



Embracing a changing society: Diversity in construction

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**Jean-Baptiste
MARTIN**

**Hydrogen supply
in the jobsite**

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Hydrogen supply in the jobsite



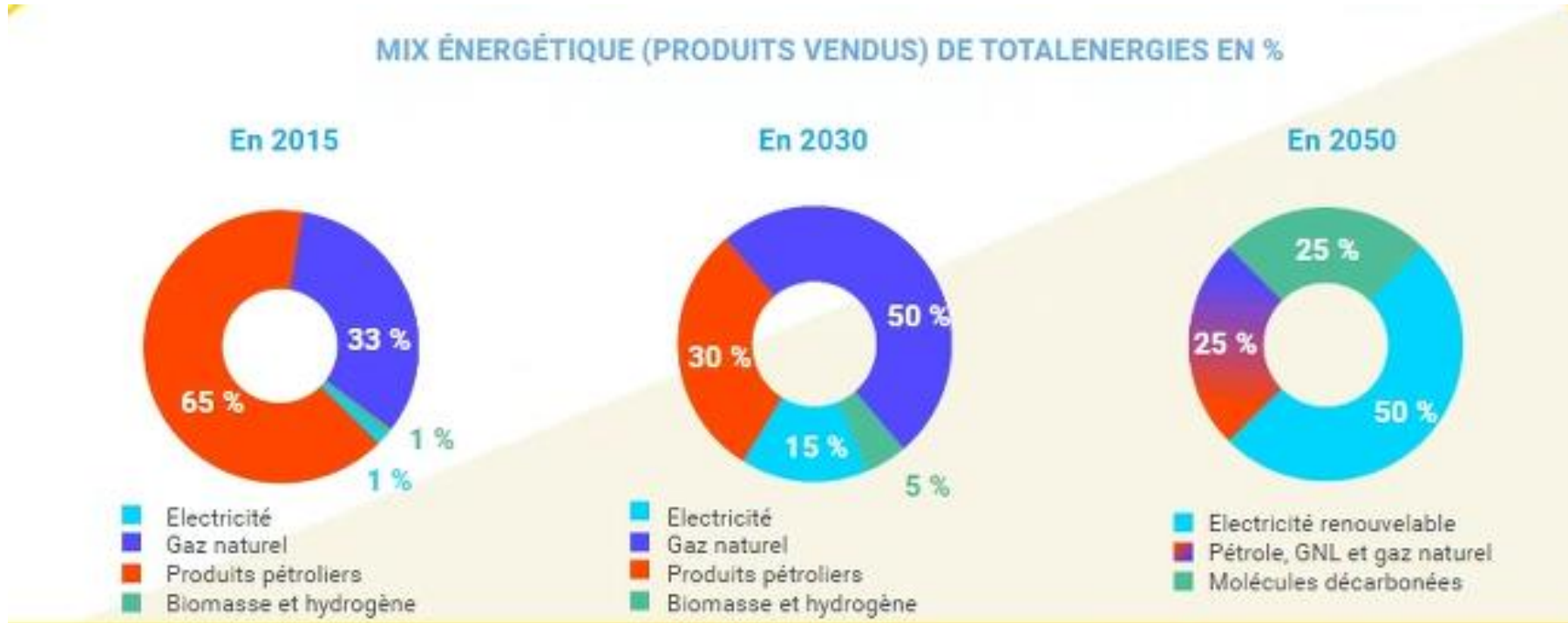
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Hydrogen supply in the jobsite



TOTALENERGIES STRENGTHENS ITS CLIMATE AMBITION



TotalEnergies Outlook 2022

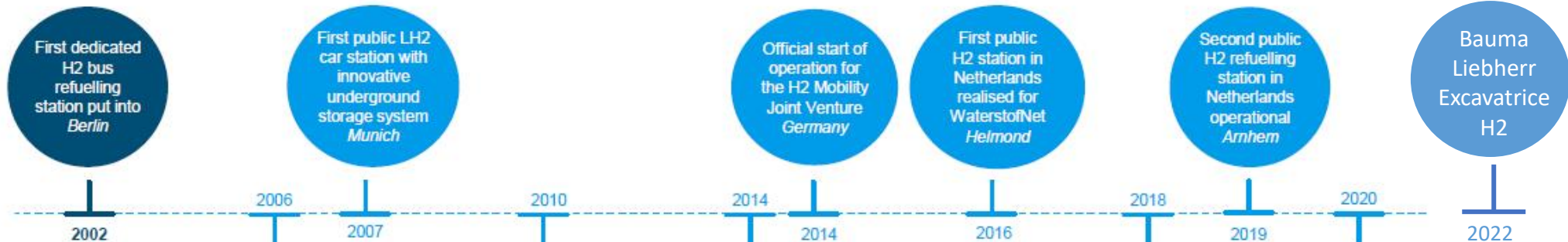


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Hydrogen Legacy



TotalEnergies & H2 for Mobility: 20 Years of Know-How, Expertise, Data and Pioneering Spirit



Berlin Usedomer Straße
2002



Berlin Heerstraße
2006



Munich Detmoldstraße
2007



Berlin Holzmarktstraße
2010



Port of Antwerp Schedehaven
2014



Helmond Automotive Campus
2016



Delfzijl Chemiepark
2018



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Our Experience & Ambition



33 stations in Europe in 2022

- 1st H2 station in 2002 (Berlin)
- Scope E4: France, Germany, Belgium, Netherlands
- Centralized or on-site production: electrolysis, natural gas and biogas reforming, chemical by-product
- 1st H2 mobile station for the competition in 2019
- Le Mans station in July 2020

JV H2 Mobility Germany

- Founding member of the JV in 2015
- Network size of 94 H2 stations for light vehicles
- New phase of the project dedicated to Heavy Duty



AMBITION

Be a reference player
of the H2 Energy Distribution
low carbon or renewable
for heavy transport from 2023



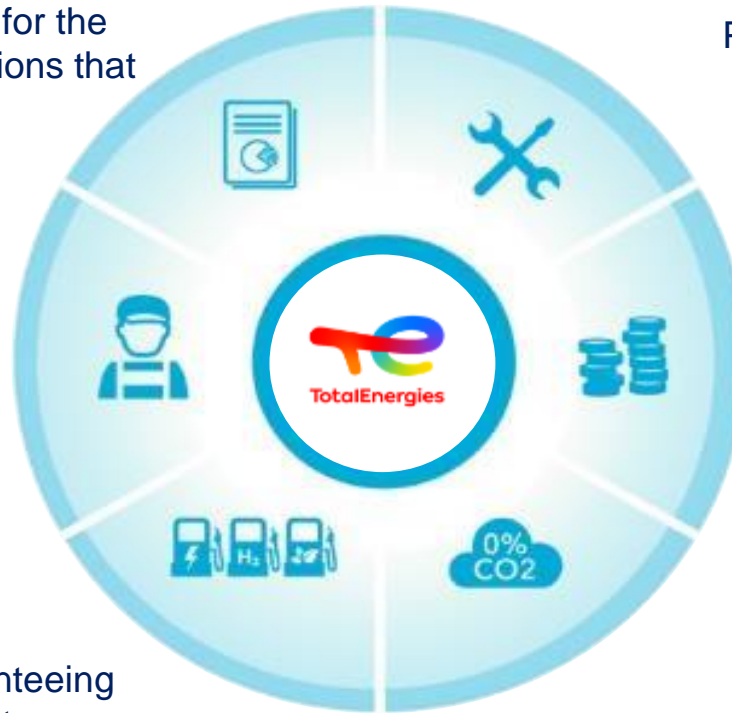
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Addressing the hydrogen mobility value chain



Consulting and Facility Design
Advice and project management for the engineering and design of installations that comply with regulations

Construction and commissioning
Project management and coordination of the various project stakeholders. Support for permitting procedures.



Service & Maintenance
Permanent monitoring of installations with a high level of service

Financing
Infrastructure rental solutions to facilitate the start-up of our clients' activities

Operation
Operation of the installations guaranteeing the best comfort of use for our partners

Hydrogen Supply
Supply of hydrogen with a low CO2 footprint at a competitive price

Renewable electricity generation
Installation of renewable electricity generation capacities

TotalEnergies has the capacity to provide complete hydrogen refuelling solutions: design, financing, installation, supply, operation & maintenance.



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Motorsport : fueling the



- A 450b MHRs has been constructed and commissioned on Spa race track in 2019
 - Adapted to current the car capacity/performance
 - Specific fueling protocol
- MHRs operated on race track more than 10 events
 - Full permitting (first ICPE periodical check in France)
 - Logistic and operation



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Hydrogen Priority areas for development



Long-haul tractor

~ 8000 tractors in E5 in 2030

TotalEnergies ambition: around 100 Heavy Duty H2 stations operated directly or indirectly by 2030s

Articulated bus / intensive lines



Railway

Freight / Passengers Transport



Captive Fleet B2B

BOM, taxis...



Endurance competition

Mission H24



OffRoad

Carbon Footprint from end users

Several & Different Use Cases

- 1
- 2
- 3



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1 Offroad Long-term site operation, pit stone example



trucks H2 fleet
Intensive deliveries

Off Road

Typical pit stone Ecosystem

On Road



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2 Fixed temporary construction site



- Offroad market H2 refilling solutions needed for addressing "green" construction site market to come.
- First operations will start in H2 gaseous way (compressed)
- From several days to several months operations → Needs of mobile and temporary H2 refilling solutions
- H2 supply : Synergies with future Heavy Duty station Network
- Use of liquid H2 to be clarified in the future. (relevant if very intensive use.



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3 Offroad: temporary mobile and moving construction site



- Needs of ultra mobile H2 refilling solutions, moving to the vehicle to be refilled (active or passive solutions)
- Internal development on going (still confidential projects)



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CHAMONIX 2023



HY-CARE : « Hydrogen as a service »

1

2

A high-level technical solution with a format that simplifies operations

- Multi-segments : station Dual Pressure 350 et 700 bar
- Performance: 2 compression units, T40 cooled distribution
- Capacity: 200kg/d to refuel 5 trucks, 10 buses, 15 dumpsters or 50 light commercial vehicles.
- Flexible: transportable and deployable in 4 to 6 weeks
- Turnkey: full OPEX offer including hydrogen maintenance and supply

For which needs?

- Operational: start of activities in case of delivery of vehicles before station H2
- Temporary projects (<2 years) to avoid high investments

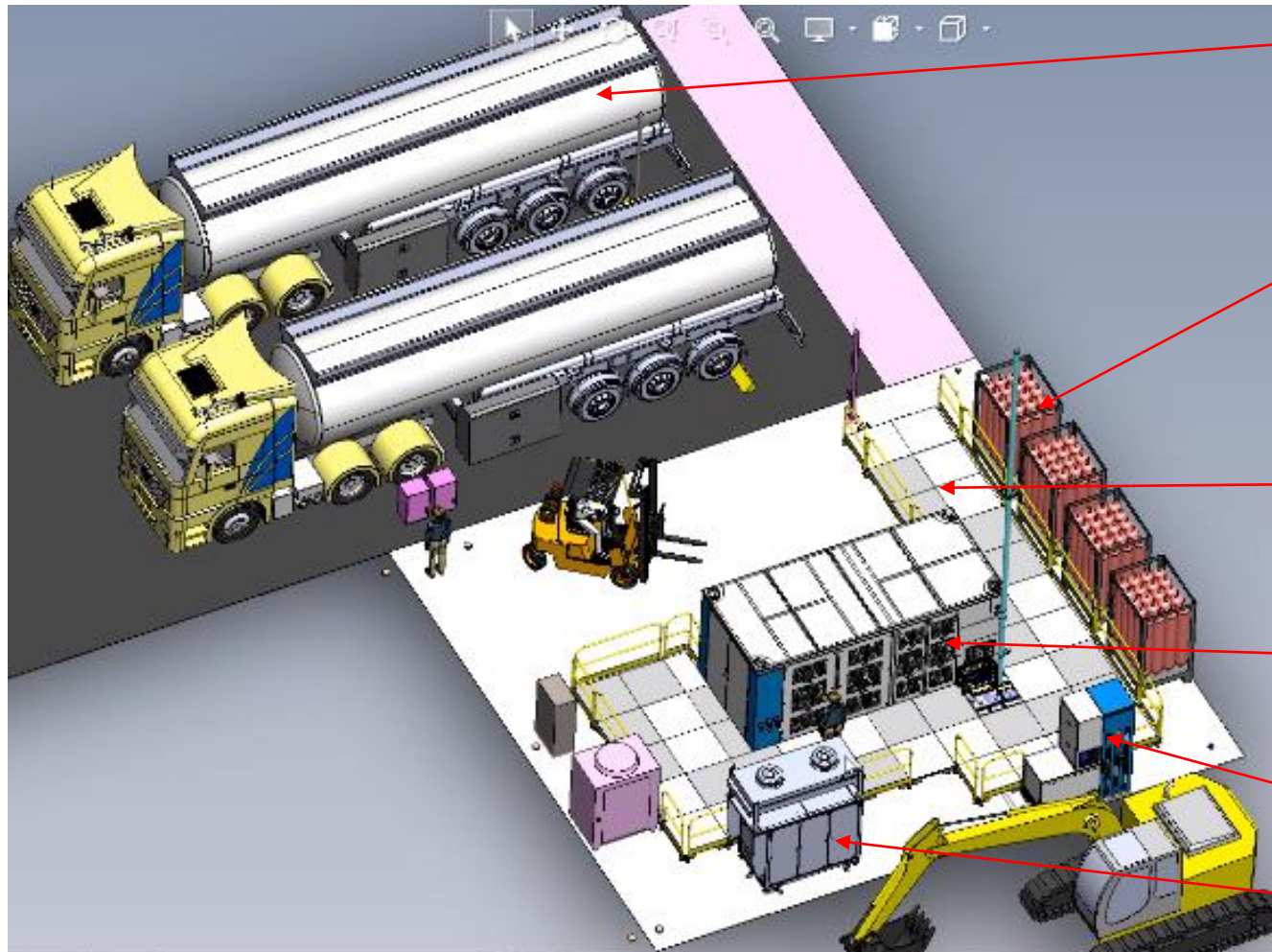


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HY-CARE : « Hydrogen as a service » 1 2



H2 supply in bulk
(350kg per truck)

4 high-pressure buffers
allowing vehicles refilling
without waiting between
fill-ups

All pipes are decked to
avoid civil work

2 redundant compressors
for high availability

A mixed dispenser 350
and 700 bar

A refrigeration unit to ensure
rapid filling of the tanks

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Hydrogen supply in the jobsite



HY-CARE : « Hydrogen as a service »



TotalEnergies Renewable Solutions

98 291 abonnés
2 sem. •

+ Suivre ...

Want to see a more environmentally friendly fuel solution for [#construction](#) and [#off-road vehicles](#) in action? 😊

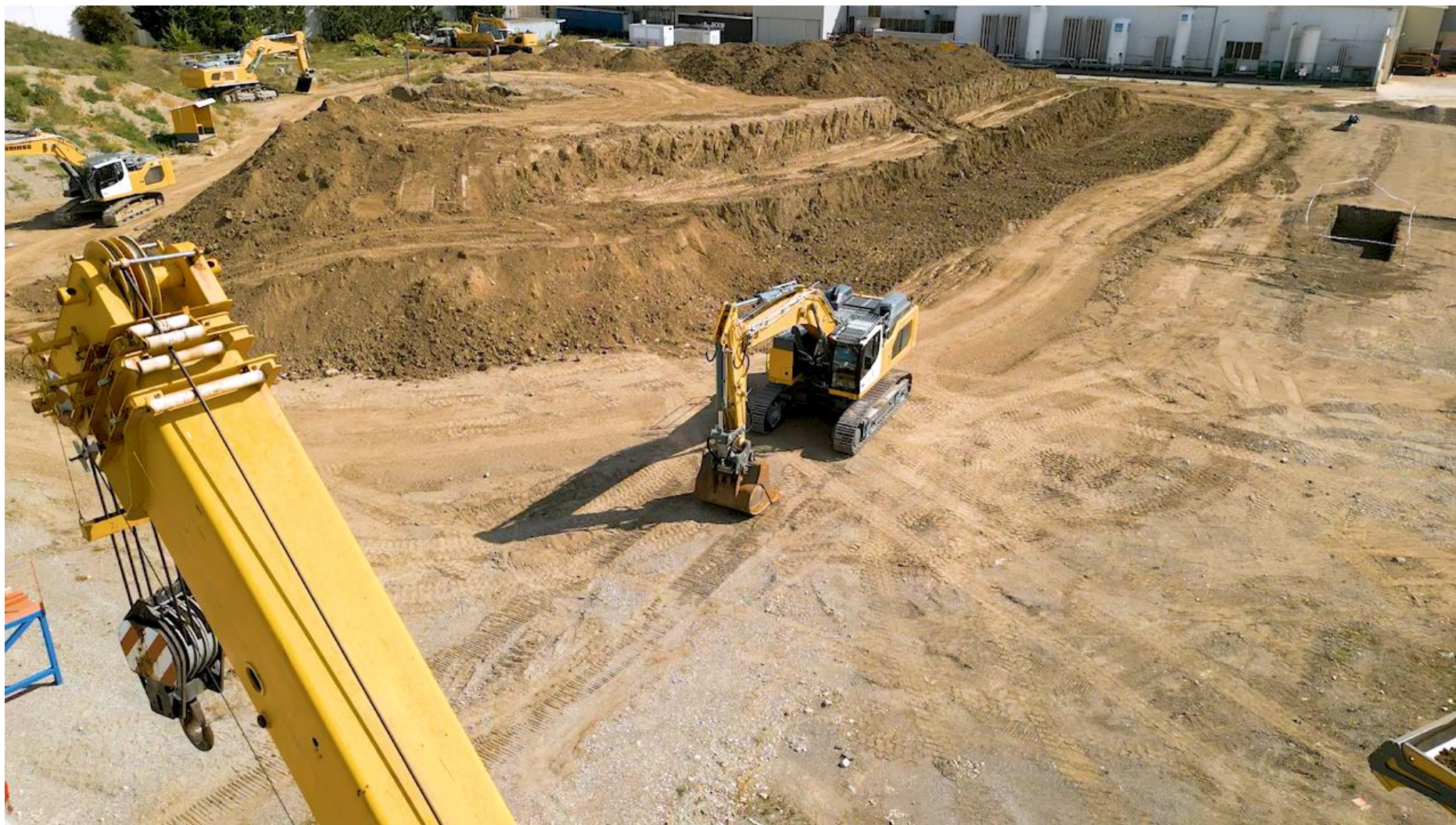
TotalEnergies and [Liebherr Group](#) worked together for the Liebherr's [#H2](#) crawler excavator unveiling at this week's [#Bauma 2022](#), the world's leading trade fair for the construction and off-road sectors in Munich, Germany! 🇩🇪

Our hydrogen refueling station (HRS) kept the Liebherr H2 crawler excavator going throughout the daily live demonstrations. The only emission coming from its tailpipe? Water vapor! 💧 Together we were able to introduce this innovative mobile HRS solution which can be expanded with modularly expandable storage systems or on-site electrolysis. 🏗️



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A woman wearing a white hard hat, safety glasses, and a high-visibility orange and yellow safety vest over a white shirt. She is wearing black gloves and is looking intently at a piece of industrial equipment. The background is a blurred industrial environment with warm lighting.

**Thank you for your
attention!**

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Contact



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