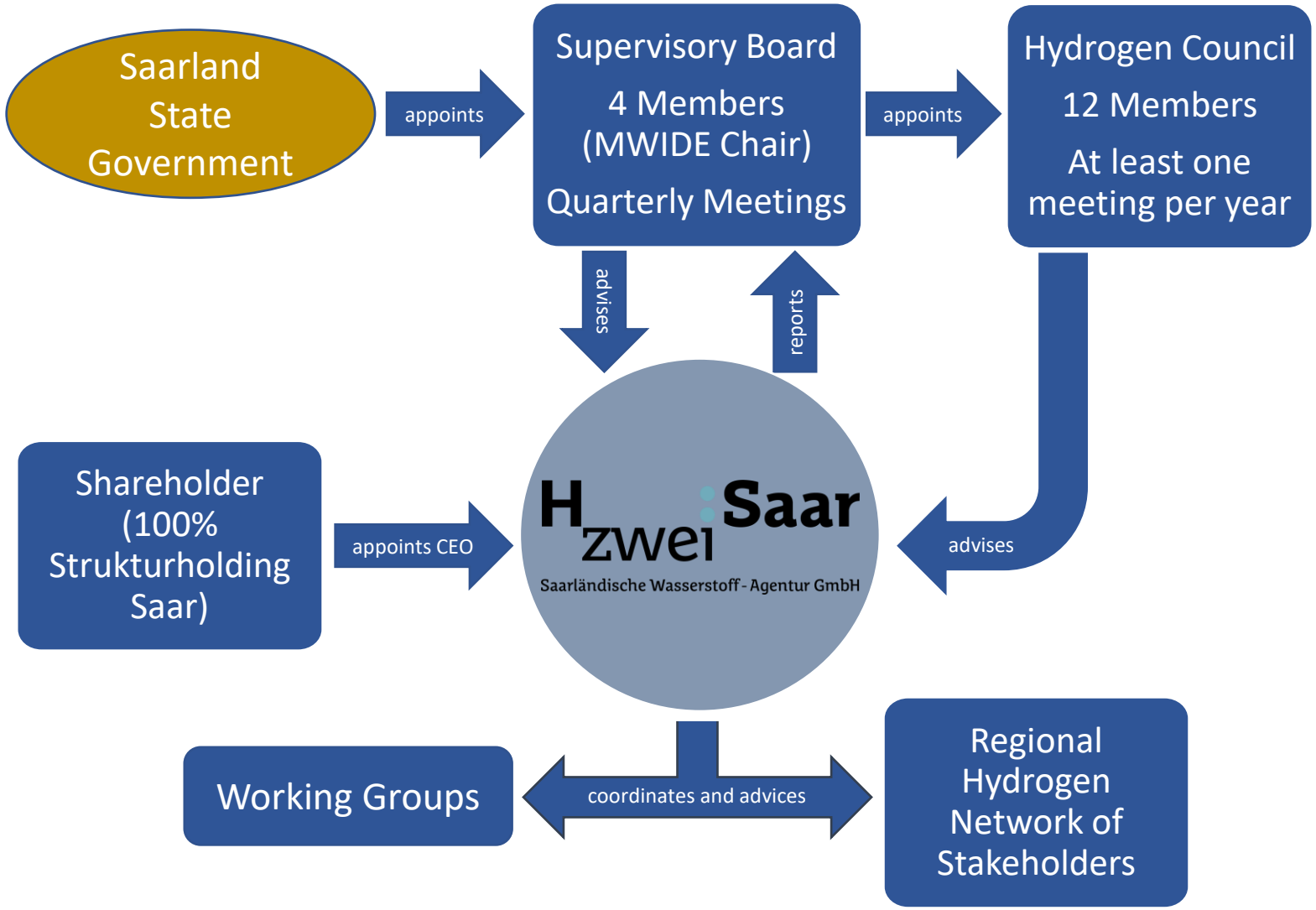
Saarland‘s Hydrogen Agency

Dr Bodo Groß

30. REGWA Energie-Symposium

Stralsund, 08.-10. November 2023

Saarland‘s Hydrogen Agency: Organisation Chart



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Federal State Saarland aims to become a „hydrogen region“

- Saarland has developed a hydrogen strategy already in 2021 which is constantly updated
- A strong network of companies, municipal utilities , local authorities, associations and research institutions was established
- In order to implement the strategy successfully and efficiently, Saarland’s Government founded the Saarland Hydrogen Agency in May 2023
- We, the team of the H_2-Agency, are convinced that hydrogen acts as a technological bridge to an economically successful, CO_2 emission free and sustainable future
- Our mission and goal is to coordinate, accelerate and establish the transition from fossil fuels to a hydrogen-based energy supply for all sectors in the Saarland as well as in the greater region.

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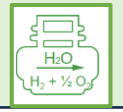
Therefore we plan to establish a complete H_2 value chain

Renewable Energy Generation

- Onshore wind and PV
- Sharp increase in installed Renewable capacity
- Place 3 in ranking of German „Länder“ regarding installed capacity in relation to size

H_2 Production



- Multiple electrolyser projects under development:
  - Up to 70 MW in Perl by Lhyfe
  - Up to 300 MW in Dillingen next to steel plant by RWE
  - Up to 58 MW on former power plant site by Iqony
  - Several additional projects in early stage
  - Some promising projects on French side of the border (EmilHY, CarlHYng)

Distribution & Storage

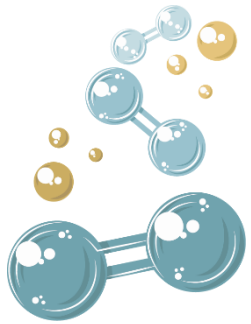
- Pipeline network „MosaHYc“ connecting producers and consumers of hydrogen on the French and Saarland side of the border
- Different connections to German and European pipeline backbones through France, Benelux or Germany currently envisaged, providing infrastructure for imports

Application

- Main user of hydrogen steel plant Dillinger (steel production)
- Other strong use cases from players in other industrial branches, heat or mobility

Components

Research & Development



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Main activities of Saarland‘s Hydrogen Agency I

- **Wasserstoffnachfrage**
  - Umfangreiche Bedarfsanalyse der Wasserstoffbedarfe nach Anwendern
  - Wann kommt welcher Bedarf und unter welchen Bedingungen
  - Wo entstehen lokale Bedarfscluster
  - Abfrage begleitet von Informations- und Beratungsveranstaltungen
- **Wasserstoffbereitstellung und -versorgung**
  - Unterstützung laufender Aktivitäten
  - Marktanalyse und Nachverfolgung von Änderungen und neuen Entwicklungen
  - Lokale Produktion: Elektrolyse, alternative Verfahren
  - Importe: z. B. Ammoniak, LOHC, SynGas
  - Pipelinenetz: Anschluss an überregionale Netze und den European Hydrogen Backbone

- **Hydrogen demand**
  - Comprehensive demand analysis of the hydrogen requirements by user
  - When does which demand arise and under which conditions
  - Where do local demand clusters arise?
  - Query accompanied by information and guidance events
- **Hydrogen provision and supply**
  - Support of ongoing activities
  - Analysis of the markets and keep track on changes and new developments
  - Local production: electrolysis, alternative processes
  - Import: e.g Ammonia, LOHC, SynGas
  - Pipeline network: connection to national networks and the European Hydrogen Backbone

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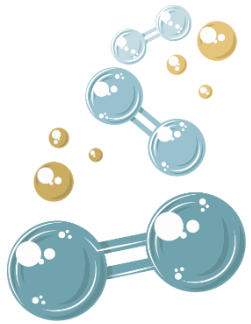
Main activities of Saarland‘s Hydrogen Agency II

- **Fördermittelbeschaffung**
  - Unterstützung und Beratung der Unternehmen über Fördermöglichkeiten
  - Hilfe bei der Antragstellung
  - Verbindung zwischen Unternehmen und Ministerien
- **Forschung und Entwicklung**
  - Verknüpfung und Koordination der vorhandenen Forschungsaktivitäten
  - Anregung weiterer Initiativen und Projekte
- **Vernetzung/Information**
  - Zentraler Ansprechpartner für Unternehmen, Bürger, öffentliche Stellen
  - Vernetzung von Institutionen
  - Information und Beratung von Unternehmen, Bürger*innen und weiteren Interessenten über H2-Anwendungen, Sicherheit und Technologie

- **Fundraising**
  - Support and guidance to companies about funding opportunities
  - Support of the application process
  - Connection between companies and ministries
- **Research and Development**
  - Linking and coordinating of existing research activities
  - Suggestion of further initiatives and projects
- **Networking/information**
  - Central contact for companies, citizens and public authorities
  - Networking of institutions
  - Information and consulting for companies, citizens and other interested parties about H_2 applications, safety and technology



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Many companies are already active in the hydrogen industry

Source: autoregion, TraSaar

We are on a strong path – but welcome further involvement

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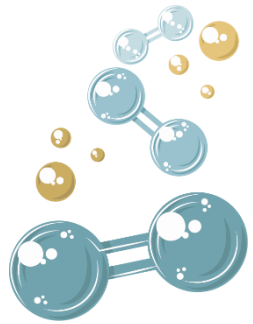
Current main Activity of the Agency

Analyse und Abschätzung der benötigten Wasserstoffmengen im Saarland und der Großregion

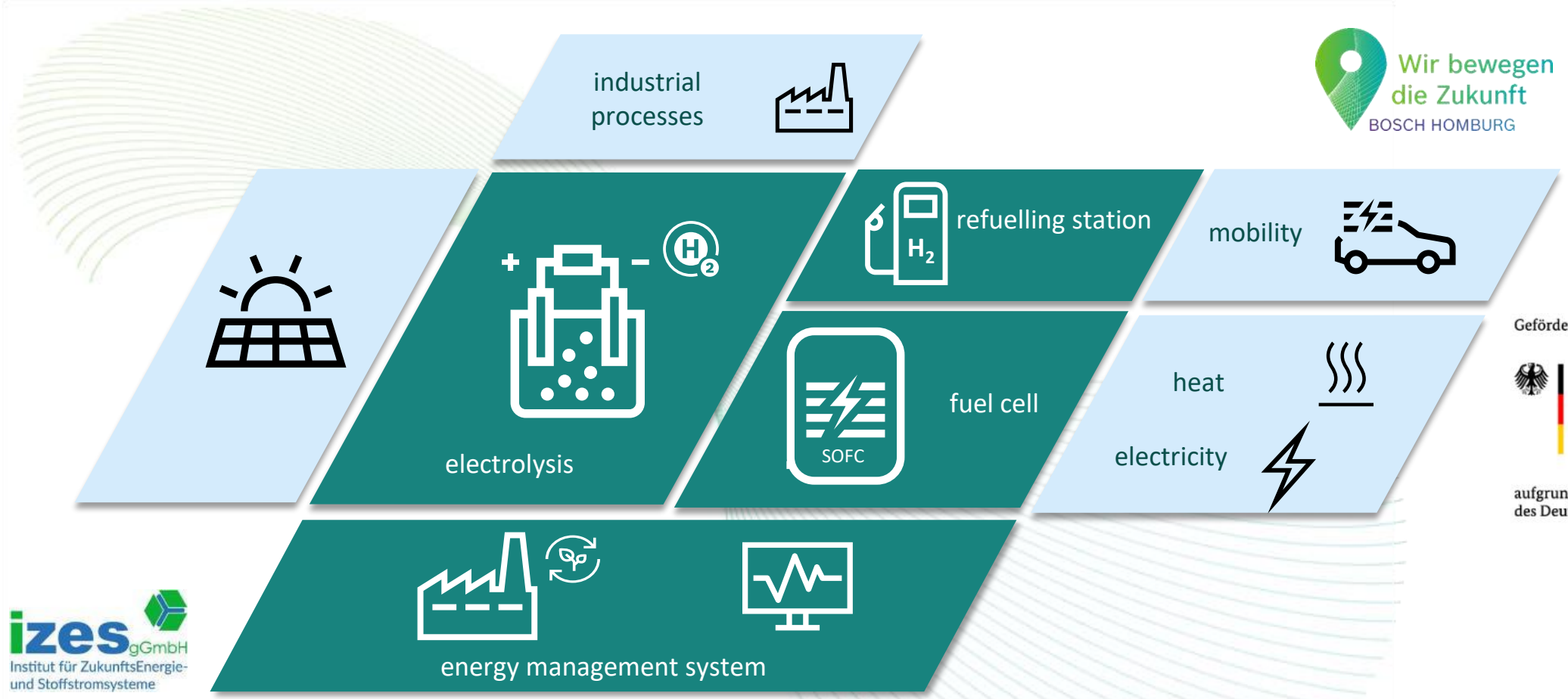
- Im Vorfeld Austausch mit bereits durchgeführten ähnlichen Abfragen in Hessen und Baden-Württemberg, Bayern noch ausstehend
- Erstellung eines Fragebogens, der online ausgefüllt werden kann und einer Webseite mit weiterführenden Infos
- Unterstützung durch IHK und VSU (Vereinigung der Saarländischen Unternehmensverbände e.V.) zur Erreichung der maximalen Reichweit
- Begleitung durch Kick-off Veranstaltung, Info-Termine vor Ort und Abschlussveranstaltung
- Auswertung des Fragebogens durch wirtschaftswissenschaftliches Institut der Hochschule für Technik und Wirtschaft des Saarlandes
- Extrapolation fehlender Daten wie z.B. Mobilität oder lückenhafter Rückmeldung

Analysis and estimation of the required hydrogen quantities in Saarland and the Greater Region

- Exchange with similar surveys already carried out in Hesse and Baden-Württemberg, Bavaria still pending
- Creation of both, a questionnaire that can be filled out online as well as a website with further related information
- Support by chamber of industry and commerce and VSU (Association of Saarland Business Associations e.V.) to achieve maximum coverage
- Support through kick-off event, on-site info sessions and final event
- Evaluation of the questionnaire by the economic institute of Saarland's the University of applied Sciences
- Extrapolation of missing data such as mobility or incomplete feedback



Industrial Utilisation of Hydrogen – R&D Project KoNSTanZE



Wir bewegen die Zukunft
BOSCH HOMBURG

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Industrial Utilisation of Hydrogen – R&D Project KoNSTanZE

The picture shows the current status of the installation progress of the HALLIE test field at Bosch Homburg.

The following components can be seen:

Cylinder bundle filling station, electrolyser, low and medium pressure storage, compressor and the hydrogen cooling system. The HRS is hidden under the roof.

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Hydrogen Infrastructure – mosaHYc

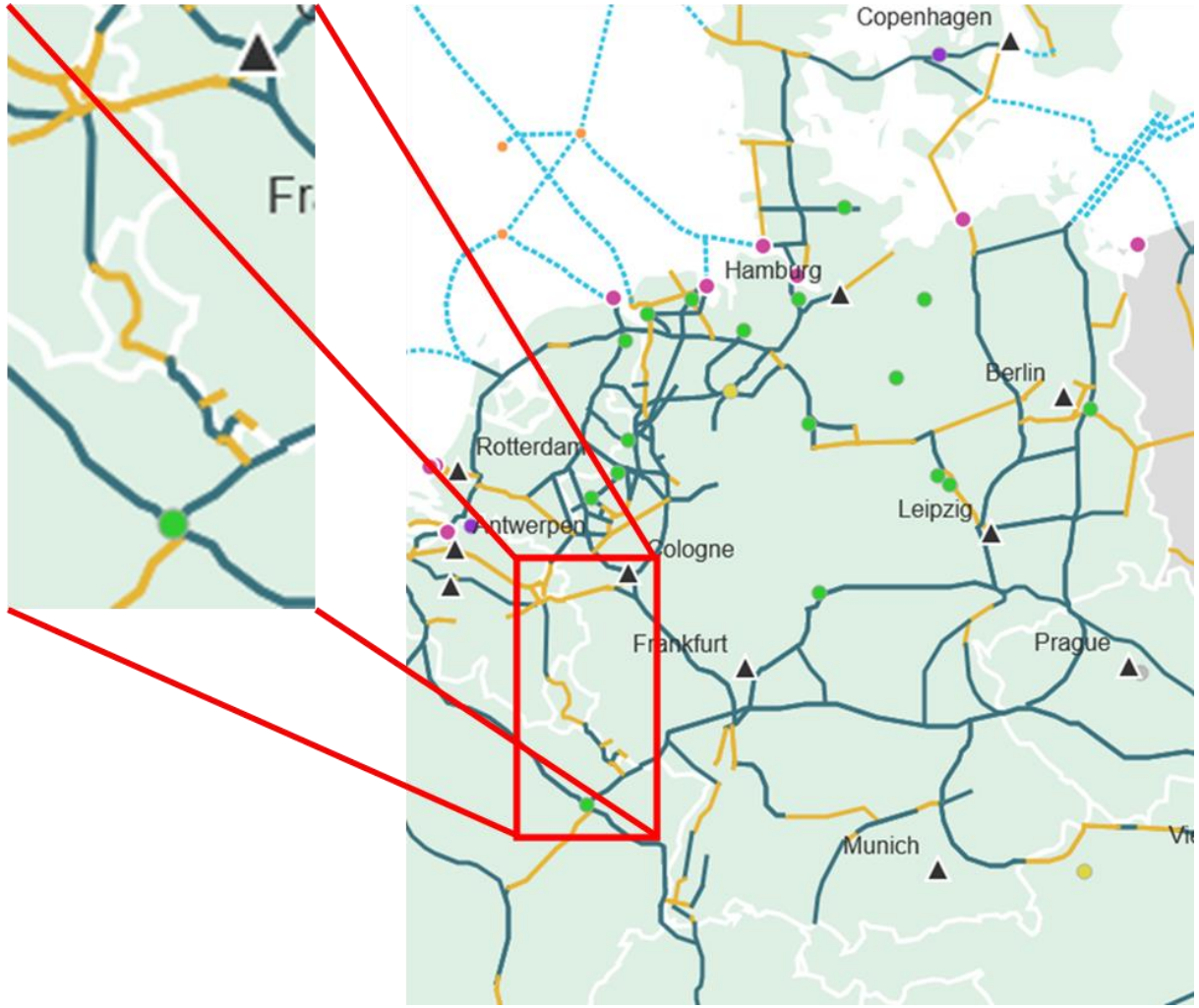
Source: Grande Region Hydrogen

Cross-border pipeline network of 100 km, out of which 70 km existing, 30 km new-to-be-built

New connection from Bouzonville to Dillingen

The network can act as prerequisite and starting point for the connection of the Greater Region to the European Hydrogen Backbone

Hydrogen Infrastructure – mosaHYc / European Hydrogen Backbone Connection



The drawing shows the vision of the European Hydrogen Backbone for the year 2040 from July 2023.

In the first step the mosaHYc pipeline will be an isolated network.

In the vision two important connections to the EHB are shown:

- connection to the north sea or the benelux countries in the west
- connection to the baltic sea via Ludwigshafen Ludmin in the north east

Source: European Hydrogen Backbone; https://ehb.eu/files/downloads/EHB-initiative-to-provide-insights-on-infrastructure-development-by-2030.pdf

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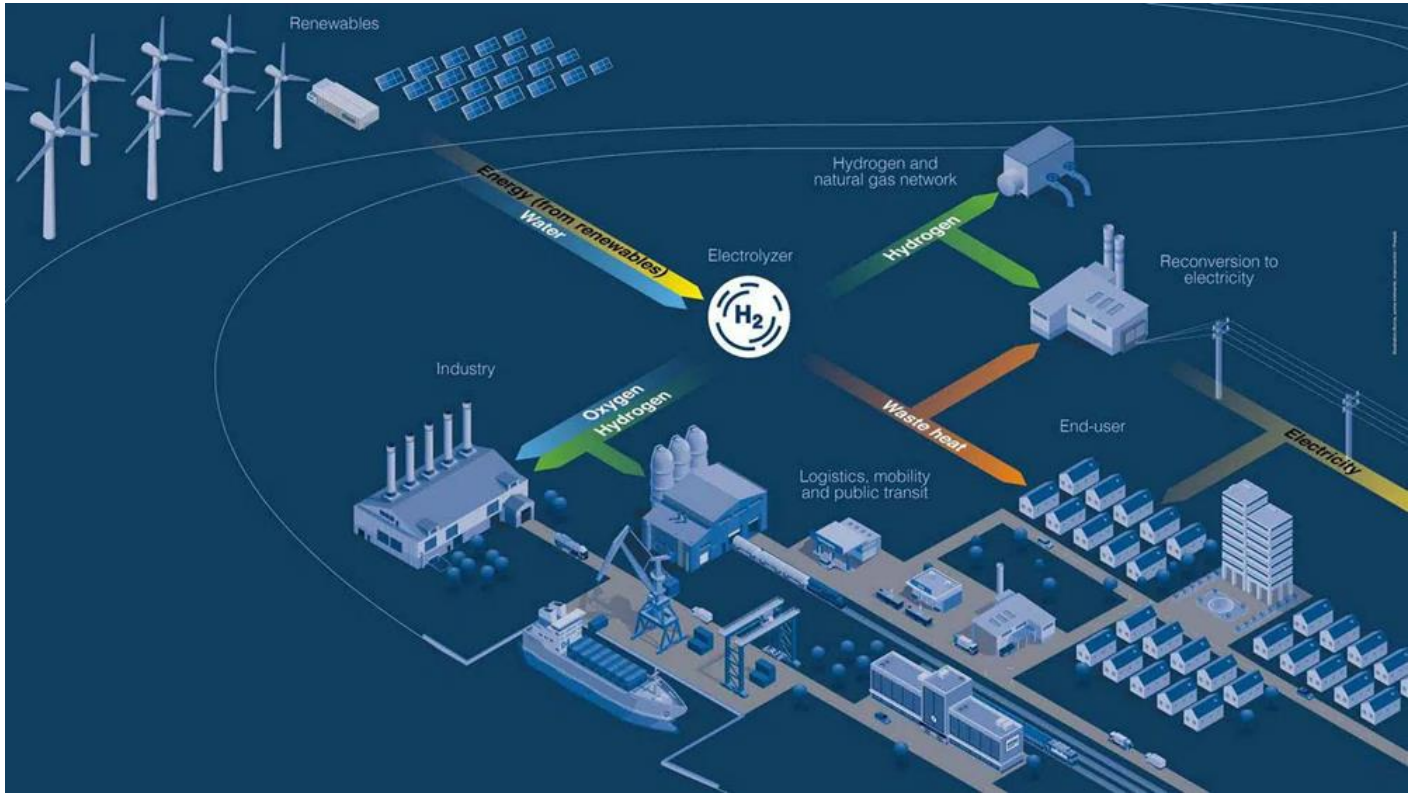
Green Hydrogen Production along the mosaHYc Pipeline – HydroHub Fenne

The HydroHub Fenne, located on the German side of the border on the site of an existing Iqony power plant, will be connected to the mosaHYc pipeline.



HydroHub Fenne facts:

- Project partner involved: Iqony GmbH and Siemens AG
- Planned electrolysis power: ~ 53 MW
- Planned production capacity: ~ 8,200 t/a (8,000 operating hours)
- Investment: ~ 110 million €
- Planned start of commissioning: 2027

Source: Grande Region Hydrogen

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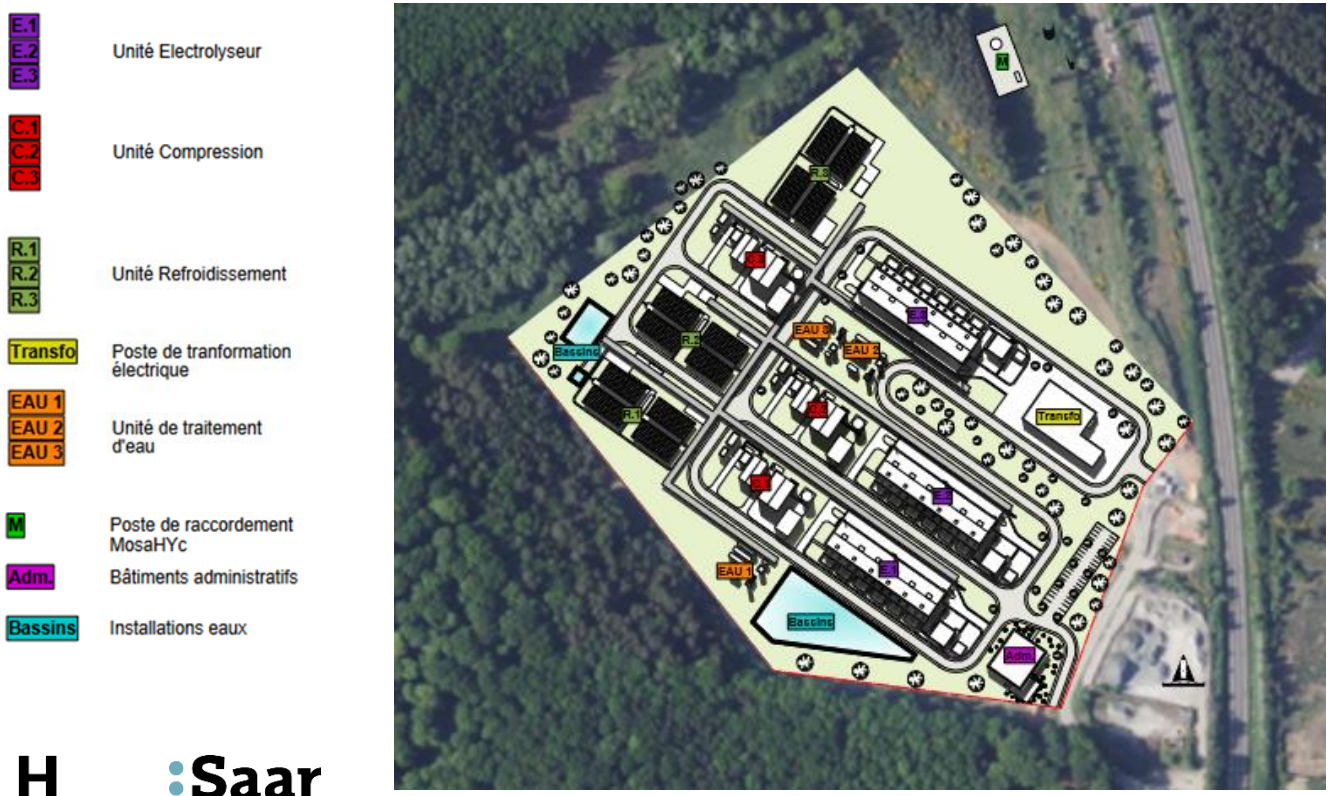
Green Hydrogen Production along the mosaHYc Pipeline – CarlHYng

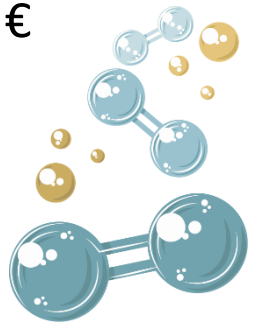
The CarlHYng green hydrogen production project is located in France in the village of Carling, near the existing Chemical platform CHEMISIS. The production side will be connected to the mosaHYc pipeline.



Source: Projet CarlHYng, Dossier de la concertation préalable 23 octobre 2023 au 18 décembre 2023

CarlHYng facts:

- Project lead partner: Verso Energy and Siemens Energy
- Planned electrolysis power in 2027: ~ 100 MW
- Planned production capacity in 2027: ~ 17,000 t/a
- Planned electrolysis power in 2030: ~ 300 MW
- Planned production capacity in 2030: ~ 51,000 t/a
- Investment: ~ 450 million €
- Planned start of commissioning: 2027



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Green Hydrogen Production along the mosaHYc Pipeline – Emil'Hy

The Emil'Hy green hydrogen project is located in France right next to the planned CarlHYng project. The planned side for this production site is the existing coal-fired power plant Emile Huchet, which is scheduled to cease operations in 2023. Emil'Hy will be also connected to the mosaHYc pipeline.

Emil'Hy facts:

- Project partner involved: GazelEnergie and Storengy
- Planned electrolysis power: up to 400 MW
- Planned production capacity: up to 68,000 t/a
- Investment: unknown
- Planned start of commissioning: unknown

Source: Projet CarlHYng, Dossier de la concertation préalable 23 octobre 2023 au 18 décembre 2023

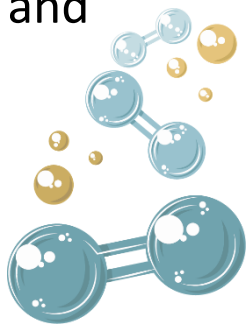
Green Hydrogen Production along the mosaHYc Pipeline – HyStarter Municipality Perl

The planned mosaHYc pipeline ends in the municipality of Perl in the three-country corner of France, Germany and Luxembourg.

Source: https://www.hy.land/hystarter-ii-gemeinde-perl/

Facts of Perl's the hydrogen mission:

- Generation of green H_2 – 70 MW electrolyser planned
- Planned production capacity: up to 12,000 t/a
- Utilisation of the waste heat of the electrolysis
- Connection to the mosaHYc pipeline
- Conversion and use of a former rail transshipment point as a green H_2 distribution hub with connections to the motorway, the rail network as well as to the Moselle waterway.
- Realisation of an H_2 refuelling station for the supply of regional public transport and logistics companies
- Investment: ~ 130 million €
- Planned start of construction: first half of 2027



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Green Hydrogen Production for the Local Steel Industry – H2Saar & Power4Steel

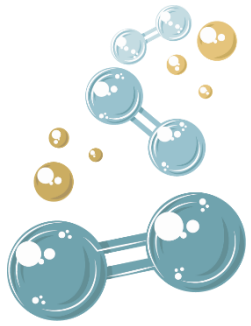
Two green H_2 projects are currently being developed for the steel industry: H2Saar & Power4Steel

H2Saar facts:

- Responsible Company:
  RWE Generation SE
- Planned electrolysis power:
  up to 4 x 100 MW
- Planned production capacity: up to 50,000 t/a
- Investment: unknown
- Planned start of commissioning of the first extension phase: 2027

Power4Steel:

- Responsible Company:
  SHS – Stahl Holding Saar
- Planned electrolysis power:
  unknown
- Planned production capacity: up to 50,000 t/a
- Investment: unknown
- Planned start of commissioning of the first extension phase: 2027/28

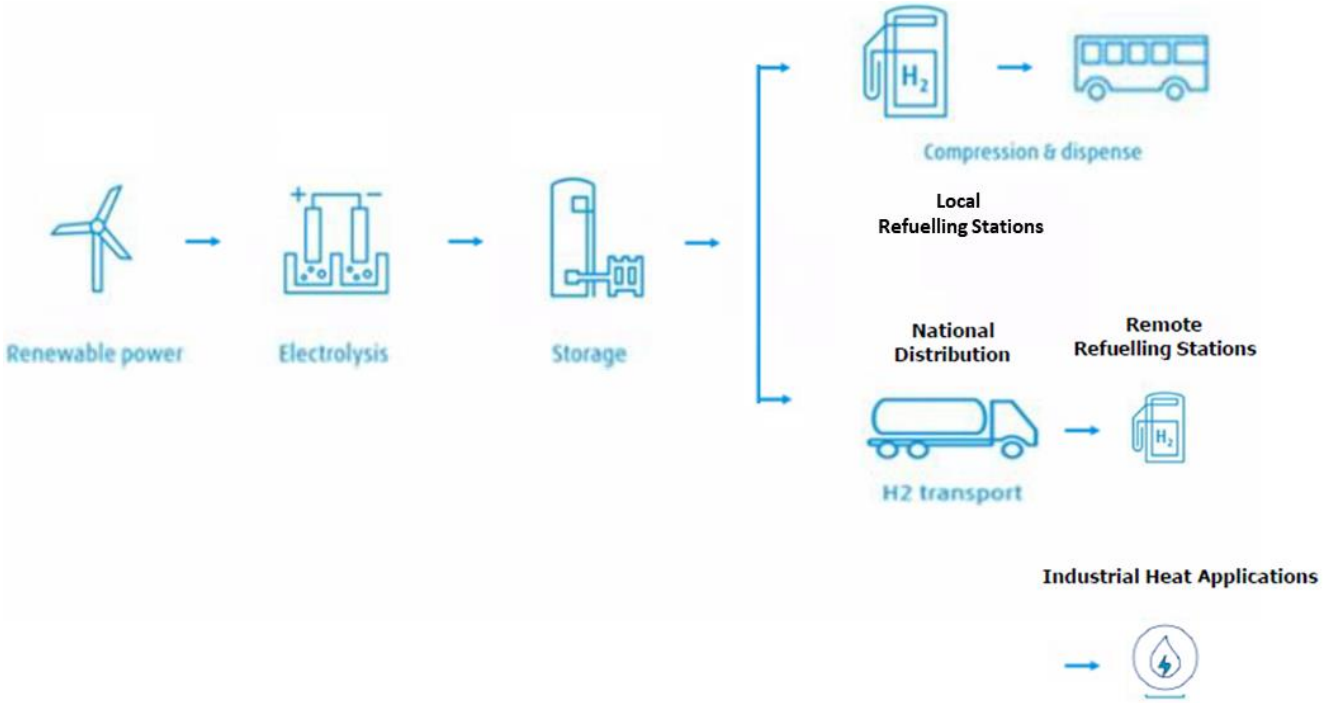


Source: https://www.hy.land/hystarter-ii-gemeinde-perl/

Hydrogen Valleys – $SH_2AMROCK$

$SH_2AMROCK$

Ireland's Emerald Hydrogen Valley



SH2AMROCK facts:

- Coordinator: University of Galway
- Consortium consists of 30 partners (globally)
- Project goal: Set-up and demonstrate multiple end uses in mobility and industry. Including different transport options
- Design, build and operate the first Irish Hydrogen Hub
- Research programme, including European wide dissemination of findings and results
- Investment: 24 million € eligible costs / 8 million € total grant
- Duration: December 2023 – November 2028

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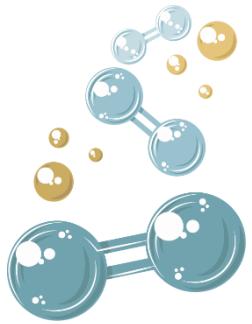
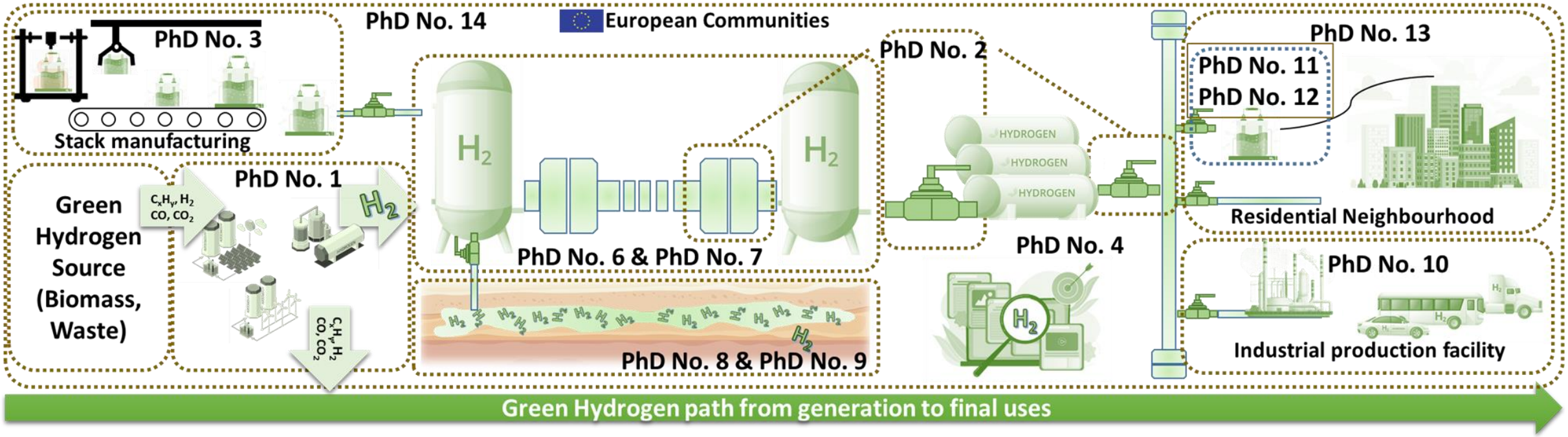
Hydrogen Research and Development – MSCA Application HALLIE

HALLIE – Hydrogen applications on a scientific/industrial level as a leading instrument for decarbonisation of the future energy system in Europe

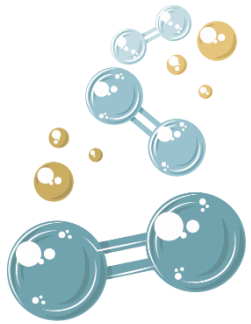
- HALLIE is a four year-project with a total funding of approx. 3.5 Mio. €
- HALLIE will be applied in the MSCA “doctoral networks” within the sub-programme industrial doctorate”
- The main objective of HALLIE is to support and educate a new generation of Doctoral Candidates in the field of hydrogen technologies
- The consortium of HALLIE consists of 29 partner organisations (19 beneficiaries and 10 associated partners or 14 academic and 15 non-academic or industrial partners) and will be coordinated by IZES



Hydrogen Research and Development – MSCA Application HALLIE



- Within the framework of HALLIE (currently) 13 PhD projects are confirmed; two more could be applied for
- The projects interlink aspects of basic research, applied research as well as economic sciences



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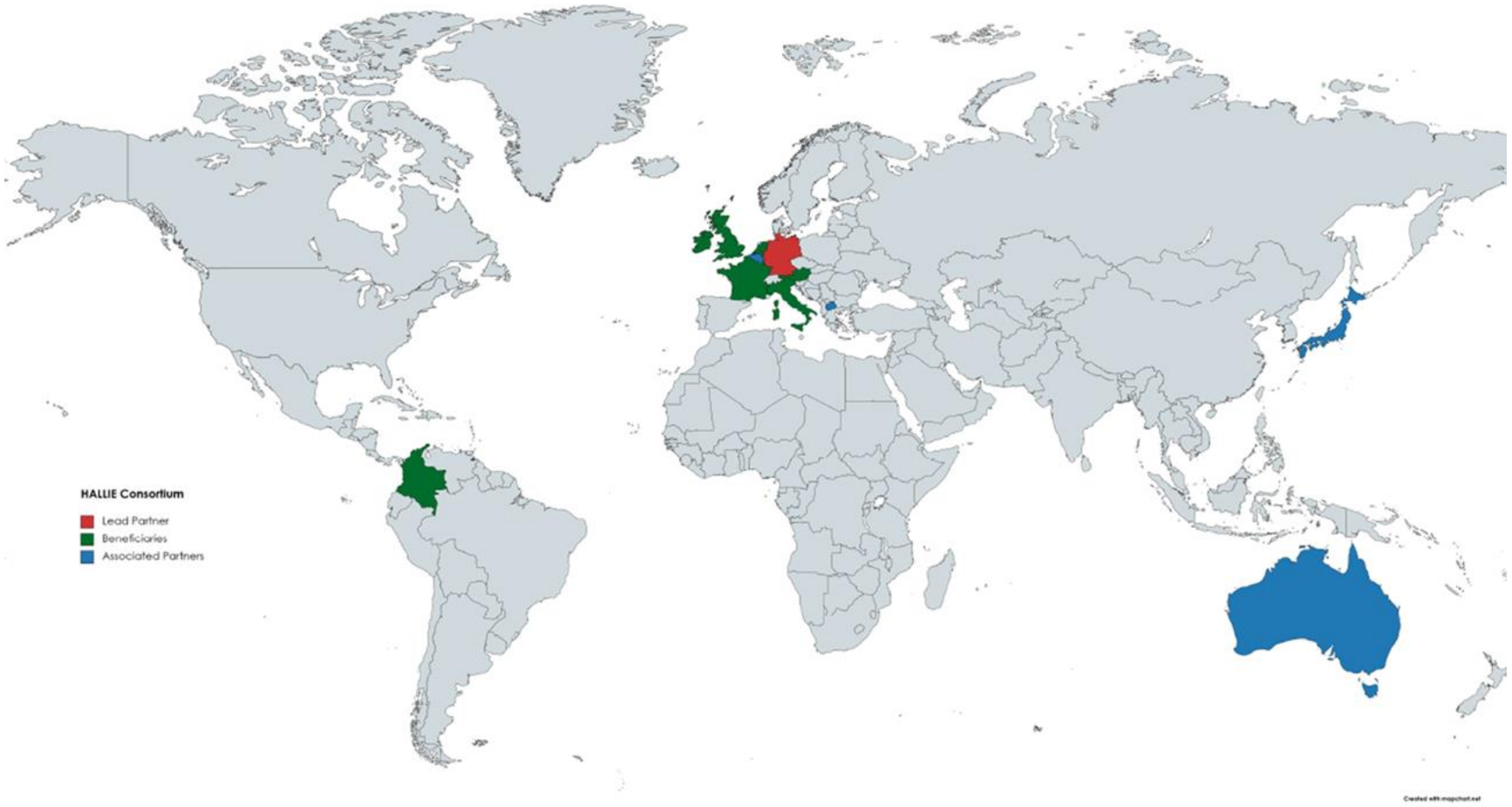
Hydrogen Research and Development – MSCA Application HALLIE



The HALLIE consortium consists of ten European countries (AT, BE, DE, FR, IR, IT, LU, NL, NM & UK)

and

three non-European countries (COL, AU & JP)

Source: IZES gGmbH

Thank you for listening!

Any Questions?

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