Solutions for special challenges in production

In the context of research and development projects, the Fraunhofer Institute for Large Structures in Production Engineering IGP realizes concepts for product and process innovations together with cooperation partners from industry. The research focus is on future-oriented industries such as shipbuilding and steel construction, energy and environmental technology, rail and commercial vehicle construction, and mechanical and plant engineering.
The scientists specialize above all in finding resource-saving alternatives that reduce the burden on the environment and workers. The aim of the research is to develop holistic solutions that enable more cost-effective and high-quality production.

- Forming technology joining and shaping
- Mechanical joining technology
- Thermal joining technology
- Adhesive bonding technology
- Fiber composite technology
- Coating, weathering and corrosion protection
- Factory and work organization
- Production planning and control
- Automation technology
- Measurement of large structures
- Alternative propulsion systems

FORSCHUNGSFABRIK WASSERSTOFF MV

Contact

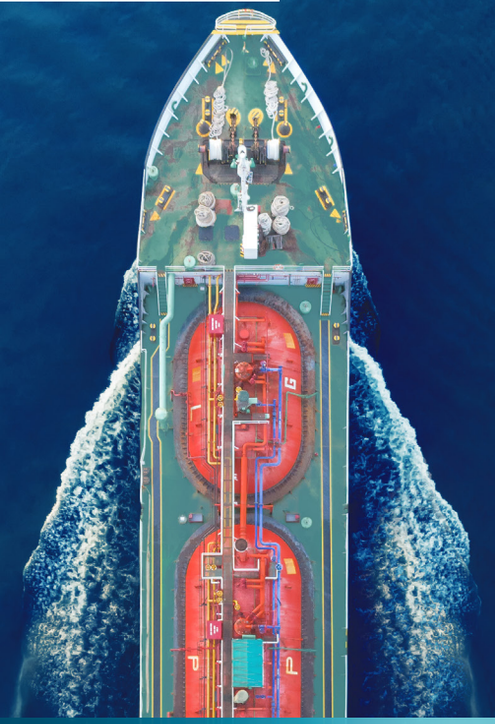
Prof. Dr.-Ing. Wilko Flügge
Director
Tel. +49 381 49682-0
wilko.fluegge@igp.fraunhofer.de

Dr.-Ing. Benjamin Illgen
Project Management Forschungsfabrik Wasserstoff MV
Tel. +49 381 49682-230
benjamin.illgen@igp.fraunhofer.de

Fraunhofer Institute for Large Structures
in Production Engineering IGP
Albert-Einstein-Str. 30
18059 Rostock
www.igp.fraunhofer.de

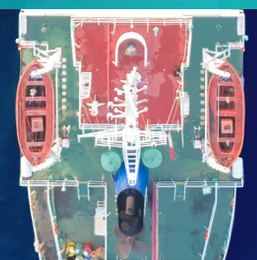
© Fraunhofer IGP
Rostock 2023

Fraunhofer IGP

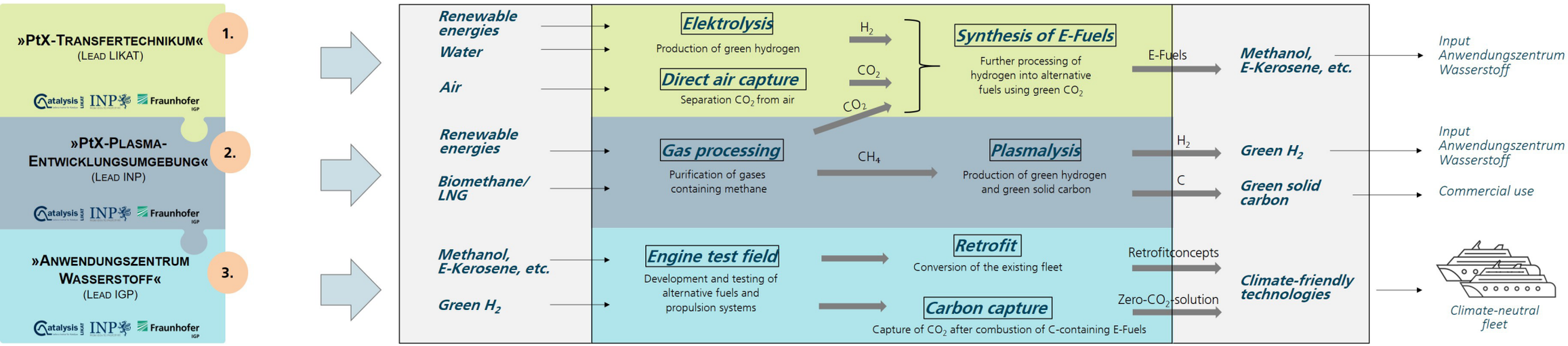


Forschungsfabrik Wasserstoff MV
Research Factory Hydrogen MV

Green solutions for the maritime industry



© Adobe Stock

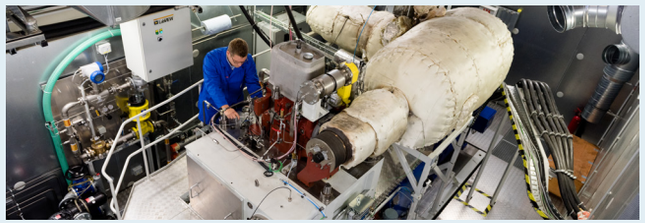


Overall concept of the Forschungsfabrik Wasserstoff MV – Research Factory Hydrogen MV.

Anwendungszentrum Wasserstoff

- Establishment of an application-oriented R&D environment for an efficient transformation towards a climate-neutral maritime industry
  - Large engine test field incl. dual-fuel full engine retrofit
  - retrofit concepts for the conversion of the existing fleet
  - ship section as demonstrator and as infrastructure for technology testing
  - technologies for novel manufacturing challenges (new procedures and materials, automation solutions, etc.)
  - development of hydrogen-based supply chains

- New construction in the »Rostock Werftbecken« as an enabler for the economic industrial use of sustainable hydrogen technologies



Engine test field for research into alternative fuels.
© Holger Martens

Example 1 – Large engine test field

- Propulsion technologies for H2-based shipping
- Cooperation with the LKV of the University of Rostock and FVTR GmbH

- Technological design of the transformation process
  - Objective: Establishment of completely H_2-based fuels in shipping
- Design of alternative propulsion systems for shipping with emission-free fuels → e.g. hydrogen (primary fuel and additive), methanol, ammonia, etc.
- Evaluation and classification of PtX fuels
- Provision of test field capacity for external parties
  → **Type-open R&D infrastructure for engine and component manufacturers**
- Overall system approach with fuel cell and battery system

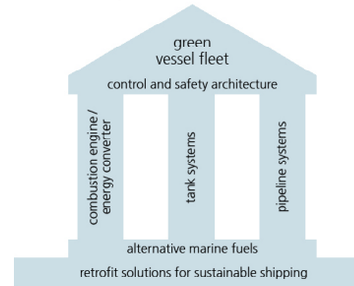
Example 2 – Retrofit solutions

On the one hand …
- Societal target:
GHG emissions ↓
- EU directive »Fit for 55«
- IMO guidelines

… On the other hand
- Shipping approx. 3 % of the CO_2emissions
- Heavy oil domination
- ship service life > 30 a

Retrofit solutions are necessary!

- Adaptation of engine technology
  - Analytical investigation of retrofit requirements
  - Prototypical system development
  - Conception of retrofit kits
- Technologies for the reduction of emissions
- Development of retrofit solutions for tank systems
- Retrofitting of tube and pipeline systems
- Aspects of Ship integration



The three essential pillars for retrofitting the existing fleet.