

PROJECT FINAL REPORT

Final Publishable Summary Report

FCH JU Grant Agreement number: 245133

Project acronym: NEXTHYLIGHTS

Project title: Supporting Action to prepare large-scale hydrogen vehicle demonstration in Europe

Funding Scheme: Support Action

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¹ Usually the contact person of the coordinator as specified in Art. 8.1. of the grant agreement

² The home page of the website should contain the generic European flag and the FCH JU logo which are available in electronic format at the Europa website (logo of the European flag: http://europa.eu/abc/symbols/emblem/index_en.htm; logo of the FCH JU, available at: http://ec.europa.eu/research/fch/index_en.cfm). The area of activity of the project should also be mentioned.

2.1 Final publishable summary report



PREPARATION FOR LARGE-SCALE VEHICLE DEMONSTRATION IN EUROPE

NEXTHYLIGHTS

EXECUTIVE SUMMARY

This project is co-financed by funds from the
European Commission under
FCH-JU-2008-1 Grant Agreement Number 245133.



*The project partners would like to thank the EC for establishing the
New Energy World JTI framework and for supporting this activity.*

Abstract

NextHyLights was a project called for by the European Fuel Cells and Hydrogen Joint Undertaking (FCH JU) to assist in preparing the next large-scale hydrogen fuel cell vehicle demonstration projects in Europe. This summary gives an overview on the project's ambition, its focus and its reports and results. It provides insight into the development of work plans for the vehicle segments "passenger cars", "buses" and "other vehicles" and the related hydrogen infrastructure.

1. Introduction

The project has developed consolidated plans for large-scale demonstration projects across three parallel hydrogen fuel cell vehicle (FCEV) segments 'passenger cars', 'buses' and 'other vehicles'. In the case of the bus segment a roll-out plan covering the market introduction has also been developed. The vehicle segment specific work plans cover the time span including the next large-scale demonstration projects.

2. Status Quo of Hydrogen Vehicles

2.1 Fuel Cell Passenger Cars

About seven major demonstration projects involving hydrogen and FCEVs are ongoing or have been launched recently in Europe. A total of about 100 hydrogen fuelled vehicles and FCEVs are in daily use there and compare to 350 hydrogen fuelled vehicles and FCEVs worldwide. In the European area a total of 70 refuelling stations are available but only 30 are in principle accessible by the public. Typical FCEVs are small city vehicles, medium sedan cars and SUVs.

2.2 Fuel Cell Buses

The fuel cell bus market has been growing slowly over the last 10 years. The number of competitors for both fuel cell systems and bus manufacturing has increased through time from one firm in 2002 up to 12 firms in 2010. The substantial increase in the last two years, for example, has been promoted by a new wave of demonstration projects, which has led to new investments in the sector.

According to our study, the key barrier to commercialisation of the hybrid fuel cell bus technology is its high cost. The current capital cost of a hybrid fuel cell bus is over five times the cost of a conventional diesel bus, whilst its ownership cost is over three times higher. The analysis identified also the key factors which increase the capital cost over a typical diesel bus.

2.3 Other Fuel Cell Vehicles

The material handling sector (i.e. fork lifts, pallet trucks, lift trucks, tow tractors) is the most active group in the "other vehicle" segment with about 700 demonstrators worldwide. Most of the demonstration projects are taking place in the United States. A total number of 683 material handling vehicles are in operation in the U.S. whereas only 10 material handling vehicles are operated in Europe. Further applications are municipal vehicles, scooters, bikes, boats and ships.

3. Regions Approach and Regions Eligibility Assessment

In its endeavour to support the advancement of FCEVs and hydrogen refuelling infrastructure the FCH JU was keen to learn which regions across Europe score highest on a “commitment list”. For that reason the project comprised an activity to identify and assess the European regions’ commitment on hydrogen and fuel cells for transport.

4. Social and Environmental Impact Assessment

Even if FCEVs will have a performance similar to conventional vehicles and be available at acceptable cost, they will only be successful if they meet with good social acceptance. In accordance with Ricci et al., we have defined acceptance as “a lack of (explicit) public opposition to the introduction of hydrogen as fuel in the transport sector” [Ricci, M., P. Bellaby, R. Flynn (2008): What do we know about public perceptions and acceptance of hydrogen? A critical review and new case study evidence. International Journal of Hydrogen Energy, 2008, 33, p. 5868-5880]. We distinguish three interrelated types of acceptance. Market acceptance is largely beyond the scope of the project, and the remainder of this section focuses on global and local acceptance.

The environmental impacts resulting from the implementation of hydrogen vehicles were assessed principally for demonstration projects and roll-out scenarios. This work has been performed for the three hydrogen vehicle segments: passenger cars, buses and special vehicles with a specific focus on the bus segment.

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