

**BWG-P-06-11**

**Opportunities and barriers to the market introduction of low carbon buses**

*This paper is an expansion on paper BWG-P-05-18 presented to the Bus Working Group in December 2005. The paper is provided for information and comment in relation to the discussion of paper BWG-P-06-09 on the route map.*

**Market Barriers**

**General**

- There is little commercial incentive for public service bus operators to move away from a well established market for diesel-fuelled, technology to one that invests significantly in more energy efficient bus technology, alternative fuels and infrastructure.
- Limited UK market opportunity for significant economies of scale for new, more energy efficient technologies and infrastructure investment due to size of market and unique market requirements.
- Market expectations for hydrogen fuel-cell technology are both speculative and long term. The development of supportive, energy-efficient drivelines needs however to be the focus of investment now.
- Alternative fuels are technically available but not in a commercially viable manner. (Example of cost differentials is to be attached) Their technical and operational impact is unproven.
- Market investment in alternative fuel infrastructures is immature, costly and insufficiently incentivised to create the necessary market pull for greater market penetration. Economies of scale are limited due to low demand and limited incentives.
- UK-wide, ridership of buses is in decline, notwithstanding BSOG, local and rural fiscal incentives.
- Strong local partnerships are also required to introduce new technologies and political commitment and whilst there are some flagships examples of success, these are generally proving hard to galvanise due either to low, local bargaining capability or leadership by all potential partners.
- Local transport authorities also tend to consider the Government to be the leader on initiatives for energy efficiency and lower greenhouse gases.
- In the current environment, there is little encouragement for innovation and to pioneer new technology and be seen to be 'getting ahead' of the competition.
- Significant change in commercial technology and infrastructure investment is to be expected to have a long-leadtime. The change to low carbon bus technology is one such example.

**Opportunities and Recommendations**

- Available, more energy efficient technologies should be trialled in the market to establish both the commercial case and policy requirements for significant market transformation.

- Undertake concerted action to stimulate the European Market for energy efficient buses
- Research and development of electric driveline technology should be independent of fuel cell technology to deliver ever more efficient and commercially viable technologies that will better meet future, energy efficient fuelling systems.
- Continued financing from public funds is needed to encourage investment and increased market penetration. Encourage exchange between as many transport modes as possible at interchanges in order to encourage use of public transport.
- Extend the range of public transport and reduce end-of-journey distances to less than those of a car.
- Address the decline of ridership and in particular, that outside of London.
- The bus market has proven itself capable of the rapid change where it is either required to or it is commercially expedient to do so. This is a relatively unexploited opportunity.
- Incentivise or better empower local transport authorities to negotiate local partnerships with operators that focus on more energy-efficient technologies. Encourage other bodies with current empowerment to be more proactive and joined up in approach (e.g. Road Traffic Commissioners).

### **Market Cost Barriers**

- First it should be recognised that the cost of development of new technology is considerable. This is reflected in the capital investment required to purchase a bus with up to 70% on-costs for more efficient vehicles
- Whole life costs of new technology are generally unknown. Any available data is limited and not widely circulated.
- Infrastructure investment is significant whilst the commercial benefit is at best uncertain and at worst, does not meet industry expectations.
- There are additional training and implementation costs.
- The costs of change are not directed to and borne equitably by all those who are both responsible for and benefit from change. Costs are instead expected to be borne largely by commercial operators. Costs cannot be passed on to customers without significant impact on service provision.
- Examples of typical on-costs and likely scale up to meet commercialisation are to be attached by LowCVP)

### **Fiscal and policy measures Barriers**

- Strategy and policy objectives, along with commitment to fiscal incentives are short-term and lack clear linkages.
- The main mechanism for stimulating change has been grant programmes. These have been subject to constant change and are currently limited in support. Delays to programme availability has as much of a negative effect as the absence of programmes.
- BSOG (introduced to increase public bus service ridership) has had a distorting effect since by providing a significant rebate on fuel costs, it rewards mileage covered by operators rather than either passenger kilometres served

or the adoption of more energy efficient technology and fuels. Although rebates are available across a number of fuel types, given the dominance of diesel technology in the market place, it acts as a barrier to the adoption of more energy efficient technologies, including those that still use diesel such as hybrids. The on-cost or operating differentials of immature technologies or alternative fuels in the market.

- A host of central and local government bodies, as well as other bodies are involved in a range of related strategies and policy implementation around transport. These do not appear to be joined up either in thinking or action. Linkages with European policy and initiatives also appears to be absent whereas the challenges and opportunity for future solutions are European-wide.

### **Opportunities and Recommendations**

- To stimulate a significant increase in market investment in more efficient technologies, simple, focused, long-term strategy and policy initiatives are required, supported in the short-term by public funding. Strategy also needs to be supported by focussed and co-ordinated policy initiatives that are either directly linked or mutually supportive. Commitment periods should match those of other European countries such as GermanyXXXXX , SwedenXXX or the USAXXXXX
- Fiscal incentives should be both technology and fuel neutral and incentivise the most energy-efficient transport of passengers. This would also be mutually supportive of policies to encourage modal shifts in transport.
- Continued public funding through grants is required to pump-prime the market to adopt new more energy efficient technologies and fuels through demonstrations and commercial development.

### **Technology Barriers**

- Generally unproven;
  - Immature market knowledge of alternative technologies and alternative fuels. Market experience that exists is at best mixed, highlighting the immaturity of development, lack of demonstration and development, low level of commercialisation, uncertain economies of scale.
  - Operational reliability needs to meet that of established diesel technology whereas current more energy-efficient technologies are only at trial demonstration level and operational performance reflects this fact. The upside is that future development is more clearly defined but the investment that it requires is not attractive to either manufacturer or operator.
  - Trial demonstrations are critical to development of new technology and greater market awareness and acceptance. There is little incentive for trials in the UK. and the primary driver is that conventional operating requirements set performance standards.
  - Trial demonstrations have to date, indicated that market expectations as to energy efficiency are not met by real world operation. The latter

is part of the commercial case for adoption but this is subject to route application and driver/operator operation.

- New operational needs – additional or unique technical/maintenance and in-service requirements of new technology is unknown. This could also include health and safety considerations.
- A large number of increased energy-efficient technologies are now available or could be in relatively short order but are not being fully exploited in either trials or in development. This not only includes new powertrain solutions but also advanced conventional technology or ‘bolt-on’ technology that could increase the efficiency of buses. There is not at present, a ‘one technology’ solution for future mass adoption and future technological requirements may be more mixed than at present. This range of potential options and future market solutions is therefore an opportunity missed.

### **Opportunities and recommendations**

- A wide range of technologies are available. The UK is strong in the field of expertise in transport research and development, particularly in lower carbon technology. The gap to close remains the learning, proving and further development of technologies that could lead to commercialisation and broader market adoption. Significant trials of demonstration technologies are needed to achieve this, aided by public funding to unlock this potential. To this end, the range of technological and alternative fuel solutions should also be better exploited as part of any demonstration activity.
- Technology and fuel neutral policy and fiscal measures should assist with both demonstrations and future commitment for adoption.
- Opportunities should be explored for both development and demonstration to be opened to the wider European market. Greater and more rapid learning, as well as economies of scale are more likely to occur. This will also assist with focussing policy initiatives and the roles of all respective players.

### **Other barriers**

- Myles Mackie’s paper on the roles of local authorities in the adoption of low carbon buses details the challenges to local transport planners but also some of the possible solutions. The role of local quality contracts and partnerships are covered at length. Strong local commitment is the cornerstone for locally successful initiatives. The single biggest barrier to more trials and adoption of low carbon buses is economic and local political will is essential to help all local parties overcome it. Local authorities and other transport related bodies need to be better mobilised to play their part.
- Government targets for low carbon buses have proven to be ineffectual. The targets have lacked a workable implementation plan, supported by the full buy-in of all interested parties.

### **Other opportunities and recommendations**

- A commitment from Government to clear targets on energy efficiency and policy initiatives. The Governments currently stated target for buses is well

known and did stimulate a lot of positive activity around technology development and opportunities for trial demonstrations. Clear commitment will stimulate the opportunity for change in the market place, so long as that commitment is both constant and targets that are achievable. Correct target-setting remains a fundamental step for initiating change.

- The development of improved and cleaner, low carbon public transport systems, of which public bus services are an important part, remains an important goal with strategic implications for modal shift, road traffic management and in particular, congestion management. Cleaner, low carbon bus services will continue to provide a significant alternative to the use of a car. (Find an example) There is some evidence that the public will also choose to support local initiatives which aim to reduce the impact of local services on the local environment. (Find example) The interest of local authorities in purchasing low carbon buses is also evidence of this.
- The London Olympics provides a great opportunity to demonstrate both the benefits and commercial viability of more energy efficient bus technology, as do local low emissions zones. A number of technologies can deliver both lower carbon and regulated air emissions.

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