



CUTE

The largest fuel cell bus fleet trial worldwide

Challenges/Problems addressed

CUTE will be the first volume production test of this scale for fuel cell buses conducted anywhere in the world. The buses will be operated in cities with different climatic conditions and topographical extremes. Exchange of experiences including bus operation under differing conditions among the numerous participating companies will increase the knowledge on hydrogen and its use in transport systems. The design, construction and operation of the necessary infrastructure for hydrogen production, including the required refuelling stations, is a challenge in itself as so far only one fuelling facility exists in Europe. The collection of findings concerning the construction and operating behaviour of hydrogen production facilities for fuel cell buses will enable the future use of hydrogen in mobile applications. A wide range of pathways will be explored to produce hydrogen as a transport fuel, allowing the comparison of different methods of hydrogen production for fuelling systems. The technical and economic risk particularly lies in the use of this technology under day-to-day operating conditions, as no operational experience is available.

Technical targets

Neither the fuel cell technology nor the high-pressure filling station technologies for hydrogen are available in series production. Thus the technical targets refer to: operating fuel cell driven buses in regular service conditions for two years, operating decentralised hydrogen production facilities, getting experience in the

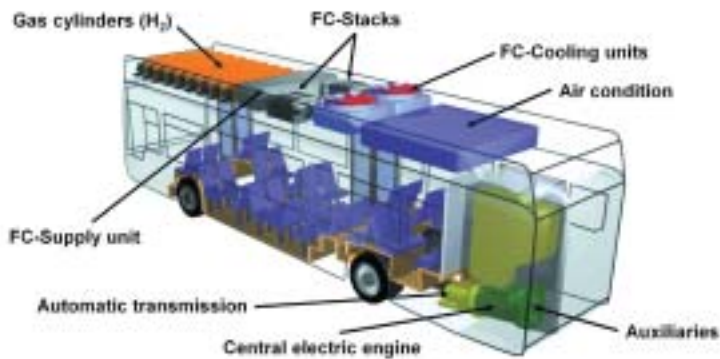
operation of novel small scale hydrogen steam reformers and developing a 350 bar hydrogen technology for both filling station and hydrogen gas cylinders onboard.

Project structure

CUTE is organised as a “horizontal” and “vertical” cross-linked project group including 28 partners. In every city (Amsterdam, Barcelona, Hamburg, London, Luxembourg, Madrid, Porto, Stockholm and Stuttgart) a specific project group addresses the different topics (hydrogen production, hydrogen filling station, certification and homologation, operation of the buses, project management etc). The city specific organisation is vertically structured. The buses are produced by EvoBus GmbH in Germany. The bus operators in the participating cities are building the filling stations for gaseous hydrogen. Fuel producers are participating in the creation of the hydrogen infrastructure and some of these will subsequently operate the filling stations to gain experience with alternative fuels. Hydrogen is being produced through different methods in order to provide data for an efficiency comparison. A Fuel Cell Bus Club (FCBC) was founded by the CUTE & ECTOS (Ecological City Transport System) members in March 2001 to display the strong commitment of its members to support mobile fuel cell technology by developing and demonstrating an emission-free and low-noise transport system. The vision of the FCBC is to implement in the longer-term sustainable transport solutions based on renewable fuels.

Objectives

Due to the gradual shortage and consequent increase in the cost of fossil fuel resources expected in the coming decades, it is necessary to encourage technical developments for the timely realisation of innovative and highly efficient energy systems based on regenerative/renewable resources. The aim of CUTE (Clean Urban Transport for Europe) is to develop and demonstrate a zero-emission transport system, including the accompanying energy infrastructure. The operability of a hydrogen based mobility technology will be demonstrated in 9 European cities by running 27 fuel cell powered buses in regular service for 2 years combining a number of novel systems for H₂-production, storage and supply. The outcome of the project will support the public and commercial acceptance of a hydrogen fuel cell transport system, a secure energy supply, reduced overall CO₂, NO_x, SO₂ and PM emissions, improved health and living conditions in cities and better quality of life. It will strengthen European industry and greatly contribute to the Kyoto commitments.



Picture map of Europe and bus company logos.

Expected impact and exploitation

These 27 trial fuel cell buses will enable the cities to demonstrate that hydrogen is an efficient and environmentally friendly fuel for the future urban traffic in European cities. The buses, running on mainly locally produced and refilled hydrogen, should prove that emission-free and low-noise transport is possible today when ambitious political targets and innovative technology are combined. One of the key outcomes will be to assess and validate – in real market operation conditions – the efficiency of hydrogen production costs, and the life cycle assessment of fuel cell driven buses. Additionally a new filling technology with advanced pressure will be developed in order to fulfil a range of requirements by transport companies. The project addresses technical safety aspects (tests for the buses, filling station in city centres, production facilities close to cities, storage tanks, etc.) as well as social aspects. The CUTE project aims at creating public awareness, better public understanding and therefore acceptance of the hydrogen technology.

Progress to date

The hydrogen infrastructure and the bus maintenance facilities are being set up at all nine participating cities in order to be ready to refill and accommodate the three FC buses at each location. The first fuel cell bus will be delivered at the UITP conference in Madrid on 5th May 2003 and the other 27 buses will be delivered to the cities before the end of 2003. A general information brochure has been published and an infrastructure brochure will be made available by June 2003. Some technical information on the certification of the infrastructure and of the buses will be made available during the next months. A Web-Site (<http://www.fuel-cell-bus-club.com>) is up and running with information on the CUTE project and further information on hydrogen and other fuel cell/hydrogen related projects.

INFORMATION

References: NNE5-2000-113

Programme:
FP5 - Energy, Environment and Sustainable Development

Title:
The Largest Fuel Cell Bus Fleet Trial Worldwide (CUTE)

Duration: 5 years

Partners:
Large consortium led by EvoBus, involving transport operators, hydrogen infrastructures and fuel cell developers, universities and city authorities.

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