

COMET MODULE

LEC FFF – FUTURE FUEL FUNDAMENTALS



Main location: Graz (Styria)

Other locations: none

Thematic area: Energy & Environment

Thematic focuses

Understanding the fundamentals of ammonia combustion with the aim of significantly improving the development methodology of carbon neutral energy and transportation systems.

- Basic experiments and analyses of ammonia spray formation, combustion and emissions
- Detailed modeling of ammonia spray, as well as ammonia/hydrogen combustion and emissions
- Long-term stability of lubricant and component materials in use with ammonia combustion

Planned realisation and outcomes

The COMET module LEC FFF will provide the scientific basis for novel development methods and development tools to advance the use of ammonia as a carbon-free fuel in large engines. LEC FFF includes conducting research on the detailed physical characterization of ammonia flames and understanding all relevant processes that occur in the ammonia injection spray and within the flame front. Detailed modeling of these phenomena is an essential building block for a predictive simulation methodology, as it is currently assumed that existing simulation models cannot be applied to ammonia combustion without significant adaptation or new developments. LEC FFF will experimentally investigate the conversion processes of ammonia including hydrogen-enriched fuel-air mixtures in injection chambers and combustion chambers, perform fundamental tests with special measuring equipment in the laboratory and improve and validate simulation models with the resulting measurement data. In addition, the module will also take a detailed look at the emissions resulting from the combustion of ammonia and the particular effects of the fuel and the combustion products on lubricating oil and engine component materials.

COMET FACTSHEET

Selected company partners (max. 10):

1. AVL List GmbH
2. ExxonMobil Technology and Engineering Company
3. INNIO Jenbacher GmbH & Co OG
4. Winterthur Gas & Diesel Ltd.

Selected scientific partners (max. 5):

1. AC2T research GmbH
2. Graz University of Technology
3. Universitat Politècnica de València - CMT-Motores Térmicos
4. University of Applied Sciences and Arts Northwestern Switzerland

Selected international¹ partners (max. 5):

1. ExxonMobil Technology and Engineering Company, USA
2. Winterthur Gas & Diesel Ltd., Switzerland
3. Universitat Politècnica de València, Spain
4. University of Applied Sciences and Arts Northwestern Switzerland

Duration: 01.01.2024 bis 31.12.2027 (4 years)

Staff employment: 7.5 FTE, thereof 7 scientists

Management: Dr. Gerhard Pirker, Area Manager

Contact: LEC GmbH
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¹ Partners with headquarters outside Austria