

PRESS RELEASE: EU funded project HELIOS launched

The HELIOS project ambition is high: it will make a big leap in hydrogen combustion within gas turbines, clearly beyond the latest state-of-the-art.

The “HELIOS” project fully entitled “Stable high hydrogen low NO_x combustion in full scale gas turbine combustor at high firing temperatures” started officially on March 1st, 2023. The project, led by Eindhoven University of Technology, is funded by the EU Horizon Europe Research and Innovation Framework Programme under the Clean Hydrogen Partnership (GA No. 101101462). HELIOS has an overall budget of approximately EUR 4 million and will run for four years.

About HELIOS:

Nowadays, the increasing awareness of the need to decarbonize the economy has put pressure on the power generation sector to reduce their share of CO₂ emissions. In this context, gas turbines are the most robust, flexible, proven and cost-effective technology especially for distributed and large-scale power generation. A proven approach to decarbonize the fuel of gas turbines, and thus their carbon intensity is to mix natural gas with increasing amounts of hydrogen. As such, it becomes essential yet technologically challenging for gas turbines to operate on any variable mixture of natural gas and hydrogen including 100% hydrogen.

HELIOS will develop needed technology for hydrogen combustion as a global retrofit solution for operating and installed gas turbines based on the commercially operating FlameSheet™ combustor platform contributed by our project partner, Netherland-based Thomassen Energy BV. Essential for this approach is a sound fundamental understanding of hydrogen combustion, combined with advanced numerical modelling and measurement techniques in a full-size combustor. This is imperative to realize the required technological developments for utilization of hydrogen-enriched natural gas with the FlameSheet™ combustor.

The HELIOS project will start with gas-turbine combustion rig testing at well-defined lab conditions (Technology Readiness Level, TRL, 4) and will reach realistic conditions in a relevant environment (TRL 6) by the end of the project, with full-scale high pressure rig test validation. Besides the technical developments, HELIOS will help enable and accelerate the emergence of an immense innovative ecosystem and create economically feasible future adoption and commercialization of this technology at cost effective and scale.

The decarbonized repurposing of these existing power generation assets becomes vital as a complement to the massive introduction of inherently intermittent renewable energy sources used for electricity generation. Gas turbines offer grid inertia and stability whilst also generating at-scale, dispatchable firming capacity needed to balance. Clearly, this HELIOS project will contribute significantly to solving the substantial challenges that Europe faces by making its energy system secure, cost competitive, clean, flexible and resilient.

The highly complementary HELIOS consortium includes five partners from three European countries: Eindhoven University of Technology (NL), Thomassen Energy BV, A Hanwha Company (NL), Centro Combustione Ambiente S.P.A. (IT), Deutsches Zentrum für Luft- und Raumfahrt e.V. – DLR (DE), Technische Universiteit Delft (NL). More information about the project can be found at: <https://www.linkedin.com/company/eu-project-helios>



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Start Date: 01/03/2023

Project Duration: 48 months

Project Budget: € 3 984 187.00

Project Coordinator: Roy Hermanns, Eindhoven University of Technology

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