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HyCS-TECHNOLOGIE

Einsatzmöglichkeiten alternativer Wasserstoffspeicher nach bestandenem Praxistest

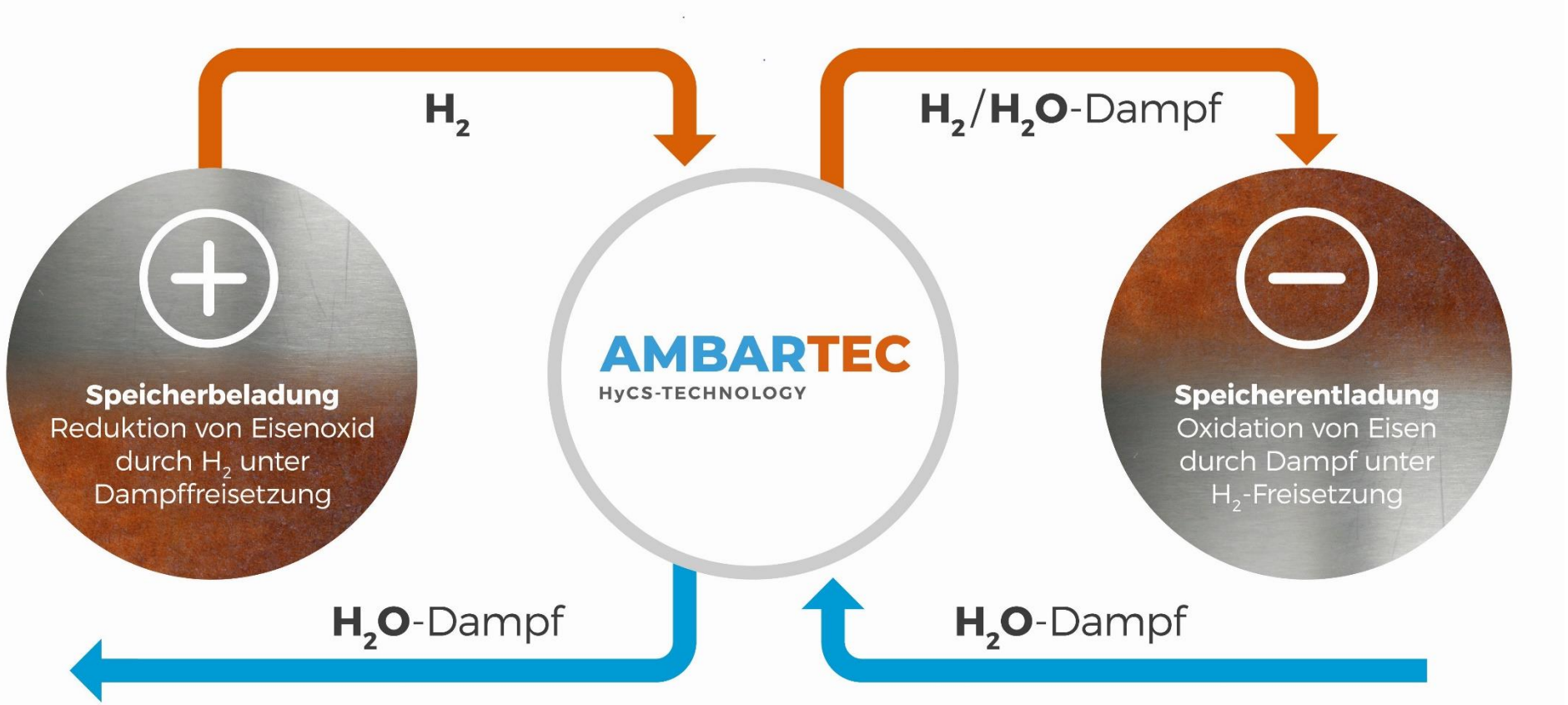
Dresden, 13.12.2023

Gliederung

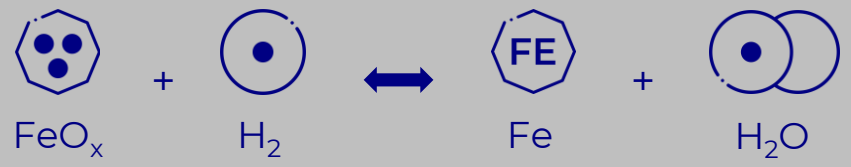
1. Die HyCS-Technologie als alternativer H2-Speicher
2. Ergebnisse des Demonstrationsbetriebs
3. Anwendungsbeispiele

1. HyCS-Technologie - Fe-Speicherelemente

Unsere Innovation: Die HyCS® -Technologie



Die von uns exklusiv angewandte HyCS® -Technologie basiert auf einem bekannten reversiblen chemischen Prozess.



Benefits

Our HyCS®-Technology is …

Compact

- Up to **900 kg of H_2 in a 20-foot container – 2 to 4 times more** than other systems
- Use of existing infrastructure (ship, rail, road)

Efficient

- **50 % less electricity** and **90 % less water** in combination with H_2 electrolysis
- Charge / discharge in 30 mins
- **No cooling required,** no H_2 evaporation

Sustainable

- Iron as storage medium is widely available
- **Non-hazardous** – easy permitting
- Long lifetime (no degeneration)

Lowest total cost of ownership

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2. Milestones

1972 Basic principle in large scale operation

2018-2019 Know-How-revival in laboratory scale

2020 AMBARtec GmbH founded; test facility preparation

2021 Test facility Freiberg/Saxony H2compact 10

2022 Transformed into AMBARtec AG; Seed round; proof of concept

2023 Development & Sales; H2compact 100; H2compact 1000

2024 H2compact 6000; Prep. production facility for storage elements

Technology Proven

- Test Operation for 1 Liter and 10 Liter plant successful:
  - Quick/slow unlaoding - controlsystem ready,
  - Quick/slow loading - controlsystem ready
  - Safety concept and loops approved (SIL, HAZOP, ATEX)
- 100 Liter facility under test operation 11/23
  - Purpose: Optimization of energy balance → minimising heat losses
- 1000 Liter facility: design work in progress → Target: Minimising construction costs

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3. Products & Applications

- H2compact 100
  - Speicherkapazität: 250 kWh/7,5kg H2
- H2compact 1000
  - Speicherkapazität: 3 MWh/90 kg H2
  - Lieferung: ab 03/24
- H2compact 6000 – 20‘ Container
  - Speicherkapazität: 20 MWh/600 kg H 10, Gewicht <18 t
  - Lieferung: ab 12/24
- H2compact 6000 Plus – 20‘ Contai
  - Speicherkapazität: bis zu 30 MWh/90 H2, bis PN 100, Gewicht ca. 32 t
  - Lieferung: ab 03/25
- Größere Einheiten auf Anforderung

Projects


Norway
Canada
UK
Poland
Germany (18 Projects)
Austria
Switzerland
Spain
India
Vietnam

H2-Combined Heat and Power (CHP) power plant

- Location: North-East Germany
- Partner: local municipality

- Decentralized energy supply of the municipality with heat and power with Hydrogen instead of wood pellets
- Up to 5 MW Usage of H2

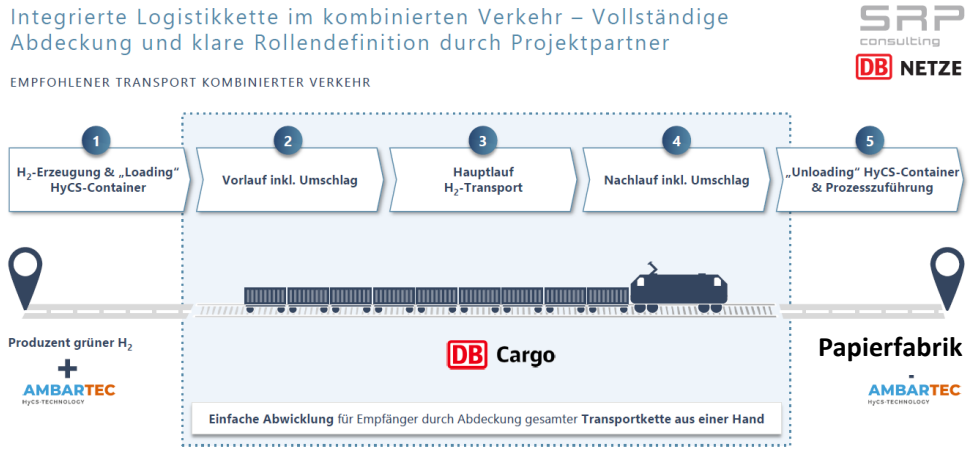
H2 production for Bakery

- Location: North-East Germany
- Partner: PV-project developer, bakery
- 1000 kW PV plant for local power demand
- Usage of surplus power + green/cheap grid power for H2 production in 300 kW electrolyser
- H2 blended to natural gas (0…100%) in the owen and power supply

Source: https://www.brigitte.de/rezepte/eiswaffeln-11687820.html
Foto: Elena Veselova/Shutterstock

H2 supply from Windfarm to Paper Mill

- Location: North/Central Germany
- Partner: H2-producer at windfarm, Paper Mill, German rail
- Transport of 2 GWh/a H2 in 2024/25, 18 GWh in 2026/27
  - 2xHYCS 6000 + loading/unloading unit in 2024
  - 20xHYCS 6000 in 2026
- Usage for the high temperature part of the paper maschine



Rolling Pipeline

- Location: India
- Partner: Chemical Industrie, Large PV project developer
- Purpose: H2-Transport from 300 MW Solar Power Plant by rail to H2-Hub

Current Market	Target 2030
5 MMT*	10 MMT*

H2 transport from Offshore Wind plattform to LNG power plant

- Location: Vietnam
- Partner: Local Project developer
- Offshore Windfarm in Middle Vietnam
- Power Plant in Hanoi Area
- Blending of H2 into LNG-Gas for Gasturbine

Hydrogen
Our Element.

Thank you for your attention.

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