

5. TRANSPORT POLICY AND INITIATIVES OVERSEAS

Countries in Europe and North America have experienced similar transportation trends to Australia i.e. rising demand for transport; growth in road traffic – both freight and passenger; increasing use of private cars; and declining use of public transport, cycling and walking.

Concern and debate over the growth of motorised transport and its environmental consequences has been occurring in North America and Europe for decades. Many major cities, predominantly in Europe, have tried to curtail growth in car travel and encourage use of less polluting modes.

A vast array of policy measures have been adopted – about 450 were reported in a study of 132 cities (Dasgupta, 1993). Those most frequently implemented in the last two decades relate to parking policy, promotion of public transport, pedestrianisation, traffic management and restrictions on vehicle access to certain zones.

Several of the measures have had positive results (for example, increased public transport usage, reduced traffic flow in city centres) but in many cases, the overall volume of car traffic remained high as problems elsewhere in the transport system were created or not resolved. For example, the city of Zurich achieved a 30% increase in the number of public transport passengers following investment in its public transport system (infrastructure, operational and marketing) but car traffic did not decline as more cars were attracted to the now less congested road system (Walter et al., 1997).

By the early 1990s, the concept of sustainability in transport was at the forefront of discussion as existing patterns of transport activity were seen to be contributing to permanent damage to the global environment, damage to local environments, and social inequity.

Policies for “sustainable” transport aimed at reversing the trends of rising car use and falling use of other modes have now been developed in many cities. These typically comprise a number of elements:

“We must ensure that the well-being of our communities is put first when preparing and making decisions regarding transport and infrastructure policies”.

Charter on Transport, Environment and Health adopted by European Member States of WHO and Members of the European Commission responsible for transport, environment and health, June 1999.

- (a) containment or reduction of the total volume of traffic;
- (b) improved and expanded public transport systems;
- (c) better provision for pedestrians and cyclists;
- (d) traffic restraint and traffic management aimed at reduced flows;
- (e) control of land use and new development in such a way as to reduce journey length and car use wherever possible.

Experience overseas indicates that, for a transport policy to be effective in changing mobility patterns and reducing car use, not only must there be a policy mix but all elements must be implemented together. Omission of some elements can reduce or negate the effect of others: for example, getting individuals to reduce their car use is extremely difficult to achieve in the absence of fast and reliable public transport and dedicated infrastructure for cyclists and walkers.

European cities have generally led the way in terms of innovative programs to reduce car use. Those that have achieved a high proportion of travel on non-polluting or low polluting means of transport (for example, Amsterdam, Stockholm, Bologna, Basle) have done so by using a variety of policy instruments and strategies.

Singapore has also been extremely effective in minimising car use largely through the

introduction of strongly restrictive measures – measures that have proved very successful in that culture and environment but which would not be politically palatable in countries with established high car ownership and use.

Britain and the US have relied instead on increasing road capacity to meet growing demand. In recent years, however, there has been a move towards funding public transport again as both governments have increasingly questioned whether investment in roads generates value for money.

In the US, transit funding has increased from around \$2 billion to approximately \$40 billion in just a few years while roads funding has remained pretty static and is now starting to decline. This has occurred in response to US legislation giving significantly more power to local communities to determine transport funding priorities. The result has been a dramatic shift away from highways to the development of transit systems, cycling, walking, and land use patterns which reduce the need to travel (Australian Broadcasting Corporation, 1998).

In Britain, legislation passed in 1997 and subsequent policy require local authorities to undertake reviews of current and future traffic levels and to set targets for road traffic reduction, public transport, air quality and road safety improvements, as part of Local Transport Plans. Traffic reduction is also being more closely linked with control of land use and planning. Running parallel is a local authority-based initiative, Travelwise, which is a public campaign raising awareness about car use, its impacts and the alternatives available.

“The country wants a better transport system which does not continue to damage our environment and people’s health. Doing nothing is not an option.”

*John Prescott, Deputy Prime Minister
Statement to British House of Commons
20 July 1998*

Japan’s postwar decision to discourage use of the private car and encourage public and non-motorised transport was, according to one economic analyst, part of a broader policy to

nurture its domestic industries. By keeping aggregate transport costs to a minimum, industry production costs were minimised making Japanese products more internationally competitive. By discouraging the use of motor vehicles and encouraging savings, a larger pool of potential investment capital was created for investment in new technology (Hook, 1994).

Japan continues to encourage public transport, walking and cycling, viewing these modes as the most cost effective way of meeting its urban transport needs. It is instructive that Australia, with its emphasis on catering for the private motor vehicle, uses nearly three times as much of its GNP for transport than Japan (Parker, 1995c).

Survey data from a study of 44 cities show that cities with the highest car use, largest road building program and lowest density, have the highest proportion of their city wealth being spent on transport. Cities such as Zurich, Copenhagen and Stockholm which invest heavily in public transport and emphasise walking and cycling now spend only 4-5% of their wealth on transport compared to up to 17% for cities such as Phoenix, Detroit, Los Angeles and Perth which spend heavily on roads.

Newman & Kenworthy, 1999

Recent experience of the Belgian city of Hasselt illustrates the financial effects that a move away from car-based transport can have on city wealth. In 1998, faced with a serious cash shortage and population exodus, the city decided to scrap plans for a third ring road, switched the second ring road to pedestrian and bicycle traffic only, and used available finance to provide free bus services. Twelve months later, debt problems were abating, the population drift had been reversed and bus patronage was up 800% (TransScan, 1999).

5.1 Increasing public transport usage

Public transport has been considered a major plank of sustainable transport policy because of its ability to move large flows of traffic and

preserve the environment. Making public transport 'more attractive' has been the principal response to the question of how to induce people to forsake their cars and travel by public transport instead.

Improvements made to public transport cover the areas of vehicles and rolling stock, system integration, information provision, quality of service, increased convenience, planning priority for public transport, and land use planning.

In the European Union, **new vehicles and rolling stock** (including trams) that are highly accessible have been introduced and a new generation of midi, mini and city buses are being developed to serve once inaccessible areas or newly pedestrianised zones. The public transport operator in Portland, Tri-Met, operates brightly painted minibuses that provide a neighbourhood and employer shuttle service.

Better use of existing systems is being made through the introduction of guided busways and trams capable of operating on railway tracks. In Karlsruhe, Germany, development of a link between trams and the railway allowing trams to use the main railway line increased the public transport share of total trips from about 5-7% to 35-45% (European Commission, 1996).

High priority has been placed on **system integration** with the different modes – tram, suburban train, metro, bus – operating within a network. Bringing the modes into a common operating environment managed by a single organisation simplifies co-ordination of timetables and ticketing and is the route taken by such cities as Zurich.

It is a route being revisited by Britain after earlier privatisation of the bus industry and the breaking up and franchising of the rail industry resulted in increased fares, fragmentation of service and reduced patronage. To overcome these problems, the British government is establishing a Strategic Rail Authority and an independent Commission for Integrated Transport to provide a unified vision and act as a force for change (UK Department of Environment, Transport and the Regions, 1998).

To facilitate transfer between modes, effort has been directed to the provision of quality, **accessible transport interchanges**.

Development of the simplest form of interchange, Park-and-Ride terminals, is widespread and ideally provide secure, covered parking for bicycles. In Paris, a major multimodal terminal was recently constructed integrating urban, suburban and regional buses, private cars, taxis, tourist coaches and TGV trains. Belfast has established a fully accessible integrated bus and rail facility featuring low level counters at booking offices, low level telephones, textphone facilities, tactile flooring, high contrast signage, an induction loop, parents room and toilets accessible for travellers with disabilities.

As out-of-vehicle time is viewed up to three times more negatively than in-vehicle time, **synchronising of schedules** between services is critical to minimise the time spent by passengers waiting for the next vehicle or service. In Graz, Austria, a signal announces to a waiting bus if an approaching tram is within a few minutes of the stop, enabling the bus to delay its departure. The operation assistance scheme in Barcelona permits constant communication between vehicles, users and the control centre which enables passengers both on the vehicles and waiting at stops to be informed of unforeseen delays (European Commission, 1996).

Systems are operating elsewhere which provide **real time information** on public transport and allow the time of arrival of services to be predicted and displayed at stops. In Munich and surrounding municipalities, information screens have been installed at stations and connecting points that advise passengers of the first best option to get to their destination. Information is adjusted in line with traffic flows.

Nottinghamshire County Council introduced the UK's first traffic and travel information web site in 1996. Between November 1997 and February 1998, the site attracted from 200-300 users a week with Road News (accessed by 46%) and Public Transport (accessed by 43%) being the most popular sites.

Evaluation of the site revealed it to be very highly rated overall with real time images of most value in assisting users' journeys. Workplace journeys were very important to respondents suggesting the potential value of

Intranet travel information provided at the workplace. Intranet travel pages including comprehensive public transport timetables were subsequently established in Boots and another large employer in Nottingham. Similar initiatives have been taken elsewhere in the UK and US (Bates et al., 1998).

Integrated and harmonised **ticketing systems** have been introduced resulting in increased public transport usage. For example, introduction of the all-mode Carte Orange in Paris was accompanied by a 36% increase in bus patronage while the introduction of Travelcard in London for use on tube, rail and bus services increased public transport usage by 16% (European Commission, 1996).

With funding from the European Union, Dublin began trialling in the mid 1990s a *multi-service payment card* that could be used for public transport, parking charges and telephone calls. The card automatically debits units dependent on the service used. Results of the trial are unknown (ibid).

Innovative forms of ticketing such as '*environmental cards*' are in evidence elsewhere in Europe. In the Netherlands, passengers with a Regional Environment Card can travel throughout a particular region on 14 different companies. During the weekend, up to two adults and four children can travel on a single card. In Lunenburg, special family and 'environmental' travel cards were introduced to reduce the price of public transport, particularly for frequent use. Students have travelled free since October 1994 (Hass-Klau, 1997). Environmental cards on public transport networks also operate in Freiburg in Germany.

In many places, **discounted or subsidised travel** has been negotiated by employers or is provided by public transport operators to encourage commuters to travel to work by public transport. '*Jobtickets*', co-financed by employers and public transport operators in Munich and other German towns, are available for employees at a reduced cost to encourage them to travel to work by public transport. In Munich, the tickets are financed by BMW and Siemens while in smaller towns, the town council is frequently involved (European Commission, 1996).

In Portland, Oregon, employers provide transport subsidies to employees by way of discounted annual transit passes, a voucher type system, and monthly passes and tickets. For most employers, the full amount can be deducted as a business expense at tax time (Tri-Met, 1999).

To encourage greater use of public transport on days when pollution is expected to exceed safe levels, Portland's public transport provider, Tri-Met, distributes special '*Sky Blue*' tickets that people can use to ride buses and light rail on official Clean Air Action Days from 1 July to 30 September. The tickets are available at metro-area Safeway stores and come in a kit containing tips to reduce pollution, three free tickets and a Tri-Met system map (ibid).

Some large employers operate or subsidise bus services between workplaces or between the worksite and the nearest rail station. These are predominantly undertaken as part of a workplace transport plan (see section 5.7). Although there is a significant cost attached to this measure, employers gain through the reduced need for car parking, increased accessibility for existing employees and a potentially larger labour market.

Traffic management measures such as bus lanes and giving public transport priority at traffic signals (via magnetic loops in the road, vehicle mounted transponders, filter lights etc.) are being used to increase reliability and journey speed. They have the dual effect of reducing road capacity for cars and making public and non-motorised transport more attractive.

Under the Quality Partnerships scheme in Britain, traffic management measures are being provided to operators in return for a better quality service in terms of comfort, accessibility, staff training and environmental measures. In Quality Partnership corridors, journeys have increased by 10-20% and by 40% where measures to segregate bus traffic have been established (UK Department of Environment, Transport and the Regions, 1998).

In an effort to provide the convenience of the car, some public transport operators now provide a **door-to-door service**, arranging for taxis to interchange with night buses or operating the service with taxis alone. In the

Netherlands, for payment of a fixed supplement, the Train-Taxi ticket allows the passenger to transfer to a waiting taxi for the final leg of the journey.

In the Hamburg suburb of Wedel, night buses, on payment of a small fee, will stop directly outside passengers' homes, even if this involves a detour. In some residential areas, under the Hail and Ride system, passengers can request the bus to stop anywhere on a set route. These routes are often served by minibuses and can feature vehicles adapted for use by the mobility impaired (European Commission, 1996).

In Luneburg in Germany, a dial-a-ride taxi service picks up people at fixed times at three locations in the town centre from 10.30pm until 11pm, or until 1am on Fridays and Saturdays. The taxi has to be ordered at least 30mins before the fixed times and delivers customers from the town centre to their front doors for the price of a bus fare plus an additional cost of approximately A\$2. The service covers the region as well as the town (Hass-Klau, 1997).

Guaranteed ride home schemes providing employees who car share or use public transport with a taxi ride home in cases of emergency were introduced in North America in the late 1980s. In 1987-88 in the eastern part of Seattle, the local public transport agency, the Metro, initiated and funded a guaranteed ride home program. Administered by two travel co-ordinators, the program was available to commuters working in two areas (a total of 28,000 people) and was publicised through a network of employers as well as by conventional advertising. A contract was negotiated with a local taxi firm. After registering, users in an emergency could use a cab and claim back the cost from Metro, up to a maximum annual claim of 60 miles, and minus a \$1 per trip contribution from themselves (Kadesh et al., 1990).

After operating for 12 months, the scheme had 250 registered users of which 25% had changed mode from driving alone, claiming that the scheme was instrumental in their decision. Results indicated that a Guaranteed Ride Home scheme was highly valued but rarely used (and hence operated under-budget) and was an important influence on people's attitudes to commuting by an alternative mode (ibid).

Guaranteed or emergency ride home schemes have subsequently been established in other cities in the US and by employers as part of a Green Transportation Plan. In the UK, two large employers, Southampton Hospital and Boots, operate a free taxi scheme in the event of emergency/sickness for car-sharers.

5.2 Reducing the need to travel

The growing concern for sustainability in Europe in the 1980s and early 1990s prompted a change in direction in urban planning from spatial separation of working and living to a **more compact and mixed land use** strategy aimed primarily at reducing the need to travel.

The Netherlands has a policy of '*The Right Business in the Right Place*' under which new developments are allocated to specific sites according to their traffic generating characteristics. The policy aims to ensure that businesses and other people-generating activities are concentrated in areas well served by public transport. The urban planning principles applied by the Dutch government are as follows:

- (a) high density living;
- (b) high quality public transport within walking distance in new urban areas;
- (c) location of activities that attract many employees and/or visitors as near to public transport as possible;
- (d) improvement of public transport and cycling links;
- (e) implementation of a strict parking policy in cities, discouraging long-term parking;
- (f) comparable prices for public transport travel and car travel (Walter et al., 1997).

Similar policies are in place in Bern (Switzerland) and Vienna (Austria).

To reduce reliance on the car in Portland, Oregon, high density housing was built in downtown areas to increase the resident population, more pedestrian friendly areas were created (a riverside motorway was replaced with an esplanade), businesses were sited next to

public transport terminals, stringent parking restrictions were introduced, free public transport on light rail was provided in the central area, and new road schemes were scrapped in favour of new public transport lines. The result was 30,000 more jobs and 40% of commuters using public transport. In support of the policy, the State Department of Transportation moved to new offices in Portland with no parking but well served by public transport (European Commission, 1996).

In the UK, planning policy guidance to local authorities in the mid 1990s emphasised the use of land use planning to reduce the need to travel and to encourage alternative forms of transport to the car. In line with this, there was a move away from giving planning permission for out-of-town shopping developments following the lead provided by European cities more than a decade earlier.

Singapore has engaged in systematic settlement planning with co-location of homes, schools, shops, recreational facilities, factories and offices in each of 17 new towns or housing estates. More than 50% of Singapore's homes and work locations are within 1km of the mass rapid transit system.

A small number of local authorities in Germany and the Netherlands have gone one step further and created **car-free residential areas**. The best known in Germany is located at Hollerland in Bremen. The residential area covers 2.6ha and supplies 250 homes. It is based on a legally binding contract between residents and the city council not to keep or use a car in the new development. The absence of cars allows 25% of the total area to be released for other uses, and resources to be reallocated to energy efficient housing, kindergarten facilities and attractive public space.

The estate contains 30 car parking spaces (instead of the normal 200) which are used for car-sharing and car-pooling schemes. The funds saved from the reduced parking has been used to reduce rents and house prices and improve building quality. Even so, housing prices remain rather high. There is no through road in the estate but the area has good cycling facilities and is well connected to the city-wide bike network. A newly constructed tram line

connects the estate to the city centre (Hass-Klau, 1997, Whitelegg, 1997).

A similar project in the Westerpark district in inner Amsterdam comprises 600 apartments in a 6ha area formerly used by gas, water and electricity utilities. The apartments, built by non-profit housing co-operatives, cost about the same as equivalent flats elsewhere in the city; about half are owner occupied and half social housing. A maximum of 180 car parking spaces are available; a car-hire company is located close to the area. The project fits well with Amsterdam's low level of car ownership (70% of city residents do not own a car) and interest in the apartments was very high when released on the market (Hass-Klau, 1997).

In the city of Freiburg, a car-free housing estate was designed and is being developed by over a thousand people who opted for an annual public transport pass and membership of a car-sharing club in lieu of owning a car. In place of car parking, the estate includes permaculture gardens and a range of community facilities that could not otherwise have been provided (Newman, 1999b).

Telecommuting and **teleconferencing** have been used to help reduce business travel in the UK and US. In the UK, Surrey County Council has implemented 'Surrey Workstyle' which enables employees to work from a telecentre, home or satellite office closer to home. The Council reports that teleworking, by eliminating high-mileage driving patterns, can result in benefits to both the individual (more leisure time, less stress, lower cost) and employer (reduced transport costs) (UK Department of Environment, Transport and the Regions, 1999b).

Working from home for just one day a fortnight can reduce an employee's commuting trips by 10%. A large consulting firm, ADAS Consulting now has more than 500 staff working permanently from home and has reduced office sites from 90 to 25. The company estimates that each home-based consultant has reduced their work-related car use by 2,000 miles a year (ibid).

In Oregon, the Department of Energy provides tax credits to businesses for purchasing telecommuting equipment to encourage

employers to engage in this work option. To achieve a significant reduction in car travel, telecommuting must occur on a large scale and continue over a long period.

Firms using teleconferencing report that it has played an important part in reducing business travel. The Royal Bank of Scotland estimates that video and audio conferencing has saved the company more than A\$175,000 a month (close to \$2 million a year) on corporate travel (ibid).

As part of a trip reduction strategy to comply with Californian Regulation XV on air quality, Los Angeles County introduced a **compressed work week** changing the hours worked from an 8 hours/day, 5 day week to a 10 hours/day, 4 day week. A survey of 10% of employees showed that although more trips were made on the day off than any other day, employees made fewer trips and travelled fewer miles per week than when working a traditional week. Overall, the compressed work week resulted in a significant reduction in weekly mileage and vehicle operating costs of those employees surveyed (Ho & Stewart, 1992).

In addition to societal benefits in the form of reduced travel, compressed working arrangements for staff can result in other savings. For example, the City of Irvine in California experienced a 16% reduction in sick leave and a lowering of other on-costs after introducing a compressed work week in 1991 and continues to operate the arrangements today.

5.3 Restricting car use

Restricting car access to certain zones in a city, particularly the city centre, has been a popularly applied strategy in Europe. It can be done by removing cars entirely from particular areas (for example, pedestrian zones), limiting access to certain zones to holders of a permit (for example, Milan, Bologna) or by number plate controls (for example, Athens).

Access restrictions are very successful in securing an immediate reduction of traffic at relatively low cost and creating a more friendly environment for pedestrians and cyclists. Limitations on car use in certain areas in Milan and Bologna produced a 30% reduction in motorised traffic.

Limiting access to certain zones can lead to increased traffic flow around the restricted zone which can pose problems for public transport but, for the most part, predictions of traffic chaos as a result of closures of particular zones to vehicular traffic have proved to be unfounded. The effects on retail turnover of access limitations have generally been less than feared by traders or only short term.

Road pricing in the form of toll rings or cordon charges is an important means of internalising the external costs of motor vehicle transport. They have proved effective in collecting funds to finance road building and maintenance, and in reducing the volume of traffic and, therefore, congestion. A disadvantage of tolls is that they can contribute to a redistribution of traffic away from the toll road to non-toll (and residential) roads less able to cope with large numbers of vehicles.

Urban toll rings in the Norwegian cities of Oslo, Bergen and Trondheim were introduced primarily to finance road construction although traffic demand management and the avoidance of adverse secondary effects emerged as priorities in the 1990s. In Oslo and Trondheim, a percentage of the funds collected are used for public transport infrastructure, cycling and walking facilities. In the Stockholm region, a toll ring was introduced as part of a plan to solve environmental and congestion problems. Both the Trondheim and Stockholm systems are electronic (Walter et al., 1997).

The toll ring in Oslo led to a significant short term reduction in traffic but has had a lesser impact in the longer term. It did not generate a modal shift to public transport. The effects of the Trondheim toll ring on overall traffic are ambiguous. In peak periods, traffic on the ring fell but increased on roads outside the ring, while in off-peak zero charge periods, traffic on the ring increased. Estimates suggest that overall in the Trondheim region, car driver trips fell by 5-6% while public transport trips increased by about 8% (European Commission, 1996).

Introduction of a **cordon charge** scheme in Singapore in 1975 achieved its aim of reducing morning peak traffic in the CBD. The scheme was extended to include evening peak hours in

1989 and then to the whole day in 1994. The scheme was replaced by an electronic road pricing system in 1996.

As a method of easing traffic congestion, the Singapore system is viewed by some analysts as having limited transferability because of the unique conditions in Singapore, namely, an efficient public transport system, a well developed set of ring roads, and a political system that encounters little opposition (Clarke & Phui San Wong, 1998).

The US appears to be moving instead towards a 'value pricing' system which charges motorists for uncongested roads (such as high occupancy lanes), thereby giving them something tangible for their money. The government reportedly views congestion pricing such as that used in Singapore as a punitive measure constraining motorists' freedom to drive when and where they want. This is in line with an argument being advanced in road magazines in the US that suppressing demand for road trips by rationing road space and blocking infrastructure investment does not respect individual rights and prevents the market from determining how much people are willing to pay for road space and how much road space is warranted (Transport WA et al., 1999).

Limiting parking capacity by means of time and space restrictions and higher parking fees is applied in varying degrees in most cities. Cities such as Amsterdam, Copenhagen, Nuremburg, Munich, Bologna, Stockholm and Gothenburg have implemented policies reducing car parking places in the city centre and improving alternatives, including park-and-ride systems, and cycling and pedestrian infrastructure. In Britain, local authorities can levy charges on workplace parking to discourage car use and raise revenue for cycling and other forms of transport.

Despite claims by retailers that reduced availability of parking in central areas results in car users shifting expenditure to regional shopping centres, German studies have shown that city centres with a relatively low supply of car parking and high usage of public transport, cycling and walking, are more successful than cities with greater parking facilities (Walter et al., 1997).

The ready supply of parking by employers including universities, hospitals and local authorities is a real obstacle to modal switching. In Britain, local authorities are being given the power to place levies on workplace parking to reduce car travel and raise money to help fund other transport improvements.

5.4 Reducing car ownership

Car sharing seeks to decrease unnecessary car travel by providing people with mobility without the need to own a car. Begun in Europe in the late 1980s, car sharing schemes now operate in cities, neighbourhoods, workplaces and university campuses across Europe, Canada, US, UK and in Singapore.

A car sharing organisation consists of a group of individuals who share a fleet of vehicles (cars, vans, trucks). Organisations can be established on the basis of co-operative ownership, private agreement, as non-profit or commercial profit-making entities. The vehicle purchase or lease agreements, fuel costs, maintenance, insurance and repair costs are borne by the organisation.

To become a member, individuals are generally required to pay an entrance fee and/or security deposit (refundable on departure from the scheme), a monthly fee or annual subscription, and a usage fee (usually a rate per hour and per kilometre). Petrol, insurance and maintenance are included in these rates. The NTUC Income Car Co-operative in Singapore issues personal smart cards to members and deducts charges monthly through GIRO (NTUC Income Car Co-operative Ltd, 1999).

To reserve vehicles, members phone a 24 hour reservation line, then collect the key from an automatic key safe and pick up the vehicle at a permanent location convenient to their residence, typically within walking distance.

Schemes vary in size from as low as 6 members (a co-operative in Waterloo, Ontario) to 6,000 members (ATG in Switzerland). Two car sharing umbrella groups in Europe - European CarSharing (ECS) and Mobility CarSharing Switzerland - have 45,400 and 25,000 members respectively. ECS has 68 participants operating a total of 2,440 cars in 7 European countries (Car Sharing Network, 1999).

Some organisations place a high priority on use of low polluting vehicles; for example, the 'CarLink' scheme at the University of Davis, California, uses clean fuelled (CNG) vehicles and advanced IT to track and allocate cars.

The results of car sharing have been quite impressive with reductions of 50% to over 70% recorded in members' driving (Car Sharing Network, op cit). After 12 months operation, CarSharing Portland, the largest commercial car sharing organisation in the US, reported that 17 of its 110 members sold a personal vehicle while 34 avoided purchasing one. Vehicle use was planned more carefully, trips were 'bundled' together, and more use was made of bus travel, cycling and walking. Advantages for members include lower cost (compared with car ownership) and access to vehicles best suited to each trip (for example, small car for city use, larger car for holidays, van for moving heavy items) (Public Policy Research, 1999).

To provide a **smoother interface with other modes**, several car sharing organisations have developed '*mobility passes*'. For example, Mobility CarSharing Switzerland launched a nationwide mobility package in 1998 in collaboration with the Swiss National Railway System which enables rail passengers to gain easy access to car sharing and traditional car renting vehicles.

Travel brokers in the Netherlands extend the flexible mobility concept further, arranging all aspects of local and long distance trips using the most cost and energy efficient means of transport. The brokers provide *integrated travel packages*, organising such details as scheduling, ticket purchase, vehicle pick-up and drop-off, with bicycle hire firms, train and bus operators, taxi companies and car hire businesses. In so doing they provide the customer with efficient, seamless travel on a range of different transport modes (OECD, 1997b).

Rather than dealing with high levels of car ownership, Singapore acted early introducing tough **fiscal measures** to discourage people from purchasing a car. The implementation of high import duty, vehicle registration fees and annual road tax has made car ownership extremely expensive in Singapore. In 1994, import duty and registration fees amounted to

195% of car import values; fuel tax is also high (ibid). The result is that the average owner spends between \$1,200 and \$1,500 a month to maintain a car (NTUC Income Car Co-operative Ltd, 1999).

A similar situation exists in Japan where motorists pay very high automobile registration fees, parking fines, fuel taxes and tolls.

In addition to fiscal measures, Singapore introduced a Vehicle Quota Scheme in 1990, limiting new registrations of cars and other vehicles. New vehicle buyers have to bid for quota allocations in a monthly public auction (OECD, 1997c).

Although successful in creating road space and reducing car ownership, the road pricing and fiscal measures pursued in Singapore have made car owning the preserve of the wealthy; the poor have been kept off the roads. Moreover, those with cars have a higher usage rate than car owners in Australia (Australian Broadcasting Corporation, 1999).

5.5 Increasing vehicle occupancy

Increased vehicle occupancy is most commonly sought through the encouragement of ride sharing or carpooling and vanpooling schemes. Other measures include schemes giving traffic privileges to vehicles carrying more than two or three occupants.

Transit lanes or **high occupancy vehicle (HOV) lanes** involve the reservation of particular carriageways for high occupancy vehicles. By encouraging higher occupancy, the schemes aim to reduce the number of vehicles on the road, thereby easing traffic congestion. Those vehicles using the lanes may also experience increased journey speed.

Transit or HOV lanes are in operation in both North America and Europe. They have been estimated to achieve a 3% reduction in national road transport greenhouse gas emissions in the Netherlands and a 0.7% reduction in traffic (OECD, 1997c). However, in North America where traffic authorities have had widest experience of HOV systems, there is debate as to how effective they are in solving traffic congestion.

HOV schemes require a high level of observance and enforcement of the rules which is extremely difficult to achieve. Also, systems have often been established with few clear objectives. They are most effective when they are established on freeways and where there is high bus usage (Transport WA et al., 1999).

Carpooling schemes are generally promoted on the grounds that they are easy, inexpensive, flexible, and reduce stress. To assist the formation of car pools, some public transport operators (such as Tri-Met in Portland) and employers offer a matching service providing names and telephone numbers of interested people in a particular area or workplace who share destinations and have similar schedules.

In some areas, car pools also receive incentives in the form of reduced parking rates and lower insurance premiums for car pool members due to the reduced use of their cars for daily work trips.

Vanpools are a US initiative and are defined as a group of 7-15 people who commute together on a regular basis in a van. One person generally drives and maintains the van and passengers split expenses. Vanpooling has grown significantly since formation of the first van pool in 1973; by the mid 1990s, there were around 2,000 vanpools on the road every day in Southern California alone (Commuter Transportation Services Inc, 1993).

Schemes are formed by companies who own and operate them for their employees, by commercial vanpooling service providers, or by individuals. One large commercial company, VPSI, has 3,500 commuter vans and runs 28 offices in the US. Part of the Budget Group, VPSI provides a turnkey service to firms and commuter groups (Norvell & Wilbert, 1998).

Benefits of vanpools to employers include reduced need for parking facilities, enlarged geographical area for staff recruitment, enhanced punctuality, a classified employee benefit, and a recognised trip reduction strategy to meet legislative air quality requirements. Vanpools are subject to tax concessions and have tax exempt status in some states.

For participants, the advantages include reduced driving stress, cost saving on car operation and maintenance; and, in some states, a credit on expenses of non-employer sponsored vehicles. The system has proved popular with employees - 96% of people who have tried vanpooling list it as their preferred method of commuting (Commuter Transportation Services Inc, 1993).

An attempt was made by VPSI to extend vanpooling to the Netherlands through acquisition of a personnel bus service provider in Rotterdam. However, the move was hindered by tax and legal administrative barriers (for example, vanpools in Europe are subject to taxes discouraging large car use and drivers require an additional licence to carry more than nine people) (Norvell & Wilbert, op cit).

5.6 Promoting cycling and walking

Creation of a friendly environment for cyclists and pedestrians is most advanced in Europe where for over 20 years countries such as the Netherlands, Denmark and Germany have taken action to separate bicycle, pedestrian and motor vehicle traffic, and to reduce the speed of vehicles to ensure their compatibility with bicycles and pedestrians. The main emphasis has been on improving safety and priority for cyclists and pedestrians, and establishing complete cycle networks.

To reinforce the role of walking and cycling as a means of transport, the European Transport Safety Council has developed a Charter for the Rights of Pedestrians. Key points included are the right of pedestrians to live in cities structured to cater for pedestrians and cyclists as well as motor vehicles; the right of the vulnerable to live in cities which enable them to mingle, socialise and be part of their society; the fixing of speed limits and restructuring of streets to accommodate pedestrians and cyclists; the right of pedestrians to pedestrian-only areas which offer shorter, safer and logical routes of travel; and the right of pedestrians to complete and unlimited mobility through an integrated use of traffic resources - in particular, the right to an environmentally friendly, extensive public transport system that is accessible to all. The Council has also initiated a program to

implement major issues outlined in the Charter (Victorian Road Safety Committee, 1999).

General urban speed limits have been reduced in many European countries to 50 km/h on main roads and to 30 km/h on the secondary (principally residential) road system. In operation for a number of years, the **lower urban speed limits** have reduced serious injuries and fatalities even where the decrease in actual travel speeds has been less than the posted speed limits. The death rate of pedestrians aged between 25 and 64 years in these countries is, on average, 30% lower than the average for countries with an urban speed limit of 60 km/h (ibid).

To achieve long term improvements in road safety, the Netherlands and Sweden have developed a **functional road classification system**. The main principle of the system is that every road has a function (for example, flow, access, or residential). Each road is allocated a specific function and is designed and managed according to that function. Roads are allocated only one function and the appropriate traffic management and land use planning controls implemented along its length. There is no mixing or compromising of functions; according to the Dutch, multi-purpose streets lead to conflicting design requirements and increased risk of a road accident. The system aims to achieve consistency in use with no large differences in speed, direction and volume of road users; elimination of unintended use of roads (for example, high traffic volumes in residential areas or trucks in areas used by pedestrians); and greater predictability of use and elimination of uncertainty among road users (ibid).

Extensive use has been made of **traffic calming and traffic management** strategies by the Netherlands, Denmark, Germany, Austria and Japan to create 'woonerfs' or 'community streets'. A Dutch concept, woonerfs are streets designed to completely integrate pedestrian, bicycle and motor vehicle traffic, rather than separating walkers and cyclists from motor vehicles. Streets are reconstructed so as to tip the balance in favour of pedestrians and to reduce the domination of motor vehicles. Motor vehicle speed is substantially reduced to below 20 km/h (or as low as 5 km/h in Japan) through the use of such devices as road narrowing,

extended pavements, chicanes, different coloured and textured road surfacing, and the strategic placement of speed humps, bollards, shrubs and trees.

Woonerfs or community streets have been created on streets near schools and parks, where children and elderly pedestrians are commonly found, and in neighbourhood shopping precincts or commercial zones where they have helped invigorate market areas. Each street is signed with an internationally recognised sign showing a walker, a house, a child with a ball and a distant car. Since introducing the concept 25 years ago, the Netherlands has created around 6,500 woonerfs.

The essential traffic calming concept inherent in the woonerf is now applied to whole areas of towns and not just to individual streets. Borrowing from Dutch, German and Danish experience, Japan has applied the concept in neighbourhoods where traffic and safety is a problem, to create what is known as 'road-pia'. Road-pia involve the creation of pedestrian priority areas (using community and pedestrian-only streets and other traffic management measures) surrounded by arterial roads. These area-wide treatments have been found to be very effective in reducing overall traffic volumes and through traffic, reducing vehicle speeds and accidents, and increasing pedestrian and bicycle use (Replogle, 1992).

The development of 'traffic cells' is another traffic management technique that has been used quite successfully in some cities in Europe and Japan to promote walking and cycling. A traffic cell system is created by establishing a network of vehicle restricted streets which cars cannot use or cross. These streets define the internal boundaries of the cell. Pedestrians, cyclists and public transport can cross the boundaries freely but drivers wishing to go from one cell to another must drive out of the cell onto a ring road and then back into another cell of the system. This eliminates through traffic and makes motor vehicles a slow and inefficient form of travel within the traffic cell system relative to walking and cycling (ibid).

Since the 1960s, Copenhagen has tried to reverse the trend of car-based travel by concentrating on **developing cycle facilities**

and pedestrian spaces. Each year, the city has reduced parking by 3%, created interesting pedestrian spaces, and built more cycleways; it now provides thousands of free city bicycles. The result has been a substantial increase in the number of people walking and cycling with currently, one third of people cycling to work (Newman, 1999b).

In the 1970s, the Netherlands spent up to 10% of the road budget on bicycle facilities. Between 1977 and 1989, investment in the maintenance and improvement of bicycle infrastructure amounted to \$150m per annum (1990 prices). Work undertaken included the creation of dense networks of bicycle paths, lanes and roads; the design of streets and junctions to protect and give priority to cyclists; the application of coloured road surfacing; the use of traffic calming techniques and low speed limits to reduce vehicle speed; and the provision of secure bicycle storage. These and other measures have encouraged cycling in the Netherlands to the point where five times as many journeys are made by bicycle than by all forms of transport combined (Parker, 1995c; Hillman, 1997).

In the Dutch town of Groningen, 50% of commuters now cycle to work, a large parking lot has been converted to a town square, a heavily trafficked street has been turned into an open air marketplace, and apartments in traffic-free precincts have been constructed on former highways.

On a much larger scale, the UK is **developing a national cycle network** which, when completed, will create 8,000 miles of continuous, safe and attractive routes linking schools, houses, shops, workplaces and the countryside throughout the UK. The National Cycle Network will be composed of traffic-calmed roads and traffic-free routes for shared use by cyclists, walkers and people in wheelchairs. It will comprise at least one high quality route through the middle of most major towns and cities in Britain (including London), inspiring further local urban cycling and walking routes.

The network is the concept of Sustrans, a civil engineering charity which designs and builds routes for cyclists, walkers and people with disabilities. The Millennium Routes (3,500 miles) will be complete by the year 2000, with the

remaining 4,500 completed by 2005. When finished, around 20 million people will live within 2 miles (a 10 minute cycle ride) of the Network (Sustrans, 1999a).

Based on surveys of current use, Sustrans estimates that the Network will carry over 100 million journeys per year, with the urban sections most heavily used. Approximately 60% will be journeys to work, school and shopping, and 40% will be for leisure. Fifty-five per cent of all journeys will be on foot and 45% by bicycle (ibid).

To complement their cycling infrastructure, cities in Europe, North America and Japan have pursued strategies **integrating cycling and public transport** to enable cyclists to significantly extend the distance that can be travelled - of particular importance in large cities. The most common measure implemented is the provision of *secure bicycle parking* at railway and bus stations. In the Netherlands, there are bicycle centres at 80 railway stations. Operated by Dutch railways, these centres provide guarded parking, bicycle hire, repair, and sales.

In Japan, three million cyclists access railway stations daily to commute long distances. By 1989 in Japan, there were over 8,700 bicycle parking facilities at railway stations with a total capacity of 2.77 million bicycles (Replogle, 1992). Secure bicycle parking spaces provided at stations since 1975 are valued at approximately A\$3.5 billion (1990 prices) (Parker, 1995c).

The *carriage of bicycles on public transport* (rail, bus and light rail) is possible in Europe and North America. This permits a far larger share of journeys to be made using bicycles and public transport, with travel times more competitive with the car. In 1997 in Portland, Oregon, there were over 80,000 bicycle trips annually on light rail or bus (Rails to Trails Conservancy et al., 1998).

A variety of initiatives **encouraging bicycle commuting** have been taken in the US, Canada and the UK. For the most part, these form part of workplace-based transport plans developed by employers voluntarily or as a legislative requirement to reduce the environmental impact of commuter and business travel (see section 5.7).

In addition to providing secure parking and change facilities, some employers in the UK and US offer financial incentives for employees to encourage cycle use to and within work. For example, Nottingham City Council and the Royal Mail provide *interest-free loans* for bicycle purchase. Stockley Park Consortium Ltd, Birmingham Company Travelwise and Southampton Hospital in Britain have all arranged *discounts at local cycle shops* for employees. Nottingham City Council receives 10% commission on all discounted purchases made by staff at a local cycle supplier. This was intended to offset the cost of the loan scheme but proved so popular that in 1997/98 it generated a surplus of over A\$3,000 (UK Department of Environment, Transport and the Regions, 1999b).

Stepping Hill Hospital at Stockport in the UK operates a *bicycle hire* scheme where staff pay a nominal amount (approximately A\$1.20) per week for 2 years after which they have the option to purchase the bicycle at a discounted price.

Bicycle pool schemes are operated by a number of employers in Britain including Stockley Park Consortium Ltd (bicycles can be borrowed for up to a month at a time), BAA Heathrow Ltd, the Royal Mail (bicycles are available on a 5 day loan scheme) and the University of Portsmouth. The latter has a fully automated scheme with 150 bicycles located at 3 depots around the city. Staff and students are provided with smartcards to release the bike from a rack and to return it when they have finished (ibid).

The company operating the rail service to Cambridge in the UK has offered regular train travellers the use of a bicycle in the city area where car travel is banned.

Other initiatives are aimed at **improving cycling skills and building confidence**. In Toronto, Canada, the City Cycling Committee runs 40 Can-Bike courses with classes for children, novices, novice adults, and experienced commuter and recreational cyclists, while in Portland, Kaiser Permanente operate an Injury Prevention Program.

In Cambridge, UK, a 'Buddy Bike' scheme is being introduced under the umbrella of the

Cambridge Cycle Friendly Employers Scheme (CFES). The CFES, which is a joint project of the Cambridgeshire County Council, Cambridge City Council, Cambridgeshire Health Authority, Addenbrookes Hospital, University of Cambridge and the Cambridge Cycling Campaign, will act as a matchmaker, bringing together people uncertain about cycling in traffic with a more experienced cyclist. CFES also provides Adult Cycle Training for groups within companies and for individuals.

Programs **promoting physical activity in the workplace** are in evidence in the UK and parts of Europe. WH Smith and Sons (Tools) Ltd encouraged walking at lunchtimes with the creation of a riverside pathway on its Birmingham site. The project is part of a healthy lifestyles initiative run in consultation with the City of Birmingham's 'Well-being at Work' program. The company's 400 employees have the chance to have their fitness tested after completing a 2km walking test. This is similar to projects in Scandinavia which have led to increases in the number of people walking to work (Newson, 1997).

Programs **encouraging active modes of transport to school** are in evidence in the UK, Canada, US, Denmark and Japan. Successful school travel schemes operate in Canada and Britain. Canada's school program, 'Way To Go', consists of a range of initiatives including safe routes to schools and 'Walk a Child to School Day'. The Canadian national Active and Safe Routes to School program is a joint venture of Go for Green, the Canadian Association for Health, Physical Education, Recreation and Dance (CAHPERD), Toronto's Greenest City project, Health Canada and the Climate Change Action Fund.

The program encourages students and parents to choose active modes such as walking, cycling or in-line skating to go to and from school. It also encourages the creation of no-idling zones in front of schools where waiting drivers are requested to turn off their engines, and facilitates mapping exercises where children get to know their neighbourhood better and the safest routes to walk. The mapping exercise fits into the school curriculum and is aided by a workbook and teacher's guide available from Go for Green.

A component of the program is the 'Walking School Bus', an idea developed in Australia in 1993, which involves parents, caregivers or senior citizens taking turns in escorting young children along an identified route, picking up child passengers at selected 'bus stops' and delivering them to the 'bus depot' (school). The 'Biking School Bus' operates on the same principle with cyclists meeting at a designated place and then being led to school by a volunteer parent.

In rural New Brunswick, students exit their bus at a designated drop-off zone approximately 1km from school where they are met by volunteers who supervise the ten minute walk to school, mainly along trails.

Resources are available from Go for Green to help school groups to get started. Benefits of the program include increased physical activity for children and parents, greater knowledge of the community and more independence for children, less traffic congestion around schools, and reduced likelihood of accidents. In Odense, Denmark, an Active and Safe Routes to School program has led to an 85% reduction in child pedestrian and cyclists accidents. Some schools also report that the program has generated a new sense of community leading to other positive events in the neighbourhood (Go for Green, 1999).

In the UK, a Safe Routes to School project initiated by the civil engineering charity, Sustrans, has been operating since 1995. With funding from government, charitable trusts and its own supporters, Sustrans in partnership with four local authorities and ten schools has conducted a three year national demonstration project showing how children can be encouraged to walk and cycle to school independently through the use of traffic-free routes, traffic calming, bicycle security, environmental education and awareness building to create safe streets. Involving students in practical ways is an important part of the project, for example:

- students from two York schools visited Odense, Denmark, in a school exchange to see the measures taken there to encourage walking and cycling. The local authority has asked them to report on their findings;

- a Hampshire school invited the Secretary of Transport to the school to tell him of their findings after investigating the need for safety improvements at the school;
- a sculptor is working with students at a York school to build new secure cycle parking which was found to be a major deterrent to cycling to school.

The project has produced a range of information and resource materials for use by schools and local authorities. The UK Government supports the Sustrans initiative and has encouraged use of safe routes policies by local authorities in conjunction with traffic calming and 20mph zones. A large number of highway authorities have also included a Safe Routes to Schools element in their transport funding bids.

In addition to the Safe Routes project, the UK Department of Environment, Transport and the Regions (DETR) has introduced the concept of a *school travel plan*. Based on consultation with teachers, parents, students, the school governing body and other local people, the plan comprises a package of measures to improve safety and reduce car use, backed by a partnership involving the school, education and transport officers from the local authority, police and the health authority (UK Department of Environment, Transport and the Regions, 1999a).

Two guides have been prepared to assist the process. One, a Best Practice Guide issued jointly by DETR, the Department for Education and Employment (DfEE) and the Department of Health (DoH), is intended to help local authorities work with individual schools to prepare school travel plans. It provides advice for local authorities on how to prepare an area-wide strategy on school travel which is a required part of their Local Transport Plans. The second guide, 'A Safer Journey to School', complements the first and was specifically designed by Transport 2000 for schools. It gives clear, practical advice on how schools can implement a package of simple measures to encourage alternatives to using the car, identifies current good practice from around the country and explains how a school travel plan can be implemented (ibid).

In June 1999, the UK Government announced that it would provide funding to help forty schools set up safe, workable and cost effective alternatives to the use of the car for school journeys. To help identify ways of reducing car use, the Government established the School Travel Advisory Group comprising representatives of parents, teachers, governors, business, local authorities, and experts in child health, road safety and school transport. The Group's work program includes a resource pack for teachers, parents and school governors; and guidance on promoting bus use for school travel and best practice in transport for children with special needs.

Other Government initiatives include:

- financial assistance for rural local education authorities to help with travel for out of school hours learning initiatives;
- piloting a car sharing database to reduce the number of cars going to and from school;
- the Safe and Sound Challenge: a competition open to all schools in England to develop innovative schemes promoting healthy and safe travel to school. Cash prizes of over \$10,000 are awarded to winning schools. The Challenge is part of the Healthy Schools program and is supported by DETR, DfEE and DoH.

An estimated 1.75 million families in the UK are involved in "Walk to School Week" which is organised jointly by the local authority initiated Travelwise program and the Pedestrians' Association as part of Travelwise's 'Walk to School' campaign. Surveys in Dorset indicate that there is an average 28% increase in the number of pedestrians on the school run during Walk to School Week (Walk to School Working Group, 1999).

'Adopt a Path' scheme operates in several counties in the UK where the journey to school includes walking on an official Right of Way. By 'adopting' a footpath or bridleway, school groups help in its maintenance, thereby gaining a safer route to school and a greater knowledge of the surrounding countryside (ibid).

5.7 Changing commuter and personal travel

Action to change commuter and business travel patterns has occurred in the UK, European Continent and North America. Initiatives have largely been in the form of **workplace-based transport plans**. These come under the various names of Green Transport Plans, Green Commuter Plans, Company Transport (or Travel) Plans, and Employer Transportation Programs.

Development of these programs has been voluntary or has been required under planning controls or air quality legislation (for example, Regulation XV in California and the ECO Rule in Oregon). In the UK, organisations applying for planning permission are increasingly being asked by planning authorities to demonstrate with a workplace-based transport plan how they will minimise the potential traffic impact of the proposed development.

Regulation XV (later Rule 15-01) was introduced in California in 1987 as an attempt to control pollution from "mobile sources" (cars) in the severely polluted Southern Californian region around Los Angeles. It required all employers with more than 100 workers in southern California to implement and monitor a Green Transport Plan for their worksite(s). CEOs of firms that did not attempt to implement a plan risked a prison sentence.

The ECO Rule was developed by the Oregon Department of Environmental Quality to improve air quality in the region. The Rule which aims to reduce the number of automobile trips used for commuting, requires employers located within a prescribed air quality maintenance area around Portland and with 50 or more people at any one worksite, to implement programs that encourage their employees to use alternatives to driving alone. An employer has 3 years after implementing the program to achieve a 10% reduction in the number of commuter auto trips taken to a work site (Tri-Met, 1999).

Some large and multinational firms have tackled transport problems because of a commitment to environmental responsibility and are exerting pressure on suppliers to demonstrate 'green credentials' through ISO 14001 or eco-

management and audit scheme accreditation. Other businesses see company transport plans as good public relations (for example, Manchester United Football Club who recognised the need to minimise the effects of parking on the local community) or have responded to a favourable tax situation (UK Department of Environment, Transport and the Regions, 1999c).

In the March 1999 budget, the British government introduced a package of tax measures to encourage employers to establish workplace-based transport plans. All large government offices in the UK are required to have a Green Transport Plan and most public sector organisations are in the process of implementing one (ibid).

A **Green Transport Plan (GTP)** is a strategic approach that enables employers to analyse the key transport challenges and opportunities facing the organisations and to develop an organised program or package of initiatives to tackle different aspects of transport, including commuter journeys, business travel and fleet management.

GTPs can include:

- (a) measures that encourage travel to work by public transport;
- (b) measures that encourage cycling and walking to work;
- (c) a flexible benefits package providing alternatives to a company car;
- (d) a review of standard working hours/telecommuting;
- (e) a car sharing and/or car pooling scheme;
- (f) measures to reduce business travel such as video conferencing;
- (g) enhancing the fuel efficiency of the vehicle fleet.

In most cases, employers hire a staff travel or transport co-ordinator who is responsible for undertaking a preliminary survey of employees' commuting habits and needs and of business

travel in the firm, and for implementation and monitoring of the plan.

The elements of a GTP can vary depending on what alternative transport services are available, the geography of the area, as well as the firm's level of interest and transport budget. For example, Dutch employers concentrate on encouraging cycling and public transport use whereas US firms focus on car- and van-pooling, reflecting the availability of different transport infrastructures and taxation differences in the two countries.

Measures included in a GTP to encourage public transport usage can comprise providing employees with public transport information (timetables, maps and other information) in staff meeting places or on the firm's intranet; negotiating discounts with public transport operators; providing or subsidising works buses; encouraging rail travel to meetings; parking restrictions; offering a cash payment to relinquish car parking spaces or permits; and providing an emergency ride home service.

Employer provided discounts on public transport services appear in GTPs in the Netherlands, UK and the US. In the UK:

- (a) Nottingham City Council employees receive a discounted bus and the cost is deducted automatically from their salary;
- (b) Stepping Hill Hospital in Stockport secured a 5% discount on employee travelcards and may provide a further 20-30% discount (funded by car parking revenue);
- (c) Hewlett Packard negotiated a 45% weekly season ticket discount with the local train operator;
- (d) Staff at BAA Heathrow can purchase travelcards that offer discounts on bus and rail services of up to 80%;
- (e) Edinburgh Chamber of Commerce negotiated a 10% annual season ticket discount with bus operator LRT for 10 large local employers;
- (f) Under the Company Travelwise scheme, a 50% reduction on the price of annual bus and rail travelcards is offered provided a free

car parking facility is withdrawn and other conditions are met (UK Department, Environment, Transport and the Regions, 1999c).

In Portland, Oregon, employers can offer public transport subsidies to their employees in a variety of ways: annual discounted transit passes purchased by the employer from the public transport provider, Tri-Met; vouchers preprinted with a subsidy amount determined by the employer which employees can use to purchase tickets; tickets and passes sold by the employer at the worksite at whatever discount the employer chooses (Tri-Met, 1999).

In the Netherlands, the Municipality of Tilburg offers annual cash incentives of 250 guilder (over A\$250) to staff if they sign a declaration promising not to bring cars into work. In the mid 1990s, 900 staff had taken up the offer (UK Department of Environment, Transport and the Regions, 1999c).

Measures in GTPs to encourage cycling include:

- (a) interest-free loans for cycle purchase;
- (b) on-site cycle storage facilities;
- (c) shower and changing facilities;
- (d) cycle hire; and
- (e) cycle purchase discounts from local cycle shops.

Information on some of these incentives is provided in the previous section.

Many employers offer a salary alternative or a flexible benefits package instead of a company car. At Hewlett Packard in the UK, 102 of the 159 eligible staff (including the site manager) opted for a cash alternative of the monthly lease allowance plus 32%. Boots employees have been given the option to trade down their 'status' company car to a smaller capacity car, pocketing the cash difference (ibid). Company car allowances may also be traded for a public transport subsidy, extra holidays, health care or leisure club membership.

A growing number of health facilities in the UK are developing GTPs or 'Healthy Transport Plans' prompted by problems of excessive traffic

and inadequate parking. Health facilities face unique problems of traffic congestion. Besides having to meet the needs of patients, visitors and staff within the same sites, many have to provide ready access for emergency vehicles. The pressure on car parking has become more acute with the centralisation of specialist health facilities, the relocation of facilities to outer areas with limited public transport, and the growth in car ownership.

Area-based transport 'plans' have been used in some instances to resolve traffic problems in a particular geographic location. A project that has been successful in reducing car travel at a neighbourhood level is the *Marquam Hill Transportation Partnership* in Portland, Oregon. The partnership is a consortium of predominantly health-related organisations and public transport providers (the Oregon Health Sciences University, Veterans Affairs Medical Centre, Shriners Hospital for Children, City of Portland, Tri-Met, C-TRAN, and the Homestead Neighbourhood Association) who came together to resolve traffic congestion and improve parking conditions on Marquam Hill. An on-site transport co-ordinator was appointed and a package of measures agreed upon. These include an express bus service, a carpool matching database, an emergency ride home program, and the equivalent of an annual, all-zone transit pass for every employee and student on the Hill (Tri-Met, 1999).

In Britain, local authorities are required to prepare *local transport plans* setting out their strategies for transport and their long term targets for improving air quality, road safety and public transport, and for reducing road traffic. The plans must have the support of local communities. Local authorities have been given new powers such as road user charging and levies on workplace parking to help tackle congestion and pollution; the funds raised will help finance other transport improvements. The government is also revising planning guidance to local councils to improve urban and country planning and reduce reliance on the private car (UK Department of Environment, Transport and the Regions, 1998).

The *Cambridge Cycle Friendly Employers Scheme* (CFES) operates on similar lines to GTPs. A joint project of local government, health and medical organisations, a cycling

advocacy group and the university, CFES aims to replace driving with cycling to work. Cambridge is ideally suited to such a project: the city is flat, compact and has a large cycling population (27% of all journeys are by bicycle). Employers are targeted and taken through a set process commencing with a survey of staff travel patterns and attitudes towards cycling, appointment of a company co-ordinator, preparation of a company cycle plan setting out transport modal targets and how these will be achieved. There are currently 35,000 employees at 29 companies targeted under the scheme. The project has been expanded to include other forms of transport (walking, public transport, car pooling etc) in a broader Travel for Work scheme.

CFES has also recently introduced a Health Monitoring Experiment, based along similar lines to the Danish 'Bikebusters' scheme and the Australian 'Cycle 100' scheme in Perth. This project aims to get a group of non-exercisers to commute by bicycle for 4-6 months with physical health and attitude changes being measured along the way. Similar projects have achieved high retention rates with participants continuing to cycle after completion of the project (Meiklejohn, 1999).

The **benefits of GTPs** accrue to employers, employees and the wider community. Benefits to organisations include improved environmental image, savings through the reduced need for workplace parking, less congested and more accessible worksites, and healthier, fitter and more productive staff. Personal employee benefits include less problematic journeys to

work, less time spent in traffic jams, financial savings and improvements in health. For the community, the benefits are cleaner air and less congested streets, better public transport, enhanced environment for pedestrians and cyclists, and a better place in which to live, work and visit.

Research indicates that GTPs can significantly reduce car commuting to a workplace, on a corridor or within a sub-area, and that the degree of success is directly related to the components of the GTP. Experience to date suggests that a good mix of carrots (encouragement to use alternative modes) and sticks (disincentives to car use) are required for a GTP to be successful. Incorporating the concept of 'travel blending' with its focus on providing individual feedback on travel options, increases the likelihood of a significant reduction in car use being achieved (UK Department of Environment, Transport and the Regions, 1999c).

The most effective GTP measures involve direct financial incentives and disincentives. However, the taxation treatment of these incentives can be critical. In the UK, the liability of the incentives for income tax, National Insurance Contributions and VAT, has discouraged employers from using green transport measures that have proved successful in the US and Europe.