# A Wish Called $quander: (In)Effective Speed and Effective Wellbeing in Australian Cities

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**Abstract:** Cities where people spend one working day a week to pay for an activity that may save only a few hours are inherently Pythonesque. The concept of effective speed allows policy-makers to appreciate the (in)effectiveness of transport options in terms of time savings, by examining the total time associated with transport, including time spent at work to pay for associated costs. Consequently, cars are not necessarily 'faster' than alternatives we instinctively think of as slower: public transport, cycling and even walking. Any rational person would agree we should minimise the resources devoted to the essentially unproductive intermediate activity of driving. But economic bean-counters regard this as contributing to our well-being, as it consumes resources, the primary criterion for inclusion in Gross Domestic Product. The paper examines effective speed in Australian cities and presents results from strategic analysis for Perth, Western Australia, highlighting the consequences of 'squandering' a large and increasing part of our individual and collective time and financial resources. Increasing oil prices may soon start to force changes in economic behaviour, including travel, that have potentially profound impacts on our real wellbeing and the form and functioning of our cities. The paper will describe these consequences and outline ways in which adverse impacts can be reduced.

## Introduction

The title of this paper has its origins in the authors' previous collaboration on the adverse impacts of 'automobility' on the independent mobility of many people in the community ('A Wish Called Wander', Ker and Tranter (1997, 2003)) and their discovery of an eponymous board game ($quander) from the 1960s in which the winner was the first player to go bankrupt. This counterpoint to the more popular game of Monopoly™, in which the objective is to accumulate more money than other players, prompted thoughts of how we, individually and collectively, spend more than we need to or we recognise on transport in our cities. This issue is being thrown into clearer focus through discussion of 'Peak Oil' and its implications for the cost and even the feasibility of continued heavy reliance on oil-based individual motorised transport (see, eg, Senate, 2007).

The concept of effective speed relates the output of transport systems (travel) to the total inputs required (not just the time for the journey). Effective speed is calculated using the usual formula: speed equals distance divided by time, but <u>all</u> the time costs are considered, including the time spent at work to earn the money to pay for all the expenses associated with the mode of transport. For car drivers this includes registration, depreciation, and insurance costs, fuel, parking and tolls.

There is very limited research or literature on the concept of effective speed, with Kifer (2002), Tranter (2004) and Tranter and May (2005a, 2005b) being the sources for most of that material. Tranter and May (2005a) used effective speed to present some indicative analyses of Transit Oriented Development from the traveller's perspective – what in this paper we term the 'private effective speed'. They concluded with the semi-rhetorical questions: *What if we add in external costs? (Pollution cost, Accidents, Cost of lack of exercise related to car traffic). Most drivers don't care about external costs, but should policy makers care?*

Kifer (2002) has attempted to answer this question through estimation of a range of concepts of 'net effective automobile speed' including varying levels of the costs borne not by the individual traveller but by other travellers or by the community – the so-called externality costs of transport. We have called this 'social effective speed' in this paper. This paper presents estimates of both private and social effective speeds for a range of travel options for Perth, Western Australia, and explores the implications of the dissonance between perceived speeds, private effective speed and social effective speed for the planning and functioning of our cities.

The paper does not attempt to cover all possible situations but to use simple analysis to show the extent to which, individually and collectively, we wrongly estimate the speed at which we travel and to identify some of the consequences for the state of our cities. Our focus is on the single-occupant car, as this is the predominant mode of private car usage. Car passengers significantly change the calculus, but more than 60% of car trips in Perth are driver-only and for work trips this proportion rises to at least 91% (ABS, 2001 Census).

## How Much Does Transport Cost?

The answer to this question depends upon which 'costs' are considered. There are many ways of measuring the costs of transport, including financial, economic, social and environmental. In almost all cases, individually and collectively, we underestimate the costs of private motorised transport. At an individual level, when driving a car we take account only of the cost of fuel – and parking where we have to pay for it. Many drivers with employer-provided or salary-packaged cars do not face even these costs – to them car driving is free. Where Fringe Benefits Tax is payable, there can be a negative cost, where the travel takes the vehicle across a thresholds to a lower tax rate (Ker, 2003a).

It is also well established through surveys that people generally overestimate both financial and time costs of public transport and under-estimate those of car driving. In other words, the perceived speed of car travel greatly exceeds the actual performance, even in the simple sense of operating speed – car drivers think they travel faster than they really do over a whole trip (See Figure 1 for data from German cities and for Perth). A study by the RAC (Royal Automobile Club) in the UK also found that drivers grossly undervalue the costs of motoring, estimating their expenditure at a level of less than 40% of the real average cost calculated by the RAC, very similar to the German cities in Figure 1.

**Figure 1  Perception of Travel Time and Cost**
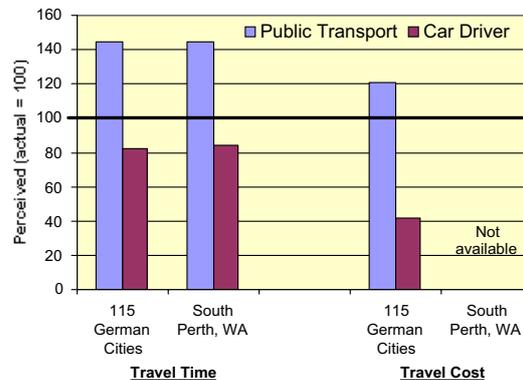


Source: Socialdata (1998) and TravelSmart WA

## Calculating Private Effective Speed

The calculations of effective speed in this paper are based on the effective speeds of commuters in urban areas. These speeds would of course be lower than the speeds of inter-city commuters, due to the lower trip speeds of urban trips. However, as will be explained below, for some modes of transport, the trip speed is a relatively unimportant component of the effective speed. The effective speed calculations for car drivers in this paper are based on single occupant car drivers.

To estimate the 'effective speed' of any mode of transport, we need to:

- Estimate the average in-vehicle speed. For a car driver, this can be calculated by dividing the total distance travelled by the total time spent in the car (from the time you open the car door to the time you get out of the car).
- Estimate the time devoted to that mode in terms of activities that are undertaken as a consequence of making trips by that mode or of owning and operating a particular vehicle. These include putting fuel in the car, checking oil and tyre pressures and walking to and from the car when it is parked.
- Calculate the time that a person must spend at work to earn the money to pay for a particular mode of transport.

For car drivers, the direct financial cost of operating a car has been calculated by motoring organisations such as the NRMA and RACWA as average vehicle operating costs, but such calculations do not cover the full range of costs associated with cars.

### Estimating trip speeds

While there is information available on average speeds on particular roads, such studies do not provide all the data needed to calculate average trip speeds. For car drivers, calculating average trip speed requires consideration of the time spent getting into and out of the car, putting on seat belts, opening and closing garage doors, driving around car parks, and reversing out of private garages or driveways. There appears to be little available evidence that can reliably indicate average in-vehicle speeds over the course of a driver's weekly or monthly driving behaviours. This is an area that should be researched more fully.

Data on peak hour speeds on major routes in Australia's capital cities shows some major roads with peak hour speeds down to 18 km/h on Brisbane's Moggill Road (Hinchliffe, 2004). For Melbourne, according to traffic monitoring carried out by VicRoads, the average traffic speeds on Melbourne's freeways and arterial roads was 41.4 km/h in 2001/2 (VicRoads, 2003). However, this did not include minor roads: the lowest level of arterial road considered was classified as "Undivided Arterials with Trams" (which had average speeds of 22.3 km/h). Minor roads have average recorded speeds of as low as 3 km/h in inner city Sydney.

Given the range of speeds listed above, it is unlikely that any major Australian city would have an average in-car speed of more than 40 km/h. None of the speeds quoted above include speeds in car parks, petrol stations, driveways, laneways and culs-de-sac, most of which feature in the normal driving patterns of city drivers. The calculations of effective speed in this paper assume an average urban trip speed of 32 km/h, based on data for Perth. While some motorists might believe this to be an underestimate of their actual trip speeds, evidence indicates that most motorists overestimate their trip speeds Socialdata (1998). Also, for car drivers, even a doubling of trip speed will have little impact on effective speed (as we will explain later). Bus trip speeds in this paper were estimated at 25 km/h, trains at 60 km/h and cycling at 20 km/h (see Tranter (2004) and Tranter and May (2005a)).

### Other time devoted to transport

Car ownership and use necessitate a range of activities. Not only must the car driver spend time 'in' the car, but anyone who drives a car must also devote time to getting to and from the car when it is parked. Most car owners devote time to cleaning their car, and time is needed to put fuel in cars. Getting a car serviced also involves a time cost. Other time costs not included in the calculations include time spent paying insurance and registration bills and time spent purchasing cars.

### Transport Monetary Costs

The effective speed calculations were based on RACWA car operating costs for a range of vehicles (RACWA, 2007), including: the average price for fuel in Perth during November 2005-April 2006 (e.g. unleaded at $1.19 per litre); depreciation; registration; interest on loans (as opportunity cost); insurance (for a driver 29-59 years of age with 55% no claim bonus); servicing and repairs. The costs were based on an average mileage of 15,000 km for vehicles owned for a 5 year period. (Average costs for the entire vehicle fleet are likely to be lower than the averages for these cars as depreciation is lower on older cars.)

Note that these operating costs do not include a range of other costs that add to the cost of driving and are paid by individual drivers. Parking costs and fines for driving infringement (e.g. speeding) were not considered. Costs of any car accessories (e.g. car polish, seat covers, tow bars, baby capsules, child seats, windscreen covers) were not included. Some of these extra costs have been estimated in this paper, and added to the calculation of total costs of the car. The external costs of motoring are not considered at all in the RACWA calculations.

The figures used in this paper for car parking costs and for infringement fines are based on ACT Treasury data on revenue from car parking and infringement fines, averaged for Canberra drivers. The estimates for the cost of bicycles rely on information from several Canberra cyclists and are based on 'high-end' road bicycles. The monetary costs for public transport passengers are simple to calculate: their only cost is the fares. Bus and train fares are calculated using the cost of a full-fare, 3-zone, 40-trip multi-rider, which covers most of the Perth Metropolitan Area.

### Time at work needed to pay for each mode of transport

The calculations of effective speed require the consideration of the time spent at work to earn the money needed to pay for all the costs of various modes of transport. The calculations here are based on "Average Full-time Adult Total Earnings" as at February 2004 - $40,100.60 after tax (ABS, 2004). Note that average earnings in Australia are lower than this, as not all employees work full-time, and not all employees are employed for a full year. To calculate the time at work needed to pay for the costs, the total car costs are divided by the total net income. It is assumed that full time work equates to 38 hours per week for 48 weeks per year. The effective speeds for each mode of transport and various types of car are shown in Figure 2.

**Figure 2    Private effective speeds by mode of transport**



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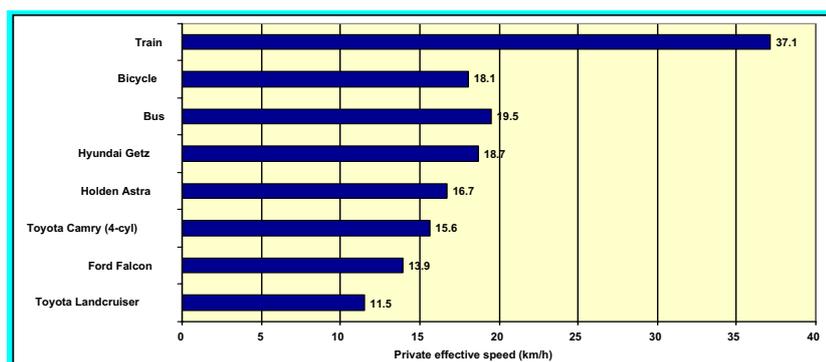
### What is the effect of a dramatic increase in trip speeds?

Even if it were possible to double the average in-car speed, this would have minimal impact on the effective speed. In contrast, if we can significantly increase in-vehicle public transport speed, the majority of this increase is reflected in an increase in effective speed. The reason for this is simple. The majority of the time devoted to car travel by most drivers is the time spent at work, earning the money to pay for the car itself, plus the fuel, parking, tolls, insurance and registration. The time spent in the car travelling is only a minor component of this travel (for some Perth drivers representing only 35% of the total time).

If transport planners can understand this concept, they will also understand the futility of trying to 'save time' by building 'faster roads'. Of course, building 'faster roads' can only be done at additional expense, which must be at least partly paid for by the car drivers themselves, further reducing their effective speed. The 'costs' of increasing trip speed would include not only the road construction costs, but increased costs of pollution, the health costs associated with a decline in active transport (fewer pedestrians would be using the streets if cars are travelling at high speeds) and the social cost of traffic intrusion.

In contrast, for users of public transport and for pedestrians and cyclists, any increase in trip speed will have a significant impact on their effective speed, because the time spent travelling is the major component of the time costs associated with their travel. Commuters who walk, cycle or catch public transport spend much less time than car drivers at work earning the money to pay for their transport.

If we could double the speed of a car driver without increasing the cost of transport (using a Toyota Landcruiser as an example), this would increase the trip speed to only 14 km/h (from 11.5 km/h). Thus, the driver of a Landcruiser with an average trip speed of 64 km/h would still be effectively travelling much slower than a cyclist!

## Social Effective Speed: Accounting for Costs <u>not</u> Paid by Users

The effective speed assessment outlined above does not include the costs that motor vehicle drivers impose on others through driving or that public transport users/operators impose on others. These are generally termed 'external costs' and include economic (eg congestion and road trauma), environmental (eg air pollution and greenhouse gas emissions) and social (eg health) impacts of motorised travel. In the case of public transport, they also include the financial support provided to public transport (usually, in Australia, from State governments).

### Private Cars

The external costs of private motor vehicle use in cities are at least as large as the direct (financial) variable costs of operating a car (Ker and James, 2000, Table 5). Litman (2006) suggests that the external costs exceed the direct variable financial costs to drivers by 50% and are equivalent to 70% of the <u>total</u> direct (internal) financial costs (Figure 3).

External cost analysis is not sufficiently refined to be able to clearly differentiate the costs, other than those that are fuel-related, for different types of cars. However, the alternative modes (walking, cycling and public transport) have very low external costs, with the exception of diesel buses which have a substantial air pollution impact (ATC, 2006, Vol 3, p102). We can, therefore, have a high degree of confidence in the relative social effective speeds of cars compared to the other modes.

**Figure 3    Average distribution of car costs**
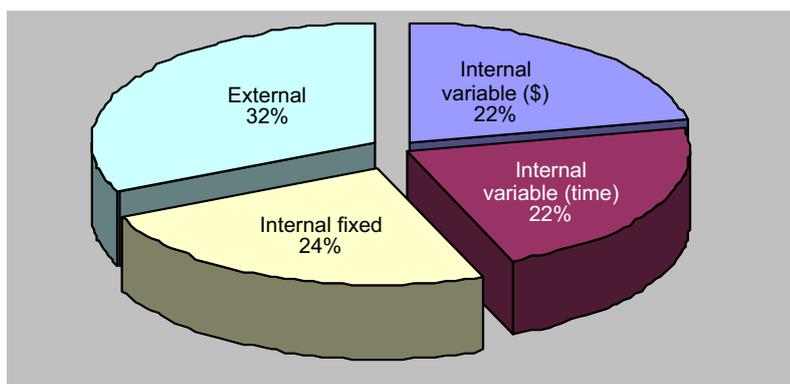


Source: Litman (2006, page 6-5)

Estimates of the external costs of car use have been taken from Ker (2003b), updated to 2006 prices (Table 1). Table 2 shows the impact of externality costs on the effective speed of cars. We have chosen not to use the more recent estimates in ATC (2006, Vol 3, Appendix C) because these later estimates:

- Assume a very low value for Greenhouse Gas emissions of $10/tonne of $CO_2e$. Ker (2003) uses a value of $40/tonne, which is still towards the lower end of the range derived from Australian and international research and practice. Even the referenced source for ATC (2006) gives a range from $10 to $90/tonne of $CO_2e$ and notes that the Victorian Department of Infrastructure uses $40/tonne (Pratt, 2002).
- Do not include a value for congestion. It is entirely correct not to value congestion directly when projects are being evaluated through models that compute system-wide vehicle operating costs. In the present context, however, congestion is an externality that must have a value placed on it.
- Do not include a value for road trauma, again on the basis that transport and traffic models used in project evaluation already produce estimates of crashes from which crash costs can be derived on a 'per crash' basis. In the present context, however, road trauma due to car use is an externality that must have a value placed on it.

**Table 1     Externality values used in estimating social effective speed**

| Externality | 2003 Value (Ker, 2003) | 2006 Value* |
|---|---|---|
| Road trauma | 5.1 cents/car-km | 5.76 cents/car-km |
| Congestion | 15.5 cents/car-km | 17.52 cents/car-km |
| Air Pollution | 3.5 cents/car-km | 3.96 cents/car-km |
| Greenhouse gas emissions | 1.2 cents/car-km | 1.36 cents/car-km |
| Transport Noise | 0.35 cents/car-km | 0.40 cents/car-km |
| Social impacts - severance | 0.24 cents/car-km | 0.27 cents/car-km |
| **Total Externality Cost** | **25.89 cents/car-km** | **29.27 cents/car-km** |

* Adjusted by increase in Perth CPI between June 2003 and December 2006 (+13%)

**Table 2     Adjustment to social effective speed taking external costs into account: cars**

| Vehicle | Private effective speed (km/h) | Total Hours | Non-travel/ownership (include travel time) | Running/ Ownership | Externality addition ($) | Externality addition (hrs) | Travel/ Ownership | Total 'Social' hours | SOCIAL effective speed (km/h) |
|---|---|---|---|---|---|---|---|---|---|
| **Toyota Landcruiser** | 11.5 | 1304 | 519 | 785 | $6,658 | 319 | 1104 | 1623 | 9.2 |
| **Ford Falcon** | 13.9 | 1080 | 519 | 561 | $4,508 | 216 | 777 | 1296 | 11.6 |
| **Toyota Camry (4-cyl)** | 15.6 | 961 | 519 | 442 | $4,094 | 196 | 638 | 1157 | 13.0 |
| **Holden Astra** | 16.7 | 899 | 519 | 380 | $3,391 | 162 | 542 | 1062 | 14.1 |
| **Hyundai Getz** | 18.7 | 803 | 519 | 284 | $2,523 | 121 | 405 | 924 | 16.2 |

*Public Transport: Buses*

Litman (2006, Figure 6-7) indicates that the external costs of bus operation are greater (+50%) than the direct financial operating costs, but his direct costs do not appear to include crew costs. The most recent estimates for Australia (ATC, 2006) show emissions costs for buses of just under 20 cents/vehicle-km (Vol 3, Table C4) compared to a direct operating cost of 90 cents (Vol 4, Table 1.6.10). CNG-powered buses, which are becoming much more common in Australia, produce emission costs that are less than 15% of those from 1990s' diesel buses (Litman, 2006, p5-10-11). On this basis, externality costs from CNG buses are 5.5 cents/vehicle-km (0.15*20 cents for air pollution plus 2.5 cents for greenhouse emissions) compared to direct bus operating costs, including crew costs, are $2.55/vehicle-km (derived from ATC (2006, Vol 4, Table 1.6.10, at average operating speed of 25km/hr).

The private effective speed of bus travel was estimated using the cost to the user. In the case of ACTION buses (Canberra), which is a stand-alone bus system, thus eliminating network integration

and overhead cost allocation issues, fare revenue covers 20% of the full costs of bus services. The component of the effective speed calculation that translates financial cost into working hours needs to be multiplied by five to cover the 80% of costs that are borne by the taxpaying community. However, public transport has positive social externalities that should be offset against this.

The net result is to reduce the social effective speed to 14.1km/h, compared to the private effective speed of 19.5km/h (Table 3). Nevertheless, even accounting fully for the financial support to public transport, the effective speed is competitive with car travel (Figure 4).

**Table 3      Effect of externalities and financial support on bus effective speed**

|  | Private | | Social |
|---|---|---|---|
|  | 20% farebox | 50% farebox | (@ 20% farebox) (a) |
| Work hours to earn bus fares | 108 hrs | 269 hrs | 108hrs |
| Work hours to 'earn' financial support | Not applicable | Not applicable | 431hrs |
| Work hours to 'earn' externalities | Not applicable | Not applicable | 12 hrs |
| Work hours for social externalities (b) | Not applicable | Not applicable | -144 hrs |
| Walking from and to bus | 60 hrs | 60 hrs | 60hrs |
| Time in bus (25 km/h) | 600 hrs | 600 hrs | 600 hrs |
| *Total hours on transport* | *768* | *929* | *1067 hrs* |
| **Effective Speed** | **19.5 km/h** | **16.1 km/h** | **14.1 km/h** |

(a) The extent of cost recovery from the farebox (ie users) makes no difference to the <u>social</u> effective speed for buses: higher farebox recovery correspondingly reduces the financial support required.
(b) Assuming one-third of financial support is attributable to the social objectives for public transport

Including environmental, social <u>and</u> financial externalities of public transport, the social effective speed of bus public transport is at least similar to cars and better than most. Its advantage will depend upon the level of service provided for particular journey patterns.

We have not made any adjustment for externalities to the effective speed of bicycles because such impacts are small with the exception of road trauma. Road trauma is both a private cost and an externality for cyclists but is more than offset by the health and fitness benefits from the physical activity of cycling, which can be over twice the road trauma costs  (Ker, 2004).

**Figure 4      Social Effective Speed, including external costs for all modes and financial support for public transport**
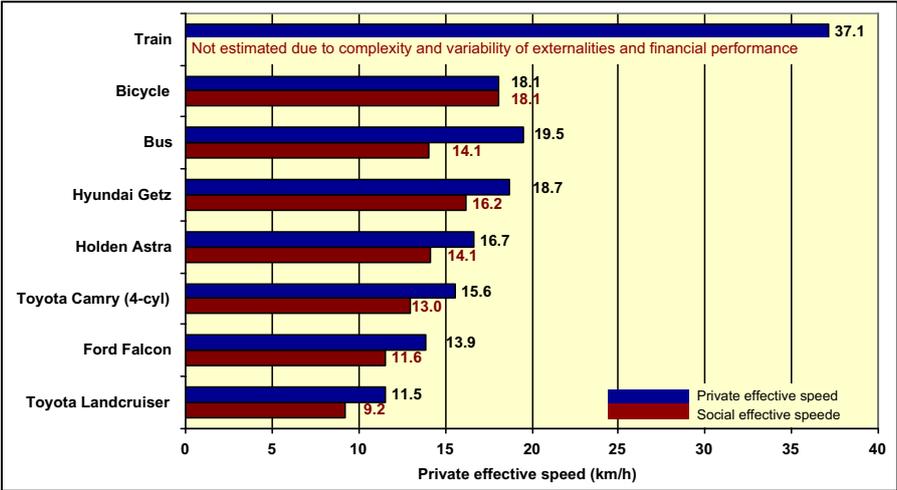


## When Fuel Price Doubles
The foregoing analysis was undertaken using data from when petrol was around $1.19/litre. There is a general expectation that global oil production will peak within the next decade (if, indeed, it has not already done so) while demand continues to increase, especially with the growth of the Chinese and Indian economies (see, eg, Senate, 2007, esp Ch2. For additional information on Peak Oil and oil depletion see the Association for the Study of Peak Oil http://www.aspo-australia.org.au and *Life After the Oil Crash* http://www.lifeaftertheoilcrash.net). For Australia, the situation will be exacerbated by a rapid decline in the proportion of the oil we consume that is produced within the country  (Table 4). Alternative fuels

are unlikely to provide more than a partial top-up, especially in the short-medium terms and, in any case, will require pump prices substantially higher than current prices to be viable.

**Table 4    Forecast Australian production of crude oil and condensate, and consumption of petroleum products, excluding LPG**

| Thousand barrels per day | | | | | | | |
|---|---|---|---|---|---|---|---|
| | production | | | consumption | production as percentage of consumption | | |
| | P90 | P50 | P10 | | P90 | P50 | P10 |
| 2006 | 544 | 635 | 741 | 756.8 | 72% | 84% | 98% |
| 2010 | 400 | 510 | 654 | 817.0 | 49% | 62% | 80% |
| 2015 | 225 | 349 | 541 | 902.9 | 25% | 39% | 60% |
| 2020 | 177 | 269 | 409 | 998.3 | 18% | 27% | 41% |
| 2025 | 148 | 224 | 342 | 1099.9 | 13% | 20% | 31% |
| P90: 90 per cent probability that the true figure will be at least this much (most cautious estimate).  P50: 50 per cent probability that the true figure will be at least this much.  P10: 10 per cent probability that the true figure will be at least this much (most optimistic estimate). | | | | | | | |

Source:  Senate (2007, Table 2.7)

The inevitable result is that transport fuel will become substantially more expensive.  The Western Australian Minister for Planning and Infrastructure has acknowledged that $1.80/litre is likely to be a reality by 2010.   So what happens when (not if) petrol hits $2.litre? The direct impact is that car travel will cost more.  As a result, people will change from cars to public transport, cycling and walking.  They will also make shorter car journeys, where they can substitute a closer destination for their current one (eg shop more locally).  Even with these changes, they will still spend more on fuel than they currently do and the effective speed of car travel will be lower (Figure 5).  No adjustment has been made to the bus effective speed, as the price of CNG fuel is less likely to be affected, at least in the short term, as it is a substitute for oil only for heavier road transport vehicles with current technology.

**Figure 5    Impact of $2/litre petrol on private effective speed**
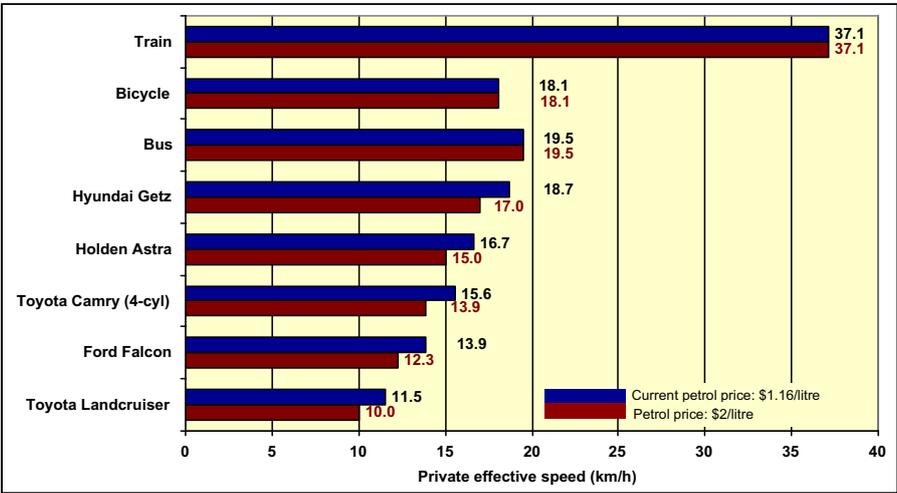


**But Not Everyone Drives A New Car…**
Analysis based on new cars might reflect the choices made by individuals when it comes to buying a new car, but it is not typical of the car fleet.  Nor is it representative of the basis on which people make decisions about travel, as new cars are disproportionately likely to be company cars or subject to some form of salary packaging, both of which affect the costs for which their drivers are responsible.

The median age (50% of cars are newer; 50% are older) of cars in Australia is around five years (http://www.airwatch.gov.au/result/graph.pasp?t=vehicle_age).  According to the RACWA (2007), the trade-in value of a car after five years is between 30% and 40% of the new price. We have used RACWA model-specific values to adjust the depreciation and interest components of the costs of owning and operating a car (Figure 6).
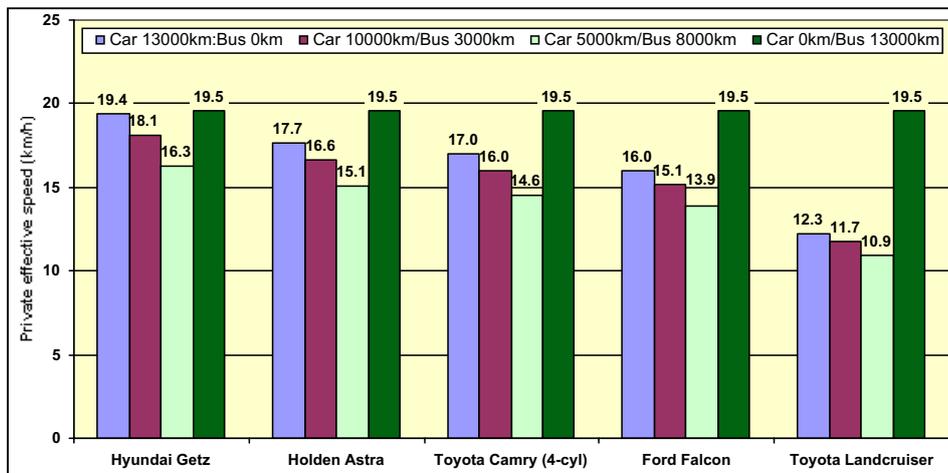
**Figure 6    Private and social effective speed with five-year old cars**
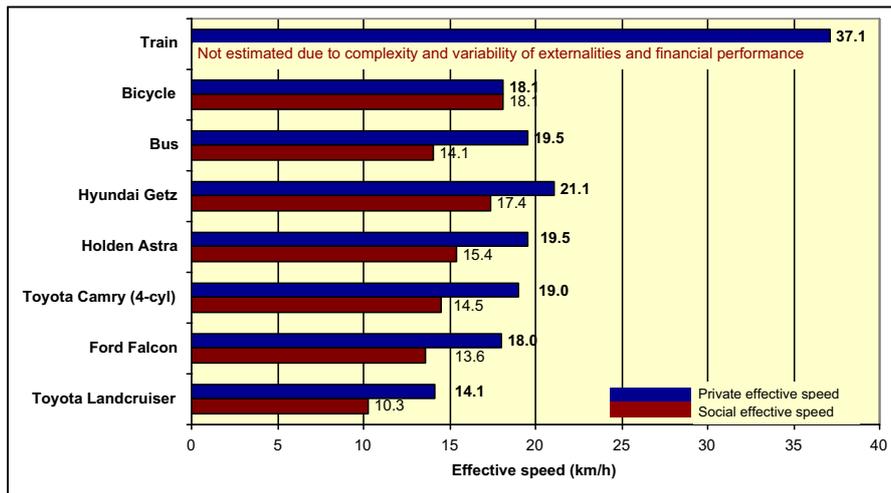
Even for the owner of a 'typical' five-year old car, public transport is overall faster than driving a car. Although there is a large amount of variation in circumstances, the analysis clearly demonstrates that public transport is able to compete in broad socio-economic terms with the car.

With petrol at $2 a litre, on average people will reduce their car driving from 15,000 to 13,000km a year. For most people, however, there is not a simple choice between driving a car 13,000km/year and undertaking all the same travel by bus or train. Nevertheless, for many people (such as those who work in the CBD or other transit-oriented centres) the daily trip to work can be undertaken by public transport. In this case, the effective speed of the remaining car travel is decreased by the smaller amount of travel over which the fixed costs of car ownership can be distributed, although there is still variation between types of car (Figure 7).

**Figure 7     Private Effective Speeds with mix of modes**



## The Private-Public Dichotomy

The twin concepts of effective speed, private and social, highlight a common dichotomy in public policy. In the case of effective speed, an individual may feel worse off if he/she makes a larger proportion of travel by bus, as the average trip speed declines. Society, on the other hand, is likely to be better off as more public transport use enables a higher level of service to be offered, thus increasing the average social effective speed for all users of public transport.

Overlooking the fact that public transport can be 'faster' than car travel, this is very similar to the 'what can one person do?' argument that used to be mounted in response to large-sale environmental issues – and which the current Australian Government is still maintaining in respect of global climate change. This translates into a self-interest argument as follows: "why should I make myself (usually marginally) worse off when I am insignificant in the total picture and there is no guarantee that others will do the same?"

Decision-making based on this type of self-interest reduces the overall social effective speed and increases the cost of transport to the community. Most transport planning relies on modelling the

behaviour of individuals and providing infrastructure and service responses to accommodate that behaviour, however socially misguided it might be.  On the other hand, land use planning, at least in principle, requires assessment of long-term consequences for the form and functioning of cities. We should not be surprised, therefore, when the aspirations of planners are not achieved.

On the transport side, some of this problem can be addressed by:
- Improving user perceptions of the relative time and cost of car driving and public transport (see Figure 1).
- Reducing access/egress times for public transport, which modelling in Perth shows is more effective than either reducing waiting time or increasing on-road bus speeds.  Short of a major restructure of bus routes, which would have adverse impacts on usage through reduced familiarity, this can be achieved by enhancing the pedestrian permeability of bus stop catchments.
- Converting the fixed costs of car use (registration and insurance) to costs that vary directly with usage.  Registration could be incorporated into the GST on fuel (which is returned to the States) and there are already US and UK insurance companies that offer car insurance with the premium directly based on usage.

More fundamentally, public transport needs to be provided in advance of the conventionally-justified 'need', as the critical factor is the fixed costs of car ownership.  Early provision of public transport in new residential estates minimises the perceived need to have more than one car per household.

On the planning side, the detail of accessibility to public transport and to local activities by means other than car (mainly walking but also cycling) is critical.  The planning profession has moved away from the worst car-oriented excesses of 'can of worms' residential subdivision, but in its place we see the gated or walled community surrounded by impermeable walls and with no through way for public transport.  This can be even more effective at making access to public transport difficult than the style it replaced. The solutions here can include:
- Pedestrian access through the walls, especially in the vicinity of bus stops, coupled with good internal pedestrian connectivity and legibility;
- A 'bus gate' that allows through access for buses (and pedestrians and cyclists – not to mention emergency vehicles) but not for cars (see Figure 8).

**Figure 8     Bus gates provide access for pedestrians and cyclists** (Source: Danish Road Directorate)



At a strategic level, planning needs to focus on the location of residences and activities with respect to public transport, as a way of providing low access/egress times for the greatest number of people.   Resolution of this dichotomy is not in any sense simple, but it can be facilitated by consideration of whether, even to the individual, faster is necessarily better (below).

**The 'Need to Speed'**

There is a large body of evidence from around the world that people travel an average of one hour (plus or minus a few minutes) a day.  So pervasive is this evidence that it has become known as the 'constant travel time budget'.  The consequences of this for the form of cities have been described by Newman and Kenworthy (1999, Chapter 2).

At the individual level: if we have to travel further to access activities and opportunities, we try to travel faster; and the faster we are able to travel, the further we choose to live from those activities and opportunities.  Collectively, we capitalise a large proportion of notional travel time savings into the value of property.  One of the first impacts of the commitment to build a new railway in Perth was strong pressure to rezone land beyond the then suburban development front for residential development.  'Affordable' housing and land ends up being pushed into areas with poor transport and access, exacerbating the social disadvantage of those already on low incomes.  All of this calls into question the conventional assumption that if we choose to travel further or faster we are better off.

**Speed and Distance: the Enemies of Cities and the Civil**

A city can be defined in terms of a spatial and organisational structure to facilitate exchanges (Engwicht, 1992). In turn, exchanges are often thought of as <u>economic</u> exchanges and this is largely the basis of our urban transport planning. In practice, however, a city only functions effectively if it also facilitates social exchanges. There are many conflicts, as well as some synergies, between the two. The increasing incidence of 'road rage' is but the most visible manifestation of the conflict.

The number of social contacts for any individual is inversely related to the volume of traffic on the street on which they live (Appleyard & Lintell, 1972). Busy streets have less social interaction, and less social support networks. This can lead to increased psychiatric disorder, physical morbidity and mortality from all causes (WHO, 1999, s5). The WHO adds that the effects on mental health include increased "risk-taking and aggressive behaviours, depression, and post-traumatic psychological effects of traffic collisions."

Leyden (2003, p1549) reports that neighbourhood walkability (ie the level of amenity for the 'slowest' (operationally) mode of travel) was the most important predictor of trust, the second most important for 'knowing neighbours' and 'social engagement' and a close third for political participation (out of eight factors considered).

Adams (2000) has concluded that countries that continue with current car-centric transport models, compared to those pursuing environmentally sustainable transport policies:
*"…will be richer (measured by GDP), but poorer measured by most other social and environmental indicators. They will be:*
- *more polarised (greater disparity between rich and poor);*
- *more anonymous and less convivial (fewer people will know their neighbours);*
- *less child-friendly (children's freedoms will be further curtailed by parental fears);*
- *less culturally distinctive (the McCulture will be further advanced);*
- *more dangerous for those not in cars (more metal in motion);*
- *fatter and less fit (less exercise built into daily routines);*
- *more crime ridden (less social cohesion and more fear of crime); and*
- *subject to a more Orwellian style of policing (more CCTV surveillance).*

Add to all this the isolation when actually driving a car and it is hardly surprising that we are witnessing the breakdown of *civility* in our *cities*, where once (both etymologically and in practice) the two words were virtually synonymous.

## Conclusion

The State of Australian Cities is about more than economic or even environmental considerations. Given that cities are essentially human constructs, discussion of their 'state' must give primary consideration to the well-being of the people who live, through choice or necessity, in cities.

There is substantial evidence that the twentieth century, car-centric model of city is:
- economically inefficient, consuming more resources for transport than necessary;
- environmentally inefficient, creating more adverse impacts on the local and global physical and atmospheric environment than necessary;
- unsustainable in the face of declining oil production coupled with increasing demand (Peak Oil); and
- socially unsustainable, because of the systematic social exclusion of those without independent access to a car and the impacts of traffic on social coherence and mental health.

A significant contributor to this is the private and social under-estimation of the time and other resources used by our transport systems. The concept of *effective speed* illustrates the nature and extent of this dichotomy between perception and reality. Far from the private car being the fastest mode of travel for individuals, when we take account of the time we have to work to earn the money to pay for the car and its use, it is no faster and is often slower than the alternatives. For the community as a whole, the picture is similar, and effective car speeds are even slower when we account for the external costs of transport on other users, the community and the environment. As Peak Oil becomes a reality, people will adjust their travel behaviour, but the cost of car travel will increase, and the private and social effective speeds of car travel will decrease. Whilst conventional perception might be that this reduces the well-being of those who live in cities, it will reduce the resources used in personal transport, reduce the impacts on the environment, enhance social interaction and, perhaps, realign cities and civility.

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