North Adriatic Hydrogen Valley

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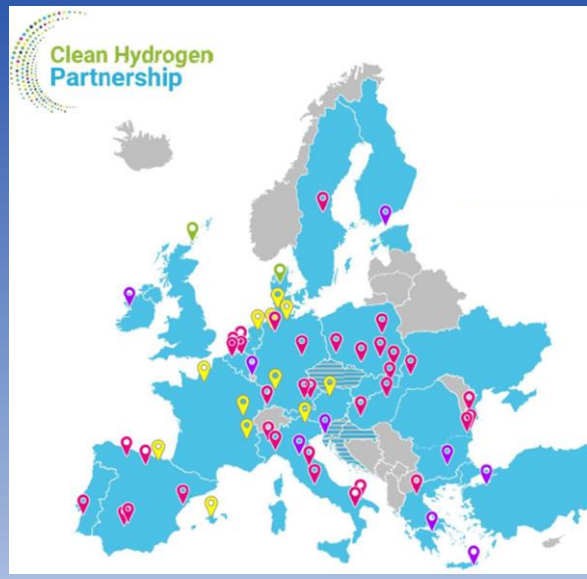
NAHV Coordinator
27th May 2025

Co-funded by the European Union
The project is supported by the Clean Hydrogen Partnership and its members.

The context of the NAHV

Renewable hydrogen is universally considered to be an important energy vector for combating climate change. It enables the decarbonisation of hard-to-abate sectors, acting as a no-emission fuel with vast potential for industrial development and job creation. Its benefits are also acknowledged through the many dedicated national hydrogen (H2) strategies which have been published globally in recent years.



Simultaneously, **the emergence of a hydrogen market economically stimulates regions where hydrogen is produced**, and associated technologies are deployed by creating new jobs and showcasing the regions as environmental forerunners.

In this sense the NAHV is **one of the most promoted hydrogen valleys in Europe**. It is **the first transnational Hydrogen Valley in the EU**, merging two countries and one region, and is set to contribute to opening Central Europe to the Balkans.

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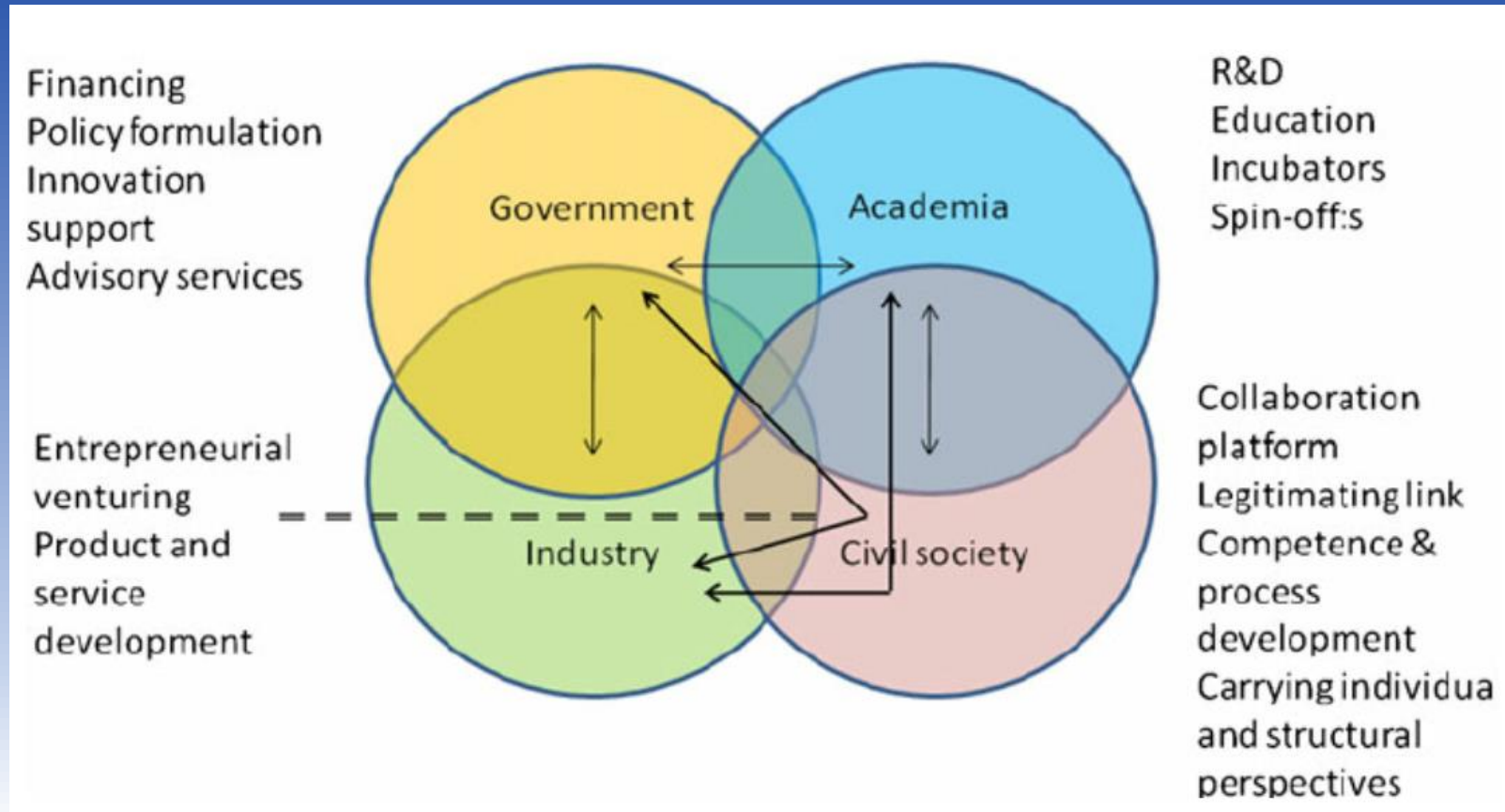
The NAHV's distinctive ambition

The NAHV's ambition is the creation of a hydrogen-based economic, social and industrial ecosystem based on the capacity of the quadruple helix actors.

Quadruple Helix Innovation Systems



Source: She Ji: The Journal of Design, Economics, and Innovation Volume 5, Issue 2, Summer 2019, Pages 128-146

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The NAHV has received the Seal of Excellence as a highly rated project

The NAHV has received the **Seal of Excellence**, which is awarded under Horizon Europe to projects that have been highly rated.

„If we are to meet our climate goals, we need to accelerate in the European hydrogen economy. Hydrogen valleys, are a perfect example of the hydrogen economy we want to build. For example, the Groningen area – in the Northern Netherlands, from the island of Mallorca to the border region between Italy, Slovenia and Croatia. This is how we can accelerate the hydrogen economy on a local scale, on our way towards a European hydrogen economy as a whole." (Brusseles, Hydrogen Week, November 29th, 2021)

Source: *Opening keynote by President von der Leyen at the European Hydrogen Week 2021, https://ec.europa.eu/commission/presscorner/detail/en/speech_21_6421,*

November 29th, 2021

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Key facts about the NAHV

The NAHV is the first transnational initiative of this kind under the Horizon Europe programme, supported by the Clean Hydrogen Partnership.

Target territories: **Croatia, Friuli-Venezia Giulia and Slovenia**

A grant of **€25 million** awarded by Clean Hydrogen Partnership

37 partners in a consortium lead by HSE

Launched in Portorož-Portorose, Slovenia, in September 2023

Duration: 72 months

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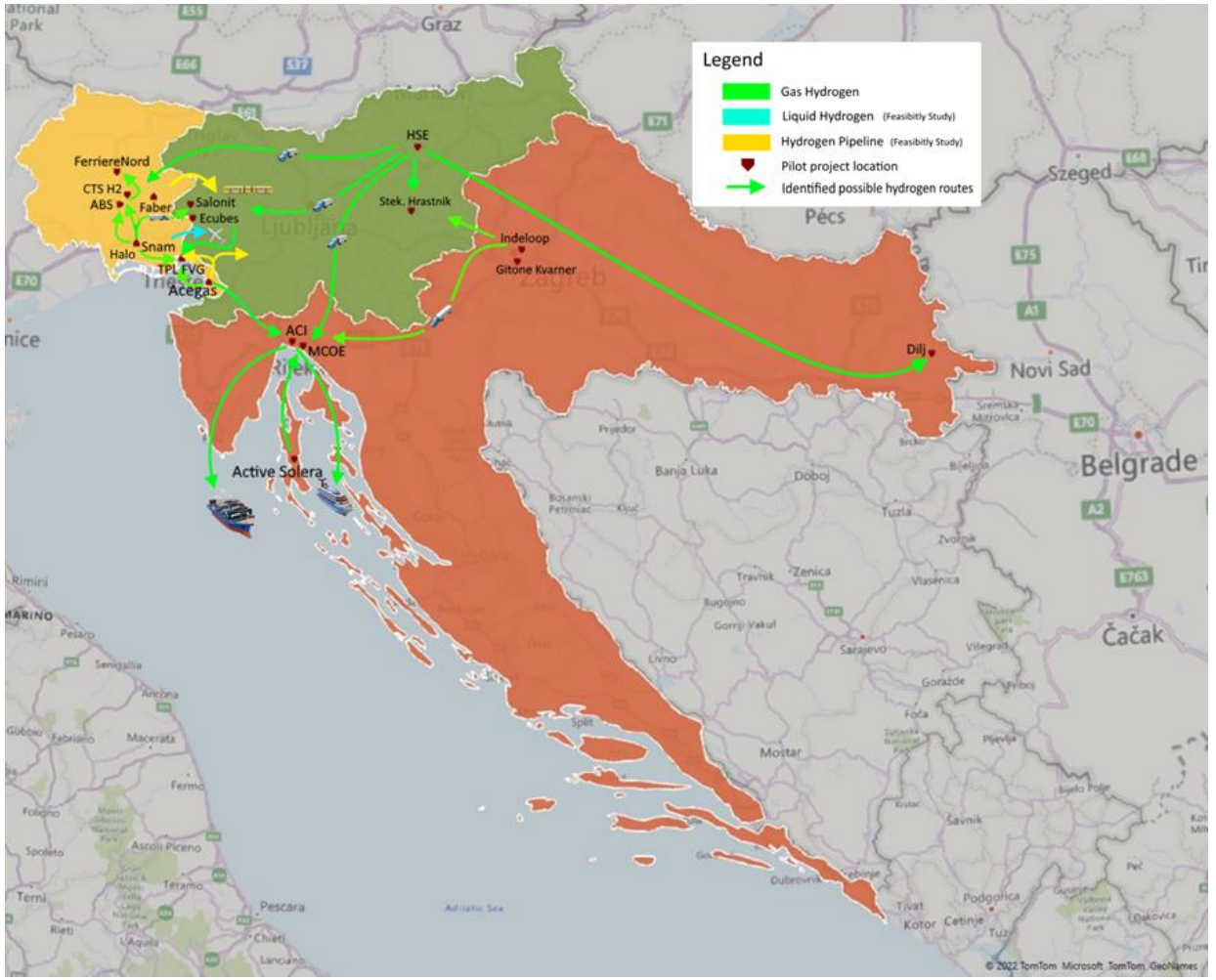
Key aim of the NAHV: creating a cross-border market for renewable hydrogen

The key aim of the initiative is **to create a market for green (renewable) hydrogen on both the demand and supply sides**, making it a competitive energy source for the future. Key industry players from all three countries will develop pilot projects to produce up to **5,000 tonnes of renewable hydrogen per year from renewable energy sources**, destined for energy storage, distribution and use.

It is expected that some **20% of the produced renewable hydrogen will be exchanged between the participating countries**, thus creating a primary regional market for hydrogen.



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Partners of the NAHV consortium

Over 120 participants from 37 project partners are directly involved in the tasks and activities of the NAHV: companies, universities, institutes and other public entities

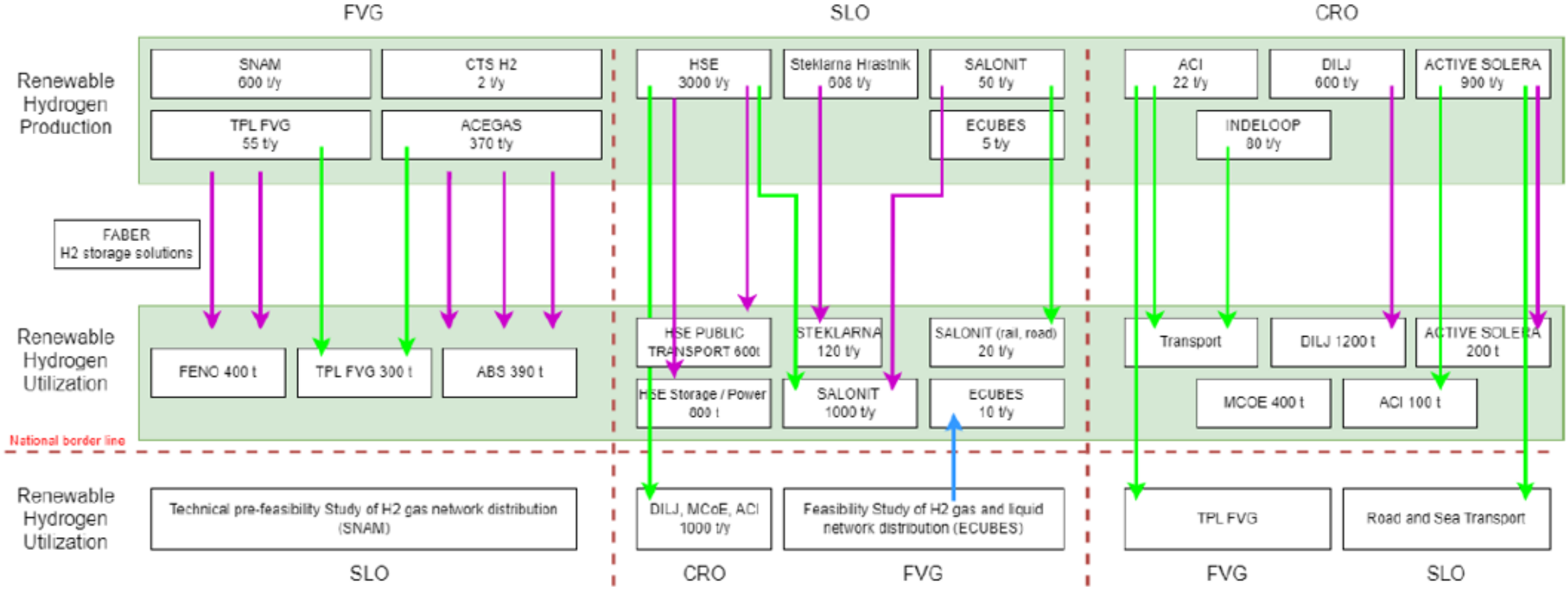
Lead partner: HSE, Slovenia's largest electricity producer and trader, largest producer of electricity from renewable sources

Territory	SLOVENIA	CROATIA	ITALY Regione autonoma Friuli-Venezia Giulia
Institutional Partners	Ministry of the Environment, Climate and Energy	Ministry of Economy and Sustainable Development	Regional Council of Friuli-Venezia Giulia
Research Community	University of Ljubljana	University of Rijeka	University of Trieste
Industrial Partners	Holding Slovenske elektrarne d.o.o. Termoelektrarna Šoštanj d.o.o. HSE Invest d.o.o Ecubes d.o.o. Steklarna Hrastnik d.o.o. Salonit Anhovo d.d.	ACI Marine Active Solera Dilj Indeloop MCoE Gitone Kvarner d.o.o.	AREA Science Park ABS /Danieli Centro Combustion Snam S.p.A Ferriere Nord, Pittini Group ACEGAS Faber Industrie Meta Group Fondazione Bruno Kessler CTS H2 TPL FVG
Partners Outside Territory	Fundación para el Desarrollo de las Nuevas Tecnologías del Hidrógeno en Aragón		

Creating a primary regional market for hydrogen

Expected hydrogen production and consumption: 500 tons / year

20% of the produced renewable hydrogen to be exchanged between the participating countries



Project design covers the entire value chain of renewable hydrogen use

The project design covers the entire value chain of renewable hydrogen use, from production, through storage and distribution, to its end use in various sectors, notably industry and land and maritime transport, creating leverage to accelerate the transition to renewables on three target pillars: hard-to-abate industries, and the energy and transport sectors.

17 pilots to be developed in different locations in all three partner countries:

- **Croatia**
- **Friuli Venezia Giulia Autonomous Region**
- **Slovenia**

… in their related ecosystems clustered in **three main pillars**:

- **Hard to abate**
- **Energy**
- **Transport sectors**

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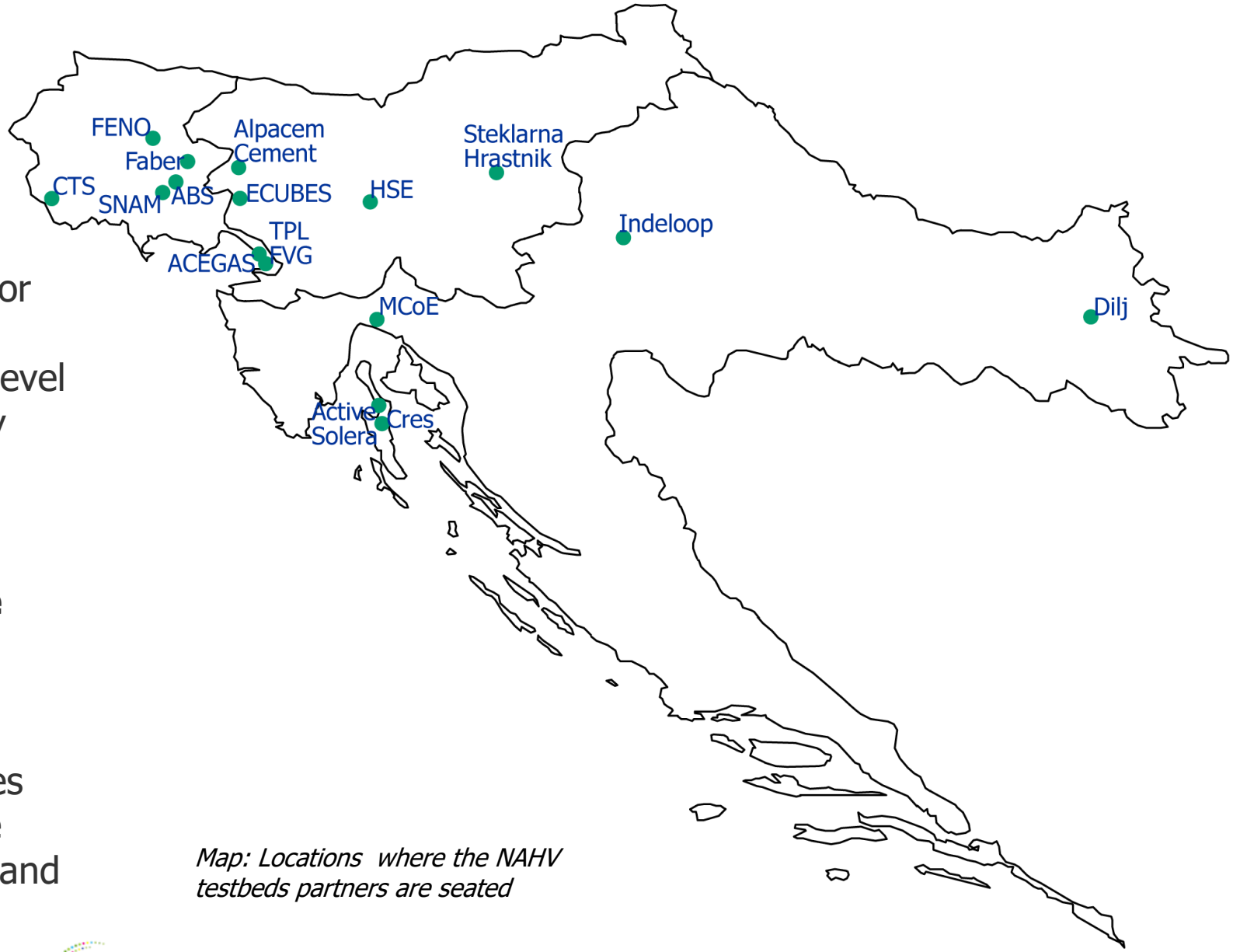
Testbed Projects

These projects act as real-life cases for piloting global hydrogen markets, moving from Technology Readiness Level (TRL) 6 at the beginning to **TRL 8** by the end of the project.

Four fuel cell applications in the energy and transport sectors are being demonstrated. Testbeds are scaled up to the industrial level as a replicable model, contributing to the decarbonisation of the three territories by harnessing renewables to improve system resilience, security of supply, and energy independence.



Map: Locations where the NAHV testbeds partners are seated

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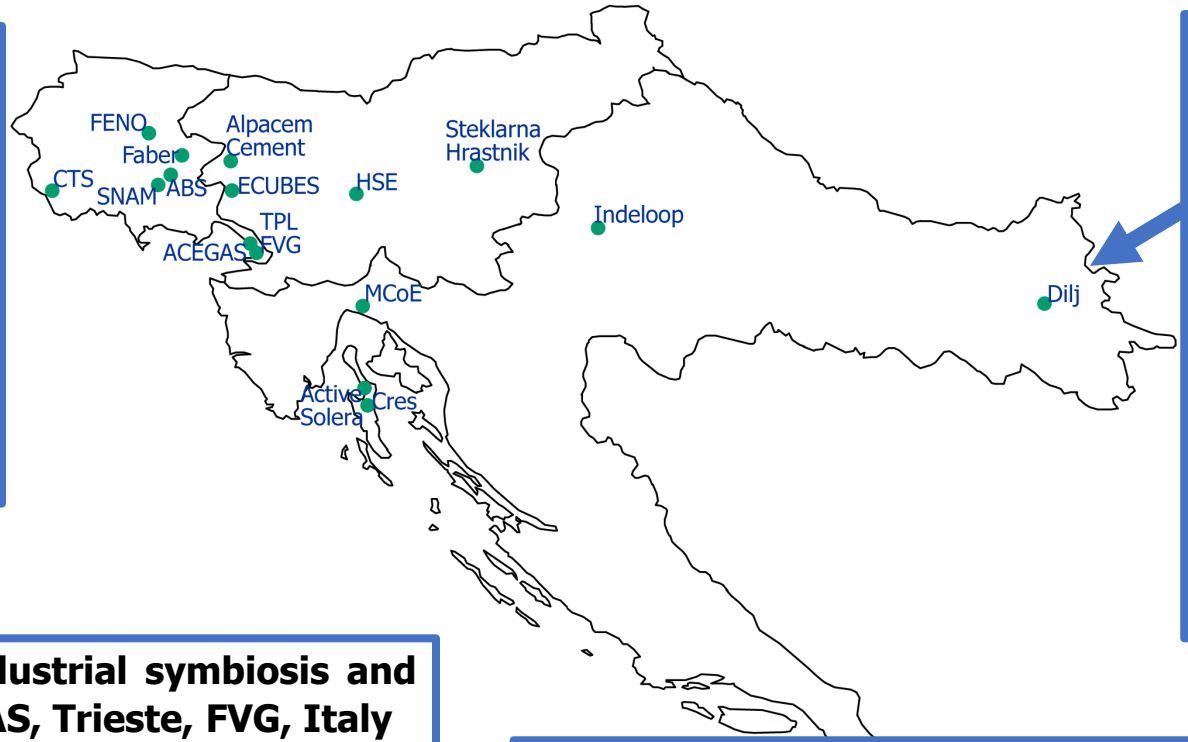
Testbed key metrics

H2 production for cement industry decarbonisation, Alpacem Cement, Anhovo, Slovenia

The testbed project aims to produce 50 t/year.

The produced hydrogen will primarily fuel hydrogen truck(s) for cement delivery.



Hydrogen as a partial replacement for natural gas in a kiln of a roof tile producer Dilj, Vinkovci, Croatia

- After the project implementation we expect to **reduce CO2 emissions for more than 20 %** and **energy consumption for more than 10 %.**
- PEM Electrolyser will be used for hydrogen production, **hydrogen production up to 315 t/year.**

H2 production through industrial symbiosis and asset enhancement, ACEGAS, Trieste, FVG, Italy

Hydrogen production: 370 t/year.

The hydrogen produced will be made available to the logistic the sector and the local public transport service.

H2 by gasification of organic material for small microgrid in the industry area, Indeloop, Zagreb, Croatia

Hydrogen production: 80 t/year.

Plant Capacity: 2 MW PV system, 430 kW PEM electrolyser, and 200 kW fuel cells.

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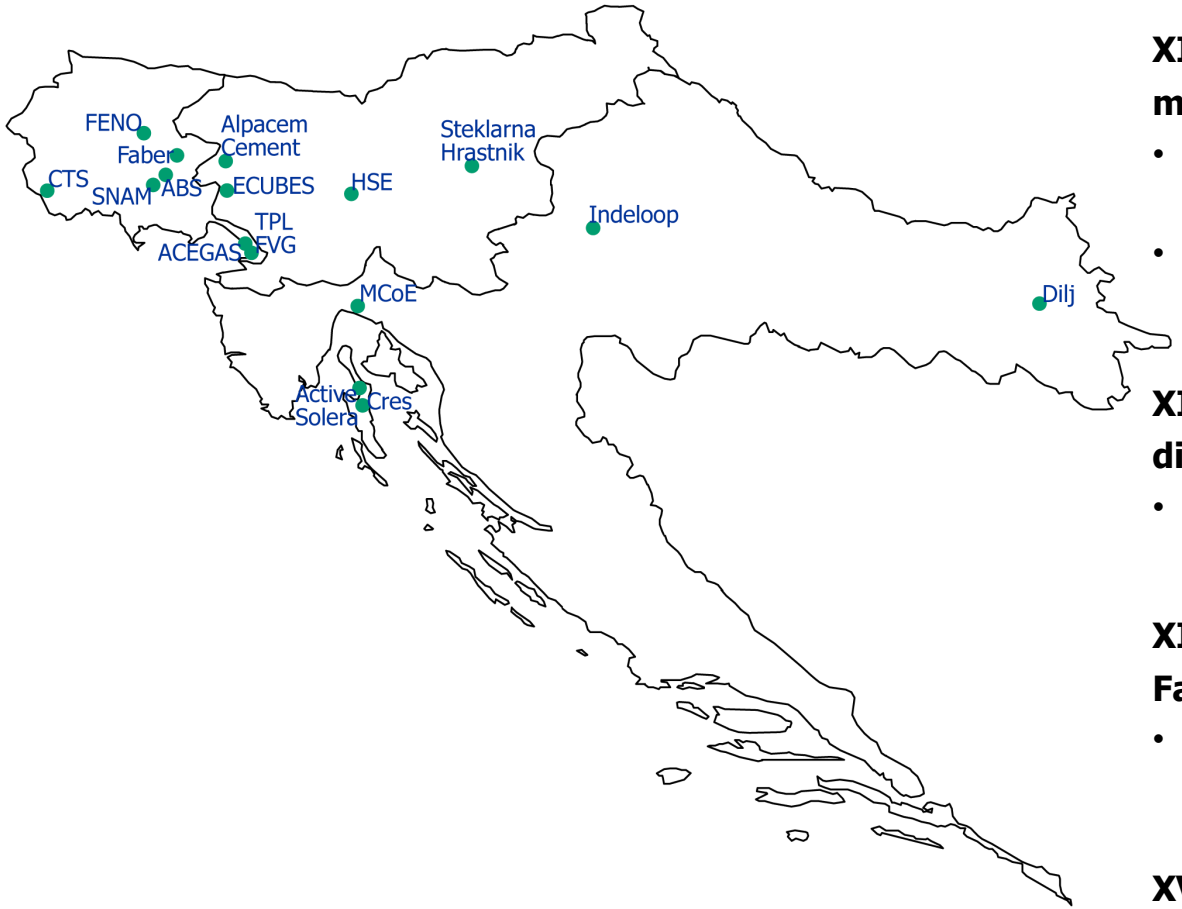
Testbed key metrics



XI. Hydrogen ecosystem solutions and production for emerging markets, HSE, Ljubljana (Slovenia)

- In the first phase we will deploy a 3 MW PEM electrolyser, with the to produce **300 t/year** of renewable hydrogen.
- In the second phase, we will deploy 30 MW electrolyser system to increase the production capacity to **3.000 t/year.**

XII. Integrated hydroelectric and HFC power station for retail distribution of hydrogen, CTS, Brugnera, Italy

- The system will be able to fuel buses for running 50.000 km with a production of **6 t/year** of hydrogen.

XIII. Development of Hydrogen storage system for distribution, Faber, Cividale del Friuli (UD), Italy

- The testbed implementation will make it possible to create vehicles capable of reaching a payload of over **1.2 t/year** of hydrogen.

XVII. Energy storage for distributed power generation based on innovative fuel cell technology of ECUBES, Nova Gorica, Slovenia

- The project targets 1 MWh of energy storage with liquid hydrogen for use in EV charging stations.

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A platform for further investments in renewable technologies

The implementation of the planned mature stage innovation activities is expected to unleash further investments in renewable hydrogen-related technologies in an amount of **more than €300 million***, destined to increase the capacity of hydrogen production, storage, transmission and use.

(A per the grant Agrement at the start of the project)

Estimated cumulative investment into the Hydrogen Ecosystem topping up (last update early 2025)

Additional investments are expected to be funded on top, both during the course of the project implementation and afterwards, from private and public sources in the form of follow-up investments in the successfully implemented pilots in 17 testbed locations across the three participating countries, as well as through **new initiatives** which will contribute to the evolution of a social and economic ecosystem based on renewable hydrogen.

Clean Hydrogen Partnership

A platform for new skills and competencies

The foreseen development creates the need for new competencies and skills, which makes **the universities and research institutions** which are partners in the initiative important protagonists in designing and disseminating new educational programmes, as the NAHV is destined to become a vehicle for job creation.

Universities of Ljubljana, Rijeka and Trieste

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NAHV AISBL:
A SPV ensuring replicability and inclusiveness

One of the major objectives of the NAHV is to stimulate new initiatives of private and public origin to emerge and prosper within the North Adriatic hydrogen-based economic, social and industrial ecosystem. **A non-profit special purpose vehicle** is going to be established under the Belgian law as the international non-profit association (AISBL) to become a point of reference for the coordination and governance of the NAHV's exploitation forms after the end of the Horizon project life as well to hold space for the new initiatives.

Replicability will be ensured for the whole NAHV model, with the uptake of **at least five additional hydrogen valleys in Europe, particularly in Central and South-Eastern Europe.**

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You are welcome to apply for the Stakeholders' Advisory Forum (SAF)

The **NAHV SAF** is a consultation body that brings together experts from research, policy, business, and civil society to support the NAHV. It provides strategic advice, fosters cooperation, and ensures stakeholder engagement in developing a sustainable hydrogen ecosystem.

Why Join?

- Act as a **project ambassador** for hydrogen innovation.
- Contribute to **decarbonisation efforts** and the hydrogen economy.
- Provide **insights and feedback** on stakeholder needs.
- Be part of a **dynamic community** shaping the future of hydrogen.

How SAF Works

Meetings are held **twice a year**, primarily online, with a flexible structure that allows targeted expert involvement when needed.

Joining Process

1. **Submit a Letter of Interest (LOI).**
2. **Evaluation** by the SAF Committee.
3. **Notification** within a month.
4. **Accepted members provide a profile** for publication on the NAHV website.

Become a key player in the hydrogen transition—**apply to join NAHV SAF today!**

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Towards a NAHV ecosystem

NAHV Horizon Europe is the fundamental pillar of an innovation ecosystem evolving under the governance of the AISBL.

Examples:

- Follow up financing, private and public (e. g.: M. C. E.),
- NACHIP (I3 Programme), first follow-up initiative to have been awarded EU co-funding
- Private initiatives of involved partners
- International development in Europe and globally

NACHIP: An acceleratior for clean hydrogen-related technology solutions

NACHIP is an accelerator for the integration and diffusion of advanced hydrogen-related technologies, building on local hydrogen alliances and strengthening targeted value chains by involving small and medium-sized enterprises (SMEs) through cascading funding with a focus on less developed EU regions.

The long-term implementation of NACHIP will be ensured through its integration into the dedicated North Adriatic Hydrogen Valley (NAHV) SPV and through a set of actions to be implemented in the NAHV target areas and in other regional innovation ecosystems across the EU.

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NAHV partners with the HE Conference North Adriatic

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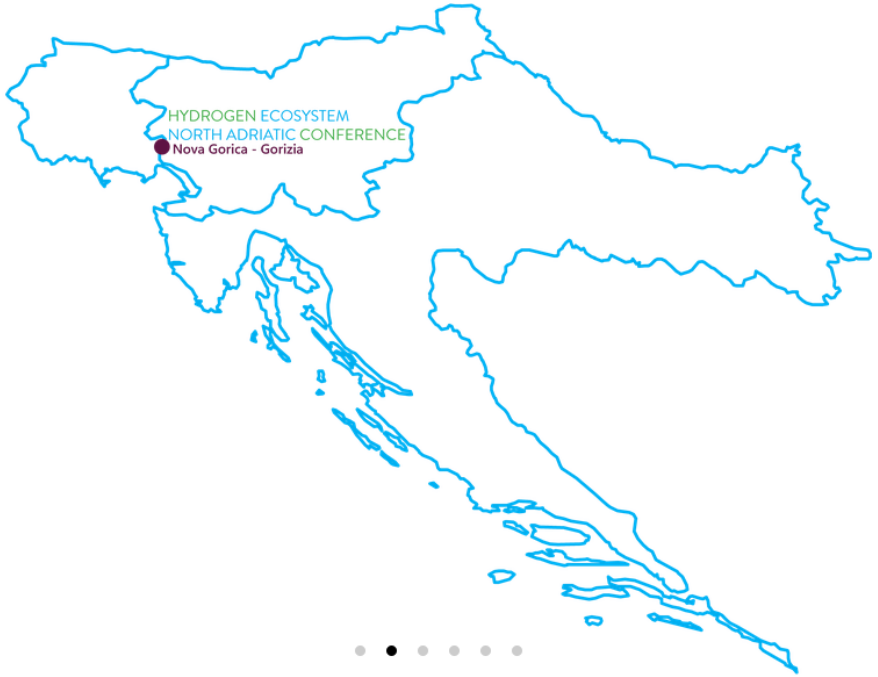

Becoming a first mover

Hydrogen is an essential element for a sustainable future. It is a missing piece of the puzzle to unlock the electrification of the global economy. It is a

wards carbon neutrality. In the present

://www.hydrogen-ecosystem.eu/becoming-a-first-mover/

A game-changing energy storage enabler of affordable clean energy in the region by ECUBES to revolutionise the offtake of hydrogen in the North Adriatic

Thank you.

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