

# Pilot project Hydrogen fuel cell drive system in rail vehicles and buses

# Objective: reducing CO<sub>2</sub> emissions from transport

## Starting position:

- Brandenburg has a high fluctuating share of renewable energy in electricity generation (approx. 6,300 MW installed power wind power)
- Time decoupling RE-wind and electricity demand of RE-systems can be solved by electrolytic storage in hydrogen (H<sub>2</sub>)

## Project idea: use of H<sub>2</sub> in the transport sector (Integrated Energy System)

- Use of green H<sub>2</sub> generated from renewable surpluses
- Replacement of diesel locomotives with motor vehicles with fuel cell drive

## Objective:

- Pioneering role of Brandenburg through first-time use of 100% wind power for hydrogen operation in rail transport



# Project Scenario: consortium companies from Brandenburg

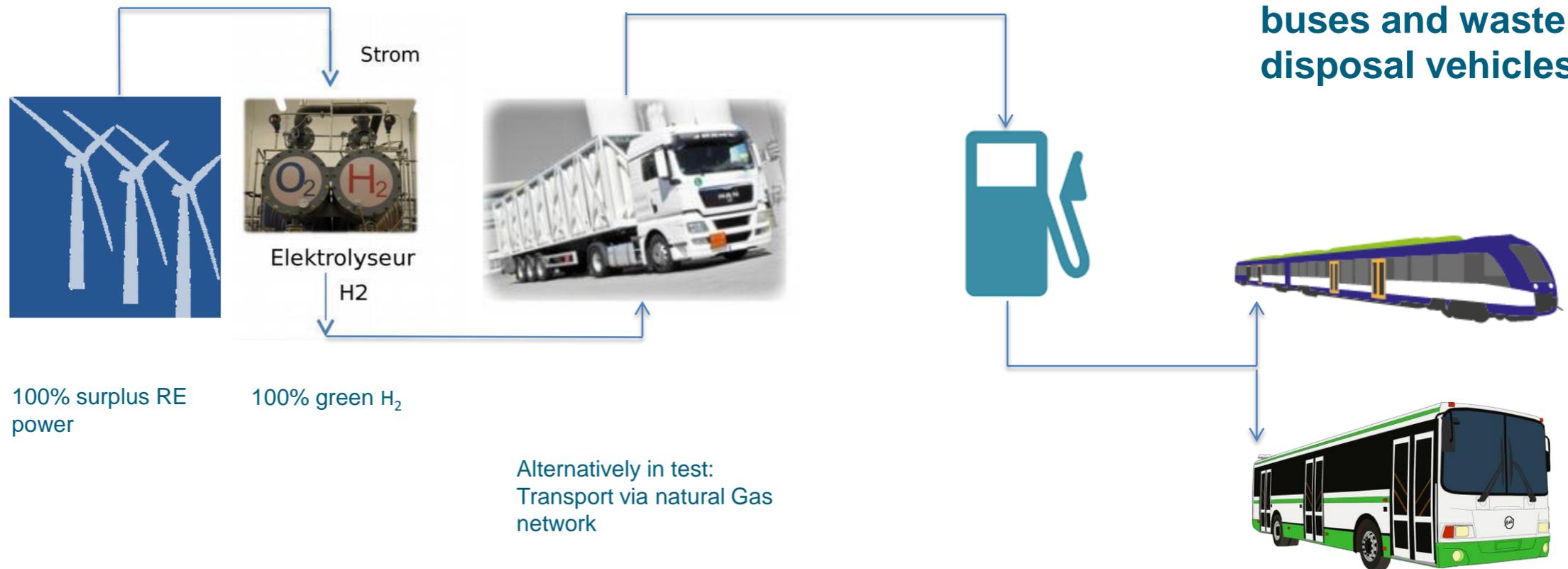
Sub-projects

H2-production

H2-transport

H2-station incl.  
storage

Procurement and  
operation of trains,  
expansion to  
buses and waste  
disposal vehicles



# Comparison of CO<sub>2</sub>-emissions

Alternatives	CO <sub>2</sub> -emissions per 100 km	CO <sub>2</sub> -emissions per 640.000 km	Change
Diesel train	85 l → 263 kg	1.683.200 kg	Basis
H <sub>2</sub> -train with green H <sub>2</sub> from wind power electrolysis	25 kg → 0 kg	0 kg + 30.035 kg transport	- 98,2 %



# Support by research project of the German Aerospace Centre

## Planned subject areas:

1. Integrated Energy System : wind power / photovoltaic electrolysis and H2 demand of fuel cell trains
2. reliability and availability (vehicles and H2 infrastructure)
3. cost consideration / LCC (vehicles and H2 infrastructure)
4. emissions / environmental impacts
5. synergies, macroeconomic effects
6. acceptance / visibility

## Other connecting factors:

- Development and construction of H2-BZ (hydrogen fuel cell) clusters in the Brandenburg-Berlin metropolitan Region
- University spin-offs and research projects in the hydrogen sector as potential for the creation of industrial value added

# Scope, Timeline, Partner and Budget

## Scope:

- Direct relevance for the “Energiewende“
- Pilot project with particular relevance for Brandenburg

## Current status of the project and timeline:

The project has not yet started. Realization in 2018-2022.

## Partner:

Three consortium partners and two districts in the state of Brandenburg.

## Budget:

Overall, depending on the option, additional investment costs of between € 10-16 million compared to the acquisition of conventional technologies are incurred in the project.



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