

# CRAVE-H2 CRETE AEGEAN H<sub>2</sub> VALLEY

Crete Island, Greece

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EUNICE

//EU HYDROGEN

RESEARCH DAYS

15-16 NOVEMBER

CRAVE H<sub>2</sub>



 <http://crave-h2.eu/>

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Co-funded by  
the European Union

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# Project Overview



Call year: 2022

Call topic:

HORIZON-JTI-  
CLEANH2-2022-  
06-02

Hydrogen Valleys  
(small scale)

Project dates:  
01/06/2023 - 31/05/2028

Total project budget:  
11,201,812.00 €

Crave-H<sub>2</sub>

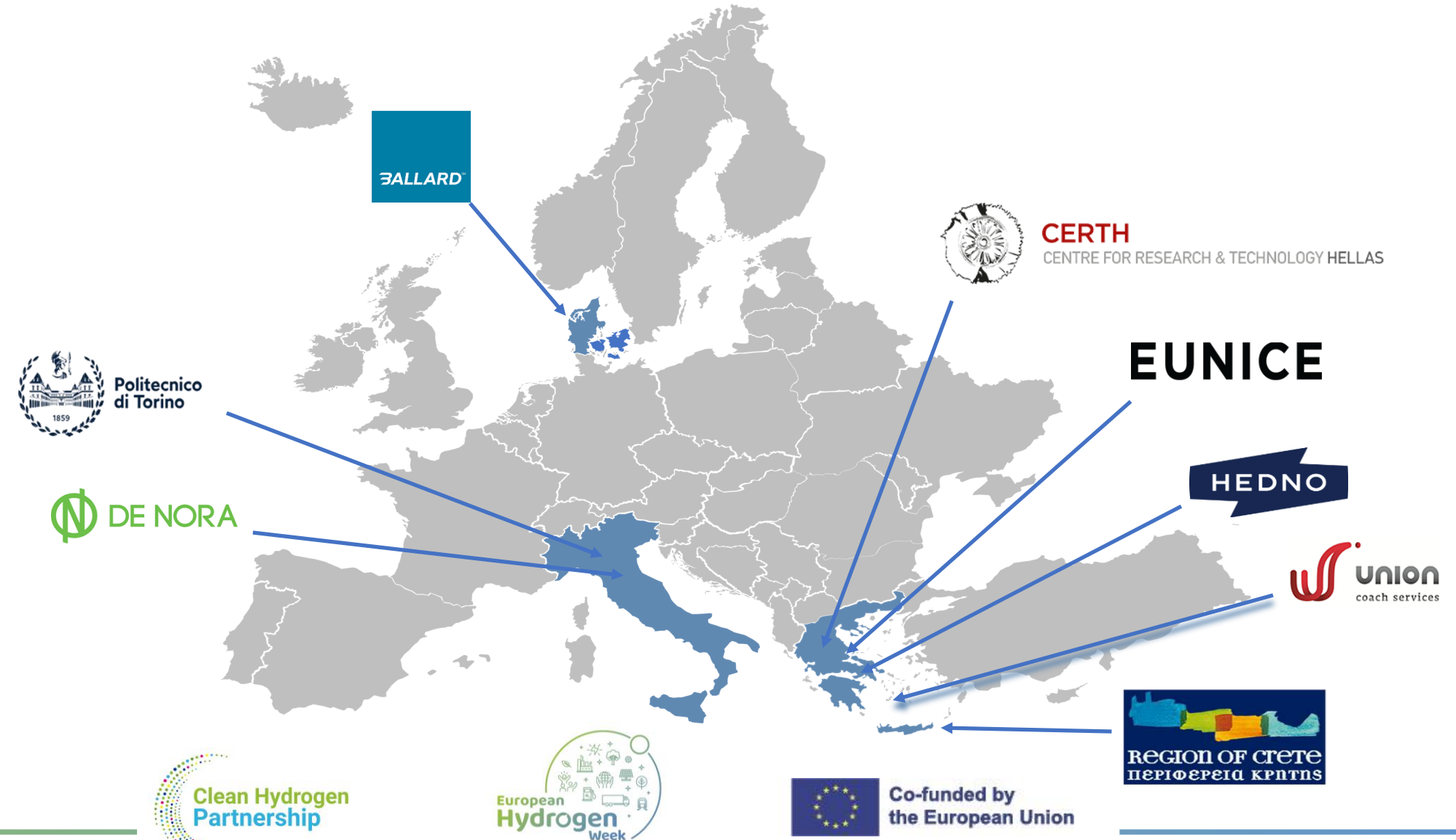
10 % executed  
by Nov. 30<sup>th</sup>, 2023.

CHP contribution: 7,994,812.00 €  
Other financial contribution:  
3.207,000.00 €



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# Partners and location of the Crete Aegean H2 Valley



# Green Hydrogen Production in Crete (GR)

## Crave-H2 objective:

develop the green hydrogen value chain in the island of Crete for decarbonizing the:  
a) transportation sector; and  
b) electricity grid.

### Eunice (GR)

- Green energy supplier
- Energy Management System

### De Nora (IT)

- 3MW alkaline electrolyzers



Greece-Africa Interconnector

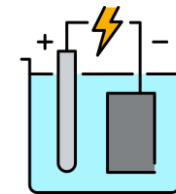


PV Plant



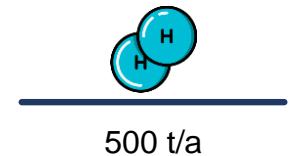
Wind

**EUNICE**



**AEL**  
3 MW

**DE NORA**



500 t/a

# Green Hydrogen End Uses

## Eunice (GR)

- Compression - Storage
- HRS - H<sub>2</sub> Refueling Station

## Ballard Europe (DK)

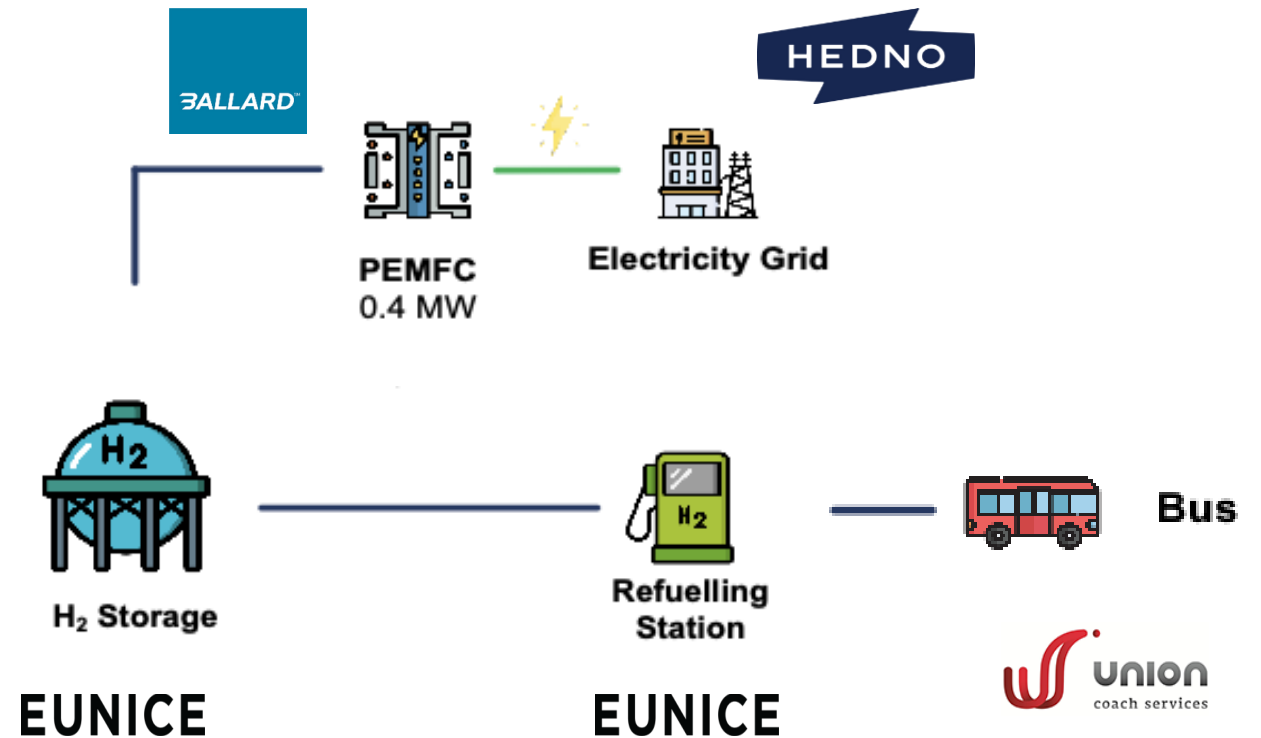
- 400 kW PEM FC manufacturer

## HEDNO (GR)

- PEM FC connection to the grid

## Union Coaches - SOLMAR (GR)

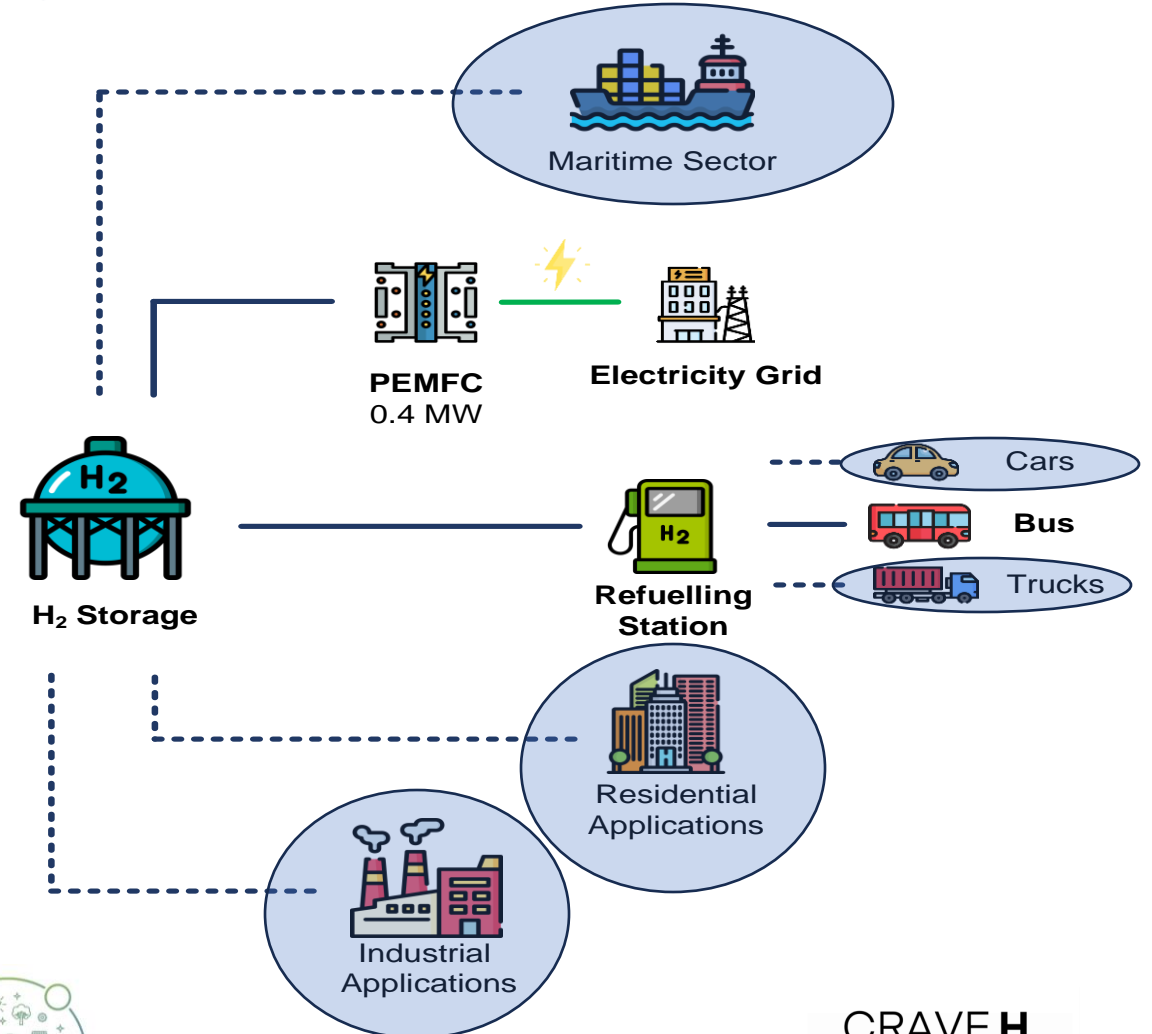
- end user - H<sub>2</sub> powered buses



# Green Hydrogen Future End Uses

## Future Applications

for green H<sub>2</sub> as a fuel, will be explored mainly in:  
a) maritime sector and  
b) power production, at refurbished thermal power plants.



# Project implementation and progress

Achievements to date (10%)	Actions planned till M24	Actions planned till M36	Actions planned till M48	Actions planned till M60
15/11/2023 10% (6 M)	31/05/2025 40% progress	31/05/2026 60% progress	31/05/2027 80% progress	31/05/2028 100%
PM Handbook-PMH	Licensing and permitting procedures for all H2 systems	Commissioning of electrolysis and PEM-FC plants	Delivery & commissioning of hydrogen fuel cell buses	Analysis of operational data for the Hydrogen Valley
Data Management Plan-DMP	Completion of Electrolysis and the PEM-FC systems	Development of the installation control system	On-site maintenance and servicing training for H2 buses	CBA/CEA analysis and impact assessment
Communication & dissemination MP-CDMP	Civil works finalised on site for all hydrogen systems			Life cycle assessment and life cycle costing
Stakeholder Engagement Plan-SEP	Final Hydrogen Safety Plan			Exploitation plan for the utilization of the produced H2

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# Project Objectives in Relation to the Work Programme

CRAVE -H2 results are expected to contribute mainly to the following objectives of the Clean Hydrogen JU SRIA for H2 Valleys:

*Improved security and resilience of the energy system, e.g. via hydrogen production using locally available renewable energy sources*

- ✓ Crete has a great difference in electricity demand and production, and H2 storage and use will come to better close the gap between RES production and power demand.

*Market creation: demonstration of new market for hydrogen*

- ✓ CRAVE-H2 is the first project that investigates interconnecting H2 storage into an aggregator operation, in conjunction with strategic connectivity of an important energy node in Crete.

# Risks & Challenges

## Lack of legal framework for licensing and permitting

- ✓ The installations of the electrolysers and the fuel cells; and
- ✓ The connection of the fuel cell to the grid.

# Communication and dissemination



## Project's Kick-off Meeting Press Conference in Athens (June 2023)

- ✓ More than 50 references in national and international press



## Communicate CRAVE-H2 in Events

- ✓ 1<sup>st</sup> Hydrogen and Green Gases Forum in Athens, Greece, June 2023
- ✓ Workshop on “Hydrogen Technologies and alternative fuels”, 87<sup>th</sup> Thessaloniki International Fair, Sept. 2023
- ✓ 27<sup>th</sup> Annual “Energy and Growth” IENE Greek National Conference, Nov. 2023.



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# Expected interactions with projects funded under EU Programmes



Develop the Green Hydrogen value in the island of Crete for decarbonizing  
a) the transportation sector; and  
b) the electricity grid.

GA #101112169—Horizon-JTI-CleanH2-2022-2



Zero Emissions Network,  
enabled with a high-performing  
33 / 100 kW rSOC (reversible  
Solid Oxide Cell) power  
balancing plant, suitable for  
electricity and gas grids.

GA #101101418—Horizon-JTI-CleanH2-2022-2



Create Renewable Energy Valley 'Living Labs' (REV-Labs) in the island of Crete, for green hydrogen production and applications.

GA #101136139, HORIZON-CL5-2023-D3-01-01



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# Expected interactions with projects funded under EU Programmes

## Greece - Africa Power (GAP) Interconnector

Submarine 600 MW DC transmission cable connecting Egypt to the island of Crete, with the aim to produce green hydrogen.

TYNDP2020 #1048 Project

## Aegean Project

A project of national & European importance  
Installation of 582 MW wind parks on remote and uninhabited Greek islets of the Aegean Sea.

Ref.: <https://eunice-group.com/projects/aigaio-project/>



## Tilos Smart Island

TILOS aims to demonstrate the optimal integration of local scale energy storage in a fully-operated, smart island microgrid that will also communicate with a main electricity grid.

TILOS Ref no: 646529



Co-funded by the European Union



Demonstrate the technical and financial feasibility of FC-based H<sub>2</sub> energy storage solutions, in 3 demos (isolated micro-grids or off-grid remote areas)

GA. #779541, Societal Challenges-Secure, clean and efficient energy

# Recommendations looking ahead

Clean Hydrogen Partnership can support the Green Hydrogen Value Chain developers, by assisting for:

1. Creating a suitable framework for Licensing and Permitting Hydrogen Projects.
2. Setting national and European and National targets for electrolysers, green hydrogen production and hydrogen uses.
3. Creating an encouraging investment climate in the hydrogen sector, with the initiative of local communities.

# Thank You

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Crete Aegean H2 Valley

 Atherinolakos, Crete, Greece

 <http://crave-h2.eu/>

CRAVE H<sub>2</sub>



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