

Wystrach hydrogen systems

Products and services

Wystrach 
Customized solutions in high pressure



Agenda

- Company profile
- WyBundle bundles for industrial gases
- WyStorage storage solutions
- WyCarrier transport solutions
- WyTankSystems tank systems
- WyRefueler hydrogen refueling stations
- WyService maintenance and service for hydrogen products



Company profile



- Located in Weeze, Germany (greater Düsseldorf area)
- Approximately 200 employees
- Over 30 years' experience with high-pressure systems
- EUR 38 million revenue in 2021
- Certified to DIN EN ISO 9001:2015
- Production largely on-site in Weeze
- In-house development department



Wystrach – a part of Hexagon Purus

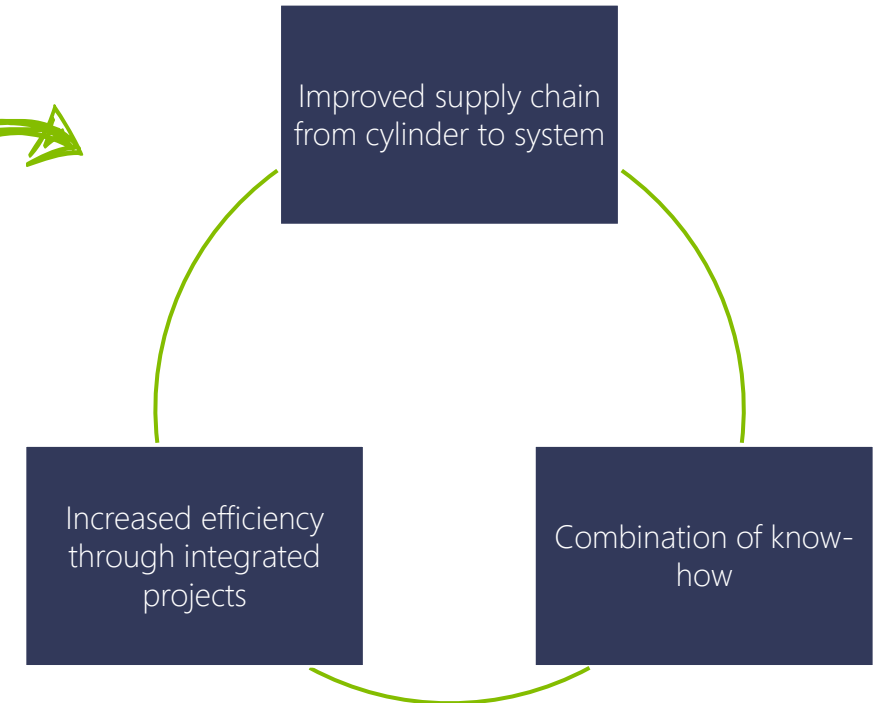
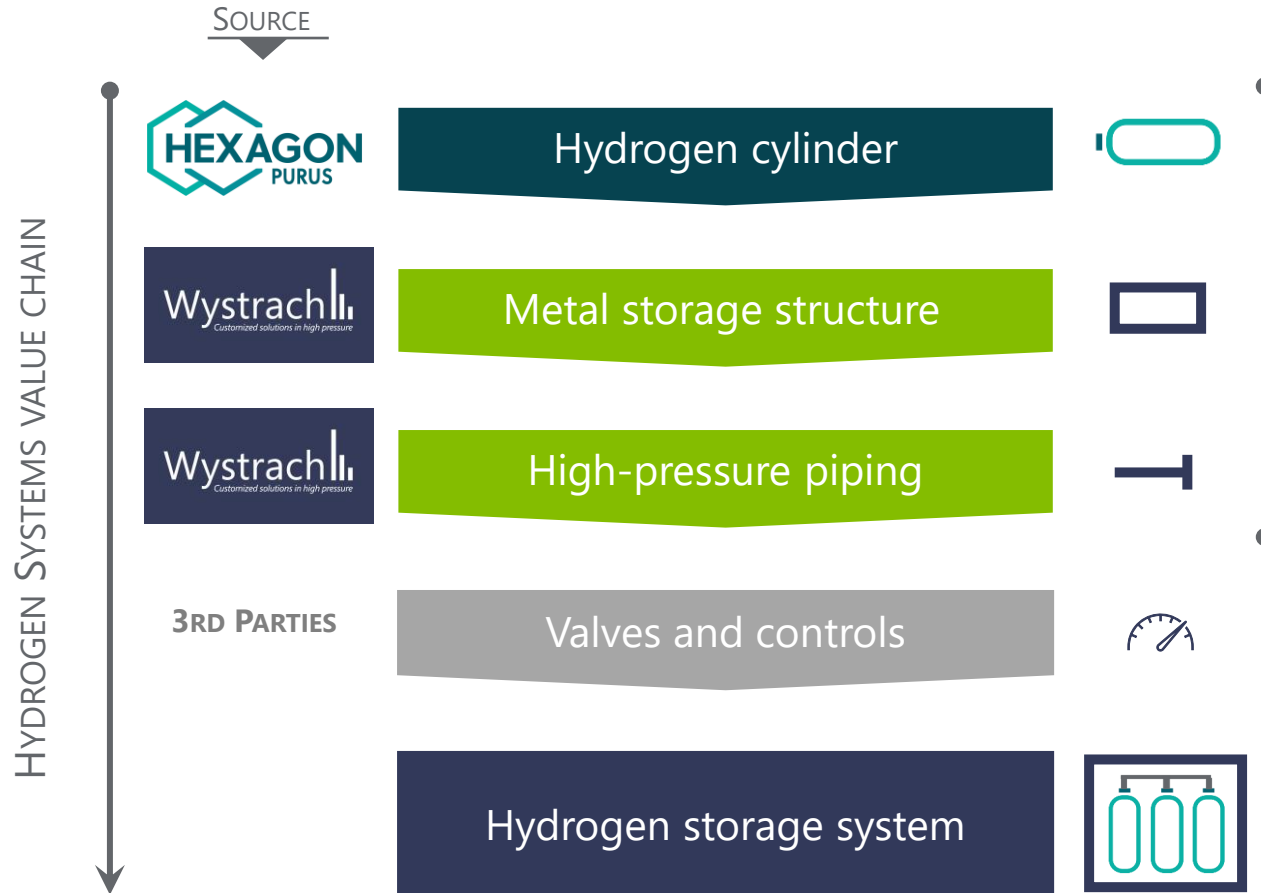
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- Globally active, stock listed company based in Norway
- leader in key technologies for zero-emission mobility
- largest producer of Type IV high-pressure vessels



Extension of value chain



Corporate development

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Site



1988



1992



1996



1999



2017

1990

2000

2010

2020

Products



1988



2001



2012



H₂-2014



H₂-2017



H₂-2019



H₂-1995



H₂-2005



2013



H₂-2016



2018



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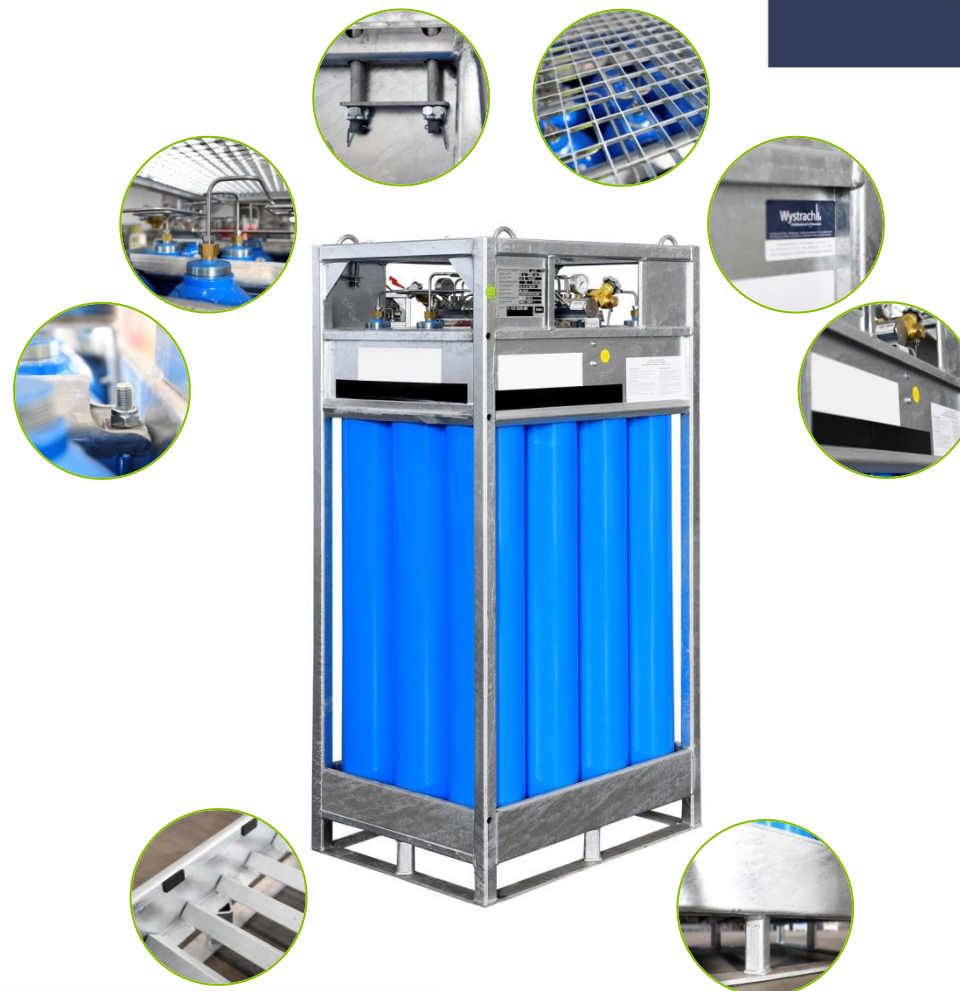
WyBundle: industrial gases

TPED

- transportable
- approved for transportation under pressure
- approved according ADR 6.2

PED

- stationary storage
- transportation only in depressurized state
- in accordance with PED 2014/68/EU



WyStorage: Stationary storage solutions

- Flexible (can be expanded later)
- Scalable (size can be selected)
- Pressure ratings of 200 to 1,000 bar
- Stackable to make optimum use of available floor space



WyStorage flex

- Based on **WyBundle**
- Ideal for
 - infrequent load changes
 - small variations in working pressure
- maintenance possible during operation
- central control panel
- pre-assembled in containers on request
- maintenance interval: 10 years



Applications



WyStorage flex-System for Home Power Solutions

- 100 % efficient storage solution for autonomous energy supply in the home (Picea)



WyStorage 1.000 bar

- storage systems for 700 bar refueling stations

WyStorage robust

- Based on **WyCarrier**
- System complies with PED
- Ideal for
 - high amount of gas
 - frequent load changes
 - large variations in working pressure
- Type IV cylinders (others possible)
- Optimal use of space
- maintenance interval: 10 years





WyCarrier

High-pressure transport systems

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WyCarrier: transport solutions

- Modular design: 10 ft to 45 ft
- maximum stability
- Pressure: 300, 380 & 500 bar
- Certified to ADR, TPED (RL 2010/35/EU);
 - ADN on request; RID, IMDG pending
- approx. 500 transport systems (since 1995)
- Customized solutions available



WyCarrier: transport solutions

Examples and details



Sample cabinett



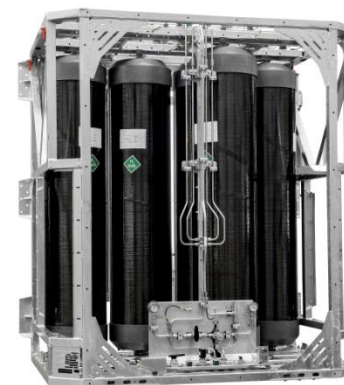
WyTankSystems

High-pressure vehicle tank systems

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WyTankSystems: Vehicle tank systems

- Customized solutions (depending on type of vehicle)
- 350 bar and 700 bar possible
- Pre-assembled systems with weight-optimized design
- Compliance with UN-ECE-R 134 / EC-79
- Optional pressure control system
- Welding completed to certification level CL1 (EN 15085-2)
- 20 years' experience / approx. 10,000 systems in the field (different OEMs)





WyRefueler

High-pressure hydrogen refueling

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WyRefueler: Refueling systems

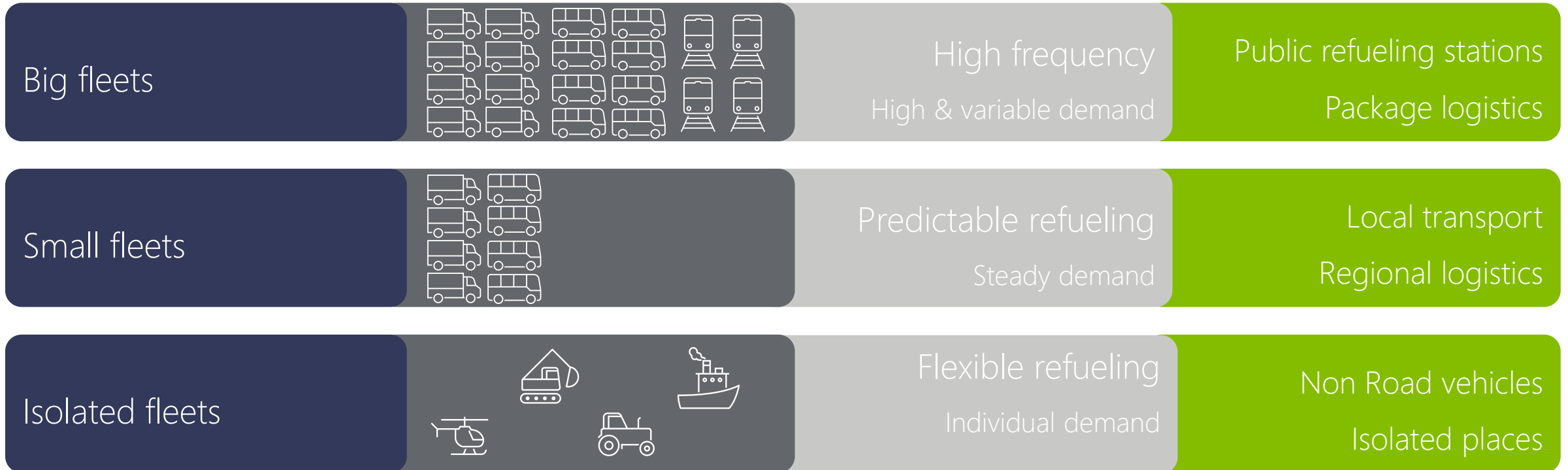
- Components and complete systems
- 350 bar and 700 bar
- stationary and mobile



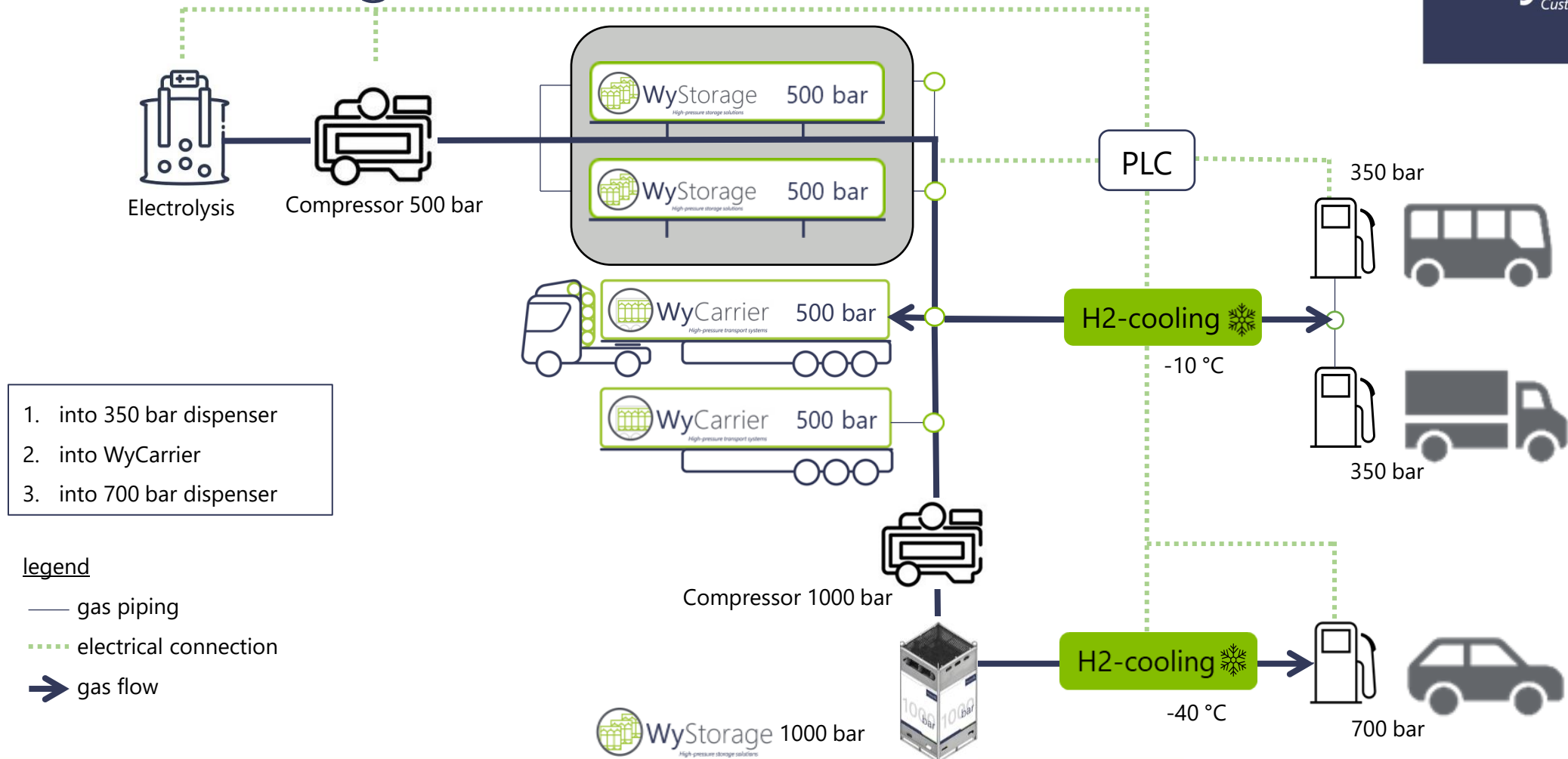
Systems

Stationary Refueling Stations	Components	350/700 bar Refueling	Storage Dispenser H2-Cooling Control system
Mobile Refueling Stations	Complete systems	350 bar Refueling	Storage Dispenser Compressor H2-Cooling Control system
Tankwagon (coming soon)	Complete system	350 bar Refueling	Storage Dispenser Control system

Use cases



Solution for big fleets



Solutions for big fleets

Advantages & disadvantages

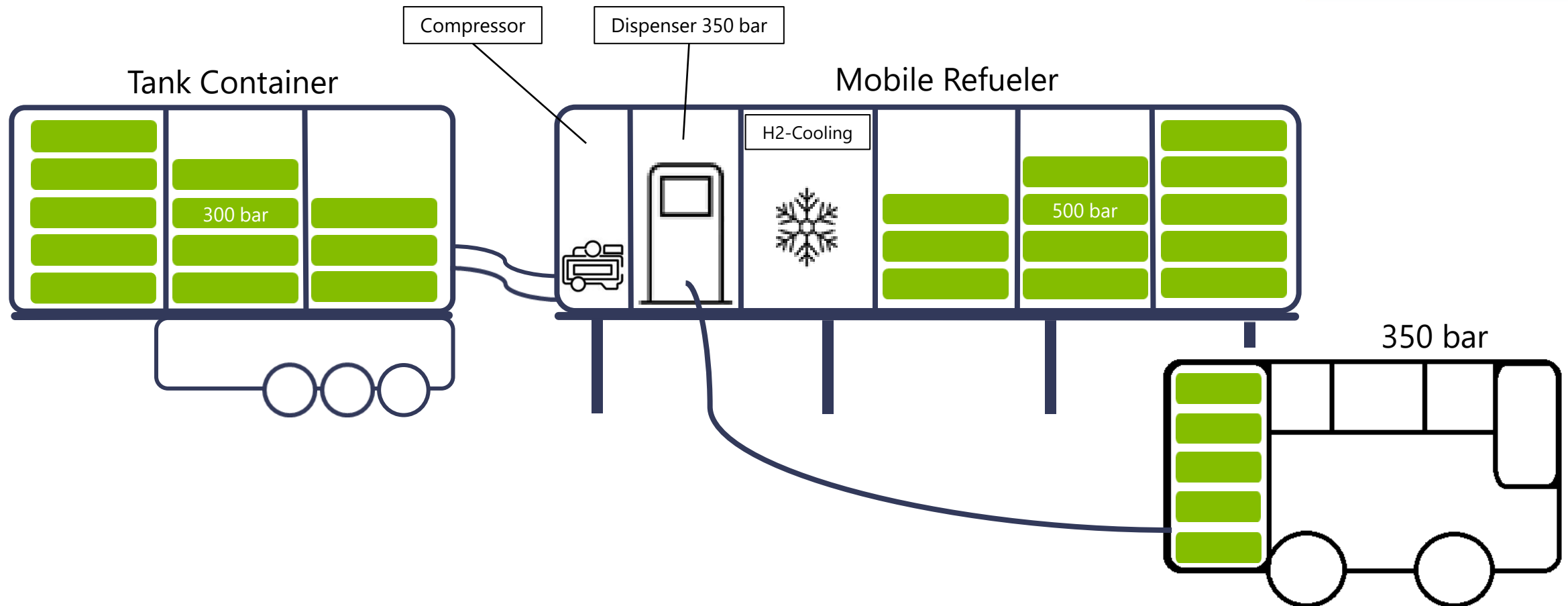


- Highly flexible and scalable
- Fast refueling / high amounts
- No capacity restrictions
- No stationary storage (hybrid usage)
- High availability due to low complexity



- More expensive transport systems (compared to stationary storage)
- Need for 500 bar filling

Solution for small fleets



Solution for small fleets

Advantages & disadvantages



- Mobile character (no construction work, simple installation)
- Integrated logistics (transport container)
- Energy efficient (cascaded refueling)
- Compact construction (container design)
- Usable as redundancy system



- Limited capacity (10-12 buses/trucks)



Mobile refueler

- Complete plug & play solution for 350 bar vehicles (700 bar compatible)
- Capacity up to 360 kg/day (~10 trucks/buses); 120 kg back-to-back
- H₂-Precooling optional
- Logistics included through transport unit
- Simple set up
 - Approval according to ADR regulations → transport on road
 - No civil work → just fixed ground
 - Only electrical power needed
 - Safety package included
- Easy operation → no permanent staff required



WyRefueler: hydrogen refueling station

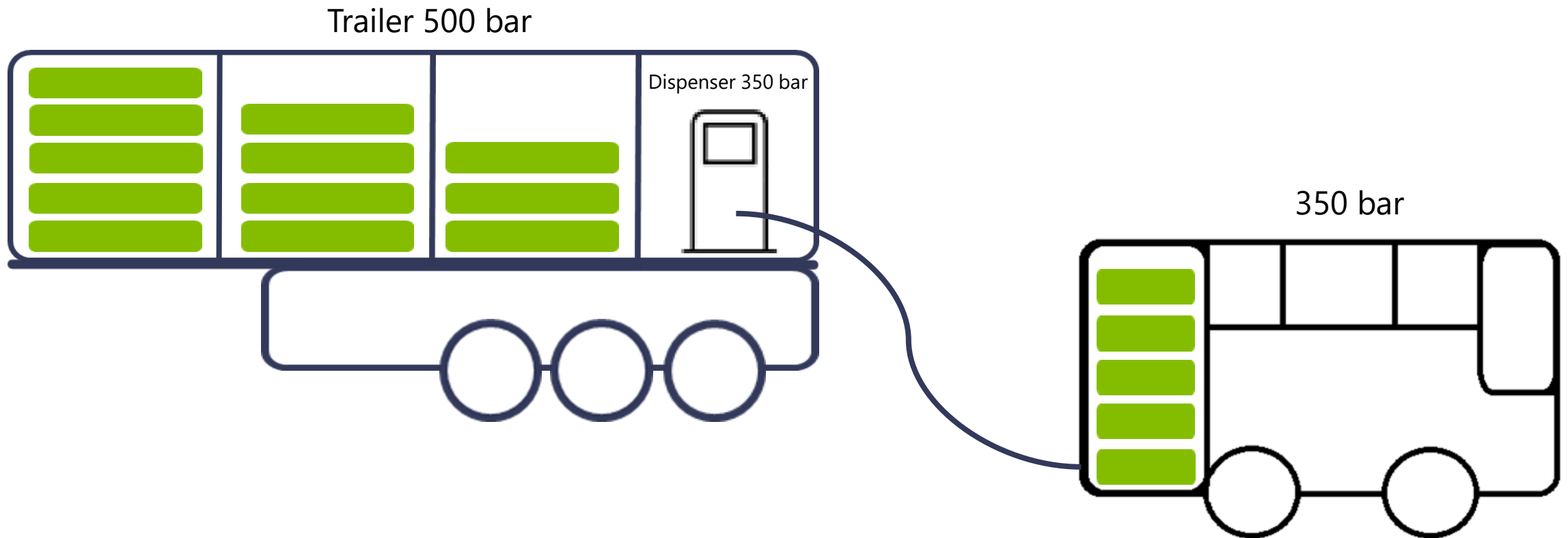
Selected references

- H2-Share project: WyRefueler in use since early 2020
- HyBayern Hydrogen Days in Hofolding (near Munich)
- Robert Bosch GmbH to start using WyRefueler in mid-2021
- First system in Poland by end of 2021
- Second system in Poland by beginning of 2022
- Train refueling at Deutsche Bahn by Q1/2022





Solution for isolated fleets



Solution for isolated fleets

Advantages & disadvantages



- Full mobility
- No installation time
- No external power supply
- Less Invest
- Selectable size



- Limited capacity
- Lower filling speed
- Need for 500 bar filling

WyService

- assembly, commissioning, maintenance
- non-destructive testing according to latest standards
- 24/7 availability
- worldwide



Thank you for your attention!

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