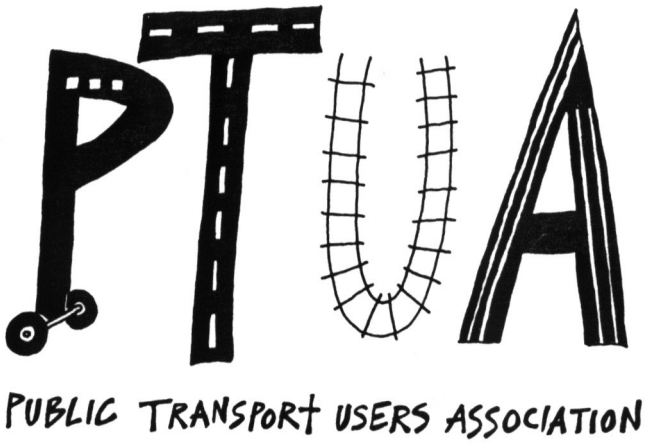
Submission to the
East-West Needs Assessment



June 2007

Table of Contents

247 Flinders Lane
Melbourne Victoria 3000
www.ptua.org.au

Introduction

The Public Transport Users Association (PTUA) welcomes the opportunity to contribute to the East West Needs Assessment (EWNA). Based upon the findings of a range of previous studies such as the Northern Central City Corridor Strategy (NCCCS) and consideration of pressing issues like global warming and oil depletion, the PTUA concludes that there is no justification for a westward extension of the Eastern Freeway as some have been advocating. We also believe that if the EWNA process is robust, the study will come to the same conclusion and recognise the urgent need to build new rail lines, as urged by Victoria's Commissioner for Environmental Sustainability (CES 2007).

1. Transport volumes and patterns

Current transport volumes and patterns and likely changes over the next 30 years

a) Impact of Melbourne 2030 and other policies

The study will consider the impact of Melbourne 2030 and other government policies on transport – what other issues do you consider are likely to impact on transport volumes and patterns over the next 30 years?

Melbourne 2030 recognised that unrestrained traffic growth is neither desirable nor sustainable. This was reflected in community forums all over Melbourne during the development of Melbourne 2030.

Transport patterns over the next 30 years must be shaped in response to the twin carbon constraints of climate change and peak oil, as well as a range of negative social consequences of car dependence such as social exclusion, road trauma and the obesity epidemic.

i) Greenhouse emissions

In addition to a general emissions reduction objective under *Growing Victoria Together*, the State Government has adopted a target of a 60% reduction in greenhouse gas (GHG) emissions by 2050 (based on 2000 levels), and a similar target looks set to be adopted as part of the state-based National Emissions Trading Scheme. This target is consistent with maintaining atmospheric greenhouse gas concentrations below 490 parts per million (IPCC 2007, p.23), however at such a level there is a medium to very high likelihood that warming will exceed 2 degrees above pre-industrial levels (CSIRO 2007, p.7), and the "best estimate" being a warming of about 2.4 degrees above pre-industrial levels (IPCC 2007, p.23). Although 450ppm is often quoted as the GHG concentration leading to a 2 degree warming, there is still a medium likelihood of the 2 degree warming being exceeded at this level of greenhouse gas (CSIRO 2007, p.7).

A warming of 2 degrees above pre-industrial levels is often quoted as the threshold for "dangerous" climate change, however some studies suggest that smaller temperature changes could also lead to dangerous impacts on ecosystems, food production and economies (Preston & Jones 2006). Recent research also suggests that current GHG concentrations are already at or close to "dangerous anthropogenic interference" (Harvey 2007). It should also be noted that the published scientific consensus is compromised by the political interest/interference of major emitter countries such as the USA (Adam & Traynor 2007; Zarembo & Maugh 2007). There is evidence emerging that the IPCC significantly/systematically understates the likely impacts of climate change and the level of emissions reductions required (Hansen 2007; Hansen et al 2007). The State Government's current 60% reduction target should therefore be

considered a ***minimum*** interim target, with the strong likelihood of deeper and faster cuts being required. Various studies have also shown that making emissions reductions at an early stage will be cheaper, easier and less disruptive than delaying reductions until mid-century, while taking steps now that entrench growth in fossil fuel consumption will make adjustment more difficult, disruptive and costly.

The transport sector is one of the largest and fastest growing sources of GHG emissions, growing faster than all other sectors apart from stationary energy. Cars and trucks contribute close to 90% of transport emissions, with aircraft contributing much of the remainder (AGO 2007). As Sir Nicholas Stern warned in his report to the British Government, the transport sector is on track to maintain its position as one of the largest sources of carbon emissions, and transport emissions may grow even faster than forecast due to increased use of carbon-intensive synfuels (oil produced from coal and gas). As part of its energy strategy, the State Government is pursuing coal-to-liquids technology based upon Victoria's large reserves of brown coal. As a result, fossil fuel looks set to be the primary focus of liquid transport fuel supplies in Victoria well into the future. Life-cycle analysis of coal-to-liquids technology incorporating carbon capture and storage (CCS) indicates that it is about as carbon-intensive as conventional petroleum, whereas coal-to-liquids without CCS is several times more carbon intensive than conventional petroleum (Tarlo 2002; Hawkins 2006).

The State Government's 60% emissions reduction target implies that total emissions in 2050 will be no more than 40% of the level of total emissions in 2000. Emissions from Victorian road transport grew by 1.6% p.a. from 1990 to 2005 (incorporating an economic slowdown in the early 1990s) and by 2.2% p.a. from 2000 to 2005. Based on a 1990 emissions benchmark as called for by environment groups and the lower 1990-2005 transport emissions growth rate, road transport emissions in 2050 will reach 36% of the level of **total** 1990 emissions. This means all other sectors would need to achieve GHG emission reductions of 95% based on 1990 levels to achieve the overall 60% reduction target. Based on the Government's year 2000 emissions benchmark and the 2000-2005 transport emissions growth rate, road transport emissions in 2050 will reach 41% of the level of **total** 2000 emissions, which means road transport emissions alone would breach the Government's relatively unambitious emissions reduction target of 60% for the economy as a whole. If road transport is to make a proportionate contribution to the Government's 60% reduction target, road transport emissions in 2050 will need to be cut by nearly two thirds relative to 2005 levels, which in the context of a growing population means a cut of three quarters in per capita road transport emissions compared to 2005 (the most recent greenhouse inventory year). As discussed above, it is likely that even these cuts are not deep or fast enough to avoid dangerous climate change.

By way of comparison, widespread adoption of hybrid engine technology is only expected to result in reduced *growth* in absolute fuel consumption rather than actual reductions compared to current use (McDonald et al 2005). There is also an emerging trend to use hybrid technology to boost power output with comparable fuel consumption rather than seeking significant *reductions* in fuel consumption (Wald 2005). With current levels of motor vehicle use (i.e. not allowing for growth), a Victorian passenger

car fleet comprised wholly of 100% electric cars would require another Hazelwood power station to provide the primary energy[1].

Although claims are often made about significant emissions reductions from operating in hypothetical free-flow traffic, these results are typically obtained by testing in controlled conditions and do not accurately reflect real-world experience. Increases in road capacity, traffic flow and average speeds invariably result in induced traffic, i.e. additional motor vehicle journeys and increases in the length of existing journeys (Pfleiderer & Dieterich 2003; VCEC 2006). Not only does the increase in vehicle kilometres offset the initial reduction in per kilometre emissions, free-flow conditions only last a short period of time as the induced traffic consumes the additional road capacity and congestion is returned, as witnessed on the CityLink toll-road which had been heralded as the solution to traffic snarls prior to its construction (Hopkins 1998; Das 1999). The level of induced traffic tends to be particularly high where there is a significant amount of latent demand currently being deterred by congestion (Litman 2007, p.9) which is likely to apply to the study area. With much of the traffic in the study area converging on the inner city, major increases in road capacity would at best shift the location of congestion rather than eliminate it and therefore have no benefits in terms of traffic flow or GHG emissions.

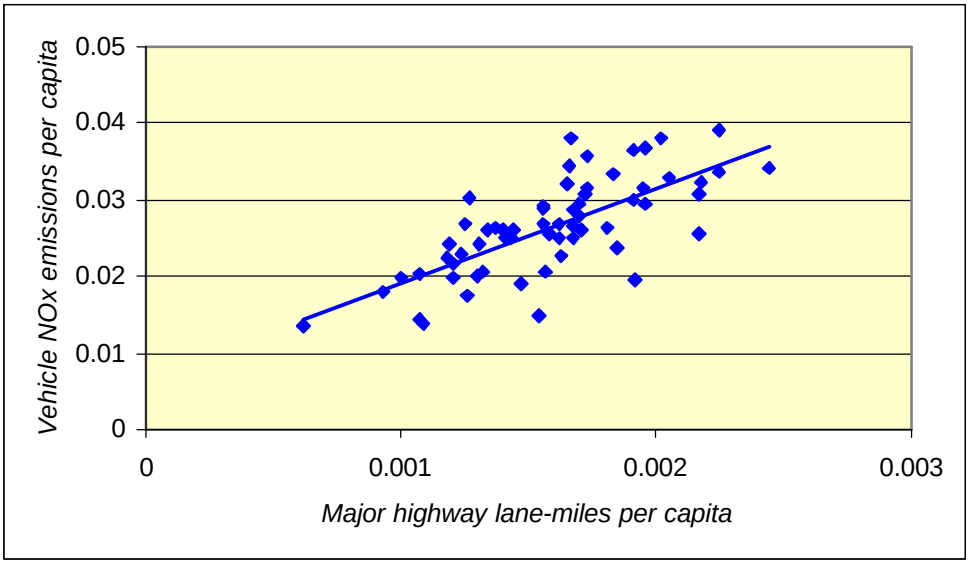
In view of the emissions reductions that are required and current emissions trajectories, maintaining a business-as-usual or incremental approach to transport emissions carries a significant probability of leading to dangerous climate change. To reduce this risk to acceptable levels, emissions reduction strategies must include fundamental restructuring of transport priorities away from private motor vehicle use and road freight, and towards active transport, public transport and rail freight. Such moves would dramatically reduce motor vehicle volumes, including a likely reduction in typical journey lengths and cross-town traffic, and increased cycling and public transport patronage.

ii) Air pollution

Urban air pollution is a serious environmental and health problem leading to more deaths each year than road crashes (Beer 2004). Both *Growing Victoria Together* and *Melbourne 2030* target reductions in urban air pollution. Motor vehicles are the main source of urban air pollution, and diesel engines a major producer of airborne particulate matter (APM). Electrified public transport produces no localised air pollution and public transport in general can offer significant pollution reductions on a per passenger kilometre basis. Pursuing these opportunities to reduce air pollution in line with Government policy would reduce traffic volumes and lead to increased walking, cycling and use of public transport, especially electric trains and trams. On the other hand, increased roadway provision is associated with higher levels of pollution such as oxides of nitrogen and Volatile Organic Compounds (VOCs) (see Figure 1 and Figure 2).

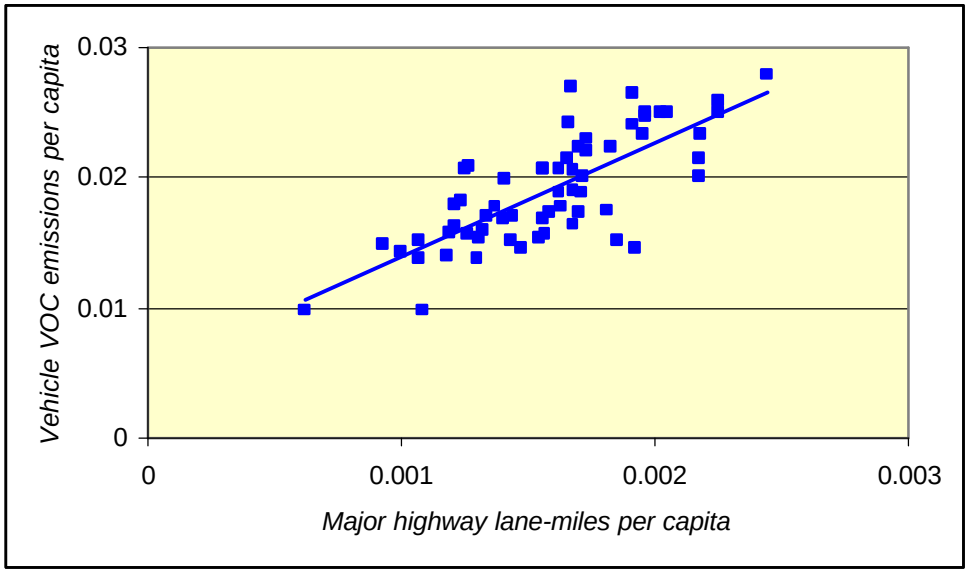
[1] Based upon 17.3 kWh/100km and 50% energy loss in generation, transmission, battery charging, etc.

Figure 1: Relationship between road provision and NOx emissions



Source: Environment California

Figure 2: Relationship between road provision and VOC emissions



Source: Environment California

While technologies such as catalytic converters are in use or are available to reduce emissions of some pollutants, these generally involve a trade-off between reducing the target pollutants and increasing other emissions (e.g. CO2) and fuel consumption.

iii) Strengthening Central Melbourne

The State Government, under *Melbourne 2030*, has a policy of strengthening central Melbourne, while the City of Melbourne, under the *Melbourne Transport Strategy*, has an objective of increasing CBD visitation. The competitive advantages held by central Melbourne over other parts of the city relate mainly to the density of activity and associated agglomeration economies. A high level of activity density is aided by high

quality public transport links, whereas encouraging or relying upon motor vehicles for access impedes activity density by consuming high value space with unproductive car parking and roads (Litman 1995; Voith 1998).

The CBD and central city area will never be able to compete with suburban locations for cheap, abundant car parking (Voith 1998), and attempting to do so would fundamentally undermine the competitive advantages of central Melbourne and degrade the amenity of the inner city. Successfully strengthening central Melbourne and increasing CBD visitation will therefore rely on restraining private motor vehicle use, increasing the share of journeys undertaken by public transport, increasing the absolute level of public transport patronage, and expanding the availability of high quality public transport across the greater metropolitan area (Voith 1998, p.11).

See also Section 4.e).

iv) A fairer city

A fairer city is one of the key directions of *Melbourne 2030*, and the government's social policy action plan, *A Fairer Victoria*, recognised that "[g]ood public transport links provide support for local economic activity and growth, improve access to employment and education, create a safer community and provide more sustainable travel options." (*A Fairer Victoria*, p.51)

The NCCCS found that improving public transport would "[s]ubstantially increase... the number of travel options available to all members of the community but particularly assist... disadvantaged groups" (initial appraisal p.8). Similarly, improved public transport will allow low income households to escape rising petrol prices while still gaining access to education and employment.

Research has shown that residents of Melbourne's car dependent suburbs are highly vulnerable to rising oil prices (Dodson & Sipe 2006), with a strong negative relationship between oil vulnerability and the availability of rail services. The Commissioner for Environmental Sustainability has warned that Melbourne could be divided into two cities "with well-to-do inner suburban dwellers thriving on abundant transport, jobs and services while car-dependent fringe dwellers languish and suffer from rising petrol prices" (Millar 2007).

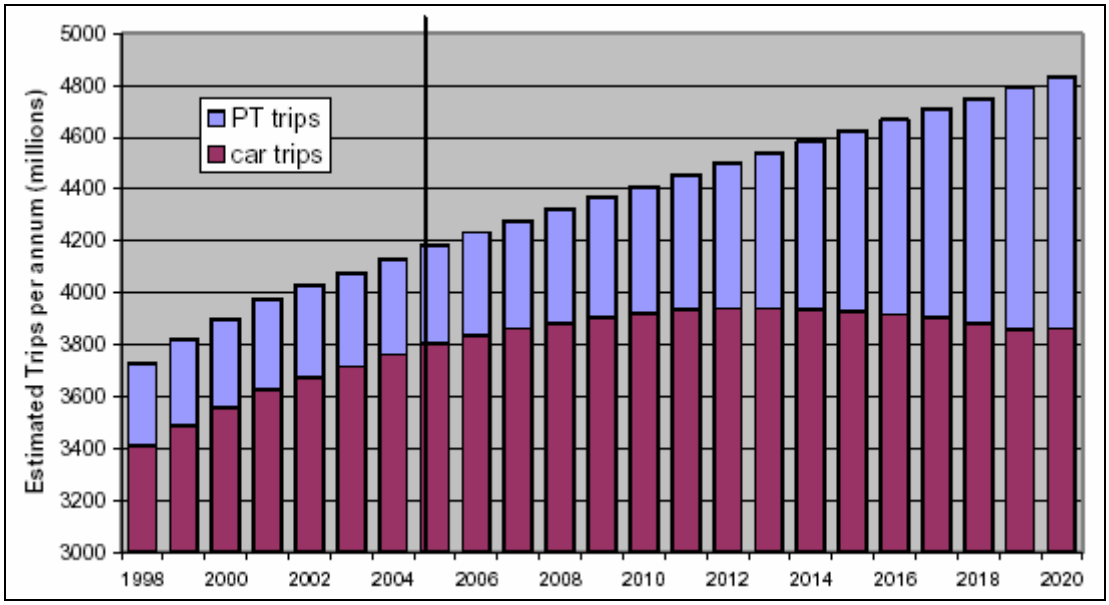
Ensuring greater availability of public transport and reducing car dependence would reduce the amount of motor vehicle traffic and increase public transport patronage.

v) Public transport mode share

Under *Growing Victoria Together*, the Government has adopted a target of 20% mode share for public transport by 2020. Analysis by the Bus Association has demonstrated that this policy will lead to the number of journeys in private motor vehicles plateauing close to current levels, while public transport patronage will go close to tripling in absolute terms (see Figure 3). This implies that there will be little change in motor

vehicle volumes over the next two decades, even with population growth, and substantial growth in the number of journeys undertaken on public transport.

Figure 3: Travel mode share towards 2020



Source: Bus Association of Victoria

vi) Freight mode share

Under *Growing Victoria Together*, the Government has adopted a target to increase the proportion of freight transported to and from ports by rail to 30 per cent by 2010. Given the proximity of 2010, priority for improving freight infrastructure over the next three years must clearly be on the rail network, including capacity and connectivity to ports and acceleration towards meeting the government's commitment to gauge standardisation. Progress towards meeting this target will result in growing demand for rail freight and moderation in demand for road freight.

vii) Road trauma

Under *Growing Victoria Together*, the Government aims to reduce deaths and serious injuries in road crashes by 20%. In 2004, the Inquiry into National Road Safety recognised that a reduction in road trauma could be achieved by providing alternatives to private motor vehicle trips. Encouraging alternatives to motor vehicle use is now a strategic objective of the National Road Safety Strategy.

Although road projects are often claimed to offer safety benefits, there is strong evidence that these benefits are overstated (Noland 2002), and that car dependent cities suffer from higher rates of traffic fatalities (Ewing et al 2003; Litman & Fitzroy 2005).

The risk of a driver being involved in a casualty crash starts to increase above the age of 50. As our population ages, it is important to ensure that those who become unable to

drive are willing to give up motor vehicles, by providing them with viable alternate transport options.

b) Evolving patterns

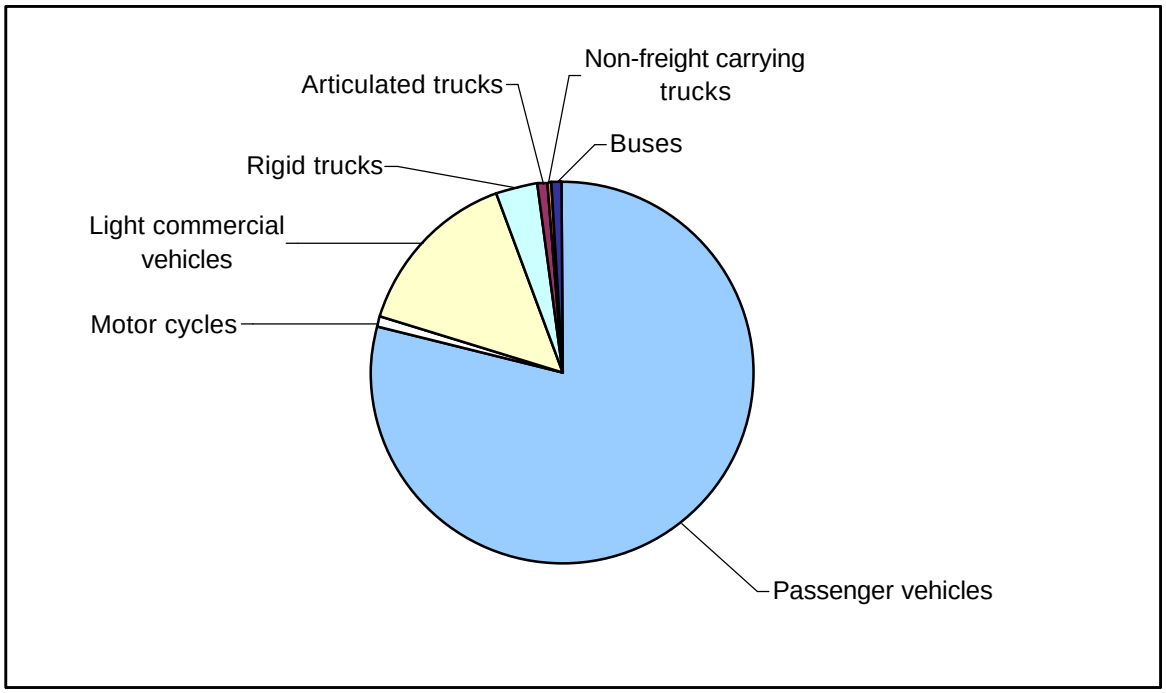
What patterns do you see evolving in transport over the next 30 years, particularly with respect to freight, public transport and commuter traffic?
Please include any information to support the volumes and patterns you envisage.

The PTUA is concerned that many of the Study's reference questions are framed according to the outdated and discredited "predict and provide" approach to transport planning which has delivered relentless and unsustainable growth in congestion, energy use, emissions and sprawl. The study should instead consider how transport infrastructure should be shaped to deliver a shift towards public transport and rail freight, and supportive landuse policies.

i) Current travel patterns

As implied by the reference question, future travel patterns will evolve from current travel patterns. Therefore current travel patterns should form an important part of the analysis.

Figure 4: Vehicle Kilometres of Travel (VKT) in Melbourne



Source: Australian Bureau of Statistics

Passenger cars make up the vast majority of traffic in Melbourne, including on the main freight routes (see Figure 4). Accordingly, the volume and characteristics of passenger travel are the most critical factors limiting the efficiency of freight movement in urban areas.

One of the more comprehensive compilations of travel data is the Journey To Work information collected as part of the Census. At the time of writing, the most recent information available is from the 2001 Census. This information demonstrates that most journeys to work are relatively short, venturing only within the same Local Government Area (LGA) or a neighbouring LGA, or are destined for an LGA on the same rail corridor that runs through the home LGA. The table below outlines journey to work patterns for the growth areas identified within *Melbourne 2030*.

As seen in Table 1, in the region of a quarter to a third of journeys in these growth areas are wholly within the same LGA. Another 16-30% of journeys are to neighbouring LGAs. From around a third to half of journeys are to other LGAs on the same rail corridors. Typically less than a third of journeys are to LGAs that neither neighbour the home LGA nor are on the same rail corridors, with only a small proportion of journeys to LGAs on the other side of the study area.

Table 1: Journeys to Work from Growth Areas

Destination	***Cardinia***	***Casey***	***Hume***	***Melton***	***Whittlesea***	***Wyndham***
Same LGA	36%	24%	36%	20%	26%	33%
Neighbouring LGA on same rail corridors	11%	22%	12%	19%	12%	11%
Other neighbouring LGA	5%	9%	5%	6%	17%	6%
LGA on same rail corridors, not neighbouring (exc. Melb)	21%	21%	8%	6%	4%	6%
City of Melbourne	3%	6%	14%	15%	12%	17%
Other LGA not already listed	24%	19%	26%	33%	29%	27%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

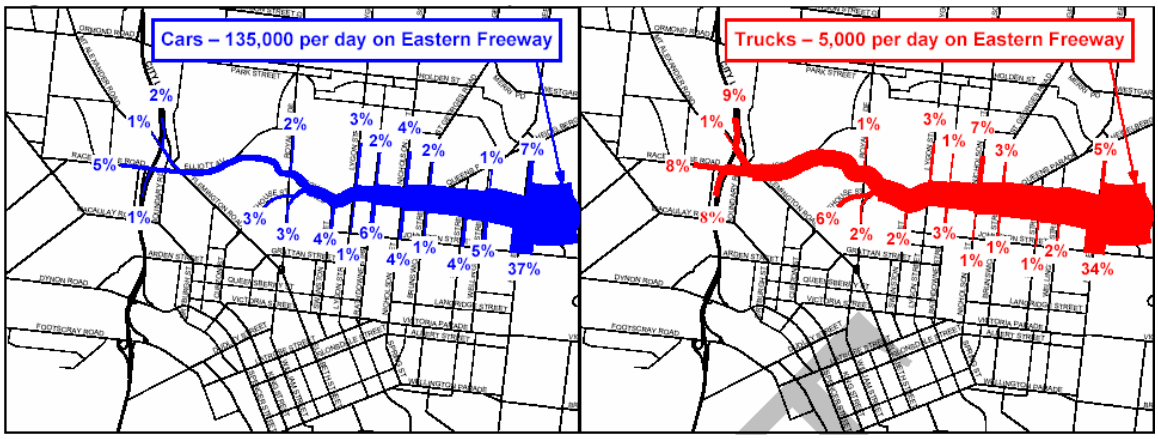
Source: Australian Bureau of Statistics Census 2001
Note: "Neighbouring" is regarded as sharing a border. e.g. Hume and Moonee Valley are not regarded as neighbouring despite their proximity, so the proportion of journeys to neighbouring LGAs should be regarded as conservative.

It is also worth noting that journeys to the City of Melbourne typically make up a small proportion of journeys to other LGAs on the same rail corridors, especially from the outer south east municipalities of Casey and Cardinia. This demonstrates the need to properly serve intermediate destinations and not focus too heavily on express services from Dandenong to the CBD at the expense of stopping services. It also follows that train services need to integrate well with other services along these corridors to ensure that passengers can get from the railway line to their ultimate destination (i.e. ensure a "network effect" from comprehensive and integrated public transport provision - see Section 4.c)i)(C)). For example, tram 67 currently falls short of Carnegie railway station and trams could also be extended down Burke Road to Caulfield station. The NCCCS noted that a lack of integration between services was one of the key impediments to increased modeshare for public transport (NCCCS, p.9).

One of the largest sources of traffic in the study area is the Eastern Freeway. This corridor is the main route through the inner city from a part of Melbourne that currently

lacks good quality public transport. The Northern Central City Corridor Study (NCCCS) analysed travel patterns of traffic coming in along the Eastern Freeway and found it was largely destined for the CBD and surrounding areas (see Figure 5). Within half a kilometre of passing Hoddle Street, half of Eastern Freeway traffic has turned to the left or right (mainly left), and two thirds has turned towards the CBD by the time it reaches Royal Parade. Only a small proportion travels further West, demonstrating that an East-West Link is not needed so much as vastly improved East-CBD public transport that integrates with the broader public transport network.

Figure 5: Destination of Eastern Freeway traffic



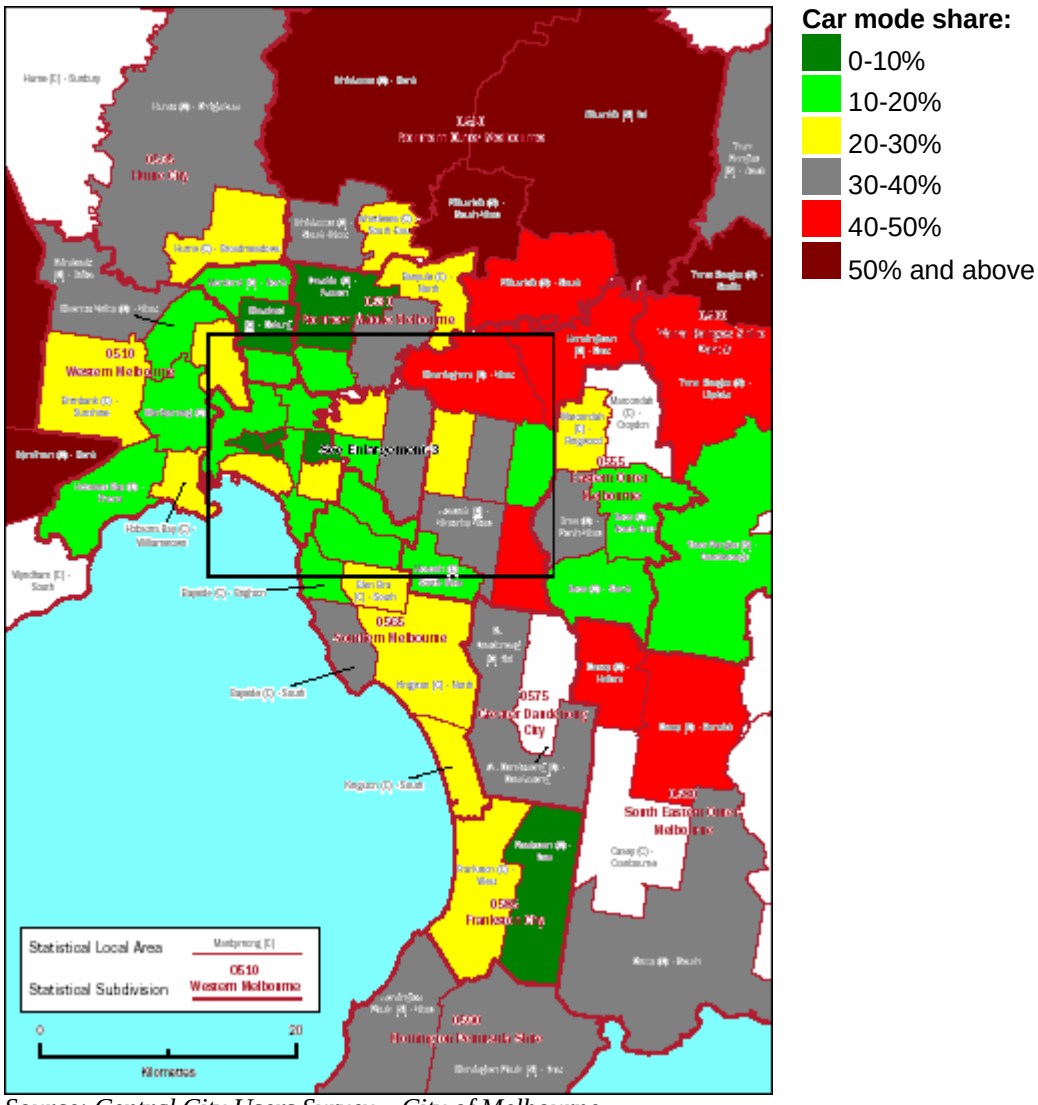
Source: Northern Central City Corridor Study

The Central City Users Survey commissioned by the City of Melbourne identifies the method of travel and origin of visitors to the central city area. This is a useful indicator as it includes all types of journeys, not just journeys to work, and journeys to the central city area form a significant component of travel within the study area as shown above. At the time of writing, the latest survey is also more recent than the latest Journey to Work data available from the Australian Bureau of Statistics and may better reflect the impact of increasing petrol prices.

Figure 6 indicates the mode of travel to the central city area from different Statistical Local Areas (SLAs) across Melbourne. In most areas, car use represents a minority of journeys to the central city area, and a very small minority in some cases. The map clearly shows however that travel by car is significantly overrepresented in journeys from the Doncaster corridor and the outer west (e.g. Melton and Wyndham) where rail services are currently absent or infrequent. The high share of journeys undertaken by car from the outer west would be placing excess pressure on the Western Ring Road and the West Gate Freeway, including the bridge. The high mode share for car from Manningham and neighbouring areas would be placing unnecessary pressure on the Eastern Freeway and inner north.

Compared to neighbouring SLAs, Camberwell North (bordered by the Eastern Freeway to the north) and Camberwell South (bordered by the Monash Freeway to the south) have relatively high car use. The proximity of the freeways would clearly play a role in this level of car use, although given the demographics of the areas, there is also likely to be a disproportionately high number of senior executives with a propensity to salary-package company cars.

Figure 6: Mode share in journeys to the central city area

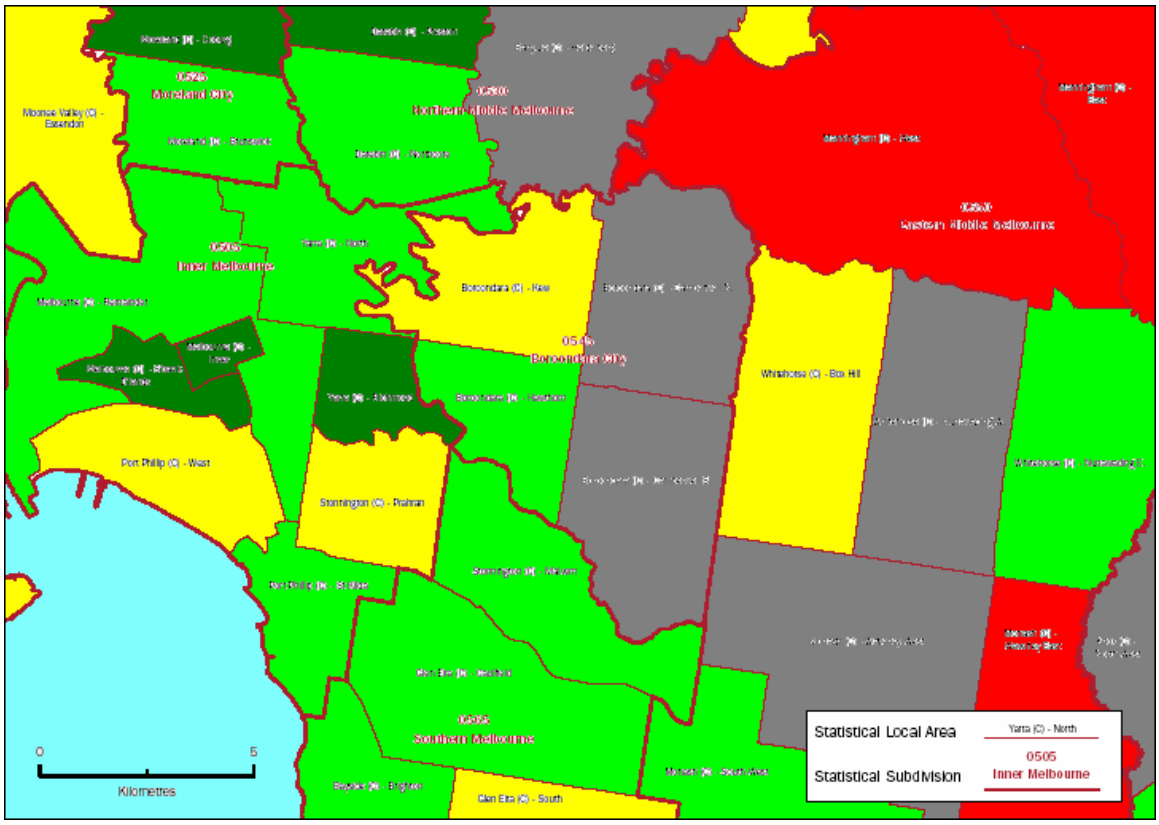


Source: Central City Users Survey – City of Melbourne

Another interesting comparison is between the northern part of the City of Bayside which is dissected by the Sandringham rail line and is within Zone 1, and the southern part of Bayside which is for the most part in Zone 2 and tends to be more distant from rail services. Car use for access to the central city area is nearly 4 times higher in the southern part of this municipality than in the northern part, which reflects significant differences in public transport cost and service quality between otherwise comparable areas.

The SLAs where cars are used for over 40% of journeys to the central city are those areas where freeways dominate for access to the central city area and/or public transport is of poor quality. For example, over 40% of visitors from Manningham (in the Doncaster corridor) and Waverley East (in the Rowville corridor) come by car. Car use for access to the central city area is typically less than half these levels in comparable SLAs with rail services (see Figure 7).

Figure 7: Mode share for journeys to the central city area



Although claims are made about the need to cater for business travel in passenger vehicles, it appears that business use of private vehicles is somewhat overstated (Richardson 2000), so the benefits of improving capacity for general traffic - as opposed to just freight vehicles – are also likely to be exaggerated, especially after the effects of induced traffic are considered. The OECD (2006, p.70) has also indicated that "personal trips are growing faster than work-related trips". Perverse incentives inherent in current Fringe Benefits Tax provisions may also underlie some travel in business vehicles. It would be inappropriate to reinforce this regulatory distortion with significant infrastructure that encourages further traffic.

Monitoring of the road network by VicRoads indicates that traffic volumes in the inner city have been stagnant or falling in recent years, with rising petrol prices likely to be a major factor. This demonstrates that continued growth in motor vehicle traffic is not inevitable, however it does reveal a divergence in traffic volumes between the outer suburbs where public transport is highly deficient and the inner city where transport alternatives are better developed.

ii) Predicting future freight traffic volumes

The Study Overview draws attention to projections of a doubling in articulated truck travel and a 60% increase in light commercial vehicle travel in Melbourne over the 15 years from 2005 to 2020 (BTRE 2003 cited in BTRE 2004). Since taking these projections as gospel could result in extremely expensive mistakes being made, the study team should note:

- the projections assume underlying growth in freight volume (tonne-kilometres) of about 54%,
- these are business-as-usual base case projections that assume no demand management measures,
- the projections may be quite sensitive to assumptions about real freight rates, and
- given certain projections of freight volumes (tonne-kilometres), the traffic volumes (vehicle kilometres) may be sensitive to assumptions about average loadings, vehicle utilisation, etc.

These projections of substantial growth in freight traffic volumes are only as accurate as the assumptions used in the modelling. Therefore, it is important to question the veracity of the predictions and underlying assumptions that are informing this Needs Assessment. There is strong evidence that the most widely accepted predictions of future freight volumes rely on assumptions that significantly overstate the extent of future freight growth.

BTRE (2004) have described a simple model for truck traffic:

> Truck Traffic (vkt) = Road Freight Task / Average Load per Truck

(A) Road freight task

The components of this basic model can be decomposed further, with the road freight task comprised of:

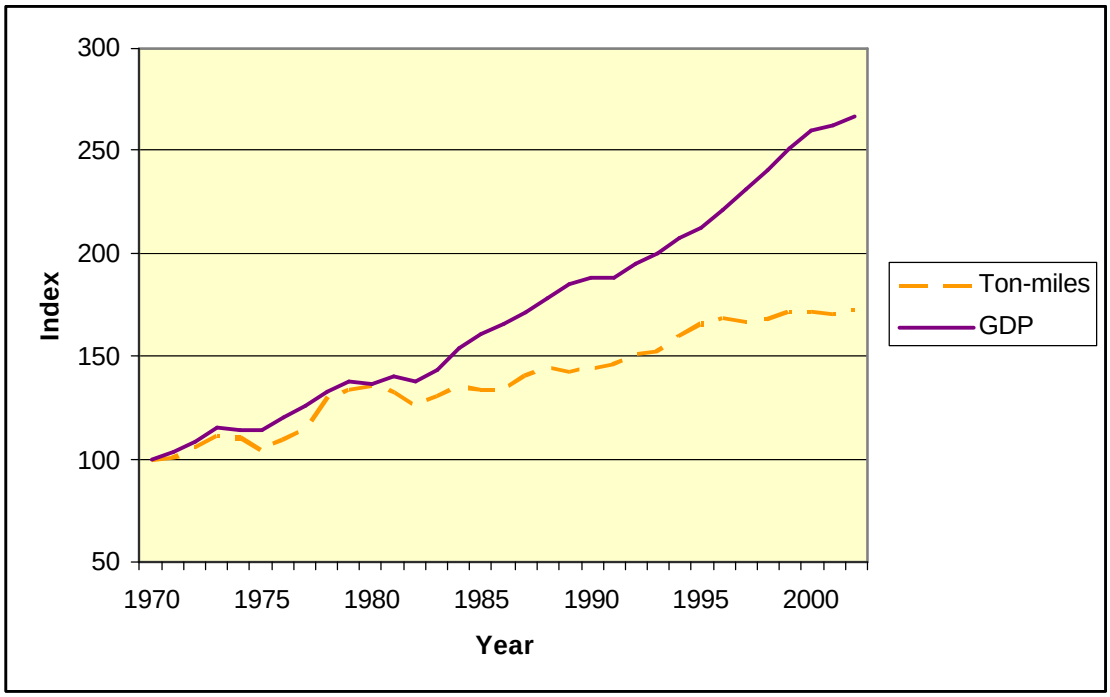
> Base year freight task x (1 + (economic growth x freight multiplier))^no. of years x (1 + (real freight rate change x freight rate multiplier))^ no. of years

(B) Freight multiplier

The freight multiplier reflects the extent to which freight growth diverges from economic growth, or the elasticity of freight volumes relative to economic growth. The received wisdom in Australia appears to be that the freight multiplier is 1.21-1.24, or that freight volumes grow by at least 1.21 times the rate of economic growth (Gargett 2004 cited in BTRE 2004; BTRE 2006). As long as 15 years ago the World Bank found that the elasticity of freight (in tonne-kilometres) by road with respect to GDP was 1.02 across 17 developed countries (Bennathan et al 1992, p.7 in McKinnon 2006, p.5). Since then, a number of countries around the world, including the USA, have

experienced growth in freight volumes below the rate of economic growth (Pastowski 1997, p.5). The USA experienced a 35% drop in tonne-kilometres per dollar of real GDP between 1980 and 2002 (see Figure 8), and the ratio of inland tonne-kilometres to GDP in the UK declined by 12.7% between 1993 and 2003.

Figure 8: US freight ton-miles and GDP 1970-2002



Source: US Bureau of Transportation Statistics

Meersman and Van de Voorde (2002, p.5) note that "it is not so much growth of GDP that is the driving force behind freight transport, but the increase in industrial output". With the growth of the service sector, a growing proportion of economic activity is intangible and does not require physical transportation (Kveiborg & Fosgerau 2005 in Lehtonen 2006). In light of this, there is growing evidence that the freight multiplier may in fact be less than 1 going forwards with decoupling of freight transport from economic growth. Although Australia may not have experienced decoupling of freight volumes from economic growth to the same extent as the UK or USA, the link does appear to be weakening. For example, domestic freight growth over the period from 1963 to 1973 was over twice the rate of economic growth, whereas freight growth over the decade to 2003 was only 1.05 times the rate of economic growth; approximately equal to the elasticity identified by the World Bank. If Australia follows the lead of the UK and USA, as current trends suggest, elasticity may fall below 1.0 in the near future.

Experience with road freight growth over the last couple of decades reflects substantial investment in road networks, lack of investment in rail networks and the consequent decline in competitiveness of rail freight. In their *2005 Victorian Infrastructure Report Card*, Engineers Australia (2005) rated the condition of Victoria's national, state and local roads in the range of C to C-, whereas the rail freight network rated a D or lower. Therefore the observed historical road freight multiplier may include a component of increased modal share at the expense of neglected rail networks, as distinct from an increase in aggregate freight volume. There are now signs that both the Commonwealth

Government, through AusLink, and the Victorian Government, with the buyback of the state's broad gauge network from Pacific National, are committed to redressing recent neglect of the rail network. Through measures such as facilitating intermodal hubs and ongoing commitment to the goal of 30% mode share for freight going to Victorian ports, the government has the opportunity to reverse the decline in rail's modal share. To the extent that the standard road freight multiplier incorporates mode share gained from rail, this could be expected to be reduced or even be reversed over the next two decades. A shift back away from road transport and towards rail and water in the UK is estimated to account for one fifth of the decoupling of road freight from economic growth identified above (McKinnon 2006, p.16).

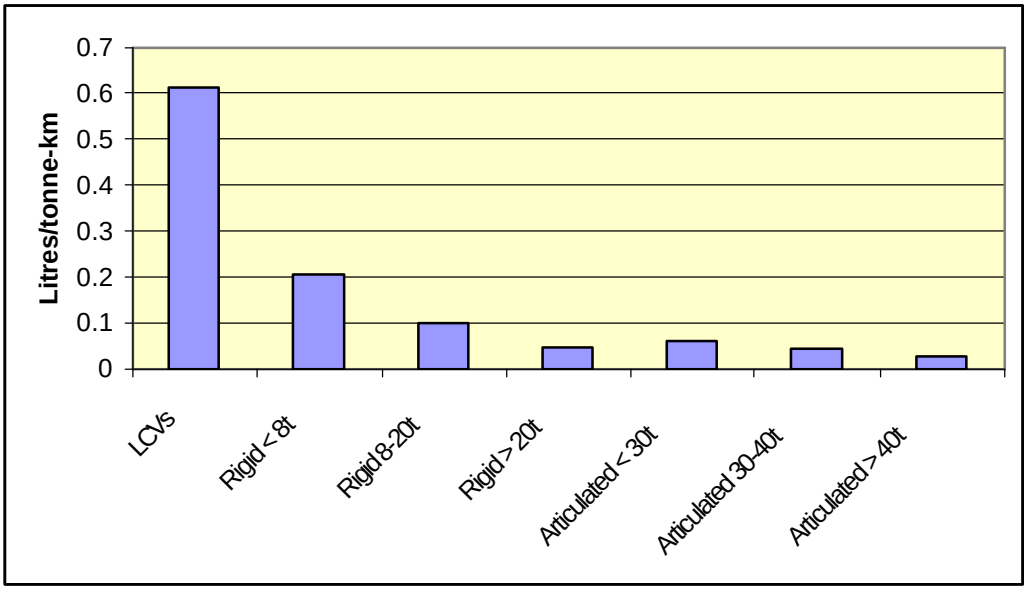
Opportunities may also exist to increase the efficiency of material use and reduce the quantity of material consumption and throughput for a given level of production, otherwise known as *dematerialisation* (OECD 2006, pp.66-68).

(C) Real freight rate

Official predictions of future freight volumes tend to assume that real freight rates will either fall or remain at current levels (BTRE 2006, p.154). There is good reason to believe that current freight rates are unsustainable, let alone lower freight rates. The following key pressures should be considered:

- **Peak oil** - the imminent peak and subsequent decline in global oil production discussed elsewhere will result in high prices for liquid transport fuels in both real and nominal terms. This will significantly increase the operating costs of road freight operators and will feed through into freight rates. This is likely to particularly impact smaller trucks and light commercial vehicles with higher fuel consumption relative to tonnes carried (see Figure 9), while fuel consumption by rail freight is an order of magnitude lower than articulated trucks.

Figure 9: Fuel consumption per tonne-kilometre



Source: Australian Bureau of Statistics

It should also be noted that higher oil prices will also reduce economic activity and the size of the freight task it implies (see Sub-section (B) above), especially if dependence upon liquid transport fuel is not significantly reduced among consumers. High petrol prices will also restrain private motor vehicle traffic, as it already appears to be doing.

- **Carbon pricing** - long overdue recognition of the need to price carbon emissions is also likely to result in higher prices for liquid transport fuels and increase the operating costs of freight businesses. This is likely to impact trucks more-so than trains, and particularly impact vehicles with low tonnage relative to fuel consumption (e.g. smaller trucks and LCVs).

- **Aging trucking workforce** - the road transport industry faces stiff competition from other sectors for labour and, at current trends, by 2011 nearly 70% of truck drivers will be over 45 years of age (BTRE 2003a, pp.49-52). Serious concerns are also raised periodically about the workload on individual drivers and the health and safety implications of fatigue. The reported shortage of drivers may even place real capacity constraints on the industry. Properly addressing these challenges is likely to place upwards pressure on industry wages and feed into higher freight rates.

- **Industry profitability** - reductions in real freight rates observed since the early 1970's have, at least in part, been enabled by shrinking margins within the industry (BTRE 2006, pp.152-3; BTRE 2003a, p.64). With margins now quite low, it is possible that further tightening of margins would not be financially sustainable, thus restricting future reductions in real freight rates.

(D) Average Load per Truck

The average load per truck can be further broken down into the amount of travel unladen and the average load when laden. A substantial proportion of truck vkt in Melbourne is unladen or "empty running" and therefore contributing to truck traffic without contributing at all to freight movement. Substantial opportunities exist to reduce the amount of unladen vkt through Government initiatives such as Smart Freight. It is also likely that the private sector would find other means to optimise the level of vkt where price signals are imposed that provide an incentive for more efficient truck movements (Liechti & Renshaw 2006, pp.7-8). International examples include internet services to facilitate backloading of trucks on their return journey.

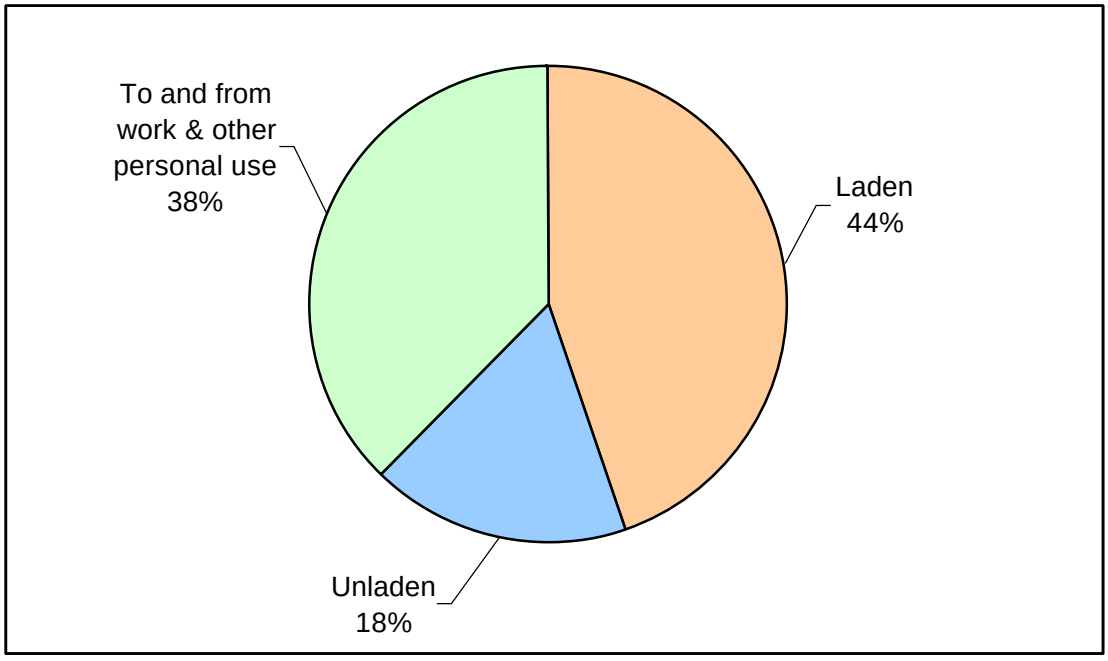
There is also significant potential to increase the average load of laden trucks by better utilising existing vehicles and introducing higher capacity vehicles where appropriate. Around one third of truck movements to and from the Port currently carry no containers at all, and the container vehicle utilisation rate is only about 51% (VCEC 2006, p.324). Efficient pricing of road use would also provide an incentive to optimise vehicle usage rather than the current practise that effectively externalises a large portion of warehousing costs upon society through just-in-time logistics.

Although just-in-time logistics has grown over the last couple of decades in hand with a trend to out-sourcing, a newer trend of strategic sourcing can also be expected to influence transport demand. Many firms are consolidating their supplier relationships and looking for stronger integration with their suppliers in both a systems and locational sense, achieving what some might call virtual vertical integration. This can be expected to reduce the number of deliveries (as the number of suppliers is rationalised) and the distance freight must travel as industries seek the benefits of operating in clusters (Strutynski 1995).

Through reducing the amount of unladen vkt and increasing the average tonnage on laden vehicles, a substantial amount of growth in freight volume could be absorbed without significant growth in truck traffic.

Even given the likely overstatement of business use of light vehicles (see Section 1.b)i)), official data indicates that non-business use of LCVs is comparable to the quantity of laden business kilometres in LCVs (see Figure 10). To some extent, this would reflect the lenient compliance obligations to obtain a full exemption from Fringe Benefits Tax in relation to commercial vehicles under Section 8 of the *Fringe Benefits Tax Assessment Act 1986* (Cwlth). Since this distortion could be rectified by Fringe Benefits Tax reforms, there does not appear to be a business imperative to cater for ever-expanding use of light vehicles through high-cost infrastructure measures, especially when providing additional general purpose road capacity will inevitably induce additional private traffic.

Figure 10: Utilisation of Light Commercial Vehicles in Victoria



Source: Australian Bureau of Statistics

Growth in LCV traffic to some extent reflects growth in home shopping and replacement of car journeys by the consumer with van deliveries to the consumer's door. Although this appears to be increased freight transport, it largely represents increased visibility of "latent freight movement that has never appeared in official freight

transport statistics" (McKinnon 2006, p.20). As such, it does not need to be accommodated with increased road capacity.

iii) Supply-led demand

In addition to factors discussed above, changes over next 30 years will be strongly influenced by transport supply. Regardless of the level of freight traffic growth, it must be recognised that the vast majority of traffic, along with the resulting emissions and congestion, relates to low occupancy private motor cars (see Figure 4).

Even if truck VKT was to double, it would represent less than a 10% increase in total VKT across Melbourne. On the other hand, a 10% reduction in car VKT would be broadly consistent with meeting the Government's 20/2020 mode share target for public transport.

Conversely, increases in road capacity feed back into larger volumes of passenger vehicles, which can over the long term cause greater delays to freight movement.

In essence the Government faces choice between:

- improving the coverage and integration of fast and frequent public transport which will encourage greater use of public transport in line with the Government's 20/2020 goal, thereby reducing transport emissions and household transport costs; or
- inducing further motor vehicle traffic with additional road supply, entrenching greater car dependence and contributing to rising transport emissions and urban sprawl.

Transport patterns over the next 30 years will be largely shaped by how the Government responds to this choice.

c) Impact of land use and economic trends

What impact will economic conditions and land use trends have on transport patterns in the study area over the next 10, 20 and 30 years?

i) Land use trends

The bulk of population growth over the coming decades is projected to occur in a set of growth areas identified under Melbourne 2030. These growth areas are generally located on current or potential rail corridors, i.e.:

- Whittlesea (South Morang/Mernda and Aurora extensions to Epping line),
- Casey-Cardinia (Cranbourne and Pakenham lines),
- Wyndham (Werribee line),
- Melton-Caroline Springs (Melton line),
- Hume (Sunbury and Broadmeadows/Craigieburn lines).

Since there is no reason to expect new residents of these growth areas to adopt travel patterns that are markedly different from existing travel patterns, this growth has the potential to substantially increase rail patronage in the study area, since a substantial share of travel to the CBD and inner city is undertaken by public transport, especially from areas on rail corridors. On the other hand, as these areas develop, local opportunities for employment and recreation will increase and encourage residents to undertake a higher proportion of travel within the local area, and thereby reduce the amount of travel they need to undertake. In other words, it is likely that most people will continue to work and play in and around the area in which they live and not undertake a significant amount of travel across the study area. That is, people in Whittlesea will mainly travel in and around Whittlesea, people in Casey will mainly travel in and around Casey, people in Hume will mainly travel in and around Hume, and so on. To the extent that people venture further from their local area, a large proportion tends to travel radially towards or into the CBD, further adding to the need to enhance rail operations, boost service levels and integrate with other services.

ii) Economic trends

As discussed in Section 1.b)ii), the impact of economic growth on freight volumes is likely to be less than is commonly stated. Similarly, a link between economic growth and car travel is not inevitable or likely to be as strong as often claimed. Above a certain income level, car use is generally observed to plateau, whereas land use practices and transport provision appear to be much stronger determinants of vehicle use than income (Newman 2000; Cameron, Lyons & Kenworthy 2004; Litman 2005b).

This reinforces our view that transport patterns over the next 30 years will be largely shaped by transport infrastructure and service provision along with pricing policies.

d) Impact of Port traffic

What directions do you consider that the Port of Melbourne and associated commercial traffic are likely to take over the coming 20 – 30 years and how will this impact on transport needs in the immediate area and beyond?

As noted above, commercial traffic is a very small portion of traffic in Melbourne (see Figure 4). The Port of Melbourne Corporation has indicated that only a small portion of heavy vehicle traffic relates to activity at the Port:

> "Analysis of ABS 2004 Survey *of Motor Vehicle Use in Australia* report, and data obtained from PoMC's November 2005 Truck Utilisation Survey suggests that only 4% of all heavy vehicles in Victoria are involved with port freight operations, and that these vehicles travel approximately 2.3% of all Victorian heavy vehicle kilometres, making land transport associated with the port a small part of the total task."
> (PoMC 2006, p. 5)

In other words, commercial traffic associated with the Port of Melbourne is a small part of the total freight task which itself is a small portion of total traffic. Even in the immediate area where Port traffic does comprise the majority of truck movements, it represents a minority of overall vehicle movements (PoMC 2006, p.5) - underlying the fact that low occupancy commuter traffic is the main consumer of roadspace and that significant opportunities exist to use existing road capacity more efficiently.

The PTUA strongly endorses the Government's policy of increasing the proportion of freight going to and from Victoria's ports by rail (*Growing Victoria Together*). This growth in rail's share of freight movements to the Port, along with any increases in the total volume of freight, will require investment in rail freight infrastructure to ensure adequate capacity in the immediate area and connectivity to inland ports and intrastate and interstate rail networks.

Any discussion of sea freight should also note that shipping is a major, yet largely unrecognised source of greenhouse emissions. The twin carbon constraints of peak oil and climate change could reduce the commercial appeal of shipping large quantities of goods around the world, and therefore moderate the volume of freight passing through the Port in future.

2. Infrastructure capacity

Capacity of existing and planned infrastructure to meet future requirements

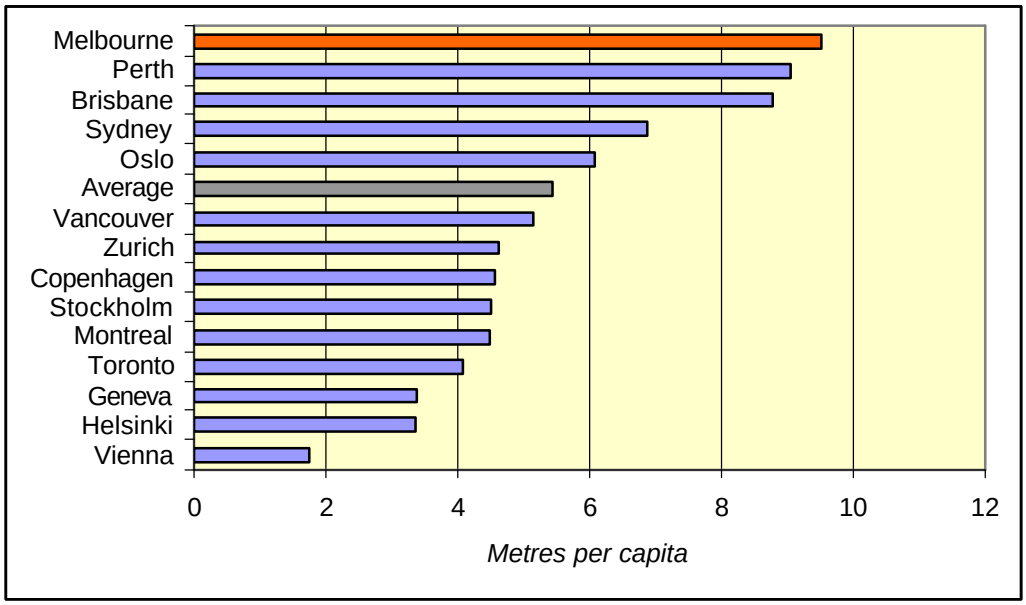
a) Strengths and shortcomings

What are the strengths and shortcomings of current and planned transport infrastructure to meet future east-west transport demand?

i) Road supply

Melbourne has a highly developed road network with more roadway per capita than most comparable cities despite a relatively uncomplicated topography (see Figure 11).

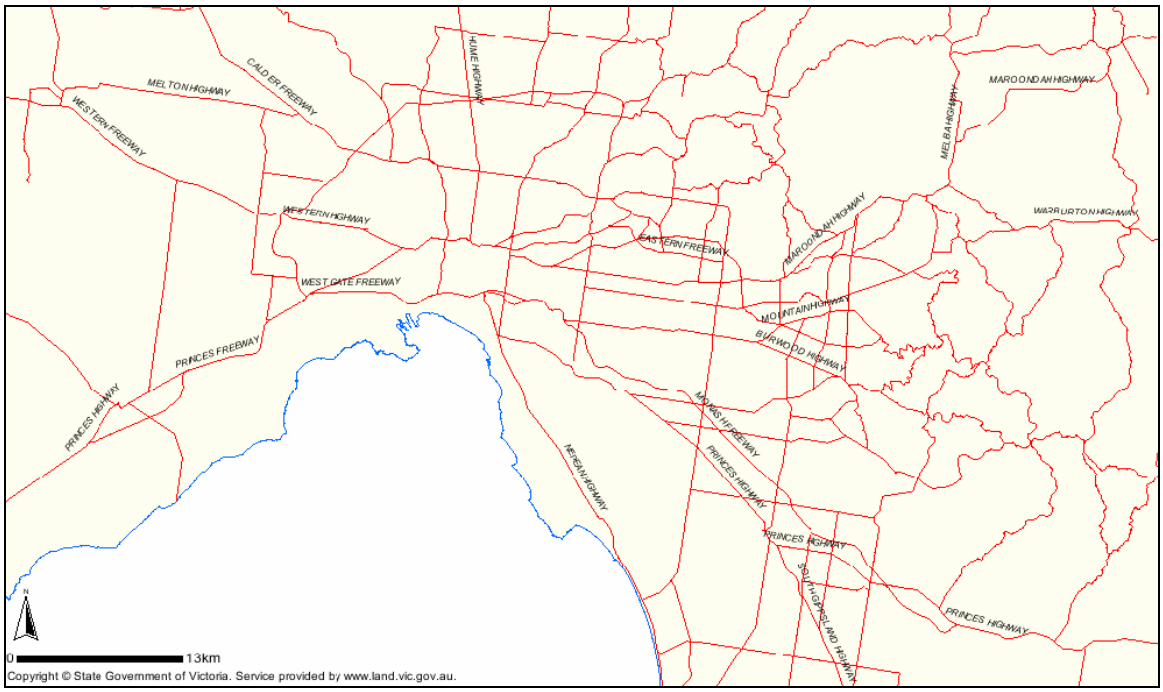
Figure 11: Length of road per capita



Source: Newman & Scheurer 2005

A significant freeway and arterial road network is already in place and this is more than capable of meeting East-West transport needs if it is utilised efficiently (see Figure 12). East-West travel is a minor component of transport demand, and many of the vehicles currently have low occupancies.

Figure 12: Freeways and major roads around Melbourne



Source: www.land.vic.gov.au

ii) Lessons from CityLink

Before its opening, CityLink was hailed as the solution to Melbourne's cross-city traffic problems (Das 1999). But while many expected the big increase in roadspace to result in free-flowing traffic, the reality has been that daily congestion plagues CityLink, with large numbers of single-occupant vehicles dominating. Delays during peak hours have prompted the government to fund the widening of the inner-southeastern part of the road – at a cost of around $1 billion – in an attempt to remove congestion.

Similarly, the benefits to parallel roads such as Toorak Road and Alexandra Avenue have not been realised, as these routes continue to be clogged at peak hours (ABC Television 2006; Moonee Valley City Council 2006).

It is therefore not clear why building another cross-city link would provide a fix to traffic delays. If an east-west link followed the CityLink path, induced traffic would fill it to capacity within a few years, and place further pressure on surrounding roads.

The fatal Burnley Tunnel accident in March 2007 highlighted safety concerns with road tunnels, which commonly have no emergency stopping lane because of space limitations, and have prompted calls for safety measures such as lower speeds (perhaps to 60km/h; no more than normal surface arterial roads).

The accident prompted some to call for an east-west link as a "backup" – but it is not readily apparent why such a link would, once established and handling its own traffic, have the capacity to handle an influx of traffic from any other major road that might be

temporarily closed. Further, the Eastern and Monash freeways serve different corridors, so at best a cross city tunnel would be a faster way to go in the wrong direction.

A new freeway-standard 'backup' would be extremely expensive to construct and probably just as vulnerable to the sorts of incidents it would be supposed to protect against. Furthermore, the disruption involved in construction is likely to be greater than any benefits that would be obtained during a roadway incident due to the rarity of such events and the induced traffic that would fill the 'backup' route in the meantime. A range of less costly measures are available to deal with incidents on the road network, including public communications tools (e.g. television, radio, internet, SMS), road signage, Intelligent Transportation Systems (ITS), temporary clearways (that do not suffer from induced traffic due to their short-lived nature), enhanced public transport provision and measures to spread the peak.

iii) Public transport

Melbourne has the foundation of an effective public transport network, with a heavy rail network that extends in most directions from the centre of the city and an extensive tram network across much of the inner city and some middle suburbs. The key shortcomings that inhibit the ability of these networks to serve diverse trips (such as east-west journeys) can be summarised as:

- gaps in the electrified heavy rail network, largely corresponding to the red areas in Figure 6 and Figure 7, and existence of single track sections of line;
- poor integration across public transport modes and inadequate interchange opportunities, specifically trams that terminate several hundred metres from train stations;
- lack of priority measures to speed up buses and trams and make more effective use of the fleets.

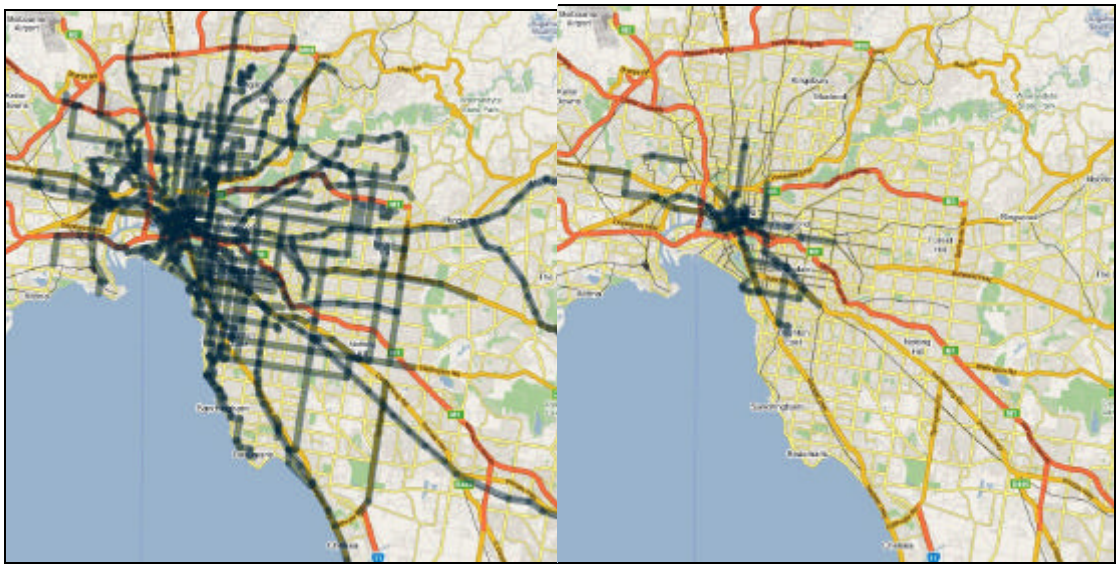
Improving the public transport network so that it can attract and absorb some of the journeys currently taking place by low occupancy private car would give commuters greater choice and ease pressure on the road system.

To do this, the public transport network needs improved coverage and integration, which includes extending rail and tram services to "fill the gaps" in the current network, and ensuring bus services cover the remaining areas of Melbourne.

To ensure trips are competitive with car travel, and minimise waiting times when interchanging between services, upgrades to frequencies will need to occur, to provide services at least every 15 minutes for most of the day, seven days a week. At present most areas of Melbourne do not have frequent public transport services within walking distance, making car travel the mode of choice for those who have it available.

Figure 13: Melbourne public transport services running every 15 minutes or better

Peak **Evening**



Source: www.ptua.org.au/2006/08/20/study-15min-routes/

b) Existing or potential capacity constraints

Do you consider that existing, or potential, capacity constraints in the current transport networks are, or will, adversely affect economic activity or urban amenity? Where specifically have you identified?

To the extent that the public transport network is not able to attract and absorb growth in personal travel, the resulting motor vehicle traffic and associated congestion and pollution will impede commercial traffic and detract from Melbourne's liveability, both within and outside the study area.

The PTUA notes a range of divergent views on the extent of capacity crises affecting Melbourne's transport network. In terms of the road network, low average vehicle occupancies demonstrate that current road capacity is poorly utilised and could absorb substantially higher levels of passenger and freight movement if road space was rationed efficiently.

Notwithstanding a relatively low share of total motorised travel when averaged across the greater metropolitan area and all times of the day, public transport does absorb a very substantial share of travel in the study area at peak times when the combined road and rail networks are under most pressure. To a large extent, public transport's low overall mode share reflects low capacity utilisation outside peak times (with pricing and service levels significant deterrents to use – see Figure 13) and gaps in the coverage of the high capacity heavy rail network (see Section (a)).

In terms of the public transport network's capacity to absorb an even larger share of peak travel, we note international examples of two track rail corridors carrying substantially higher passenger volumes than the Dandenong rail corridor in Melbourne.

This suggests that existing rail capacity could also be better utilised (although we do acknowledge a pressing need to duplicate single track sections of the network). To ensure that full value is extracted from current infrastructure and that investment in additional rail capacity is appropriately targeted, it would be prudent to seek a full review of the infrastructure and operating practices of the Melbourne rail network by internationally recognised experts on public transportation systems. In the absence of advice from the leading experts in this field, we are concerned that full value will not be obtained from infrastructure investment and capacity.

c) Future constraints

Can you identify any future constraints that may develop as a result of economic, demographic and land use changes in the east-west corridor over the next 30 years?

The PTUA believes that future constraints should also be considered within a review of the rail network as discussed in (b) above. See also our response to question 1(c).

3. Residential needs

Balancing the needs of freight traffic with the needs of residents

a) Conflicts between traffic and residents

There are a number of locations within the study area where conflict between traffic needs (in particular heavy freight) and residential needs are causing concern. Have you identified any such locations and how do you consider these conflicting demands might best be resolved?

As discussed above, the vast majority of vehicle traffic in Melbourne is low occupancy private cars, including along key freight corridors. In some cases, such as the Monash-West Gate corridor, this car traffic can encourage heavy vehicles to take alternative routes that impact negatively upon local amenity (Western Transport Alliance 2005, p.13). A significant proportion of this car traffic could be removed from the road network if an attractive public transport alternative was available. Encouraging a shift out of private cars would both reduce the conflict between light vehicle traffic and residential needs as well as encourage heavy vehicles to use existing freeways and arterials rather than local streets. If necessary, this could be backed up with bans on heavy vehicles in residential streets.

A significant amount of Port-related traffic could be removed from nearby roads by encouraging the development of intermodal hubs in strategic locations around Melbourne that could receive freight closer to its point of origin and transfer it to the Port by rail shuttles (and vice versa). Carriage of freight by rail can substantially reduce the number of truck movements and local air and noise pollution, especially if electric locomotives are used. Compared to articulated HGVs, emissions of NOx and APM can be reduced by over half by use of diesel freight trains, while use of electric locomotives can totally eliminate local emissions and as well as provide noise reductions (WS Atkins 2001). Research has also indicated that people find a given amount of noise from road traffic more annoying than the same level of noise from rail (UK Transport Analysis Guidance Unit 3.3.2, Table 1). Notwithstanding this, a range of measures are also available to reduce the noise resulting from rail operations, including improvements to the track, locomotives and rolling stock (CER 2006; Thompson & Gautier 2006).

b) Reconciling freight and residential activities

To what extent can freight and residential activities coexist in an urban environment?

The number of truck movements for a given freight task could be reduced by improved vehicle utilisation. To some extent this is a pricing issue in that there is currently little

incentive to ensure each truck movement is utilised to the maximum extent possible (Liechti & Renshaw 2006, pp.7-8).

The current work program within the National Transport Council on Performance-Based Standards is likely to increase the productivity of heavy vehicles. The impact of heavy vehicles on residential activities could be further mitigated by incorporating a range of performance-based standards to deal with noise and other intrusion impacts from operating heavy vehicles near residential areas. Such measures should not, however, be seen as a substitute for mode shift to rail freight.

In Europe, the focus also includes noise insulation of buildings along transport routes as well as the performance of freight vehicles themselves. Where noise is currently an issue for local residents, the installation of noise insulation could be funded by a small levy on the movement of empty container slots in and out of the Port of Melbourne in much the same way as the noise levy at Sydney airport has funded noise insulation. This could help to reduce the impact of freight activities on residential areas as well as provide an incentive to improve truck utilisation (see Section 1.b)ii)(D)) without imposing a significant additional cost on freight movements *per se*.

4. Transport options

Development of options to address capacity constraints and future demand, future needs of port and associated commercial traffic

a) Identifying options

What factors are important to consider during the identification or development of possible options to address any east-west transport needs?

Serious consideration should only be given to options that contribute positively to the goals of *Melbourne 2030* and broader sustainability requirements such as reducing transport emissions and oil consumption as discussed in Section 1.a).

Options should be immediately dismissed if they would facilitate urban sprawl, encourage mode shift away from public transport or rail freight, or perpetuate environmentally and financially costly car dependence.

It is now widely understood that taking early action to reduce greenhouse gas emissions will be the least costly and least disruptive approach to climate change mitigation in the long run. This principle also applies to transport. Adopting measures now that encourage mode shift towards public transport and rail freight will reduce the long term cost of achieving the Government's 20/2020 and 30/2010 targets and reducing transport emissions. Adopting measures that facilitate continued growth in motor vehicle traffic will make transport emissions reductions and the Government's mode share targets more expensive, more disruptive and more difficult (if not impossible) to achieve.

Other principles that should be applied include:

- opportunities should be sought to further develop local capacity to deliver public transport infrastructure and services on an ongoing basis in line with the Government's 20/2020 policy which implies a tripling in public transport journeys over time;
- options should contribute to achievement of the Government's mode share policies of 20/2020 for passengers and 30/2010 for port freight;
- measures should focus urban development on high capacity public transport as envisaged in *Melbourne 2030*;
- options should reduce system-wide transport emissions, as distinct from per vehicle emissions at a micro level;
- options should be capable of absorbing large-scale mode shifts to public transport.

In terms of infrastructure investment, options should:

- build upon the existing heavy rail and tram networks to ensure new services are well-integrated with existing services,

- utilise standards and technologies that are already utilised in Melbourne or that will be rolled out across the existing network to take advantage of scale economies in the procurement and maintenance of rolling stock and other assets.

The NCCCS wisely recognised that "[m]any transport issues in the inner north are caused by travel generated outside the area [and] the importance of many initiatives outside the inner north" (NCCCS, p.1). This study should therefore not adopt a blinkered approach to traffic flows within the study area, but instead look to the factors leading to transport mode choice across the city as a whole which are leading to traffic patterns within the study area. For example, "[p]oor coverage of outer catchments by public transport" was considered by the NCCCS to be one of the main impediments to public transport gaining an increased share of inner north travel (NCCCS, p.9).

b) Developing options

What issues should be considered in developing options to address the needs identified in relation to the growth of the port?

The priority objective in relation to the Port is ensuring there are no physical or regulatory impediments to achievement of the Government's goal of 30% modeshare for Port freight. Options should also seek to reduce the number of truck movements by better utilising truck capacity and supporting the development of intermodal hubs.

c) What options are there?

What feasible, practical options are there to address capacity constraints, future demand, port needs and associated commercial traffic?

i) Moving people

Pressing concerns around sustainability and induced demand demonstrate the need to prioritise public transport over private cars for the movement of people. While existing road infrastructure is more than adequate to cater for a sustainable level of motor vehicle traffic, the ability of public transport to attract and absorb a growing share of journeys is constrained in a small number of key regards:

- coverage;
- speed and reliability;
- integration.

(A) Coverage

As discussed in Section 2.a), one of the key impediments to public transport playing a larger role in serving transport needs is the existence of gaps in the electrified heavy rail network. As shown in Figure 14, the PTUA proposes a number of extensions and new lines to boost the coverage of the rail network:

- new lines to Doncaster and Rowville;
- extensions to South Morang/Mernda and Cranbourne East;
- electrification to Sunbury, Melton and Mornington; and
- a rail spur to the airport.

Figure 14: An expanded electrified heavy rail network for Melbourne

As discussed in Section 1.b)i), the Eastern Freeway is a major source of traffic in the study area, most traffic coming in on the freeway is heading towards the CBD and surrounds, and travel by car is currently disproportionately high among visitors to the central city area from the Doncaster corridor. This excessive car use could be mitigated by offering commuters in the Doncaster corridor a heavy rail service as is available in most other directions from the CBD. A train running at 10 minute intervals along the Doncaster corridor could carry more than 3,000 seated passengers per hour, or the equivalent of about 2,600 cars based on typical occupancies. This would be equivalent to removing nearly one and a half lanes of heavy traffic. Fully loaded, trains running each 10 minutes could carry about 9,000 seated and standing passengers per hour, or 4 lanes of traffic. Such a service would offer a vastly superior and faster public transport alternative to commuters in the Doncaster corridor as well as provide significant relief to those who continue to drive on the freeway, including commercial vehicles. To enable integration with other services and greater accessibility for pedestrians and cyclists, the Doncaster service should include stations at Chandler Highway, Burke Road, Bulleen Road/Thompsons Road, High Street, Doncaster Shoppingtown, Victoria Street and Blackburn Road. It may also be appropriate to consider a station at Springvale Road.

More broadly across the North-East, Scheurer (2006) has proposed a comprehensive and integrated range of transport measures for this part of Melbourne which is a significant catchment for the study area. These include:

- Operation of up to 8 trains per hour in each direction on each of 3 corridors through Jolimont to/from the CBD – Epping with Mernda extension, Hurstbridge and proposed Doncaster/Ringwood line;
- Adaptation of the proposed Orbital Smart Bus routes and the current, disjointed bus network to provide a comprehensive pattern of limited stop and local bus services focused on public transport nodes at rail stations and major activity centres;
- A number of small tram route enhancements to aid the coherence and usability of the network.

Added pressure is placed on the Monash-Westgate corridor by a lack of competitive transport alternatives around Rowville in one direction and the outer west in the other direction. Analysis above demonstrated above average car usage in parts of Monash, Melton and Wyndham for access to the central city area. Pressure on the Monash-West Gate could be relieved by introduction of a heavy rail service to Rowville and electrification plus duplication of the Melton line. Such services could provide a competitive alternative for commuters in these corridors in the same way that Doncaster rail could relieve the Eastern Freeway of thousands of cars. Service levels on existing western suburbs lines also need significant improvement to attract and absorb a larger share of journeys.

(B) Speed

Public transport will only succeed in attracting discretionary passengers (e.g. passengers with the option of taking their car instead) if it can offer journey times that are

competitive with driving. In the minds of passengers, journey times have a number of key components:

- expected time in vehicle;
- expected waiting time;
- unexpected delays.

While opportunities to minimise all three components should be sought, one minute of unexpected delay is generally perceived to be longer than one minute of expected time in vehicle and, to a lesser extent, a minute of expected waiting time. This perception underlines the importance of ensuring frequent and reliable services as well as speeding up public transport vehicles.

The following measures are required to address each of the components of journey speed (see Table 2).

Table 2: Measures to improve public transport journey times

Measure	***Speed***	***Frequency***	***Reliability***
Expanding coverage of the train network	X		
Level crossing elimination on tram / SmartBus routes	X		X
Traffic signal priority for trams and buses	X	X	X
Duplication of single track sections of railway	X	X	X
Upgrade control systems		X	X
Fleet expansion		X	X
Operational improvements	X	X	X

Source: PTUA 2007

The current practice of running most train services around the loop and using Flinders Street station as a timing and recovery point places additional pressure on the network in one of its most constrained segments. Rather than the current focus on running most services right around the loop, a higher proportion of services could be routed directly to or through Flinders Street and Southern Cross stations, thus relieving the loop for additional services.

Through-routing could also make cross-town (e.g. East-West) journeys faster by reducing the need to change and wait in the CBD hub, and bring Melbourne more into line with metro services such as London, Paris and Moscow. If through-routed rail services are not considered to be justified by demand, it would be indicative of lack of justification for any major new East-West infrastructure projects.

(C) Integration

It is clearly impractical to provide a public transport system that enables people to travel from any part of Melbourne to any other part of Melbourne without at least one change of service in between. An effective public transport system relies on routes intersecting with each other, thus offering passengers the opportunity to transfer and travel to diverse destinations all over the city.

Unfortunately, Melbourne's public transport system is not as well integrated as it could be. Numerous tram routes terminate "in the middle of nowhere" several hundred metres

from the nearest train station, meaning passengers cannot transfer between the services. Many bus services are scheduled to depart from train stations moments before a train load of passengers arrives, leaving a long wait until the next bus. As a result, Melbourne has a low proportion of journeys involving a transfer compared to cities with high public transport patronage (Sheurer, Kenworthy & Newman, 2005, p.8).

The effect of better integration was demonstrated by the extension of tram 109 to Box Hill. Even though the extension was not integrated very well into the Box Hill transport interchange, the fact that it now comes close to Box Hill railway station and activity centre has led to a strong increase in patronage. A range of other minor tram extensions could also improve integration and allow a broader range of radial and cross-town journeys to be made by public transport. Examples include:

- extend Route 3 to East Malvern station, and then onto Chadstone (Warrigal Rd);
- extend Route 48 from North Balwyn to Doncaster Hill (park and ride, etc);
- extend Route 8 to Hartwell station;
- extend Route 57 to East Keilor;
- complete Route 75 extension from Vermont South to Knox (Stud Rd SmartBus);
- extend Route 16 to Kew Junction (tram 48 and High St buses);
- extend Route 6 to Ashburton Station;
- extend Route 109 to Box Hill station;
- extend Route 72 north to Doncaster Road (tram 48);
- extend (Route 72) south along Burke Rd to Caulfield station;
- extend Park St South Melbourne track to St Kilda Rd;
- extend Route 67 to Carnegie station.

ii) Moving freight

The development of intermodal hubs has the potential to serve a growing proportion of freight going to and from the Port, and thereby reduce the amount of truck traffic in the immediate area of the Port, including local roads currently suffering the negative impacts of truck traffic.

By distributing such hubs in strategic locations around the conurbation closer to the businesses that are ultimately receiving or consigning the freight, as the Government appears to be planning, the hubs could also reduce the cost to business of delivering freight to and collecting freight from the main ‘break-bulk’ depots.

If the movement of freight is regarded as a priority for the road network, freight vehicles could also be given priority access to the existing freeway network through dedicated truck lanes. Given the concentration of freight activity in the south-east and west of the city, the additional capacity being created on the Monash-West Gate corridor could be allocated to this purpose. On the other hand, additional general purpose traffic capacity would induce extra passenger car traffic and further impede the movement of freight.

d) Is doing nothing further an option?

In addition to future projects already identified by government, is doing nothing further an option? What are the ramifications of doing nothing further?

i) Road supply

In terms of road supply, doing nothing further is an appropriate and prudent course for Government. As noted in Section 2.a) above, Melbourne already has a large road supply relative to its peers. Furthermore, under *Meeting Our Transport Challenges* the Government has identified "a major program of arterial road projects across Melbourne's growing outer suburbs" on top of commuting $2.9 billion in future concession payments from CityLink into significantly expanding the capacity of the Monash-West Gate corridor. This latter project will supposedly address capacity problems in the corridor until after 2015, leaving time to implement demand measurement measures to make more efficient use of road capacity (see Section 5), as well providing the opportunity to monitor developments in global liquid fuel availability which are likely to render large road projects superfluous.

Furthermore in Melbourne local road freight has not adapted, so far, by high level utilisation of the road network at its least congested – overnight. Little pressure has been applied by the trucking industry for the provision of exclusive (tolled?) truck lanes on existing infrastructure either.

Expanding road supply is a self-defeating exercise as it generates additional traffic and increases transport emissions and energy consumption, especially where latent demand is high as in the study area (Litman 2007, p.9). Over time, the congestion reduction benefits of increased capacity would be largely eroded by this induced traffic. Recognising the impact of induced demand, a study by the OECD (1995) found that:

> "[a]s soon as new road space becomes available in large cities, it is quickly filled ... While congestion might spread in cities which make little or no attempt to increase road capacity in line with demand, such cities will not 'grind to a halt'. People and firms adapt. Travellers change either mode or destination".

This final remark from the OECD reflects the role of congestion in dampening demand for car travel. People will be more likely to undertake a low occupancy car journey if they expect the trip to be relatively unimpeded by congestion. On the other hand, they will be more likely to undertake that journey by public transport (particularly where it is grade separated or has priority) if they expect some degree of congestion on general purpose roadways. Given the phenomenon of induced travel, governments face a choice between rationing road space by queuing (i.e. congestion) or by comprehensive pricing. An honest Government would not pretend that motorists can have cost-free access to congestion-free roads, regardless of whether it is a new or existing road.

ii) Public transport

In contrast with the extensive road network, the Government is yet to articulate a plan to ensure comprehensive coverage and integration of public transport that is competitive with car use across Melbourne (PTUA 2006). Failure to implement such a plan would condemn large parts of the city to car dependence and vulnerability to high petrol prices. This car dependence would also result in unnecessarily high traffic volumes across the city, along with the associated congestion, emissions and road trauma.

iii) Economic impacts

Once a basic road system is in place (see Section 2.a)), the benefits of further road building are often overstated (Whitelegg 1994; Kenworthy, Laube, Newman & Barter 1997; SACTRA 1999; Wilmot 2006). Rather than road bottlenecks, the barriers to improved economic performance often relate more to human capital, institutional deficiencies or "getting the prices wrong".

Car dependence carries with it significant economic costs. Cities that are focussed on car use tend to spend a larger share of their regional wealth on transport (Newman 2000; Litman & Laube 2002). Household expenditure on motoring also tends to have a lower local employment multiplier than expenditure on public transport or general consumer expenditure (see Table 3). A study in Texas found that each 1% of regional travel that was shifted from car to public transport increased regional income by $2.9 million and created an extra 226 local jobs (Miller et al 1999 cited in Litman & Laube 2002, p.10).

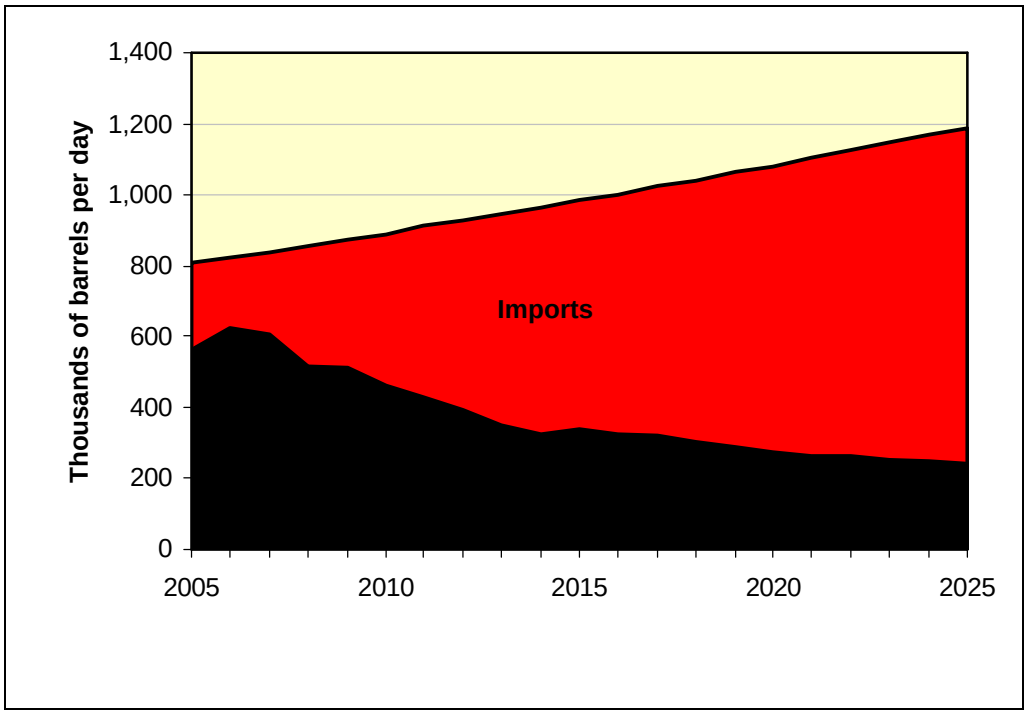
Table 3: Impact of $1 million expenditure

Expenditure category	***Regional income****	***Regional jobs****	***Full-time jobs#***
Petroleum			4.5
General automobile expenditure	$307,000	8.4	7.5
Non-auto consumer expenditure	$526,000	17.0	
Public transport	$1,200,000	62.2	21.4

** Analysis performed in Texas, USA (Miller et al 1999)*
 # Analysis performed in British Columbia, Canada (BC Treasury Board 1996 in Litman & Laube 2002)

With declining domestic self-sufficiency in oil production, pouring petrol into our cars is also going to become an even larger drag on our economy (see Figure 15).

Figure 15: Australian oil & condensate production and consumption projections to 2025



Source: Geoscience Australia
Note: Domestic consumption in red, domestic production superimposed in black – balance to be comprised of net imports.

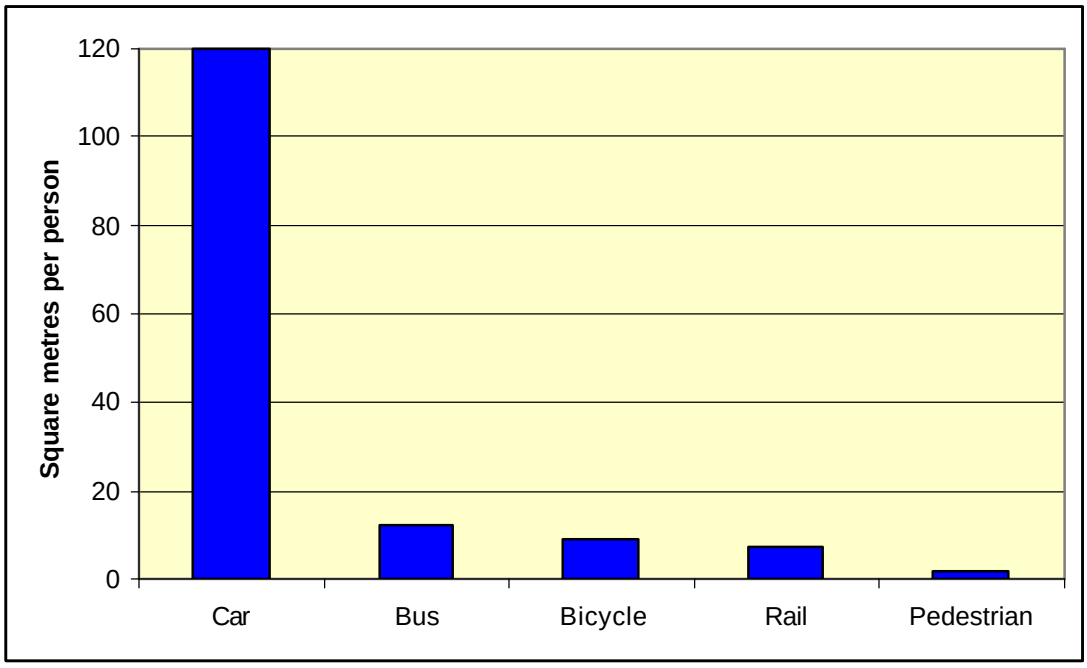
Car dependence is also bad for our health. On top of the high number of deaths attributable to air pollution from motor vehicles, clear links are being established between high car use and the prevalence of overweight and obesity. Transport choice could now be considered a key risk factor in a range of lifestyle diseases that are placing increasing pressure on the health system and harming participation and productivity in the workforce (CfPT 2006, pp.7-8).

e) Dealing with a constrained urban environment

Any transport developments in the east-west corridor would be in a fully developed urban environment. How would competition for space be best handled?

As mentioned in Section 1.a)iii), the strength of the inner city lies in high activity density which itself is best served by high capacity public transport. This limited space available would be most efficiently utilised by prioritising those modes of transport that require least space, i.e. walking, cycling, public transport and rail for freight (see Figure 16). Given the low occupancy rates of most cars in the study area, there is enormous scope to reduce traffic volumes while still moving more people and freight without increasing road capacity. Prioritising and improving public transport would encourage people to shift from low occupancy cars to forms of transport that require less space.

Figure 16: Road space requirements by mode



Source: Teufel 1989

Despite the majority of Eastern Freeway traffic turning towards the CBD along one of the numerous north-south streets from Hoddle Street to Royal Parade, proposals for underground motorways include more limited opportunities to exit the tunnel. For example, tunnel proposals typically include interchanges at Hoddle Street, Nicholson Street and/or Royal Parade before linking with CityLink. This would funnel traffic through the chosen interchanges and create increased pressure on these inner city streets, as well as queuing within the tunnels themselves (Initial Appraisal Report, pp.70-71). The NCCCS noted that Nicholson Street "is already congested and has very limited scope for capacity improvement" (Tunnel Report Part 1, p.5) and that "there is either no scope, or very limited scope to improve the capacity of the various north/south routes between Alexandra Parade and Victoria Street" (p.6). Space-efficient modes of transport rather than increased vehicle through-put is therefore the only viable option to address access to the inner city.

The high activity and population densities of the inner city also dictate that preference should be given to modes of transport that do not produce local emissions, i.e. walking, cycling, trams and trains, especially considering growing concerns among health researchers regarding airborne particulate matter. Extending a heavy rail line from Victoria Park to Doncaster would require minimal development work in the fully developed inner city area as a reservation was included as part of the freeway. Similarly, rail corridors to Melton and Sunbury are already in place and ready for electrification.

We note the government's policy on tolling roads outlined in its response to the VCEC congestion report:

> "... that it would not require the closure of other roads, or force people to use the road." (Victorian Government 2007, p.13)

This indicates that in the event of a new toll-road in the study area, the government would not permit a reallocation of existing roadspace away from general traffic in favour of pedestrianisation, bike paths, public transport or public space. In view of the experience with Sydney's Cross City tunnel where agreed reductions in surface-level road capacity were subsequently reversed, there appears to be no guarantee that an underground motorway would improve amenity above ground, or that current government policy would allow surface-level roadspace to be reclaimed from cars and trucks. Either way, people in the densely populated inner city would be faced with ventilation stacks, unsightly portals and interchanges where traffic would emerge from the tunnel and stream onto local streets (since most Eastern Freeway traffic is destined for the inner city), and the possibility of elevated carriageways according to some plans.

Existing traffic patterns also indicate that the majority of cars and trucks would still exit an underground motorway within the inner north, so only a small minority would be removed from local surface-level roads.

See also Section 6.b).

5. Other measures

Consideration of a range of measures to meet future demands

a) Regulatory, policy, physical or technological measures

What measures (regulatory, policy, physical or technological), if any, do you consider could address identified capacity constraints and future demands?

In order to rein in the unsustainable environmental impacts of transport growth, demand should be managed, not simply "met" with increased road capacity. A range of measures to decouple transport from economic growth have been identified in recent times. For example, various “soft” measures can reduce traffic demand by as much as 20% in some cases (OECD 2006, pp.85-86)

i) Economic instruments

When considering transport in the broader economic context, it is important to recognise transport as a transaction cost to be minimised rather than a desirable end in itself. Much of this transaction cost is externalised upon society in the form of pollution and government expenditure on roads and health. The full fiscal and social costs of road use in Australia currently exceed revenue from road users by more than $16 billion per annum (see Table 4). Since motorists do not pay the full social cost of their road use, the amount of travel undertaken exceeds the socially optimal level, resulting in excess congestion and pollution. This effect is amplified by the fact that many charges on motorists do not vary according to distance or time of travel. For instance, the annual motor vehicle registration charge is the same whether the vehicle sits in the garage all year or is driven extensively at peak hour on congested inner city roads.

More efficient pricing would provide an incentive to make more socially optimal transport choices and ease pressure on Melbourne's road network. The congestion reduction and economic benefits of more efficient pricing are estimated to be substantially larger than the benefits of increasing road capacity (Eddington 2006). For example, estimates of the revenue and economic welfare gains from efficient pricing amount to many billions of euros per annum across a range of European countries (ECMT 2003). When the cost of using transport infrastructure more accurately reflects the full social costs, road users will seek to minimise transport costs (or transaction costs) and thereby make more efficient and socially-optimal use of transport infrastructure.

Table 4: The road deficit in Australia

Costs	**($ million p.a.)**	
Road construction & maintenance	8,800	
Land use cost	6,000	
Road trauma	15,000	
Noise	700	
Urban air pollution	4,300	
Climate change	2,900	
Tax concessions	4,800	
State fuel subsidies	600	**43,100**
Revenue		
Fuel excise (net of rebates)	9,800	
GST on fuel	1,700	
Registration fees	3,250	
Insurance premiums	9,000	
Tolls	750	
Other revenue	2,300	**26,800**
Road deficit		**16,300**

Source: http://www.ptua.org.au/myths/petroltax.shtml

Suggestions that it would be unfair to charge road users for use of existing infrastructure which is already paid for by taxpayers are based on a false premise. The existence of the road deficit demonstrates that road users are accruing a debt to the rest of society at the rate of over $16 billion per annum. Furthermore, taxpayers, both motorists and non-motorists, may prefer that their tax dollars are spent on providing alternatives to car dependence or on services that are totally unrelated to transport. Failing to reduce the road deficit by not charging for road use has an opportunity cost in the form of higher state taxes and less funding for public transport, health, education and other government services. Even if the Government wishes to continue this large subsidy to fossil fuel use, it could still choose to adopt revenue neutral measures that change existing charges from fixed annual costs to charges that vary with the amount of road use, such as distance-based registration and insurance (VTPI 2007).

Given the propensity for road users to avoid tolled roads, a road pricing scheme should be comprehensive and apply to all travel, not just travel on new roads (Liechti & Renshaw 2006, p.8; ABC Television 2006; Moonee Valley City Council, 2006), and the revenue invested in improving transport alternatives (PTUA 2006b).

The Commonwealth Government should also continue to be encouraged to reform FBT provisions to remove the incentive to drive further under the statutory formula for motor vehicle benefits.

ii) Regulatory reforms

(A) Speed limits

A range of benefits could be obtained by reducing urban speed limits to 80km/h where they are currently above this level, such as on freeways and arterial roads:

- **Congestion** - road capacity tends to fall as traffic speeds exceed 80km/h due to the increased distance required between vehicles. For example, implementation of an 80km/h limit in Rotterdam reduced the daily congestion period by 30 minutes and average length by 2 kilometres, despite an increase of approximately 3 per cent in traffic (EFT&E 2005).

- **Fuel consumption** - Fuel consumption tends to increase significantly above 80km/h and motorway speed restrictions have been proposed by the International Energy Agency as a means to reduce oil consumption (IEA 2005, p.99).

- **Emissions** - Reducing speeds to 80km/h in Rotterdam was found to reduce NOx emissions by 25% (EFT&E 2005).

- **Noise** – Noise from heavy vehicles tends to increase significantly above 50 km/h, with significant noise and air quality benefits from reducing speeds on motorways where the limits are currently above 70 km/h (WS Atkins 2001).

- **Safety and reliability** – The risk of a crash and the severity of crashes increase with speed. Most truck crashes occur in 100km/h zones (Transport Industry Safety Group n.d.). In addition to reducing road trauma, reductions in the frequency and severity of crashes resulting from lower speed limits would enhance the reliability of the road network and reduce non-recurrent congestion which is estimated to comprise 40 to 60% of total congestion.

(B) Performance-based standards

As mentioned in Section 3.b), the adoption of performance-based standards could increase the productivity of heavy goods vehicles and thereby reduce the number of truck movements for a given freight task.

iii) Institutional arrangements

(A) Urban planning

The efficiency of the transport network would be enhanced by ensuring that land use decisions reflect the availability of appropriate transport infrastructure and services. Following the Dutch 'ABC' model, high people-intensity uses should be built around good public transport, whereas high freight intensity land uses should be kept to areas that already have good road (and rail freight) access (Newman 1995, p.13). This will enable more passenger journeys to take place on public transport and therefore give freight better access to road capacity. This will be a two-way process: locating land use

near appropriate infrastructure, and making adequate investment in public transport infrastructure and services to support mode shift objectives.

(B) Public transport governance

Interstate and international experience has shown that effective governance is the most critical requirement for ensuring 'best practice' in urban transport, more critical even than adequate funding, infrastructure or land-use planning (Kennedy et al, 2005). According to a British study of best practice in the delivery of integrated transport, competent central agencies managing public transport provision are:

> "…crucial in improving integration (through route planning, common fares and coordinated timetables) and marketing services which have led to increased patronage. They have also helped to agree common policies and objectives between those involved in transport provision, and led to the adoption of (higher) common standards of transport infrastructure."
> (WS Atkins Transport Planning 2001, p. 28)

The lack of effective governance largely explains why public transport in Melbourne, and Victoria more generally, fails to be competitive with car travel despite its relatively extensive train and tram infrastructure, generous recurrent funding, multi-modal ticketing and a moderately public-transport-friendly urban form.

iv) Educational instruments

The OECD (2006, p.103) notes the importance of awareness-raising when implementing measures to reduce the impact of transport on the environment. Following the lead of the 'Our Water Our Future' campaign, public information campaigns could be conducted to educate Victorians about the impact of their travel decisions on the environment, their health and other road users, and the need for a new approach to transport policy.

6. Funding and implementation

Funding issues, sequencing of projects, funding capacity of public and private sectors and the capacity of the construction industry to deliver

a) Sequencing projects

In sequencing projects, what do you think should be the factors to determine the priority of one project or part of a project over another?

i) Relative priorities

In sequencing projects, priority should be given to measures that contribute to a shift towards public transport and rail freight, in line with the *Growing Victoria Together* targets and broader sustainability imperatives discussed above. Given the negative impacts of road traffic, the Government should not make any commitments at this point to measures that would encourage further growth in private motorised transport or freight traffic (i.e. VKT as distinct from tonne-km).

In view of the enormous potential to achieve more efficient use of existing infrastructure, the Government should implement "soft" regulatory, policy and technological measures (see Section 5.a)) to manage demand for roadspace *before* considering "hard" measures that increase road capacity. For example, the OECD (2006, p.102) notes that road pricing measures and full cost recovery are important early elements of a strategy to decouple transport from economic growth.

This sequence will allow Government to assess the impact on traffic volumes of policy reforms, public transport enhancements and of trends in liquid fuel prices. Expanding road capacity prior to or simultaneous with policy reforms and public transport upgrades would likely lead to expensive overcapitalisation in road infrastructure and negative environmental impacts. The NCCCS noted the potential for traffic levels to fall below current levels if strategies to promote walking, cycling and public transport were successful, and found that the “need for additional road capacity is therefore questionable at this stage” (NCCCS, p.34).

In the short to medium term, "hard" measures should be restricted to those that encourage and facilitate already-existing modeshift objectives such as increased modeshare and patronage for public transport and rail freight. For instance, the OECD highlights "improving rail service quality or the overall accessibility of rail and public transport" for the early stages of a decoupling strategy (OECD 2006, p.102). New road capacity should only be considered *after* the above "soft" measures have been put in place and time-competitive public transport services have been made universally available.

An important initial step in improving the capacity of the public transport network is a full review by internationally recognised experts on public transportation systems into the infrastructure and operating practices of the Melbourne rail network, to identify any impediments to increased train frequencies and to recommend measures to mitigate such impediments where they exist.

Since radial journeys towards and away from the CBD comprise the largest single share of passenger movement in the study area at peak times, the priority should be on improving the coverage and quality of the heavy rail network. In terms of public transport infrastructure, the initial focus should be on:

- duplicating single track sections of railway, such as those between Newport and Laverton, Clifton Hill and Hurstbridge, Keon Park and Epping;
- extending heavy rail from Victoria Park along the Doncaster corridor, along with complementary measures such as feeder trams to Doncaster Hill;
- extending heavy rail to Rowville in the Monash corridor;
- electrifying (and duplicating where applicable) the existing heavy rail lines to Melton and Sunbury in the west, incorporating stations to serve growth areas such as Caroline Springs;
- adding a rail spur to Melbourne Airport from the Broadmeadows/Craigieburn line to reduce traffic pressure on the CityLink/Tullamarine corridor; and
- extending tram lines to meet nearby railway stations.

These measures encourage use of space-efficient modes in the study area and do not require extensive inner city tunnelling, therefore deferring or eliminating the need to undertake expensive and disruptive engineering works in the fully developed inner city environment. On the other hand, these measures would integrate well with the existing public transport network and enhance the system's capacity to serve diverse origins and destinations.

Although the largest volume passenger flows tend to be radial, there is still a need to serve non-radial journeys, hence public transport should be developed to provide a "network effect" whereby the radial heavy rail services are complemented and fed by non-radial bus and tram services, including the various orbital bus routes. Concurrent with the public transport infrastructure investments outlined above, bus service reviews should also be undertaken in the affected corridors with a view to implementing bus route reforms once the new suburban rail services are commissioned.

In the short-term, non-radial journeys should be served by better integration and greater opportunity to transfer between services, thus contributing to a network effect that serves a diverse range of origins and destinations. The NCCCS recognised a “lack of integration between services” as a key impediment to increased use of public transport in the inner north (NCCCS, p.9). Since travel to the inner north is not a purely or even disproportionately eastern suburbs phenomenon, measures to improve the accessibility of the university and medical precinct around Parkville should focus initially upon improving the performance of existing services to and from the CBD by means of traffic light priority measures and increased frequencies. Options requiring more extensive engineering work in the inner city, such as routing the Doncaster rail line under the inner north or construction of a north-south tunnel, should be regarded as longer-term options after the above measures have been undertaken.

Therefore there appears to be little justification for a tunnel in the inner north at this stage and the focus initially should be on a rail link to Doncaster from Victoria Park. If supplemented with improvements to existing services (e.g. routes 402 and 546), the government's plans for orbital bus routes, as announced in MOTC, would appear to be adequate for most cross-town journeys not served by radial services. We do note however that the timeline for SmartBus roll-out is disappointingly slow. It should also be noted that surface-level road-based public transport in close proximity to trip generators is also vastly superior to less-visible bus services running along underground motorways that don't necessarily coincide with trip generators or integrate well with other public transport services.

Of particular relevance to the current study, the NCCCS also noted that heavy rail to Doncaster "opens up more opportunities for inter-regional travel growth than the light rail option. Possibly because the heavy rail design integrates better with other heavy rail services" (Final Transit Appraisal Report, p.41). This highlights the role that the radial heavy rail network can play in serving cross-town (e.g. East-West) travel when attention is paid to coverage and integration.

ii) Timelines

Table 5: Important recent peak oil forecasts

Name		***Predicted peak***
T. Boone Pickens	Oil & gas investor	2005
K. Deffeyes	Retired Princeton professor and Shell geologist	2005
E.T. Westervelt et al	US Army Corps of Engineers	At hand
S. Bakhtiari	Iranian National Oil Company	Now
R. Herrera	Retired BP geologist	Close or past
H. Groppe	Oil/gas expert & businessman	Very soon
S. Wrobel	Investment fund manager	By 2010
R. Bentley	University energy analyst	Around 2010
C. Campbell	Retired oil company geologist: Texaco & Amoco	2010
C. Skrebowski	Editor of Petroleum Review	2010 +/- a year
L.M. Meling	Statoil oil company geologist	A challenge around 2011
X. Pang et al	China University of Petroleum	Around 2012
R.H.E.M. Koppelaar	Dutch oil analyst	Around 2012
Volvo trucks	Automotive company	Within a decade
C. de Margerie	Oil company executive	Within a decade
S. al Husseini	Retired Exec VP of Saudi Aramco	2015
Merrill Lynch	Brokerage/financial	Around 2015
J.R. West, PFC Energy	Consultants	2015-2020
C.T. Maxwell, Weeden & Co	Brokerage/financial	Around 2020 or earlier
Wood Mackenzie	Energy consulting	Tight balance by 2020
Total	French oil company	Around 2020

Source: Hirsch 2007

Given the impact of rising fuel prices on mobility and household budgets, the Government should ideally seek to make substantial progress on the public transport

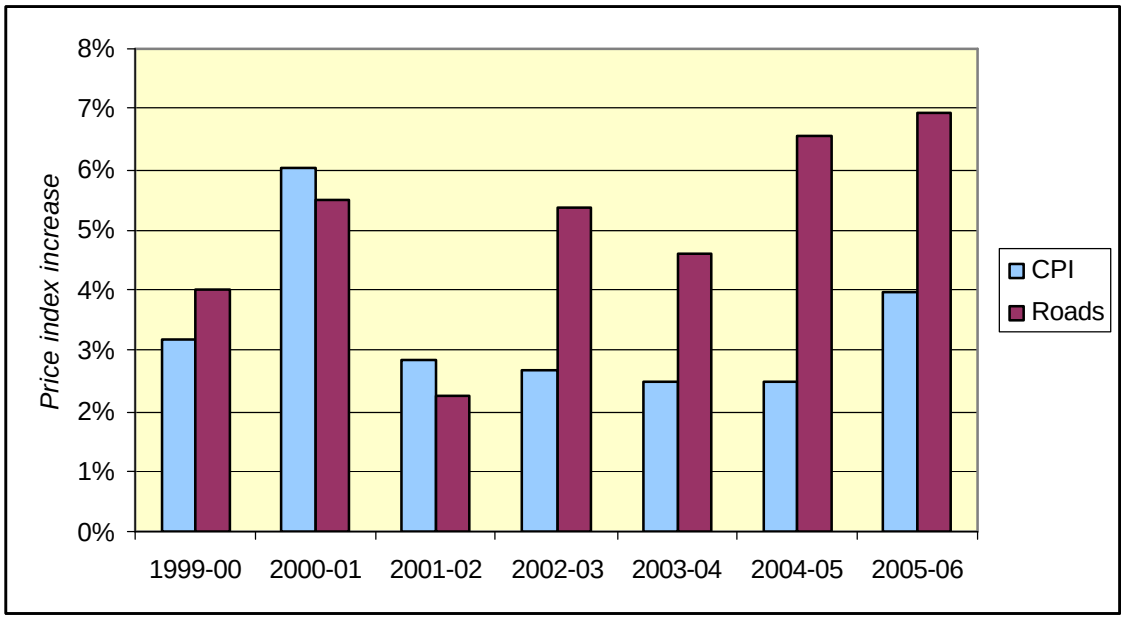
improvements outlined in this submission prior to the peak in global oil production[2]. As outlined in Table 5, there is no time to lose.

b) Issues for the construction industry

Are you aware of any issues for the construction industry should any developed option involve large scale infrastructure?

The likely imminent peak in global oil production will reduce demand for private motorised traffic and increase the cost of building and maintaining roads. This can be expected to significantly reduce traffic volumes and toll revenues. The BTRE Road Construction and Maintenance Price Index has shown above-inflation growth in recent times as the cost of oil has risen (see Figure 17). Except for a blip where CPI surged upon introduction of the GST in 2001, the cost of building and maintaining roads has generally been growing faster than inflation since 1999-2000. This trend is likely to continue with ongoing pressure on global oil supplies and the importance of oil-derived bitumen in road construction and maintenance, and/or future pricing of the carbon embodied in concrete-production.

Figure 17: Increase in road construction & maintenance costs vs CPI



Source: Bureau of Transport & Regional Economics, Australian Bureau of Statistics

[2] Peak oil refers to the maximum level of oil production that is achievable and immediately precedes an inevitable and irreversible decline in oil production as field depletion overwhelms all efforts to open up new production. Peak oil is only likely to be recognised after the event once the production decline trend is evident.

When properly designed, rail tunnels can be inherently cleaner and more efficient than road tunnels, which can reduce ventilation costs and local environmental impacts. There are two key factors leading to this advantage:

- **Vehicle exhaust** - electric trains do not create local emissions from the combustion of fuel which then need to be ventilated to the surrounding neighbourhood. While filtration systems can be installed on road tunnel ventilation stacks, these systems can add significant cost to the tunnel and their effectiveness is not assured, especially considering the concentrated nature of ventilation stack emissions. Serious concerns over the health impacts of ventilation stacks prompted the federal health minister to announce an inquiry into the health impacts of road tunnels. It is recommended that no commitments be made to road tunnels before the outcome of this inquiry is known.

- **Piston effect** - the movement of a train through a single track rail tunnel acts like a loose-fitting piston and forces air through the tunnel. The resulting rush of air would be familiar to users of many underground rail systems such as the London Underground and Melbourne's city loop. This piston effect can eliminate or reduce the need for active ventilation which in turn reduces the capital and operating costs of the tunnel. Due to the larger size of road tunnels, cars and trucks merely force the air aside rather than through the tunnel, and sizable mechanical ventilation systems are therefore required to maintain tunnel air quality within acceptable limits.

As well as enabling a piston effect, the smaller size of rail tunnels relative to road tunnels means their construction is less expensive and results in less surface level disturbance (see Figure 18) and less spoil to be disposed of.

Figure 18: Surface-level damage from Lane Cove Tunnel construction in Sydney

Photo: Jon Reid, Sydney Morning Herald

c) Sourcing funding

Should any options identified require higher funding levels than readily available, both privately and publicly, how do you think the sourcing of funding should be approached?

In the first instance, option selection should be based upon the effectiveness in meeting the considerations discussed elsewhere in this submission. The sourcing of funding should only follow option selection, and option selection should not be influenced by the availability of private finance.

i) Private finance

Large mandated inflows into Australia's superannuation sector and the attraction of off-balance-sheet financing to governments have both contributed to increased interest in private financing initiatives or public private partnerships (PPPs). This trend has been driven strongly by the financial rewards available to financiers and other service providers involved in arranging PPP transactions. Often the fees from arranging a PPP and the ongoing management of infrastructure providers can be more lucrative than the operation of the infrastructure asset itself. As a result, the incentive to arrange a deal (any deal) can be stronger than the incentive to ensure financially and economically efficient allocation of capital based upon triple bottom line analysis. Distortions away from efficient capital allocation may be particularly acute where tax concessions or other government assistance is granted to toll-road providers.

The financial collapse of some major toll-road operations internationally (e.g. Hungary, Mexico) has possibly contributed to reduced interest in PPPs in the transport sector overseas, however the failure of the Sydney Cross City Tunnel and serious questions over the longer-term viability of other local toll-road projects (Myer 2005; Goldberg 2006) does not seem to have lessened the enthusiasm among PPP proponents. Given possible imbalances in the incentive structure mentioned above and questions around the future solvency of domestic toll-roads, any further use of PPPs in Victoria should be conditional upon greater transparency in traffic and financial modelling and adequate steps to ensure that regulators (e.g. ASIC, APRA), institutional investors and advisers fully understand the business model and associated risks, including oil vulnerability.

Even if private finance is seen as infrastructure provision at minimal cost to government, we note that a privately-funded motorway does not necessarily offer the best triple bottom line outcomes for Victorians (Murphy 2007) who may be seeking an alternative to costly car dependence, and that it could still crowd out more appropriate investments or "divert resources from investment in other transport needs, which is more aligned with Government targets and *Melbourne 2030*" (NCCCS, p. 13).

Notwithstanding the potential drawbacks of PPPs, we do note that other jurisdictions internationally have been more active than Victoria in utilising them for expanding public transport infrastructure, and that there may be synergies in developing PPPs in concert with integrated land use planning and value capture. We emphasise however that value capture financing can also take place in the absence of PPPs.

ii) Value capture

The technique of value capture is relatively well understood and explored in some jurisdictions (Doherty 2004; SGS Economics & Planning 2005, pp.37-38), however it has attracted little attention in Melbourne. The tendency for passenger rail infrastructure to provide investment certainty and enhance the value of neighbouring land is effectively exploited in many cities to finance rail expansion projects. This is particularly effective when integrated with land use planning, as aspired to under Melbourne 2030. Studies in the USA have demonstrated that in some cases land values close to rail stations increased at over twice the rate of property away from the rail system, reflecting the premium that both residents and businesses placed on the accessibility afforded by the rail network (Cervero 1992; Doherty 2004, p.8). The importance attached to public transport access is also likely to rise along with rising petrol prices.

While some approaches to value capture explicitly target the increase in property values flowing from public transport investment, the increased land values associated with proximity to high quality public transport would naturally flow through into general land tax and conveyancing duty revenues over time. The resulting revenue growth would contribute to the servicing of any public debt incurred to finance capital expenditure (Falk 2003).

iii) Road pricing

Studies of road pricing schemes have shown that public acceptance is stronger where revenue is invested in improving public transport (NCCCS, p. 32; Eddington 2006). Not only does this provide an alternative to paying the road charge, it also helps to ensure the objectives of road charging are met by enabling a shift from cars to other modes, thereby reducing congestion (COAG 2006, pp.60-61). Revenue from road charging could be invested directly into public transport or used to service debt that had been incurred to improve public transport in anticipation of road charging or other demand management measures being introduced. On the other hand, the OECD (2006, p.73) has noted that:

> "road-pricing that funds additional highway capacity can increase total automobile travel through rebound effects and so may increase downstream traffic congestion, parking costs, crashes, pollution, and sprawl."

iv) Public finance

For a range of economic, environmental and social reasons, the PTUA strongly believes that the federal government should contribute to urban public transport infrastructure on a scale at least comparable to urban road funding. We strongly encourage the state government to pursue federal funding for public transport on an ongoing basis and ensure the AusLink Melbourne Urban Corridor Strategy prioritises public transport for the movement of people and rail for the movement of freight.

We also note a long-standing bias towards road infrastructure in state capital expenditure (PTUA 2006, pp.32-34). If the current pool of state transport funding was allocated in line with the government's objective of doubling public transport mode share and reducing motor vehicle use, significant additional funding could be made available to public transport options.

Given the social and environmental consequences of encouraging growth in motor vehicle use, government should not make any financial contributions to an east-west motorway.

References

Wheeling and Dealing, 2006, transcript of television program, 4 Corners, ABC Television, Sydney, viewed 31 March 2006, from <http://www.abc.net.au/4corners/content/2006/s1571546.htm>

Adam, D. & Traynor, I., 2007, 'Scientists' stark warning on reality of warmer world', *The Guardian*, 7 April, available at: http://environment.guardian.co.uk/climatechange/story/0,,2051915,00.html

Australian Greenhouse Office, 2007, *National Inventory Report 2005*,

Banister, D & Stead, D. 2002, *Reducing Transport Intensity,* http://www.stellaproject.org/focusgroup4/helsinki/papers/Bannister&Stead.doc

Beer, T. 2004, *Air pollution death toll needs solutions*, media release, 2 March, CSIRO, viewed 12 April 2007, <http://www.csiro.au/files/mediaRelease/mr2004/PrAirPollution2.htm>

BTRE, 2003, Urban *pollutant emissions from motor vehicles: Australian trends to 2020*, report to Environment Australia, Canberra

BTRE, 2003a, *An Overview of the Australian Road Freight Transport Industry*, Working Paper 60, Canberra

BTRE, 2004, *Predicting Traffic Growth in Australian Cities*, Canberra

BTRE, 2006, *Freight Measurement and Modelling in Australia*, Report 112, Canberra

Cameron, I., Lyons, T. & Kenworthy, J., 2004, 'Trends in vehicle kilometres of travel in world cities, 1960-1990: underlying drivers and policy responses', *Transport Policy*, Volume 11 Issue 3, July 2004, pp.287-298

CER, 2006, *Rail Freight Noise Abatement*, Community of European Railway and Infrastructure Companies, Brussels, available at: http://www.cer.be/files/Noise_State_Art-094044A.pdf

Cervero, R., 1992, 'Transportation shapes the city', *Perth Beyond 2000*, Proceedings of City Challenge Conference, Challenge Bank, Perth

COAG, 2006, Review *of Urban Congestion Trends, Impacts and Solutions*, Report prepared for the Council of Australian Governments by the Competition and Regulation Working Group, available at: http://www.btre.gov.au/COAG/COAG_Urban_Congestion_Review_Report.pdf

CfPT, 2006, *Transport and Liveability: The Path to a Sustainable Victoria*, Coalition for People's Transport, Melbourne, available at: http://www.melbourneontrack.org.au/publications/liveability_statement.pdf

Commissioner for Environmental Sustainability, 2007, *Creating a city that works*, available at: http://www.ces.vic.gov.au/CA256F310024B628/0/99086A5A4188EF7DCA2572E6000E935D/$File/Creating+a+City+That+Works+-+low+res.pdf

CSIRO, 2007, *Response to Issues Paper - Prime Minister's Task Group on Emissions Trading*, available at: http://www.pmc.gov.au/emissionstrading/submissions/142_sub_emissionstrading.pdf

Das, S. 1999, 'A link to the future', *The Age*, 27 May, p.2

Doherty, M. 2004, *Funding public transport development through land value capture programs*, available at: http://www.ecotransit.org.au/reports/land_value_capture_mdoherty2004.pdf

ECMT, 2003, *Reforming Transport Taxes*, European Conference of Ministers of Transport, Paris

Eddington, R., 2006, *Transport's role in sustaining the UK's productivity and competitiveness*, HM Treasury, London, available at: http://www.dft.gov.uk/about/strategy/eddingtonstudy/

Engineers Australia, 2005, 2005 *Victorian Infrastructure Report Card*, North Melbourne, http://www.engineersaustralia.org.au/shadomx/apps/fms/fmsdownload.cfm?file_uuid=1D0444EA-9C44-7EEA-2AAA-CD51EE406FD7&siteName=ieaust

European Federation for Transport & Environment, 2005, *Road transport speed and climate change*, Brussels, available at: http://www.transportenvironment.org/docs/Positionpapers/2005/2005-09_cars21_speed_co2.pdf

Ewing, R., Schieber, R. & Zegeer, C. 2003, 'Urban Sprawl as a Risk Factor in Motor Vehicle Occupant and Pedestrian Fatalities', September 2003, Vol 93, No. 9, *American Journal of Public Health*, 1541-1545

Falk, N., 2003, 'Reforming the Business Rate system: new sources of funding for public projects', *Self-financing Transport Projects Through Land Value Gains: Too Good to be True?*, Conference, London, 20 May 2003

Goldberg, J., 2006, 'The fatal flaw in the financing of private road infrastructure in Australia', *Australasian Transport Research Forum 2006*, Brisbane, available at: http://faculty.arch.usyd.edu.au/web/staff/homepages/pdf/johngoldberg_ATRF06_paper.pdf

Hansen, J., 2007, 'Scientific reticence and sea level rise', *Environmental Research Letters*, Volume 2, Number 2, April-June 2007, available at: http://www.iop.org/EJ/abstract/1748-9326/2/2/024002

Hansen, J., Sato, M., Ruedy, R.,Kharecha, P., Lacis, A., Miller, R., Nazarenko, L., Lo, K., Schmidt, G., Russell, G., Aleinov, I., Bauer, S., Baum, E., Cairns, B., Canuto, V., Chandler, M., Cheng, Y., Cohen, A., Del Genio, A., Faluvegi, G., Fleming, E., Friend, A., Hall, T., Jackman, C., Jonas, J., Kelley, M., Kiang, N., Koch, D., Labow, G., Lerner, J., Menon, S., Novakov, T., Oinas, V., Perlwitz, Ja., Perlwitz, Ju., Rind, D., Romanou, A., Schmunk, R. Shindell, D., Stone, P., Sun, S., Streets, D., Tausnev, N., Thresher, D., Unger, N., Yao, M. and Zhang, S., 2007, 'Dangerous human-made interference with climate: a GISS modelE study', *Atmos. Chem. Phys.*, 7, 2287-2312, available at: http://www.atmos-chem-phys.net/7/2287/2007/acp-7-2287-2007.pdf

Harvey, L.D. 2007, 'Allowable CO2 concentrations under the United Nations Framework Convention on Climate Change as a function of the climate sensitivity probability distribution function', *Environ. Res. Lett*. 2 014001 (10pp) doi:10.1088/1748-9326/2/1/014001, available at: http://www.iop.org/EJ/abstract/1748-9326/2/1/014001

Hawkins, D G 2006, Testimony to the Full Committee Hearing on Coal Liquefaction and Gasification, Committee of Energy and Natural Resources, United States Senate, viewed 15 December 2006, <http://docs.nrdc.org/globalWarming/glo_06042401a.pdf>

Hirsch, R., 2007, *Peaking of World Oil Production: Recent Forecasts*, National Energy Technology Laboratory, US Department of Energy, available at: http://www.odac-info.org/assessments/documents/Hirsch-Recent%20Forecasts.pdf

Hopkins, P. 1998, 'CityLink promise to save time, money', *The Age*, 16 November, p.5

IEA, 2005, *Saving Oil in a Hurry*, International Energy Agency, OECD/IEA, Paris, available at: http://www.iea.org/textbase/nppdf/free/2005/SavingOil.pdf

IPCC, 2007, *Mitigation of Climate Change*, Summary for Policymakers, Intergovernmental Panel on Climate Change, Geneva, available at: http://www.ipcc.ch/SPM040507.pdf

Kennedy, C., Miller, E., Shalaby, A., McLean, H. and Coleman, J., 2005, 'The Four Pillars of Sustainable Urban Transportation', *Transport Reviews*, vol.25, pp. 393–414

Kenworthy, , J., Laube, F., Newman, P. & Barter, P., 1997, *Indicators of Transport Efficiency in 37 Global Cities*, Institute for Science and Technology Policy, Perth

Lehtonon, M, 2006, *Decoupling freight transport from GDP – conditions for a 'regime shift'*, http://web.fu-berlin.de/ffu/akumwelt/bc2006/papers/Lehtonen_Decoupling.pdf

Liechti, M. & Renshaw, N., 2006, *A Price Worth Paying - A guide to the new EU rules for road tolls for lorries*, European Federation for Transport and Environment, Brussels, available at: http://www.transportenvironment.org/docs/Publications/2006/2006-07_a_price_worth_paying_eurovignette.pdf

Litman, T., 1995, 'Land use impact costs of transportation', *World Transport Policy & Practice*, Vol. 1, No. 4, pp.9-16

Litman, T. 2005, Rail *Transit in America: A Comprehensive Evaluation of Benefits*, Victoria Transport Policy Institute

Litman, T., 2005b, *Changing Transportation Trends And Their Implications For Transport Planning*, Victoria Transport Policy Institute

Litman, T., 2007, *Generated Traffic and Induced Travel - Implications for Transport Planning*, Victoria Transport Policy Institute, available at: http://www.vtpi.org/gentraf.pdf

Litman, T. & Fitzroy, S., 2005, *Safe Travels: Evaluating Mobility Management Traffic Safety Impacts*, Victoria Transport Policy Institute, available at: http://www.vtpi.org/safetrav.pdf

Litman, T. & Laube, F., 2002, *Automobile Dependency and Economic Development*, Victoria Transport Policy Institute

McDonald, D., Chester, C., Gunasekera, D., Buetre, B., Penm, J. and Fairhead, L. 2005, *Impact of Oil Prices on Trade in the APEC Region*, APEC Energy Working Group, Report no. APEC#09/2005, Published by ABARE as Research Report 05.3, Canberra, October, available at: http://abareonlineshop.com/product.asp?prodid=13276

McKinnon, A., 2006, *The Decoupling of Road Freight Movement and GDP Trends in the UK*
http://www.sml.hw.ac.uk/logistics/Decoupling_of_Road-tonne-km_and_GDP.pdf

Meersman, H. & Van de Voorder, E., 2002, Utopia and goods transport observations at decoupling economic growth and demand for transport, paper presented at the European Conference on Mobility Management, Gent, 15-17 May

Millar, R., 2007, 'Build new train lines, state urged', *The Age*, 29 May, available at: http://www.theage.com.au/news/national/build-new-train-lines-state-urged/2007/05/28/1180205160397.html

Moonee Valley City Council, 2006, *Traffic Congestion on Arterial Roads as a Result of CityLink*, Submission to VCEC Inquiry into Managing Transport Congestion, access 31 March 2006, from <http://www.vcec.vic.gov.au/CA256EAF001C7B21/WebObj/Submission77-MooneeValleyCityCouncil/$File/Submission%2077%20-%20Moonee%20Valley%20City%20Council.pdf>

Murphy, M., 2007, 'Report urges link-ups to build mega-projects', *The Age*, 13 June, available at: http://www.theage.com.au/news/business/report-urges-linkups-to-build-megaprojects/2007/06/12/1181414299727.html

Myer, R., 2005, 'Indebted toll roads divide opinion', *The Age*, 12 October, available at: http://www.theage.com.au/news/business/indebted-toll-roads-divide-opinion/2005/10/11/1128796525471.html

Newman, P. 1995, 'The end of the urban freeway', *World Transport Policy & Practice*, Volume 1, Number 1, pp.12–19

Newman, P., 2000, *Sustainable Transportation and Global Cities*, Institute for Sustainability and Technology Policy, available at: http://www.sustainability.murdoch.edu.au/casestudies/Case_Studies_Asia/sustrans/sustrans.htm

Noland, 2002, *Traffic Fatalities and Injuries: The effect of changes in infrastructure and other trends*, Centre for Transport Studies, <http://www.cts.cv.ic.ac.uk/staff/wp22-noland.pdf>

OECD, 1995, *Final Report of the Joint OECD/ECMT Project Group on Urban Travel and Sustainable Development*, OECD, Paris

OECD, 2006, *Decoupling the Environmental Impacts of Transport from Economic Growth*, http://www.oecd.org/document/7/0,2340,en_2649_34363_37676487_1_1_1_1,00.html

Pastowski, A., 1997, *Decoupling Economic Development and Freight for Reducing its Negative Impacts*, Wuppertal Institute for Climate Environment and Energy, Wuppertal, available at: http://www.wupperinst.org/uploads/tx_wibeitrag/WP79.pdf

Pfleiderer, R. & Dieterich, M. 2003, 'Speed Elasticity of Mileage Demand', *World Transport Policy & Practice*, Volume 9, Number 4, pp.21–27, available at: http://www.eco-logica.co.uk/WTPP09.4.pdf

Port of Melbourne Corporation, 2006, *Submission to the Victorian Competition & Efficiency Commission Inquiry into Managing Transport Congestion*, available at: http://www.vcec.vic.gov.au/CA256EAF001C7B21/WebObj/SubmissionDR115-PortofMelbourneCorporation/$File/Submission%20DR%20115%20-%20Port%20of%20Melbourne%20Corporation.pdf

Preston BL, Jones RN. 2006. *Climate Change Impacts on Australia and the Benefits of Early Action to Reduce Global Greenhouse Gas Emissions*. A consultancy report for the Australian Business Roundtable on Climate Change. CSIRO. Canberra, Australian Capital Territory, available at: http://www.csiro.au/files/files/p6fy.pdf

PTUA, 2006, The *Real Transport Challenges: A Call for Vision*, Public Transport Users Association, available at: http://www.ptua.org.au/publications/real-transport-challenges/

PTUA, 2006b, *Road user and congestion charging*, Public Transport Users Association, available at: http://www.ptua.org.au/files/2006/PTUA_paper_road_pricing.pdf

PTUA, 2007, *Getting Melbourne's Rail System on Track*, Public Transport Users Association

Richardson, A.J. 2000, "Measurement Error Problems in Surveys of Motor Vehicle Usage", *Road & Transport Research*, 9(4), pp. 3-10. available at: <http://www.tuti.com.au/Publications/2000/2000ARRB.pdf>

SACTRA, 1999, *Transport and the Economy*, Standing Advisory Committee on Trunk Road Assessment, London

Sheurer, J., Kenworthy, J. & Newman, P., 2005, *Most Liveable and Best Connected: The Economic Benefits of Investing in Public Transport in Melbourne*, Metropolitan Transport Forum, Melbourne, available at: http://www.mtf.org.au/n/resources/presentations_from_mtf_report_launch_8th_november_.html

Scheurer, J., 2006, *Keeping people moving in Melbourne's North-East*, Metropolitan Transport Forum, Melbourne, available at: http://www.mtf.org.au/n/resources/northeast.html

SGS Economics & Planning, 2005, *Managing Transport Congestion*, Submission to Victorian Competition & Efficiency Commission

Strutynski, P. 1995, 'A new approach to reducing road freight transport', *World Transport Policy & Practice*, Volume 1, Number 1, pp.37–40

Tarlo, K., 2002, *Why Brown Coal Should Stay in the Ground*, Institute for Sustainable Futures, available at: http://www.isf.uts.edu.au/publications/Brown_Coal%20final.pdf

Teufel, D, 1989, '*Die Zukunft des Autoverkehrs*' (The future of car traffic), Umwelt und Prognose Institut, Heidelberg

Thompson, D. & Gautier, P., 2006, 'Review of research into wheel/rail rolling noise reduction', *Proceedings of the I MECH E Part F Journal of Rail and Rapid Transit*, Volume 220, Number 4, 2006 , pp. 385-408(24)

VCEC, 2006, *Making the right choices: options for managing transport congestion*, Final report, September.

Victorian Government, 2007, *Response to VCEC's Final Report, Making the Right Choices: Options for Managing Transport Congestion*, Melbourne, available at: http://www.vcec.vic.gov.au/CA256EAF001C7B21/WebObj/Governmentresponse14March2007/$File/Government%20response%2014%20March%202007.pdf

Voith, R. 1998, 'The Downtown Parking Syndrome: Does Curing the Illness Kill the Patient?', *Business Review*, January/February 1998, Federal Reserve Bank of Philadelphia, available at: http://www.phil.frb.org/files/br/brjf98dv.pdf

Transport Industry Safety Group, n.d., *Speed and Speeding Safety Guide*, available at: http://www.vta.com.au/Documents/Speed%20&%20Speeding%20Guide.pdf

VTPI, 2007, 'Distance-Based Pricing', *TDM Encyclopedia*, Victoria Transport Policy Institute, Victoria B.C., available at: http://www.vtpi.org/tdm/tdm10.htm

Wald, M., 2005, 'Hybrid Cars Burning Gas in the Drive for Power', *The New York Times*, 17 July, viewed 27 July 2005, available at: <http://www.nytimes.com/2005/07/17/automobiles/17hybrid.html>

Western Transport Alliance, 2005, *Submission to Victorian Competition and Efficiency Commission Inquiry into Managing Transport Congestion*, Werribee

Whitelegg, J., 1994, *Roads, Jobs and the Economy*, Eco-Logica Ltd, Lancaster

Wilmot, K., 2006, 'Fool's gold at end of EastLink rainbow', *The Age*, 20 October, available at: http://www.theage.com.au/news/business/fools-gold-at-end-of-eastlink-rainbow/2006/10/19/1160851066435.html

WS Atkins, 2001, *Determination of the Potential Synergies and Conflicts Between Noise and Air Quality Action Plans*, available at: <http://www.defra.gov.uk/environment/noise/research/synergy/pdf/synergymain.pdf>

WS Atkins Transport Planning 2001, *Study of European Best Practice in the Delivery of Integrated Transport: Summary Report*, WS Atkins Transport Planning, Epsom, viewed 8 June 2006, <http://www.cfit.gov.uk/docs/2001/ebp/ebp/exec/pdf/exec.pdf>

Zarembo, A. & Maugh, T., 2007, 'Bleak U.N. report on global warming derided as too soft', *Los Angeles Times*, 7 April, available at: http://www.mercurynews.com/healthandscience/ci_5616208