

**Tyczka**<sup>®</sup>  
HYDROGEN



Tyczka Hydrogen  
**Your partner for  
green hydrogen**

## Working towards a greener economy with hydrogen

Hydrogen is a zero-emission energy carrier and an essential building block for a holistic energy transition based on renewable energies.

Hydrogen brings flexibility to the energy system and improves the integration of renewable energies. One of its greatest advantages is that hydrogen makes renewable electricity easy to store, easy to transport and versatile in its use. Thus, hydrogen transforms solar and wind energy

for temporally and spatially independent use in industry and mobility as well as in power and heat generation.

Hydrogen also opens up new import routes for renewable energies, thereby contributing to the diversification of our energy portfolio in Europe. Whether it is imported in the form of liquid or gas, bound in ammonia or methanol, hydrogen is the foundation of these options.



» Hydrogen is the connecting element of a cross-sectoral energy transition. Tyczka is going to speed up this transformation with hydrogen. Hydrogen is happening now!«

**Thomas Zorn**  
Managing Director of Tyczka Hydrogen GmbH

## Tyczka Hydrogen Your partner for green hydrogen

### Our Mission

We are implementers of a cross-sectoral, sustainable energy transition with green hydrogen!

Tyczka Hydrogen specialises in hydrogen production and supply for customers in the industry, mobility and R&D sectors. The Tyczka Group has a strong foundation as a supplier of industrial gases and LPG, and can draw from over 100 years of experience. We are unlocking the full potential of hydrogen to drive the energy transition.

Our operations cover the entire value chain, from hydrogen production to compression and filling, transport and logistics, to refuelling and application technology for our customers.

The Tyczka Hydrogen team has many years of expertise in working with hydrogen and a wealth of experience in the energy and industrial gases sector. We draw on this expertise and tap into our entrepreneurial and innovative spirit to find tailor-made solutions for every individual requirement. Our top priority is to find efficient solutions as a partner to our customers.

» Hydrogen as an energy carrier with all its facets never ceases to inspire us day by day. We bring this enthusiasm into the projects with our customers and partners, thereby helping them achieve sustainable success.«

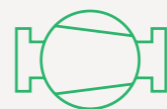
**Dr. Christoph Stiller**  
Head of Business Development & Sales of Tyczka Hydrogen GmbH



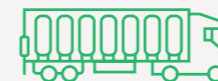
Renewable energy



Hydrogen production



Compression and filling



Transportation and logistics



Supply and application technology

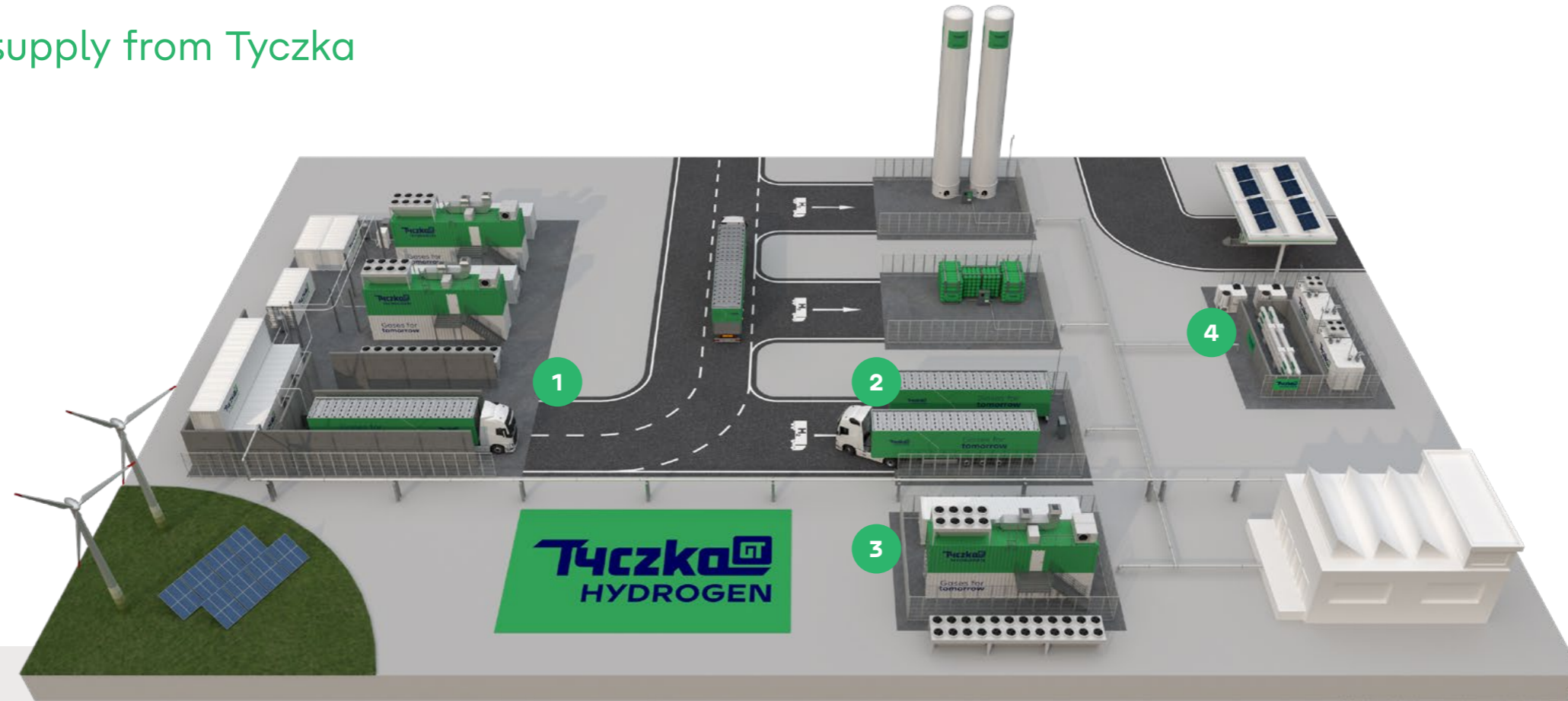


Application in mobility and industry

Our value chain

Our value chain

## Your hydrogen supply from Tyczka



1

### Hydrogen production

- We design, build and operate hydrogen production plants that use electrolysis technology for our growing production network.
- From these, we supply customers directly on-site via pipelines, or we fill our modern fleet of compressed gas trailers with hydrogen to supply regional markets.
- We develop regional solutions with our partners along the entire hydrogen value chain.
- If necessary, we also source the product from third parties and take care of filling, transport and storage to supply our customers.

2

### Supply and marketing of bulk hydrogen

- We supply green and conventional hydrogen in Germany and beyond via compressed gas transported in trailers.
- We use a network of sources to ensure a high level of availability and offer a broad range of purities and certifications.
- We use the latest transport technology with high delivery volumes and low specific emissions.
- We work with you to develop optimal supply concepts based on our storage concepts.

3

### On-site production operator models

- On-site generation with electrolysis can be an alternative to bulk supply via trailer. The advantages are less site traffic, cost optimisation, use of the by-products oxygen and heat, use of your own electricity.
- Working together with you, we examine your framework conditions to develop a concept for the generation and buffering of hydrogen at your location – including backup supply and operator models – and then put it into practice.
- In the operational phase, your only task is to use the product – we handle everything else.

4

### Refuelling station and application technology

- We work with you and our technology partners to develop innovative and demand-oriented refuelling solutions based on rental and operator models on your company premises and beyond, and then put hydrogen supply into practice.
- We support the implementation of your vehicle fleet project, from forklifts to regional trains.
- We advise you on the selection and design of your processes and the associated application technology (e.g. gas conditioning, burners, fuel cells).

## Our supply and technology solutions



### Pressure tank installations

Our steel tanks have a maximum operating pressure of 45 bar and are ideal for long-term supply of medium to large quantities with moderate-pressure requirements.

- Internal volume up to 115 m<sup>3</sup>; height up to 21 m
- Usable amount up to approx. 434 kg hydrogen
- Can be set up horizontally or vertically
- Low maintenance



### High-pressure packs (MaxiPacks)

Our stationary high-pressure bundles with a maximum operating pressure of 180 to 225 bar are ideal for high-pressure requirements, smaller quantities and gradual increases in demand.

- Base area from 4–8 m<sup>2</sup>; height from 1.8–2.8 m
- Usable amount of up to 90 kg hydrogen per MaxiPack
- MaxiPacks can be stacked on top of each other and expanded in modules



### Trailer swap stations

Transport trailers for hydrogen are used to fill storage tanks, but can also be used for on-site storage as a swap concept or a multi-pressure supply system for refuelling stations.

- Based on innovative composite tanks (type 4) with a maximum operating pressure of 380 bar
- Capacity of over 1,200 kg of hydrogen enables efficient transport, even over longer distances
- Other capacities also available

### Hydrogen refuelling stations in the rental and operator model

We design, build and operate hydrogen refuelling stations for various applications in transport and logistics.

- Turnkey systems with the appropriate technical solution from a single source
- Provision, hydrogen supply and, if necessary, operation of depot refuelling stations by Tyczka Hydrogen, with public access optional
- Refuelling pressures of 350 and 700 bar with and without pre-cooling



### On-site production operator models

For on-site supply at your premises, we offer the design, implementation and operation of production plants based on electrolysis – from a single source.

- Optimised operating strategy adapted to the individual needs / circumstances of the customer / location
- Ensuring the required hydrogen quality according to customer requirements
- Backup supply by Tyczka Hydrogen via trailer delivery from the production network



### Application technology

Upon request, we can help you find the appropriate application technology for your individual needs in conjunction with supplying you with hydrogen. We will gladly advise you and put you in touch with cooperation partners from our broad network.

- Hydrogen powered vehicles: forklifts, trucks etc.
- Hydrogen-based cogeneration unit solutions
- Burners, heaters and other heat applications
- Gas mixing and conditioning – and much more



## Services associated with your hydrogen requirements

- Technical advice on the concept and dimensioning of your supply solution for hydrogen from us
- Assistance with the approval process of your hydrogen installation
- Service and maintenance of your supply systems as required
- Remote monitoring of the tank levels for the greatest security of supply
- Digital processing of the supplier-customer interface



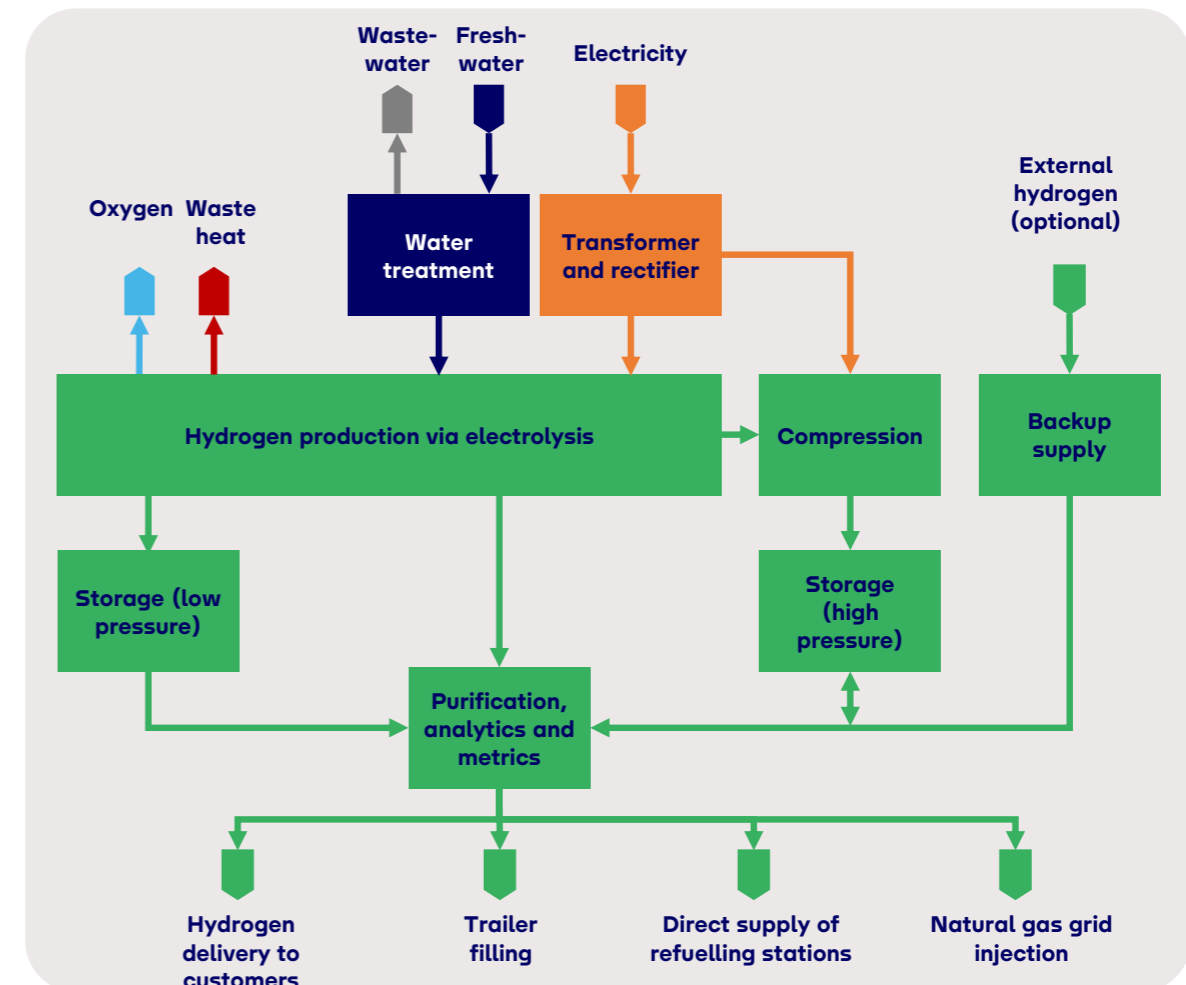
## Our quality standards

- Over 100 years of experience in energy and industrial gases from the Tyczka Group as a medium-sized family-owned company
- Technological expertise in all project phases, from engineering to plant construction and operation
- Highest safety standards based on a group-wide system for safety, health, environment and quality
- Implementation and collaboration according to certified quality and environment management standards (ISO 9001 / 14001)
- Further development of the state of the art through ongoing committee work
- Independence in the selection of components to the greatest benefit for the customer and suitable for specific needs
- Pragmatic and solution-oriented approach as well as fast reaction times and decision-making processes

## We produce your hydrogen – regionally or on-site

In addition to electrolysis, our production sites feature a number of other components, such as water treatment, compressors and buffer storage. A typical plant with an electrical capacity of 10 MW has the following specifications:

- Annual production capacity: 700–1,300 t<sub>H<sub>2</sub></sub> (with utilization of 4,000–7,000 h/a)
- Freshwater consumption: approx. 2.5 m<sup>3</sup>/h
- Waste water: approx. 1 m<sup>3</sup>/h (the waste water merely has a higher concentration of the minerals than the freshwater and is therefore harmless and suitable for many applications)
- Oxygen by-product: approx. 1,000 Nm<sup>3</sup>/h (suitable for various on-site applications)
- Waste heat: approx. 2–3 MWh/h at 45–60°C (suitable for local heating supply, possibly via heat pump)



## Broad network of hydrogen sources

We rely on a broad and growing network of sources for hydrogen, thus providing a high level of security of supply for our customers. We source hydrogen both from partners including investment projects and from our own production

sites in order to ensure greatest possible flexibility and most favourable conditions. We constantly expand our partner source network and examine and realise new production sites.

### Examples for green hydrogen sources



#### Schweinfurt/Bavaria

- Construction of a 5 MW electrolysis plant with filling station for trailers with commissioning at the end of 2026
- In addition, on-site supply for refuelling station for heavy-duty vehicles
- Project funded by the Bavarian Ministry of Economic Affairs (StMWi) as part of the funding programme for the development of an electrolysis infrastructure (BayFELI)



#### Pfeffenhausen/Bavaria

- Tyczka Hydrogen has been a shareholder in Hy2B Wasserstoff GmbH since November 2021
- 5 MW electrolysis with trailer filling in cooperation with Hynergy Invest GmbH, BayWa AG, the districts of Landshut and Munich and the energy cooperatives Isar eG, Niederbayern eG and Unterhaching eG
- Project funded by the Federal Ministry of Transport within the HyLand Initiative



#### Völs/Austria

- Cooperation with MPREIS Warenvertriebs GmbH in Völs/Austria for hydrogen sourcing
- Marketing of hydrogen in Germany, Austria and neighbouring countries
- High security of supply through mutual backup between different sources and growing trailer fleet

## Green hydrogen from Tyczka

### Green (unspecified)

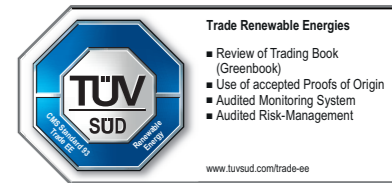
Produced from renewable energy. Physical, mass balance or balanced delivery (book & claim). In case of 'Book & Claim', guarantees of origin (GO) for green hydrogen from certified production facilities which use electricity from renewable energy sources are applied.

### Green (certified)

Produced from renewable energy and certified (e.g. GreenHydrogen according to CMS70 TÜV SÜD). Delivery physically or mass-balanced. Our mass balancing and trading system is certified according to the TÜV SÜD standard trade EE.

### Green (RFNBO)

Produced from renewable energy and certified as Renewable Fuel of Non-Biological Origin (RFNBO) in accordance with Commission Delegated Regulation (EU) 2023/1184 or 37th BImSchV. Physical or mass-balanced delivery.



We also supply conventionally produced ('grey') hydrogen on request.

### Our product qualities

We supply gaseous hydrogen in various qualities from 3.0 to 5.0 according to customer requirements. Hydrogen 3.7/FC is suitable for fuel cells in accordance with national and international specifications\* and can be used as a fuel in the mobility sector.

Purity Class	H <sub>2</sub> Vol.-%	N <sub>2</sub> ppm	O <sub>2</sub> ppm	CO+CO <sub>2</sub> ppm	KW ppm	H <sub>2</sub> O ppm
Hydrogen 3.0	≥99.9	<1,000	<50	-	-	<100
Hydrogen 5.0	≥99.999	<3	<1	<0.5	<0.5	<3
Hydrogen 3.7/FC*	≥99.97	<300	<5	<2.2	<2	<5

% and ppm values are to be understood as ideal volume proportions  
 \* Specification according to DIN EN 17124, ISO/DIS 14687 (Type I/II D)

## We are actively promoting hydrogen mobility with our own filling gastation network



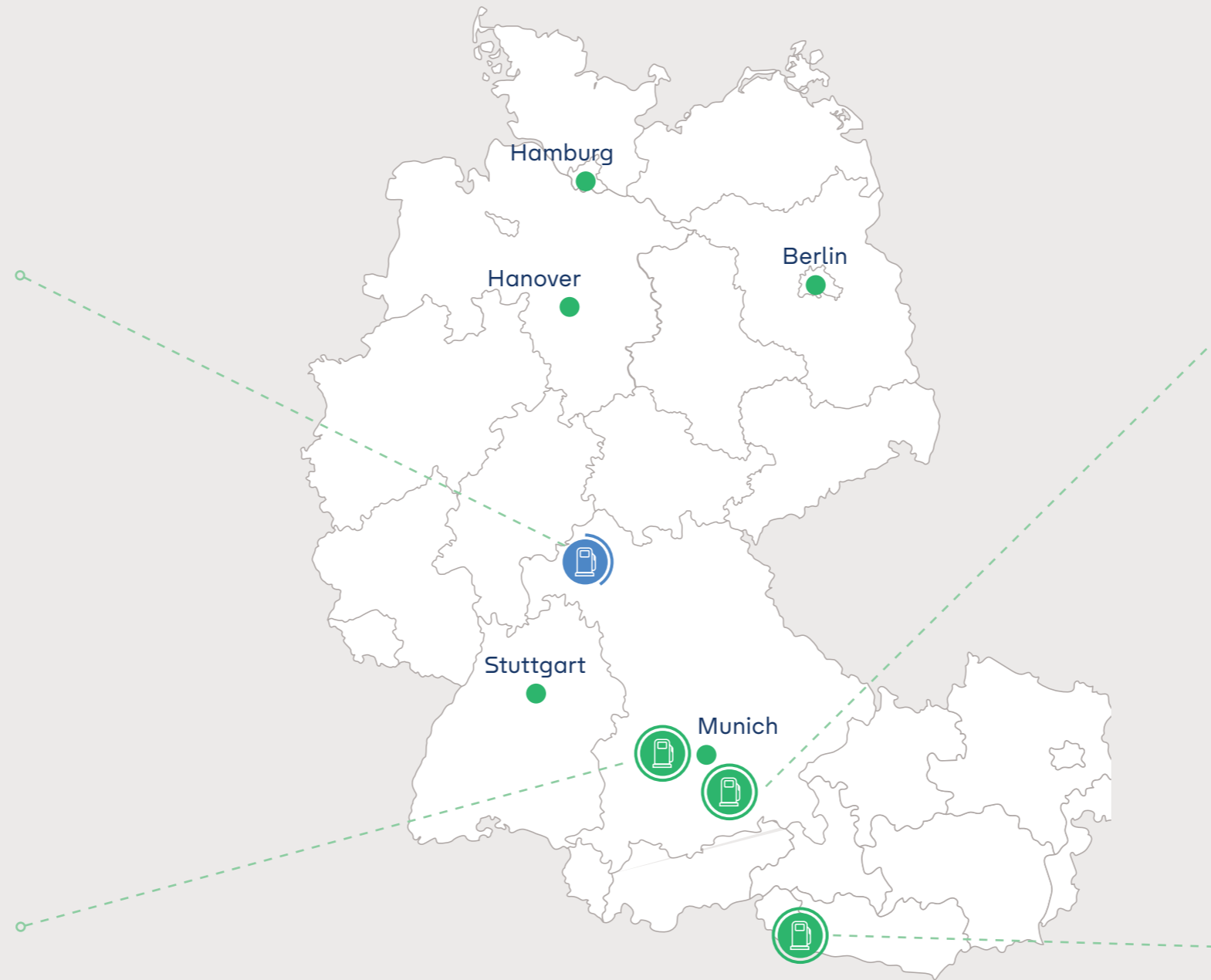
### Schweinfurt harbour

- Operator: Tyczka Hydrogen
- 350 & 700 bar for buses and commercial vehicles
- Capacity: 1,000 kg/day
- Status: approval phase
- Planned opening: 1<sup>st</sup> half of 2026



### GVZ Augsburg

- Operator: Tyczka Hydrogen
- 350 & 700 bar for buses and commercial vehicles
- Capacity: 500 kg/day
- Status: in operation
- Commissioning: June 2024



### Partner refuelling station Hofolding

- Operator: Hy2B (Tyczka Hydrogen is a shareholder)
- 350 bar for buses and commercial vehicles
- Status: in operation
- Commissioning: September 2023



### Partner refuelling station Völs/Austria

- Cooperation with MPREIS Warenvertriebs GmbH as operator of the refuelling station
- 350 bar for buses and commercial vehicles
- Status: in operation
- Commissioning: May 2022



Funding for all projects in Bavaria by the Bavarian Ministry of Economic Affairs (StMWi)

## Our added value for your project

### How we contribute:

- Design and build the hydrogen value chain
- Invest in, build and operate hydrogen production plants
- Develop manufacturing facilities, supply chains and demand
- Assist with acquiring project funding
- Network stakeholders and enable profitable partnerships
- Strategic cooperation for market development
- Gain political backing and public support



## Memberships in initiatives and associations



Hydrogen Europe



EIGA – European Industrial Gases Association



Deutscher Wasserstoff- und Brennstoffzellen-Verband



IGV – IndustrieGaseverband e. V.



Wasserstoff Bündnis Bayern



Cluster Brennstoffzelle BW



Plattform H2BW



H2BZ Initiative Hessen e.V.



H2BZ Netzwerk RLP e. V.



CNA e.V. | Der ThinkTank für Transport, Verkehr & Logistik

## Wide-ranging experience and references in the field of hydrogen

### Green hydrogen for H2 MOBILITY refuelling stations in Bavaria

- Supply for H2 MOBILITY refuelling stations in Erlangen, Biebelried, Fürth and Pentling
- H<sub>2</sub> refuelling stations in Erlangen and Fürth: supplying heavy-duty vehicles in particular for commercial customers from the logistics and waste management sectors
- Provision of RFNBO-certified hydrogen - as soon as certification mechanism is available



### Supply for leak tests and start of initial filling of salt caverns

- Hydrogen supply by Tyczka Hydrogen to various cavern operators (including Storag Etzel) for leak tests and start of initial fillings
- Storage of hydrogen in a salt cavern at a back pressure of up to 250 bar possible
- **Success factors:** High capacity and flexible configuration of the Tyczka trailers as well as intensive technical consultation with the customer



Source: STORAG ETZEL GmbH

### Provision of green hydrogen for rail transport applications

- Provision of green hydrogen and refuelling via a multifunctional dispenser in Augsburg for the test run of the Siemens Mireo Plus H regional hydrogen train (2023)
- Supply of DB Energie's refuelling station for regular operation of the Mireo Plus H in the Allgäu region since December 2024
- **Success factors:** Smooth hydrogen supply thanks to high flexibility and comprehensive service from Tyczka Hydrogen





# Tyczka Group

## Gases for tomorrow

Over 100 years of success and experience in handling gases characterise our actions. With our LPG, industrial gases and hydrogen, we are securing the future energy supply and driving the decarbonisation of our markets through innovative solutions. Our goal of actively contributing to a more sustainable world of tomorrow motivates us anew every day.

Gases for tomorrow is Tyczka's guiding principle. With offerings such as green air gases, biogenic LPG, green hydrogen and technological solutions, we support our customers in making their processes and products more sustainable and thus make our contribution to a better world of tomorrow.



Our experts will find the right solution  
for your hydrogen requirements

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[More info](#)



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