

Start: October 2021

IKV • INSTITUTE FOR  
PLASTICS PROCESSING

IN INDUSTRY AND CRAFT AT RWTH AACHEN UNIVERSITY



# Call for Participation: Joint Market and Technology Analysis Opportunities for Material Technologies in a Hydrogen Economy

- Markets and market potentials
- Technologies and their readiness
- System configurations, components, materials
- Applications and use cases, supply chains, players
- Future scenarios for plastic applications in complex material systems

# Introduction

## **How material systems will contribute to advanced hydrogen technologies:**

We are providing the know-how and a marketplace for exchanging application, material and production knowledge across hydrogen value chains.

Hydrogen is becoming an important building block for achieving a CO<sub>2</sub>-neutral economy.

The importance is underlined by huge investments into further developing technologies for using hydrogen in a sustainable way. Governments of large industry nations around the world including the EU incentivize both industry and also the private sector for advancing the hydrogen economy with triple-digit billion Euro budgets.

The main field for growth will be related to energy conversion, which will give a push to innovation in transportation, building and many other industries.

Significant improvements of efficiency in generating, transporting, storing and converting hydrogen will only be stimulated by innovations enabled by materials and correlated processing technologies.

More than ever a smart combination of different materials enables efficiency improvements in both production of complex components and their performance in a critical environment.

Within this joint market and technology analysis, we invite you to join a cross-domain industry network in order to discover and shape new opportunities for realizing safe, cost-efficient and durable components enabled by plastic technologies in complex material systems.

This initiative is hosted by the IKV with its proven expertise in industry-relevant R&D and Prof. Rudolf Stauber with long experience in implementing new material systems into high volume applications. Participation will offer you the opportunity to enter into a long-term strategic community for cooperation and technology development for plastics in the hydrogen economy.

Final energy demand  
in the EU [TWh]

14,100

11,500

9,300

Thereof H<sub>2</sub>

2%

4%

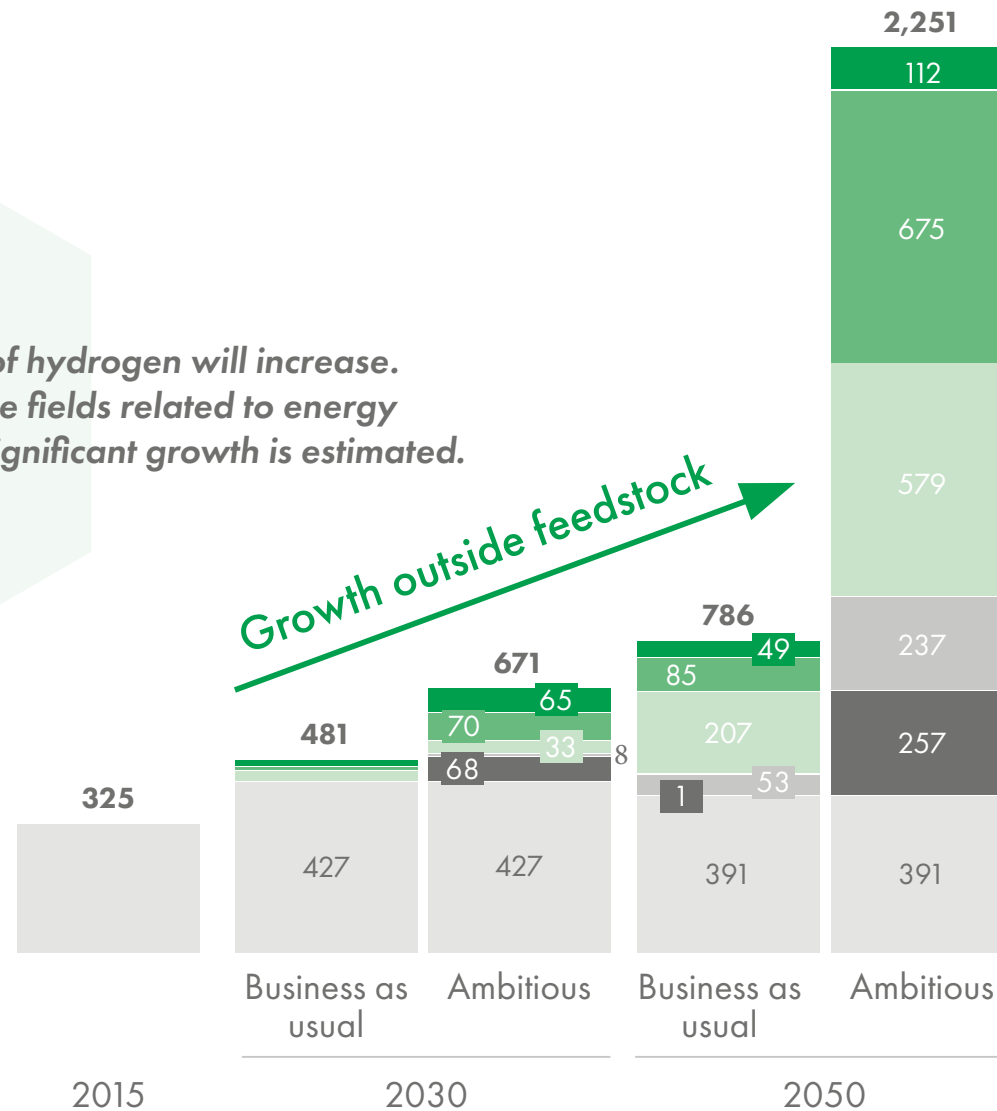
6%

8%

24%

*The utilization of hydrogen will increase.  
Especially in the fields related to energy  
conversion a significant growth is estimated.*

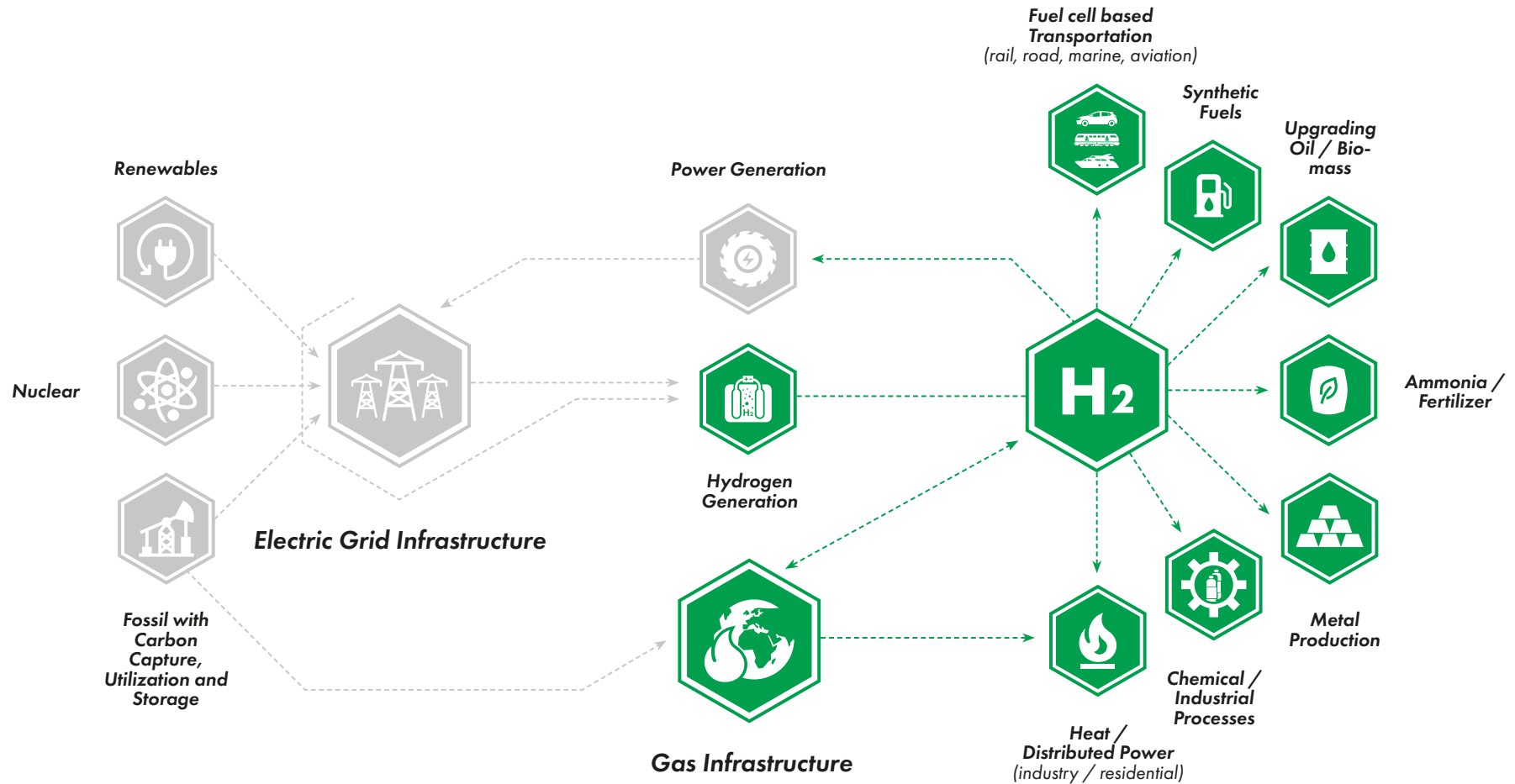
*Growth outside feedstock*



- Power generation, buffering
- Transportation
- Heating and power of buildings
- Industry energy
- New industry feedstock
- Existing industry feedstock

Source: FCH2 JU Hydrogen Roadmap Europe (2019)

# Holistic Consideration of the Hydrogen Value Chain





*„We will identify scientific and developmental challenges that have to be addressed for the best fit of plastics in the hydrogen economy in the coming years.“*

**Prof. Dr.-Ing. Christian Hopmann, Head of IKV**

*„In the next decades, hydrogen technology will significantly change a large number of industrial processes. For this overall economic environment, plastics technology will support a systematic and comprehensive approach for technical solutions.*

*We kindly invite you to become a partner for application-oriented investigations in this field.“*

**Prof. Dr. Rudolf Stauber, Head of stauber.engineering**

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# Project Objectives

## Basis for creating business opportunities



### Structured Technology Overview

- Generation
- Transportation
- Storage
- Conversion
- Energy
- Materials
- Including **existing, emerging** and **early-stage** hydrogen technologies
- Focus on **state of the art and future potentials for plastic technologies exposed to hydrogen and/or high pressure environments**

### Marketplace for knowledge exchange

- **Cost-sharing** of study efforts
- **Networking** between industrial project participants from the application, material and production sector
- **Exchange** with experts regarding hydrogen systems
- **Entry into a long-term strategy community**, meeting regularly after the study to evaluate cooperation opportunities and realize regular meetings as platform for sustainable partnerships to implement innovative technologies



## Target Group

- Material supplier
- Plastic machinery
- Plastic converter
- H<sub>2</sub>-system producer
- End users
  - of hydrogen as resource
  - of hydrogen systems
  - of plastic materials and components in complex material systems
- Service Providers
- Gas Transition Network Operators and Gas Providers

## Addressed Topics

- Thermoplastics
- Elastomers
- Thermosets
- Composites
- Hybrids
- Compounding
- Moulding
- Extrusion
- Coating, Barrier, Cross-linking, Annealing, Stretching, ...
- Joining Technologies
- Safety, Operations, Testing, Qualification

# Content and Timeline

## TECHNOLOGY AND MARKET KNOWLEDGE

- For a target-orientated development and in order to open up new business areas a well-founded **basis for strategic decisions** is required
- In order to benefit from emerging markets, it is necessary to build up a **technical expertise**, accompanied by a well-grounded **knowledge of market specific information**

## ADDRESSED QUESTIONS

- What kinds of **value streams** exist and what **readiness level** do the involved systems have?
- Which different types of **system configurations** are used today within conversion of hydrogen into materials and energy?
- How can mobile or stationary H<sub>2</sub> systems with components consisting of complex material systems be **safely integrated, operated and monitored?**
- What are the **use cases** and **application criteria for materials?**
- Which **plastic materials** are processed for component manufacturing?
- What are the **enabling key-technologies?**
- How big is the **economic potential?**
- Who are the **key-players?**

## OBJECTIVES / RESULTS

- Providing of detailed **market insights**
- Detailed explanation of **technological state of the art** solutions
- Information about **emerging technologies** and **trends**
- **Scenarios for further implementing plastic technologies** in complex material systems
- Technology know-how and identification of stakeholders as basis for **evaluating new business opportunities**
- **Networking** within project meetings and additional workshops with external experts
- **Identifying scientific and developmental challenges** and **deriving a R&D road-map** for the IKV research platform





- Kick-off **questionnaire**
- **Market segmentation**
- **Use cases and applications**
- **Market sizes and growth potentials**
- **Players (end users and technology provider)**

- **Detailed technology analysis** including:
  - Technologies and their readiness
  - System configurations, components, materials

- **Identification of interesting fields of applications**
- **Concept studies for substitution of materials by plastics** (concerning requirements for plastic material systems, production technology, part design)

**Q** Kick-off questionnaire

**W** Workshops with partners/experts

**M** Final meeting

**Start**    **October 2021**  
**Duration**    **12 months**  
**Contribution**    **19,000 € per participant\***

*\*Payment:*  
50% in 09/2021  
20% in 06/2022  
30% in 10/2022

Place your interest:

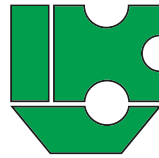


[www.ikv-aachen.de/hydrogen-materials](http://www.ikv-aachen.de/hydrogen-materials)

# About the team

## IKV · INSTITUTE FOR PLASTICS PROCESSING

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The Institute for Plastics Processing is an innovation driver and research partner for the plastics sector. Extensive know-how and many years of experience in all areas of plastics technology put IKV in a unique position in Germany. The possibilities for cooperation with IKV are many and varied. In publicly funded projects of Industrial Joint Research, and in bilateral industry research through IKV services such as consulting, plastics testing, damage analysis etc., our partners benefit from IKV's expertise and know-how.



stauber.engineering is a service provider in the fields of materials, recycling and logistics with a strong focus on plastics technologies. Prof. Dr. Rudolf Stauber, the founder and managing director of stauber.engineering, possesses extensive technical and scientific know-how with many years of professional experience in industry and research. In more than 30 years he was active in senior management positions in the automotive industry and afterwards responsible for the establishment of a new scientific institution of the Fraunhofer Gesellschaft.

Kick-off meeting  
September 29<sup>th</sup> 2021,  
3:00 - 4:00 p.m. CEST.  
in Aachen

The initiative will also be  
introduced in a webinar on  
July 29<sup>th</sup> 2021,  
3:00 - 4:00 p.m. CEST.  
Please register via  
[H2@ikv.rwth-aachen.de](mailto:H2@ikv.rwth-aachen.de)

## Would you like to talk about the individual benefits the initiative can offer you?



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