



## PRESS RELEASE

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Rheden, The Netherlands; April 15, 2019

### **Important subsidy paves way towards emission-free gas turbines**

***'High Hydrogen Gas Turbine Retrofit to Eliminate Carbon Emissions' Project receives subsidy from the Dutch Ministry of Economic Affairs.***

Six partners, Ansaldo Thomassen, Delft University of Technology, OPRA Turbines, Vattenfall, Nouryon and EMMTEC have been awarded a subsidy by the Dutch Government for the project: "High Hydrogen Gas Turbine Retrofit to Eliminate Carbon Emissions".

The subsidy, valued at €500k, is awarded as part of the Dutch hydrogen program within the Top Sector Energy area of the Dutch Ministry of Economic Affairs and Climate Policy. This amount is apportioned among all partners of the consortium based on their specific contributions to the project. The subsidy was approved considering the cooperation of partners from Dutch academia and industry.

The Dutch hydrogen program focuses on future carbon-free hydrogen value chains in line with European Commission 2050 Energy Strategy Directives. Hydrogen can deliver a carbon free solution for industry, mobility, housing and the power sector. The ambition of the program is to enable joint innovation between Dutch companies and institutes to be able to deliver economic value in the short to medium term. This project fits perfectly within the ambitions and objectives of the hydrogen program.

The major objective of the High Hydrogen Retrofit Project is to develop a cost-effective ultra-low emissions (sub 9ppm NOx and CO) combustion system retrofit for existing installed gas turbines in the output range of 1MW to 300MW. Fuel flexibility and stable operation from 100% natural gas to 100% hydrogen and any mixture thereof, is a key requirement. This is a key challenge as extreme changes in fuel reactivity switching from natural gas to hydrogen can result in dramatic shifting of heat release within the combustor, which can be physically destructive if not well controlled.

At the center of this innovative high-technology project is the patented and novel aerodynamic trapped vortex FlameSheet™ combustion technology platform, owned by Genoa Italy-based Ansaldo

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Energia. The FlameSheet™ combustion system is operating commercially in multiple 60hz F-Class gas turbine power plants with sub-9ppm NOx emissions including with the use of a hydrogen- blended fuel mix.

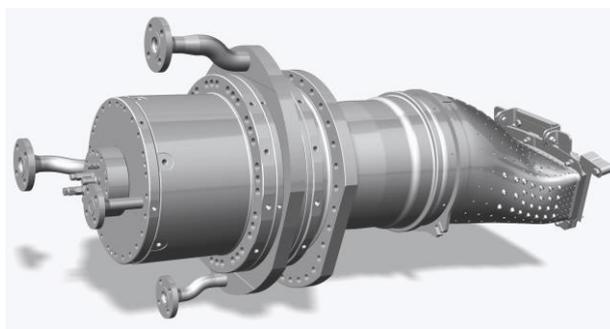
The prime focus of this award from the Dutch government is a full-scale atmospheric verification in 2020, which will ultimately lead to a first engine demonstrator by 2023.

The lead applicant, Ansaldo Thomassen B.V. is an experienced expert in high technology gas turbine retrofits. Delft University of Technology provides advanced theoretical, computational and experimental experience in support of advanced high hydrogen combustion development. OPRA is a manufacturer of gas turbines with access to state-of-the-art test facilities which will play an important role in the project. The knowledge from this project will enable the power plant operator partners Vattenfall, EMMTEC and Nouryon, to make significant progress in the realization of dry low NOx, carbon free production of power and heat. Hydrogen generated from renewable energy resources such as excess wind and solar will also allow existing gas turbine power plants to become part of the large-scale energy storage solution.

Websites:

- <https://www.ansaldoenergia.com/ansaldo-thomassen>
- <https://www.tudelft.nl/>
- <https://www.opraturbines.com/>
- <https://www.nouryon.com/>
- <https://www.emmtecservices.nl/>
- <https://group.vattenfall.com/>

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*Ansaldo's Multi-OEM Platform Gas Turbine Services FlameSheet™ Combustion Retrofit Solution*