

## The institute at a glance

The Institute of Engineering Thermodynamics at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt - DLR) is establishing the scientific and technological fundamentals of the energy storage industry of the future. It carries out research in the field of efficient energy storage systems to conserve natural resources and develops next generation energy conversion technologies.

The spectrum of activities ranges from theoretical studies to laboratory work for basic research to the operation of pilot plants.

These experimental and theoretical studies are accompanied by systems analysis studies to analyze the associated technological, environmental and economic potential and situate it in a larger overall context of the energy economy by means of scenarios. In addition to these core activities in the DLR field Energy, the Institute of Engineering Thermodynamics also works on selected subjects from the fields of aviation and transportation, thus contributing to other focal topics of the DLR. These include developments to the use of fuel cell systems in aircraft and ground vehicles and to the generation and the storage of hydrogen.

A major characteristic is the interdisciplinary collaboration of the departments, so that skills and synergies are utilized to greatest possible extent. The institute and its activities are very well integrated in national and international research networks.

## FACTS & FIGURES

Scientists & Technicians >200

Annual Budget ~30M €

50% third party funding

Number of Professors 3 (+1)

Number of Sites 5

## DLR at a glance

DLR is the Federal Republic of Germany's research centre for aeronautics and space. We conduct research and development activities in the fields of aeronautics, space, energy, transport, security and digitalisation. The German Space Agency at DLR plans and implements the national space programme on behalf of the federal government. Two DLR project management agencies oversee funding programmes and support knowledge transfer.

Climate, mobility and technology are changing globally. DLR uses the expertise of its 55 research institutes and facilities to develop solutions to these challenges. Our 10,000 employees share a mission – to explore Earth and space and develop technologies for a sustainable future. In doing so, DLR contributes to strengthening Germany's position as a prime location for research and industry.

## Imprint

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# HYDROGEN FOR MOBILITY

Projects of the DLR-Institute of Engineering Thermodynamics

Your scientific pioneer for the future of energy storage

## Hydrogen for Mobility

An economy without greenhouse gas emissions by 2050 – this is Europe's declared, 30-year goal for halting climate change. Renewable energies are expected to replace fossil fuels such as oil, coal and gas. Hydrogen will play an important role in the sustainable transformation of the energy supply system. We, the Institute of Engineering Thermodynamics, are working on this goal.

The institute's application-oriented research is concerned with innovative energy storage and energy conversion systems and the associated components, as well as with the development and analysis of technical processes. The bridging function between research and industry is one of the focal points of our institute.

The goal of our work is to develop technologies to reduce emissions from air, water, and land transportation. To this end, research efforts include low- or zero-emission fuel cell propulsion and drive systems, and the development and integration of electrolyzers to provide sustainable fuels.



## Selection of Projects on Hydrogen for Mobility

### Further-FC

EU project to investigate power limitations of PEMFC at high current densities.



### AC-APU

Hydrogen-powered chiller based on metal hydride. Utilizing pressure difference to generate refrigeration.



### CH2P

EU project to develop innovative technology for hydrogen refueling stations using solid oxide cell technology by operating on low carbon natural gas or biomethane.



### 328H2

FC 1.5 MW liquid hydrogen fuel cell system for use in a regional aircraft.



### BALIS

BMVI project to develop and build a test environment for fuel cell powertrains up to 1.5 megawatts for aviation.



### Nautilus

Development and testing of a liquid natural gas powered natural gas fuel cell and battery system to reduce ship CO<sub>2</sub> emissions by 40% and other pollutants by 90%.



### H2-ReNoWe

Sustainable management of hydrogen by switching a compressed air energy storage power station to a CO<sub>2</sub>-free operating mode.



## How to get the information

To get more information about projects we are involved in, we would like to ask you to focus the QR code with the camera of your cell phone.

You will receive on your screen the corresponding web link. Activate the link and get information about the project on the spot.

You are also welcome to contact us directly. You will find our contact details on the back page!

### HEAVEN

Pressurized fuel cell technology and liquid hydrogen for 4-seat aircraft.



### Pa-x-ell Phase 2

NOW project to study and develop a decentralized energy network and hybrid energy system using novel fuel cells for use on ocean-going passenger ships.



### H2Mare

In the BMBF-funded project, off-shore-electrolysers and P-t-X demonstrators are directly coupled to offshore wind to produce on-site green hydrogen, as well as liquified methane, Fischer-Tropsch hydrocarbons, methanol and ammonia.



### FCCP

Interreg North-West Europe project to equip electric cargo bicycles with fuel cell propulsion and test them in logistics applications.



More projects on our website:

[www.DLR.de/TT/PROJECTS](http://www.DLR.de/TT/PROJECTS)