## PRESS RELEASE: EU and Swiss-funded project Insigh$_2$t launched

The "InsigH$_2$t" project officially started on 1st January 2025. The project, led by NTNU, is jointly funded by the EU Horizon Europe Research and Innovation Framework Programme under the Clean Hydrogen Partnership (GA No. 101192349) and the Swiss Federal Department of Economic Affairs, Education and Research, State Secretariat for Education, Research and Innovation (SERI). InsigH$_2$t has an overall budget of approximately EUR 6.2 mil. and will run for four years, between January 2025 and December 2028.

One of the biggest challenges facing the development of zero carbon, hydrogen fired gas turbines for power generation is the lack of fundamental understanding of how hydrogen flames behave under elevated pressure. The aim of the InsigH$_2$t project is to solve this problem. The InsigH$_2$t consortium brings together world leading researchers and industry partners with unique capabilities to perform groundbreaking experiments and numerical simulations that will be used to develop new, predictive tools and design methodologies for safe and efficient operation of hydrogen fired gas turbines.

The objective of InsigH$_2$t is to advance the current scientific understanding regarding the effect of pressure on the turbulent burning rate, thermoacoustic response, and emission performance of premixed hydrogen flames under relevant gas-turbines operating conditions. Hydrogen, with its high diffusivity and reactivity, poses significant challenges to its clean and efficient utilisation as a fuel in gas-turbines, due to the lack of understanding of its pressure-dependent turbulent burning rate, crucial for combustion stability in gas-turbines operation.

Beyond scientific understanding, the project's impact addresses industrial challenges. Crucially, the involvement of two gas turbine Original Equipment Manufacturers (OEMs) ensures alignment with the Strategic Research and Innovation Agenda of the Clean Hydrogen Joint Undertaking, facilitating the swift transfer of improved combustion methodologies and understanding towards application in operational power plants. InsigH$_2$t's contributions align with the objectives of the EU Green Deal Hydrogen Strategy, offering a tangible pathway towards a more sustainable energy future. Additionally, it supports the manufacturing of key technologies in Europe, in line with the Net-Zero Industry Act (NZIA) goals of strengthening manufacturing of clean-tech in Europe.

InsigH$_2$t leverages high-pressure experimental measurements, featuring advanced optical diagnostics, coupled with cutting-edge direct numerical simulations, focusing on a selection of simple canonical flames that are paradigms of more complex industrial burner geometries and configurations. The fundamental insights gained will facilitate the development of advanced models and enhanced design tools, empowering industrial OEMs to reduce the significant development time and costs of hydrogen combustion

technologies. By leveraging science-based predictive capabilities, Insig$H_2$t aims to accelerate the deployment of clean, reliable, and efficient hydrogen-fired gas turbines.

**The Insig$H_2$t consortium includes eleven partners from six European countries:** NTNU (NO), Arttic Innovation (DE), Technische Universität Berlin – TUB (DE), Baker Hughes (IT), SINTEF Energi (NO), RWTH Aachen (DE), Centre Européenne de Recherche et de Formation Avancée en Calcul Scientifique – CERFACS (FR), ETN Global (BE), Università di Firenze – UNIFI (IT), Ansaldo Energia Switzerland – AES (CH), Zürcher Hochschule für Angewandte Wissenschaften – ZHAW (CH).

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