Low Emission Zones

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_2 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 Low Emission Zone (LEZ) policies. LEZs usually regulate access for some categories of vehicles in order to reduce transport related emissions in the most polluted areas of a city. LEZs are thus normally instigated for reasons of local air quality rather than concerns over climate change but they may nevertheless have some effect on carbon emissions. Note also that the majority of LEZs target lorries, buses, and coaches not private cars and therefore most evidence on LEZs falls outside the scope of UKERC TPA transport project.

Evidence Tables

Carbon Savings and Policy Measures

Year	Author	Type	Evidence
2005	Wolfram et al. (ref 11380)	C	The introduction of LEZs might lead to some small reductions in CO2 emissions, due to some owners purchasing vehicles with more fuel efficient engines.
2005	Wolfram et al. (ref 11380)	C	The analysis of air pollution concentrations has found that a London low emission zone would have a greater impact in improving air quality concentrations than it would in reducing emissions.
2005	Yedla (ref 3051)	C	GHG mitigation strategies (GEMS) result in the reduction of local pollutants as well. In a comparative analysis it was found that TSP (total suspended particulate matter) mitigation strategy (TEMS) also performed well by reducing GHG (non-target emissions) by a similar magnitude as that of the target pollutant. Yedla finds (from modelling) that TEMS seems to be more effective than GEMS for long-term transportation planning, because it results in more reduction of non-target pollutants (both local and global), competitive economic performance and preference from the local policy makers and civil societies. Urban planning/development/management projects should consider TSP mitigation strategy rather than CO2 or GHG strategies in order to achieve the same level of effect both locally and globally.

Other CO2 Impacts

Year	Author	Type	Evidence
			No specific evidence found.

Other Benefits

Year	Author	Type	Evidence
2005	Wolfram et al. (ref 11380) citing	C	The following are benefits of LEZs: • Improved air quality – all pollutants (not just NO2 and PM10) • Progress towards EU air quality limit values

Year	Author	Type	Evidence
	Watkiss et al., 2003		• Health benefits • Small reduction in noise • More attractive environment for companies and people • Safety benefits of new vehicles • Economic and employment benefits for the vehicle manufacturing sector, including retrofit equipment manufacturers and fitters.

Policy Costs and/or Revenues

Year	Author	Type	Evidence
			No specific evidence found.

Business and Consumer Costs

Year	Author	Type	Evidence
2005	Wolfram et al. (ref 11380)	C	The main cost impacts, other than to authorities, are on the owners of vehicles that are ineligible to enter a zone. This impact is not likely to be significant for operators with larger fleets. For operators with mix of older and newer vehicles, there would be potential for zero cost options. Evaluations from two schemes (the environmental zones in Sweden and the proposed "Low Emission Zone" in London) suggest that the monetised environmental benefits of the schemes are likely to be broadly similar to the overall costs.
2005	Wolfram et al. (ref 11380)	C	Wolfram cites costs for different cities in Europe. However, note that most LEZs studied included heavy goods vehicles (trucks and buses > 3.5t) and not cars. • 4 cities in Sweden – costs to industry 128 million kroner for period 1996-2000. Benefits estimated to be 101 million kroner for the same period. • In Denmark (Copenhagen) – implementation costs estimated between 45-100 million Euros depending on the number of trucks and buses that will be retrofitted. The government has dedicated 30 million DKr to subsidies for the retrofitting of particulate filters (which is 30% of the filter price). • In Rome (for a private car and commercial vehicle scheme), development costs about Euro1.3 million, purchase costs at Euro 2.5 million, operating costs at Euro 3 million and maintenance costs at euro 200k. Revenues calculates to Euro 53 million per year in fines and Euro 4.5 million per year in permits. This resulted in an evaluated achievement of 10% reduction in traffic during the day and a 20% decrease in traffic during the restriction period.

Unintended Consequences

Year	Author	Type	Evidence
2005	Wolfram et al. (ref 11380) citing Watkiss et al., 2003	C	The following are disbenefits of LEZs: • Disproportionate impact on expensive specialist vehicles (e.g. coaches, specialist lorries) • Greater relative impact on smaller companies • Greater relative impact on road haulage, the wholesale, trade, manufacturing sectors and smaller construction and building companies • Higher potential business costs for companies
2005	Wolfram et al. (ref 11380)	C	A European study of LEZs reports that in Rome, the implementation of the LEZ resulted in traffic reductions during the restriction period, but outwith the zone's hours it resulted in increased traffic. There was a general increase in the quantity of 2-wheeled traffic.

Reasons/Arguments for Carbon Reduction Achievement and/or Failure

Year	Author	Type	Evidence
2005	Yedla (ref 3051)	C	Local emissions policies have more support from local policy makers and civil society, and in some cases (depending which pollutant is targeted) have lower marginal abatement costs than CO2-based policies.

Policy suitability for UK

Year	Author	Type	Evidence
			No specific evidence found.

References

Wolfram, M. 2005 – 11380 – Sustainable Urban Transport Plans (SUTP) and urban environment: Policies, effects, and simulations - Review of European references regarding noise, air quality and CO2 emissions, EC, Brussels.

Yedla, S., Shrestha, R. M., & Anandarajah, G. 2005 – 3051 - Environmentally sustainable urban transportation - comparative analysis of local emission mitigation strategies vis-a-vis GHG mitigation strategies, Transport Policy, vol. 12, no. 3, pp. 245-254.