

Vehicle Procurement

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 CO₂ 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 vehicle procurement policies which specify the vehicle type, fuel efficiency or emissions of fleets of vehicles purchased by organisations (whether private or local/national government).

The relevance of (especially public) procurement to emissions abatement is that through substantial buying power it may be possible to establish a market which is able to absorb the initially higher costs of new lower carbon vehicle technologies. This may facilitate the expansion necessary to obtain the economies of scale required to reduce overall costs.

Evidence Tables

Carbon Savings and Policy Measures

Year	Author	Type	Evidence
2007	Haller (ref 5611)	Q	Haller (2007) in Table 3 reports results from the FPDDC's AFV investment (in terms of VMT for each type of vehicle not CO2 savings).
2006	Smokers (ref 11268)	C	"The principle behind the use of public procurement is that through the large collective buying power of the public sector it could be possible to establish a market which is able to absorb the initially higher costs of new technologies. Manufacturers can then scale up production in this market segment and obtain sufficient economies of scale to reduce the overall costs of more fuel efficient vehicles. The benefits of this are then passed on to all consumers, thereby making the more fuel efficient vehicles more competitive in terms of cost compared to conventional vehicles; the result is that there is increased take-up of new, more fuel efficient vehicles."
2006	Smokers (ref 11268); and citing SEC, 2005	C	Public procurement accounts for less than 1% of the total annual passenger car market. In the light vehicle sector, public procurements do not represent a sufficient share to stimulate the market. Notwithstanding the above, "public procurement could have a role to play in market development, i.e. ensuring a market for new post-demonstration technologies to help them to become fully commercial, which is otherwise often a 'gap area' in market transformation policy packages." (citing an Impact Assessment (SEC, 2005) for a proposed EU Directive on the promotion of clean road transport vehicles).
2002	Langer (ref 11242)	C	The US Energy Policy Act of 1992 (EPA Act) mandating purchase of increasing percentages of alternative fuel vehicles in federal, state, and alternative fuel provider fleets are leading to acquisition of a significant number of alternative fuel vehicles, though not in numbers sufficient to meet the requirements of the act. Moreover, fleets covered by the EPA Act are only a small fraction of all fleets.
1996	Hui (ref 8428)	Q	It is estimated that about 241,000 state LDVs (including automobiles, light trucks and vans) may be covered under

Year	Author	Type	Evidence
			the EPACT Section 507(o) mandate . These vehicles amount to 46 percent of the entire state government vehicle stock in 1994 and consume 757 million liters (200 million gallons) of fuel per year (see Table 3). Cars account for 58 percent of the total "covered" vehicle stock and 45 percent of the total fuel consumed by the "covered" vehicles (see Table 2).

Other CO2 Impacts

Year	Author	Type	Evidence
			No specific evidence found.

Other Benefits

Year	Author	Type	Evidence
2007	Haller (ref 5611)	C	Reductions of other pollutant emissions from vehicles e.g. VOCs.
2006	Smokers (ref 11268)	C	Air quality benefits, increase in vehicle choice for the consumer, increased demand for qualified engineers and workers, improvement to the security of energy supply, with the potential to diversify away from oil-derived fuel technologies.

Policy Costs and/or Revenues

Year	Author	Type	Evidence
2007	Haller (ref 5611)	Q	Re FPDDC: Assuming 100% use of alternative fuel, despite an expected \$1.8 million investment in vehicle, infrastructure, consulting and training, the Forest Preserve District Dupage County would realize returns from grants, rebates, emission reduction credits, reduced fuel and maintenance. However, many of these did not materialise, AFVs cost 15% more than expected, and CNG refuelling cost twice that expected. At the half way point of the scheme, 71 light duty AFVs had been purchased, at a total cost (including all set up costs, and grants) of \$2775 per AFV versus 2399 projected.
2007	Haller (ref 5611)	Q	While the FPDDC spent \$93,587 less on fuel than they would have without alternative fuels, this amount represents only 16% of the expected baseline savings \$672,240 (see Table 3).

Business and Consumer Costs

Year	Author	Type	Evidence
2006	Smokers (ref 11268) citing SEC, 2005	C	Public procurement of lower carbon vehicles should have no direct impacts on the consumer, as the costs are borne by the relevant public authority. In fact, the cost to consumers and businesses of new fuel efficient vehicles should reduce as a

Year	Author	Type	Evidence
			<p>result of economies of scale, and increased levels of investment in the technology could allow the potential expansion in the fleet range offered (citing SEC, 2005).</p> <p>Public procurement funding, however, may be raised at the expense of other public service investment, so consumers and business may be indirectly affected.</p>
2002	Langer (ref 11242)	C	Cost and infrastructure issues have prevented alternative fuel vehicles from gaining a foothold in the general market, and even from claiming a major share of the fleet market.

Unintended Consequences

Year	Author	Type	Evidence
			No specific evidence found.

Reasons/Arguments for Carbon Reduction Achievement and/or Failure

Year	Author	Type	Evidence
2007	Haller (ref 5611)	Q	The Illinois procurement policy was supported by a tax deduction of 80% of vehicle capex (up to \$4000) (Haller 2007), but suffered from a lack of income from other grants.
2007	Haller (ref 5611)	Q	FPDDC achieved target for number of AFVs purchased, but conventional fuels were actually used more than alternative fuels. Cheaper, slow-fill propane and natural gas refuelling facilities were constructed rather than a higher cost fast-fill facility, due to higher than predicted costs and the absence of expected grant-funding). This meant that a much smaller proportion of alternative fuel was used than expected. The results showed that when given a choice between CNGAS and regular unleaded, passenger car drivers chose to drive on CNGAS approximately 33% of the time.
2007	US GAO (ref 11191)	Q	The US Postal service bought flex fuel vehicles but as a result of poor E85 infrastructure and high cost of E85, gasoline continued to be used. As of 2006, alternative fuels accounted for only 1.5 percent of the total fuel consumed by USPS's internal fleet. The Energy Policy Acts of 1992 and 2005, required federal agencies to increase their purchase of flex-fuel vehicles and use alternative fuels to fuel these vehicles. Use of hybrids has improved gasoline mileage but does not help USPS to meet the requirements of the act.
2004	LowCVP (ref 11334)	C	Support for demonstration fleets of commercial and public service vehicles is likely to be particularly effective. Relatively small numbers (perhaps a thousand) of these vehicles need to be sold before economies of scale become significant and unit costs fall sufficiently to make the clean vehicle commercially competitive. This compares to supply of 100,000+ passenger cars before unit costs are significantly reduced.
2002	Langer (ref 11242)	C	For fleets, differences in manufacturers' incentives are likely to outweigh fuel cost differences among conventional

Year	Author	Type	Evidence
			vehicles. Furthermore, fleets typically own vehicles for less than half of their useful life, so high fuel economy reduces costs only through a few years of fuel savings and the increment in resale value attributable to high efficiency, which may be negligible.
2002	Langer (ref 11242)	C	<p>It is important to recognise the differences in priorities between fleet types: government, corporate and rental – e.g. vehicles' purchase and operating costs and resale value, corporate agenda, ties to specific manufacturers, and existing laws and policies. In particular, Langer (2002) suggests that government:</p> <ul style="list-style-type: none"> • support high resale values for fuel-efficient vehicles by extending any reductions in sales tax or other incentives to resale. • aggregate vehicle purchases among jurisdictions • Avoid conflicts between fuel economy and other environmental transportation priorities. In particular, avoid incentives to promote high fuel economy vehicles that result in more driving, use of vehicles during peak hours, greater tailpipe emissions, etc. • Consider allowing hybrids that are sufficiently clean and efficient to qualify for EPAct credit while expanding requirements to fleets not currently covered. • Consider ENERGY STAR-type designations for vehicles and for fleet practices to attract fleets and raise public awareness of fuel economy issues. • Expand vehicle criteria for "environmentally preferable products" under the EPA's pollution prevention program to include fuel economy.
2001	Leiby (ref 3121)	Q	In 2001, existing EPACT fleet mandates represented less than one-half of one percent of new vehicle sales.
1999	Leiby (ref 11157)	C	<p>Actual use of AFs in AFVs can be constrained by lack of user-friendly refuelling infrastructure or non-competitively priced AFs. Unless the use of alternative fuels in AFVs is mandated, and the fuels are easily accessible, little may be used.</p> <p>“In the absence of any specific requirement that fleet AFVs use alternative fuel, fleet AFV purchase mandates may be met with dual or flex-fueled vehicles, and little alternative fuel may be used. However, if fleet AFVs are also mandated to use some fraction of alternative fuel, and if they refuel at publicly accessible commercial stations, then the barrier of limited retail fuel availability is diminished.”</p>

Policy suitability for UK

Year	Author	Type	Evidence
2007	Haller (ref 5611)	C	Public procurement policies voluntarily introduced by organisations (i.e. not mandated) involve complex decisions, based on a balance between stakeholder pressure,

Year	Author	Type	Evidence
			environmental considerations, and uncertainties about economic costs and benefits of conversion. The main unknowns are the costs of AFVs, fuel costs and emissions improvements for conventional vehicles, and availability of refuelling infrastructure. This discourages organisations from using this approach.
2002	Langer (ref 11242)	C	Vehicle mandates must be designed with supply in mind: “Demand for hybrids has already outstripped the supply. The substitution of alternative fuel vehicles by hybrids in government fleets would not increase hybrid sales in the short run and would in fact make a significant dent in the number of hybrids available to the general public. In the longer term, manufacturers may look to fleet mandates and buying practices to determine how many hybrids to produce. On the other hand, an EPAct fleet demand of 40,000 is not sufficient to create economies of scale and consequently will not have a large effect on the speed with which hybrids reach a mass market.”

References

Haller, M., Welch, E., Lin, J., & Fulla 2007 - 5611 – S. *Economic costs and environmental impacts of alternative fuel vehicle fleets in local government: An interim assessment of a voluntary ten-year fleet conversion plan*, Transportation Research, vol. no. 3, pp. 219-230. May 2007., p. -230.

Hu, P. S. & Wang, M. Q. 1996 – 8428 – *State vehicle fleets and their potential acquisition of alternative fuel vehicles under EPACT 507* , Transportation Research Record no. 1520, pp. 140-146.

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. & Rubin, J. 1999 – 11157 – *SUSTAINABLE TRANSPORTATION: ANALYZING THE TRANSITION TO ALTERNATIVE FUEL VEHICLES*, Conference on Policies for Fostering Sustainable Transportation Technologies no. 492, pp. 54-82.

Leiby, P. & Rubin, J. 2001 – 3121 - *Effectiveness and efficiency of policies to promote alternative fuel vehicles*.

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

Smokers, R., Vermeulen, R., van Mieghem, R., Gense, R., Skinner, I., Fergusson, M., Mackay, E., ten Brink, P., Fontaras, G., & Samaras, Z. 2006 – 11268 - *Review and analysis of the reduction potential and costs of technological and other measures to reduce CO2-emissions from passenger cars*.

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.