End-uses: Transport (0) ✦ Ľ **— H**₂ European F00= Hydrog Week

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#EUResearchDays #PRD2022 #CleanHydrogen







Sessions on end-uses: transport

27th Oct. 13:45 - 15:30



Manufacturing (for Supply Chains)

28th Oct. 09:30 - 11:15



End-Uses: Transport

28th Oct. 11:45 - 13:30



Building Blocks for Transport Applications



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Sixteen fleets of 5-50 buses in daily operation

Hydrogen buses witnessed in 6 countries - test one today

JIVE 😢





Fébus: Pau's zero emission hydrogen bus





Best Bus Awards in 2019

France

Pau

Fébus

 High level service line, 6km, backbone of the network, linking key points with main activity areas

Buses as springboard for local development

- Increase city attractiveness
- Create high value jobs locally
- Renew vigour for public transport use







268 kg

production

capacity per day

Co-funded by

the European Union

Benefits and operational data 9 kg 145 400 km of H2 per 100 km Buses in operation passenger capacity range, exceeding initial expectations on average per bus 12 12 12 12 12 12 12 12 12 12 00 0 410K 763K 1090t 3.9M litres of diesel saved KMs driven since 2019 of CO2 saved (H(H) H₂

700 kW

800 kg

of hydrogen stored at high pressure 65t of H2 distributed since 2019







Ports as hydrogen « coastal hubs »: trials and study

Pilots for clean port operations in container and ferry terminals

Pilots for ports operations

Heat and on-shore power for ferry terminals

BIGHI

EVERYWHZERE

- Port of Palma = 100kW
- Port of Orkney = 75 kW
- Port of Tenerife = 100kW

Heavy machinery for container handling





Study on hydrogen in ports and industrial coastal areas

Timing

Nov. 2021 - Oct.2023

Forecasting

- Estimate hydrogen demand and supply transiting through European ports in 2030, 2040 and 2050
- SWEDEN SWEDEN DRWAY HELAND HEL
- Project assistance for 4 case study ports

Community building

- Create an European Hydrogen Ports Network
- Exchange with Global Hydrogen Ports Coalition
 CEM initiative







Supporting the uptake of clean rail

Taking the steps towards zero-emission rail

Objective

- Develop a bi-mode fuel cell hybrid train to operate on catenary and on FC/battery propulsion
- Test, validate and carry out the homologation of the prototype

Regulation, codes and standards

- Identify gaps normative framework
- Modifications of relevant standards and technical specifications for interoperability

Integration completed

- Integration of FC and battery pack at test bench
- Integration of power pack on existing train





Tests on rail ongoing

 Tests ongoing on railways in Spain and Portugal













Driving forward fuel cell technology for HD

Advanced fuel cell components meeting performance and durability targets





Standardised modules for HD applications

Making fuel cells a mainstream technology



Definition of the specifications

- Define dimensions
- Physical interface
- Application Program Interface



 Partners are building and testing the FC modules





- Exploitation workshops already started (more to come!)
- Public deliverables







Co-funded by the European Union



Manufacturing of fuel cells components

Scaling up production to match expected demand



- Yearly capacity up to 50.000 units stacks
- Digital characterisation of materials
- Assessment bottlenecks



- Development of online QC techniques
- Abatement of BoP costs via redesign of components

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- Mass manufacturing techniques for stack production
- CCM = 3 GW/line/y













