



„Significance of Hydrogen and Fuel Cells for Urban Traffic on Roads and Waterways“

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Some Figures



- HOCHBAHN is a public transport company operating in the Metropolitan Region of Hamburg (Traffic area 8700 km²).
- Being the largest company within the Hamburg Transport Association (HVV) HOCHBAHN offered services for 400 M passengers in 2009. The overall capacity of the HVV accounted to 648 M passengers in 2009.
- About 50% of all passengers of HOCHBAHN travelled by underground and 50% by bus.
- HOCHBAHN operates a fleet of 726 buses and 211 trains.
- Overall demand for HOCHBAHN services increased considerably during the last year demonstrating the high attractiveness of underground and bus system for customers.



- 1,78 M residents in Hamburg and 3,32 M in the Metropolitan Region

Climate Protection important to HOCHBAHN



- Hamburg - European Green Capital of 2011- through promotion of energy efficient technologies – as for example fuel cells and hydrogen
- Decrease CO₂-emissions by 40% until 2020 through climate action plan based on values of 1990
- **HOCHBAHN plays an important role for City-owned companies with regard to the practical use of green technologies**



Challenges Along the Way to „Green“ Public Transport



- Public Transport is a very green mode of mobility already.
- Introduction of e-mobility may change the public perception of Public Transport as being the only green mode of transport. Therefore further green definition of Public Transport is needed to keep distance to other modes of transport.
- Green technologies have to be technically reliable and accepted by customers (e.g. bio fuels and food production dilemma) to be of any interest for operation within the Public Transportation sector.
- Public Transport needs to be prepared for the post fossil age in order to secure its position as affordable and attractive provider for mobility for all residents also in future.
- „Greening“ Public Transport even more by introducing fuel cell technology can not be accomplished over night. Transforming a bus fleet takes nearly 15 years. A politically supported step by step approach is needed. HOCHBAHN is systematically preparing for this required change.



Strategic Approach to Hydrogen and Fuel Cells



- Hydrogen and fuel cell technology has clearly been identified as one of the most promising „green“ technologies for the long term.
- The technology is clean, sustainable and accepted by customers.
- Currently all hydrogen and fuel cell projects that are conducted within HOCHBAHN and at subordinated companies are limited in time span and scope.
- ATG, FFG and hySOLUTIONS are strategic early adopters within HOCHBAHN that develop long term perspectives with regard to a diversified operational field for the effective deployment of the technology. Synergies, economics of scale and further technical optimization are important step stones.
- HOCHBAHN takes advantages of major national and European wide funding sources (National Innovation Program, EU – Life Programm) to keep project costs as low as possible.



Long term Strategy of HOCHBAHN



- 30 years from now diesel fuel will be too expensive to be used for public transport. Furthermore it will not fulfill the ecological objectives of HOCHBAHN anymore.
- At the same time production of electricity from renewable energy sources is expected to increase strongly.

Objectives

- Complete transformation of HOCHBAHN bus fleet to electric drive technologies until 2030.

Measures taken

- Replacement of old generation of DT3 underground-cars by new DT5 generation. Like the DT4, the new DT5 is able to restore braking energy back to the grid.
- Introduction of new and modern light rail system within the next five years.
- Continuous purchase of newest electric Diesel Hybrid Buses and gradual replacement of old buses by Fuel Cell Buses starting from 2020.

CUTE and HyFLEET:CUTE Performance in Hamburg



Up to 9 fuel cell busses In Operation



Achievements (December 2009)

More than **525.000 km overall – Cute + HyFLEET:CUTE**

Average operating hours per bus : around **6500 - 7000 h**

Availability: **up to 96,1%**

More than **1.5 Mio. Passengers**

Lifetime fuel cell system: partly more than **4.000 hours**

High satisfaction of HOCHBAHN customers and bus drivers with new technology

Environmental Standards at HOCHBAHN



- HyFLEET:CUTE follow-up project. Testing of 10 new FuelCELL-Hybrid buses within regular line service starting in 2010.



- Project Zemships has demonstrated that Fuel Cell technology is not limited to bus fleets only and that it can support the greening process of the ship building industry.



- By applying state-of-the-art green technology HOCHBAHN actively promotes the objectives of the City of Hamburg and fulfills the targets of the Climate Protection Program of the Senate. Our activities can be an example for other cities and regions that are interested to “green” their own Public Transport companies.



Thank you very much for your attention!