Fuel Cell Testing

Modern Fuel Cell

As alternatives to batteries a fuel cell system tailor made for the mobile application in cargo bikes is tested within this project. The objective is to demonstrate the potential of those bikes to replace combustion engine vehicles and constantly reduce CO_2 emissions, traffic jams and delays in deliveries. In comparison to batteries the fuel cell technology provides more energy and has less weight although having the same dimensions. Furthermore, the hydrogen tank can be refilled within minutes and suffers no performance losses at subzero operation in winter. As a result, with the fuel cell technology tailored by the German Aerospace Center, cargo bikes can be operate in all seasons with optimal performance.

Cooperation Partners

Cities & City Near Organizations:

STUTTGART | ABERDEEN CITY COUNCIL | ISSY

Energy Expo *Duurzame Mobiliteit* | issymedia Communication & Innovation

Research Institutions & Schools:

DLR | ULB Université Libre de Bruxelles | Université Gustave Eiffel

Companies:

CSF | Noorderpoort | VeloCARRIER | unicorn engineering | dpdgroup

Contact:

DLR **Deutsches Zentrum für Luft- und Raumfahrt**
German Aerospace Center

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Interreg North-West Europe

Fuel Cell Cargo Pedelecs

European Regional Development Fund

Powered by Hydrogen

Emission Free Transport

Hydrogen refuelling process on FCCP

The Project

Today, 75% of Europeans live in cities and suffer from air and noise pollution and traffic jams. The transport sector in European cities currently causes up to 50% of emissions and 30% of vehicle kilometres*, thus is one of the major contributors to this issue. Due to expanding e-commerce, the last mile delivery has fundamentally changed. Goods are increasingly ordered online and delivered to the customer's private address. More frequent but smaller parcels to decentral destinations are increasingly replacing the typical A2B transport from factories to shopping centres. Cargo bikes also called pedelecs provide a veritable answer to the evolved requirements of last mile delivery.

However, modern batteries cannot supply sufficient energy and fail in low temperatures which limit the potential of this promising concept. In contrast, the emission-free fuel cell technology of DLR provides significantly more energy until at least -20°C, is refilled within minutes and is twice as durable than batteries at comparable costs.

With these characteristics, one fuel cell cargo pedelec (FCCP) can save 5,5 t CO_2 p.a. by replacing combustion engine vehicles.** For efficient exploitation of this potential, this project builds on an innovative logistic concept, tailored for the performance characteristic of FCCPs and the requirements of today's urban freight transport, latest fuel cell technology, as well as intense involvement of cities to foster and implement FCCPs.

In line with this, one crucial output of this project is a transnational strategic concept concerned with the best integration of emission free FCCPs in logistic delivery chains, including innovative technology and sustainable urban development. This project will facilitate the multiplication of emission free FCCPs, as it provides relevant and replicable information to cities and the transport sector to stay abreast of the fundamental changes in the transport sector, reducing CO_2 emissions in European cities.

*Cf: Letitia Dablanc, Goods transport in large European cities: Difficult to organize, diffficult to modernize, 2006
** Assumed one FCCP replaces a half combustion engine van that emits 11 tones CO2 p.a.

Project - Facts and Figures

- 36 fuel cell driven cargo bikes will be tested under various conditions by municipalities and logistic companies
- data from the pilots will be collected and analyzed in order to give recommendations to other cities and companies
- up to three hydrogen tanks containing each 300g - estimated range ~150 km per tank
- approx. 10 hours of operation at 250 W
- refilling time per tank about 3 minutes

Advantages of fuel cell cargo bikes

- emission free transport
- long distance
- fast refill
- all season operation

The full cell cargo bikes are supported by a tailormade logistic concept.

What is Interreg?

A European Territorial Cooperation programme with the ambition to make the North-West Europe area a key economic player and an attractive place to work and live, with high levels of innovation, sustainability and cohesion.

Interreg NWE is one of instruments to implement the European Cohesion Policy. Its purpose is to reduce disparities between the various regions in North-West Europe.

www.nweurope.eu