

## Vehicle Capital Grants

### Introduction

This record of evidence forms part of the work undertaken by UKERC's Technology and Policy Assessment team relating to its project on policy strategy for carbon emissions reduction in the passenger transport sector. The material was produced alongside the project's main report and since it supports that report, it was judged appropriate to make this material available to a wider audience. The main report itself '*What Policies are Effective at Reducing Carbon Emissions from Surface Passenger Transport?*', and the supporting evidence can be found at:

<http://www.ukerc.ac.uk/ResearchProgrammes/TechnologyandPolicyAssessment/TPAProjects.aspx>

### Explanation of Content

Evidence on this policy measure has been collected by the TPA team on the basis that it has, or may have, the potential to result in carbon dioxide emissions reductions in the passenger transport sector. This evidence document begins with a summarised description of the policy measure. The evidence itself follows the summary and is presented in table form.

Each piece of evidence has been assigned a separate row and tabulated using four columns:

- Year of publication, arranged chronologically, beginning with the most recent year
- Name of author, including where applicable additional cited authors (and year); and a Reference ID number.
- Type of evidence:
  - Evidence containing quantitative information is denoted by the letter 'Q'
  - Qualitative evidence is denoted by the letter 'C' for 'comment'
- The evidence itself

The evidence was originally gathered and assessed using several sub-headings. The purpose of this was primarily internal i.e. to facilitate the handling of evidence and the production of the main report. These sub-headings have been retained here as follows:

- Policy Measures and Carbon Savings
- Other potential CO<sub>2</sub> Impacts i.e. outside of the immediate policy influence
- Other Benefits e.g. air quality improvement or traffic congestion reduction
- Policy Costs and/or Revenues i.e. to local or national government
- Business and Consumer Costs
- Unintended Consequences e.g. rebound effect
- Reasons/Arguments for Carbon Savings Achievement or Failure
- Policy Suitability for the UK

A list of references follows the evidence tables. Note that the Reference ID numbers are allocated by Reference Manager, the referencing software used by the TPA team.

Any charts, figures and tables referenced in the evidence are not reproduced here but can be found in the original publication or evidence material.

Where no relevant evidence was found for a particular sub-heading, this has been noted.

## Policy Description

The evidence recorded here covers grants towards the purchase price of a lower carbon or reduced emissions vehicles. Past examples include:

- PowerShift – UK capital grants to put towards the additional cost of buying a clean vehicle or converting an existing vehicle to run on cleaner fuels. Used for new vehicles running on LPG, NG, and electric & hybrid vehicles.
- CleanUp – UK grants towards emission reduction technologies such as particulate filters on exhausts. Available to commercial and public sector diesel vehicles.
- Hybrid Tax Credit (US Energy Policy Act 2005) – tax credit for the purchase of a new hybrid petrol-electric or diesel-electric vehicle.

## Evidence Tables

### Carbon Savings and Policy Measures

Year	Author	Type	Evidence
2005	CFIT (ref 11280) citing House of Commons Transport Committee, 2004	Q	TransportEnergy programmes (i.e. PowerShift + CleanUp) have saved 34,210 tonnes of CO <sub>2</sub> emissions in the last two years (citing House of Commons Transport Committee 2004 Cars of the Future 17th Report of Sessions 2003-04).
2005	CFIT (ref 11280)	Q	The PowerShift programme has funded 17,000 vehicles.
2004	LowCVP (ref 11334)	C	The Clean Up Programme was generally considered by LowCVP members to be inefficient at reducing CO <sub>2</sub> emissions from the transport sector. This is because it is aimed at NO <sub>x</sub> and particulate emissions and yields only minor improvements to existing relatively clean stock or old stock that will soon be replaced.
2003	EST (ref 11333)	C	EST (2003) gives a detailed description of UK grant programmes.

### Other CO<sub>2</sub> Impacts

Year	Author	Type	Evidence
			No specific evidence found.

### Other Benefits

Year	Author	Type	Evidence
			No specific evidence found.

### Policy Costs and/or Revenues

Year	Author	Type	Evidence
2007	US GAO (ref 11191)	C	Experts noted that performance based credits (e.g. based on vehicle fuel economy) would be more economically efficient than those that are technology-based (e.g. hybrid vehicle tax credit).
2007	Anable & Bristow (ref 12297) citing DoT, 2006h	Q	CleanUp and PowerShift CO <sub>2</sub> abatement cost is estimated to be £661/t CO <sub>2</sub> (citing Department for Transport, 2006h).
2005	CFIT (ref 11280)	Q	CFIT (2005) shows 2003/04 CleanUp and PowerShift Autogas+ government funding costs of £26.3m combined. In 2004/05, the PowerShift programme budget was £7.5m. In 2005/06, the combined budget was £24m.

### Business and Consumer Costs

Year	Author	Type	Evidence
2007	US GAO (ref 11191)	Q	US tax credits for hybrid vehicle purchase range from \$250 to \$3,400, depending on the fuel economy of the model; and the credit is phased out once a manufacturer has sold 60,000 vehicles. The 60,000 vehicle limit was intended to prevent tax credits from accruing excessively to foreign hybrid manufacturers.

### Unintended Consequences

Year	Author	Type	Evidence
			No specific evidence found.

### Reasons/Arguments for Carbon Reduction Achievement and/or Failure

Year	Author	Type	Evidence
2005	CFIT (ref 11280) citing House of Commons Transport Committee, 2004	C	The role of the Powershift and CleanUp grants is not to effect mass change in the car fleet but they can help to encourage new technologies by pump priming new types of vehicles to help them break into what is essentially a very conservative market. The real 'heavy lifting' is then done by the Treasury through other fiscal incentives (citing House of Commons Transport Committee 2004 Cars of the Future 17th Report of Sessions 2003-04)
2004	LowCVP (ref 11334)	C	Encouraging the purchase of small, clean conventional-engine vehicles can be achieved more effectively through differential in VED and fuel duty or through other market transformation activities (such as supporting R&D or demonstration fleets) than by a new Low Emissions Grant programme, according to LowCVP opinion.
2004	LowCVP (ref 11334)	C	Small, clean, diesel mini and supermini vehicles that are eligible for grants are currently being sold in significant

Year	Author	Type	Evidence
			numbers without grant support.
2004	LowCVP (ref 11334)	Q	In 2003, 36 cars with less than 100gCO <sub>2</sub> /km were sold and 6,800 cars with tailpipe CO <sub>2</sub> emissions of less than 120 gCO <sub>2</sub> /km. A £7 million budget with a fixed grant of £1000 per car would provide sufficient resources to grant support each of these vehicles representing about 0.3% of new vehicle sales. Subsidising clean vehicle sales on this scale is unlikely to make much contribution to promoting clean vehicle technologies or sales.
2004	LowCVP (ref 11334)	C	Most LowCVP members consider that for alternative fuels, fuel duty differentials provide a better incentive and specific schemes to promote fuel switching should not be supported through a grant.
2004	LowCVP (ref 11334)	C	To maximise the effectiveness of Vehicle Capital Grants: <ul style="list-style-type: none"> <li>• A Low Emissions Grant Programme must complement voluntary agreements between EC, ACEA, JAMA and KAMA.</li> <li>• For conventional petrol or diesel powered engines, qualification for grants should be principally on the improvement in g/km CO<sub>2</sub> emission performance of the vehicle employing the technology.</li> <li>• For electric or other alternative fuelled vehicles well to wheel emissions must be used – but the vehicle should demonstrate innovation in addition to low emissions.</li> <li>• Fuel switching should not be supported through vehicle capital grants as fuel duty differentials provide a better incentive.</li> <li>• Schemes must be sufficiently resourced, administratively simple, and must be structured in a way to ensure that suppliers can have certainty over grant availability for a set period of time. E.g. the stop-start nature of the Powershift programme significantly undermined manufacturers' confidence in the scheme. Consequently, few companies are willing to take account of grant availability in decisions regarding supply or demand for clean vehicles, significantly undermining the effectiveness and credibility of the scheme.</li> </ul>
2003	Leiby (ref 3086)	C	HEVs advantages over AFVs in sidestepping transitional economic barriers may allow targeted policies to be more effective in spurring the hybrid market despite low global oil prices that effectively prevent AFVs from significant market penetration. <ul style="list-style-type: none"> <li>• Off-grid HEVs (e.g. Prius) derive all of their energy from gasoline and generate electricity on board, avoiding the fuel-compatibility issues of AFVs.</li> <li>• HEVs may achieve cost reductions from economies of production scale more easily than AFVs because the sharing of generic components (e.g. batteries, electric motors and controllers) across vehicle platforms leads to rapidly declining incremental costs</li> </ul>

Year	Author	Type	Evidence
2003	Leiby (ref 3086)	C	<p>Hybrid subsidies on the order of \$2,000/vehicle can induce substantial hybrid penetration and gasoline demand displacement under EIA's 2001 oil price projections.</p> <p>HEV subsidies are far more effective than AFV subsidies because of the huge infrastructural needs of AFVs. Leiby's model showed the HEVs sold would be primarily of the mild hybrid type: 42-V systems that achieve modest fuel-efficiency gains (&lt;15%) with greater cost-effectiveness than more extensive hybrid designs.</p> <p>Temporary HEV subsidies are effective at inducing hybrid vehicle penetration but do not have long-term effects after they are removed unless there are cost reductions due to LBD (Learning-By-Doing). With LBD, a sufficiently high temporary subsidy can be effective in assisting hybrid vehicles to overcome transitional barriers and to become self-sustaining in a competitive market.</p>
2000	Langer (ref 11242)	C	<p>The uptake of hybrid vehicle, promoted by tax deductions, has been limited by the limited tax liability of fleets and dealers to fleets: "Hybrid vehicles qualify for a federal tax deduction of up to \$2000 as "Clean-Fuel Vehicles," but many fleets would be unable to take advantage of this deduction due to their limited tax liability. A bill has been introduced in Congress that provides federal tax credits for efficient, advanced technology vehicles, including up to \$4000 for hybrids and \$8000 for fuel cell vehicles. Fleet vehicles would be eligible for these tax incentives. In the case of a non-taxpaying entity, the proposed tax credit would accrue to the dealer, who would be required to disclose the existence of the credit to the buyer. This approach is somewhat problematic, in that dealers may not have sufficient tax liability to take full advantage of the credits, and those credits that are received will not automatically be passed on to the buyers."</p>

### Policy suitability for UK

Year	Author	Type	Evidence
			No specific evidence found.

### References

Anable, J. & Bristow, A. L. 2007 – 12297 – *Transport and Climate Change: Supporting document to the CfIT report*, Commission for Integrated Transport.

Commission for Integrated Transport 2005 – 11280 – *Transport and Climate Change: CfIT Response to DEFRA Consultation*.

Energy Saving Trust 2003 – 11333 – *Road fuel gases and their contribution to clean low-carbon transport*, Energy Saving Trust, London.

Langer, T. & Williams, D. 2002 – 11242 - *Greener Fleets - Fuel Economy Progress and Prospects*, American Council for an Energy-Efficient Economy, Washington, D.C..

Leiby, P. N. & Rubin, J. 2003 – 3086 – *Transitions in light-duty vehicle transportation - Alternative-fuel and hybrid vehicles and learning*, Energy, Air Quality, and Fuels 2003 no. 1842, pp. 127-134.

LowCVP 2004 – 11334 – *LowCVP response to the TransportEnergy Clean Vehicle Grant Programme Consultation*, Low Carbon Vehicle Partnership, London.

U.S. GAO (Government Accountability Office) 2007 – 11191 - *Vehicle Fuel Economy: Reforming Fuel Economy Standards Could Help Reduce Oil Consumption by Cars and Light Trucks, and Other Options Could Complement These Standards*, U.S. Government Accountability Office.