



PROJECT

ACHIEVE

Advancing the Combustion of Hydrogen-Ammonia blends for improved Emissions and stability

ACHIEVE aims at developing the fundamental knowledge to enable a transition to unconventional carbon-free fuel blends based around H2 and NH3 to achieve zero carbon emissions, ultra-low Nox emissions, and stable gas turbine operation.



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PARTNERS

9

COUNTRIES

€3 M

TOTAL BUDGET

3.5

YEARS

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Coordinador	Programa	Fechas
UNIROMA	Horizon Europe	2024-2027
Sector	Web	
Energy	Under construction	

01
Challenge

H2/NH3/CH4/H2O/N2 blends is a major hurdle for industrial applications. The gas turbine sector faces the formidable challenge of transitioning to a decarbonized energy system, manoeuvring through a range of fuels from hydrocarbons to intricate blends of hydrogen, ammonia, and methane. The pressing task is to devise solutions enabling gas turbines to adeptly handle unconventional fuel mixtures, meeting strict emission constraints. Despite progress, the burning properties of unconventional H2 blends remain elusive, necessitating focused research to refine models and unlock the full potential of diverse fuel combinations.

02
Solution

ACHIEVE proposes to enhance understanding of different swirl-stabilized combustion systems (MILD and DLE). It aims to evaluate system feasibility, develop fluid dynamic models with reduced kinetic mechanisms, and validate them with unique datasets. Special focus is on exhaust gas recirculation's impact on a second combustion stage in heavy-duty GTs. The project also aims to develop and validate a real-time monitoring concept for fuel-flexible operation at MILD and conventional conditions (TRL 4).

03
Impacts

ACHIEVE envisions significant advancements in the realm of combustion science and technology. In the event of a successful outcome, this project has the potential to substantially elevate gas turbine efficiency, resulting in heightened overall performance and a notable reduction in the environmental footprint associated with such technologies.