

# Hydrogen

Electrically safe from production  
to the end consumer



Design the future  
of energy



## Demand for hydrogen today and tomorrow

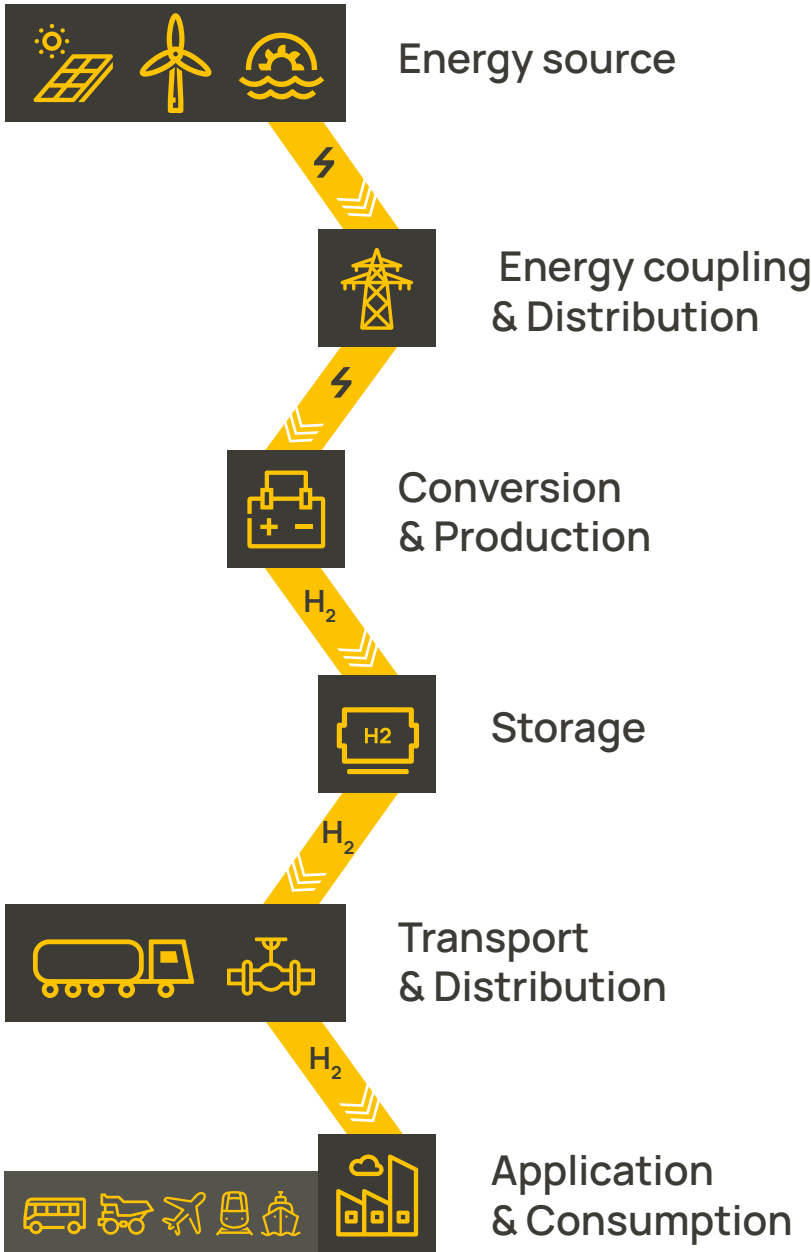


# Energy sources of the future

## Focus on green hydrogen

Everybody is talking about hydrogen. As an ideal energy carrier and energy storage medium, hydrogen can play a central role in the energy transition. The demand for so-called green hydrogen in particular will therefore grow exorbitantly over the next few years.

But there are still many hurdles to overcome. Hydrogen can only gain in importance if hydrogen production and utilisation is also economical, reliable and safe.



# Green hydrogen from sun, wind and water



Photovoltaic



Wind energy



Hydropower

BESS (Battery Energy Storage System)

Energy coupling & distribution

Electrolyser system

Residential area

Industry

Fuel cell



## The challenge of electrical safety

A high level of electrical energy is required for hydrogen production using electrolysis. And electricity is generated when hydrogen is utilised in fuel cells. In order to protect people and systems from the dangers of electrical current, aspects of electrical safety must be taken into account as early as the system planning stage. Because only electrically safe systems can guarantee reliable and smooth operation.

The technical challenges for electrically safe operation in the production or consumers of hydrogen are great. In most cases, individual concepts have to be developed that correspond to the respective system, the process and the normative and other requirements.

### We support you in your projects:

- Customised solutions and concepts
- Implementation of a holistic safety concept with the following integral components of the protection goals:
  - System protection
  - Protection against thermal effects
  - Protection against the dangers of electricity
- System availability as an integral part of the protection goals
- System expansion and scaling effects
- Choosing the right and consistent power supply system
- Early detection of asymmetries in the electrical supply to prevent excessive equalising currents
- Complex correlations in norms and standards, taking into account that some of the corresponding norms are not yet available

## Solutions for smart and safer electrical systems

For more than 75 years, Bender has been a pioneer and market leader for solutions that make electrical power intelligent and safer. Our experience and mature technologies have played an important role in the technical developments of recent years, for example in the transformation of the energy sector and mobility.

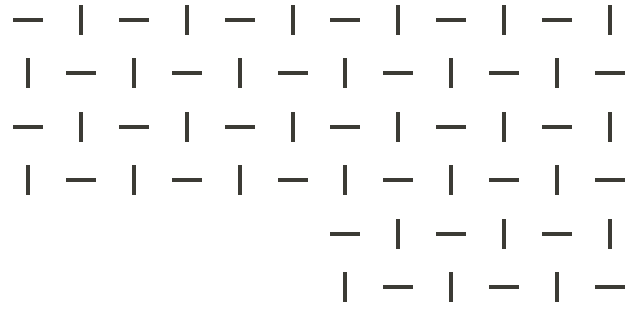
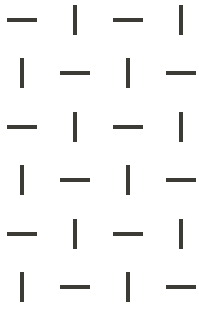
Bender also offers solutions for electrically safe operation in the field of hydrogen production and utilisation. We are also actively involved in the relevant standardisation committees in order to create the framework conditions required for the development and production of safe hydrogen applications.

### Do you have any questions?

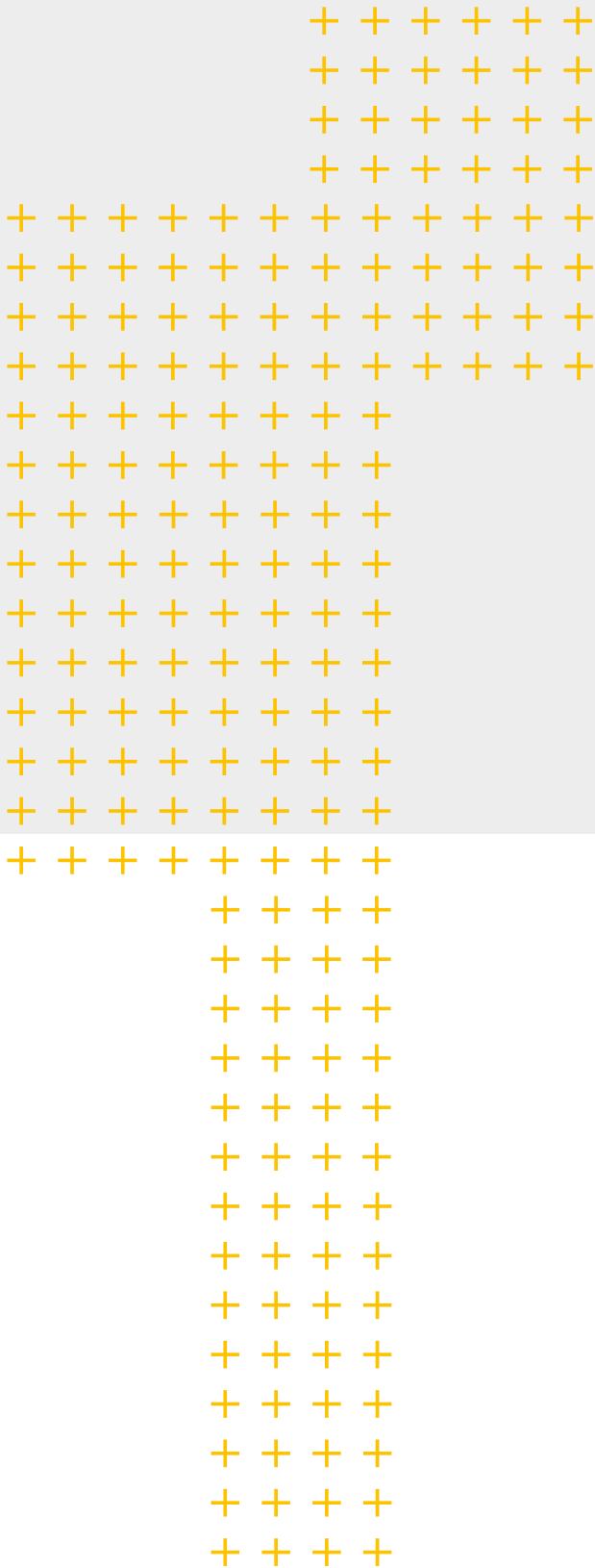
For further information, please contact us.

Tel.: +49 6401 807-0  
[global.contact@bender.de](mailto:global.contact@bender.de)





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**Bender GmbH & Co. KG**

Londorfer Straße 65  
35305 Grünberg  
Germany

Tel.: +49 6401 807-0  
info@bender.de  
www.bender.de

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