HyPowerGT

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Public presentation

The HyPowerGT project is supported by the Clean Hydrogen Partnership and its members (GA 101136656) and the Swiss Federal Department of Economic Affairs, Education and Research, State Secretariat for Education, Research and Innovation (SERI).

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Co-funded by the European Union

Project funded by

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HyPowerGT

Hydrogen-Powered Gas-Turbine engine fuelled with up to 100% H_2

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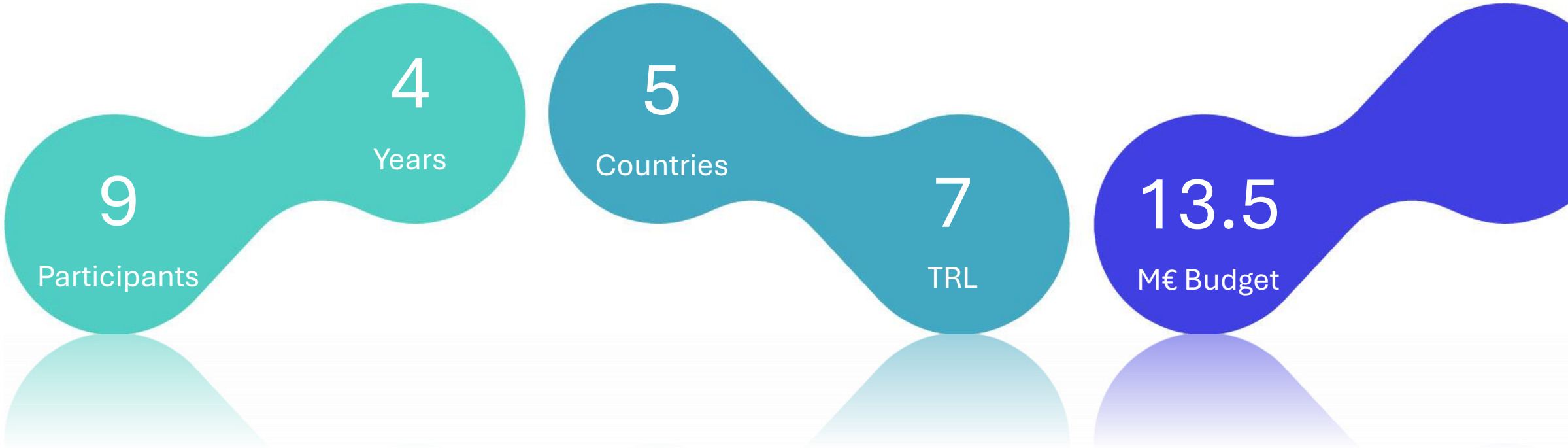
HyPowerGT in a nutshell

Figures and facts



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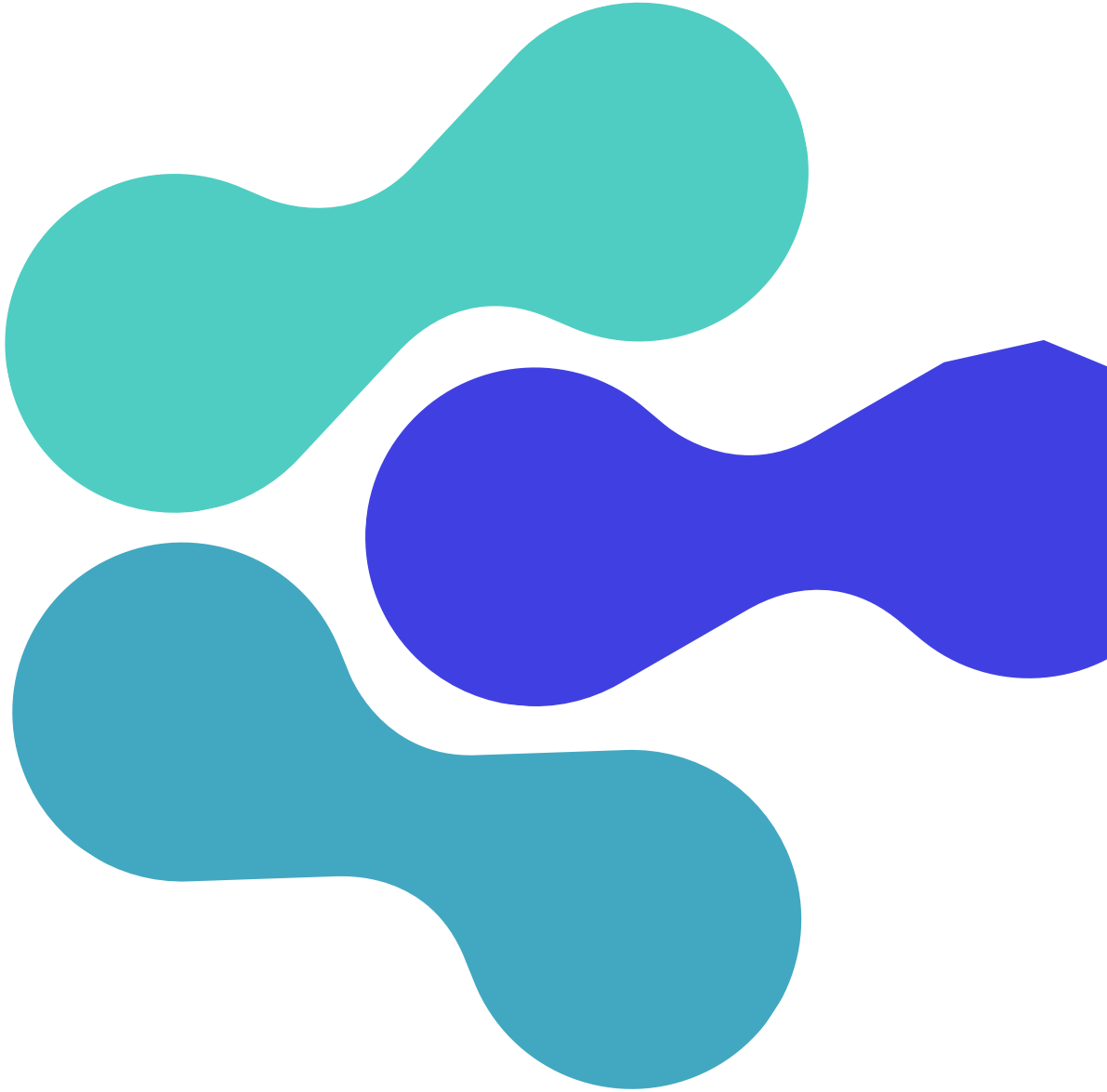
HyPowerGT Objectives

Objectives

- To provide a safe and efficient **low-emission H_2 combustion system** retrofittable to gas-turbine engines in the 10-20 Mwe class

- To demonstrate operating capabilities, as well as compliance with NO_x regulations, of a simple-cycle gas turbine at full operating conditions with fuel compositions mixed with hydrogen **up to 100% H_2**

- To present pathways for **decarbonised** power generation through retrofits and uptake of project's results



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HyPowerGT main impacts

CO2 free operation, low NOx gas turbine

- HyPowerGT will offer an innovative solution for the energy transition: a **CO_2 free operation gas turbine** with low NO_x emissions that represents the cleanest possible gas turbine configuration on the market

Green technology

- The **low NO_x target** will be obtained working on the DLE combustion technology, neither using diluents, nor catalysts in the gas turbine exhaust or reducing the gas turbine's thermodynamic efficiency by lowering the combustor exit temperature

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HyPowerGT main impacts

Gas turbine fuel flexibility

- The project will demonstrate, by means of engine test campaigns, the ability to burn **any blend of natural gas and hydrogen** up to pure H_2, from start-up and with a switching ability at any load.

Supporting EU climate neutral targets

- HyPowerGT will contribute significantly to the, proposing through a technology development up to TRL 7 a concrete market solution **Green Deal**
- **Energy transition** will be fostered through the retrofittability on existing natural gas and CHP applications.

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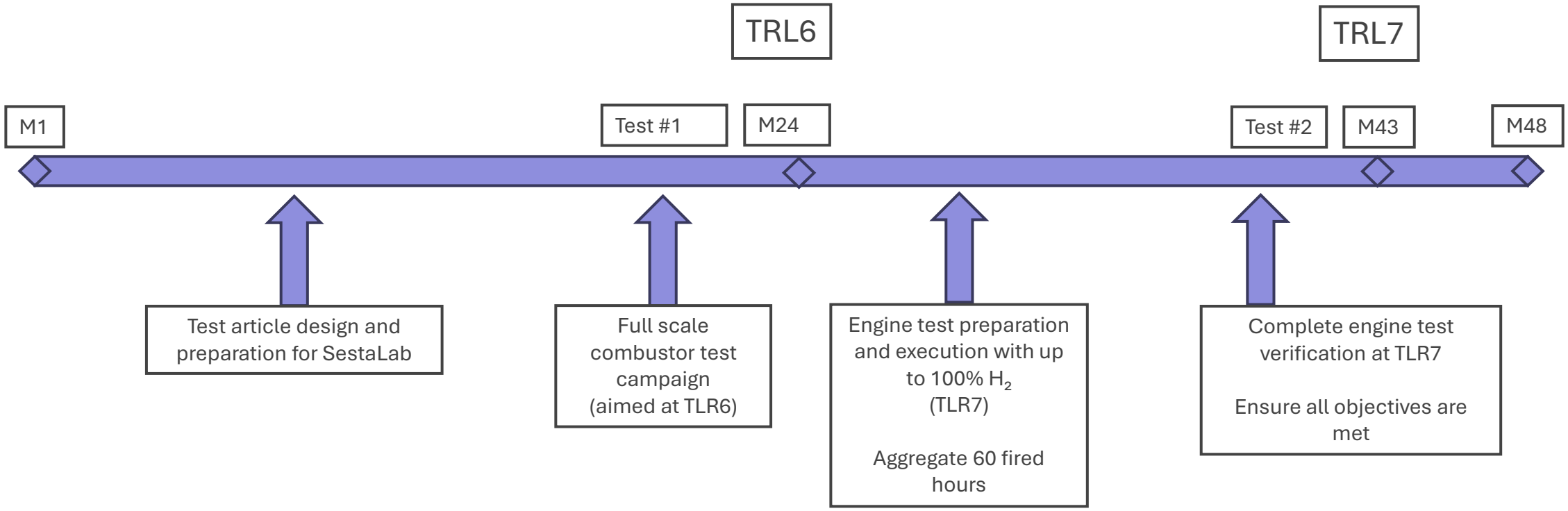
HyPowerGT project timeline



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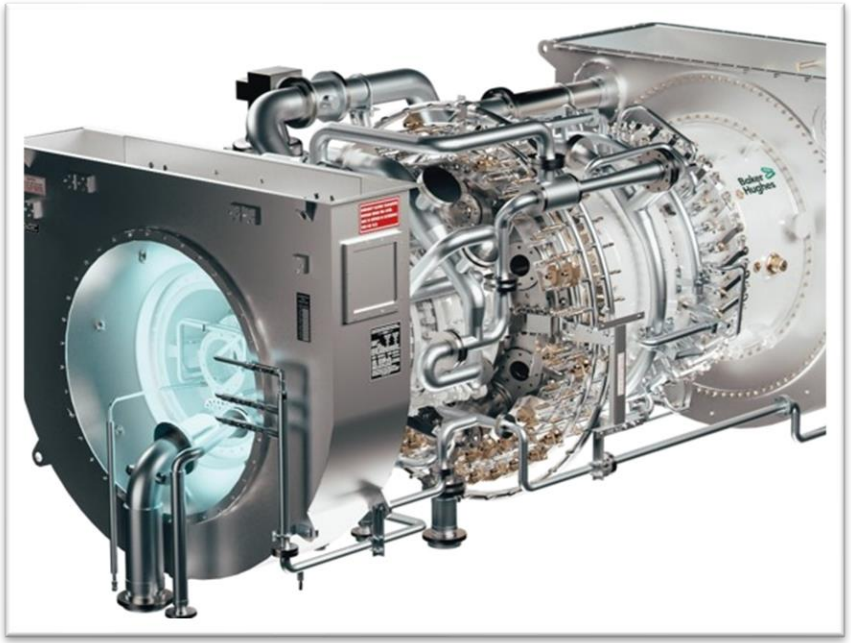
HyPowerGT main developments

DLE H_2 combustor technology

The system will be verified at TRL6 by testing in an instrumented annular combustor rig, operated at engine representative conditions of pressure and temperature

To complete the design verification at TRL 7, the DLE H_2 combustor will be introduced in the instrumented prototype engine and tested at all the mission conditions, operating up to rated power (16.9 MWe) and with a minimum of 60 testing hours.



Baker Hughes NovaLTTM16 gas turbine, 100% H2 ready (*)

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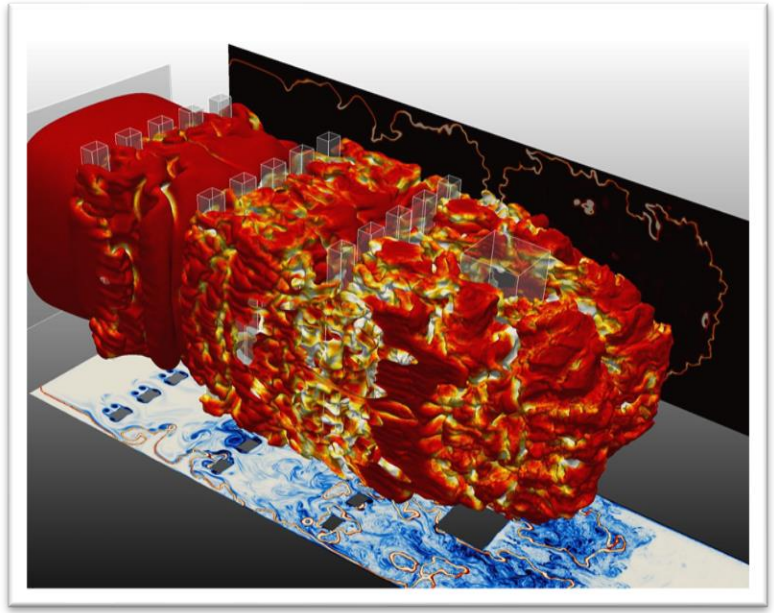
HyPowerGT main developments

Safety handling

An assessment for retrofitting the DLE H_2 gas turbines and a complementary risk analysis related to health, safety, and environment assessment will be performed.

A safety management plan will be ultimately developed, with the aim of enabling operation of retrofitted GTs with up to 100% H_2 and certifying the NovaLT™16 DLE H_2 product.



Advanced numerical simulation of a venting duct deflagration scenario*

*Dr. D. Barré, CERFACS

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HyPowerGT main developments

Retrofitting and techno-economic roadmap

- The HyPowerGT project will conduct a comprehensive **assessment of the market potential** for DLE H_2 technology
- **Techno-economic analyses** of midstream hydrogen turbo-compressor stations, industrial cogeneration facilities, and broader energy system solutions will be carried out
- An exploitation roadmap will be formulated, designing **strategic pathways** for spreading the DLE H_2 technology's potential. This roadmap will address the requisite R&D efforts
- An **analysis of regulatory frameworks** will be conducted to identify gaps and opportunities that could facilitate the widespread deployment of the technology

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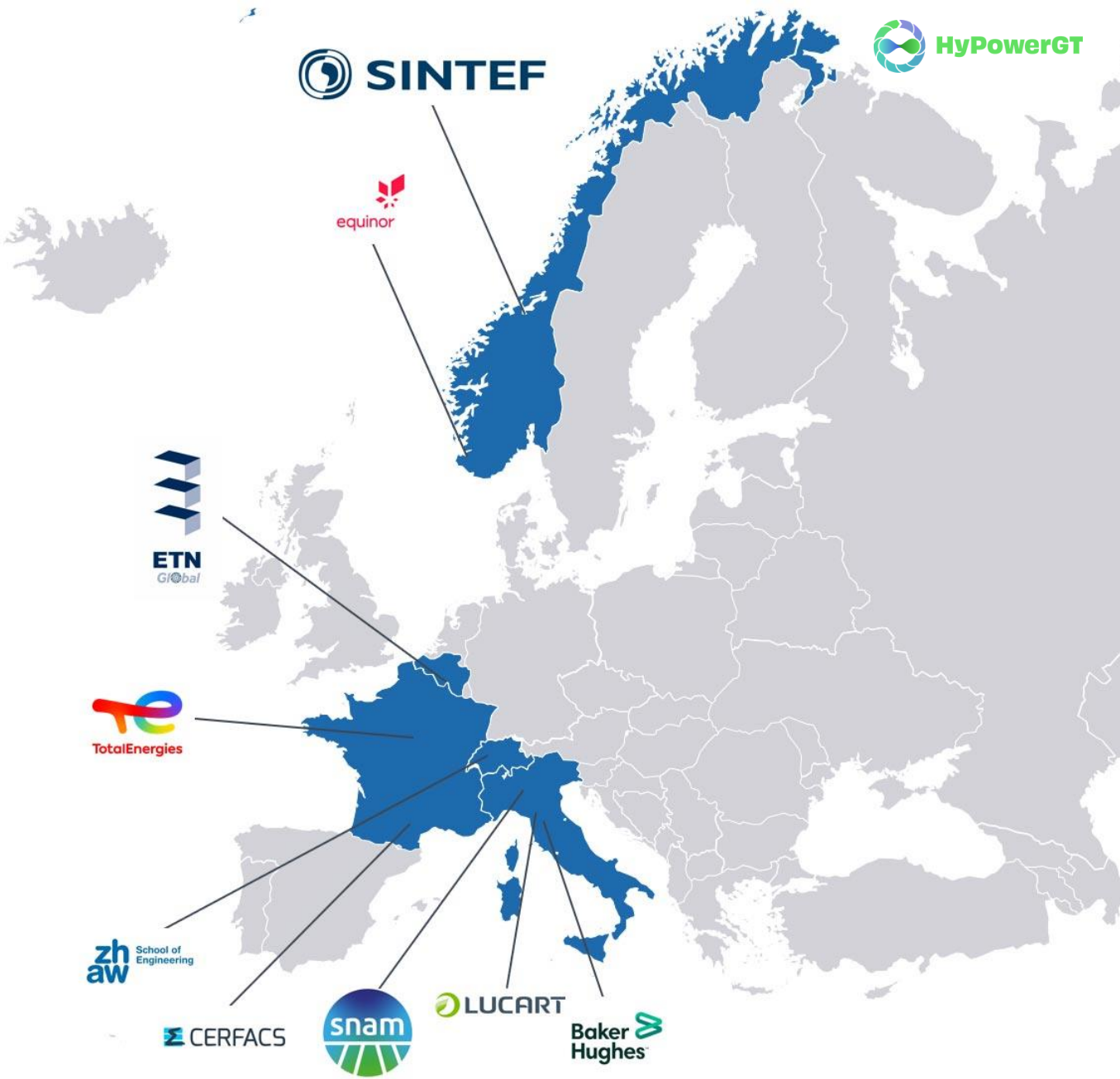
HyPowerGT consortium

A consortium of **nine** project partners, from **five** different European countries



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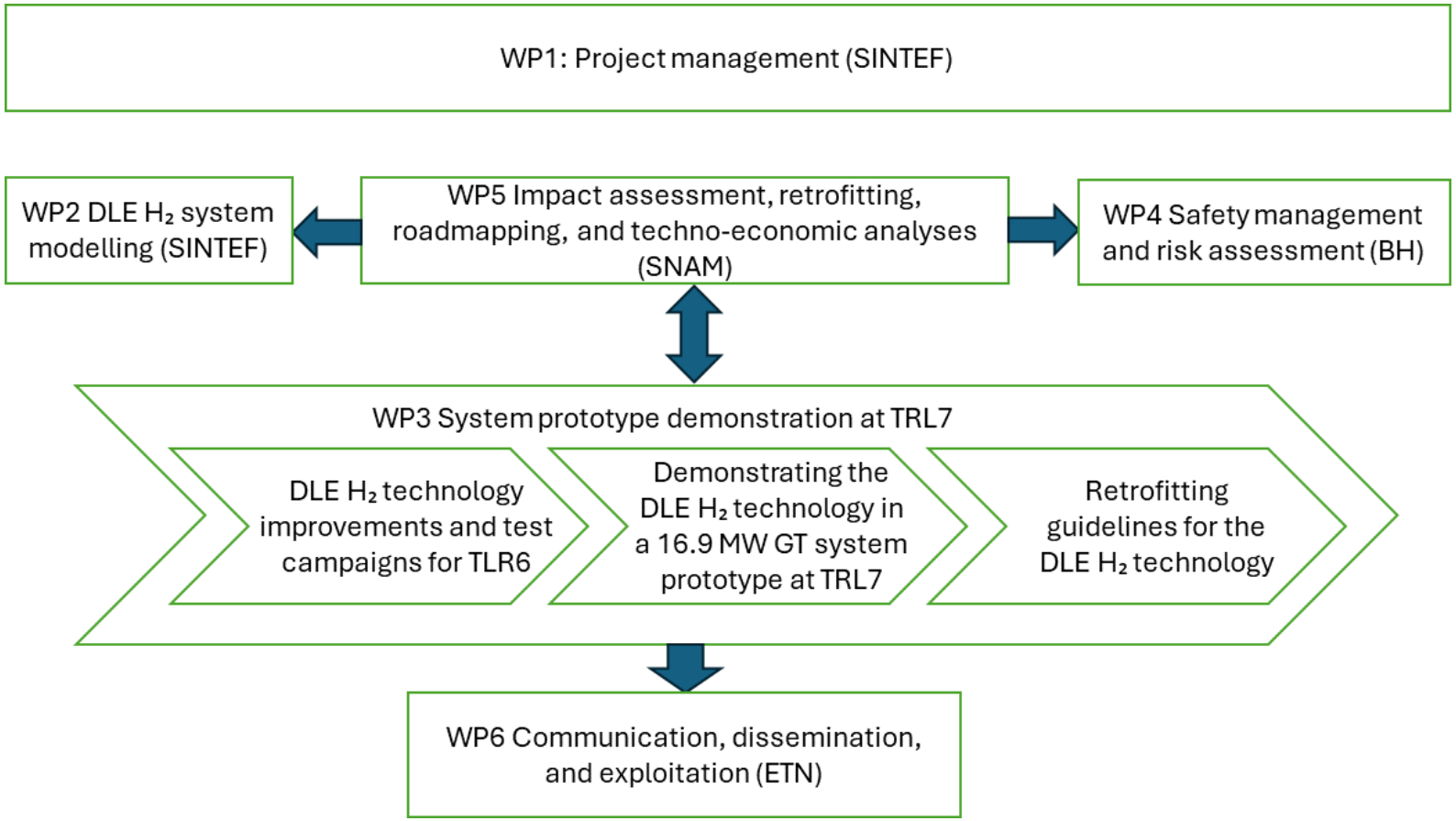
HyPowerGT Work Packages



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Thank you for your attention

info@hypowergt.eu

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