Senate Rural and Regional Affairs and Transport Committee

Inquiry into the investment of Commonwealth and State funds in public passenger transport infrastructure and services

Submission by the Cycling Promotion Fund
27th February 2009

CPF
cycling promotion fund

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The Secretary
Senate Standing Committee on Rural and Regional Affairs and Transport
PO Box 6100
Parliament House
Canberra ACT 2600

RE: Inquiry into the investment of Commonwealth and State funds in public passenger transport infrastructure and services

Secretary,

The Cycling Promotion Fund is pleased to offer our submission to the above Inquiry.

This submission focuses on the following term of reference, as outlined by the Inquiry.

c. an assessment of the benefits of public passenger transport, including integration with bicycle and pedestrian initiatives

In particular, our submission argues that closer integration of public transport with bicycle transport will enhance the efficiency and attractiveness of the transport system for all Australians.

This submission puts forwards practical, evidence based measures that could be undertaken in order to fully capitalise on a range of important benefits.

The Cycling Promotion Fund argues that the integration of the cycling and public transport network will assist Australia meet a number of emerging challenges. By creating a seamless connection between the public transport and bicycle/active transport networks, sustainable mobility options will be considerably enhanced, and provide the following benefits:

- Reduced greenhouse gas emissions
- Reduced expenditure on transport fuel
- Reduced traffic and car parking congestion
- Increased physical activity and health
- Improved social inclusion and liveability

We welcome the Committee's interest in this important issue and would be happy to provide additional information to assist the Inquiry.

Kind regards,

Rosemarie Speidel
Program Director

Executive Summary

The public transport system is in a unique position to contribute to ameliorating many of the key challenges faced by Australia; climate change, fuel prices, congestion, social exclusion and population health.

The integration of active transport modes such as the bicycle with public transport is part of the solution needed to address these challenges.

A concerted national initiative to achieve seamless integration between these sustainable, complementary transport modes is urgently needed and critical to the effective functioning of our cities and regional areas.

Increasing accessibility to the public transport network through cycling widens transport choice, reduces the need for motor vehicle travel and improves transport efficiency and national productivity. The integration of cycling and public transport routes is also an effective strategy that can be shown to reduce greenhouse gas emissions, oil consumption and economic disadvantage.

Increasing accessibility to the public transport network through cycling widens transport choice, reduces the need for motor vehicle travel and improves transport efficiency and national productivity.

Importantly, meaningful improvements in the integration of the cycling and public transport network can be delivered rapidly compared to other public transport enhancements and integrating cycling and public transport is a highly effective way of increasing the catchment area of public transport corridors – effectively bringing the public transport system closer to more residents in their communities. This is especially pertinent when one considers that the majority of Australians now live outside a comfortable walking distance from the public transport system.

In order to maximise the integration of the cycle and public transport network, this submission recommends:

- A national strategic approach to funding integrated public and active transport
- Funding action plans to connect public transport hubs with the surrounding community through a comprehensive network of cycle ways and shared paths and marketing support to inform the public of the range of options.
- Providing a range of key infrastructure enhancements that would significantly increase the transport options for trips by active modes. These include:

    - bicycle racks on buses
    - rail rolling stock designed to carry bicycles with passengers
    - high quality bicycle parking at train stations and other transport hubs
    - signage and marketing support

This Inquiry offers an excellent opportunity to address shortcomings in the provision of public transport and its integration with bicycle travel.

Contents

Introduction

This submission focuses on the opportunity to address key national challenges through the integration of cycling with the public transport system.

A growing number of cities, especially in Europe and increasingly in North America have successfully created a seamless connection between bicycle and public transport. These cities have effectively enlarged the catchment area of their public transport system, opening it up to those that previously lived or worked beyond a comfortable working distance of a public transport hub.

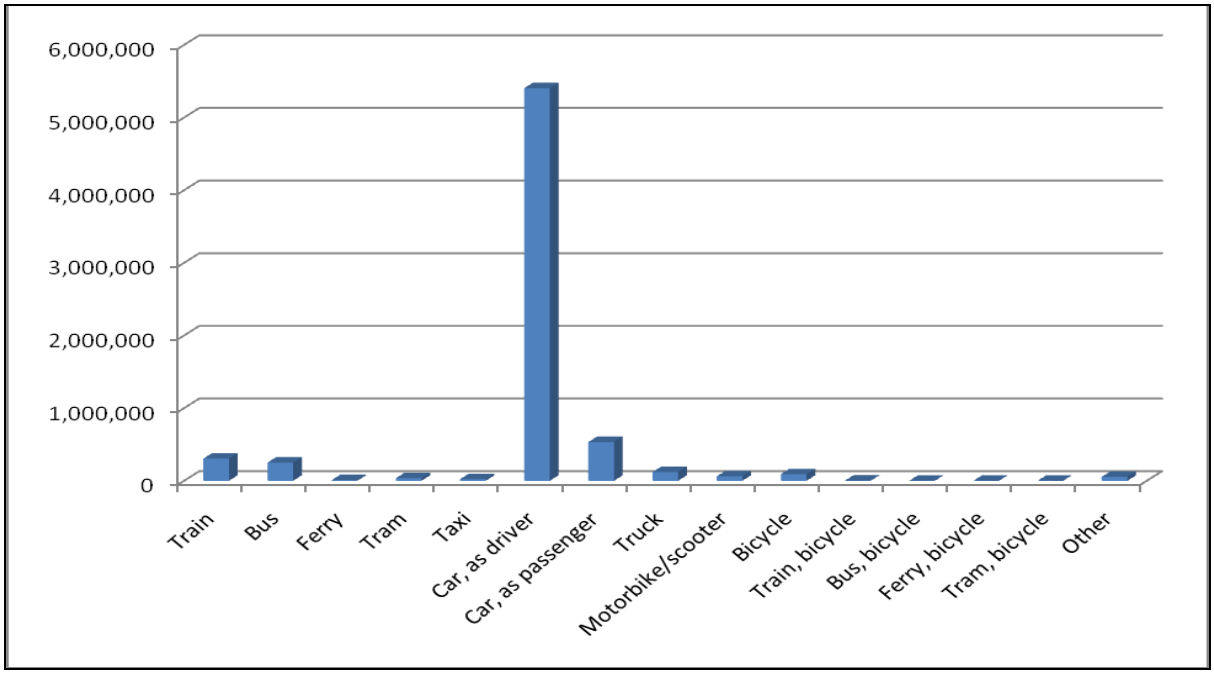
A growing number of cities, especially in Europe and increasingly in North America have successfully created a seamless connection between bicycle and public transport.

By viewing active (walking and cycling) transport as a natural extension of the public transport system, ridership increases and short car trips to stations decrease. This improves traffic and parking congestion, greenhouse gas abatement, public health and household expenditure on transport (Litman, 2009). The Inquiry is an opportunity to bring Australia up to world's best practice on public transports' integration with cycling, and help address these and other challenges of national importance.

A snapshot of current travel behaviour

Australian cities and towns are some of the most car dependent globally (Newman & Kenworthy, 1999). According to the 2006 ABS Census, the vast majority (over 80%) of all trips to work are done by car, as illustrated in the graph and table below.

Journeys to Work – ABS Census 2006



Source: ABS, 2007

Almost all the cars driven to work daily are single occupant vehicles (78%), as illustrated below:

Proportion of journeys to work by mode – ABS Census 2006

Mode	Number of people	Proportion of trips
Train	305,197	4.40%
Bus	250,717	3.60%
Tram/ferry/taxi	67,750	0.97%
Car, as driver	5,404,040	78.42%
Car, as passenger	533,324	7.70%
Truck	120,404	1.70%
Motorbike/scooter	60,777	0.88%
Bicycle	90,114	1.30%
Bicycle with other mode	4,557	0.43%
Other	53,871	0.78%
TOTAL	6,890,751	100%

Source: ABS, 2007

Correspondingly, very few trips are made by public transport and cycling, although rail services, particularly in Sydney and Melbourne provide higher proportions of trips into/out of the CBD at peak times.

Almost all the cars driven to work daily are single occupant vehicles

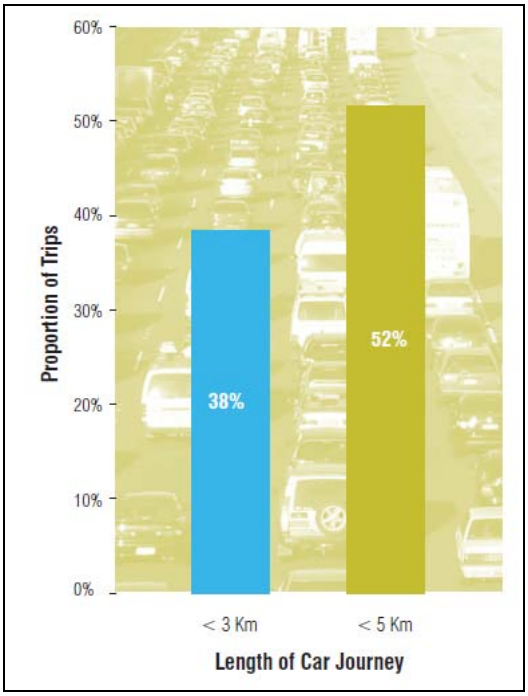
The table above also reveals the low numbers of Australian currently combing cycling with public transport. In total, only 0.43% of trips to work combine cycling with public transport (ABS, 2007). In contrast, in countries with a dedicated program of combining these two sustainable modes of transport, such as the Netherlands, up to 1/3 of all train trips start with a bicycle journey (Cycle Council of the Netherlands, 2007).

Recent WA research indicates that 60% of motor vehicles parked at Perth railway stations have travelled less than 2.5 km - an ideal for cycling and walking. In the most extreme instance, one inner city station had almost half of all vehicles travelling less than 800m (Transperth, 2008).

...one inner city station had almost half of all vehicles travelling less than 800m

Indeed this is supported by RMIT and Austroads studies showing over 30% of car trips in Australian cities are less than 3km and more than 50% are under 5km, as illustrated below:

Many car trips are short



Source: RMIT, 1999; Austroads, 2005

One of the reasons for this high level of car use is the lack of appropriate bicycle infrastructure and integration with public transport (Bauman et al, 2008). For instance, Melbourne, which is often seen as amongst the most bicycle friendly large Australian city, has only 35% of its bicycle network complete (VicRoads, 2007, pers. comms).

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Even with this lack of bicycle infrastructure in Australian cities, cycling to work in 2006 accounted for 189,392,000km travelled in Australian capitals (Derived from Census 2006 data).). The following table outlines some of the key cycling figures:

Cycling to work in Australian cities – the numbers

	No. of people	Kilometres per year	Proportion of trips by bike
Sydney	10,175	35,612,500	0.83%
Melbourne	18,047	63,164,500	1.60%
Brisbane	7,502	26,257,000	1.35%
Adelaide	6,085	21,297,500	1.72%
Perth	6,323	22,130,500	1.41%
Hobart	810	2,835,000	1.27%
Canberra	3,763	13,170,500	2.76%
Darwin	1,407	4,924,500	3.85%
	54,112	189,392,000	

Source: ABS, 2007

There is significant potential to increase the number of trips made by cycling. According to the 2006 Census, cycling accounts for around 1.3% of all journeys to work in Australian capital cities. Bicycle journeys to work jumped almost 29% across Australian capital cities between the 2001 and 2006 Census. Melbourne's growth rate soared 48% in the same five year period (ABS, 2001 & 2007) and this corresponded with a significant increase in bicycle infrastructure investment.

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An indication of the latent demand for cycling as transport is its popularity as a recreational activity. Cycling is currently the fourth most popular physical activity for adults, with over 1.6m Australians participating in 2006, an increase of 244,500 people (17%) from 2001 (Australian Sports Commission, 2006). The fastest rate of increase occurred in the areas with improved bicycle infrastructure. In areas where bicycle infrastructure development stagnated, flat or negative rates of growth were observed.

Cycling participation in many industrialised countries is higher than in Australia (Pucher et al, 2009). However, bicycle ownership in Australia is high (Australian Bicycle Council, 2004), indicating an underlying interest in cycling, with considerable potential for increased participation.

Data from the Victorian Department of Infrastructure reveal that over one-third (36%) of all weekday trips in Melbourne are less than 2km, while around 60% of all weekday trips in Melbourne are less than 5km.

Cycling also represents a practical mobility alternative to the private car for trips to school. Almost three quarters of children (72.3%) in grades 3 to 6 are driven to school (VicHealth, 2002) despite most of these journeys being less than 3km.

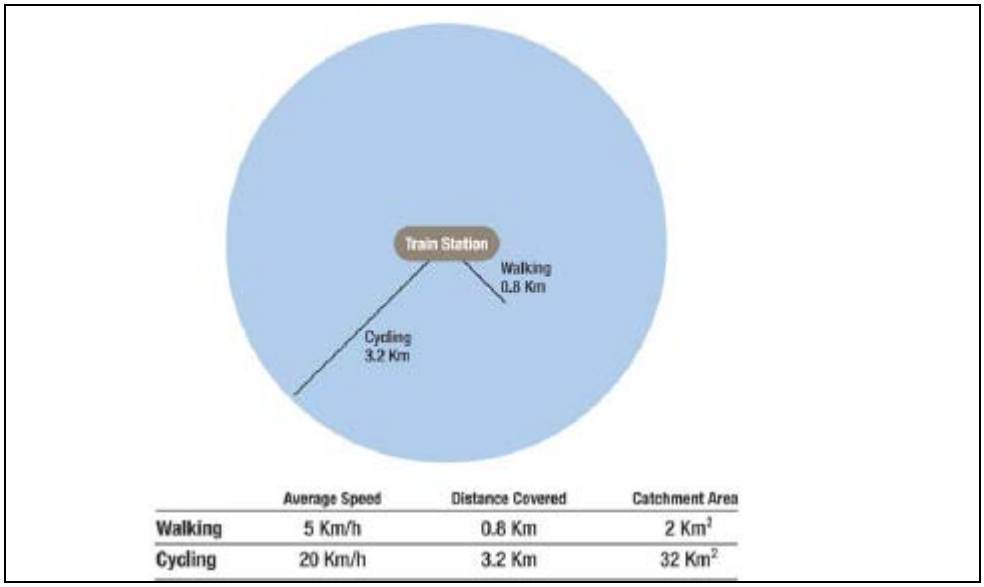
Around 60% of all weekday trips in Melbourne are less than 5km

The data indicates that significant opportunities exist to transfer many of the short car trips that occur in our cities to bicycle journeys and an even larger percentage to a combined bicycle/public transport trip.

The benefits of improved integration between the bicycle and public transport network

When combined with public transport, cycling offers a simple, healthy and viable alternative to private motor vehicle use and can extend the journeys that can be undertaken by public transport, even for those journeys covering a significant distance.

Promoting access to stations and other transport stops/hubs by bicycle is an effective, practical way of increasing the catchment area of each station, as demonstrated below:



	Average Speed	Distance Covered	Catchment Area
Walking	5 Km/h	0.8 Km	2 Km^2
Cycling	20 Km/h	3.2 Km	32 Km^2

Source: Taken from Bauman et al, 2008

The increased catchment area when cycling to public transport hubs also overcomes issues of poor servicing of some areas with public transport .This is particularly important in the Australian context, given that all of our major cities have experienced post WWII development that has occurred without corresponding increases in public transport provision (Newman & Kenworthy, 1999).

The provision of cycling infrastructure to/from a station can increase its catchment area by a factor of 15, without increasing the number of car parks or public transport routes.

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Cycling and health

Physical inactivity is one of the major causes of ill health in Australia. Half the Australian adult population are insufficiently active to protect against sedentary lifestyle disease, such as diabetes (Australian Institute of Health and Welfare, 2006).

The direct gross cost of physical inactivity to the Australian health budget in 2006/07 was $1.49 billion (Econtech, 2007). This translates to $198.57 per adult, per year. Cycling

provides a practical, sustainable opportunity to help get more Australians active and drive down the cost of physical inactivity.

In terms of the health benefits provided from those Australians who currently cycle, in 2006, over 1.68 million Australians cycled for recreation and of those, 417,400 cycled more than 104 times a year (Australian Sports Commission, 2006). These individuals can be classified as meeting the levels of physical activity to protect against sedentary lifestyle diseases from cycling alone. By including the cycling that takes place for commuting purposes (to/from work) as well, bicycle riding participation cuts sedentary lifestyle disease costs by approximately $154 million (Bauman et al, 2008).

It must be noted that a significant amount of non transport-based cycling occurs that is not collected by the Census (such as visiting friends, or trip to local shops). According to the Australian Greenhouse Office (2006) around 66% of our journeys are for non-commuting purposes.

Cycling has also been shown by the World Health Organisation to be effective in the treatment and prevention of mental health (Dora & Phillips, 2000). Depression and anxiety have been found to cost Australian businesses almost $10 billion a year. This includes $6.6 billion for sick days and $3 billion for poor work performance (Hilton, 2005).

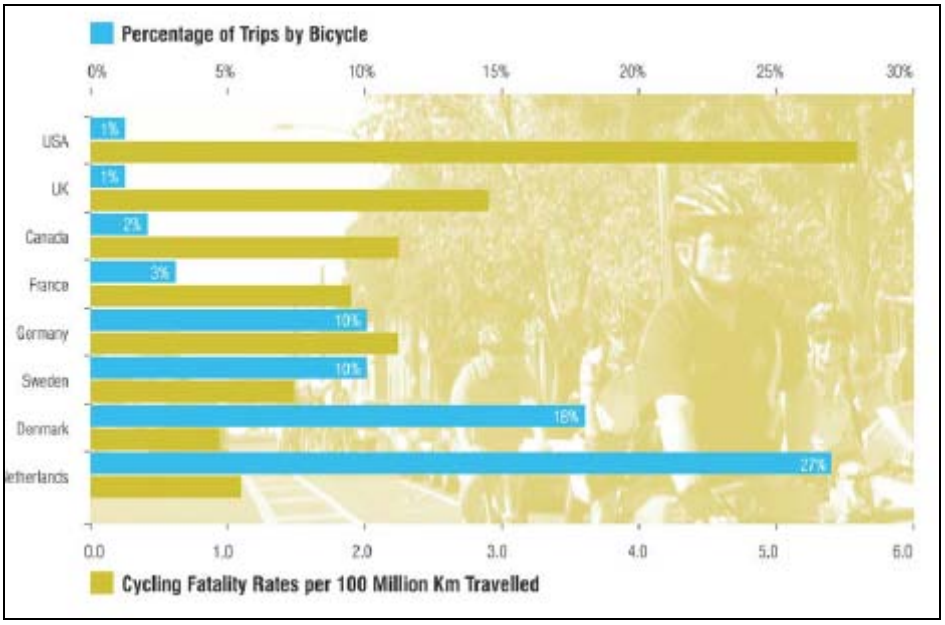
...around 66% of our journeys are for non-commuting purposes.

Cycling can also provide benefits in terms of air quality. Air pollution caused by motor vehicles, especially in urban areas, is a major source of respiratory illness (Standing Committee on Environment and Heritage, 2005; Commissioner for Environmental Sustainability, 2007; Bureau of Transport and Regional Economics, 2005). Between 900 and 4500 cases of cardio-vascular and respiratory disease occurred due to motor vehicle related air pollution in 2000, costing between $0.4 billion to $1.2 billion. In addition, air pollution caused by motor vehicles accounted for between 900 and 2000 premature deaths, with an estimated cost of between $1.1 billion and $2.6 billion (Bureau of Transport and Regional Economics, 2005). Cycling, as a zero emission form of transport, offers significant potential to reduce this cost.

Cycling, whether alone or in combination with public transport, offers significant benefits in terms of road trauma. In Australia, road trauma costs $17 billion a year (Connelly & Supangan, 2006). Evidence is increasing that measures involving the combination of public transport and bicycle network integration are an effective method of minimizing the incidence and severity of road trauma (Litman & Fitzroy, 2005). Cyclists' safety is a crucial component of road trauma reduction. A recent review of the literature on this issue found that safety concerns are a primary reason for people to choose *not* to cycle and that the more cyclists there are, the safer it becomes. This is illustrated in the figure below which demonstrates that the countries with the highest rates of cycling have the lowest levels of cyclists' fatality on a kilometre travelled basis.

Measures involving the combination of public transport and bicycle network integration are an effective method of minimizing the incidence and severity of road trauma

Relationship between Bicycle Mode Share and Fatalities



Source: Pucher & Buehler 2008; Organisation for Economic Cooperation and Development, 2005, European Union 2003, US Department of Transportation, 2003 & 2005 (cited in Pucher, 2006).

When cycling rates double, cyclist injury can be expected to fall by around 34%

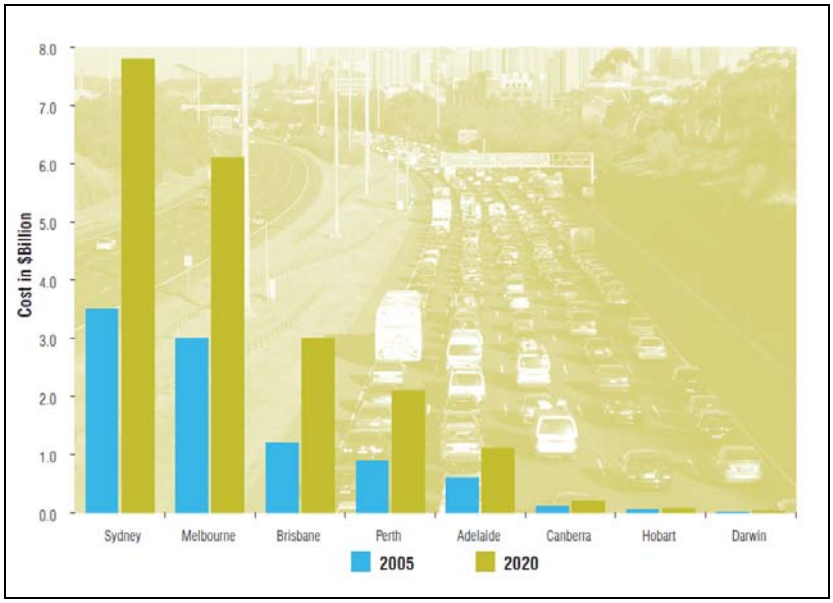
The data presented above is consist with the findings of other road safety researchers who have discovered that when cyclist rates double, cyclist injury can be expected to fall by around 34% (Jacobsen, 2003, cited in Robinson, 2005).

Reducing congestion

The integration of cycling and walking with public transport can provide meaningful reductions in peak hour traffic congestion. Private automobile use is considered the major cause of congestion in Australian capital cities (Bureau of Transport and Regional Economics, 2007). The Bureau of Transport and Regional Economics found that the cost of congestion in Australia to be estimated at $10 billion in 2005 and expect this to rise to around $20 billion by 2020.

The integration of cycling and walking with public transport can provide meaningful reductions in peak hour traffic congestion

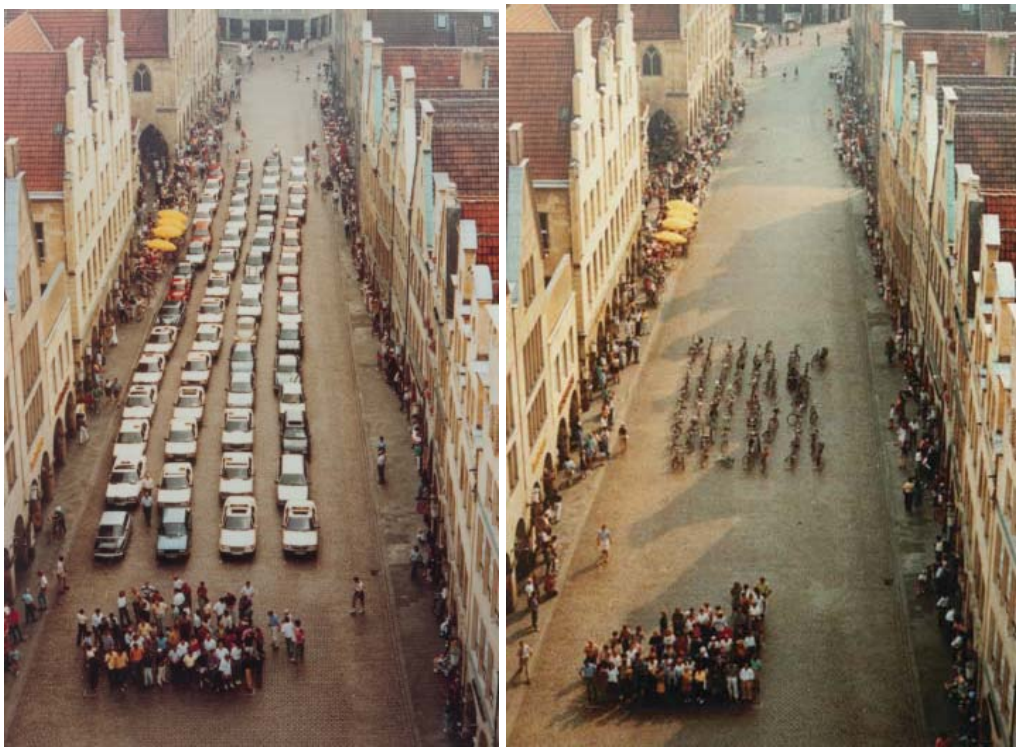
The rising cost of traffic congestion



Bureau of Transport and Regional Economics, 2007

Even without a comprehensive cycling network or programs to integrate bicycle use with public transport, cycling by Australians travelling to work in capital cities reduces congestion costs in Australia by approximately $46 million (based on calculations made in Bauman et al, 2008 using 2006 Census figures). The effectiveness of cycling in combating congestion can also be illustrated by the two pictures below, demonstrating the space efficiency of the bicycle:

Causes and solutions to traffic congestion



Source: City of Muester, 2002

Train station car parking congestion

Congestion is not restricted to the road way. Many train stations experience car parking congestion, resulting in reduced amenity, accessibility for other users and significant opportunity cost. The opportunity cost is amplified by the increase in property values surrounding new rail projects (Newman & Kenworthy, 1999; ACT Planning & Land Authority, n.d).

Car parking demand around train stations has increases dramatically since the petrol price rises that have hit Australians since 2005 and it is very common for car parks to reach capacity at peak times.

Even without a comprehensive cycling network or programs to integrate bicycle use with public transport, cycling by Australians travelling to work in capital cities reduces congestion costs in Australia by approximately $46 million

The cost of providing one car parking spot at a train station ranges between $10,000 and $17,000 (Houston & Perkins, 2008), compared to approximately $1500 for each bicycle park in the high quality bicycle shelter illustrated below:

Photo: Jim Krynen

The bicycle parking shelter picture above stores approximately 18 bicycles and costs between $28,000 - $30,000 (installed). Moreover, it is around 10 times as space efficient as car parking. Minimising the provision of car parking can act as an important travel demand management tool, encouraging the uptake of sustainable forms of transport to and from the train station.

Car parking demand around train stations has increases dramatically since the petrol price rises that have hit Australians since 2005 and it is very common for car parks to reach capacity at peak times

Combating climate change

As a zero emission form of transport, cycling is increasingly seen both in Australia and internationally as a transport mode capable of

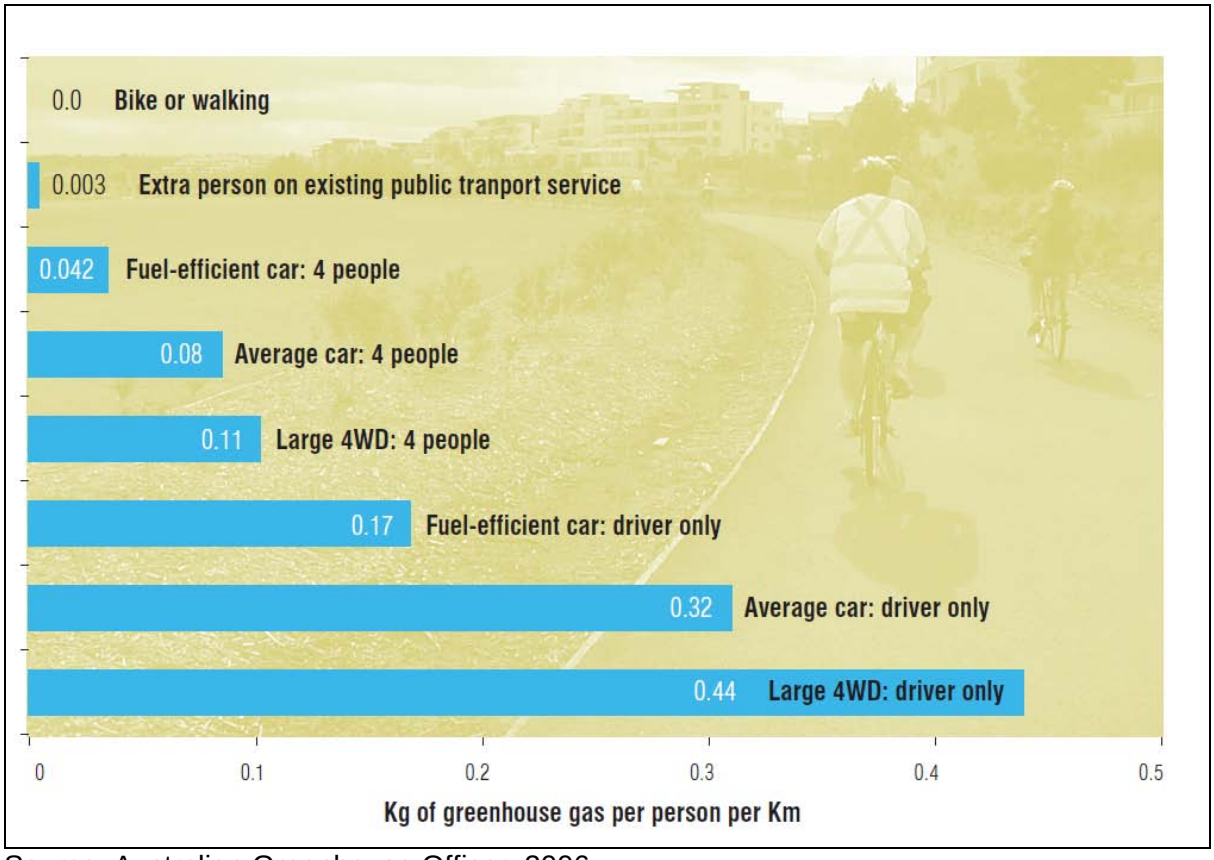
reducing greenhouse gas emissions. In combination with public transport, it offers an appropriate alternative to the many car trips occurring in cities and towns acting to drive up Australia's greenhouse gas emissions. Motorised transport is currently a significant and growing source of greenhouse gas emissions. The Australian Greenhouse Office reports that 34% of household emissions are generated from transport (2006). Transport emissions increased 30% between 1990 and 2005 and this is expected to jump 67% above 1990 levels by 2020 (Department of Climate Change, 2008). It is therefore clear that our rate of projected increase in transport emissions is inconsistent with the Government's commitment to reduce emissions by 2020.

The Commonwealth *Carbon Pollution Reduction Scheme*, due for implementation in 2010 will include transport. An unprecedented effort (for Australia) to maximise the potential integration of cycling with public transport is therefore urgently required. This will provide the community with access to low carbon forms of transport, enabling Australia to meet its greenhouse gas reduction targets.

Transport emissions increased 30% between 1990 and 2005 and this is expected to jump 67% above 1990 levels by 2020

The graph below clearly demonstrates that any effective carbon reduction strategy for the transport section must boost investment in public transport, cycling and pedestrian initiatives, as these are the least carbon intensives forms of transport.

The carbon contribution of different modes of transport



Source: Australian Greenhouse Officer, 2006

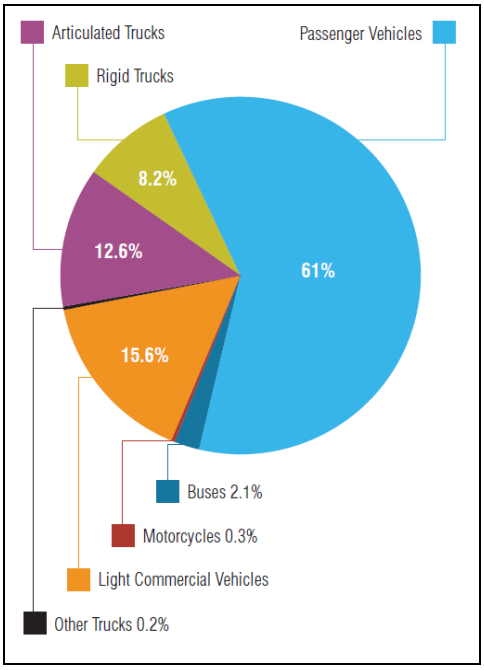
Cutting fuel costs

Oil is central to the Australian economy and community. Car use is the major consumer of oil in Australia.

The chart below illustrates that the majority (61%) of fuel consumption for road transport can be attributed to car use.

Concerns over oil depletion raise serious questions about Australia's long term energy needs and future prosperity

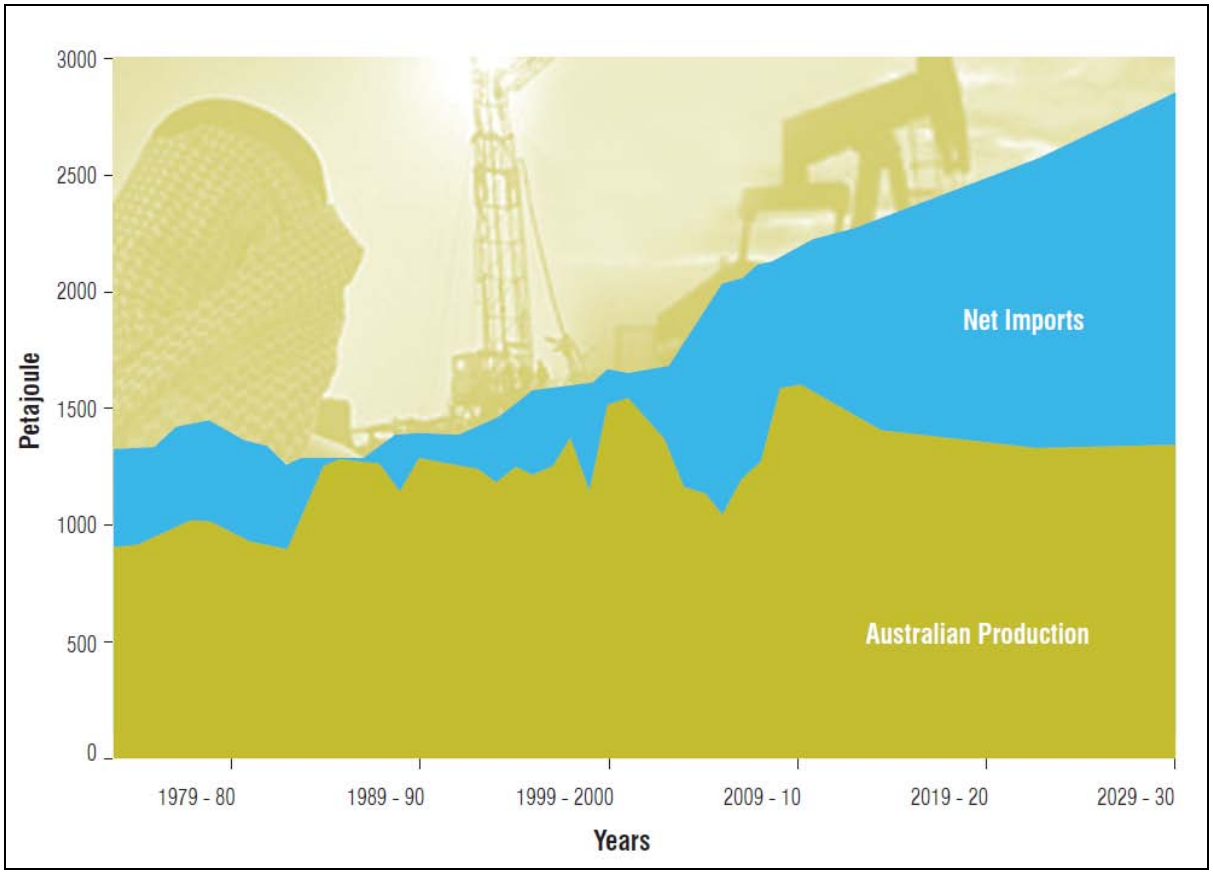
Australian road fuel consumption by type of vehicle



Source: Apelbaum Consulting Group, Australian Transport Facts, 2007, cited in Australian Bureau of Agricultural and Resource Economics, 2008.

Concerns over oil depletion raise serious questions about Australia's long term energy needs and future prosperity. Australian oil production peaked in 2000/01 (Geoscience Australia, 2006), resulting in greater dependence on imports – often from unstable regions of the world. In fact, only 53% of Australian oil consumption is from domestic production (Australian Bureau of Agricultural and Resource Economics, 2008). By 2020, this is expected to drop to 27% (Australian Petroleum Production and Exploration Association, 2007). The graph below highlights that Australia is growing increasingly reliant on imports:

Australia is becoming increasingly reliant on foreign oil



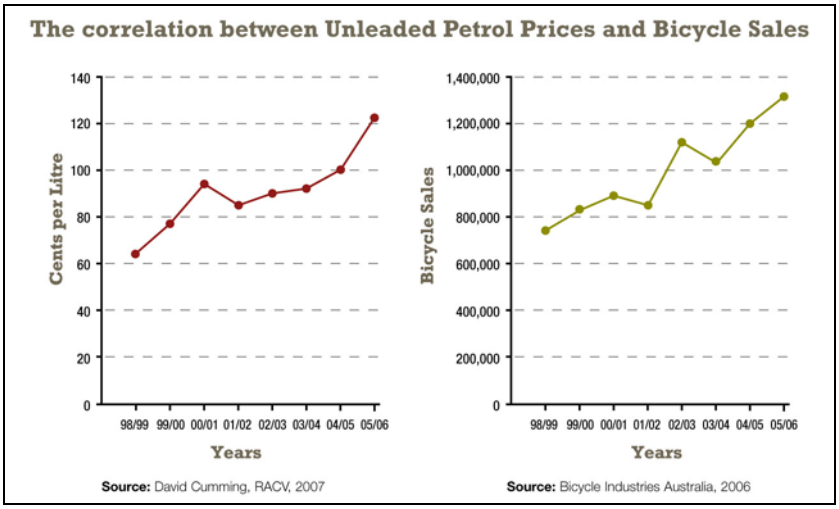
Source: Taken from Cycling Promotion Fund, 2008

The Minister for Resources, The Hon Martin Ferguson AM MP recently made it clear that this shortfall in domestic oil production will have a dramatic economic impact:

> "With only about a decade of known oil resources remaining at today's production rates, Australia is looking down the barrel of a $25 billion trade deficit in petroleum products by 2015" (The Hon Martin Ferguson AM MP, APPEA Conference, 7th April, 2008).

Automotive gasoline imports have jumped 209.8% between 2000/01 to 2005/06. Over the same period, domestic crude oil production dropped by 37.2% (Australian Bureau of Statistics, 2008). Using figures from the 2006 Census, commuter cyclists in Australian capital cities save approx. $35 million on fuel (calculated at 2008 prices).

The rise in petrol prices over recent years has coincided with an increase in Australian bicycle sales, as demonstrated by the two graphs below:



Source: Cycling Promotion Fund, 2007

This relationship between fuel prices and bicycle sales is supported by research in the United States which showed that the vast majority of transport related bicycle expenditure has been influenced in part by the surge in petrol prices (Bikes Belong, 2008).

By 2018, petrol could hit $8 per litre

The provision of cycling infrastructure and encouragement programs, in combination with public transport improvements offers a very effective method of increasing the resilience to higher fuel prices (Litman, 2008; Pucher & Buehler, 2008).

The provision of cycling infrastructure, integrated with public transport improvements offers a very effective method of increasing the resilience to higher fuel prices

The CSIRO found that the price of petrol in 2018 could reach $8 per litre (CSIRO, 2008). Should this be the case, it would cost around $480 (2008 dollars) to fill a car with petrol and this will clearly be beyond the capacity of most Australians to do on a regular basis. Even a rise to half that amount would put significant pressure on the transport system and strengthen public demand for the seamless integration of cycling and public transport.

Recommendations to increase public transport and bicycle integration

This submission has provided a comprehensive outline and discussion of Australian transport behaviour, some of the costs associated with our level of car use and the benefits offered by improved integration of cycling with public transport.

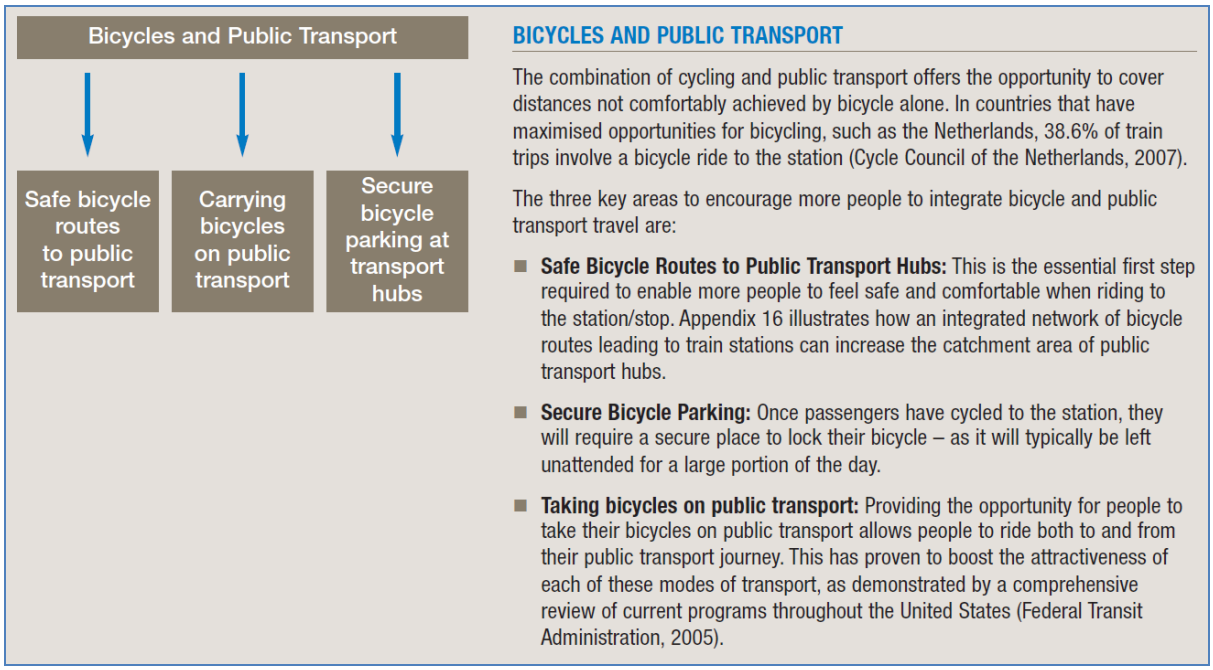
This section provides practical recommendations, carefully selected for their applicability to the Australian context. Each of the recommendations offered below offer cost effective benefits in terms of climate change, fuel price expenditure, traffic congestion, liveability and public health.

Three key areas need attention when improving the integration of cycling with public transport and these are the three key recommendations to the Inquiry:

1. Provide safe bicycle routes to transport hubs
2. Facilitate the carrying bicycles on public transport
3. Provide secure bicycle parking at transport hubs

Each of the above areas are articulated in more detail in the box below:

Improving the integration of bicycling with public transport



Source: Taken from Bauman et al, 2008

Safe bicycle routes to transport hubs

The provision of high quality, safe bicycle routes (both on and off road) leading from residential and commercial areas to train stations and other transport hubs is an essential requirement of any program to increase the integration of bicycling with public transport (Ministerie van Verikeer en Waterstaat, 2007; Pucher & Buehler, 2008; Sallis et al, 1998).

Indeed the cities that have a high proportion of bicycle routes generally have higher rates of cycling participation (Steele, 2007). The Netherlands has the highest rate of bicycle use of any country in the Organisation for Economic Co-operation and Development (Ministerie van Verikeer en Waterstaat, 2007).

The cities that have a high proportion of bicycle routes generally have higher rates of cycling participation

The Dutch became leaders in cycling for transport through a concerted effort by government to create the conditions necessary to make cycling a safe, attractive form of transport. Starting in the late 1960s, a comprehensive knowledge of the key requirements for bicycle friendly design has been developed and are summarised below (CROW, 2006):

- Safety
- Directness: between origin and destination;
- Comfort: path must be smooth, free of obstacles and with sufficient space;
- Pleasant: to ensure an enjoyable riding experience; and
- Integrated: to provide *linked up* routes between key destinations without gaps in the cycling network.

To date, only Perth can claim to have any program dedicated to the provision of bicycle routes leading to train stations and significant gaps still exist in this network.

See Appendix 1 for some images on bicycle infrastructure design

Combining bicycle and bus lanes

A number of cities have successfully combined bicycle lanes with priority bus routes. This approach has been effective in areas where there is insufficient space for an entirely separate bicycle lane. Edinburgh, Scotland has successfully combined their bus and bike routes for over a decade. A combined bicycle/bus lane maybe particularly effective in terms of integrating bicycling with the rail system, as many bus routes are designed to link with rail stations.

A bicycle/bus lane maybe particularly effective in integrating bicycling with the rail system, as many bus routes are designed to link with rail stations

Combination of bus and bicycle lanes in Oxford Street, Sydney

Linking off road cycle paths with the public transport system

Off road bicycle paths, as their name suggests, are paths physically separated from the road way and sometimes occurring without the presence of a parallel road corridor. They typically score very highly when measured against criteria for bicycle friendly design – especially in terms of safety, levels of comfort and attractiveness. They tend to be significantly more costly than on road lanes and are more space intensive. When designing off road cycle paths, it is important to consider *directness* and *integration* with key destinations, as these two factors have a strong influence on useability (CROW, 2006).

An off-road bicycle path in Melbourne connecting communities with train stations

The town of Davis, California serves as a good example of the influence high quality bicycle infrastructure, especially off road paths, has on cycling participation. Over several decades, Davis has made a concerted attempt to install bicycle routes throughout the town. The cycle network has grown to a point where approximately 80% of all streets have some form of bicycle infrastructure, providing a safe and attractive cycling environment. Davis has been identified as the most bicycle friendly town in the United States and consistently records the highest level of bicycle participation. Some 14% of all trips in Davis are done by bicycle, rising to around 47% amongst the student population (Bustos, 2001). Davis offers a pertinent example of how even in a country considered among the most automobile dependent in the world (Newman & Kenworthy, 1999), through careful design, the bicycle can become a highly significant segment of the transport system.

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Off- road bicycle paths in Davis, California

'Green' bridges connecting communities to transport hubs

Pedestrian and bicycle bridges can act as a highly valuable component of the *active* transport network. These bridges enhance cycling by providing a level of service quality generally superior to the existing road network, therefore increasing the competitive advantage of cycling. Green bridges provide a level of *directness, safety*, *comfort* and *attractiveness* that has proved very effective in encouraging cycling.

Green bridges have the potential to be used effectively in enhancing pedestrian and bicycle access to stations, reduce impediments related to topography and avoid bicycle unfriendly arterials

A green bridge in Brisbane

Green bridges have the potential to be used effectively in enhancing pedestrian and bicycle access to stations, reduce impediments related to topography and avoid bicycle unfriendly arterials.

In order to broaden the catchment area of Australia's public transport network, it is recommended the Commonwealth provide funding to projects that increase bicycle access to transport hubs.

It is recommended the Commonwealth provide funding to projects that increase bicycle access to transport hubs

Facilitating the carrying bicycles on public transport

A significant proportion of travellers using their bicycle to arrive at a transport hub will also need their bike at the "other end" of their public transport journey. For this reason, it is important to look for opportunities to carry bicycles on public transport vehicles.

Bicycles on trains

Numerous public transport providers have developed programs for enabling the carriage of bicycles on train services. In urban settings, it is typical to have restrictions during peak times. This is not always the case, with Melbourne serving as an example of a city that permits, but discourages bicycles on peak hour services. Carefully designed carriage interiors can however minimise space requirements and discomfort for other passengers.

The carrying of bicycles on trains offers several important benefits:

- Overcomes distance: The combination of bicycle and train travel enables the user to cover distances not able to be easy covered on bike alone;

- Bicycle available at both ends of the journey: Unlike parking a bicycle at the station, by carrying a bicycle on the train, it is available to complete the final leg of the journey. This is especially useful if the final destination is beyond a reasonable walking distance;
- Security: For those concerned about leaving a bicycle parked at a train station regularly for long periods, the ability to be able to take the bicycle on board the train is very useful;
- An option in adverse circumstances: In situations of poor weather or mechanical difficulties, bringing bicycles onboard trains is a desirable option; and
- Anecdotally, train operators have reported increased demand for carrying bicycles on both metropolitan and regional rail in Victoria since the petrol price rise of 2005.

See appendix 2 for more information and images on the carrying of bicycles on public transport vehicles.

Bicycles on buses

Since the early 1990s, a growing list of cities in the United States have installed bicycle racks on the front of buses (as pictured below). The key benefits of this service is very similar to the advantages identified above for the carrying of bicycles on trains. Over 35 cities operate bicycle racks on the front of their buses and this typically includes the entire fleet. Due to the popularity of the service, many of the original racks which had the capacity to carry two bikes are being replaced with new racks able to take three bicycles.

Provision for bicycles on buses in San Jose, California

ACTION Buses in Canberra will soon have the majority of all buses on the network fitted with buses with bike racks in their fleet that are used on their "Intertown" services (ACTION Buses, 2008). Each bike rack can hold two bicycles and each bicycle can be loaded or unloaded without affecting the other. Bicycles are held in place by spring-loaded clamps.

Over 35 US cities operate bicycle racks on the front of their buses and this typically includes the entire fleet

Provision for bicycles on buses in Canberra

Photo: www.action.act.gov.au/bike_n_ride.html

The bike/bus combination is at its most effective in outer suburban locations – due to lower urban densities and public transport options. The bicycle has been shown to meet the gap between travel demand and the public transport network. This would dramatically increase the catchment area of each bus route.

The bike/bus combination is at its most effective in outer suburban locations – due to lower urban densities and public transport options

Bicycle parking at train stations

Bicycle parking at train stations is an essential requirement of an integrated transport system. High quality bicycle parking encourages train passengers to arrive at the station by bicycle and leave their bike at the station, rather than bringing it on board the train, freeing up space inside the carriage and the car park. It is important to distinguish between the varying quality of bicycle parking at train stations.

Key aspects of high quality bicycle parking include:

- Security: to minimise the risk of theft. Best practice involves either attended bicycle parking or a lockable shelter with internal bicycle hoops for secondary locking, as illustrated in the two pictures below;
- Visibility: located in an area with a high amount of passing foot traffic, to deter theft;
- Shelter: to protect against rain;
- Convenient: positioned as close as possible to the station entrance, or within a prominent area of the station; and
- Signage: to clearly identify the direction of bicycle parking facilities from areas of the station where the parking facility is not visible.

Bicycle parking at train stations is an essential requirement of an integrated transport system

Bicycle parking at stations needs to cater for both the regular and infrequent users. Whilst there may be a small degree of cross over, regular users will generally prefer high security bicycle enclosures and infrequent users will generally have their needs met by casual bicycle parking arrangements. Short term users (parking for less than 4 hours) will usually be satisfied by casual parking as well.

The picture below offers an example of quality bicycle parking that although not cage-style, still adheres to many of the key features of high quality bicycle parking outlined earlier. It is located in a prominent, convenient part of the station and it protected from the elements. Additionally, it is under the view of CCTV. Finally, it is located within the ticket gate area, thereby providing an extra form of security. This technique has also been used successfully by many other public transport operators, including the Chicago Transit Authority in the United States.

Bicycle parking on the platform at Fremantle train station

For more information and images regarding bicycle parking at train stations, see appendix 3.

Public bicycle schemes – an extension of the public transport system

Bicycle share initiatives began in the 1960s, and have increased dramatically in both number and effectiveness in the last decade. Bicycle share programs vary from city to city, but essentially involve a fleet of public bicycles distributed at 'pods' throughout a city, usually restricted to the inner core. Public bicycle systems are commonly initiated by city councils with the combined aim of reducing traffic congestion, improving the environment and increasing transport choice. Most are financed through an agreement with advertising companies, whereby the agency gains advertising contracts in the city in exchange for running the public bicycle scheme.

The Paris *Velib* is the world's largest public bicycle scheme and was launched in 2007. It is a useful example to describe, as it shares many of the typical characteristics of other public bicycle programs. The 20,000 bicycles are stored at 'pods' and this is where they are picked up and returned. There are over 1450 different 'pods' (as identified Figures 4.14 and 4.15 below).

Paris Velib public bicycle scheme

Paris *Velib* public bicycle scheme

Once registered, individuals are able to remove bicycles from their station and use them for free in the first 30 minutes, with a fee charged for longer durations. Bicycles can be returned to any of the pods throughout the city.

Brisbane announced recently that it has awarded the contract to run a public bicycle system in the Queensland capital to JC Decaux (the French operator that runs the Paris *Velib* system).

Other cities that operate public bicycle schemes include:

- Copenhagen;
- Barcelona;
- Brussels;
- Lyon;
- Stockholm;
- Frankfurt;
- Cologne;
- Stuttgart;
- Munich;
- Oslo;
- Seville;
- Vienna; and
- Washington, D.C.

Many cities run their public bicycle programs as an extension of the public transport system

Many of the above cities run their fleet of public bicycles as an extension of the public transport system. In Germany for instance, the railway service offers Call-A-Bike in Berlin, Frankfurt, Cologne, Munich, Stuttgart or Karlsruhe. The system works as a public bicycle hire service and can act as a flexible adjunct to the public transport system. Members of the public can register on line or by phone and a small amount is deducted from the user's account each time they use a bicycle. Holders of a rail pass are charged at a lower rate.

Bicycle friendly train stations

Integrating bicycle friendly design into the layout of train stations is an effective way of encouraging passengers to make the journey between home and station by pedal power

Integrating bicycle friendly design into the layout of train stations is an effective way of encouraging passengers to make the journey between home and station by pedal power. In fact, when combined with a high level of bicycle route accessibility to the station, a significant proportion of passengers can be expected to choose cycling as their preferred mode. Possible facilities include:

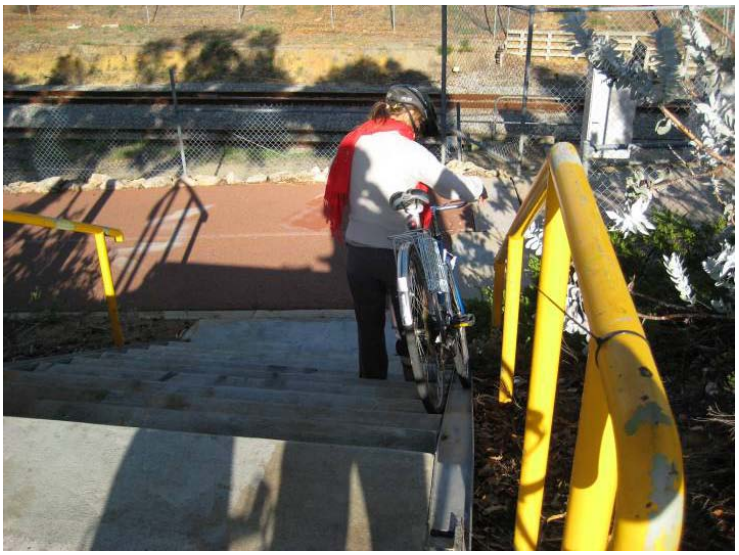
- Stair channels;
- Bike-accessible lifts; and
- Bike-accessible fare gates.

It is essential that movement between different levels of a station is as easy as possible. Lifts and ramps are the preferred method of moving between different levels by bike. When considering the movement of people with bicycles between different levels, it is important to

remember that some bikes are particularly heavy and not all riders are physically capable of lifting a bike up stairs. Some riders, especially those carrying a heavy load will be unable to transport their bike up stairs, even where a wheel ramp is provided (see image below). Many riders will not be sufficiently confident to take a bike on escalators. It is therefore important to provide a lift or ramp and ensure it is signposted clearly from appropriate location in and around the station.

When more bicycle friendly alternatives are not possible, stairs with a purpose built gutter enabling the bicycle to be wheeled rather than carried increases convenience, as shown below.

Stairs containing a purpose-built gutter



Signage

Street signage can also be used effectively to identify bicycle routes and key destinations. The picture below is an example of the signage system used in Portland, Oregon to assist cyclists select the most favourable route. In addition to displaying the direction and distance of key destinations, it also identifies the duration of a bicycle journey to each destination. This is useful for cyclists, but perhaps most importantly, can act as an awareness raiser for passing motorists who may be surprised at the time efficiency of local cycling journeys.

Bicycle journey information through signage in Portland, Oregon

Perth is the national leader in bicycle/public transport integration and have developed a signage system along their shared path network. This assists cyclists choose an efficient route both to train stations and other destinations.

Signage to assist in route selection in Perth

Information on combining cycling with public transport should be fully integrated into:

- Any signage at stations and surrounding precinct;
- Time table information;
- Public transport website; and
- Local maps and street directories.

Marketing and promoting

There is clear evidence that marketing and promotion of bicycle access to stations is a vital component in travel and parking demand management (BFM, 2004). The Western Australian Public Transport Authority have reduced car travel to stations in part through a marketing campaign encouraging cycling to stations, as illustrated in the two pictures below.

Marketing the benefits of sustainable transport is an effective method of reducing unnecessary car use

Marketing the combination of cycling and public transport, Public Transport Authority, WA

Source: Public Transport Authority, WA

Source: Public Transport Authority, WA

Marketing the benefits of sustainable transport is an effective method of reducing unnecessary car use. Programs such as Travel Smart have reduced car use by approximately 10 – 15% and have proved cost effective (Litman, 2008c; Meiklejohn, 2005).

In London, the benefits of using the bicycle for short journeys is advertised on the rear of buses.

Promoting cycling on the back of London Buses

Conclusions

Australia, particularly since the 1950s has developed away from the public transport system and this has increased our car dependence, leading to vulnerability in terms of climate change, congestion, oil prices, obesity and urban liveability.

The Inquiry has offered an important opportunity to outline the need for closer integration of public and bicycle transport. The enhancement of this integration will assist in reducing each of the above vulnerabilities.

The integration of cycling with public transport is a smart solution, helping to solve several challenges of national importance simultaneously; in the portfolios of climate change, health, congestion, fuel expenditure and liveability

In order to facilitate the integration of the cycle and public transport network, this submission recommends:

- A national strategic approach to funding integrated public and active transport
- Funding action plans to connect public transport hubs with the surrounding community through a comprehensive network of cycle ways and shared paths and marketing support to inform the public of the range of options.
- Providing a range of key infrastructure enhancements that would significantly increase the transport options for trips by active modes. These include:

    - bicycle racks on buses
    - rail rolling stock designed to carry bicycles with passengers
    - high quality bicycle parking at train stations and other transport hubs
    - signage and marketing support

There is an urgent need to implement these recommendations. The Commonwealth can play a unique role by providing national leadership, strategic direction and funding.

The integration of cycling with public transport is a smart solution, helping to solve several challenges of national importance simultaneously, in the portfolios of climate change, health, congestion, fuel expenditure and liveability.

Appendices

Appendix One: Bicycle infrastructure design

In order to maximise the safety and attractiveness of cycling to public transport nodes, it is important that each station is seamlessly connected to the surrounding bicycle routes. The image below is a good demonstration of Perth's success at linking up bicycle routes with their suburban stations. The bicycle path continues through the car park to the station's entrance.

Bicycle paths linking to train station in Perth

Bicycle routes linking to train stations in Perth

In many instances, it will be necessary to provide on road bicycle lanes connecting public transport hubs with the surrounding streets. Painted bicycles lanes offer increased perceived and real safety and an example is offered below:

Painted on road lanes to increase safety in Copenhagen

Copenhagen style bicycle lanes typically involve running wide bicycle lanes between the footpath and a row of parked cars, thereby providing a barrier between moving cars and bicycles. Melbourne has recently installed a Copenhagen style lane as illustrated over the page:

Copenhagen style bicycle lanes in Melbourne

It is important to provide a sufficient 'buffer' between parked cars and the cycle lane, to ensure opened car doors do not interfere with the safe passage of bicycles.

In situations where space does not permit the design illustrated above, it may be possible to install the lane on one side of the road only, designed for two-way bicycle traffic, as depicted below, proposed by the City of Sydney for the CBD:

Lanes on same side of the road as proposed by City of Sydney

Photo: City of Sydney

Appendix Two: Carrying of bicycles on public transport vehicles

The following three images provide a demonstration of the bike carriage that has been provided for the Caltrain service in California, due to demand from passengers (Caltrain, 2008).

The bike car runs as the last carriage on each service and accommodates 32 bicycles. Bicycles travel free of charge and do not require booking. The service runs between San Francisco and San Jose. The images below offer an example of best practice and could be appropriate for many services that connect capital cities with regional centres.

Bicycle provisions on trains, California

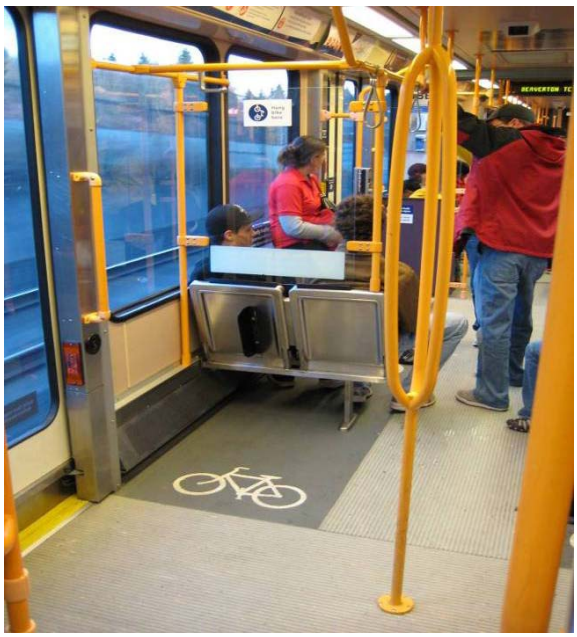
Bicycle provisions on trains, California

Bicycle provisions on trains, California

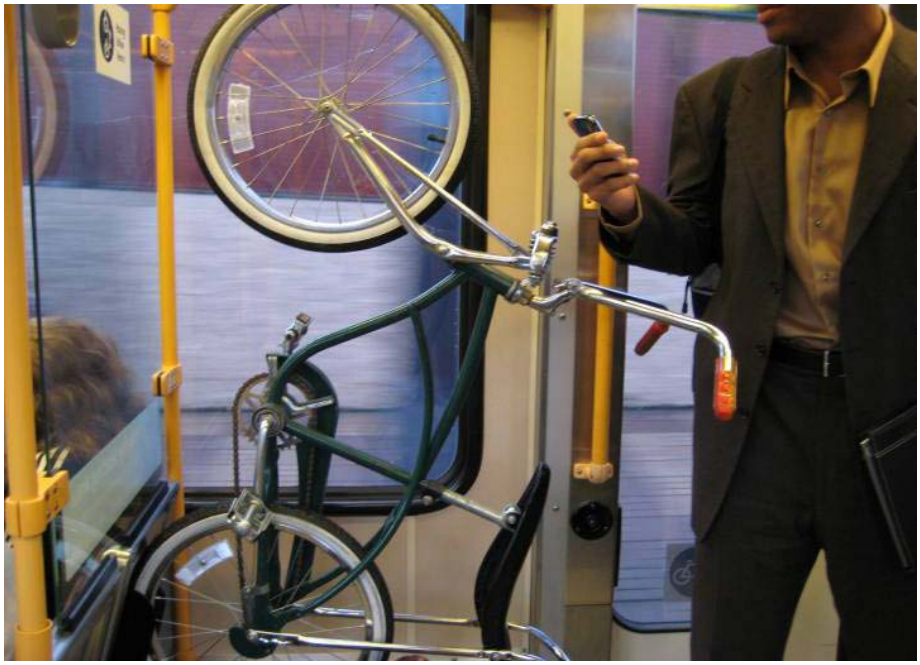
The above three images provide an excellent example of what is possible in the inside of trains, particularly for those that operate in regional Australia. For a purely urban context, the following four images, from Portland, Oregon offer an appropriate balance between the needs of general ridership, as well as those with bicycles.

Bicycle provision on light rail, Portland, Oregon

Bicycle provision on light rail, Portland, Oregon



Clever design of bicycle storage on light rail in Portland, Oregon



The purpose built bicycle storage areas are located in four positions, each close to the doors for easy entry and exit.

It is recommended that in order to achieve balance between accommodating people with bicycles and the needs of other passengers, a system similar to the Portland model be adopted.

Appendix 3: Bicycle parking at train stations

In the past, high security bicycle parking in Australia has used an individual locker style. A photo of a typical bicycle locker is shown below.

Typical bicycle lockers at Sydney train stations

Source: Bicycle New South Wales

The general procedure currently in place in NSW is to contact Bicycle NSW (or the public transport operator in other States) and register. In NSW, those wishing to register for a locker are required to pay $50 per quarter, or $180 per annum, plus a $50 refundable security deposit. Lockers are no longer considered an effective method of providing high security bicycle parking at train stations. There limitations are listed as follows when compared to the cage style system:

- Occupancy is poor (42%);
- Space and capital intensive;
- Can only be signed out to one person at a time, even if seldom used; and
- Difficult to determine the contents of a locker (possible security risk).

The picture below shows one of many *BikeLink* facilities in the San Francisco Bay Area. Unlike the parking facilities above, this one is electronically controlled and allows for more flexibility and security. Cyclists can come and go as they please, the operation of the facility is by the cyclist and their membership card. Using a machine similar to a parking ticket machine for cars, a cyclist inserts their membership card to open a locker which becomes

their key when they return to the locker. The main advantages of this system are the cost, just a few cents per hour, the secure parking and the use as both a long term and short term parking facility.

BikeLink facilities, San Francisco

Source: http://www.bikelink.org

When high quality bicycle parking is combined with excellent cycle access to the station, the evidence suggests significant numbers of train passengers will elect to ride to the station. As previously mentioned, in the Netherlands, over one third of train travellers arrive at the station by bicycle (Cycle Council of the Netherlands, 2007), as the three levels of bicycle parking outside Central Station in Amsterdam suggests.

Amsterdam Bicycle Parking

It is however important to mention that high quality bicycle parking is by no means restricted to northern European countries. The following images from North America offer examples the many innovative measures authorities in the United States have taken to encourage the integration of cycling with public transport with bicycle parking.

Enclosed bicycle parking in the San Francisco Bay Area

Combining bicycle stores with transport hubs in San Francisco

The above picture offer an example of the creative combination of a bicycle store outside one of San Francisco's busiest train stations. In an agreement between the transport agencies and the store operator, free bicycle parking for train users is included in the service agreement.

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