

REFERENZ  
FABRIK

*Value creation community  
for the production of hydrogen systems:  
electrolyzers and fuel cells*

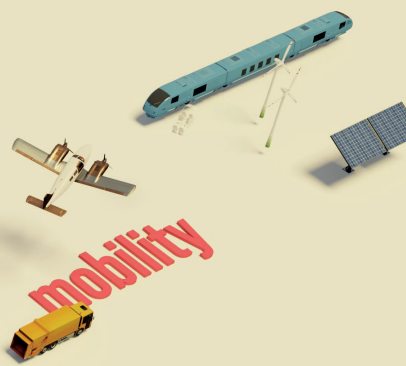
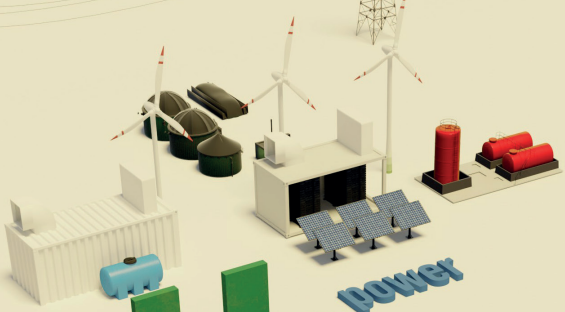
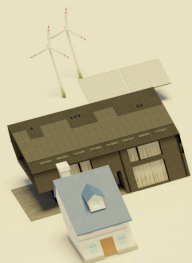
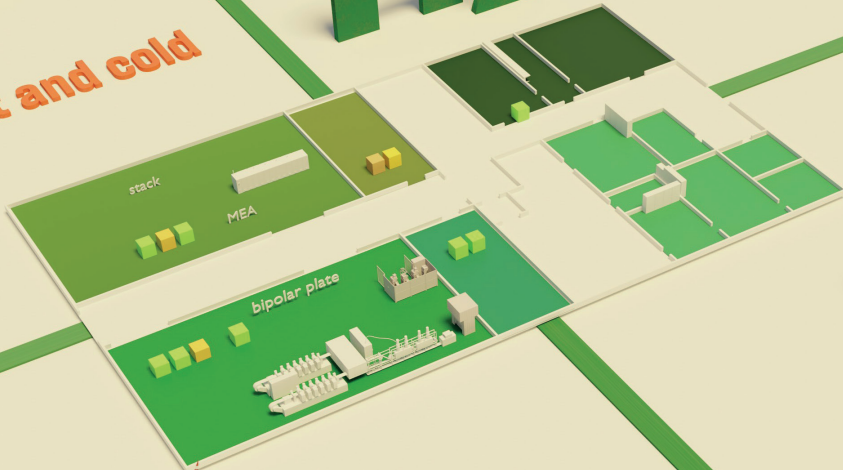
# H<sub>2</sub>

power

heat and cold

mobility

industry





# Why

## *a Referenzfabrik.H2*

### **Challenges**

Hydrogen technologies play a key role in achieving global climate targets. The central elements are systems for converting renewable energies into hydrogen (electrolyser) or converting it back into electricity (fuel cell). These are still produced in small-scale quantities. However, for a consistent reduction of CO<sub>2</sub> emissions and the development of a global hydrogen-based economy and society, availability must improve considerably, with significantly lower costs.

This requires industrial mass production, which in turn is inconceivable without value networks and manufacturing technologies. There is an urgent need to develop new high-rate production systems as quickly as possible. In addition, it must be possible to consolidate the companies to integrate their core competencies into the process chain for hydrogen system production.

The Referenzfabrik.H2 takes up these challenges and transfers them into solutions and opportunities for a large number of companies of different industries and sizes.

### **Goals**


The Referenzfabrik.H2 focuses on creating the conditions for industrial mass production of hydrogen systems.

The aim is to enable economical, high-rate production of electrolyser and fuel cells. The focus is on developing new solutions to substantially increase production volumes and reduce manufacturing costs.

The Referenzfabrik.H2 addresses 35 in 35! This means reducing production costs to €35 per kW of power produced by 2035 thanks to technology development and economies of scale.

*35 in 35*

***We are achieving  
cost parity for hydrogen systems***





*We offer*

**Reference and a strong community  
for industrial mass production  
of hydrogen systems**

*While bundling competencies and infrastructures, the focus is on technological and economic orientation, effectiveness, and risk minimization. In this way, reference points are created in the form of reference products: cells, stack, and systems as well as reference production modules or processes, which form the basis for accelerating the industrial rollout.*

*The Referenzfabrik.H2 will embody a close alliance of companies and research resources that jointly intensify the process chain to produce hydrogen systems. Fraunhofer will develop key modules of the production chain and continuously make them available to companies as starting points or for the early derivation of their individual business model.*

## **The Referenzfabrik.H2 comprises three essential areas of activity:**

### 1. Production technology kit

Develop and test modules that are necessary for the production of hydrogen systems. Here, the results of the physical and digital developments or analyses are synchronized and summarized. As a result, the individual modules can be evaluated, compared with each other, and flexibly combined into process chains.

### 2. Technological Services

It provides companies support to improve their competencies and infrastructures to quickly initiate the hydrogen system components production or processes in a prefer-

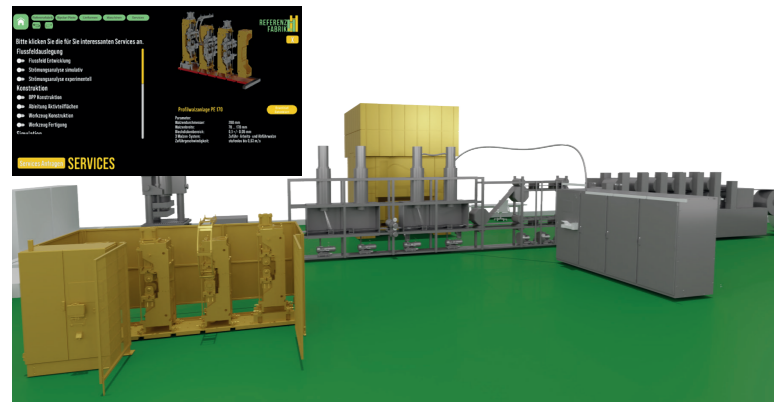
red manner with significantly reduced risk. For example, an available analysis can show which association in the process chain there is the greatest economic and technological potential for each specific company.

### 3. Virtual Platform

The virtual platform feeds on the digital twins of the physical production modules and provides economic and technological evaluation. It provides also a review of processes up to complete value-added systems.

The partner companies can link their production modules directly to the platform and thus become part of the high-rate-capable process chain, which serves as a blueprint for the industrial rollout.

Companies can develop in the Referenzfabrik.H2, grow technologically, and offer their own products and services step by step as part of the value creation community. Thanks to flexible production modules for scalable, industrial production of hydrogen systems, we will together ramp up industrial mass production in the 2030s.





*Take the opportunity and join us!*  
**Become a partner of the Referenzfabrik.H2**

*The partnership distinguishes between Starter, Expert, and Champion.*

*Depending on your competencies and strategic development plans, you can join and develop successively at any of these partnership levels.*

**STARTER:**

If you want to build up technological and economic expertise for the production of hydrogen systems and are looking for connections and exchange opportunities with key stakeholders in the value chain, this is the right partner model for you. In addition to current studies and individual needs-based workshops, technological working groups enable a targeted exchange on specific production topics.

**EXPERT:**

It uses specific competencies and infrastructures to master specific technological issues or research and development challenges. The Referenzfabrik.H2 supports you by specifying your H2 readiness level and by creating or implementing a tailor-made H2 development roadmap.

We advise and accompany you in your implementation plan. You get preferential access to manufacturing technology infrastructures and experts of the Referenzfabrik.H2.

**CHAMPION**

This level is intended for partners who have already mastered defined process steps or services of the value creation community so that they can introduce prototypical solutions into the industrial series. Champion partners benefit from privileged access to infrastructures within the Referenzfabrik.H2 for prototype production as well as for testing facilities and quality control systems. Champion partners build up tailor-made interface competence, for example for process chain integration.

The label »Champion der Referenzfabrik.H2« also enables you to integrate materials, tools, machines, and systems into the existing infrastructure of the Referenzfabrik.H2 and to network them with the latest developments and solutions from the Fraunhofer Institutes. These technologies can then be made available to a wide market (inside and outside the Referenzfabrik.H2).

*The levels are built on each other. We bring all partners to the Referenzfabrik.H2 »Kickoff Meeting« once a year. Here, current solutions from research and development projects are presented, results directly from our labs, and expert discussions are available.*

*Another focus of this forum is on several workshops where the partners can participate depending on their area of interest.*



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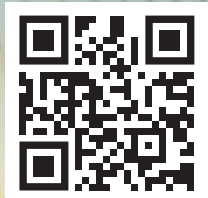
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