

9th international conference Hydrogen Days

Karin Stehlík

28. 6. 2018, RVUR



EUROPEAN UNION
European Regional Development Fund
Operational Programme Enterprise
and Innovations for Competitiveness

9th Hydrogen Days

**WE WELCOMED 75 DELEGATES
FROM 16 COUNTRIES!**

 **HydrogenDays** 2018
13. – 15. 6. 2018



9th Hydrogen Days



9th Hydrogen Days

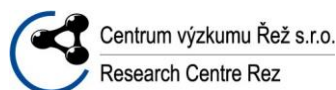


Czech Hydrogen Technology Platform



Targets

- Contact point for H₂ technologies in and for CZ
- Exchange of knowledge and best-practice experiences
- International coordination activities
- Support competitiveness of Czech industry



Call for H₂ Refilling Stations

1st call for HRS by Ministry of Transport

Supporting Infrastructure for Alternative Fuel - Supporting the development of hydrogen refilling station infrastructure

The screenshot shows the header and navigation menu of the Transport Operational Program website. The background of the page is a photograph of a paved road curving through a landscape with mountains in the distance.

EVROPSKÁ UNIE
Evropské strukturální a investiční fondy
Operační program Doprava

Information about co
These websites were co-financed from the Operational Program Transport - Cohesion Fund through technical assistance projects.

← **Period** 2004 - 2006
← **OPD** 2007 - 2013

Hledat ...

The general public

- Homepage
- Basic information

applicants

- challenges
- methodological documents

recipients

- methodological documents

Contact

- Managing Authority OPD
- Intermediate body

Transport Operational Program

Call for H₂ Refilling Stations

Supporting Infrastructure for Alternative Fuel - Supporting the development of hydrogen refilling station infrastructure

Date: 17.10.2018

Project realization: 30 months

Budget: CZK 150 mil. (approx. € 6 mil.)
aiming at 4 - 5 HRS

Support: max. 85%

Eligible applicants: Entities with economic activities in gaseous fuels, research and development in natural and technical science

Source: <http://web.opd.cz/ministerstvo-dopravy-poskytne-na-podporu-vystavby-plnicich-stanic-na-vodik-150-milionu-korun-z-opd/>

Phase 2

Two pilot Hydrogen Refuelling Station (HRS) and FCV fleet

➤ Hydrogen supply

- ☐ POx / PSA ,
- ☐ Distribution via Air Product - road tank carrier – contract since 12/2018
- ☐ On site purification design 12/2017

➤ Hydrogen Refuelling Station - Litvínov

- ☐ Feasibility study 6/2016
- ☐ Zoning permit granted 11/2017
- ☐ Development of Building permit design 01/2018
- ☐ Obtaining positive statements from authorities to the BP design 01-03/2018
- ☐ Granted Building permit - 09/2018
- ☐ Building permit with legal power/Start of construction – 11/2018
- ☐ Commissioning 5/2019
- ☐ Capacity 5 FCV & 1 FCB / day
- ☐ CAPEX XX mil. CZK (contribution with 85% of grant support: X mil. CZK)



Phase 2

Two pilot Hydrogen Refuelling Station (HRS) and FCV fleet

➤ *Hydrogen Refuelling Station - Prague*

- ☐ *Feasibility study 6/2016*
- ☐ *Zoning permit granted 12/2017*
- ☐ *Development of Building permit design 02/2018*
- ☐ *Obtaining positive statements from authorities to the BP design 02-04/2018*
- ☐ *Granted Building permit - 09/2018*
- ☐ *Building permit with legal power/Start of construction – 11/2018*
- ☐ *Commissioning 5/2019*
- ☐ *Capacity 5 FCV & 1 FCB / day*
- ☐ *CAPEX XX mil. CZK (contribution with 85% of grant support: X mil. CZK)*

➤ *Hydrogen passenger cars for Unipetrol / UniCRE*

- ☐ *6 cars – promotion, marketing, operation cost and technical availability testing,*
- ☐ *Delivery 5/2019*
- ☐ *CAPEX X mil. CZK*



Hydrogen Refuelling Station - Litvínov



Hydrogen Refuelling Station - Benzina Barrandov



Phase 3

10+ HRS and PSA in Litvínov

➤ *Hydrogen Refuelling Station – corridors to Germany, Poland, Austria, Slovakia*

- ☐ *Feasibility study + BDEP 2019*
- ☐ *Area permit awarded 6/2020*
- ☐ *Construction permit 6/2020*
- ☐ *Commissioning 12/2020*
- ☐ *Capacity 20 FCV & 2 FCB / day / station*
- ☐ *CAPEX XXX mil. CZK*

➤ *Hydrogen passenger cars for Unipetrol / UniCRE*

- ☐ *9 cars – promotion, marketing, operation cost and technical availability testing*
- ☐ *Delivery 12/2020*
- ☐ *CAPEX X mil. CZK*



Czech Expert Group for H₂ mobility

Expert group in H₂ mobility approx. 50 members



H₂ mobility for clean air

Interest in hydrogen mobility for public transport in Usti, Karlovy Vary and Moravia-Silesian region

Objective: reduction of emission

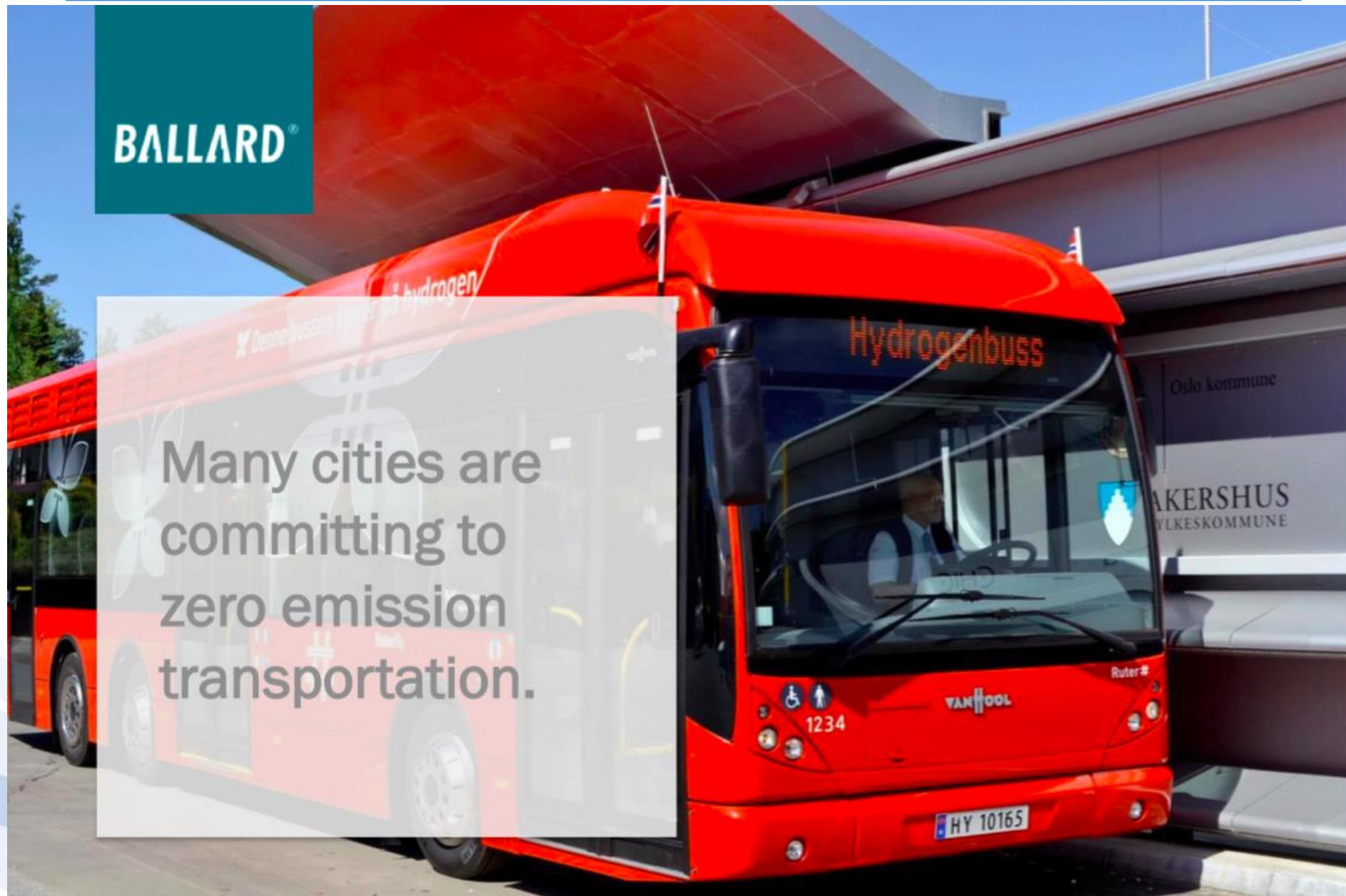
Coordinated activities by The Office of the Government Commissioner for Moravian-Silesian, Usti and Karlovy Vary regions

Realization within national restructuring program
RE:START

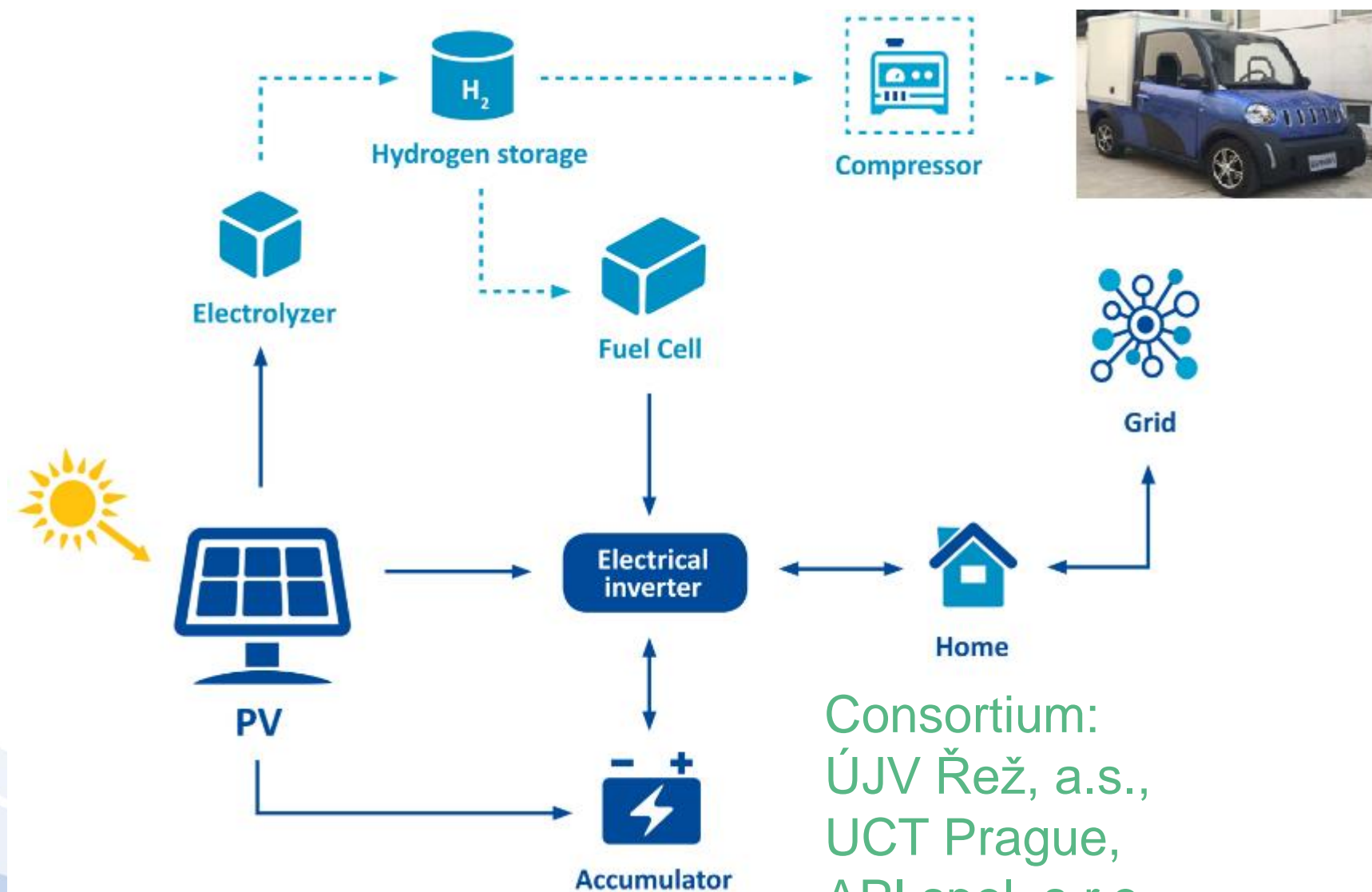
H₂ mobility for clean air

BALLARD®

Many cities are
committing to
zero emission
transportation.



Small HRS – project from TAČR



Consortium:
ÚJV Řež, a.s.,
UCT Prague,
API spol. s.r.o.

Hydrogen bus Prague - Berlin

Unique project idea: long-distance H₂ coach over borders

Possible route: Prague – Dresden – Berlin (Hamburg)

Support by German and Czech Ministries of Transport

Development of long-distance H₂ coaches

Infrastructure along the route

Provided as a commercial service

Hydrogen bus Prague - Berlin



Source: <https://www.mdcr.cz/Media/Media-a-tiskove-zpravy/fdfdg?lang=en-GB>

Otevřené otázky

Podpora vozidel

Strategie vývoje H₂ v energetice v CZ

- Akumulace energie
- Power to X
- Výroba vodíku pomocí elektrolýzy

10th Int. Hydrogen Days 2019



HydrogenDays²⁰¹⁹

March 27 – 29, 2019, Prague



karin.stehlik@hytep.cz



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Backup slides

Progress in public acceptance

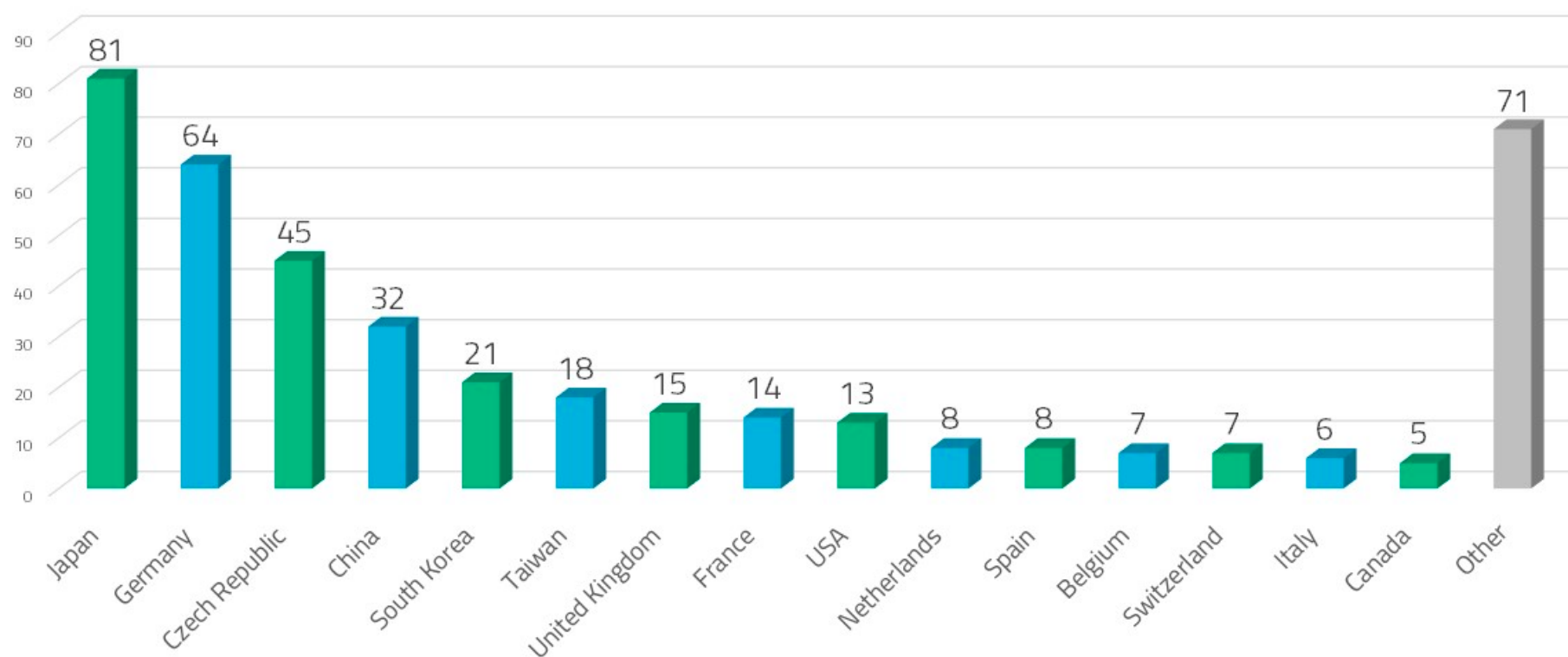
World Hydrogen Technology Convention 2017 in Prague

The Future might be closer than you think!



Progress in public acceptance

513 Delegates from 45 Countries at WHTC 2017



Source: <http://whtcprague2017.cz/images/image/stats/Slide2.JPG>

Progress in public acceptance

Ambassador Award for WHTC 2017
from Prague Convention Bureau



Czech Hydrogen Technology Platform

Memorandum with Ukrainian Hydrogen Council



Progress in public acceptance

Study on Use of Hydrogen Powered Vehicles in Transport
in the Czech Republic

Ministry of Transport of the Czech Republic

Foundation of expert group for H₂ mobility

Investigation of 4 scenarios

According to basic scenario 3 Up-date of National Plan
for Clean Mobility (NAP ČM): 6 – 12 HRS until 2025

<https://www.hytep.cz/images/dokumenty-ke-stazeni/Study-Use-of-Hydrogen-Powered-Vehicles-in-Transport-in-the-Czech-Republic.pdf>

Progress in public acceptance

Objectives within basic scenario 3

- Until 2030
- 117 filling stations
- 115,000 hydrogen powered cars (out of 5.1 mil)
- 1000 hydrogen buses (out of 20,000)
- Cumulative cost CZK 42.3 billion (approx. € 1.7 billion)

Progress in public acceptance

Expert group for H₂ mobility

Organization by MT and HYTEP

Represented institutions

- Public authorities
- Municipals
- Independent experts on transportation
- Technology Platforms
- Car manufacturer
- Companies
- Financial sector

Progress in implementation

Small HRS – project from Technology Agency CZ

Objective

- Construction of a small hydrogen filling unit
- For small transportation devices
- Operation of one vehicle at ÚJV Řež, a.s.
- Valuable data will be collected during the operation: energetic balance, reliability and OPEX.

The filling station and the transportation device will be in operation from 2020 on.

Consortium

ÚJV Řež, a.s., UCT Prague, API spol. s.r.o.

Progress in implementation

Upgrade of commercial available electric car - eChoice

Technical parameters:

- Max. speed 70 km/h
- Power of engine – 7,5 kW
- Nominal voltage – 72 V
- Electricity consumption – 6,5 kW/100 km
- Planned fuel cell: aprox. 3 - 4 kW



Progress in implementation

Location of small HRS - UJV Řež

Parameters of small HRS

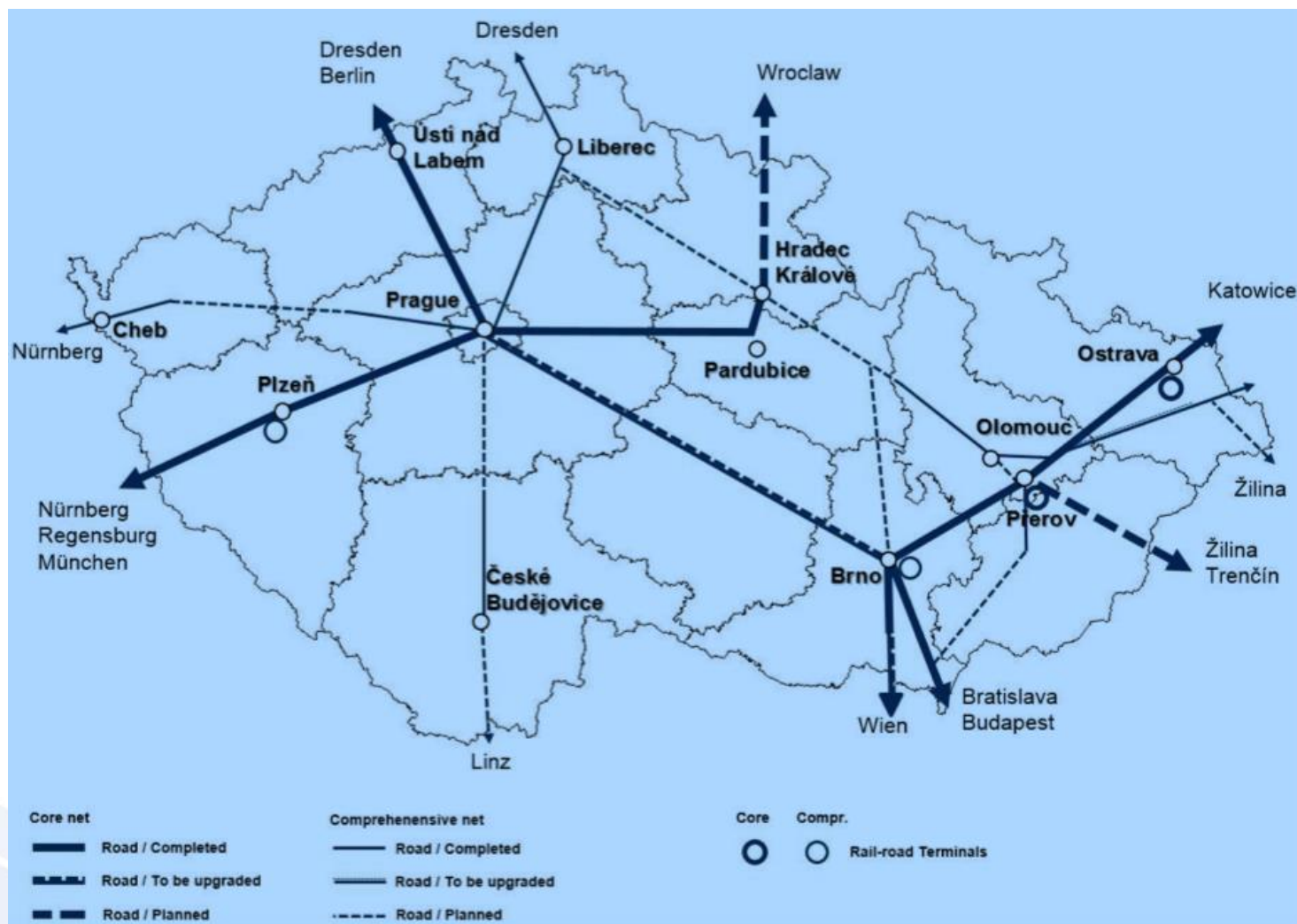
- Filling pressure: 200 bar
- Capacity: 4 Nm³ H₂/day

Construction of pilot unit of H₂ storage unit

- Hydrogen input – PEM electrolyser (cca. 2 kg H₂/day)
- Low pressure H₂ tank – capacity 10 kg H₂, 3 – 15 bar



Appendix: TEN-T corridors in CZ



<https://www.czechinvest.org/getattachment/Unternehmen-in-der-Tschechischen-Republik/Konkurrenzfahige-Infrastruktur/FS-16-Transport-Infrastructure.pdf>