

ADVANCED POWER CONVERSION TECHNOLOGIES BASED ON ONBOARD AMMONIA CRACKING THROUGH NOVEL MEMBRANE REACTORS

Objectives and Concept

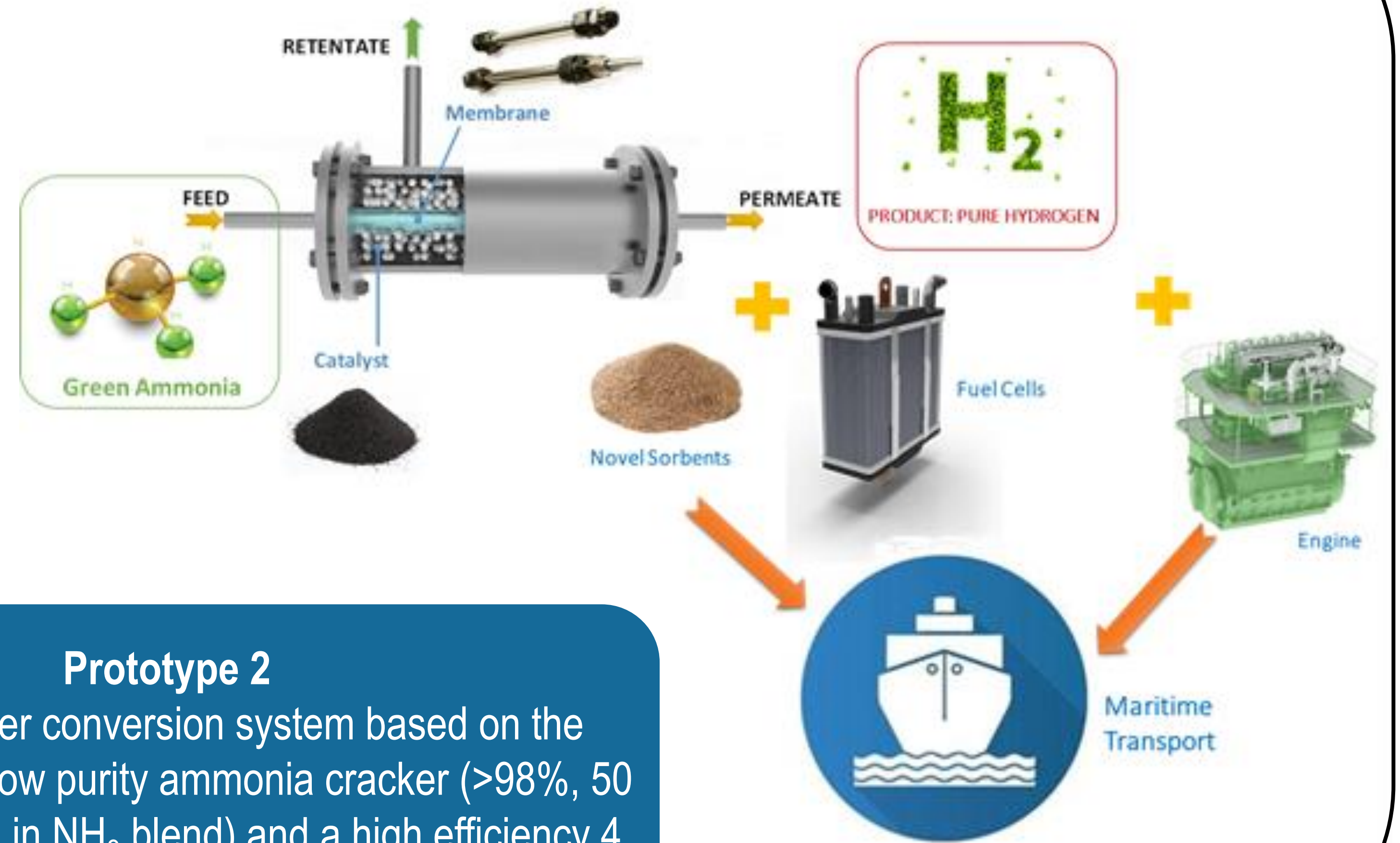
Maritime transport is one of the most energy-efficient modes of transport and plays a key role in the EU economy.

It is also a large and growing source of greenhouse gas (GHG) emissions and responsible for around 2.9% of global anthropogenic emissions (2018).

Fit for 55 (European Green Deal): Cut GHG emissions by 55% by 2030

FuelEU Maritime: Reduce GHG intensity of the energy used on board by 80% by 2050

APOLO aims to provide breakthrough in the development of advanced power conversion technologies in maritime sector by using Ammonia as an alternate fuel.



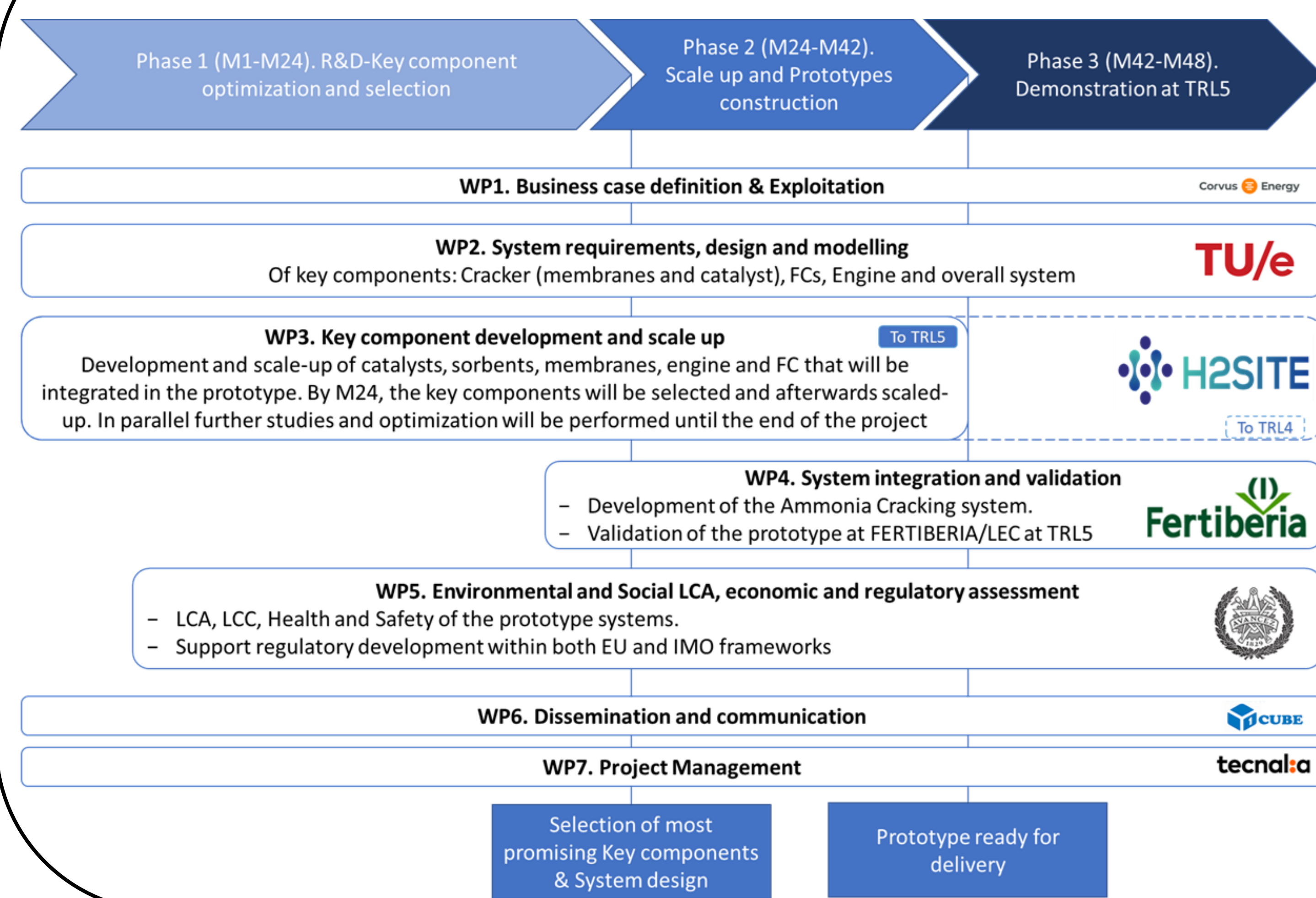
Prototype 1

Advanced power conversion system based on the combination of high purity ammonia cracker (>99.998%, 150 kg_{H₂}/day) and a high efficiency PEM fuel cell with an overall efficiency of 51-54%

Prototype 2

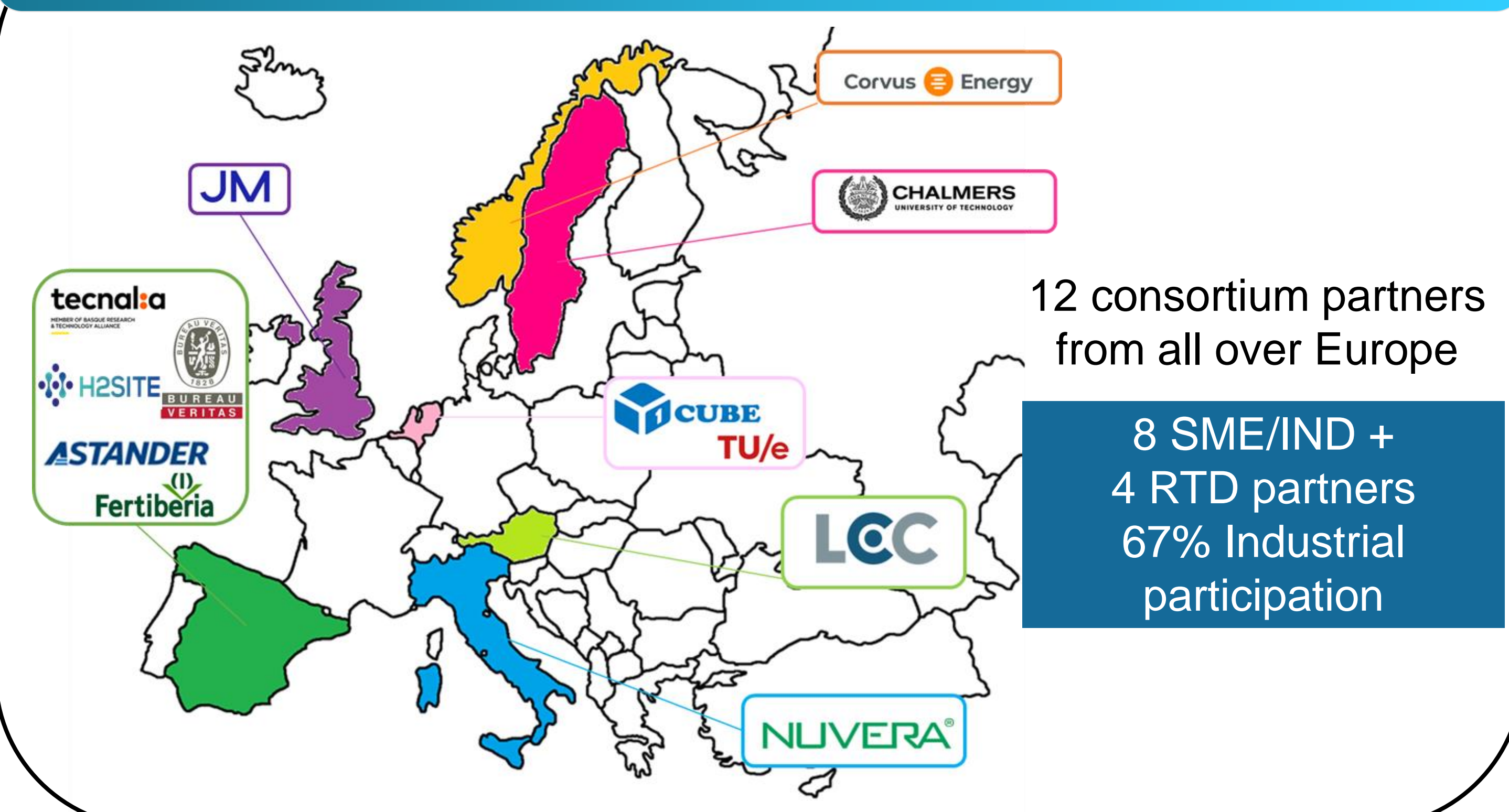
Advanced power conversion system based on the combination of a low purity ammonia cracker (>98%, 50 kg_{H₂}/day, 30% H₂ in NH₃ blend) and a high efficiency 4 stroke engine with an overall efficiency of >45%

Project Planning and Expected Outcomes



- APOLO will work to tackle the challenges of **power conversion** to fully **decarbonize the maritime sector**.
- Full value chain covers from the **synthesis of Ammonia to the shipbuilder** going through all key component manufacturers reinforce the energy independence of Europe.
- The technologies developed are **modular** and **easily scalable**.
- The results from the **LCA** and **sLCA** are combined for an integrated conclusion on the sustainability of the APOLO technology.
- Aims to suggest **amendments on EU and IMO regulations** on the use of ammonia as fuel/power conversion systems for the maritime sector.
- An **HSE assessment** inspired by HAZOP/HAZID protocols and procedures will be performed where a preliminary Safety Engineering will be included.
- During APOLO, a **TEA** and a **LCC** will be done, evaluating the cost of investments, operation, maintenance and end-of-life disposal.

Consortium



Project Details

Contract Number: 101138466
Type of Action: HORIZON Research - Innovation Action (RIA)
Granting Authority: European Climate, Infrastructure and Environment Executive Agency (CINEA)
Starting Date: 1st of January 2024
Duration: 48 months
EU Funding: € 7,511,266.25

For more information:

[Website](#)



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Acknowledgement: Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor CINEA can be held responsible for them.

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