



ÚJV Řež, a. s.

Czech Industry Experiences with H₂ Technologies

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23.09.2019

Hydrogen Mobility in V4

Content

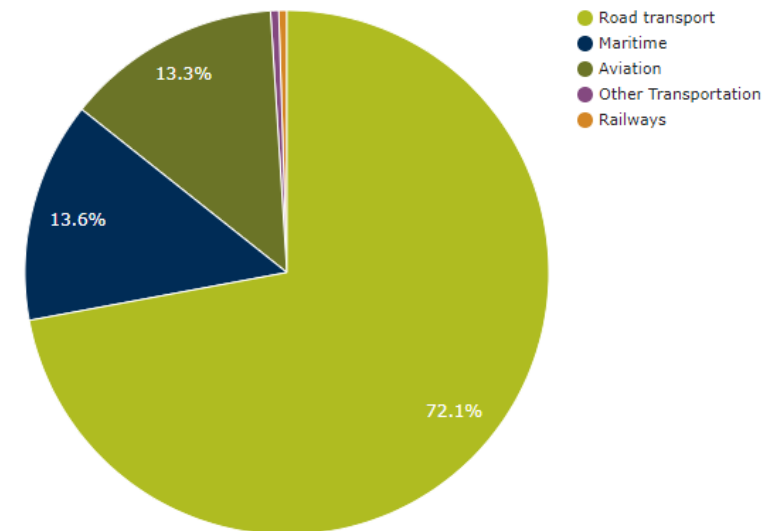
- Introduction
- History of H2 technologies in CZ
- Activities of UJV
- Present and future projects
- Conclusion

- Transport sector responsible for 27 % GHG emissions in EU-28
- Road transport has a major impact

■ EU Goals for OEM's:

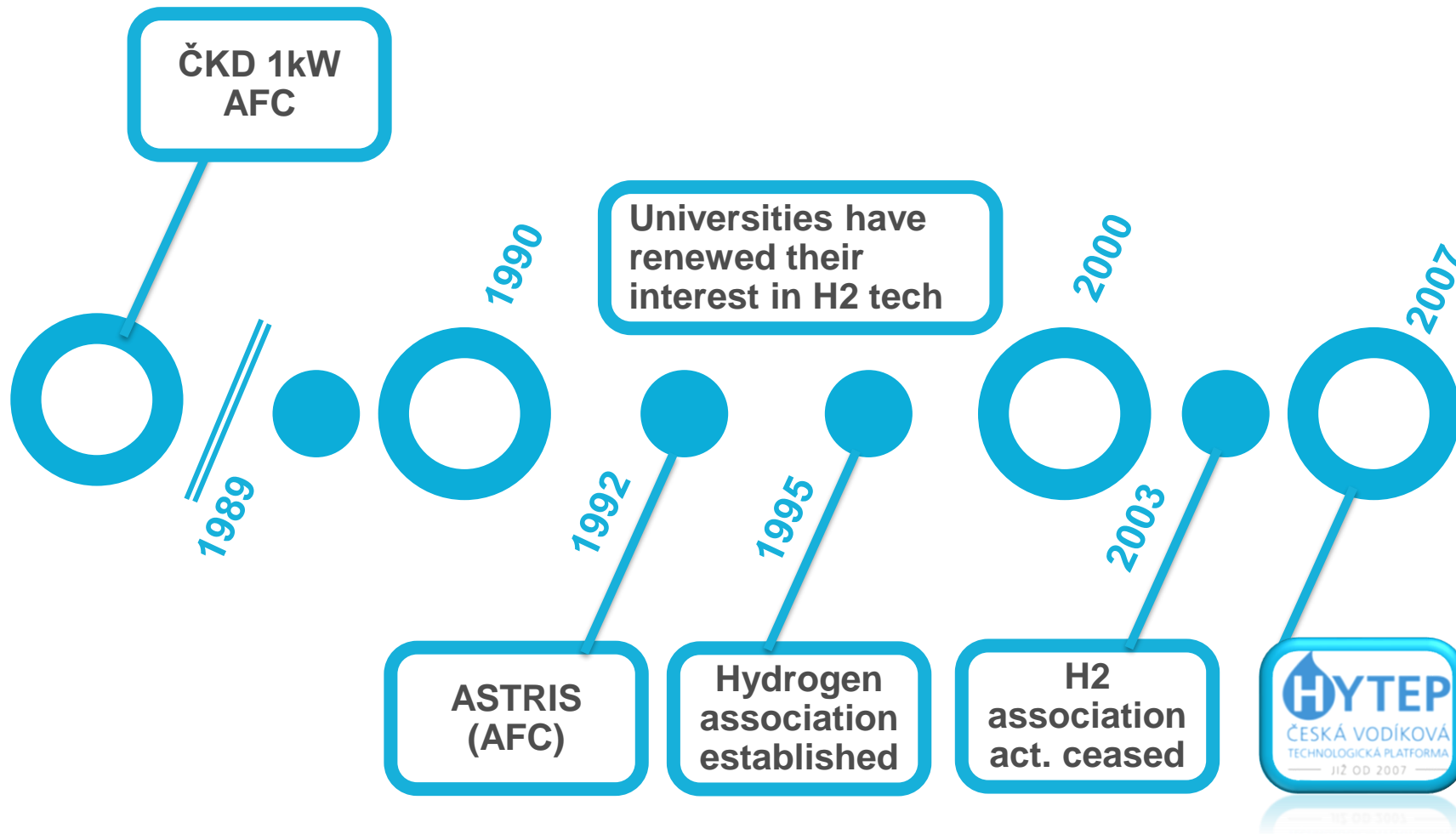
- Average emissions for passenger cars
- Goal for passenger vehicles
 - 37,5 % reduction until 2030
- Goal for heavy-duty vehicles
 - 30 % reduction until 2030

EU (Convention) – Share of transport greenhouse gas emissions



Source: European Environment Agency

History of H2 technologies in CZ

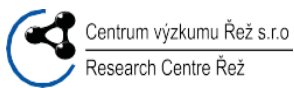


Czech Hydrogen Technology Platform

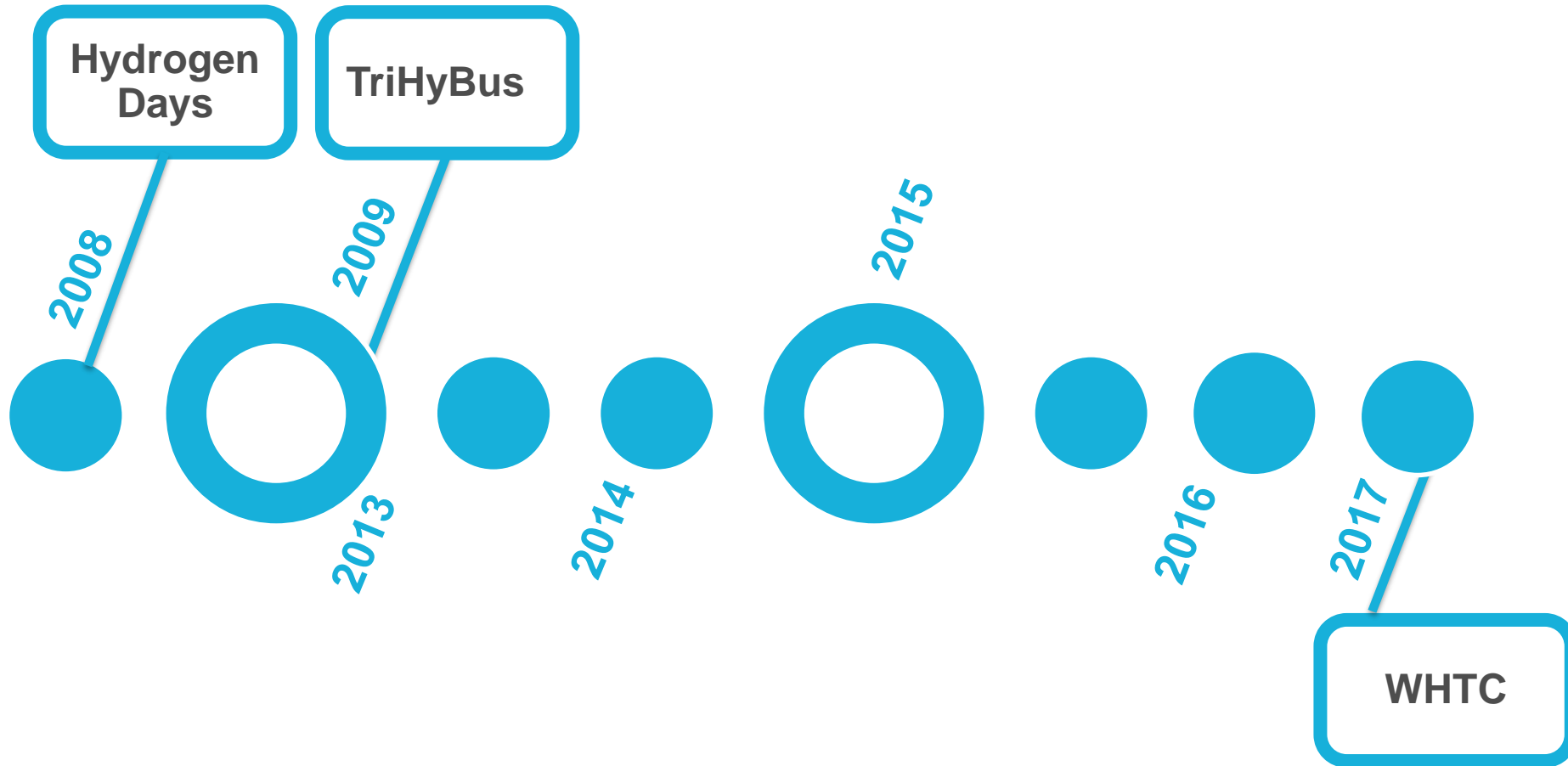


Activities

- Organizing conferences and seminars
- Representation of technology to the state administration
- Dialogue - national and region and Europe



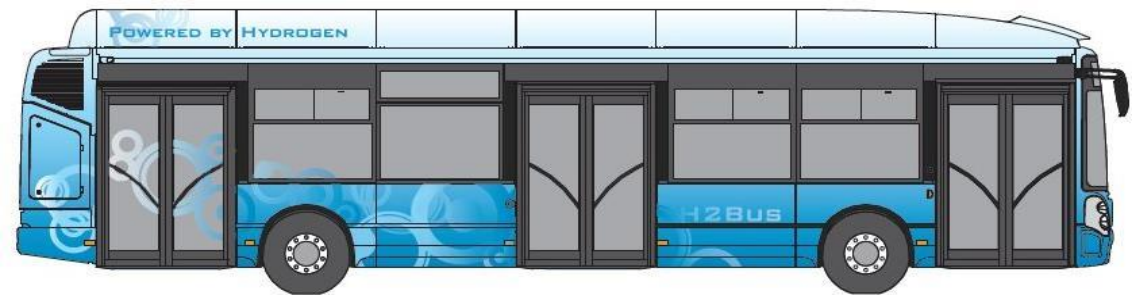
Important milestones in CZ



TriHyBus – Triple Hybride Hydrogen Bus

■ Operational parameters

- Weigh ~ 14 t
- Maximal speed 65 km/hr
- Consumption 7.5 – 8 kg H₂/100 km
 - Full tank range 250 – 300 km



■ Hannover Fair 2010

- Hermes award nomination

■ Brno International engineering Fair

- Gold medal





KONCERT

KO

EUROPEAN UNION
Czech Republic
Středočeský územní svaz
PM
VEOLIA
TRHYBUS

ZERO EMISSION

TRHYBUS

OPERA

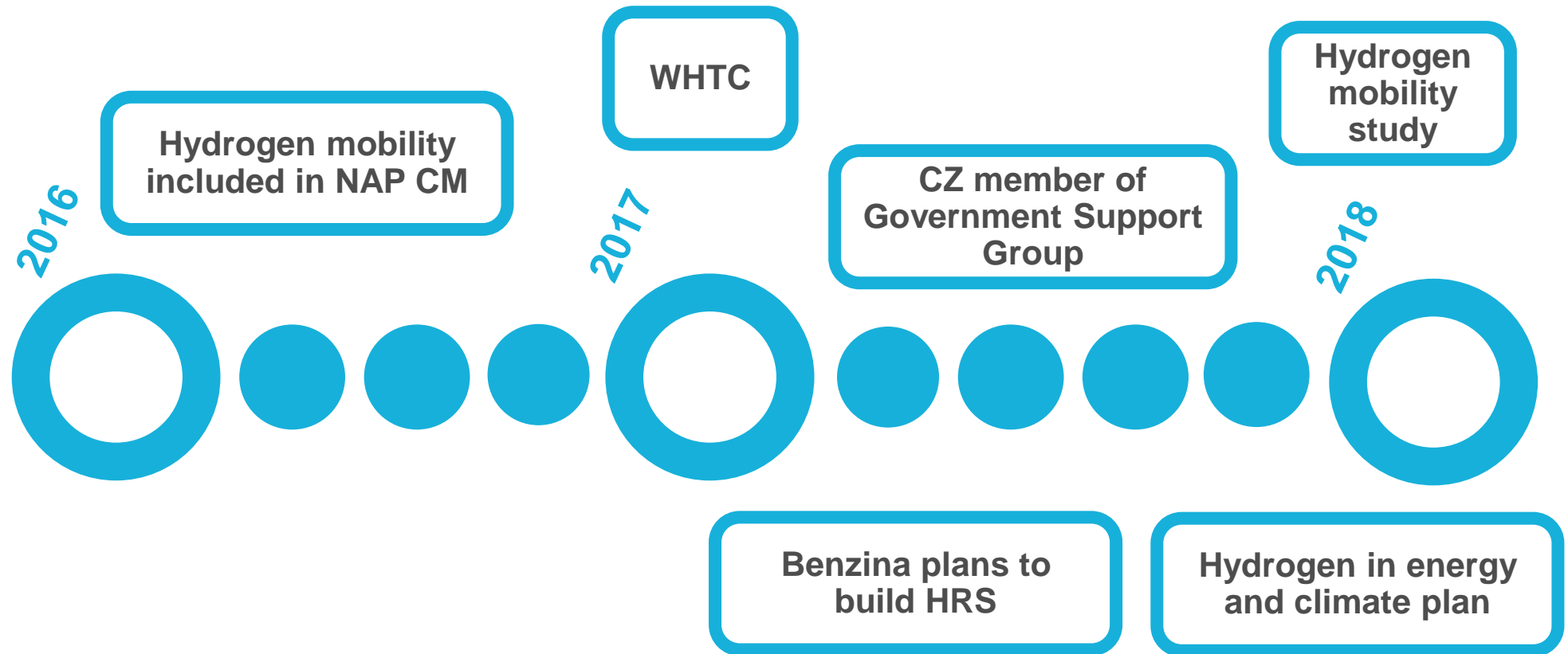
Hydrogen filling station – Neratovice

■ Parameters

- Compressed gaseous hydrogen
- Filling pressure 400 bar
- Storage 125 kg H₂ @ 40 bar
- Filling time: ~ 10 min
- Ready for 700 bar upgrade
- Fuelling nozzles TK-16 and TK-25



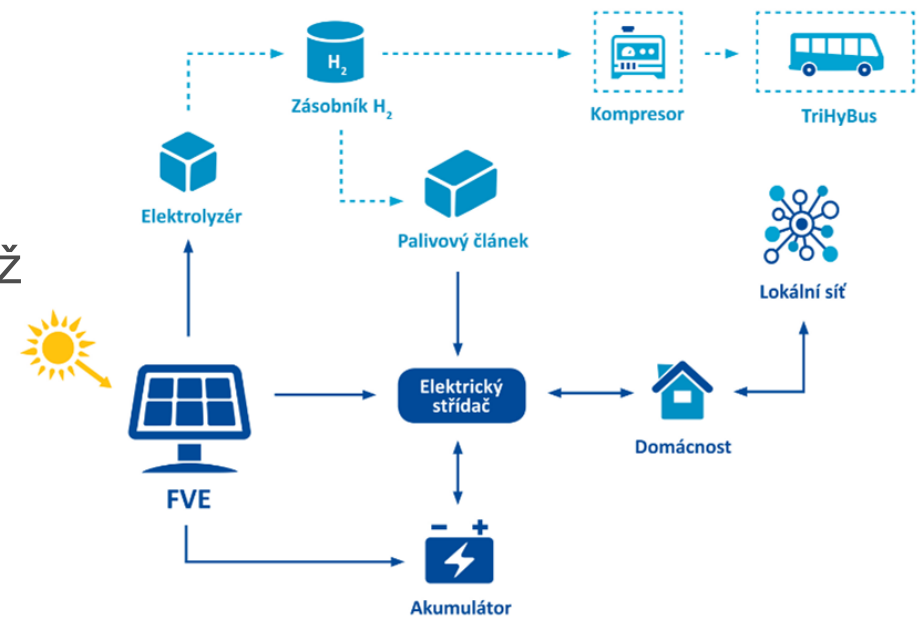
Recent activities in CZ



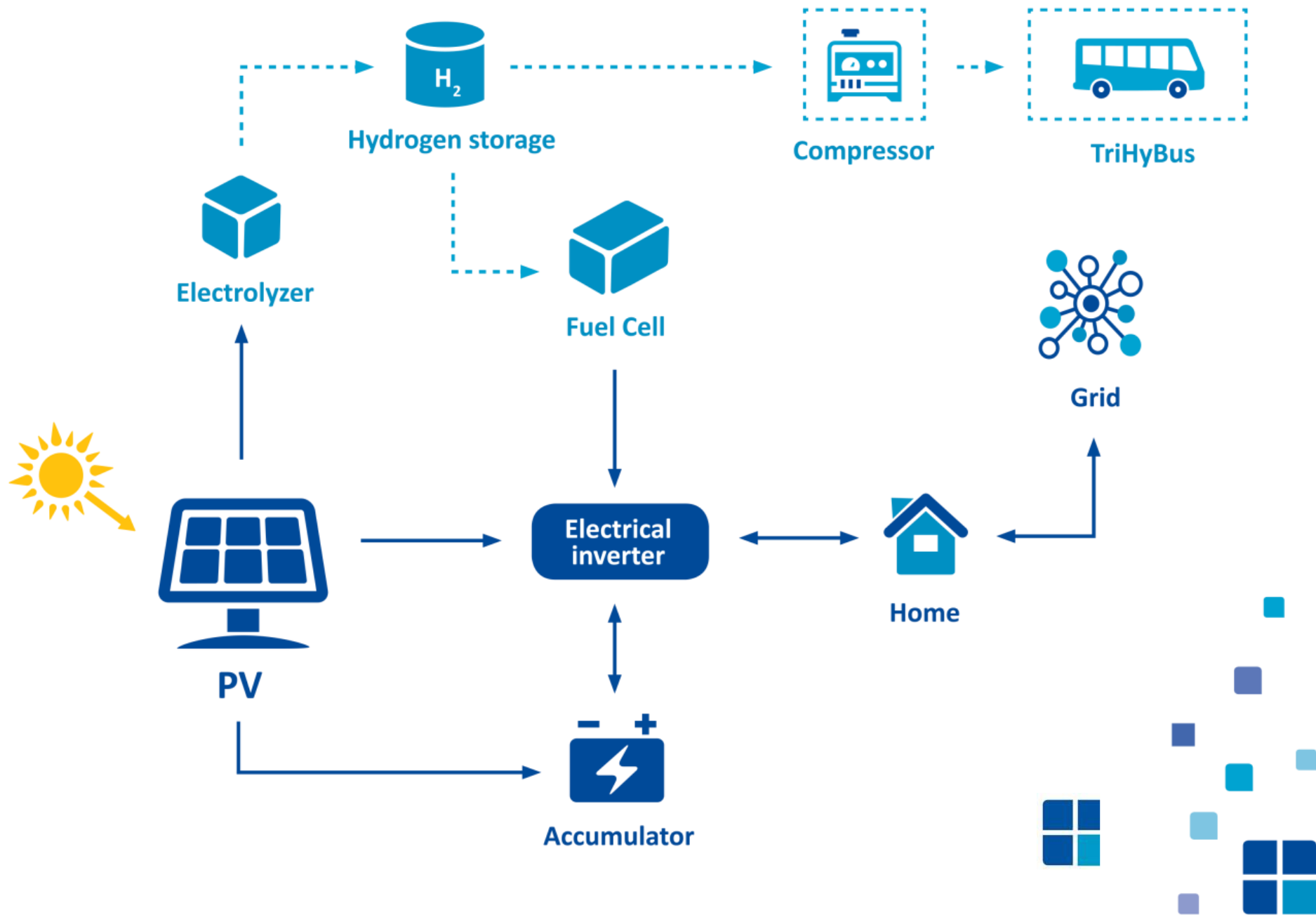
Energy Storage

■ Energy accumulation pilot unit

- Consortium: ÚJV Řež, a.s., VŠCHT Praha, Photon Energy
- Technology proved and operated in ÚJV Řež since 12/2013
- Scale: 6.7 kW electr., 4 kW FC, 10 kg H₂



Hydrogen activities in the Czech Republic



Pilot plant parameters

Device	Characteristic	Parameters
Photovoltaic power plant	polycrystalline PV cell	12 kWp (230 W per module)
Battery	Lead-acidgel accumulators	45 Ah (2.2 kWh)
Electrolyzer	PEM electrolyte	6.7 kW
Fuel cell	PEM cell	4 kW
H ₂ storage	Compressed gas (5 – 15 bar)	10 kg

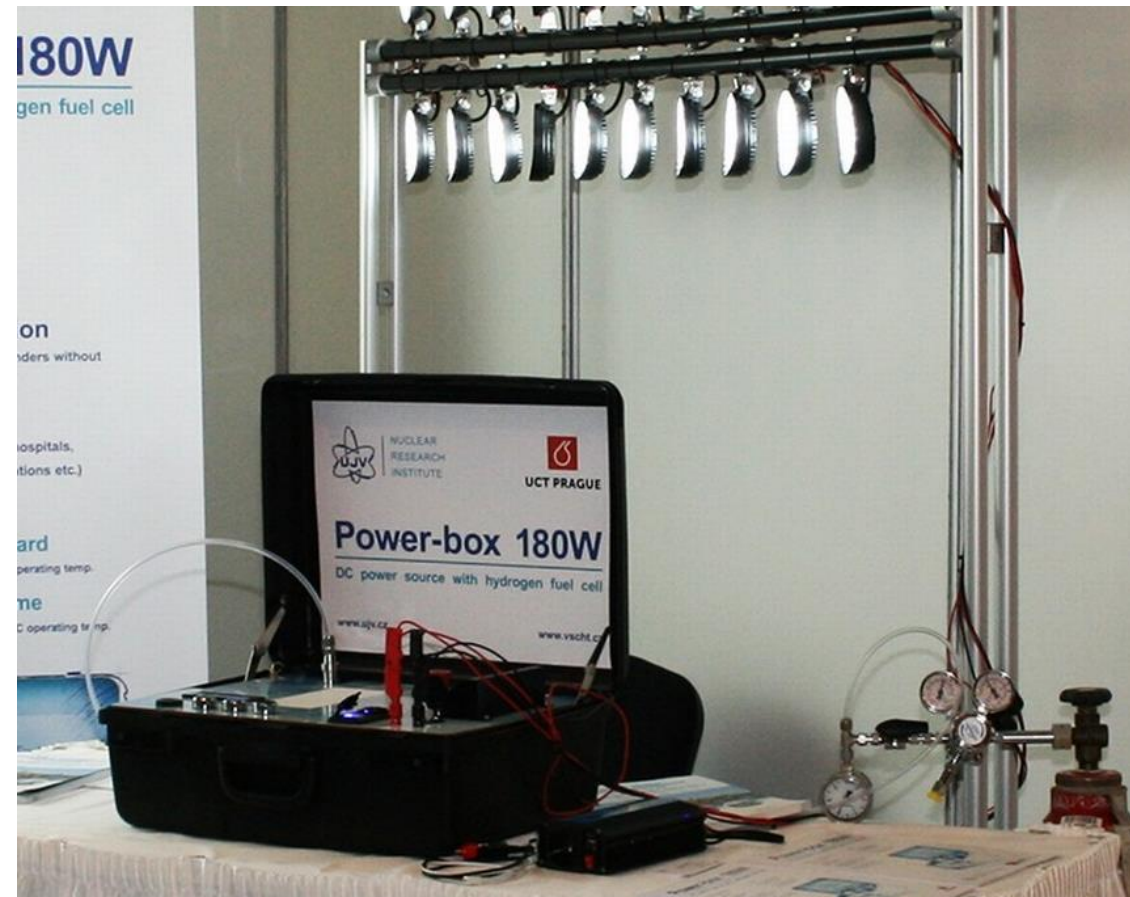
Pilot Plant for Energy Storage



Emergency Power

Power-box 180W

- Portable DC power source with hydrogen fuel cell
- Consortium – ÚJV Řež, a. s., VŠCHT Praha
- Wide range of usage
 - rescue and emergency services
 - field hospitals
 - army
 - lights
 - power for mobile radio stations



■ Hydrogen range extender

- Cooperation with ZEBRA Group and SVUM
- Upgrading a battery electric prototype



■ HYVAN

- Small battery electric van to be equipped with a hydrogen range extender



Thank you for your attention