



The Transport Dilemma

Price
70p

The dilemma

Transport (including air and water) now uses the most energy of any sector in the UK having more than doubled from 17% to 39% between 1970 and 2007. Vehicles use 27.6% and emit other pollutants besides carbon dioxide as well as noise. Satisfying motoring demand means widening or adding roads taking land space. Travelling is a major cause of accidental injury and death though rates are falling.

Yet affordable transport by land, sea and air, and personal transport by motor car has enabled even the poorest in the UK to expand their horizons and enrich their lifestyles. As Fig 1 shows, the growth of travel since the '50s has been accomplished *almost entirely* through increased use of the car. Whereas other forms of transport declined by 39 billion passenger kilometres (from 148 to 109 bn p-km) between 1952 and 2009 car use has increased by 622 bn p-km (from 58 to 680 bn p-km). Restricting people's use of their cars would devastate lifestyles. The dilemma is that anyone advocating drastic measures to curb car use is unlikely to be elected to carry them out. The 74% vote in 2005 against the congestion charging proposal in Edinburgh and a later rejection in Manchester shows the difficulty.

There is a route out of this dilemma, at least some of the way, but it is not easy, nor will results be immediate. It is important to understand first why we are where we are.

The present position

The private motor car represents an ideal form of transport: door to door, reliable, fast, comfortable, relatively cheap, secure, protected from the elements, with ample carrying capacity for companions, luggage or goods. It is personal 'integrated' transport. Travel is one of the fastest growing leisure activities. It is widely seen as a major benefit of greater affluence. Nowadays many think little of driving 50 miles up the motorway to shop; 100 miles to lunch with friends; or even flying to Australia for a few days to attend a wedding.

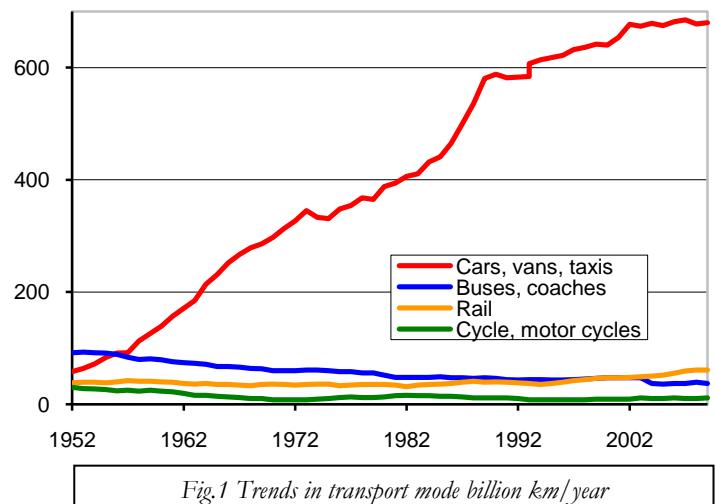
The 2000 fuel crisis and the more recent recession and high fuel prices show however there *are* public transport (PT) alternatives to some car use and many opportunities to walk and cycle, and people *can* share cars. Indeed we owe a debt to David Handley and the fuel protestors in 2000 for showing that the real problem is not that there are no alternatives, but that people do not *choose* to use them.

Having said that it is also clear that PT does not offer a complete alternative. *Nor can it ever do so as things exist today.* Since the '50s, cities and lifestyles have been developed on the assumption that most people *can* travel by car. At present cities are not *designed* to be served by PT. *If we want genuine PT alternatives we have to develop our urban areas to reduce transport needs*

whenever the opportunity arises. Though some cities such as Nottingham have started, this will take decades, not years.

In the meantime the environmental argument needs to be won. We have to educate people about the environmental imperative of reducing fuel use. One may achieve something by stealth - the odd bit of pedestrianisation here and free public transport there - but it seems to ALDES that the only strategy that will work is one of '*price and persuade*'. Ultimately financial pressure has to be applied to persuade people to (a) purchase more fuel efficient vehicles (b) reduce the *need* to travel and (c) divert to PT more.

The potential to divert to public transport is much greater in urban than rural areas. Outside towns persuasion can only really reduce *wasteful* use.



Good urban planning reduces transport need

There is a direct relationship between the *layout* of urban areas and the traffic *generated*. Transport needs can be reduced by intelligent *design*. A city centre which has flats, shops, offices, restaurants, and entertainment in, say, 6 storey buildings, *eliminates* most *need* for cars. Mechanised transport is vertical rather than horizontal. Similarly, a network of small but comprehensive shopping centres containing post office, chemist, cash machine, 2000 sq metre supermarket, specialist greengrocer, butcher, and takeaway can reduce the *need* for residents to use a car. Anyone living up to, say, a kilometre away can walk, and up to 3 kilometres, cycle. Footpaths and safe cycleways must be provided of course but the key point is that large urban areas need to be designed as a series of mostly self sufficient urban *villages*. They can only be 'mostly self sufficient. Despite the expansion of home working enabled by the internet, employment patterns are so diffuse

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that workers will still need to travel beyond their 'village', and there will be big stores and entertainment outlets that can only serve larger catchments. However these too can avoid generating car use

Travel Mode	Typical Use	Full
Express coach	0.3 (65%)	0.2
125 Diesel train	0.8 (50%)	0.4
225 Electric train	1.0 (50%)	0.5
Small diesel car 1.8 l	1.2 (35%)	0.4
Small petrol car 1.1 l	1.4 (35%)	0.5
Suburban train electric	1.7 (22%)	0.4
Large diesel car 2.5 l	1.8 (35%)	0.6
Large petrol car 2.9 l	2.8 (35%)	1.0
Internal air flight	3.5 (65%)	2.3

Energy use for different transport modes. (megajoules/passenger mile)

Source Royal Commission 18th Report on Environmental Pollution p.199

if they are sited near train stations or on good bus routes. At present it is common to find that even environmentally caring people have no *realistic* PT option.

PT is 'shared' transport and is most successful along corridors of high activity: that is where many people want to go to the same shops, work places, social outlets and so on. These corridors have to be *designed in*. They need to link the 'urban villages' together. Where there are no corridors, for example in rural or sprawling residential areas, there comes a point where not only do the costs of PT/person escalate, but the *energy used* per passenger mile becomes *greater* than the use of individual cars. As the table for long distance travel shows, the energy used by a car is not so much greater than a train. Indeed a 125 Diesel train and a small diesel car use the same fuel (0.4MJ/passenger mile) if both are full. It is only if the train can maintain higher occupancy levels (typically 50%) that it gains over the car (typically less than two passengers).

If residential areas and new developments are allowed to sprawl (as has occurred in much of the UK) or if new super-markets or business parks are sited off PT routes, say at new motorway junctions, traffic will *inevitably* increase. If city centres, which could be vibrant, highly active places, are allowed to become run down with polluted air and crime, the people who *work* there will not wish to *live* there so travelling, including car use, will increase. If parents are encouraged to seek out the best schools for their children instead of supporting the one in their local community, car use for school runs will increase. Indeed this has happened. The average distance travelled by primary children has gone up from 2.09 to 2.4 km and 4.9 to 5.5 km for secondary. None of this is rocket engineering. What ALDES is saying is that transport planning must be *integral* with town planning, not something considered *after* the problem has been created.

There may be a temptation to turn one's eyes to the sky, reflect on the present mishmash and despair about what can be done. We don't believe this. Visit a city at 20 year intervals and it can be almost unrecognisable (sadly, often as a result of new roads). Offices replace old factories. Old terraces are swept away. The key is to redevelop in a way that matches the *best* transport points such as rail and bus stations, to the *greatest* transport needs - shops and offices - and the *weakest* transport points (distant from main roads and railways) to the *lowest* transport needs, eg parks, playing fields, allotments.

It should be easier in new development, but even here the layout/transport link remains weak. ALDES believes developers should be required to show how new residents, visitors, employees, etc will be able to (a) walk or cycle to work, shops etc (b) use PT, and only then (c) move about by car. The provision of short cuts, special cycle routes etc should be built in *from the beginning*. Currently planners consider (c) and largely ignore (a) and (b).

If this simple link is understood, one outcome is likely to be higher buildings giving higher population densities at interchanges and other transport nodes. This would match demographic changes which are for increasing numbers of single person households and childfree couples with insufficient time to maintain more 'garden' than a few pots on a balcony. We should not be frightened of building 4, 5 or 6 storeys high, especially as this should create space for *urban parks*. Indeed the model of the enclosed London squares, with added car parking and shops beneath, restaurants on the top floor, and a metro station nearby, could be introduced to many other towns. The new canal side developments in central Birmingham work well. These 'urban villages' *eliminate* the need for much private car use and of course are of great interest to around a quarter of households without cars.

We believe also that transport efficient development would be assisted by the financial pressure of replacing business rates and council tax by a tax based on developed land area. This would give a further incentive to 'build high'.

Giving priority to non-car alternatives

PT can not meet all transport needs, and there is a limit to the use of bicycles and walking. However, where these modes are *potential* alternatives to the car, it is clearly sensible to *favour* them. The options of bus lanes, park and ride, cycle paths, pedestrianisation and multi-occupancy lanes (a minimum of 2 or 3 in a car) at peak times, are slowly being adopted, but through ticketing and integration of PT services is still not happening much outside London where the Oyster card is simple, popular and showing the obvious way forward. Hypothecation of car park and congestion charging to subsidise PT is accepted however and in practice in London.

However, arguing that change is *possible* is not the same as *making it happen*. Much as we might wish to widen pavements, provide cycleways or create bus lanes, the truth is that many roads have buildings either side and there is simply insufficient space for all modes of transport. Junction design becomes more complicated and can *increase* congestion and pollution by causing more delays as traffic lights go through more complicated sequences. Moving kerb lines (where this is actually possible) is expensive because it requires re-positioning of road gullies and sometimes lengths of drain. Provision for the different transport modes becomes a zero-sum game.

In these cases priorities have to be set. If we are committed to reducing car use, it means *taking away* priority from the car. There are three ways to do this: stop cars using certain roads; limit cars to one way only systems; or reduce the speed of cars to 20 mph to make life safer for cyclists. A major deterrent to PT however, remains cost. Bus and train fares are usually much higher than the *marginal* cost (mostly fuel) of

using a car and the disadvantage has *widened* over the years. There is a limit to altruism in this country. No advocate for PT can reasonably expect citizens to pay more for a less attractive mode of transport. ALDES believes that work place and congestion charges in towns should be used not just to improve PT facilities, but to directly subsidise fares.

Indeed there is a good case for making PT *free* - or available for a fixed charge, say £30 a year. Some years ago Sheffield's low fares policy and London's Fares Fair schemes were instrumental in maintaining usage of PT. The main problem with free travel is a practical one. If private bus operators get all or most of their revenue from *subsidy*, they have no incentive to provide an efficient high quality service. However smart card technology, which can record all journeys on all buses, is being introduced so individual companies are paid precisely for all passengers they carry.

If PT can not be made free for all, ALDES believes that employers should be able to give their staff tax free travel passes if they agree not to drive to work. At present an employer finances the cost of parking space, and may one day* have to pay a parking tax to go with it. Those costs are tax deductible. There is no reason why an environmentally friendly alternative should not be tax deductible as well.

We believe that congestion and parking charges *must* be accompanied by education. This is in line with our slogan 'price and persuade'. The country requires a massive culture change. At present unrestricted car use is 'ok'. Big cars are status symbols. Yet in other countries, such as Sweden and Holland, cycling is common. There 'it is the thing to do'. That attitude has to grow here.

One of the findings of the Leicester road charging trial (see Note 3 at end) was that road usage dropped *more* when drivers were told air pollution in the city was high. In other words when drivers understood the reasons to curbing use, they were likely to be, or could be shamed into being, more responsive. There is an argument that congestion charges can not be applied because PT is not in place, but this is a 'chicken and egg' problem. As the fuel crisis showed, it is amazing how much PT *is* in place. It would grow as usage grows as London has shown with a rise in bus journeys from 1.14 to 1.99 million between 1985/6 and 2006/7.

A less green but interesting option is being deployed in Sydney, Australia. GoGet cars are available from 'pods' all round the city and can be booked by members over the internet. There are 2 advantages: to deter residents from buying (and being tempted to use) a car or second car in the first place and reducing on-street parking and, second, putting up the *marginal* cost of using a car for a journey.

We can not ignore the problem that much responsibility for reducing car use depends on local councillors who often believe restrictions are unpopular and that the electorate will not vote for those who push them through. They will argue that if higher charges are introduced shoppers will drive to nearby towns and employers will re-locate. They have good pragmatic reasons for hanging back or doing nothing. Lib Dem philosophy is to devolve power and let local people decide, but Lib Dem philosophy is also about devolving

* Nottingham intends to charge organisations £185/place/year for every parking place they provide above 10, from April 2012

responsibility. Local councils *have responsibility* to reduce fuel use.

Reducing fuel use

We have said above that the potential to transfer from private cars to PT outside urban areas is limited. Those living in rural areas frequently do not generate a need that can be met by PT in an energy efficient way. Travelling between urban areas to see friends and family or simply enjoying the countryside and so on is part of the pleasure affluence has brought to modern life. The car allows us to undertake journeys *we could not otherwise make* except at excessive cost or time.

The efficiency of motor vehicles and the cleanliness of their emissions has improved steadily since the first versions were preceded by a man with red flag and continues to do so. However there is no point offering fuel efficient cars if people simply buy bigger ones. Moreover, as fuel efficiency improves, the real cost of motoring will *reduce* instead of increase. The cost of motoring must continue to increase in *real terms* and the public must be *aware* that this will be so, so that they can factor it into their long term decisions. In the Royal Commission's 18th Report on Environmental Pollution (RC18) a doubling in fuel price over 10 years was recommended, with further rises thereafter. The Institution of Civil Engineers called for the reinstatement of the fuel duty escalator in its 2003 State of the Nation report. The surge in pump prices since 2008 has found motorists thinking twice about their journeys and the fuel efficiency of their next car.

Some price pressure is now being applied via vehicle excise duty (VED), with gas guzzlers and dirty emitters paying more. The party had proposed to go further with a charge of £2000 annually for 'Chelsea tractors', but it seems to us there is no chance of having large enough differentials in VED to avoid criticism of inequity from small mileage users, whilst having any kind of significant impact on larger ones. If a Ford Fiesta owner pays £115 VED, does 10 miles/litre and drives 5,000 miles in a year, the *fuel* cost (at £1.40/litre) will be £700. For 20,000 miles it is £2800. VED adds 16.4% to the low mileage driver but barely 4% to the high mileage one, and nothing to the 'marginal' cost of using the car. It may have a once a year 'educational' effect but provides no measure of the relative damage done. The annual VED licence is a good way to check that insurance and MOT inspections are up to date but a poor alternative to direct taxes on fuel.

Road user charging or Fuel Duty increase?

Over recent years enthusiasm for charging motorists a 'road user' fee for every mile driven using satellite tracking or 'tag and beacon' road based systems has waxed and waned. The Dutch were apparently committed to it for lorries from 2013 and all cars a year later but things have been quiet for a while. Mileages would be computed from GPS records which would identify the categories of road, and these will be multiplied by a figure for average pollution for that type of vehicle. It is reported that charges will be adjusted for congestion, presumably by time of day. Foreign vehicles will be detected by their number plates but it is not clear how they will be charged without the GPS 'black box'. The Austrians have a tag and beacon system for HGVs and cars

on major roads.

In March 2007 the UK Dept of Transport got as far as proposing that roads be zoned with charges/mile of up to £1.34 in city centres, 14 to 86p in inner suburbs, 4 to 9p in outer suburbs and 2p in rural areas. Owners would have been billed monthly. This is a better option than using fixed charges like VED and potentially makes it possible to 'kill two birds with one stone' by putting pressure on motorists to reduce use overall especially in the most congested areas and roads. Ignoring the civil liberties arguments however, there are downsides, the worst being the cost and complexity of the technology on the one hand and the billing on the other. To be really efficient the charges would need to vary by time of day (rush hours, daytime, evening); day of week; and also by vehicle emissions, otherwise there would be no incentive to buy fuel efficient cars. Road user charging gives no credit to the motorist who drives carefully and maintains his car well and it will attenuate 'rush hours' rather than reduce miles travelled. The party working group proposed to limit road user charging to motorway and trunk roads. Given that these represent only 12.6% of the total road length of about 400,000 km in the UK but carry 64% of the traffic this would save on installation costs but would cause cars and lorries to divert to 'free' rural roads, 'rat runs' and quiet villages, and businesses to re-locate.

Though existing technology could support road user schemes, they will be expensive and there will be errors. Foreign visitors and lorries would require special treatment. The potential for a bureaucratic shambles is high. (There would be 30 million or so accounts with perhaps 200 entries each/month all subject to challenge.) The alternative, increasing fuel duty, is far simpler and does not exclude charges to reduce congestion in selected situations, especially cities and motorways at busy times**. Furthermore *all* the additional revenue would be available for investment in public transport or reducing income or other taxes.

ALDES continues to believe the greatest pressure should be applied in the simplest and most direct way, ie. on fuel itself.

This gives the *maximum* incentives for careful choice and thoughtful use of a car. The reason politicians of all parties shy away from increasing fuel tax is that fuel prices are highly visible, purchases often being made several times a week. It may sound cynical to say it but VED is a stealthier tax and the political downside of road user charging would not be visible before another election.

Giving a discount for 'essential' use

Some individuals, especially in rural areas, need to use a car for all kinds of good reasons and genuinely have no public transport alternative. They can of course buy the smallest practical vehicle but they can not expect to avoid higher prices or all restraints. One way to mitigate the impact on poor motorists generally, not just those in rural areas, would be to create a 'two-part tariff' structure for the fuel tax regime. We already pay for gas and electricity this way, the first few units costing more than the remainder (incidentally the wrong way round if concerned with sustainability). With fuel it could be done by using a debit card issued with one's

annual VED disc worth, for example, 500 litres/year, drawn down as fuel was bought. So, if a car's average consumption was 10 miles/litre the first 5000 miles would cost less than the remainder. A motorist driving a frugal car doing 14 m/l (63 mpg) would get 7000 miles at the cheaper price. If the rate for fuel *over* the 500 litres was £1/litre *more* than at present, the Treasury would raise £34 bn - serious money! To sweeten the pill the *concessionary* rate could of course be less than paid now and the differential between concessionary and full rate could start small and be increased over several years. ALDES believes the practicality of such a scheme should be investigated. Opportunities for fraud, and options to give greater allowances to special groups, eg the registered disabled or even those in particular rural postcode areas, could be considered.

ALDES believes the educational value of such a scheme would also be significant. There would be competition between friends as to who could get the most mileage from their fuel debit card. Much of the heat from higher and higher fuel prices would be siphoned off because essential use would be provided for. Most importantly it would increase the incentive to buy small frugal vehicles and to drive carefully and only when necessary.

Being wise about speed

A motor car uses fuel most efficiently at speeds between 40 and 50 mph. A simple way to save fuel is simply to reduce motorway speeds. RC18 quotes a typical vehicle using 0.17 litres/km at 100 mph and less than half that (0.07 l/km) at 45 mph so, for a start, ALDES believes the 70 mph motorway limit should be enforced. RC18 estimated a 3% fuel saving could be made by this action alone and there would be savings no doubt on the trauma and cost of accidents.

Nowadays, however, individuals rarely go out 'just for the drive'. Almost all are simply trying to get from A to B for work or social reasons. Thus reducing speed increases the time 'wasted' on travel and imposes an economic cost. Furthermore, every time one reduces speed below 40 mph one adds an *environmental* cost to the economic one because the car uses more fuel to complete the journey. Stop start motoring is worst of all. Indeed badly designed road humps which cause vehicles to slow below 20 mph before speeding up again increase pollution. An AA study reported in January 2008 found fuel use doubled over humps, whilst merely driving smoothly at 20 rather than 30 mph increased emissions by 10%. Other studies suggest humps cost lives because ambulances rushing to heart attack victims can be delayed by up to 15 seconds per hump. The London Ambulance service estimated 500 premature deaths/year occurred this way. 'Average speed' cameras are more expensive but a far better way to control speed. There is a good environmental argument for keeping speeds up to 40 mph even in urban areas; doing everything possible to smooth traffic flow, for example by linking traffic lights along a main road so that they turn green as vehicles approach, and by using sensors in the road to measure traffic flows approaching lights so that the time on green matches the flow and minimises the number of cars that have to stop; introducing amber controlled left turns; reducing the number of junctions and need for right turns; and so on.

There is a good case too for supporting ring roads round

** Interestingly if 50% of all motorways were tolled at 20p/mile, the daytime car rate on the M6 toll road, £8 bn would be raised.

urban areas if the opportunity is taken to *reduce road space within the urban area* by extending pedestrianisation. Essentially one would not be *adding* a road but *moving* it. Ring roads can reduce air pollution. If we are to choke off increases in road travel to achieve our CO₂ emissions targets there should be little need to expand motorways and major roads. *Currently road congestion is a major disincentive to car use. It should be price.*

Transfer to rail? HS2?

There is potential to undertake part of a long journey by coach or train especially when travelling into cities. Park and ride schemes at stations are increasing and simple bike and car hire schemes are coming for travelling on from stations. 2000 electric cars were being made available for a few euros an hour for rail travellers (and others) to complete their journeys in Paris in 2008 following the successful introduction of a 'hire cycle' scheme while London at least has bikes. More could also be done expanding light rail in cities though the cost is high.

Rail use has gone up by 71% since privatisation in 1994/5 so Network Rail is now struggling to provide sufficient track and carriage capacity. Slowly the shambles created by privatisation is being sorted out but one key point is that rail is, or can be, not only fast and reliable but a *high class* mode of travel, much more so than bus which can involve cold waits at bus stops, bumpy rides, and delays due to traffic congestion. It is much easier to get motorists to move from car to train than car to bus. Unhappily both the capital and running costs of railways are high. Currently the government is trying to reduce the £5 bn subsidy (c. 8p/passenger mile) taxpayers fork out for rail travellers.

Even so there is current interest in a high speed railway (HS2) out of London. Engineers can see that if present growth continues the West Coast mainline will reach capacity in the foreseeable future and the only realistic solution is to build another railway which would run from London to Birmingham starting about 2018 and being ready about 2025 and then extended on separate lines to Manchester and Leeds, for use around 2033. No case can be made at present for lines to Bristol/Cardiff or Scotland though travel times from Scotland would be reduced by the HS2 section. Trains would initially run at 360 km/hr and would be passenger only with few stops. HS2 would not take freight as flatter gradients would be needed adding to construction costs nor would trains be able to continue onto present lines unless tunnels could be enlarged. It could not run parallel to present lines or, indeed, motorways because those curves are too tight and the train would have to keep braking and accelerating.

Inevitably there is opposition. While everyone wants a station, none wants a new line. HS2 would free up capacity for more freight and suburban and slower intercity trains on existing lines and, importantly, it would run on electricity which has the potential to be generated from low carbon sources. However, while HS rail has proved it can divert passengers from air for journeys up to 3-4 hours in France it is doubtful that the saved journey time from Scotland will be enough. Worse, though the economic case for HS2 is being based on no increase in fares above conventional ones, one suspects that most fares will be at the high end of the current

range. Construction costs in crowded England will be high, about £2 bn each year for 15 years from 2018.

A more modest and quicker option would be to increase existing capacity through longer trains (and platforms), satellite controlled 'signalling' which can safely reduce the distance between trains and thus the number running per hour, and removing bottlenecks.

Another option is 'guided buses'. These (as in the 25 km long/£116M Cambridge to St Ives route) run on dedicated tracks with small horizontal wheels keeping the bus within kerbs. Ride quality can be good but, more importantly, the bus can also divert to ordinary roads at the end of the guided section making services more flexible than with rail.

Rail freight

Barely 10% of inland freight is moved by rail. It may be politically incorrect to say so but we do not believe a massive shift from road can be made although if fuel prices remain high this will have some effect. Taking freight by rail usually means 3 separate journeys: to the railhead, on the train, and from the railhead to the destination. The transfers take time and cost money though these become less significant the longer the rail distance travelled. At one time the break even distance was about 200 miles, but now, with bigger trucks and better motorways, it is greater. Furthermore freight train traffic, which is heavy, steady and slow, does not mesh easily with faster intercity trains or stopping local services. Much rail freight ends up travelling by night, though this conflicts with the need for track maintenance.

The key area for expansion is long distance rail distribution to mainland Europe. Our strategy must be to support projects to London which can link to the chunnel and the continental network beyond and to the ports.

Road freight

It is not true that reducing product miles reduces costs. Distribution is only one of many costs in a product, and both distribution and product costs have been coming down since the building of the first canals. One impact of higher fuel prices will be to increase distribution costs and render local production more economic. Economies of scale will be lost but there would be both employment and environmental gains.

Air travel

As stated above one argument for high speed rail is that it would capture passengers using the more environmentally damaging mode of air as has in fact happened on the London Paris route now that Eurostar trains can travel high speed all the way. Aircraft use a great deal of fuel getting off the ground but the further an aircraft has to fly the more fuel it needs to take with it which increases the weight. In fact there is an optimum distance of about 4300 km when fuel use/km is a minimum. In perfect conditions modern long haul jets need only 3.5 litres of fuel/100 passenger kilometres (p-km). Even doubling that to 7 litres/100 p-km to allow for lower than full occupancy (typically c. 70%); less than optimum flight distances; stacking time over crowded airports, etc. means that long haul aircraft use no more fuel/p-km than medium sized cars.

The real waste comes with short haul flights. Aircraft flying

from Stanstead to Edinburgh, a distance of 500 km, use 20% of their fuel getting off the ground and landing. This rises to around 33% for half the distance, eg Stanstead to Manchester, and will be even more for shorter distances. If fuel price rises the shorter flights will be abandoned first.

Even so air travel is relatively cheap compared to rail. Air does not have the huge costs of the railways infrastructure. There is a respectable case for taxing aircraft fuel at the same rate as other transport fuels relative to the CO₂ multiplied by a factor (some suggest 3) to account for additional damage to the upper atmosphere, and then allowing individuals to decide on their mode of travel: rail or air. It will not be popular to cap the trend of increasing air travel. Though technology should improve efficiency by about 2%/year demand is currently rising by 5% so CO₂ emissions from aircraft are likely to continue to increase. Nonetheless the critical issue is to get emissions down. Governments should not prejudge the best way. Rather they should put the right tax structure in place and let individuals decide.

Two wheeled transport

The environmental case for encouraging cycling has already been made and Note 2 below suggests ways to lessen the main deterrent by making it safer. Motorcyclists however can offer a persuasive case for encouragement. Generally motorcycling is seen as dangerous. In 2005 motorcyclists made up 18% (576 ex 3201) of all road deaths despite the total mileage ridden being little more than 1% of cars (which covered 52% of all miles and had 1665 deaths) making them 25 times more vulnerable than motorists and 3 times more than cyclists. On the other hand the risk is in fact small being only one death in 9,375,000 km in 2005 despite being more often used by higher risk groups. Motorcyclists use less road space and less fuel and can make a good case for promotion.

Waterways

At regular intervals, the notion of transferring goods to water comes up again. Much is still shipped in coastal waters and up the lower reaches of the major rivers like the Severn and Thames but the UK has few canals of the capacity of those on the continent. Most are limited in size and restricted by locks to the equivalent of barely 3 lorry loads/hour, and the water required for continuous use through the locks would exceed reservoir capacity most summers.

Conclusion

The prime reason for reducing travel is to reduce carbon dioxide emissions. The key is to raise the price of carbon. This will skew lifestyles for example by providing incentives to live closer to work or nearer points where PT can be used. The key to making public transport more attractive lies in making 'getting around by PT' a central requirement of land use planning. Merely promising more buses or trains without making it easier and more *efficient* to use them will simply waste taxpayer's money. Both nettles will have to be grasped sooner or later.

ADDITIONAL NOTES

1. On Pedestrianisation: It is desirable to separate vehicles from people on pollution grounds especially in shopping areas. Here pedestrianisation has proceeded apace and is usually welcomed. Some types of shop such as newsagents, takeaways and wine stores suffer and have to move but others gain. As areas extend

shopmobility schemes need to be financed, slow moving electrically powered people movers introduced, cycle lines marked out, and traders allowed special hours to deliver goods. There are many hybrid solutions for pedestrianised areas. Some allow limited bus access or use car parks above or below the pedestrianised areas. The objective is to reduce pollution and harassment by motor vehicles. Much more of central London could be pedestrianised. Its public transport system is good.

2. On making cycling safer: Anyone who has visited mainland European cities, eg in Holland and Scandinavia, can see the potential for cycle trips for short journeys. RC18 believed 10% of all urban journeys could be done by cycle (from 2.5%).

It is true cycling is less attractive in rain, wind and icy conditions, and in the dark. It is true some cyclists feel a need to shower after a brisk ride but the days cycling is unpleasant are relatively few and the need for showers overstated. The reason why people drive instead of cycle, apart from laziness, is safety - especially in the dark and wet and on a busy roads. Cycling could be greatly increased if LAs created more safe and continuous cycle routes.

Vulnerability increases as the relative speed between cyclist and motor vehicle grows; where the road width decreases; and as the volume of traffic increases (so restricting opportunities to swing out into the on-coming lane). Residential roads are generally safe. Single carriageway roads > 7.5 metres wide can accommodate 1 metre wide cycle lanes at the cost of a line of paint. In some cases lightly used or wide pavements allow cyclists to share on a 'pedestrians have right of way' basis. Too often road width is squeezed by pedestrian refuges; or cycle lanes give out at roundabouts or junctions where cyclists are most vulnerable; or cycle lanes are littered by gullies or blocked by parked cars.

3. On congestion charging: In Leicester a trial of 100 motorists using the A47 into the city (the EU funded LERTS trial) found that at £3 a day 10% of motorists switched to PT, and at £6, 14%. Put another way *86% of motorists still used their car even though it cost them over £1,000 a year to do so!* This is consistent with the outcome of London scheme, introduced in March 2003 at £5/day, which reduced traffic by about 15%. London's success defied the doom merchants and vested interests and Ken Livingstone the then mayor should be praised for his bravery. Unhappily the addition of more bus lanes, pedestrian friendly areas and traffic lights and, almost certainly, an increase in the number of motorists finding ways round the scheme (like licensing their cars as taxis (which carry a lower charge), buying hybrids, or obtaining a 'within zone' address) has brought average traffic speeds back to pre-charging levels despite an increase in the charge to £8/day in July 2005. By trying to achieve 2 objectives - reducing congestion *and* improving air quality (eg by penalising 4 x 4 s but favouring hybrids) - the mayor fell between 2 stools. As noted earlier air quality will improve with higher speeds and smoother driving. Boris Johnson should concentrate on reducing congestion alone. If the London scheme falters other cities will be deterred.