South East Transport Research Project Report

Author: Rob Liddiard

14th September 2004

Summary

The original brief for this project was to identify and assess the services provided, to promote and enable sustainable transport within the South East Region. After initial research and the discovery of the volume of material involved, it was decided that the project would concentrate on Greater London and Kent.

Amongst the first things to be identified was the fact that transport and travel are not the same. People travel on transport, but both people and goods are transported. From this came the decision that the transportation of goods is a fundamentally separate subject from the travelling of people: the report concentrates on the latter and excludes air travel.

Sustainable transport and travel are both aimed at removing, or reducing, the adverse social and environmental effects of the movement of people and goods. Concentrating on the movement of people presents its own problems: namely that of "choice". Why should people choose to travel in a sustainable manner? This has proven to be one of the most difficult questions to address and this report is not able to answer it fully.

Trends indicate that people are travelling further, but not as often. To some extent this goes against what one would expect when looking at the demographics of the UK. The major growth area is in the use of cars, but train use has also increased. In spite of the high profile of traffic congestion, car journey average speeds are rising and this is an incentive to travel further. People need a very good reason to give up using their cars, but political expediency may prevent the enactment of policies which would encourage this. There are significant groups who are restricted, or unable, to access car transport and the measures to prevent the social exclusion of these groups is investigated. Some of what is done is due to legislation, but the voluntary sector also plays a large role, especially in lobbying.

Legislation is driven, primarily, by the desire to improve the health of the people. To this end, much legislation is concerned with road accident reduction and air quality. Energy efficiency is mostly left to the market, i.e. saving energy saves money. If people are not aware of, or concerned about, saving money spent on transport energy they are left to carry on as before. Much of this is due to the perception that travel is a matter of personal freedom. Again, the freedom of those who cannot access travel is impaired.

Changing people's attitude to travel can take two routes. One can try to change their behaviour or encourage them to reduce the adverse effects of their travel. The former is more difficult because people have become used to travelling as and when they wish. The latter is possibly less difficult and is most likely to be achieved through technological fixes. This report identifies and discusses aspects of both these approaches, giving information on specific measures and their possible effects. In general, it may be said that technical fixes tend to have financial incentives, but the behavioural measures would also have a significant effect on levels of pollution and energy use. Some specific technologies are discussed in greater depth.

The gathering of information pertinent to sustainable transport and travel has shown that “one stop” sources do not exist: there is no single source of everything one could wish to know about sustainable transport and travel. However, this is likely to be due to the sheer magnitude of the task of assembling all the required information in one place. Each person’s travel requirements are likely to be individual, hence the mass of required information.

It is felt that the identification of sources of funding is the weakest part of the report, but some potential sources have been identified and CEN may wish to formulate a “pitch” for funding. A potential problem here is that a definite market for some of the information which would be disseminated is still hard to identify. However, it appears that the construction of a database of technologies could be “sold” to business and public alike.

The conclusion of the report is that sustainable transport and travel is a subject with both breadth and depth. Identifying potential markets for, and funding of, the dissemination of relevant information is not clear. Legislation may push people towards increasing the sustainability of their travel, but there are also many who need increased access to travel. It is recommended that further marketing-based research is undertaken, before a final decision is made on what services CEN should provide.

Contents

List of Figures and Tables:

1. Introduction

The intention of this introduction is to give an overview of factors which affect transport and travel, in the UK. With this in mind, the reader may well come to conclusions not drawn by the author, and this is also part of the intention.

For the purposes of this report, the terms “travel” and “transport” are not generally interchangeable. Travel refers to the movement of people from one location to another. Transport refers to the mode of travel. For example, one journey may involve one person travelling from A to B, but it may also include three modes of transport: walking, catching a bus and taking a train. Such a journey would be termed “multi-modal”. For the most part, the transportation of goods is not addressed.

28 percent of man-made carbon dioxide (CO_2) emissions in the European Union (EU) are attributable to transport, and in the UK the distance travelled is growing at the rate of 2.4% per year. [1] Also in the UK, the distance travelled by car is increasing at a rate of 2.7% per year. [2] These factors could pose a serious threat to the EU’s and UK’s ability to achieve their respective CO_2 reductions under the Kyoto Protocol. The problem is likely to be exacerbated (for the EU) by the probable increase of transport and travel resulting from the latest expansion in the number of member states, predominantly from the former Soviet Bloc.

Unlike the generation of electricity, the land transport sector is almost entirely dependent upon conventional fossil fuels. The only major exceptions to this are: vehicles powered by electricity generated from nuclear/renewable energy; those using pure biofuels; those using somatic (human-generated) energy, e.g. bicycles. The primary reasons for the use of current road transport technologies are: petroleum fuels are the accepted norm; petroleum fuels have high energy densities; there are inertia to change and vested interests.

Ultimately, it should always be remembered that travel is regarded as a supply led market. Much of this supply is dependent upon the speed of the mode of transport. In the 18th Century, it may have taken weeks to travel from London to Rome, but now the same journey can be made in a matter of hours. If it still took weeks to travel to Rome, people would not travel unless they absolutely had to, therefore one could argue that speed is what determines how far people travel.

1.1 What is the Objective of Sustainable Transport/Travel?

The most effective way of reducing the environmental impacts of travel, is to not travel. Most people (understandably) do not see this as a practical option and the ability to travel is seen as a personal freedom issue. If people cannot be persuaded to alter their life patterns to reduce the number of trips that they make, attention must be focussed on ways of reducing the impact of each trip.

The amount of economic wealth generated, by travel, is seen as a positive aspect of the growth of travel. However, there are also economic costs incurred. Time wasted on congested roads and health problems, resulting from accidents and pollution, place a financial burden on everyone. The goal of sustainable travel and transport is to reduce the negative social and environmental effects of travel, without damaging the economy, thereby improving quality of life.

This report does not, for the most part, address the planning issues connected to sustainable travel/transport, but some reference may be made in subsequent sections, where appropriate.

1.2 The Increasing Demand for Travel

According to the National Travel Survey, carried out most recently in 2002, the demand for travel continues to increase. People are travelling further, rather than more frequently, and the average journey length has risen to 6.93 miles with an average 1008 trips per year. [3] Possibly contrary to popular belief, rail travel has increased recently, but the total distance of walking trips has fallen by 10%, whilst the total distance of car trips has increased by 14%. More detailed data can be seen in Table 1. The indications may be that people are using their cars for some very short journeys, as a substitute for walking.

Table 1. Annual mileage and mode for 2002 with percentage change. [4]

Mode of Transport	Miles 2002	Percentage change to 2002 from: 1991/ 1993	1996/ 1998
Walk [1]	190	*-10*	*-2*
Bicycle	33	*-14*	*-14*
Private hire bus	124	*-*	*20*
Car only - driver	3,410	*14*	*3*
Car only - passenger	2,028	*4*	*3*
Motorcycle/moped	33	*-12*	*12*
Van/lorry - driver	218	*13*	*22*
Van/lorry - passenger	61	*-15*	*-7*
Other private vehicles	20	*-52*	*-43*
Local stage bus	259	*-1*	*4*
Non-local bus	58 [2]	*-45*	*-39*
LT Underground	62	*31*	*21*
Surface rail	373	*20*	*28*
Taxi/minicab	55	*38*	*10*
Other public including air, ferries, light rail, etc.	56	*23*	*-2*
All modes	6,981	*8*	*4*

[1] Short walks believed to be under-recorded in 2002 compared with earlier years.
[2] This estimate has a large sampling error because of the small sample.

1.2.2 Demographics and Working Parents

As life expectancy continues to rise, there is likely to be an increasing number of elderly people who will want to maintain their travel freedom, by whatever means is appropriate. [5] Additionally, the increasing number of households, depicted in Figure 2, is likely to increase car ownership still further. As the number of households increases, each household is likely to want access to a car and fewer journeys will be shared because fewer journeys will have the same start and finish points. Also, unless housing densities increase, the distances travelled are likely to lengthen as people will be further from the facilities they wish to access.

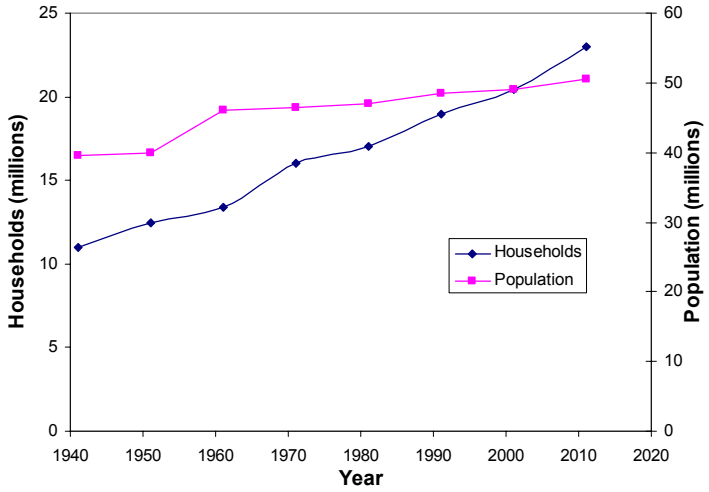

Figure 2. Population and number of households (England) 1940 to 2010. Note 2010 data are estimates. [6]

With more working parents, there are numbers of grandparents/child-minders who take over child-minding duties, during work time. Unless these grandparents/child-minders live very close to the children's homes, this will be a source of increased transport, which may be during peak periods. So not only are parents travelling to work, but childminders may be travelling at the same time, too.

1.2.3 The School Run

One area where the length of trips has increased is the journey to and from school. [7] The most likely reasons for this are the ability of parents to send their children to schools outside of the immediate locality, or that more-local schools have closed. Because schools are further away, there is a greater temptation for children to be taken to school in cars; hence journey speeds have also increased along with length. It could be the case that the provision of a wider choice of available schools has directly resulted in the increase in the numbers of children travelling to school as car passengers, with the resultant increase in traffic congestion during the "school run". Although parents may accompany their children to school when walking (this is most likely for younger children), the accompaniment can be both beneficial and a source of rancour. For younger children, the time spent going to and from school could be seen as "quality time" spent with parents, but for older children it may be a restriction of freedom. Certainly there is a growing belief that time spent with parents, in the

potentially dangerous traffic environment, is a particularly effective way of teaching children about the dangers of traffic and how to avoid them.

1.3 Freedom to Travel

The issue of freedom affects all people who travel, not just the young. The ability to travel can be seen as an expression of freedom and this may be one of the primary reasons for the popularity of personal cars: have car, will travel. Creating socially and politically acceptable means to reduce car usage is a major challenge because people see their car travel as a freedom issue. Take away their cars and you restrict their freedom. However, it must be remembered that this is primarily an issue for those who are able to use a car and that there are sectors of society who are unable to do this.

The sectors of society which are most affected by a lack of access, or restricted access, to car usage are:

- The disabled
- Those under 17 years of age
- Those who are too elderly/frail
- Those who simply cannot afford a car
- Disqualified drivers

1.3.1 Disability

The "social model" of disability requires that society adapts itself and the built environment to ensure that the disabled can lead a fulfilling life: it is not the responsibility of the disabled to adapt themselves or accept their "lot in life". To this end, public transport has begun to increase its accessibility to the disabled, thereby increasing freedom to travel and quality of life. There is still much that can be done.

1.3.2 The Young

The young are not, on the whole, seen as disadvantaged, but when it comes to travel, they are less-well equipped than people over the age of 17. The young rely on their own energies, their parents'/guardians' "taxi service" and public transport, so for longer distances their ability to travel may be impaired. Although some children may be all-too-keen to get out and make their own way around, their parents may have fears (perhaps exaggerated/misconceived) about children's safety, and this can restrict the travel of young people. However, it should also be recognised that road traffic accidents are the single largest cause of death amongst the 12 – 16 age group. [8]

The government is aware of the travel problems encountered by young people. This is an extract from The Department for Transport's *Involving children and young people: Action plan 2003-2004*

"Children and adolescents up to the age of 19 represent just over 25% of the population of England and Wales, while those in the age bracket 10-19 accounts for nearly 13%. If we include young people up to school-leaving age, which coincides more or less with the age at which one can obtain a driving licence, we may conclude

that the mobility of approximately fifth of the population in England and Wales is totally dependent on walking, cycling or public transport, or where applicable, the parental automobile (National Statistics, Census 2001)." [9]

The lack of rural public transport can have a most detrimental effect on children, restricting them, and their parents, to continual lifts. Even where public transport does exist, the service may not run at the times that young people would wish to use it, e.g. in the late evening, or at weekends.

It should also be noted that there is no obligation for local authorities, or public transport operators, to provide concessionary fares to young people. Where concessions are available, problems often occur when they are withdrawn from those over the age of 16. Thus it can be seen that young people can be in danger of social exclusion through a lack of access to (affordable) transport, in both rural and urban areas.

Appendix I gives a good overview of the problems encountered in rural areas, by the young.

1.3.3 The Elderly

At the opposite end of the age scale are the elderly. As well as the physical difficulties involved with using public transport (remember that almost all journeys start and end with some degree of walking), the elderly may also be financially-restricted in how much/far they can travel. The development of cheap motoring has liberated many elderly people from their homes and local neighbourhoods and many will be (understandably) unwilling to give up this freedom. [*]

When using public transport, a particular concern of the elderly is the return journey. Any degree of unreliability in this area is likely to have a more severe effect upon the elderly due to: a lack of stamina; the need for medication; increased mental stress, etc. As is being discovered on the rail network, passengers value reliability above speed.

Appendix J gives a good overview of the problems faced by the elderly.

1.3.4 Poverty

Often the retired are amongst the poorest sectors of society, but they can also have their poverty exaggerated through a lack of knowledge of how to access financial help to which they are entitled. A more recent factor, which may be difficult to assess, is the recent spate of pension fund failures which may continue and affect increasing numbers of people who have, or thought that they had, a pension.

Although the cost of owning a car has fallen overall, it is likely to be the case that there will always be some people who are unable to afford a car. Within this sector, it is of particular interest that, "The proportion of young driving licence holders has decreased. 32 per cent of those aged 17-20 now holds a licence, compared with 49

[*] The cost of motoring has risen by ~10% since 1985 – overall, its relative cost has fallen. (DfT. *The Future of Transport 2004. Figure, page 22)*

per cent in 1991/1993. This has probably partly been due to the introduction of the driving theory test in July 1996." [10] This report would argue that the dramatic rise in the cost of vehicle insurance, for young people, has been a more significant factor in the decline in young licence holders over this period. It would also appear that, generally, fewer people are able/inclined to carry out their own vehicle maintenance, thus adding to the costs of owning a vehicle. Part of this may be due to an apparent move away from the desire, within the younger population, to acquire practical skills.

Readers are directed to Appendix K, for more information.

1.3.5 Disqualified Drivers

Although disqualified drivers are unlikely to be the recipients of sympathy within society, they nevertheless are likely to need to replace their cars with another form of transport. These people may be in more desperate need of practical public transport than any other group as they may, for example, lose their employment through an inability to get to work.

1.4 Health and Environment

As a massive generalisation, *transport* can be detrimental to health. However, *travel* can be beneficial to health. Examples of these two phenomena could be cycling: a cyclist may be injured in a traffic accident, but the act of cycling (barring accidents) is good cardiovascular exercise, plus it gets a person from A to B.

UK domestic pollution, caused by transport, is seen mostly as coming from road transport, in the form of noxious fumes and contaminated water runoff from roads. However, it should also be remembered that all forms of transport have varying degrees of environmental impact. For example, electric trains simply create their pollution at the point of electricity generation. In spite of this, most forms of public transport are less damaging to the environment than cars. Once car passenger levels increase, the situation becomes less definite and some cars can be more energy efficient than some forms of public transport. Overall, the most energy efficient form of transport is the bicycle; not least because it always has a 100% occupancy rate. [11] The most inefficient forms are short-haul domestic air travel (assumed average occupancy of 65%) and large petrol-fuelled cars (assumed average occupancy of 42%). [12]

Transport's main air pollutants are: sulphur dioxide; carbon monoxide (CO); oxides of nitrogen (NO_x); particulates (PM10s); volatile organic compounds (VOCs); hydrocarbons (HC). Technically, CO_2 is not a pollutant, but due to its capability to be a greenhouse gas it is of particular concern at a global level.

Transport's emissions of sulphur dioxide have been falling, due to the introduction of low-sulphur road fuels (and the move away from coal, for electricity generation). The most significant pollutants, with regard to health, are now seen as Oxides of Nitrogen (NO_x) and small particulate matter (PM10s).

Petrol engines emit more NO_x than diesel engines, but do not emit any PM10s, so there is no clear-cut fuel choice when it comes to pollutants from standard fuels. Petrol engines with catalytic converters emit less NO_x than diesel engines without catalytic converters. Diesel engines can be fitted with catalysts which bring all their emissions (except particulates) below those of petrol engines, but there are few vehicles with this technology, at present. It should be noted that catalytic converters do not work at full efficiency until they are fully heated, and this may take as much as 5 miles to achieve. [13] Coupled to the fact that 60% of car journeys are less than 5 miles, and 26% are less than 2 miles, it may be concluded that present catalytic converters cannot completely cure air quality problems. [14]

The areas most affected by poor air quality, resulting from traffic pollution, tend to be motorways and busy roads in towns and cities.

2. Legislation

At the global level, there appears to be no legislation relevant to transport, except for the yet-to-be-ratified Kyoto Protocol on CO_2 emissions.

At the EU level, the primary concerns are:

- The reduction of road casualties
- The improvement of air quality, to benefit health
- The reduction of energy use and greenhouse gases – particularly CO_2

Most EU sustainable transport legislation is "encouraged" and uses suggested targets. The more forceful legislation is reserved for public health issues such as air quality.

At the UK national government level the primary concerns are:

- The reduction of road casualties
- The improvement of air quality, to benefit health
- The reduction of energy use
- The improvement of access to public transport and the reduction of social exclusion

The most stringent UK legislation is for health-related factors and social exclusion appears to be given more weight than energy use, especially by some departments, e.g. DEFRA.

The four departments most closely interested in sustainable transport are:

- Department for Transport (DfT)
- Office of the Deputy Prime Minister (ODPM)
- DEFRA
- Department for Trade and Industry (DTI).

At the UK local government level the priorities appear to be:

- Meet UK government air quality standards
- Reduce road casualties
- Increase access to public transport, thus also reducing social exclusion
- Reduce energy use

Local authorities are required to carry out air quality surveys and identify areas which do not meet government requirements. Air Quality Action Plans (AQAPs) are then drawn up to bring about improvements in air quality. Additionally, local authorities are required to have a Local Transport Plan (LTP) which sets out their "manifesto" of transport for the area under their jurisdiction. The quality of the plans, as one would expect, appears to vary.

Appendices G and H give a rough idea of how local authorities in Kent and London address sustainable transport issues. These documents are not comprehensive and it may be seen how the web-based searches developed as knowledge increased. For this reason, some of the local authorities may have been done an injustice as they were investigated earlier in the search.

3. Control of the Transport Networks

Through the Highways Agency and the Strategic Rail Authority, the UK government controls the major transport infrastructure. Rail service operators are granted franchises, to provide services on given routes, and Network Rail maintains the infrastructure of the rail network.

The Mayor of London and the Greater London Authority control Transport for London, which runs the Underground (Tube) network, London Buses and Docklands Light Railway (DLR).

The administration of local roads is split between the county councils and borough/unitary councils. Some of the major trunk roads are administered, directly, by the Highways Agency.

To a large extent, the public are the ultimate controllers of transport infrastructure as it they who choose whether or not to use it.

4. Others Active in the Area of Transport

As well as the transport operators and various levels of government, there are pressure groups which are trying to bring about a greater awareness and implementation of sustainable transport and travel, plus those which concentrate on the dangers of (mostly road) transport. Major players in this area include: Transport 2000; Sustrans; other bodies promoting specific aspects of sustainable transport, e.g. the Cycle Touring Club. A list of sources of information about sustainable travel can be found in Appendix A. Finally, and most importantly, there is the public.

5. Schemes Connected with Sustainable Travel

Appendix B gives a basic list of travel modes and schemes which have a bearing on sustainable travel. The themes are expanded, below.

5.1 Buses

Buses can provide a relatively rapid mode of transport in urban areas, especially where they are given priority over other traffic. The simultaneous promotion of bus travel and implementation of the London Congestion Charge, has led to a significant increase in the use of buses within TfL's area. It may be assumed that people have switched from cars to buses within the Charge zone.

The accessibility of buses is gradually improving through measures such as: raised bus stops; level floors inside buses; lowering suspension. Timetabling and routes still pose some problems; predominantly in areas of low population density (e.g. rural) where operators may end their services too early in the day, or provide inadequate coverage on certain days, such as bank holidays and weekends. These restrictions hinder those who do not have access to their own car. Problems also occur where delays cause missed connections, both with other buses and with trains.

Access for cyclists is not good, as most buses are not designed for the carrying of full-size cycles. Some tourist areas have dedicated “bike buses”, for example on the South Downs.

Information on buses can be obtained from TfL, for the London region, and local bus operators. Some operators have websites, but the most up-to-date information is available by telephone. Some of the Kent councils have links to local bus operators and Kent County Council has a plethora of bus information in PDF format.

5.2 Business (Workplace) Travel Plans

These can have a significant effect. Where congestion is severe, experience has shown that a 16% cut in traffic levels can reduce congestion by 30%, so even a small reduction in traffic can have a large effect. [15] The government considers a 5% reduction in car use to be significant and this should be well within the capabilities of a well-conceived business travel plan.

The reduction of car use, for travelling to work, may also reduce the number of vehicles per household, as the requirement for more than one car could be negated. In this way, there could be even greater use of public transport when not travelling to/from work. Also, as traffic congestion is so inefficient, the actual effect of a 5% reduction of traffic on CO_2 emissions could be even greater. Certainly, business travel plans could have a profound effect upon people’s mode of travel: an effect capable of spreading beyond the workplace.

Business travel plans have the potential to prolong the usefulness of a building which does not have sufficient parking spaces for those working there. Also, although this can defeat the environmental objectives, it may be possible for a company to generate income, from spaces left vacant by those who no longer drive, through leasing empty spaces to other people. Such a scheme, if used selectively, could be socially beneficial by freeing-up spaces for those who have no alternative to car travel (perhaps from rural areas). Sometimes, spaces are only made available (or at no charge) to those who bring a passenger to work.

There is no UK legal requirement for companies to have a travel plan, but some local authorities require one before granting planning permission for new developments.

The government provides advice on business, or workplace, travel plans via the DfT and The Energy Saving Trust (amongst others). The eGeneration organisation also has a very informative website and practical help. Many local councils have information on workplace travel plans. Pfizer can be used as a case study involving financial incentives to not travel to work by car. [16] Appendix L gives more information on workplace travel plans.

5.3 Car Clubs

Appendix C gives a list of car clubs and car share schemes in the London and Kent areas.

A car club generally operates by having a limited number of vehicles, parked at specific points within a borough, which are available for the use of its members. The cars can be booked days, or even as little as 15 minutes, in advance. Sometimes there is a choice between a small car and an estate. Members pay an annual subscription fee plus a per mile, or per hour, charge each time they use a vehicle. Hire periods are generally a matter of hours; perhaps up to a couple of days, in some cases. Longer periods are usually covered by conventional car hire companies.

Many of the London boroughs have information on car clubs available. Some Kent councils have information available on their websites, but the availability of car clubs in Kent is far less widespread than in London.

5.4 Car Share

Car sharing is the practice of carrying passengers on a journey which the driver was already going to make, e.g. taking a colleague to work. Although car sharing is mostly associated with commuting, many other opportunities exist and there are national and international car sharing schemes. See Appendix C.

Energy-use per passenger distance travelled, is reduced as the number of passengers increases; hence, a small diesel-engined car with four people in it is more efficient than the Eurostar train full of passengers. [17] The car may be considerably slower, but is likely to be “door-to-door”.

Many councils have links to car sharing schemes and how to get involved. Some schemes have more stringent security policies than others. For some reason, the security seems to revolve around the driver being the one most likely to initiate trouble, but this might not always be the case.

5.5 Cars

Cars are used for approximately 78% of all trips and account for 85% of the total average distance travelled, per year. [18] Appendix D gives an indication of the more readily-available technologies which can help mitigate the adverse environmental impacts of car use, whilst not restricting that use. See also Section 6.

5.6 Community Transport Services

Community transport is often provided by volunteers, but paid for by local authorities and charities to enable those eligible to travel. Examples would include community buses for Help the Aged etc. By their nature, some of these schemes will cross local authority boundaries, but it is not clear whether there is any cohesion to these services so that an integrated service can be provided; it is unlikely as they tend to operate on a very local basis.

5.7 Concessionary Fares

These are reductions in public transport fares (predominantly) for: the elderly; the disabled; the young. Concessions are typically 50% of the fare price, but may be as much as 100%, and are administered by local authorities.

Although there is no obligation for councils to provide concessions to those under 16 years of age, there are statutory obligations to provide help with travel to school. See Section 5.19. Some councils provide a similar concession for 16 – 19 yearolds in further education, to mitigate the fact that these people are not employed, but are over 16. It is not clear whether mature students can obtain this concession.

Where there are problems of people being unable to gain employment due to an inability to get to work without financial help, some councils may provide concessions.

5.8 Cycling

Despite the efforts of government and others, cycling has continued to decline in popularity as a means of transport (see Table 1). Even more than walking, cycling is done at the mercy of the weather, and this may be a strong disincentive. (Although, as Billy Connolly would say, “There’s no such thing as bad weather – only the wrong clothes.”) Also, as mentioned earlier, safety campaigns seem to emphasise the vulnerability of cyclists and this message could be putting people off the idea.

Although cycling is a door-to-door mode of transport, it does not always integrate with other forms of transport very well, e.g. buses and in some cases trains. Cycle maintenance can be taught easily; many local authorities have information on accessing such training, along with cycling proficiency training, for young people and, in some cases, adults.

5.9 Dial-a-Ride

This is a service, run by TfL, who describe it thus:

“Dial a Ride provides a multi-occupancy door to door transport service for people with a permanent or long term disability or health problem who are unable, or virtually unable to use conventional public transport. It can be used for all sorts of journeys such as shopping, visiting friends, attending meetings or doctors or dentists appointments.” [19]

Fares are charged according to distance and bookings should be made the day before the service is required. [20]

5.10 Docklands Light Railway

Essentially an overland extension of the Tube, operated by TfL.

5.11 Freedom Passes

A concessionary pass allowing certain people (e.g. the disabled, the elderly) to travel free on London Transport, during off-peak times. Such passes may encourage people to travel more, but are primarily aimed at reducing the social exclusion of those to whom they are given. The scheme is paid for by local boroughs.

5.12 Journey Planners

These can be accessed online, or by telephone, and are a means of planning a journey using public transport. Services such as Traveline.com give maps of how to get to bus stops and train stations, plus all the links between points of departure and destinations. This particular service is run on a regional basis, dependent upon the point of departure. Possibly the best-known is the National Rail Enquiries for rail journeys.

The fundamental purpose of these services is to integrate the various modes of transport in multi-modal journeys.

The Department for Transport is currently working on its own fully-integrated travel planner which will be called Transport Direct. The exact launch date of this project is not known, but it is assumed that work is currently going on and the DfT describes the project thus:

"The vision for Transport Direct is to provide a comprehensive, easy-to-use multi-modal travel information and ticketing service. In the long-term this will provide travellers with:

- Integrated Information - all the information they need to plan a journey anywhere in the country by any transport mode, including maps;
- Real-time information - details of any anticipated disruption on the chosen route, plus information about real arrival and departure times once on the move;
- Through ticketing - the ability to buy all the necessary tickets, via transport operators, travel agents and other ticket retailers" [21]

Transport Direct may prove to be a "one stop" national journey planner, but until it appears it is not possible to judge it.

5.13 Park and Ride

A scheme to reduce town centre congestion, improve road safety and air quality. Motorists park in designated car parks away from the town centre and are taken into the centre by bus. Some services are free, but often there is a small charge which should be cheaper than parking in the town centre. Canterbury has a scheme which allows non-car users to board the buses, at bus stops, along the route.

5.14 Parking

Most motorists will try to park in places where they do not have to pay, unless there are specific benefits in paying. Most town centres now have controlled parking and parking fees. Councils usually provide car parks and designated spaces for those with impaired mobility. Sometimes there are other accessibility-enhancing facilities.

Councils have information on the locations of their own car parks, but not always those which are privately operated. Such information may include: tariffs; opening times; accessibility factors; maps; and in a few cases (e.g. Maidstone) online space availability. This latter facility could be useful for those with WAP enabled mobile phones (not that they would use them while driving, of course) and would save them adding to pollution whilst driving around looking for a parking space.

5.15 Personal Travel Plans

These work in a similar way to business travel plans, but are aimed at reducing the environmental impacts resulting from the travel of a single person, or household.

Although there are several sources of information on how to develop a workplace travel plan, the help available for the individual seems much more scarce. Part of this may be that it takes a certain awareness, within the public, for someone to want to make a personal travel plan: most people treat each journey as a separate entity, whether they have the use of a vehicle, or not. The latter statement is probably an over-simplification, as regular journeys such as commuting to work may be seen as a completely separate issue to other “journey uses”.

Where a workplace travel plan may affect a large number of people in one particular way – the reduction of people travelling to work by car, for example – a personal travel plan is likely to be very personal because there are so many more variables to be considered. Factors might include:

- Location of the household
- Car ownership
- Number of people in the household
- Ages and sex of those in the household (demographics)
- Income
- Employment
- Leisure activities
- Locations of friends and relatives
- Demographics of friends and relatives

The above are just a few of the factors which would affect the formulation of a personal travel plan, there are probably many others unique to an individual.

Appendix F is an informative document about personal travel plans.

5.16 Plusbus

Plusbus is a scheme whereby people can buy a bus pass, valid for one day, as part of their train ticket. The Plusbus pass will give the traveller unlimited bus travel within a specified area and can be for more than one day. This service is only available at participating train stations.

For people who do not know exactly what they will want to do when they reach their destination train station, Plusbus passes can provide a hassle-free means of getting about.

5.17 Road Safety Training

Very young children are often seen as those most vulnerable to injury on Britain's roads, but evidence shows that it is those in the 12 – 16 age group are particularly at risk. [22] To this end, there are moves to increase the awareness of road safety within adolescents.

Training is mostly given at school, but councils will arrange for other sessions to educate people outside of school. Alternatively, there are a number of independent bodies, such as Transport 2000, who can give training.

5.18 Road Works

Road works cause delays to traffic, but are usually necessary. To reduce the length of time that road works are in place, some councils are beginning to study permit applications more thoroughly, with the aim of reducing both the number and duration of the works. In the future, utilities may have to coordinate their activities much more.

Councils give out information on road works which are taking place within their jurisdiction, but there is no central pool of data for "local" road works. The Highways Agency has an interactive website and telephone service to notify motorists of delays on major routes.

5.19 School Travel Allowances

Every school pupil under the age of 16 is entitled to help with the cost of travel to school provided that:

- they attend the nearest appropriate school
- the school is more than 1.5 miles from home, if the child is under 8
- the school is more than 2 miles from home, if the child is at primary school, but over 8
- the school is more than 3 miles from home, if the child is at secondary school.

The assistance is in the form of a free bus pass, usually, but may be monetary in special circumstances.

Most councils will give assistance to those who are over 16, but are still in full time education provided by that authority.

5.20 School Travel Plans

Every school is now required to draw up a travel plan, aimed at reducing the environmental problems and, mostly, the dangers involved in travel related to the school. Plans are likely to include input from the pupils and students, thus helping to widen their knowledge base and increase the plan's uptake. Various schemes are likely to be tried, including, Walking Bus, roadside notices to drivers and road safety training.

5.21 Taxi Vouchers

A scheme, available in a few locations, to allow young people access to travel where there is no suitable public transport. the vouchers may, for example, be issued by a youth club to allow someone to attend that club, who would not otherwise have been able to do so. Predominantly, such schemes operate in rural areas where public transport is less accessible. [23]

5.22 Taxicard

This is run by local authorities to allow those who are unable to use public transport to travel within and beyond the authority's area. The Taxicard holder is able to pay for journeys, up to a certain value, using the Taxicard. Longer journeys must be paid, in part, by the cardholder. This scheme can be very flexible and not subject to inconvenient time restrictions. The taxi operators are reimbursed by the local authority.

5.23 Taxis

This is a very flexible, though potentially expensive, means of travel. Taxis are popular with older people because they are door-to-door and "time flexible", but costs are variable and a cause for concern to these users.

"Black cabs" are generally seen as safer and "hackney cab" fare rates are set by local authorities. Private hire cars can have a poor reputation and sometimes fare rates are variable, requiring a careful choice of operator.

5.24 Trains

Train transport has suffered massive under-investment for decades. Operators are investing money in new rolling stock, but the reliability of the overall system is what appears to deter people from using trains in preference to cars. A possible exception to this is that it is often much easier to travel into larger cities (especially London) by train. However, this may be dependent upon the quality of public transport at each end of the train journey.

Information on timetables and buying tickets is readily available and mostly accurate. For the young, there are often some very good deals when travelling off-peak.

5.25 Trams

Operating much like buses, trams can be a fast means of travelling, but there are very few systems in operation within the scope of this report, or indeed the UK generally.

5.26 The London Underground

The famous, or infamous, “Tube”; a truly integrated system of public transport, especially when considered in conjunction with the overland national rail network and London Buses.

5.27 Walking Bus

Walking buses are a means of getting children to and from school. The “bus” starts at the point furthest from the school and collects children along its route. The children wear high visibility clothing and often their bags are put on a trolley. Buses are supervised by parents and teachers to ensure the children’s safety.

Walking buses can reduce the number of accidents involving children on their way to and from school, whilst reducing traffic around the school (and elsewhere) and keeping the children active.

6. Technical Fixes

In terms of environmental matters a “technical fix” may be described as a piece of technology which brings about an environmentally-beneficial result, without a significant change in people’s behaviour. Sometimes, such technical fixes are called “hard” factors, unlike behavioural changes which are called “soft” factors: presumably this is similar to the distinction between “hard” and “soft” copy.

On the whole, the public has great faith in technical fixes. Those which allow the public to carry on doing what they want to do, for the same cost, are particularly popular, especially if they are unseen (for example the changeover from town gas to natural gas, in the 1970s). Other technical fixes can be forced onto the public, but given incentives to make them acceptable (for example unleaded petrol, through lower fuel duty).

The technical fixes outlined in this report are predominantly those which pertain to reducing the negative environmental impacts of personal transport (mostly cars), and technologies which reduce the need to travel. Some attention will also be given to car fleet operations, but not, on the whole, to goods vehicles.

6.2 Vehicle Technologies

6.2.1 Fuels

Many advances have been made in vehicle fuels, over the last two decades. The two major examples are the introduction and ongoing development of unleaded petroleum and Ultra Low Sulphur Diesel (ULSD). Both of these fuels have been progressively improved to give greater fuel efficiency and reduced emissions of pollutants, but internal combustion engines still account for the most significant portion of pollutants and CO_2 emissions from transport.

When choosing fuel types, it should be observed that the Royal Commission on Environmental Pollution has this to say on the matter:

"there is no optimum fuel in environmental terms, and the choice depends on which problem is the priority at a particular time or place". [24]

6.2.2 Biodiesel

Most road haulage is dependent upon diesel fuel. The market share of private diesel-fuelled cars has increased markedly in the last 15 years, too. With these two facts in mind, reducing the environmental impacts of diesel fuel has to be considered. biodiesel, derived from plant matter, is a fuel which is being seen as a means of reducing the negative aspects of using diesel fuel.

Biodiesel is, essentially, distilled from plant matter, which is termed biomass. The resultant fuel has some distinct advantages over conventional diesel and can be better even than ULSD, due to its low pollutant emissions and increased lubricity (important to protect the vehicle's fuel system from premature wear). People are also putting forward claims that biodiesel is "carbon neutral", meaning that the CO_2 emitted when it is burned is reabsorbed by new plant growth, through photosynthesis and there is no net gain of CO_2 in the atmosphere.

In terms of the actual fuel used, biodiesel may be carbon neutral, but in overall life cycle terms this is not likely to be the case due to the Laws of Conservation. Two of the Laws of Conservation state that: matter is neither created, nor destroyed; energy is neither created nor destroyed. This means that only the carbon photosynthesised by the plants can be released by the combustion of the fuel. Also, only the energy contained within the fuel can be used to power the vehicle. At the point of use, biodiesel should be carbon neutral. What has not been considered is the energy required to get the biodiesel into the combustion chamber of the vehicle.

Taking oil seed rape as an example, because this is a viable source of biomass for biodiesel production, the life cycle can be analysed crudely. The stages of biodiesel production can be summarised thus:

1. Sow seed
2. tend plants while they grow and mature
3. supply plants with required nutrients
4. harvest the crop
5. transport the crop to a processing plant
6. process the crop into Biodiesel
7. store the biodiesel
8. transport the biodiesel to the point of sale
9. store the biodiesel at the point of sale
10. pump the biodiesel into a vehicle's fuel tank
11. pump the biodiesel from the fuel tank to the combustion chamber of the engine

The single factor that affects every stage of this process is the need for energy. The energy contained within the biodiesel burned in the engine of the vehicle can only provide the energy for stage 11. The energy for stages 1 to 10 must come from elsewhere. If the energy contained within the biodiesel is used for stages 1 to 10, there is a net loss of available fuel, compared to the present.

Other factors to consider are that only a small proportion of the oil seed rape plant can be used for the production of biodiesel, the balance is waste, unless used effectively (this may include being used as fertiliser or being burned to create energy for stages 1 to 10 above). If the balance of biomass is consumed to provide energy, the problem of the provision of nutrients becomes apparent.

All plants require elements other than CO_2 and water, to grow; these are generally termed nutrients. If nutrients are not replenished, soils become sterile and the required crops will not grow. Different plants require nutrients in varying quantities and some plants can replenish nutrients required by other plants (e.g. clover will fix nitrogen in the soil). Plant matter left in the soil is broken down by micro-organisms to provide nutrients, but any plant matter which is taken away from the area takes with it nutrients. If the removal of plant matter from land results in a net loss of nutrients, crops planted on that land will fail. Conventional intensive farming methods use synthesised fertilisers to replenish soil nutrients. Low-energy farming, for example organic methods, uses crop rotation and natural nutrients to replenish the soil. However, even crop rotations require energy to make them work, plus the land cannot be producing biodiesel all of the time.

To put this into perspective, it is estimated that, "the agricultural resources of the UK only hold out the prospect of a maximum contribution of 5-10% of current diesel fuel consumption. So unless the UK, together with the whole of Europe, starts growing crops for biodiesel on every piece of spare land available (especially that currently under set-aside subsidy) we're going to stay dependent on crude oil for some time to come." [25]

To give an idea of the strategic importance of biodiesel, the EU wants 2% of each member country's road fuel to be biofuel by 2005, 5.75% by 2010 and 20% by 2020.

[26] Biofuels, here, is not exclusively Biodiesel. Other biofuels include: Bioethanol, biogas, biomethanol, biomethylether, bio-ETBE, synthetic biofuels, biohydrogen and pure vegetable oils.

6.2.3 Used Cooking Oil

Used cooking oil (UCO) is collected from food outlets, such as fish and chip shops, restaurants and food processing plants, to be recycled, either as cooking oil or it can be turned into a road fuel. As UCO would otherwise be sent to landfill, any reuse can be deemed beneficial. †

A&B, the largest collector of UCO in the UK, collects approximately 120 tonnes of oil each week. [27] The total volume of UCO available from this source, assuming that all UCO is processed into biodiesel, would give a yearly volume of 6240 tonnes, which is roughly equivalent to 6.24×10^6 litres. [28]

The UK national consumption of diesel, through forecourts in 2000, was 8.5×10^9 litres, thus A&B's total throughput could provide approximately 7% of forecourt diesel fuel. [29] However, it must be realised that diesel sold through forecourts is predominantly "retail" and that large volumes of diesel are consumed without passing through sales forecourts e.g. fuel used by bus operators and large fleet operators.

In view of the above, it is generally accepted that the most practical use of whatever biodiesel is produced, is to blend it with ULSD to reduce further the latter's emissions and increase its lubricity. At 5% concentration, biodiesel blends cause no problems when used in modern diesel engines. When levels get to 20% concentration, the EU required governments to monitor the environmental and health effects.

The availability of biodiesel can be discovered through the following websites:

- http://www.biodieselfillingstations.co.uk/region02.htm
- http://www.transportenergy.org.uk/tools/refuellingmap/

Most of what is available is a 5% blend of biodiesel with 95% ULSD and even this has limited availability, though mixing with ordinary ULSD should not cause any problems. Pure biodiesel is eligible for 20 pence less fuel excise duty than ULSD; blends containing biodiesel have duty charged according to the proportions of the blend.

6.2.4 Liquid Petroleum Gas (LPG)

LPG is a petroleum-based fuel stored, as a liquid, in pressurized tanks. LPG is strongly supported by the government for its reduced emissions of pollutants compared to other road fuels. The only significant environmental drawback is that it creates more CO_2 than diesel. For people living in Kent, the major drawback is the lack of any registered installers and maintainers of LPG systems in the county. [30] For those who regularly use their car to enter the Central London Congestion Charge Zone (CCZ), LPG offers the advantage of charge concessions.

---

† The use of UCO as animal feed will no longer be permitted from October 2004, so an increased proportion of the volume may become available for biodiesel. Ref as [2].

The number of petrol stations which stock LPG has increased significantly in the last few years, but it would be fair to say that coverage is limited mostly to the larger petrol companies and supermarket outlets. The fuel itself is much cheaper than petrol, due to lower levels of excise duty, but is not directly-comparable with petrol, as it is less efficient. Additional savings in Vehicle Excise Duty (VED), more commonly known as “car tax”, help to lower the costs of running a LPG powered car.

6.2.5 Hybrid Vehicles

Hybrids are vehicles which utilize a combination of an internal combustion engine (ICE), batteries and an electric motor. At low speeds (approximately <20mph) the vehicle is powered by the electric motor, using energy from the batteries; at higher speeds the ICE starts and provides the power. The batteries are recharged by the ICE and regenerative braking, which effectively uses the electric motor as a generator, whilst slowing the vehicle; the kinetic energy of the vehicle is converted to electrical energy, instead of heat as would be the case with conventional brakes. (The vehicle does have conventional brakes, as well)

When used in the urban cycle, a hybrid can return exceptionally frugal fuel use and this continues in the extra-urban cycle, too. However, the very latest small diesel-powered cars can just about match these consumptions, but the diesel cars tend to be smaller and the overall CO_2 emissions are not quite as good. Where the hybrid wins is in air quality in the urban environment, as Oxides of Nitrogen (NO_x) emissions are very low and there are no particulates. [31]

As with LPG vehicles, there are concessions for hybrids in the CCZ.

6.2.6 Other Fixes for Diesel Engines

Particulate traps are designed to trap the tiny soot particles present in diesel exhaust fumes. These are mostly fitted to large goods vehicles, but smaller applications are now being developed for fitment to cars on the production line and as retrofits.

Continuous Regenerative Traps recycle diesel exhaust gases to cool combustion; this reduces the generation of NO_x and, when fitted with a particulate trap, PM10s. Due to their complexity, this type of trap can only be fitted to new vehicles.

6.2.7 Synthetic Lubricants

By dismantling oil, at the molecular level, and rebuilding it, it is possible to create lubricants which outperform conventional oils and greases. The benefits are that service periods may be extended and frictional losses in mechanical components are reduced, leading to increased efficiency.

It is reckoned that a 5% fuel saving is possible when using a synthetic engine oil. [32] The engine is not the only source of frictional losses and using synthetic oil in transmissions can lead to a *further* fuel consumption reduction of between 1 and 5%. [33] An advantage of these oils, for transmissions, is that they can be fitted and left in place, as manual transmissions are designed to be maintenance-free (apart from checking that no oil has leaked out).

It can be calculated that 2 litres of Millers synthetic 75W/90 transmission oil would cost ~£20 (inc VAT) and would pay back in less than 22,000 miles at a 1% increase in efficiency, assuming petrol at £0.83/litre and an average 40mpg. [34] If many short journeys are made, the payback may be quicker because these oils are much less viscous than conventional oils, when cold, and absorb less energy in the transmission, hence leading to better fuel consumption.

6.2.8 Fuel Additives

There are many fuel additives on the market and their claims are just as various. On the whole, these additives work by cleaning the fuel system of the vehicle. Additives are available for both diesel and petrol engines, but are not interchangeable. Diesel additives may also increase the cetane content of the fuel which improves the combustion, too. Even if fuel economy is not improved some additives can reduce emissions from vehicles; especially particulates from diesels, generated due to dirty fuel injectors.

As indicated above, pump fuel has improved in recent years and good quality fuels may negate the need for fuel additives because they already contain sufficient detergents to keep the fuel system clean.

6.2.9 Tyres

Tyre technology has advanced quite considerably in the last 20 years. The “rubber” compounds from which tyres are now made can be formulated to provide low rolling resistances, whilst retaining good grip. It is claimed that fuel savings from the use of these tyres can be as much as 5%. [35] Unfortunately some of these tyres are expensive enough to reduce any financial savings, form fuel economy, quite substantially. Also, much of the effectiveness of these tyres is likely to depend upon driving style.

Retread, or remould, tyres can give a significant energy saving in life cycle analysis. By reusing the carcass of a worn tyre, approximately 60% of the energy used to manufacture a new tyre is saved. [36] Additional environmental benefits accrue from the tyres not being sent to landfill. However, these tyres may not last quite as long as “new” tyres, but are significantly cheaper to purchase.

Another new process is described thus:
“Goodyear is taking a new approach to environmental protection. The U.S. tyre maker, which is also the owner of Dunlop, has replaced soot with corn flour as a filler in the tread compound for its new GT-3 summer tyre. In this patented process, starch is obtained from corn by photosynthesis and added to the rubber mixture. It is called Bio-TRED.

Using this natural raw material amounts to a three-fold environmental bonus. Firstly, less mineral oil is used. Secondly, the filler material takes less energy to manufacture compared to soot and silica production, so this reduces emissions. And thirdly, Goodyear is promising reduced rolling resistance and a lighter tyre for a fuel saving of about five percent.” [37]

6.2.10 Route Planners & Traffic Updates

There are several route planners on the market. These are small on-board computers which, using Global Positioning System (GPS) technology, direct drivers to their destinations. Environmentally, the benefits of these devices are that drivers can take more efficient routes and arrive less stressed. Overall fuel consumption should be reduced.

Some vehicle radios are equipped with a system that interrupts broadcasts with local traffic updates. This gives the driver a chance to avoid congestion, thereby saving fuel.

6.3 Non-vehicle Technologies

Non-vehicle technical fixes are usually aimed at changing behaviour, rather than mitigating the impacts of travel. An example of this would be the London Congestion Charge which, through the use of technology, is designed to discourage people from using vehicles to enter central London. The concept can have two or three results: people do not enter central London while the charge is operating; people use an alternative mode (e.g. bus, tube, cycle); people change their vehicle, to become exempt from the charge. The net effect is that air quality in central London improves and congestion is reduced.

A new technology which is currently being trialled by Norwich Union, the insurers, is to have people pay their insurance on a “pay-as-you-drive” basis. This is done by having a satellite transponder in the vehicle, which is accurate to approximately 2 metres. When the vehicle is being driven around, the mileage is recorded, by the satellite link, and a bill arrives at the end of the month/quarter. One consequence of this may be that people will drive less, because they will more-readily realise how much each car trip is costing them and there will be less temptation to think that they have paid their insurance, so they might as well use the car. [38]

A similar idea, but not a technological system, is limited mileage insurance. People limit the mileage that they may cover per year, as a means of reducing their premiums.

6.3.1 Telecommunications

Other technologies which are designed to affect behaviour, in order to reduce resource use through removing the need to travel, include teleconferencing and videoconferencing. Teleconferencing can be set up between people in a number of locations, so that all participants can hear each other. The flow of conversation can be affected by the lack of a visual element, and the meeting can only last as long as the telephone call, but the reduction of environmental impacts is very large. [39]

Videoconferencing may require specialised equipment, depending upon the required video quality, but there are companies that provide these facilities as a service to others. However, if the video conference is run over the internet, the costs may be reduced and more people can gain access to the conference. If the quality of the video link is sufficient, this can overcome one of the problems associated with teleconferencing, but again, there is no social interaction.

6.3.2 Financial Incentives

A “technical fix by proxy”, would be the strong encouragement of companies to issue company cars which are less environmentally damaging than is currently the case. As is set out in this extract from the DfT:

“1.42 Business cars account for over half of new car sales, and so, over time, these vehicles will comprise around half of the second-hand car market. They are newer, better maintained and less polluting than private cars for equivalent households but on average they have a 15% greater engine size. Engine size is not directly correlated with fuel efficiency but the implication is that these cars tend to be rather less fuel-efficient. There is therefore an opportunity for significant reduction in carbon dioxide emissions if fleet purchasers choose more fuel-efficient vehicles. There is also a strong business case for companies to adopt greener fleet strategies including, for example, reducing unnecessary car mileage.” [40]

The VCA Car Fuel Data website, listed in Appendix A, gives fuel consumption and emissions data for all new cars in the UK and could be used by fleet buyers to assess which would be the best vehicles for their circumstances.

A possible problem with this is the vanity of those who are given the vehicles, and companies may be reluctant to implement such a policy for fear of losing personnel.

Again, not a strictly technical fix but one which affects the same factors, is driving style. Several bodies give information on how to reduce motoring costs through a more efficient driving style. The Institute of Advanced Motorists place strong emphasis on smoothness during their instruction and this leads to increased fuel efficiency. The AA and RAC both give basic tips on how to save money whilst driving and include “top tips” on their websites. [41] Several local authorities also provide similar information. [42]

It would be a fairly simple matter for CEN to compile a list of driving tips which would help drivers minimise their environmental impacts and put it into an easy to access format.

7. Gathering & Disseminating Information

This section of the report should be considered in conjunction with the Funding and Markets section, as there is a large overlap in the subject matter.

Travel Info Systems (TIS) is a company which provides and maintains journey planner software. TIS does not source the data which the journey planner uses: that is the responsibility of the client. TIS has said that rail information is supplied by both Network Rail and the Association of Train Operating Companies (ATOC), either on CD, or as a Spanning Tree Protocol (STP) feed. Information on bus and coach operators can be gathered from the operators directly, or from councils who also collect this information. [43]

Kent County Council has gathered a large amount of information on transport within its jurisdiction. Of particular interest are the PDF files containing large posters of public transport routes in Kent. [44] Such maps could be displayed in workplaces, to encourage employees to use public transport. Another avenue to be investigated could be to send, to the parents of school-age children, a personalised travel plan of how to get their children to school without using the car.

Transport for London is the primary source of information in London. The author has contacted TfL about data on transport use and has received some potentially helpful assistance. Access has been granted to TfL's data sets, based upon the National Travel Survey, via an interactive web tool called NESSTAR. Appendix E is a copy of the email received from Dale Campbell, the Romulus administrator, regarding use of the NESSTAR system. However, the "attached link" is not attached and subsequent correspondence has not yet helped. A possible way into the system has been identified and this, too, is in Appendix E. The author suggests that Dale Campbell is contacted for further assistance.

As well as encouraging people to change their mode of transport to one which is less environmentally damaging, it is also possible to educate people about how to reduce the impacts of the vehicles they drive.

Although the EST has an informative website on technologies which have the potential to reduce the environmental impacts of vehicles, the EST only really covers those things for which it is prepared to give out grants. The author has been unable to find a "one stop" source of information encompassing all available technologies that mitigate and reduce the adverse impacts of road vehicle transport.

Appendix D, Available Technologies, gives a basic list of vehicle-based measures to reduce environmental impacts. This Appendix is a shallow pool of information, only, and could be given much greater depth and breadth. Using more rigorous trawling for data, a comprehensive database could be assembled. Such a database could also be given a geographical element with regard to technology/service availability and suitability, which could be most useful at a national scale where climatic differences would be significant. Assembling such a database would be a considerable task and its existence would have to be promoted, heavily, to make it worthwhile.

CEN clearly has the capability to easily assemble a much smaller source of data which could be put into a pamphlet format for mailing to those interested. Perhaps the pamphlet could give a breakdown of technologies/practices and their effects. An online fuel efficiency calculator might work quite well.

8. Funding and Markets

The search for funding has proved to be the most difficult part of the research for the report. In spite of some helpful pointers from people at CEN, the amount of information gathered was negligible, at first. A large part of the problems encountered stems from the exclusive nature of the jargon used by technocrats, bureaucrats and others, which perpetuates the "jargonocracy" of institutions. However, towards the end of the allotted project period, and after some more help, a few potential sources

of funding were identified. Additionally, there are some speculative attempts to identify other sources.

8.1 The EU

Possible sources of funding from the EU could be:

- INTERREG IIIa
- STEER
- ManagEnergy Initiative
- CIVITAS II

INTERREG IIIa may be a potential source of funding for "…ways of creating effective transport policies and strategies for regions outside Europe's main centres of economic activity." [45] As such, London and Kent could well fall outside this remit. However, the author believes that CEN already has connections with INTERREG, and this may be advantageous.

STEER is briefly described as:

"the vertical action of the Intelligent Energy - Europe programme that focuses on:

- Alternative fuels and vehicles
- Policy measures for efficient use of energy in transport
- Strengthening the knowledge of local energy agencies in the transport field" [46]

The second of these aims could be construed to include the use of technologies and practices. The last of these objectives would particularly fit with the ability of CEN to interact with its existing local authority and business community contacts and partners.

The ManagEnergy Initiative is described thus:

"Title attributed to the contract by the contracting authority:
ManagEnergy Initiative: information, communication and capacity building action for energy and transport actors local and regional levels and for the selected final energy users, such as municipalities and schools.

Description/object of the contract:
The purpose of the present procurement contract is to purchase external services to support the Commission in the implementation of the European Commission ManagEnergy Initiative. The external services can be provided by an organisation or by a consortia of organisations having excellent project management skills and the necessary knowledge in the topics of the tender. Tenderers should build their tenders on the policy and programme objectives described above and in the Work Programme for Intelligent Energy - Europe (http://europa.eu.int/com/energy/intelligent/index_en.html).
The aim of the contract is to support all existing European local and regional energy management agencies and other relevant energy actors in the enlarged EU, EEA and in the Candidate Countries, in their activities in the fields of demand management and the use of renewable energies. Among others, this includes the organisation of European events and capacity building actions, running of the

ManagEnergy web site, development of good practice information and its promotion. A particular attention should be paid on local and regional energy actors in the new Member States." [47]

This description would indicate that transport is a significant portion of the initiative, together with the implementation of energy demand management and the dissemination of information: particularly suited to CEN's strengths.

CIVITAS II is described thus:

"CIVITAS II will address implementation and transition strategies for Clean Urban Transport. Research in the field of public transport will include the development of innovative solutions for market analysis and product development, offensive marketing, service integration, improved access for people with reduced mobility, private sector investments, and low-cost network and vehicle refurbishment. To advance the knowledge on innovative measures, research is planned on urban pricing, awareness and information tools, mobility management, integrated planning approaches, and access control and regulation." [48]

One of CEN's core activities is the accurate dissemination of information and this might fit well with the stated aim of CIVITAS II, "To advance the knowledge on innovative measures, research is planned on urban pricing, awareness and information tools, mobility management, integrated planning approaches, and access control and regulation."

8.2 UK Government

The principal government departments concerned with transport are:

- DfT
- DTI
- DEFRA
- ODPM

In addition to these, other departments and agencies with an interest in transport include:

- Department for Work and Pensions
- Department for Education and Skills
- The Environment Agency
- The Countryside Agency

All of these departments and agencies may be potential sources of funding, but they have different interests in what they want out of a partnership

8.3 Smaller Sources of Funding

Kent Rural Community Council may be a potential partner/funding source, through the programmes outlined below. Most of these programmes appear aimed at issues of social exclusion, but a lack of access to transport and transport information would fall within this.

8.3.1 Community Action South Kent Community Chest

Maximum £5,000 for social and economic projects providing long term benefit to communities in designated areas of south east Kent. There are also individual training grants of up to £100.
Contact Miranda Hayes on 01303 850816 or email: miranda.hayes@kentrcc.org.uk

8.3.2 Rural Revival

Maximum grant of £10,000 for projects that break down barriers to employment for disadvantaged or under-represented groups or individuals in rural areas of Kent.
Contact Jonathan Bibby on 01622 221548 or email rural.revival@kent.gov.uk

8.3.3 East Kent Coalfield Community Chest

Maximum grant of £5,000 for social, economic or environmental projects contributing to the regeneration of the East Kent Coalfield.

Contact Regeneration Officer (Small Projects) at Dover District Council, White Cliffs Business Park, Dover, Kent CT16 3PB.

The only ideas that spring to mind are the possibility of having some sort of tie-in with the new visitor centre or local community transport.

8.4 Other "Blue Sky" Sources of Funding

8.4.1 New Non-drivers

As outlined above, a possible market for tailored travel information is those who have either lost (through convictions), or surrendered, their driving licences.

When the Driver and Vehicle Licensing Agency (DVLA) receives notification of the change in circumstances, it will contact those concerned. As many of these new "non-drivers" are likely to want to travel still, the DVLA could send them information leaflets about how to go about rearranging their travel options. CEN could both provide these leaflets and be the first port of call for help with revising travel arrangements.

Funding for this might be gained from the DfT, non-government sustainable transport actors, the ODPM and DEFRA (to avoid social exclusion). Other sources might be the Department for Education and Skills (DfES) (to ensure that travel to education is not affected) and the Department for Work and Pensions (DfWP) (to ensure employment is not disrupted). Another possibility would be for vehicle insurance companies to put people in touch with CEN should they become uninsurable. Quite where funding for this would come from, is less clear.

8.4.2 Start-ups

It is a good idea to have businesses embody Corporate Social Responsibility (CSR) into their ethos, from their inception. It is likely that local councils make themselves aware of new businesses through planning applications and links with chambers of

commerce and the local business community. Combining these two factors provides the opportunity for local authorities to influence start-up businesses at their earliest stages. To this end, could CEN help local authorities keep traffic growth and transport energy use to a minimum, through the provision of appropriate services?

Most local authorities are able to provide information on workplace travel plans, but CEN might be able to take that idea further, into the employees' households. Would local authorities fund this, to help their environmental and H&S targets?

Another avenue of investigation would be Companies House which has a large searchable database of existing companies. It may be possible to access the database to gather the names of just the recent additions. A potential problem would be the national nature of Companies House and the fact that the registered office of a company need not be its operational base.

8.4.3 Air Quality, Road Works and Route Planners

With national legislation requiring councils to address air quality problems, within their areas, there could be a source of funding available for the setting up of a centralised, phone/internet accessible database of local road works. This service would give a source of information to enable people to plan coherent, delay-free, journeys. There might also be the possibility of selling this service to the providers of GPS route planners. This may already have been done. Alternatively it could be sold to, or funded by the Highways Agency and DfT.

8.5 Why Fund?

Each potential funding partner is likely to have a different reason to provide funds, but it should be remembered that the government considers a 5% reduction in traffic levels to be "significant". On that basis one can make a cumulative argument that:

- a 5% reduction in traffic could equal a 5% reduction in CO_2
- a 5% reduction in traffic, at certain times, should equal a 10% reduction in traffic congestion
- a 10% reduction in traffic congestion could reduce the requirement for Air Quality Action Plans
- a 5% increase in fuel efficiency could equal a 5% reduction in CO_2

9. Conclusion

The present transport market is almost wholly dependent upon fossil fuels and is likely to remain so for at least a decade and, quite probably, considerably longer. To this end, effort should be concentrated on encouraging and enabling people to reduce the number of trips they make and/or the environmental impacts of each trip.

It would appear that there are continuing efforts to increase the integration of the UK's public transport systems. Ironically, is seems that car transport's attraction is that it can be integrated into people's lives, rather than people having to integrate their lives into a public transport system, however well-structured it may be. At the other end of the scale is the reduction of walking, which is wholly integral with the lives of most people. A reversal of the trend away from walking may be beyond CEN's scope, except where it is encouraging people to use non-car transport. Any increase in the average walking distance would bring more people within reach of public transport and the benefits it can bring.

The government, and others, appear to have had little (or no) success in encouraging people to cycle. It may be the case that safety campaigns, to make motor vehicle drivers more aware of the dangers cyclists face, have backfired by making cycling less attractive. Coupled to this, are the problems caused by the changeability of the "Great British Weather" and integrating cycling with other modes of transport.

The above tends to paint a dismal picture, but this may not be fair. With the growth of Corporate Social Responsibility there is the potential for the environmental impacts of commuting to be reduced through workplace travel plans. This, in turn, may lead people to reduce car use in their non-work lives *and* become more open-minded towards technologies which can reduce the impacts of their car journeys.

Fleet managers are always looking for ways to reduce their fleet's running costs and financial directors search for the means to reduce overheads, especially if the savings come straight off the bottom line. By buying more efficient new vehicles, fleet managers can influence the second hand vehicle market, decreasing the environmental impacts of approximately 50% of that market's vehicles. If, when new, the fleet vehicles are also fitted with additional technological fixes (which do not breach manufacturer's warranties and further increase efficiency), the efficiency would be passed on, into the second hand market place. As fleet vehicles often accumulate high mileages, the savings would give reduced payback periods (in terms of time, not mileage).

The provision of a "one stop" data source for all this technical information should be a distinct encouragement for fleet operators and the public to assess which vehicles to buy and how they may be improved. As is the case with many efficiency factors, it is often the simple solutions which give the greatest benefit because they are the easiest to apply.

The gathering of data necessary for the compilation of a "one stop" technological database could be a difficult task, but as some people will refuse to give up using their cars there must be a means to reduce the environmental impacts of these

people's travel. At the moment, there is certainly no single practical "cure" for the CO_2 and pollution resulting from car transport.

The market for non-technology based information is less apparent. The young might be a particular target as familiarising them with public transport will get both they and their parents used to the concept. The young will be au fait with how to get the best from their travel mode and their parents may be pleased to have the increased degree of freedom afforded by not having to run a "taxi service" for their children. It may even lead to the discarding of one vehicle and a major shift away from car transport by the whole family.

Clearly, non-drivers are likely to be the greatest beneficiaries of an integrated system capable of providing information across all travel modes; a system enabling people to both travel where they want and reduce their environmental impacts. The data from which to compile such a system's database is available. Companies like Travel Info Systems are capable of administering a journey planner program, but how this could become part of a huge energy consumption and pollution-reducing leviathan is less clear. Building the database would be likely to take some considerable time because travel is such a personal aspect of an individual's life and many factors would need to be considered.

The accumulation of information on sustainable transport/travel is much less of a challenge than determining just how, and at whom, it should be marketed. The market for this information is closely tied to finding partners willing to fund its provision. To a large extent, the author feels that this report can offer no concrete proposals with regards to funding. In a "conventional" business the demand would be identified and the supply provided, but quite where the demand for information on sustainable transport/travel comes from is not clear. Perhaps the plan would be to market it as "efficiency" to the "buyer" of the information, but "sell" it as "sustainability" to the funding partner.

As stated in the text, part of the lack of visibly available funds is due to the author being unfamiliar with this sphere of activity. Some potential sources of funding may have been identified, but they have not been contacted for fear of prejudicing CEN's changes of securing funding. It is hoped that CEN will find the available information useful.

10. Recommendations

This report recommends the following:

That CEN carries out further research into:

- Who wants to know about sustainable travel
- Who wants to know about sustainable transport
- Who wants to pay for finding out, or telling people, about the above

The author feels that these topics deserve some proper market research before a serious financial commitment is made.

It is also recommended that CEN contacts the Romulus/NESSTAR administrator as this may be of use beyond just the issue of sustainable transport/travel (see Appendix E).

References

[1] EU. 2003. *Europe at a crossroads: the need for sustainable transport.* page 12.
Travel growth: Department for Transport. National Travel Survey 2002. Section 1, *Introduction.* Page 9, Table 1.2.
[2] Department for Transport. National Travel Survey 2002. Section 1, page 9, Table 1.2.
[3] Department for Transport. National Travel Survey 2002. Section 1, page 9, Table 1.2.
[4] Table 1. Adapted from: Department for Transport. 2002 National Travel Survey Section 3 *How people travel.* Table 3.1: Average distance travelled by mode of travel: 1975/1976 to 2002.
[5] http://www.statistics.gov.uk/cci/nugget.asp?id=168 Accessed 04/09/2004.
[6] **Reference for Figure 2** This chart is adapted from Roy R. 2001.*Theme 1. You and the Environment. T172. Working with our Environment: Technology for a Sustainable Future.* Figure 2.2, page 13. The Open University. The 2001 data are from the National Statistics website, http://www.statistics.gov.uk/census2001/profiles/64.asp
[7] Department for Transport. National Travel Survey 2002. Section 6, page 46, Table 6.1: Trips to and from school per child per year by main mode: 1985/1986 to 2002.
[8] Department for Transport. 2003. *Involving Children and Young People.* Page 12, Road safety: pedestrians.
[9] Involving children and young people: Action plan 2003-2004 Department For Transport 2003.
[10] Department for Transport. 2002 National Travel Survey. Section 2: *Trends in personal travel*. Page 12.
[11] The Open University. 2001. *T172. Working with our Environment: Technology for a Sustainable Future. Theme 2. Travelling Lightly.* Table 3.4 Primary energy consumption of major transport modes, page 44.
[12] The Open University. 2001. *T172. Working with our Environment: Technology for a Sustainable Future. Theme 2. Travelling Lightly.* Table 3.4 Primary energy consumption of major transport modes, page 44.
[13] The Open University. 2001. *T172. Working with our Environment: Technology for a Sustainable Future. Theme 2. Travelling Lightly.* Page 57.
[14] The Open University. 2001. *T172. Working with our Environment: Technology for a Sustainable Future. Theme 2. Travelling Lightly.* Page 57.
[15] http://www.guardian.co.uk/congestion/story/0,12768,1020855,00.html Article about London Congestion Charge.
[16] http://www.pfizer.co.uk/template4.asp?pageid=38 Pfizer report on its travel plan.
[17] The Open University. 2001. *T172. Working with our Environment: Technology for a Sustainable Future. Theme 2. Travelling Lightly.* Page 44. Table 3.4 Primary energy consumption of major transport modes.
[18] Department for Transport. National Travel Survey 2002. Section 3 How people travel. Table 3.1 page 14. Also Table 3.2 page 15.
[19] http://www.tfl.gov.uk/dial-a-ride/abt-dar-intro.shtml TfL web page describing Dial-a-Ride.
[20] http://www.tfl.gov.uk/dial-a-ride/service-info.shtml TfL web page describing Dial-a-Ride fare structure.
[21] http://www.dft.gov.uk/stellent/groups/dft_about/documents/page/dft_about_030040.hcsp DfT web page about Transport Direct. Accessed 13/09/2004.
[22] Department for Transport. 2003. *Involving Children and Young People.* Page 12, Road safety: pedestrians.
[23] Transport, Young People and Rural Areas. 2004. DEFRA.
[24] http://www.sd-commission.gov.uk/roundtbl/report1/08.htm Extract from RCEP report dated 31st March 1999, contained within the Sustainable Development Commissions website at the URL shown.
[25] http://www.channel4.com/4car/buying-guide/faq/biofuels/biofuels-4.html Channel 4 motoring website. Accessed 06/09/2004.
[26] http://europa.eu.int/scadplus/leg/en/lvb/l21061.htm EU website outlining policy on alternative road fuels.
[27] http://www.leafstream.com/leafdata/800.htm A web page profiling A&B Oil, a national collection service for used cooking oil. Accessed 09/09/2004.
[28] This is an estimate assuming that 1 litre of UCO = 1 kg. The volume will be greater, as UCO is less dense than water which has a density of 1kg/litre.
[29] http://www.og.dti.gov.uk/downstream/petroleum/index.htm DTI website accessed 05/05/04.
[30] See Appendix F.
[31] http://www.vcacarfueldata.org.uk/search/vehicleDetails.asp?id=10982 Toyota Prius Hybrid.

http://www.vcacarfueldata.org.uk/search/vehicleDetails.asp?id=12962 Citroen C2 1.4litre HDi diesel.
[32] http://www.volkswagen-environment.de/buster/buster.asp?i=_content/praxis_62.asp Volkswagen website describing the advantages of synthetic lubricants. Accessed 06/09/2004.
[33] http://www.redlineoil.com/pdf/5.pdf Redline lubricant supplier's website describing improvements in fuel efficiency when using synthetic transmission oils. Accessed 06/09/2004.
[34] http://www.millersoils.net/index2.html Millers Oils website, giving prices of synthetic lubricants. Accessed 06/09/2004.
[35] http://www.michelin.co.uk/ Michelin Tyres website extolling the virtues of their low energy tyres. Accessed 06/09/2004. See also Transport White Paper 2004.
[36] http://www.volkswagen-environment.de/buster/buster.asp?i=_content/praxis_62.asp Volkswagen website about the environmental performance of tyres. Accessed 06/09/2004.
[37] http://www.volkswagen-environment.de/buster/buster.asp?i=_content/praxis_62.asp Volkswagen website about the environmental performance of tyres. Accessed 06/09/2004.
[38] http://www.norwichunion.com/pay_as_you_drive/latest_updates.htm Norwich Union Insurance website. Description of new pay-as-you-drive system. Accessed 09/09/2004.
[39] Weizsäcker et al. 1998. *Factor Four: doubling wealth, halving resource use.* Earthscan. pages 112 to 115.
[40] http://www.dft.gov.uk/stellent/groups/dft_roads/documents/page/dft_roads_506886-02.hcsp#P166_22261 DfT Website giving information on how businesses can reduce the environmental impacts of their travel.
[41] http://www.rac.co.uk/carcare/advice/general_help/responsible_driving?view=Print RAC website on driving efficiently.
[42]http://www.northlan.gov.uk/living+here/roads+and+transport/smartways/what+drivers+should+know.html North Lancashire CC website giving information on driving efficiently.
[43] Ian Spring. Travel Info Systems, Tel: 020 7428 1288. http://www.travelinfosystems.com/
[44] http://www.kentpublictransport.info/images/countymap.pdf This page is a map of public transport routes throughout Kent. There are other maps for particular districts at http://www.kentpublictransport.info/map.htm Accessed 10/09/2004.
[45] http://www.interreg3c.net/sixcms/detail.php?id=5388 Aberdeenshire Council description of its INTERREG IIIa funding for transport initiatives. Accessed 09/09/2004.
[46] http://www.managenergy.net/indexes/I354.htm Brief description of the STEER project. Accessed 09/09/2004.
[47]

http://ted.publications.eu.int/official/Exec?DataFlow=call_one_detail.dfl&Template=TED/result_one_detail.xsl&TableName=TED_EN&Query=ND:%22108024%202004%22&Lang=EN&StatLang=EN Website which briefly describes the ManagEnergy Initiative. Accessed 09/09/2004.
[48]

http://www.europa.eu.int/comm/dgs/energy_transport/rtd/6/call_3/doc/2004_tren_3_workprog_62_2002_2006_en.pdf Document describing the scope of CIVITAS II. Accessed 09/09/2004.