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HyTEA - A Decision Support Tool for Optimising the Green Hydrogen Value Chain in Ports



A tool to test scenarios of green hydrogen deployment in ports

As interest in green hydrogen grows as a pathway to decarbonisation, there is an increasing need for practical tools that can help stakeholders assess the technical, economic and operational considerations involved in developing hydrogen infrastructure, from production and storage to transport and end use.

Since the main objective of HYDEA is to boost the hydrogen transition in the Atlantic Area ports, the project was tasked with developing a decision support tool for hydrogen applications in ports. The main objective of this open-source tool, called HyTEA 1.0, is to support techno-economic assessment and decision-making in the planning and development of green hydrogen supply chains. It was developed by researchers at the University of Galway, a partner of the HYDEA consortium.

A comprehensive assessment of the entire green hydrogen value chain

HyTEA provides a flexible framework for assessing and comparing different green hydrogen supply-chain configurations, covering key elements from renewable electricity generation and hydrogen production, to storage, transport and end-use demand. The tool enables users to examine how renewable resources and hydrogen demand affect electrolyser operation, hydrogen production, storage requirements and overall system economics.

A key feature of HyTEA is its ability to integrate multiple location-specific renewable energy sources and hourly generation profiles within a single model. Users can represent different combinations of renewable resources, including onshore wind, offshore wind and solar photovoltaics. HyTEA can be used to assess and optimise electrolyser sizing under various operating conditions. The tool also supports the assessment and sizing of hydrogen storage technologies, including compressed hydrogen, liquefied hydrogen and salt caverns, as well as transport options such as pipelines and tube trailers.

By considering production, storage and transport within an integrated framework, HyTEA enables users to explore multiple green hydrogen supply chain scenarios and evaluate their technical and economic

implications. The tool calculates key performance indicators, including the levelised cost of hydrogen (LCOH) and the greenhouse gas (GHG) intensity of each scenario. These indicators provide a basis for comparing scenarios from both economic and environmental perspectives and identifying potential options for further development.

What's next?

HyTEA 1.0 was first publicly presented at the European Hydrogen Energy Conference in Seville, Spain, in March 2026. The demonstration introduced the tool and its capabilities to researchers and professionals working in the hydrogen sector. Following its initial presentation, the tool developers will continue to share HyTEA through a series of training and knowledge-exchange activities.

- A **2-hour HyTEA masterclass** is planned as part of Oman Climate Week, taking place from 14-16 September 2026. The session will introduce participants to the tool and demonstrate how it can be applied to the assessment and optimisation of hydrogen supply-chain scenarios in ports.
- A **HyTEA workshop** will take place in Galway on 29 September 2026, providing an opportunity to explore the tool's capabilities and its application to hydrogen supply-chain planning in greater depth. **Register now:** <https://forms.gle/KVvgZC1RhDkVrHW79>

The researchers from University of Galway also plan to develop an **online application of HyTEA**, making the tool more accessible to users without a programming or coding background. This planned development will allow a wider range of researchers, industry stakeholders and other users to explore hydrogen supply-chain scenarios in port environment.

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HYDEA project in short

OBJECTIVE	Accelerating the deployment and the use of green hydrogen-based technologies in an integrated way with marine and other renewable energies in Atlantic Area ports		
DURATION	3.5 years (2023-2027)	BUDGET	€3.43M
FUNDING	European Interreg Atlantic Area Programme - N°EAPA_0057/2022		
LEADER	ITG, Spain		
PARTNERS	10 consortium partners 11 ports involved		



