

TRANSPORT FOR LONDON

SURFACE TRANSPORT PANEL

SUBJECT: UPDATE ON HYDROGEN BUS PROGRAMME

DATE: 11 MAY 2011

1 PURPOSE AND DECISION REQUIRED

- 1.1 This paper updates the Panel on the Hydrogen Bus Programme.
- 1.2 The Panel is asked to note the paper.

2 BACKGROUND

- 2.1 The Mayor is committed to the development of a sustainable London. Reducing the environmental impact of the bus fleet is key to the success of the Mayor's vision and the introduction of cleaner fuels and technologies into the fleet will play a significant role in achieving this objective.
- 2.2 London Buses began taking steps to reduce emissions from the bus fleet in 1998, primarily through the introduction of an enhanced fleet replacement programme which replaced the oldest and therefore most polluting vehicles with new models which met the latest engine emission standards. Further reductions were achieved through the fitting of particulate filters to all buses by 2005, which reduced exhaust emissions of particulates, carbon monoxide and hydrocarbons by 90 per cent. Emissions of local air pollutants from the bus fleet have as a result been reduced considerably in the last decade and now the focus going forward is to reduce emissions of CO₂ as this is not a regulated pollutant and needs to be addressed through other measures.
- 2.3 London Buses' short to medium term strategy is to focus on the deployment of hybrid buses, which deliver a 30 per cent reduction in CO₂ emissions compared to diesel, in addition to lower emissions of local air pollutants and noise. There are currently 106 hybrids in operation, and a further 90 buses are due to enter the fleet by December 2011. The target is to have 300 buses in service by the end of 2012.
- 2.4 Hydrogen powered vehicles offer a potential to deliver long term zero emission transport, reducing the impact on climate change with the additional benefits of improved air quality and reduced levels of ambient noise. A fundamental step towards this objective is the Surface Transport led procurement, delivery and operation of a hydrogen-powered fuel cell bus fleet. Buses operated in this project will generate no local PM₁₀, NO_x or CO₂ emissions.
- 2.5 There are currently no pure electric buses on the market which can offer the operating range required for a London environment, although the technology is developing rapidly, especially in China. London Buses is monitoring

developments in this sector.

- 2.6 Reaching the point where hydrogen vehicles are a commercial reality requires investment in moving the hydrogen technology from the current early stage of development to commercial viability. This project is a major step in the achievement of this objective, enabling the technology to move forward by demonstrating viability of hybrid hydrogen buses under standard operating conditions and duty cycles.
- 2.7 The projects builds upon London Buses' previous involvement in the Clean Urban Transport for Europe (CUTE) trial where three fuel cell buses operated in London from 2004-2007 for 8-10 hours per day. The new project will deliver the latest generation of hydrogen buses which incorporate hybrid technology.
- 2.8 The new vehicles aim to demonstrate a near doubling of fuel efficiency compared with the CUTE trial, due to the hybridisation and technology improvement. This will enable the buses to run a full 20 hour operational day and assess their ability to operate in a commercial environment.
- 2.9 This project is part funded by the European Union as part of the Clean Hydrogen in Cities programme. London Buses is working in collaboration with other transport authorities around the world to gain experience of hydrogen powered buses and infrastructure.

3 PROGRESS UPDATE

- 3.1 Contracts for the vehicle manufacture and refuelling facility were awarded in November 2007 and March 2008 respectively.
- 3.2 Planning permission was awarded by the Olympic Delivery Authority in October 2009 for the construction of a new hydrogen bus workshop and hydrogen refuelling station in Leyton.
- 3.3 In October 2010, the first hydrogen hybrid bus was delivered to London and certified for UK bus operations and in November 2010, Kit Malthouse (Deputy Mayor) unveiled the new hydrogen workshop and refuelling station. The first vehicle entered service in January 2011.
- 3.4 By March 2011, five hydrogen hybrid fuel cell buses were in service on the RV1 route in Central London. Initial performance is promising with fuel performance and reliability currently exceeding expectations.

4 NEXT STEPS

- 4.1 London Buses will monitor the performance of the five hydrogen buses, making the data available to the public.
- 4.2 London Buses will deliver a further three vehicles by the end of 2011. This will bring the total number of hydrogen buses to eight, which is enough to meet the peak vehicle requirement for the RV1 route. An entire London bus route will then be operated using hydrogen powered vehicles.

5 RECOMMENDATION

5.1 The Panel is asked to NOTE the paper.

6 CONTACT

6.1 Contact: Mike Weston, Operations Director, Surface Transport
Number: 020 3054 0231
Email: mike.weston@tfl.gov.uk