

## Review of cost effectiveness of cleaner fuels and vehicles grant programmes

At the beginning of this year the DfT undertook a review of the grant programmes for cleaner fuels and vehicles developed by the Energy Saving Trust, which at that time were awaiting state aid approval from the European Commission. This was summarised in an internal DfT paper entitled “Cleaner Fuels and Vehicles Grant Programmes” written in February 2006. The programmes reviewed were:

- Air Quality Retrofit programme
- Enhanced Environmental Vehicle programme
- Low Carbon Bus programme
- Low Carbon Car programme
- Infrastructure programme
- Low Carbon Research and Development programme

The report draws the conclusion that four of the six programmes (Air Quality Retrofit, Enhanced Environmental Vehicle, Low Carbon Bus and Low Carbon Car) are not cost effective. The infrastructure programme, which assists in developing refuelling infrastructure for alternative fuelled vehicles, is considered worth supporting because it tackles a recognised barrier to market transformation. The Low Carbon R&D programme is worth supporting because it has a significant impact on raising interest from vehicle manufacturers in new technologies.

In coming to this conclusion the cost effectiveness of each programme was assessed using a benefit-cost ratio (BCR). The BCR is calculated by comparing the lifetime resource costs (including monetising carbon and NO<sub>x</sub> emissions, and changes in utility) of a low emission vehicle compared to a normal or base case vehicle. The difference between the two is the net benefit (or cost) of the low carbon vehicle to society. The BCR is the ratio of the societal benefit over the cost to the exchequer i.e. grant paid. A range of BCRs were calculated for each programme where appropriate, based upon the range of technologies which might benefit from the grant. The table below shows the highest and lowest BCR based upon a range of measures considered for each programme. An acceptable BCR would be greater than 1.2.

Measure	High BCR	Low BCR
Air quality retrofit	4.1	-4.0
Enhanced environmental vehicle	5.39	-8.58
Low carbon bus	-0.68	-0.91
Low carbon car	-1.2	-1.41
Infrastructure	NA	NA
Low carbon R&D	NA	NA

The report also uses cost effectiveness to compare the programmes with other measures proposed through the Climate Change Programme Review.

Measure	£/tonne carbon
Low Carbon Car	£661
Low Carbon Bus	£930
Biofuels 5% by 2010 (RTFO)	£173
Future VA	£581
Sustainable distribution	-£137
Smarter choices	-£1983
F-Gas	£121

The conclusions of the report are based upon the following assumptions or assertions:

1. The EEV and Air Quality programmes were considered unlikely to result in market transformation. As a consequence the benefits of the EEV and the Air Quality Retrofit programmes were considered to be limited to the emissions reduction achieved from the vehicles to be grant funded only, whereas market transformation effects could be taken into account for the other programmes.
2. Although the Low Carbon Bus and Low Carbon Car programmes are considered by the report to be potentially capable of market transformation, no market transformation effects are taken into account in the report. The report states “these impacts have been excluded from the BCR analysis since they are difficult to quantify” (ref para 35). Market transformation effects are, by their nature, uncertain but they can be very large in terms of emission reductions and reduce resource costs through economies of scale. These effects could have been incorporated simply using a high and low range as was done for measures in the calculation.
3. The paper asserts that to be sustainable low carbon cars would require a market share of 2% (ref para 13 and 27). It is not apparent why this should be necessary as: low carbon cars need not be a distinct technology and may share economies of scale with other sectors, while innovators, which account for 2.5% of car buyers, are often prepared to pay a price premium and so not all would require grants in order to purchase. Therefore, the Low Carbon Car programme need not necessarily be expanded to £41m p.a. and could have played a market transformation role with a budget of £7m p.a. as originally proposed.
4. The report asserts that the Low Carbon Bus programme is “limited primarily by the contradictory incentive towards diesel that is provided through the Bus Service Operators Grant” (ref para 15). While the structure of BSOG clearly does not assist, it is not necessarily the case that a market could not develop for low carbon buses, particularly in London or on local authority contracts outside London, such as park and ride schemes.
5. The forecast cost of fuel in the BCR is predicted to fall for three years and then remain stable for the remainder of the period, which is to 2018 or 2020 depending on the programme. It is not apparent why this fuel price is used, the Energy Review has forecast oil prices ranging from \$45 to \$72 per barrel

6. by 2020. A rising fuel price would have the effect of making the low carbon bus and car programmes relatively more cost effective as measured by the BCR.
7. Finally, the report values carbon at between £90 and £100 per tonne, which initially appears reasonable. However, this values the carbon saved from using a low carbon car at £133 over the life of the vehicle which is small compared to the price differential and loss of utility assumed in the report. An appropriate value of carbon would be the value at which serious climate change is avoided, which might be considerably higher than £90/t.

Had a different set of assumptions been applied, particularly taking into account market transformation effects, the study may have concluded that the Low Carbon Bus and Car programmes were cost effective.