

HyPowerGT Consortium

Project Newsletter #4



HyPowerGT

*HyPowerGT – Demonstrating a hydrogen-powered gas-turbine engine
fuelled with up to 100% H₂*



Figure 1: Representatives from Baker Hughes, SINTEF, and ZHAW visit to SestaLab facilities during the HyPowerGT TRL6 campaign in November 2025

HyPowerGT reached its implementation midpoint in December 2025, marking the conclusion of Month 24. In these two years, the consortium achieved the relevant milestones foreseen in the original project planning.

Work Package 1 – Project Management

SINTEF recently coordinated the completion of the “Data Collection Exercise for 2025” and the second “Annual data reporting for the Clean Hydrogen Joint Undertaking”. The consortium will meet in June 2026 in Trondheim, Norway.

Work Package 2 – Modelling assessment of DLE H₂ combustion system

The consortium concluded *Task 2.1 on “Hydrogen burning rate at high pressure”*, which aimed at:

- Gathering experimental data on high-pressure combustion of hydrogen-enriched premixed flames,

- Developing calculations of hydrogen-air premixed flames at GT-relevant conditions using Direct Numerical Simulations, and
- Consolidating experimental and DNS data into an updated and more robust semi-empirical scaling law for the turbulent burning rate of H₂-enriched premixed flames at high-pressure conditions

Under *Task 2.2 on “Hydrogen flames thermo-acoustic response from atmospheric to high pressure”*, two atmospheric combustion test campaigns were conducted. All damper types were experimentally characterised in cold-acoustic test facility, and an appropriate damper model was derived and validated. In the coming months, project partners will measure flame transfer functions with downstream forcing, as well as set-up the relevant network model.

Task 2.3 on “Assessment of combustion system stability and composition of exhaust gases” achieved significant advancements. Baker Hughes and SINTEF assessed the accuracy of LES models in capturing fuel-oxidiser mixing, flame-stability limits, and NO_x emissions.

Upcoming plans include the continuation of a sensitivity study on the predictions of fuel-oxidiser mixing and flame-stability limits, and the assessment of a low-order model for local analysis of burning rate/flame stability.

Work Package 3 – System prototype demonstration at TRL 7

Project partners have concluded *Task 3.1 on “DLE Hydrogen Test campaign for TRL6”*:

- The TRL6 test campaign was completed according to the original schedule.
- The two burner and combustor acoustic damping prototypes were successfully tested in November 2025.
- Baker Hughes acquired results from detailed analysis of measurements.

Upcoming activities include the definition of prototype engine test HW configuration.

Work Package 4 – Safety management and risk assessment

The Health, Safety, and Environment (HSE) guidelines are being updated, by processing the observations during the TRL6 campaign.

Future activities will include the application of the numerical code AVBP to fuel system failure scenarios identified under this Work Package.

Work Package 5 – Impact assessment, retrofitting, roadmapping, and techno-economic analyses

With reference to *Task 5.2 on “Hydrogen techno-economic analyses”*, the consortium completed the development of the common techno-economic model to compare different scenarios, which are now being characterised. Upcoming activities will focus on those scenarios related to the retrofitting of existing equipment and their potential market impact.

Task 5.3 on “Life Cycle Sustainability Analyses” and *Task 5.4 on “Simulation of H2 gas turbine equipped for cogeneration”* officially started in December 2024.

Work Package 6 – Communication, dissemination, and exploitation

HyPowerGT was featured at [ETN Global’s 12th International Gas Turbine Conference in October 2025 in Brussels](#), Belgium.

In February 2026, Baker Hughes presented the project initial outcomes at the 2nd Workshop on High Pressure Hydrogen (an event organised by an EU-funded sister project, [X-SEED](#)).

Upcoming dissemination activities include, among others, [H2science](#) (a conference gathering the entire value chain of hydrogen and organised by SINTEF).

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