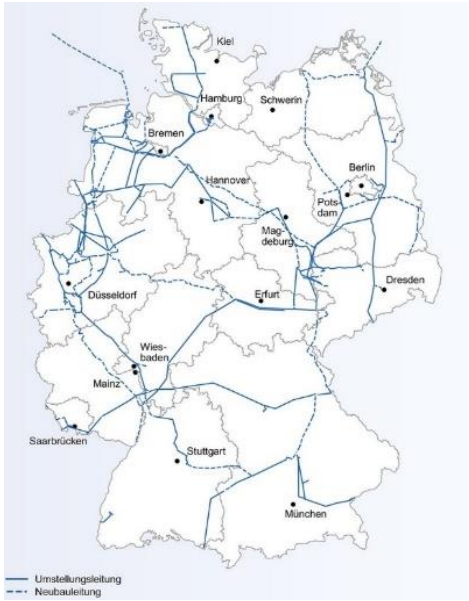
- Storage below, in caverns, and conventionally above terrain.
- Already, ~420 km $H_2$ pipelines Germany distributed in Ruhr, Central German chemical triangle, Schleswig-Holstein
- Recently: Ministry announced ~9700 km $H_2$ network costing 19.8 billion euros by 2032



**Energiepark Bad Lauchstädt**
Intergrated project including $H_2$ production, cavern storage and transport via repurposed pipeline

Graphic: Project Management Jülich on behalf of the BMBF

**TransHyDE**
Develops technologies for **hydrogen transport infrastructure**




**Length: 9,721 km**
Existing natural gas pipelines for conversion: 5,630 km
New pipelines: 4,091 km

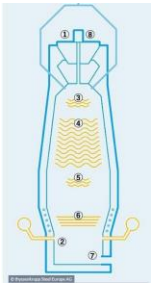
*Sources:*
*https://energiepark-bad-lauchstaedt.de/*
*https://www.tuev-nord.de/de/unternehmen/energie/wasserstoff/wasserstoff-pipelines-netze/*
*https://www.wasserstoff-leitprojekte.de/projects/transhyde*
*https://www.mdr.de/nachrichten/deutschland/wirtschaft/wasserstoff-kernnetz-kleiner-habeck-industrie-100.html*

# HYDROGEN APPLICATIONS

› Hydrogen can be utlised via solutions in 4 main areas mobility, industry, heat/electricity generation and base chemistry.

KOPERNIKUS P2X PROJEKTE
The Future of Our Energy

Store renewable energy in physical substances
**Sunfire:** Synthesis gas from water and $CO_2$ via co-electrolysis. Production of various hydrocarbons in downstream processes.



**Decarbonisation** of hard-to-abate industry
**H2Stahl:** Hydrogen injection at 10.000 $m^3$ per hour into blast furnace and 6.5 km hydrogen pipeline


Industrial scale **fuel-cell production**
**H2GO:** 80 Mio. € for R&D for fuel cell production, heavy duty traffic, 19 Fraunhofer Institutes involved

*Sources:*
*https://www.energiesystem-forschung.de/forschen/projekte/reallabor-der-energiewende-h2-stahl*
*https://h2-news.eu/forschung/h2go-fraunhofer-institute-erhalten-80-mio-e-fuer-brennstoffzellenforschung/*
*https://www.sunfire.de/en/news/detail/progress-within-kopernikus-p2x-research-project-high-temperature-electrolyzer-successfully-commissioned*

# INTERNATIONAL POSSIBILITIES

# COLLABORATION

- Germany is active in several international hydrogen related platforms:
  - IEA, 21 TCPs, Hydrogen TCP, AdvandedFuelCells TCP
  - Mission Innovation
  - Hydrogen Energy Ministerial, CEM
  - IPHE
  - Clean Hydrogen Partnership (EU)
  - RD20 Conference in Japan: R&D G20 countries for clean energy technologies”

Projektträger Jülich
Forschungszentrum Jülich

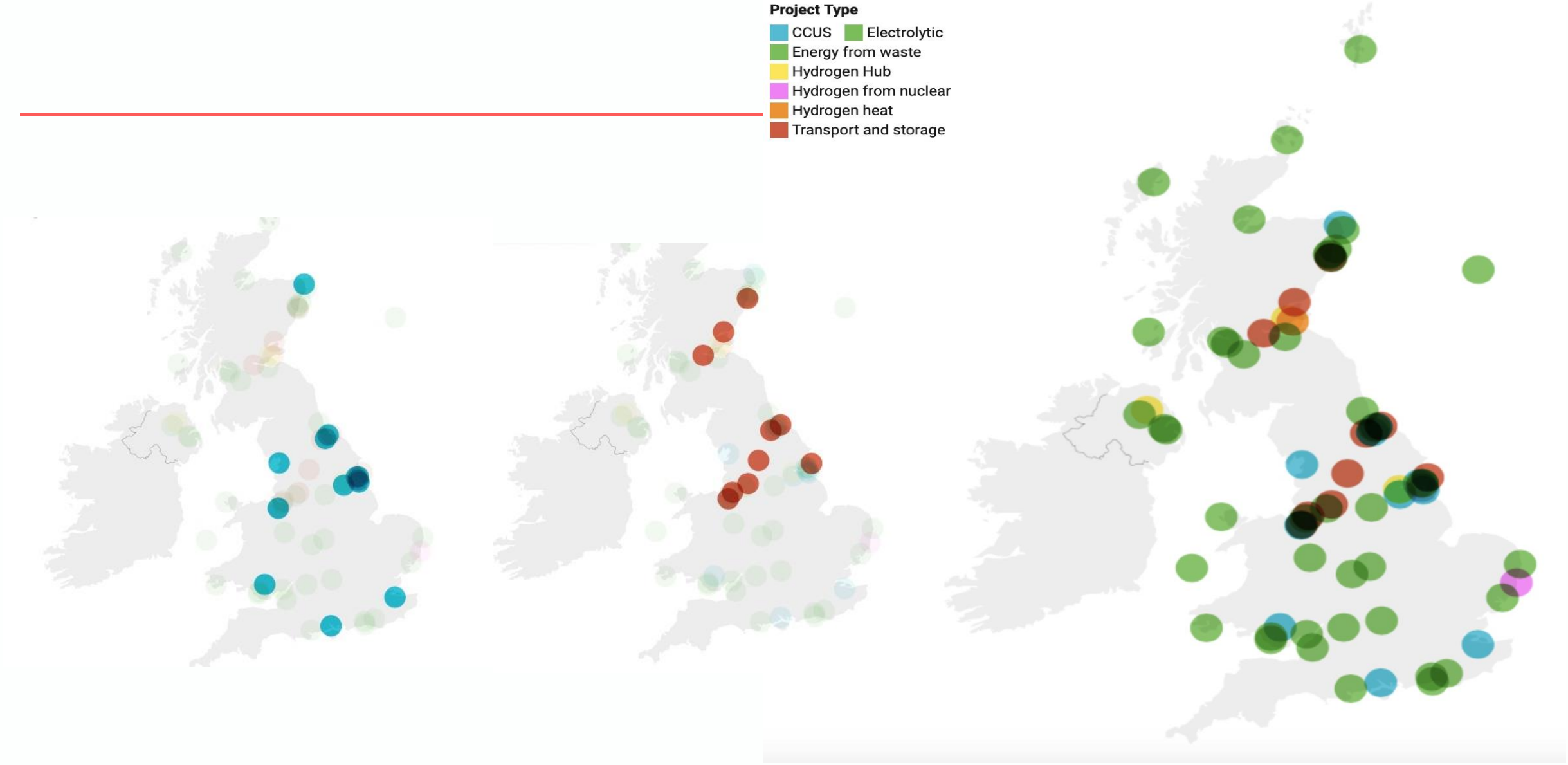
ERKENNEN. FÖRDERN. GESTALTEN.

Contact: eu-energie@fz-juelich.de

# UK Hydrogen R&D landscape

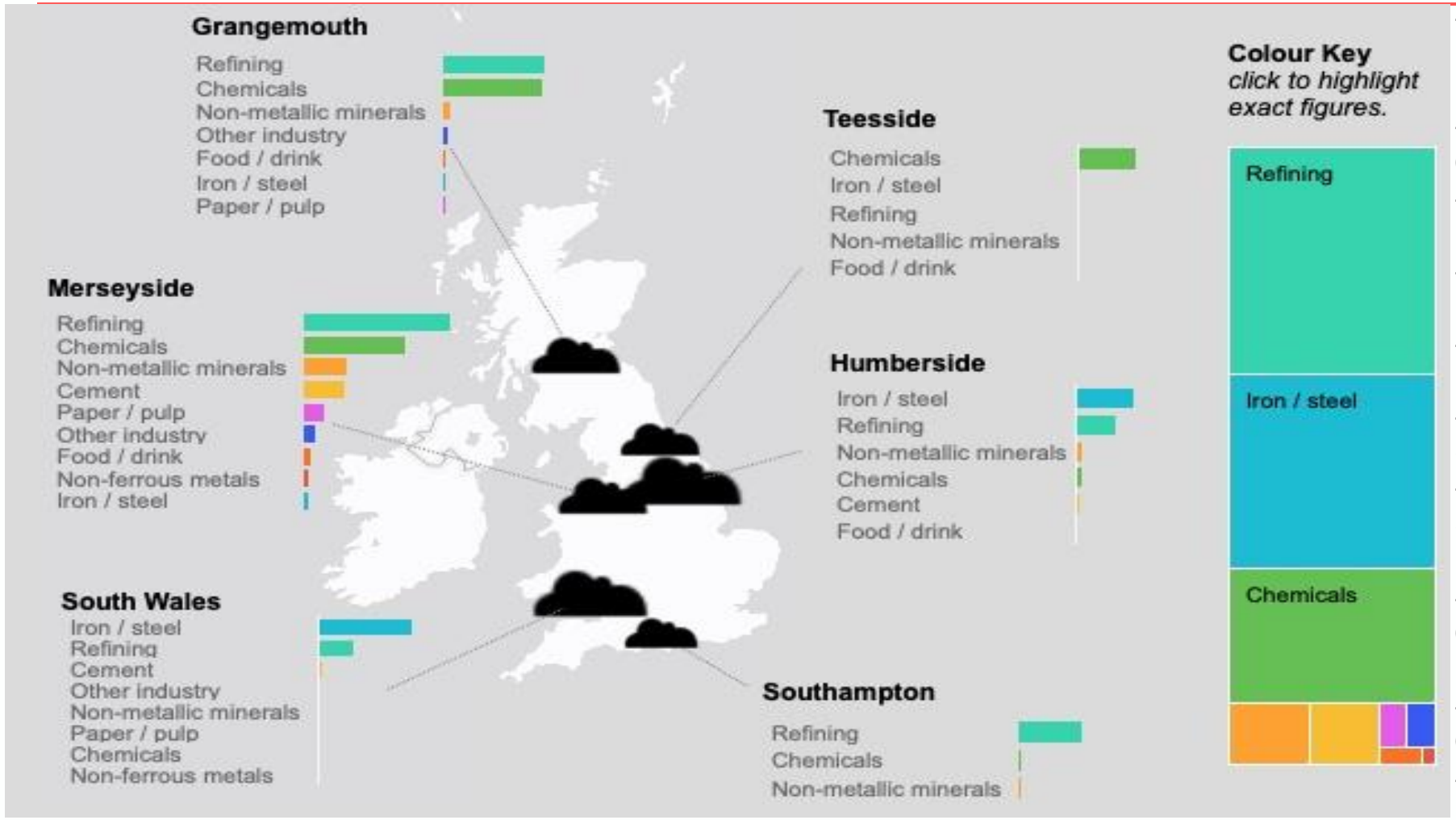
Avijita Kharel
Knowledge Transfer Manager
Clean Energy/Hydrogen

UKRI Innovate UK KTN




Innovate UK
KTN

# Industrial Decarbonisation




-Northern Endurance Partnership - Integrated Offshore Carbon Storage Net Zero Teesside Onshore,
-Humber Industrial Cluster Plan, Zero Carbon Humber Partnership,
- Humber Zero - Core Scope

-HyNet (Onshore and offshore) - Hydrogen and CCS
-The Net Zero NW Cluster Plan

-Scotland's Net Zero Infrastructure (Onshore),
-Scotland's Net Zero Infrastructure (Offshore) and Roadmap (SNZR)

-Repowering the Black Country Phase 2 Cluster Plan

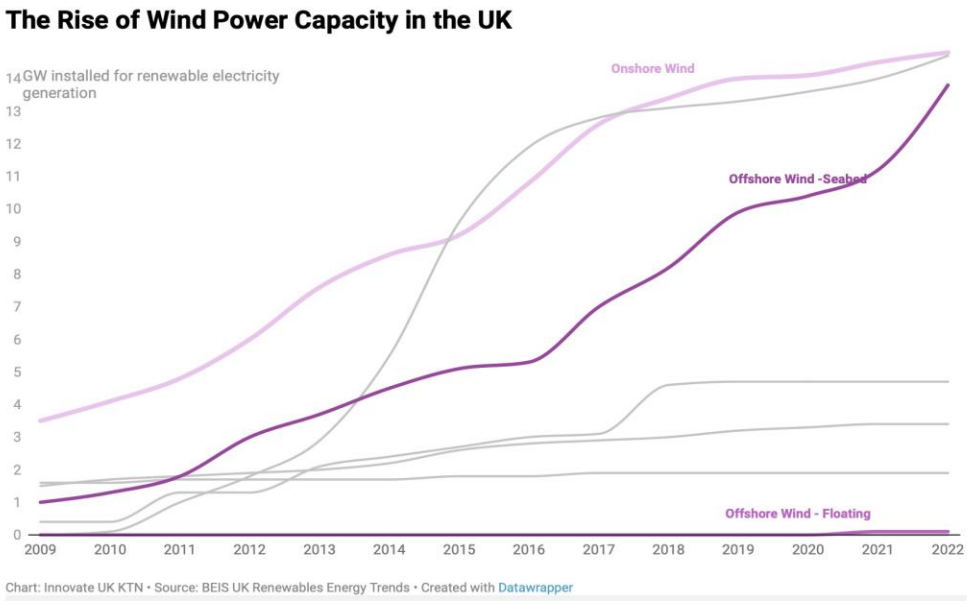
-South Wales Industry - A Plan for Clean Growth,
-South Wales Industrial Cluster - Phase 2 Deployment

About 36 million tons of $CO_2$ is emitted each year by the Industrial clusters.

UKRI Innovate UK KTN

# Power/Energy Storage

Government's 10 GW electrolyser-based hydrogen capacity target by 2030





Innovate UK KTN

# Hydrogen Transport

- Automotive Transformation Fund
- Advanced Propulsion Centre
- Zero Emission Vessels and Infrastructure Competition
- The Sustainable Innovation Fund: SBRI
- Zero emission heavy goods vehicles and infrastructure competition
- Unlocking the hydrogen energy market
- Zero Emission Road Freight Demonstration

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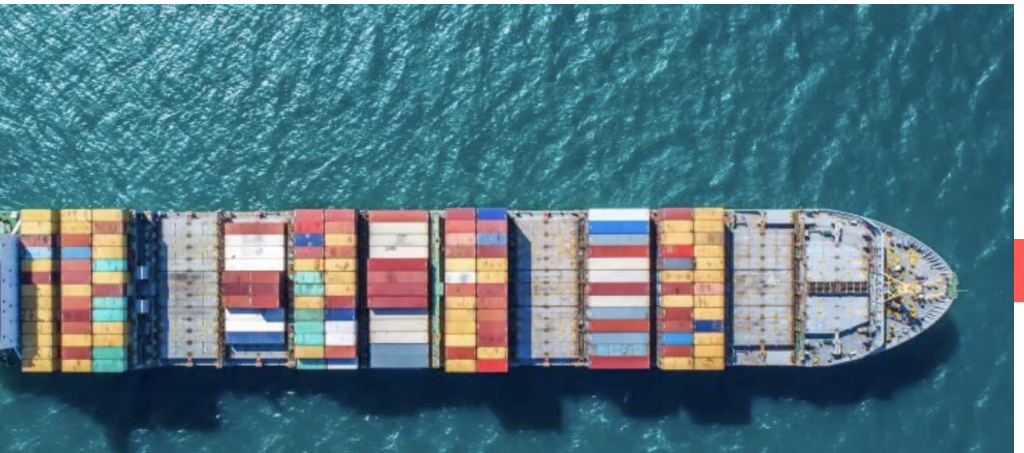
KTN

# Hydrogen Aviation and Maritime

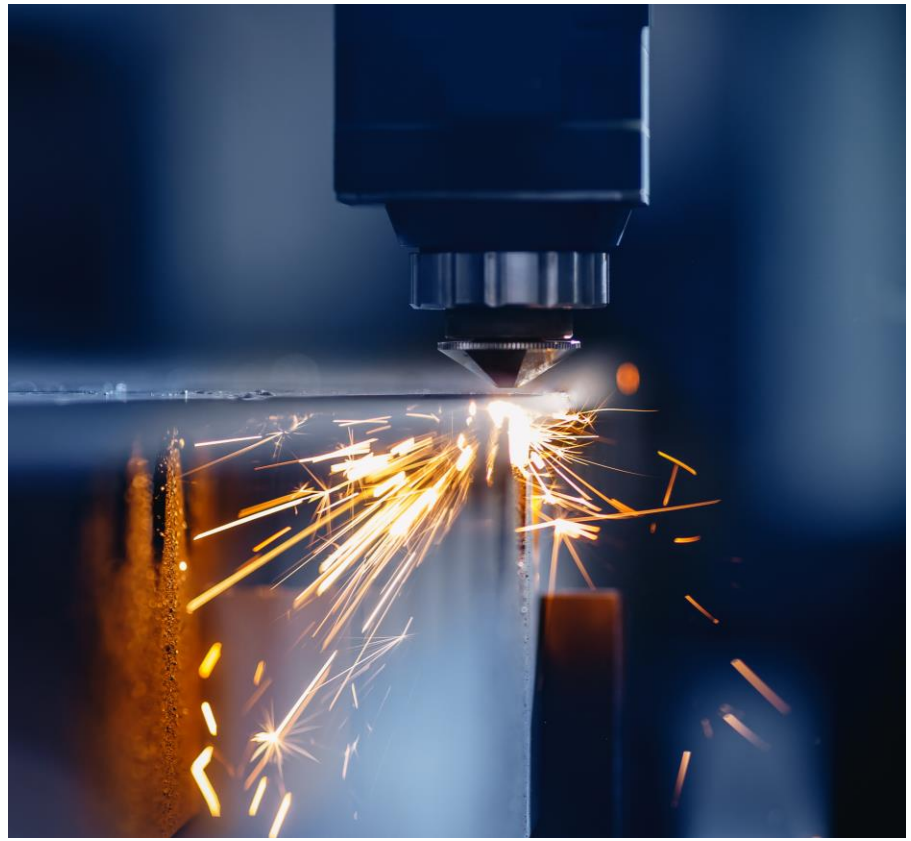
- Teesside International Airport Hydrogen Refuelling Hub
- Zero Emission Hydrogen Demonstration in Airport Applications
- Transitioning towards Zero Emission Vehicles (TZEV) and Niche Vehicle Network (NVN) programmes – various collaborations
- Zero Emission Flight Infrastructure (ZEFI) programme – 12 projects
- Clean Maritime Demonstration Competition (CMDC)
- Aerospace Technology Institute - 10 projects with multiple collaborators have received funding to carry out Hydrogen R&D projects



UKRI Innovate UK KTN

# Funding- Net Zero Innovation Portfolio

- IETF (Industrial Energy Transformation Fund),
- Low Carbon Hydrogen Supply Fund,
- Industrial Energy Efficiency Accelerator,
- Industrial Fuel Switching,
- Green Distilleries Competition,
- Red Diesel Replacement Competition
- Industrial Hydrogen Accelerator Program
- Energy Entrepreneurs Fund
- Hydrogen BECCS Innovation Programme



UKRI Innovate UK KTN

# Hydrogen Innovation Network

Activities and Support

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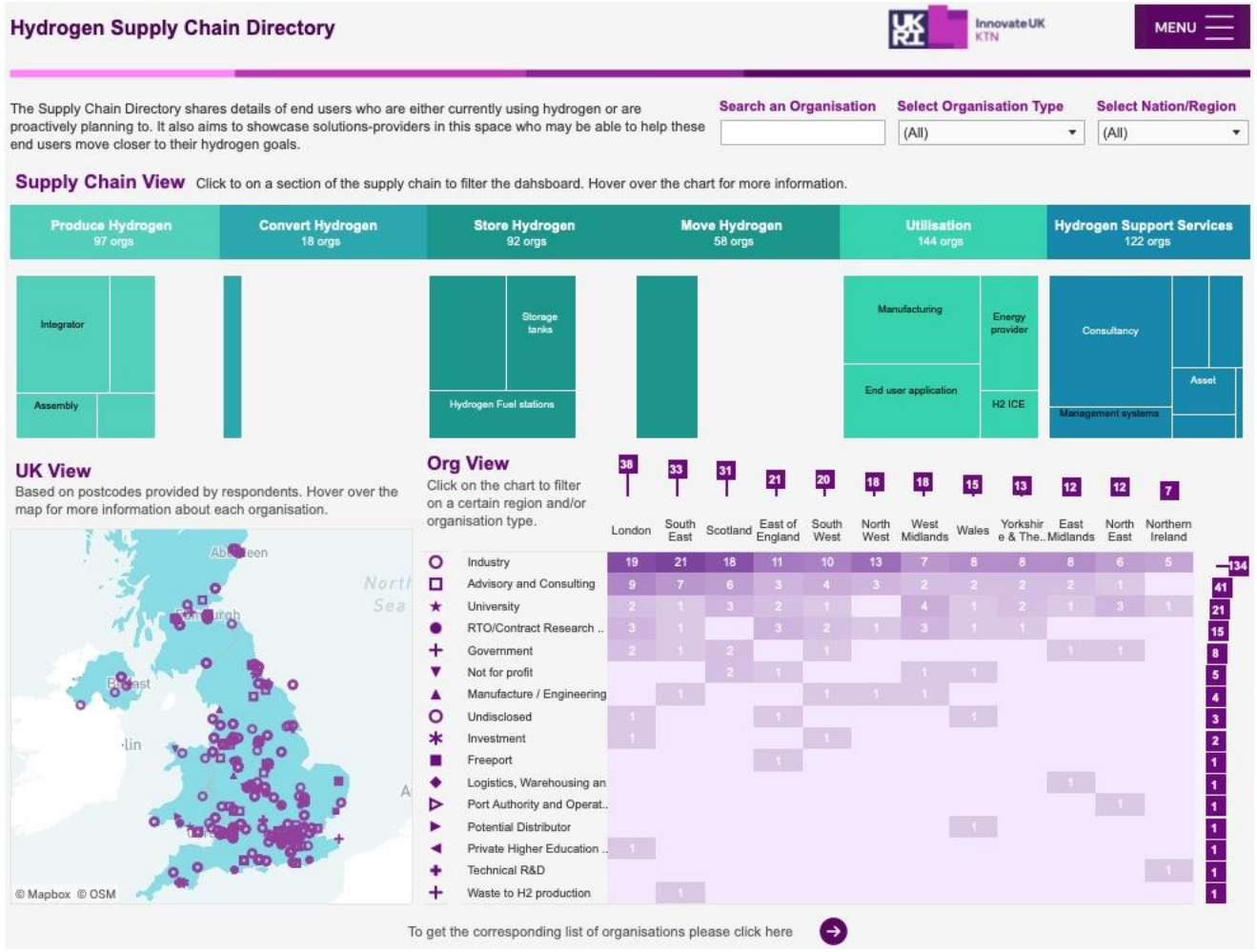
# Innovate UK KTN Hydrogen supply chain directory

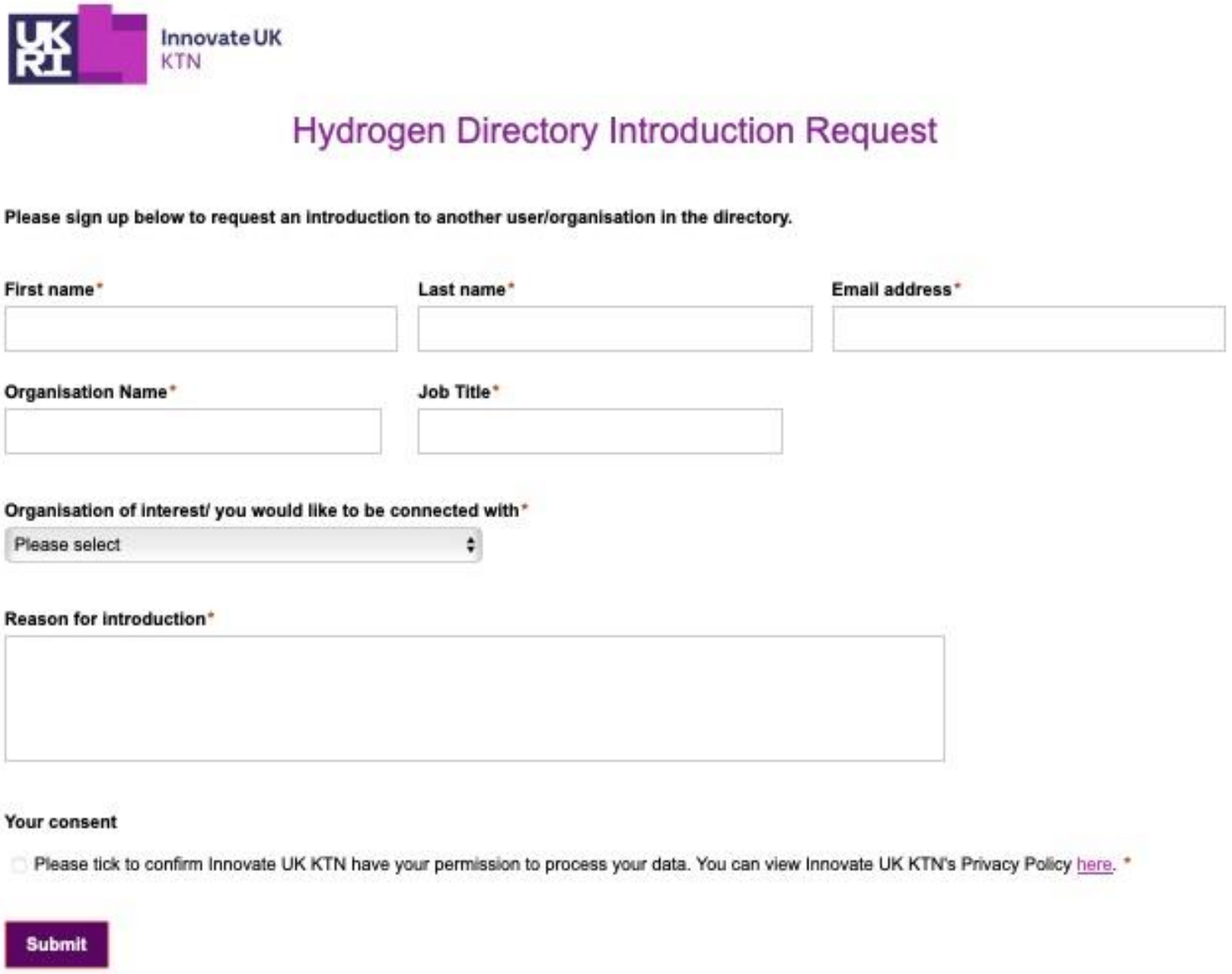



- **Hydrogen Supply Chain Directory** to discover the **320+ organisations** across the **UK** in **Hydrogen supply chain.**

Innovate UK KTN

# Innovate UK KTN Hydrogen supply chain directory

- **Hydrogen Supply Chain Directory** to discover the **320+ organisations** across the **UK** in **Hydrogen supply chain.**



Innovate UK KTN

Hydrogen Directory Introduction Request

Please sign up below to request an introduction to another user/organisation in the directory.

First name* | Last name* | Email address*

Organisation Name* | Job Title*

Organisation of interest/ you would like to be connected with*

Please select

Reason for introduction*

Your consent

Please tick to confirm Innovate UK KTN have your permission to process your data. You can view Innovate UK KTN's Privacy Policy here. *

Submit

# Innovate UK KTN Hydrogen Innovation Network 2023

Hydrogen Innovation Network helps solve **Hydrogen based challenges** through the **iX (Innovation Exchange)** program.

Innovate UK KTN's **Innovation Exchange** programme connects companies with specific challenges to innovators who are already working on the solutions. Our unique cross-sector approach connects businesses with opportunities beyond their existing thinking.

UKRI Innovate UK

Contact:

Hydrogen Innovation Network:
Avijita Kharel (Avi)
avijita.kharel@iuk.ktn-uk.org

Innovate UK
KTN

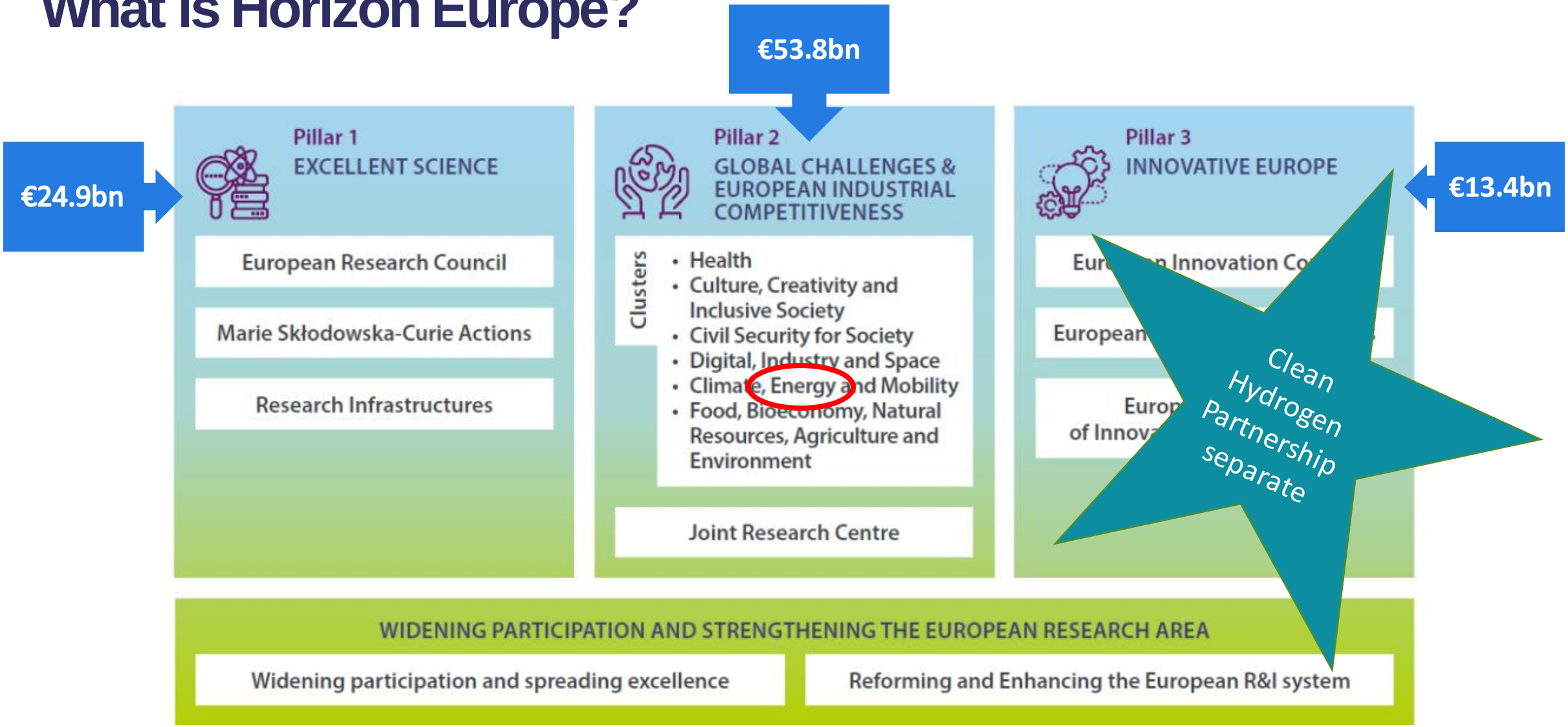
# How to get ready for Horizon Europe and find the right partners?

Conall McGinley
UK National Contact Point for Energy

# Horizon Europe Funding & Support
# Hydrogen R&D in the UK

UK Research and Innovation

# What is Horizon Europe?




UK Research and Innovation

# The fundamentals of Horizon Europe

- Must apply as part of a consortium representing at least three member states/associate countries
- Proposal preparation can take 6 months or longer
- Projects generally last 2-5 years
- Projects must advance cutting-edge innovation **at a European level**
- Projects must benefit **all Europeans**
- “Top Down” approach


UK Research and Innovation

# Benefits of Horizon Europe to your organisation

- Solve global grand challenges through collaborative R&I
- Collaborate with world leading organisations to learn from the best
- Access cutting edge technologies, infrastructure, talent & markets
- Contribute to the dialogue on standards, regulations and research policies
- Ensure that UK technology development aligns with global market place
- Collaborative partners frequently become buyers
- **Creating UK jobs, growth and stronger supply chains**

UK Research and Innovation

# What does a National Contact Point do?

Team of sector specific advisors to support UK entities to successfully participate in EU “Framework Programmes” and to shape the direction of EU research agenda.

**Assisting, advising and training** – to improve the quality of Horizon Europe proposals with UK content to increase success rate

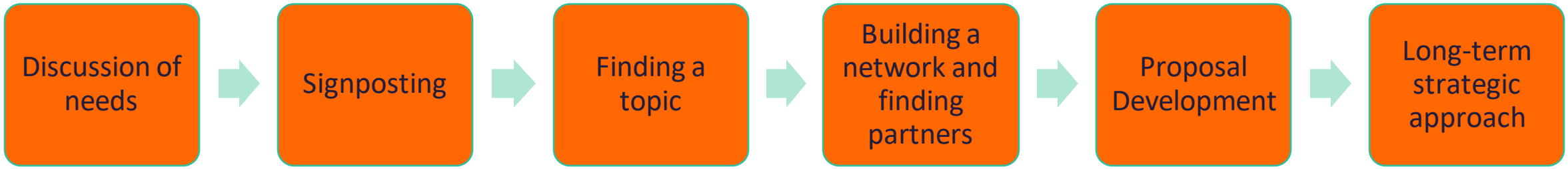
**Informing, awareness raising** – on all aspects of Horizon Europe rules, processes and participation

**Thought Leadership** – working with UK Government, sector stakeholders and Commission to shape future direction of R&I

**Signposting and cooperation** – direct to relevant support and work with each other to support consortium development


UK Research and Innovation

# What does a National Contact Point do?

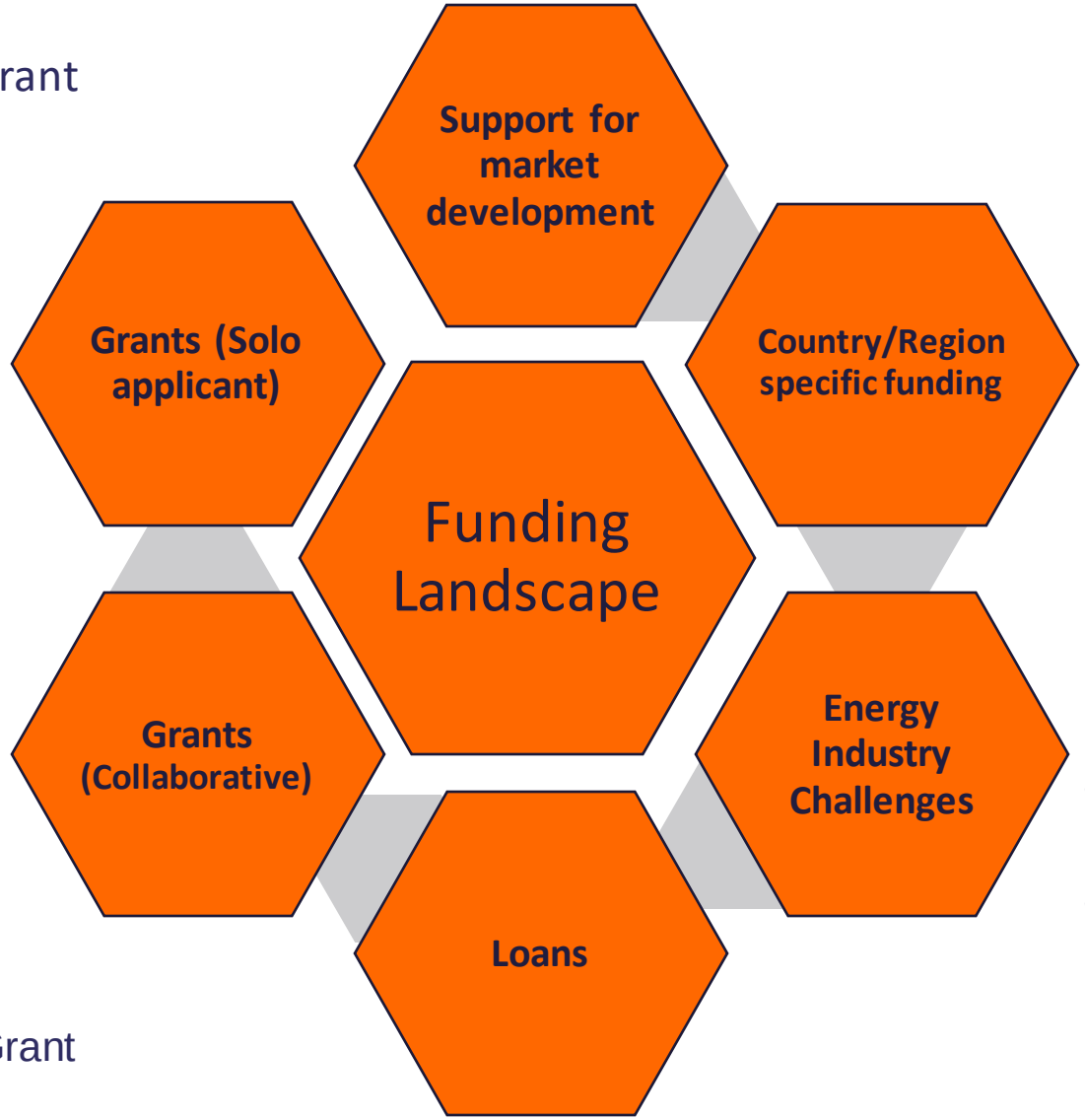



UK Research and Innovation

# Energy Innovation Funding Landscape

Global Business Innovation Programme

- Innovate UK Smart Grant
- Targeted Innovate UK/BEIS Calls
- Energy Catalyst Challenge Calls
- Knowledge Transfer Partnership funding
- EIC Accelerator




- Scottish Enterprise SMART Grant
- Scottish Enterprise CETP Grant
- Enterprise NI Grants
- Wales SMART Partnerships funding

- Targeted Innovate UK/BEIS Calls
- Horizon Europe
- Eureka Eurostars
- OFGEM Strategic Innovation Fund
- Innovate UK Smart Grant

- Energy Innovation Council Challenges
- Innovate UK Innovation Exchange

Innovate UK Innovation Loans

# Case Study - HySeas III

£9.2m project focused on developing the world's first sea-going, hydrogen fuelled, vehicle and passenger ferry using hydrogen produced from local renewable energy sources around the Scottish Isles.


Coordinated by ***the University of St Andrews,*** the team includes:

- Vessel design and development: ***Caledonian Maritime Assets Limited (UK)***
- Fuel cell power systems: Ballard Power Systems Europe A/S (Denmark)
- Vessel Systems Integrator: Kongsberg Maritime AS (Norway)
- Fuelling Infrastructure: McPhy Energy SA (France)
- Vessel and ports owner/operator: ***Orkney Island Council (UK)***
- Lifecycle and socio-economic analysis: DLR (Germany)

UK Research and Innovation

# Clean Hydrogen Partnership

- Public-private partnership supporting research and innovation activities in hydrogen technologies in Europe.
- EU will provide €1 billion euro for the period 2021-2027, complemented by at least an equivalent amount of private investment, raising the total budget to above €2 billion
- **20 live calls**


Clean Hydrogen Partnership

UK Research and Innovation

# Engaging with Europe

- Clean Hydrogen Partnership
- EU Hydrogen Week
- NCP Network
- Key conferences and events

UK Research and Innovation

Innovate UK

# Case Study Speaker

## Dennis Hayter - Intelligent Energy

# Pitches

Open the Floor
Raise your hand
Invited to the floor, unmute yourself

Pitches 2 mins

| | Organisation | Speaker |
|---|---|---|
| 1 | Aragon Hydrogen Foundation | |
| 2 | Coolkeeragh Green Energy Cluster | Catherine McHale |
| 3 | Coventry University | Oliver Curnick / John Graves |
| 4 | Coventry University | Oliver Curnick |
| 5 | Cranfield University | Mostafa Ranjbar |
| 6 | ena Development Consultants | Manolis Tsantakis |
| 7 | ERM | Andrew Flagg |
| 8 | Gerad | Rooholah Rad |
| 9 | Hive Composites | Peter Hansen |
| 10 | Hixal | Ian Perry-Jones |
| 11 | Hydrogen Ireland | Paul McCormack |
| 12 | MCG | Clinton Liu |
| 13 | Microgen Renewables | Martyn Cowsill |
| 14 | mtc | Huw Sullivan |
| 15 | Steamology | Matt Candy |

# Aragon Hydrogen Foundation

**PIC: 997456918**

## PRIVATE, NON-PROFIT RESEARCH CENTER, CREATED IN 2003 TO PROMOTE THE USE OF HYDROGEN AND FUEL CELL TECNOLOGIES AS A GREEN ENERGY VECTOR

## MOST SUCCESSFUL SPANISH ENTITY IN THE CLEAN HYDROGEN JU WITH 33 PROJECTS - 11 AS COORDINATOR


Activities

Working areas

| Strategic agenda development | Support in the development of strategic projects | Promote knowledge by companies and society |
|---|---|---|

| R&D | Innovation | Consultancy & Training | Business Development |
|---|---|---|---|

1,200 m² building with offices, laboratories and a unique workshop prepared to work with large $H_2$ equipment.

635 kW wind

100 kW PV

62 kW PV (self-consumption)

AEL 250 kW, industrial scale

AEL 20 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 (4000 L) @35 bar

23 kg (900 L) @350 bar

HIGGS - R&D Blending H2/GN

Hyundai Nexo & Kangoo ZE

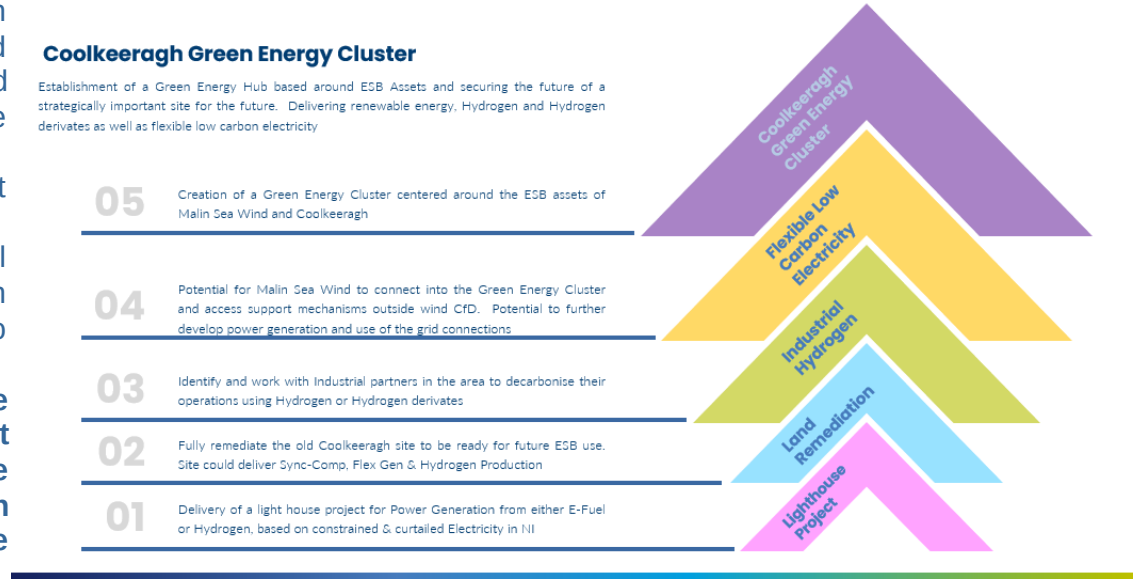
# Coolkeeragh Green Energy Cluster

## Proposed Approach & Experience

ESB are proposing the development of a Green energy cluster in the north west of NI centred around Coolkeeragh power station and surrounding Maydown Industrial Estate. The site is predisposed for such an ambitious project:

- The area has one of the largest concentrations of industry in NI.
- The surrounding seabed's have the potential for large volumes of offshore wind. For which this project could provide a valid route to market.

**The Cluster would not only be enabling the electricity system in NI become Net Zero but the green fuels created from renewable electricity would lead to the decarbonisation of the wider industrial area and provide energy storage.**




## Partners

If you are looking for partners, what type of partners are you looking for?

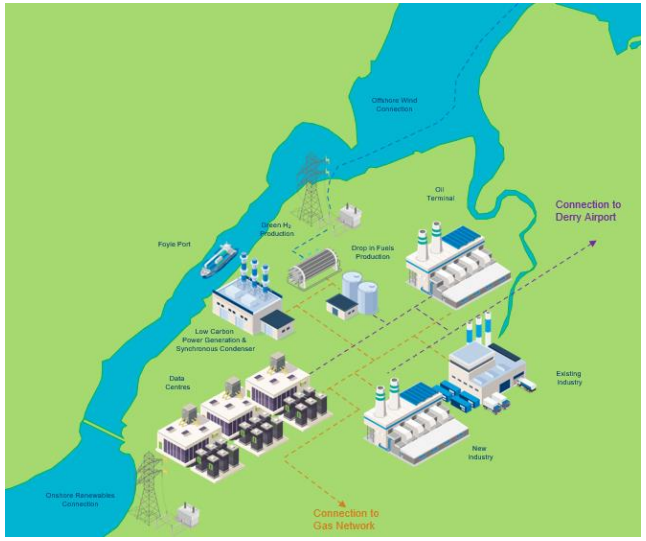
ESB has a track record of delivering projects through many different mechanisms with different structures and types of partners. For any energy cluster to be a success multiple parties need to be involved. Some key partners are:

- Renewable energy developers
- Industrial Off takers in NI
- Hydrogen/Efuel technology providers

## Organisational Capabilities

What skills, capabilities, facilities does your organisation have that will be vital for this project?

ESB, with its extensive experience and expertise in energy management and infrastructure development, emerges as an ideal partner for establishing a green energy cluster. Its proven track record in renewable energy projects, coupled with its commitment to sustainability, ensures the successful implementation of green initiatives. ESB's innovative solutions, technological prowess, and collaborative approach make it well-equipped to navigate the complexities of creating and managing a green energy cluster, driving forward the transition towards a more sustainable future with efficiency and efficacy.




## Administrative Information

ESB has been Ireland's foremost energy company since it was established in 1927, driven by an unwavering commitment to power society forward and deliver a net-zero future for our customers and the communities we serve. ESB is also NI's largest inward investor. ESB would be a lead partner in this initiative.


Contact Details:
Catherine McHale
catherine.mchale@esb.ie
+3538608480966
Ireland

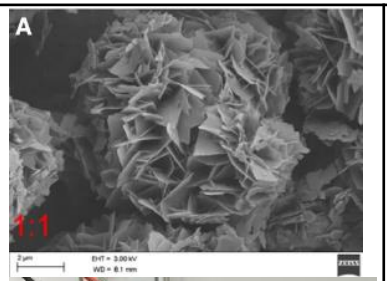
# Advanced AEM electrolysers for low-cost hydrogen production for high power range applications (HORIZON-JTI-CLEANH2-2024-01-02)

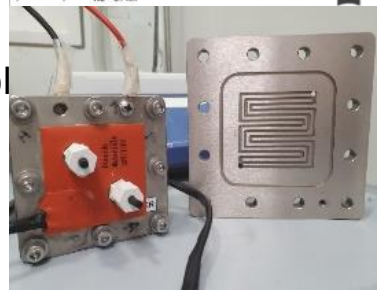
## Proposed Approach & Experience

Development of novel, non-PGM, nanostructured anode electrocatalysts for oxygen evolution, based on metal organic frameworks (MOFs).

Long-term (3000 hr) stability/durability testing at single cell (5-100 cm²) scale, according to EU harmonised test protocol

Stack testing at 50 kW scale



## Partners

AEM electrolysis OEMs, stack/system developers
Suppliers of porous transport layer (PTL) and bipolar plate materials/components.
AEM membrane & CCM suppliers/developers
Partners for post-mortem analysis of aged components

## Organisational Capabilities

CU's Hydrogen Energy Applications Laboratory hosts

Bespoke, fully-automated AEM cell test stands (x6)
Off-gas analysis (GC-TCD)
Hydrothermal synthesis
Electrolyser stack test capability up to 70kW

## Administrative Information

Coventry University (academic institution), UK
Seeking role as a partner, but can contribute to bid writing

Contact;
Oliver Curnick, oliver.curnick@coventry.ac.uk
John Graves j.graves@coventry.ac.uk

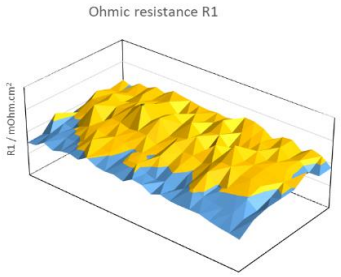
PIC: 999612161

# Development and implementation of online monitoring and diagnostic tools for electrolysers (HORIZON-JTI-CLEANH2-2024-01-04)

## Proposed Approach & Experience

The group at CU has experience in the application of advanced diagnostic techniques to fuel cells & electrolysers

We propose:
Spatially-resolved impedance spectroscopy (SR-EIS) for PEM




Electrochemical Harmonic Analysis (EHA) for online fault dete

AI-based fault detection and control e.g. diagnosis of membrane failure/crossover

## Organisational Capabilities

CU's Hydrogen Energy Applications Laboratory hosts

Bespoke, fully-automated LT electrolyser cell test stands (x6)

Off-gas analysis (GC-TCD)

Electrolyser stack test capability up to 70kW

Partners
PEM/AEM/AEL electrolyser OEMs
Data logging & management
Electrolyser modelling & digital twin,

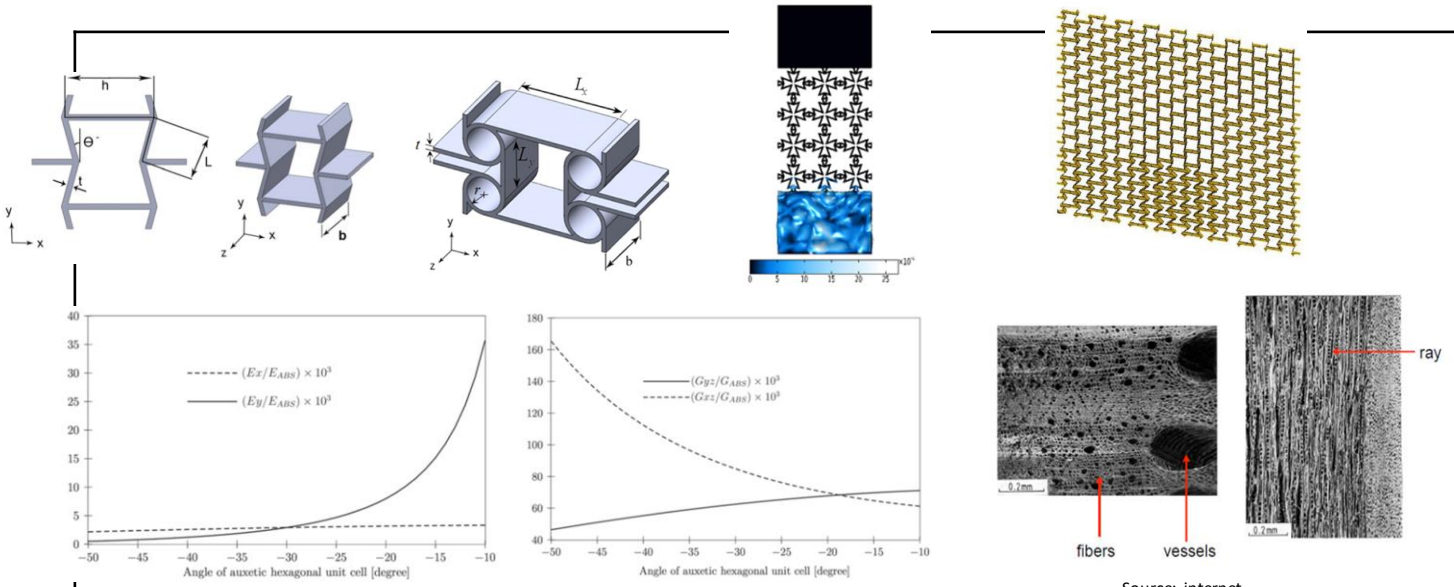
## Administrative Information

Coventry University (academic institution), UK
Seeking role as a partner, but can contribute to bid writing

Contact;
Oliver Curnick, oliver.curnick@coventry.ac.uk

PIC: 999612161

# Bioinspired Structures for Noise and Vibration Control in Sustainable Energy Applications




Source: internet

Partners

We are looking for any industrial partner in hydrogen storage tank manufacturing area, however any academic and research collaboration is welcomed.

## Organisational Capabilities

- More than a decade of experience in design and development of the metamaterials Metamaterials with increased shear stiffness
- Metamaterials with increased resistance to indentation (toughness)
- Durability at dynamic loadings and fatigue
- Increased resistance to fracture and damage
- Different deformation pattern, tendency to form double curved dome
- High energy absorption capabilities
- Better thermal management – low temperature storage
- Low density
- Adjustable mechanical properties
- Cellular and random geometry for hydrogen storage

## Administrative Information

Cranfield University is a public institution based in Cranfield, UK.

We are planning on being either the Coordinator or a Partner.

Dr Mostafa Ranjbar, mostafa.ranjbar@cranfield.ac.uk, Tel. 00447951528282, United Kingdom, PIC 999440762

# Hydrogen production and storage

| | |
|---|---|
| **Proposed Approach & Experience**<br><br>**Proposal writing stage**: *Project's pathways towards impact; Measures to maximize impact – Communication, Dissemination and Exploitation; IPRs management; Pathways to impact table: C & D & E measures; Target groups definition; Work package description; Critical risks for implementation; Business case or business plan*.<br><br>**Implementation stage**: *Communication & Dissemination Plan, Communication Pack Development, Day-to-day communication, Events organization, Use case monitoring, IPRs and Exploitation Strategy, Market Analysis, Business Plan, LCA, s-LCA, Social Acceptance Analysis, ESG reports, Field surveys, Replication of results*. | Partners<br><br>Seeking roll as a Partner for tasks:<br>- IPRs<br>- Commercial exploitation<br>- Dissemination<br>- LCA, s-LCA<br>- Social Sciences and Humanities |
| **Organisational Capabilities**<br><br>Pilots' development and monitoring through Refineries, Energy cooperatives, Academic Labs, Regional and Local Authorities.<br><br>Social Sciences and Humanities expertise and experience.<br><br>Network of Interest development and engagement. | **Administrative Information**<br>SME<br>Seeking roll as a Partner<br><br>Mr Manolis Tsantakis<br>manolis.tsantakis@enateam.gr +30 6944 83 51 51<br>Greece<br>PIC 916359292 |

# HORIZON-JTI-CLEANH2-2024 / All Topics

**Proposed Approach & Experience**

ERM's Sustainable Energy Solutions team (formed of acquisitions of Element Energy and E4Tech), provides **strategic consultancy** focused on the **low and zero carbon energy sector**, with 2 decades of **experience in the hydrogen sector.**

We provide support to consortia through key stages of **developing funding applications** as well as **Grant Agreement preparation.**

ERM has initiated most of the major Clean Hydrogen Partnership hydrogen transport projects in Europe. We also support project implementation through our role as **Coordinator.** We are involved in **27 projects through our UK entity** and **10 projects with our French entity** across FP7, H2020 and Horizon Europe. E.g:

- H2Accelerate Trucks (2022 call)
- ZEFER (2017 call)
- JIVE / JIVE 2 (2016 / 2017 call)
- ZEFER (2017 call)
- H2Haul (2018 call)
- H2ME / H2ME 2 (2014 / 2015 call)
- Oyster (2020 call)
- HOPE (2022 call)
- PACE (2015 call)
- HYPSTER (2020 call)

Partners

ERM can partner with existing consortia seeking Horizon Europe funding or projects already receiving funding.

**Organisational Capabilities**

ERM can offer:

- Extensive experience in **Horizon Europe processes** in a dedicated team supporting funded project management (project delivery, consortium management, reporting, funding management and compliance).
- Sustainable energy **sector expertise** to support project delivery and effectively interface with beneficiaries, funding agency and external stakeholders.

**Administrative Information**

Andrew Flagg | Managing Consultant
andrew.flagg@erm.com +44 20 3206 5174

ERM UK – PIC: 950924854
ERM France – PIC: 886455647

Consultancy supporting funding applications, grant preparation and in role as Coordinator / technical support.

# Clean Hydrogen Production Via PC-H2SMR

**Proposed Approach & Experience**

- Our project aims to revolutionise hydrogen production by addressing the environmental challenges associated with current methods, particularly focusing on the oil and gas industries. We specifically target the decarbonisation of fossil fuels and the production of hydrogen using a breakthrough technology called PC-H2SMR (**Plasma Catalytic Hydrogen Sulphide Methane Reformation**). This process avoids the use of water and minimises CO2 emissions. By utilising hydrocarbon-based sources like sour gas and biogas, we not only reduce methane emissions but also generate valuable by-products. Our approach is not only environmentally sustainable but also economically viable.
- Our team brings a wealth of expertise in catalysis, nanotechnology, and plasma technology. We have successfully developed a composite of **highly stable nanocatalysts supported on mesoporous boron nitride**, addressing the critical challenge of catalyst deactivation in H2SMR. This breakthrough enhances catalytic reactions and selectivity. Moreover, our integration of **Non-Thermal Plasma (NTP) technology** further demonstrates our commitment to pushing the boundaries of innovation. Our collective experience in these domains positions us as leaders in developing advanced solutions for sustainable clean hydrogen production.

Business Model

In this programme, our business model centres around forming strategic partnerships with companies in the oil and gas sector. We aim to provide a sustainable and closed-loop solution for hydrogen production within the hydro-treating process. Our primary activities involve seamlessly integrating the PC-H2SMR process into existing hydro-treating facilities. We offer oil and gas refineries a clean, cost-effective, and environmentally friendly hydrogen source. Simultaneously, we use hydrogen sulphide produced during the hydro-treating process as feedstock for PC-H2SMR. **Our target partners include major oil and gas companies, refineries, environmentally conscious organizations, technology integrators, sales and distribution partners, and research and development collaborators**. Revenue sources encompass technology licensing and operating fees, along with consulting services for process optimization. Catalysts, hydrogen, and co-product sales also contribute to our income stream.

**Organisational Capabilities**

GERAD Tech. boasts a multidisciplinary team with expertise spanning catalysis, nanotechnology, plasma technology, and petroleum engineering. Our skilled researchers have a proven track record in developing innovative solutions for sustainable energy. We possess state-of-the-art laboratory facilities equipped for advanced materials synthesis, catalyst testing, and NTP process optimization. Our in-house capabilities include a comprehensive understanding of plasma

**Administrative Information**

GERAD Tech, a simplified joint-stock company in France.

Rooholah N. RAD, r.rad@gerad.tech, +330678536783
France
Participant Identification Code (PIC): 881674905

# Cluster 5: Climate, Energy and Mobility – any hydrogen calls

## Proposed Approach & Experience

- Technologies are urgently required that enable industry to switch from fossil fuels to hydrogen and deliver a decarbonised industrial and domestic sector.
- Pipelines will be the principal means of distributing hydrogen to industrial users in both the UK and international markets. However, hydrogen causes embrittlement in steel pipes, reducing the safety of new and existing assets.
- Steel pipes can be replaced by thermoplastic composite pipe for hydrogen applications.
- Thermoplastic composite pipes (TCP) can be manufactured in lengths exceeding 2km and can be spooled onto a drum, then unspooled for rapid installation.
- TCP are attractive due their ease of installation and lower embedded CO2. Thermoplastic materials are also recyclable at end of life.
- Hive has both H2 TCP IP/technology and testing capability for H2 products – an enabling technology for the deployment of hydrogen networks

## Partners

If you are looking for partners, what type of partners?

Looking for:

- Projects looking to develop hydrogen distribution networks
- Industrial decarbonisation projects where we can demonstrate our TCP
- Projects where some further development and testing of our pipe solution can be performed – added innovation

## Organisational Capabilities

**Thermoplastic composite pipe technology – spoolable, lightweight, recyclable**

- We have designed, prototyped and are currently testing and qualifying our own TCP for hydrogen distribution with lower embedded energy than other products
- Diameters of 2” up to 8” spoolable – larger if non-spoolable
- Incorporates hydrogen permeation barrier – various technologies
- Prototyping capability for winding trial sections, tape coating line

**Testing capability**

- Hydrogen permeation, exposure and rapid gas decompression testing
- Pipe burst testing, cycling pressure, constant pressure, spooling trials
- Large scale universal test machine (up to 150kN)
- Bespoke structural test frames
- NDT inspection
- Fitting/joint designs
- Sensor technologies for condition monitoring and inspection

## Administrative Information

- Hive is a Director owned UK company
- Interested in being a project partner in projects that require hydrogen distribution

Contact details including:

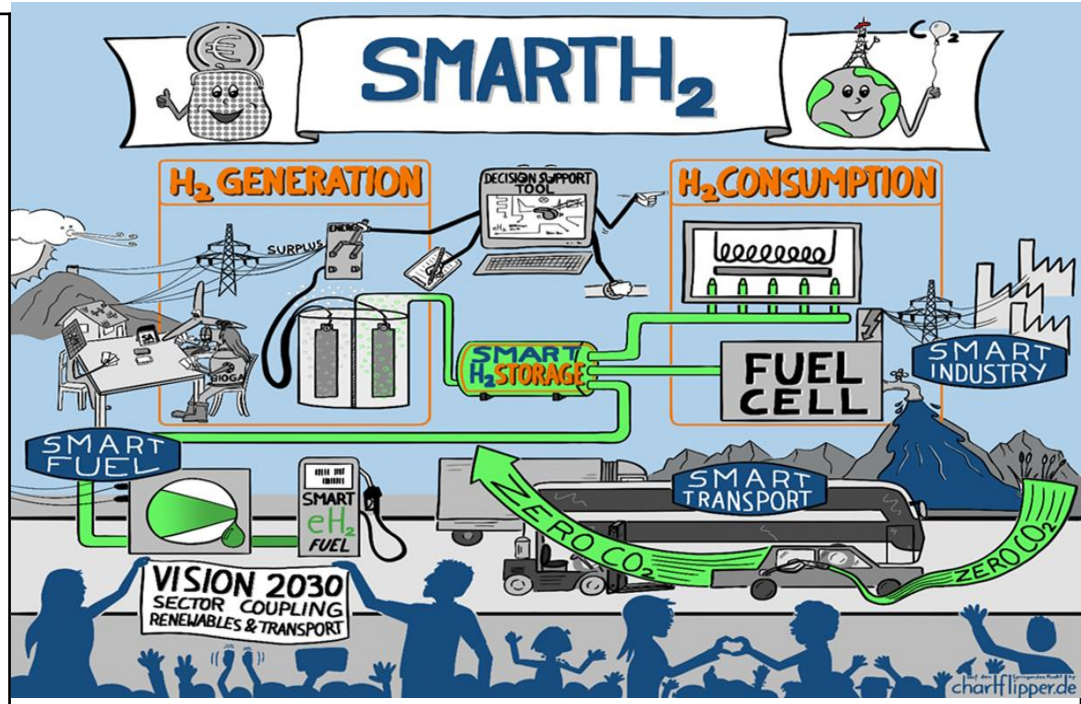
**Peter Hansen CEng MIMechE**
**Director**
Tel: +44(0)7941 818 320
p.hansen@hivecomposites.com

Your organisation’s Participant Identification Code (PIC) if your organisation has one

# CALL/TOPIC Name (Reference)

## Hydrogen Optimisation

1. ***Optimising*** hydrogen production, distribution, storage and transmission.
2. ***Actualising*** Green H2 to valorise and maximise the green energy outputs
3. ***Evaluation*** parameters of performance and benefits realisation
4. ***Validating*** *P2X* H2 technologies to be deployed in emerging scenarios
5. ***Developing*** long term strategies for the advancement in adoption of hydrogen technologies
6. ***Mapping*** Energy Navigation Routes for the transition of the EU energy system to the green destination




*Hydrogen is the catalyst driving Europe's energy transition. Optimising this journey through valorization of the hydrogen supply chain,* ***production****,* ***distribution****,* ***storage*** *and* ***transmission*** *is key to creating a successful hydrogen Europe.'*

***Extensive development and demonstration skills & experience in innovation driven Hydrogenewables GenComm, GreenH2 and SMARTH2***

- Hydrogen Ireland https://hydrogenireland.org/
- GenComm Website nweurope.eu/gencomm
- GenComm LinkedIn GenComm
- GenComm twitter @GenComm_CH2F
- Community Hydrogen Forum www.communityh2.eu

**GenComm Animation**

| | |
|---|---|
| Proposed Approach & Experience<br><br>MCG UK will use the existing blockchain-enabled supply chain traceability platform VUILA to build digital material passport (DMP) by automatically calculating the hydrogen production cost and carbon intensity index throughout the hydrogen supply chain, thereby enhancing real-time visibility and control over real operations. DMP will provide digital records of hydrogen and incorporate digital carbon footprint monitoring, report and verification(MRV) system based on the energy web chain. | Partners<br><br>MCG are looking for industry partners in Europe and relevant academic expertise for the ongoing UK-Germany Collaborative R&D funding call and other emerging opportunities. |
| **Organisational Capabilities**<br><br>MCG have led Hy-PACT and leverage the existing blockchain-enabled supply chain traceability platform VUILA to build DMP(Digital Material Passport) by automatically calculating the hydrogen production cost and carbon intensity index throughout the hydrogen supply chain, thanks to the Innovate UK KTN project between MCG and Cranfield University: https://www.cranfield.ac.uk/som/research-projects/iot-blockchain-integrated-platform-for-maritime-shipping-industry. | **Administrative Information**<br><br>MCG is a London-based SME<br><br>Coordinator/Partner<br><br>Clinton Liu<br>cliu@vuila.uk<br>07586852406<br>https://www.linkedin.com/in/clinton-liu-mcg-buildtolast/ |

# Horizon Europe Clean Hydrogen Partnership

MICROGEN RENEWABLES

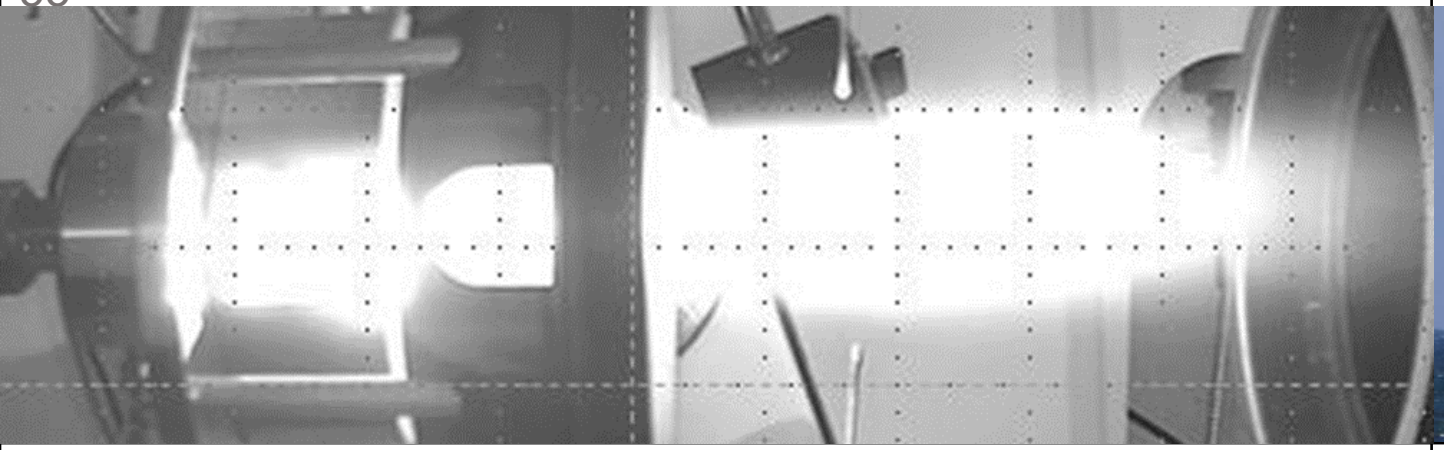
| | |
|---|---|
| **Proposed Approach & Experience - the problem/challenge you can solve?**<br><br>Electrolysis for green hydrogen production needs zero-carbon, low-cost electricity. MicroGen can identify, from satellite, sites where new hydropower (the lowest-cost form of electricity generation) could be established, in accordance with multiple qualifications as 'potential' including minimal environmental impact.<br><br>**Previous, relevant, work or track record can you bring to the team?**<br>MicroGen has developed "ISMO" satellite-based earth observation technology which is helping African governments to plan multiple hydropower installations for rural electrification | Partners<br>If you are looking for partners, what type of partners are you looking for?<br><br>Hydrogen equipment manufacture/supply (electrolysers, compressors, fuel-cell, etc.)<br>Government agencies focused on development of 'green hydrogen' production. |
| **Organisational Capabilities**<br>**Skills, capabilities, facilities does your organisation have that will be vital for this project?**<br><br>MicroGen provide:<br>Bid/proposal writing<br>Industry/Market Research<br>Team/Partnership building<br>Use of unique IP in satellite-based earth observation technology for the surveying of river valleys for sites suitable for hydropower development | **Administrative Information**<br><br>MicroGen is an SME.<br>Willing to be either the Coordinator or a Partner<br><br>Your contact details including:<br>Martyn Cowsill, martyn@microgenrenewables.com +44 7827 017796<br>From UK<br>PIC : 962402476 |

# Clean and competitive solutions for all transport modes (HORIZON-CL5-2024-D5-01)

STEAMOLOGY®
zero emission power solutions

**Proposed Approach & Experience**

Steamology delivers zero emission marine power to MW scale “Fit for 55”

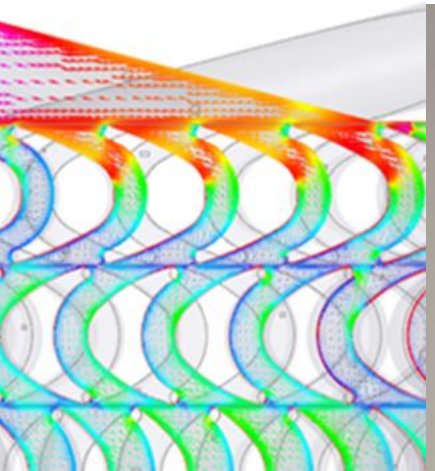


Partners

Naval Architects, Vessel Operators, Port $H_2$ Infrastructure


**Organisational Capabilities**

Design, build, test and development of quiet, clean, efficient, energy dense, cost effective, long life marine power for retrofit or new build vessels



**Administrative Information**

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