



**Cylinders
Holding**

Smart hydrogen storage

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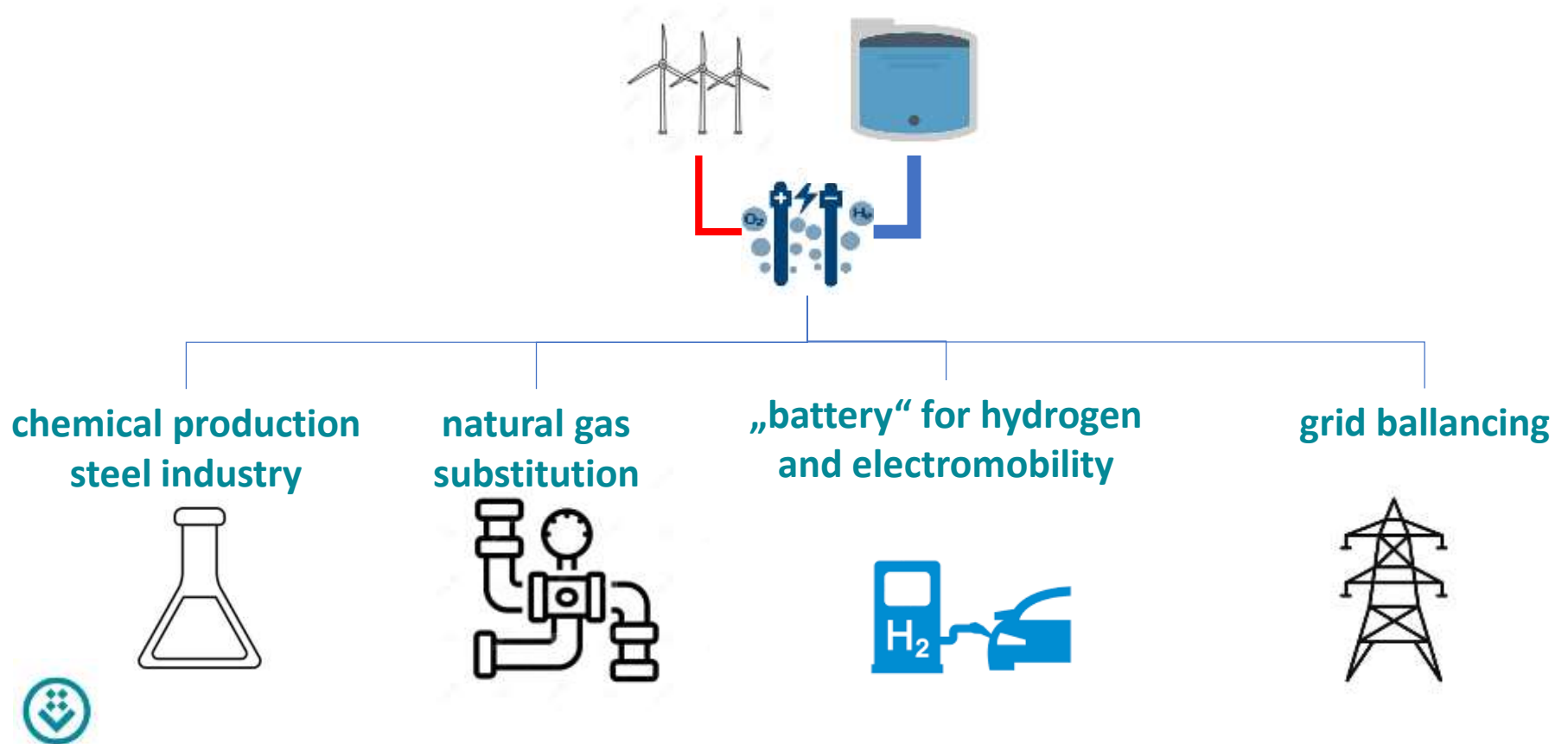
Vladislav Smrz

Business Development Manager

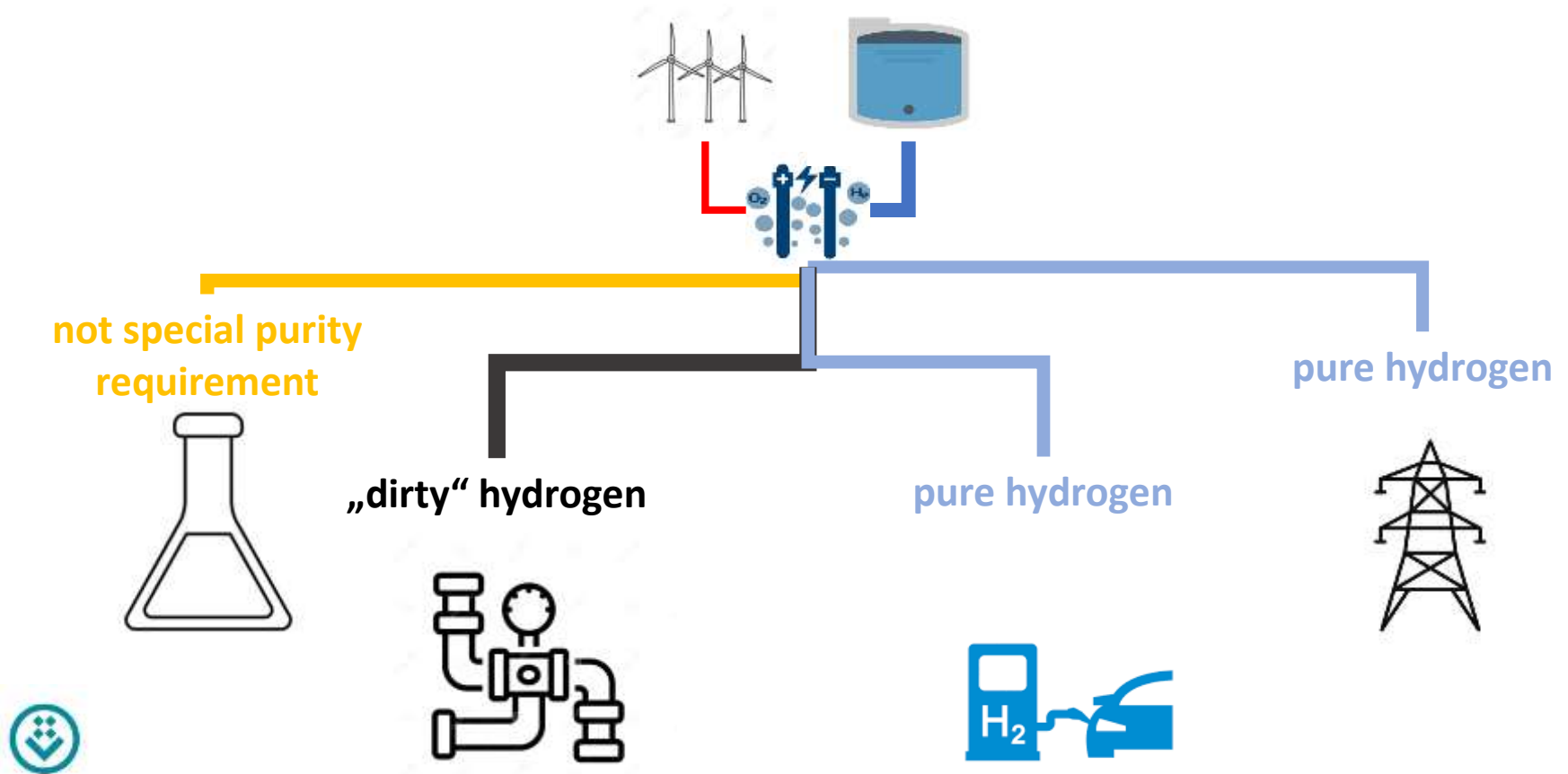
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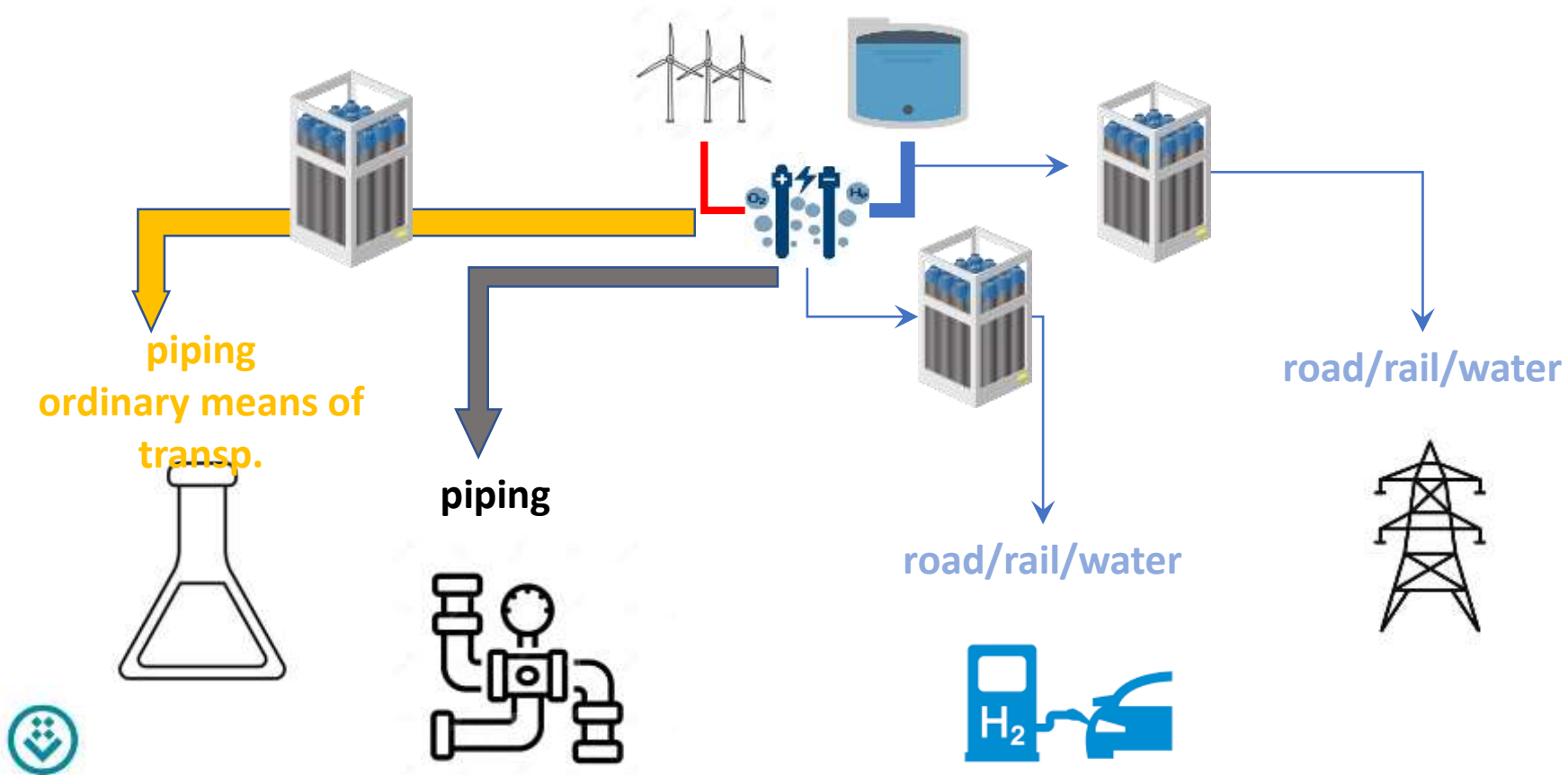
H2 Utilization for Greening the Economy



Hydrogen Purity Requirements

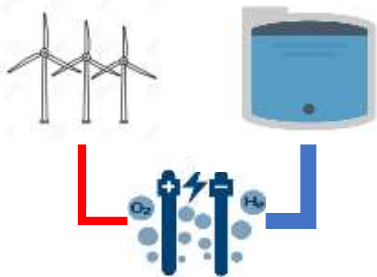


Hydrogen Transportation



Natural Gas Blending

renewables



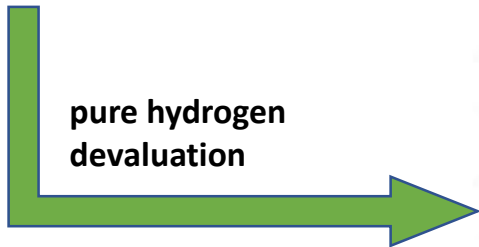
chemical production



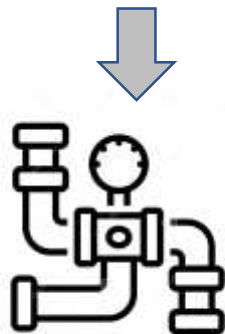
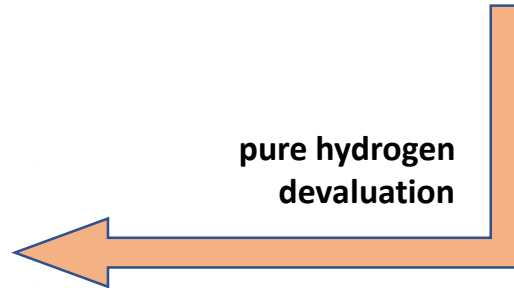
nuclear powerplant



pure hydrogen
devaluation



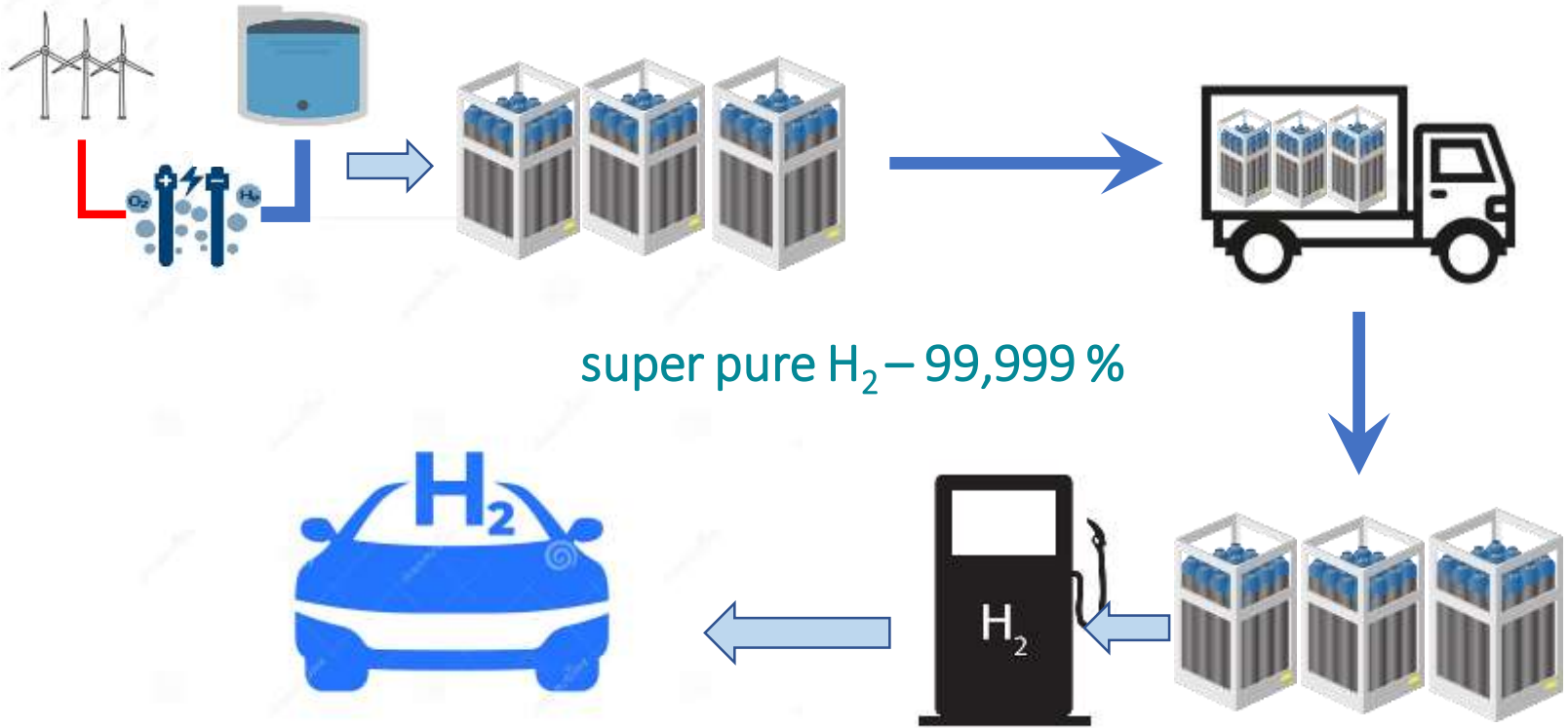
pure hydrogen
devaluation



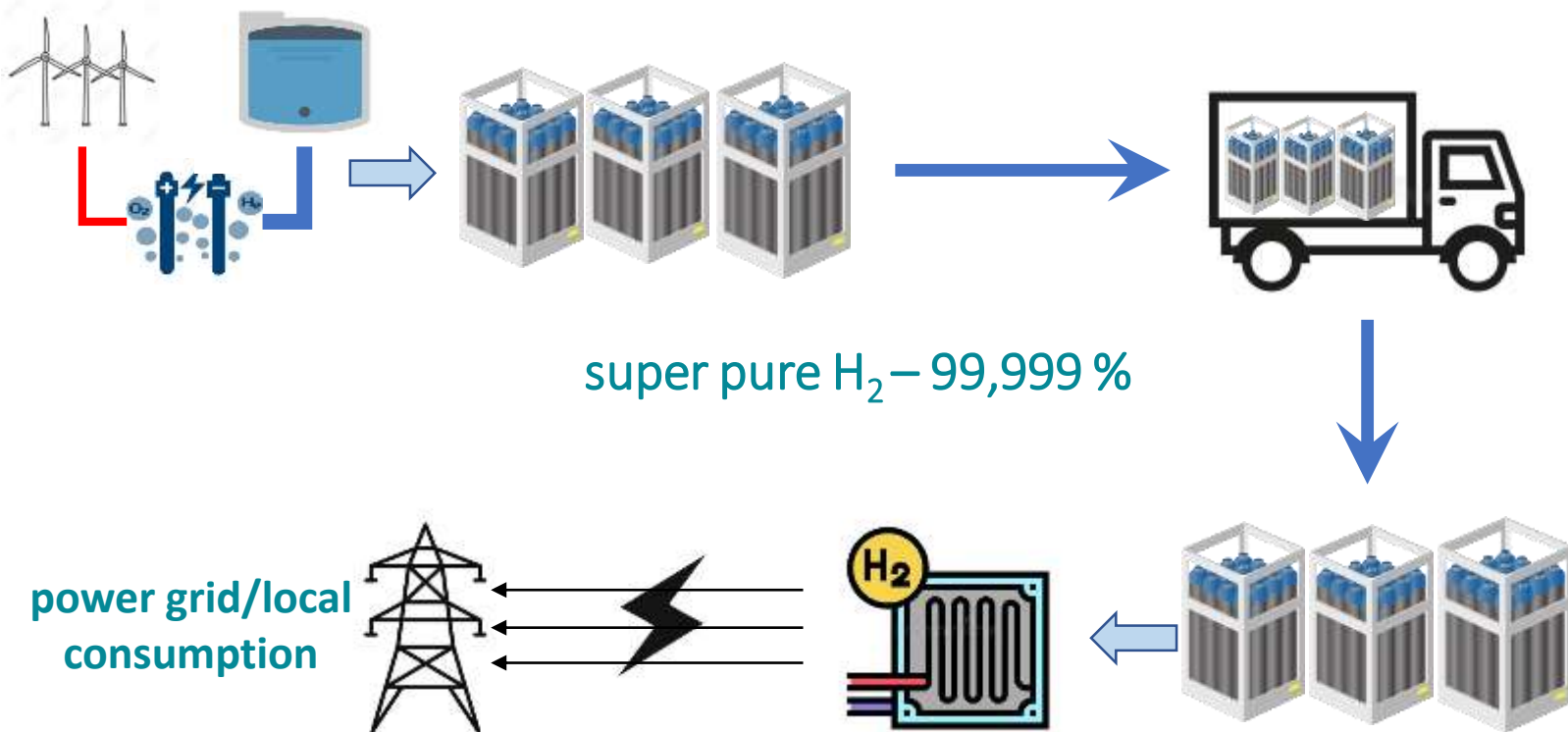
no special
requirement for H₂
purity



Hydrogen for Transport



Hydrogen for Electricity Production



Stationary storage containers

- Stackable stationary containers - cylinder banks
- Standard 20 feet container
- Local control systems to ensure a safe distribution of the gas



Mobile storage containers

- standard 20 feet transport container
- up to 312 kg H₂ at 300 bar
- Local control systems to ensure a safe distribution of the gas



Mobile storage trailers

- supply of the gas to a hydrogen storage systems – cylinder banks
- special trailers (up to 500 kg of hydrogen at 200 bar)



Stationary storage containers capacity

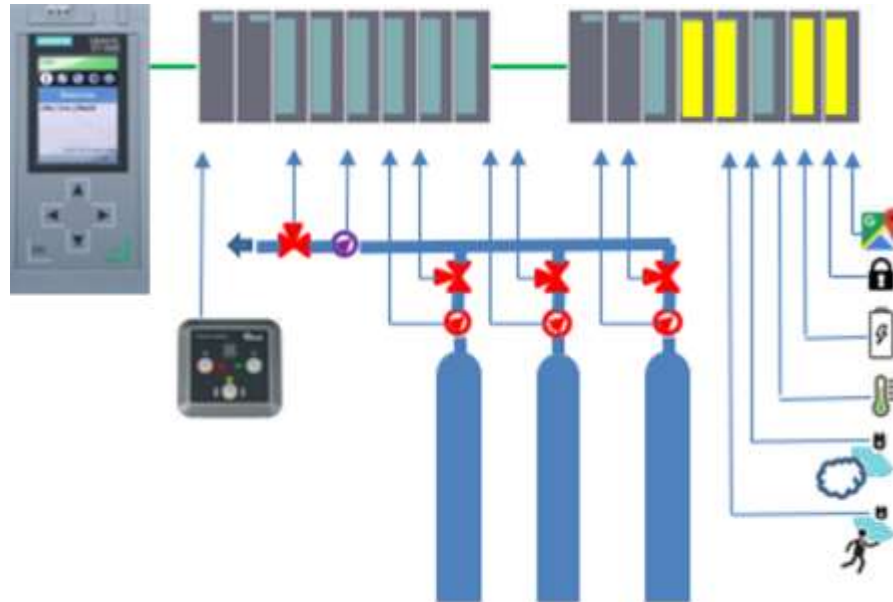
cylinder	Container volume	H2 capacity	Installation weight to volume H2/m ³
100 bar	21 594 L	182 kg	4,26 kg/m ³
200 bar	20 216 L	320 kg	7,48 kg/m ³
300 bar	15 770 L	353 kg	8,24 kg/m ³
500 bar	7 875 L	263 kg	12,45 kg/m ³
1000 bar	3 850 L	204 kg	10,8 kg/m ³

Note: all modular containers comply the limits of ADR (weight and dimensions).



Local control system of storage containers

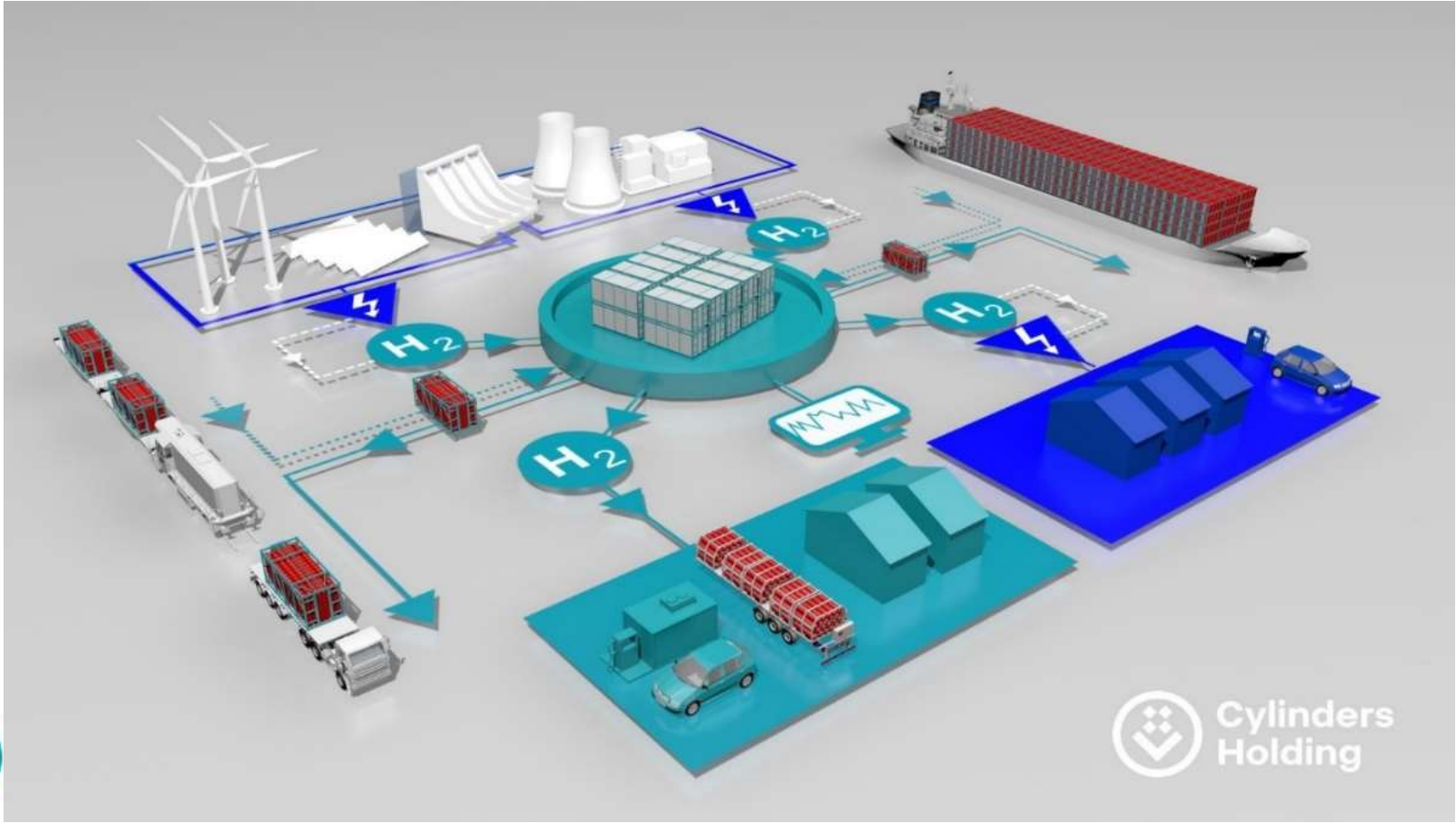
- PLC driven system with electronic valves
- Sensors of pressure, temperature, concentration, humidity and vibration
- Communication with central control systems



Central control system

- Records of all storage systems and its parameters
- Online geolocation of storage units across the globe
- Alerting on all unusual states of storage units
- Remote control of the storage units
- Monitoring of remaining hydrogen levels, overview of usage and refill needs







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Thank you for your attention!

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