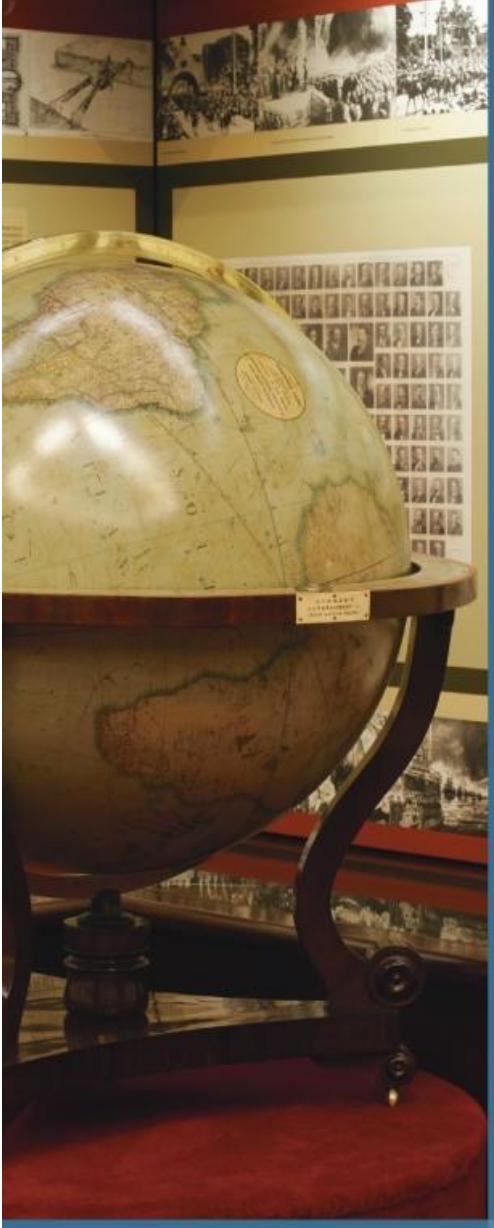

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Cycling and Transport Policy in NSW

Briefing Paper No 8/2010

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Cycling and Transport Policy in NSW

by

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ACRONYMS

ABC – Australian Bicycle Council

ALGA – Australian Local Government Association

ATC – Australian Transport Council

COAG – Council of Australian Governments

DECCW – Department of Environment, Climate Change and Water (NSW)

DIPNR – Department of Infrastructure, Planning and Natural Resources (NSW)

DOTARS – Department of Transport and Regional Services (Cth)

GHG – Greenhouse Gas

LGA – Local Government Authority

RTA – Road and Transport Authority (NSW)

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SUMMARY

This briefing paper presents an overview of the contemporary debate on cycling. It summarises the transport issues facing NSW, presents an account of the state of cycling in NSW and in Sydney in particular, and compares cycling in Sydney with the other Australian capital cities and with selected international cities.

Cycling in transport policy: overview

Over the last ten years, several policies at all three levels of government have shaped cycling in NSW. The Australian National Cycling Strategy 2005-2010 was released by the Commonwealth Government in 2005 and is now due for review. NSW released its new bike plan in May 2010: the New South Wales BikePlan. The City of Sydney is one of the most pro-active councils in respect to cycling, and has a comprehensive bike plan: Cycle Strategy and Action Plan 2007-2017. Other relevant transport policies include: the Metropolitan Transport Plan: Connecting the City of Cities (NSW); the NSW State Plan; and Sustainable Sydney 2030 (City of Sydney). **[2.0]**

Transport issues facing NSW

Transport issues faced by Sydney include: congestion; greenhouse gas emissions; air quality; energy consumption; and travel times. The State of the Environment 2009 found all transport indicators to be in poor or moderate condition. Many of the economic, social and environmental costs of these transport issues are projected to increase in the coming years. This raises the question – to what extent can cycling contribute to addressing transport issues in NSW? **[3.0]**

The costs and benefits of cycling

Research on the costs and benefits of cycling has increased markedly in recent years. This research has identified transport, environmental, economic, social and health benefits that may arise from increased levels of cycling. Cost-benefit analyses have also been conducted on cycling infrastructure projects around the world. Cost-benefit ratios for these projects range from 1.5:1 to 20:1. **[4.1]**

The factors that influence cycling uptake

Rates of cycling are affected by many factors. These include: cycling skills; topography; climate; distance; social norms; bike infrastructure; safety; land use mix; and accessibility and affordability of other forms of transport. Policy therefore needs to address multiple factors in order to increase cycling adoption. **[4.2]**

NSW and Sydney cycling statistics

More bikes than cars were sold per year in Australia between 2001 and 2008. Although 42% of Sydney households owned at least 1 bicycle in 2005, only 0.7% of people cycled to work. Despite an increase of 0.6% in the number of

trips to work undertaken by bike between 2001 and 2009, the overall share of cycling for all trips to work has remained roughly constant. The number of trips to work by bike varies considerably between local government areas. 2.47% of Marrickville LGA residents cycle to work, whereas only 0.38% of Canterbury LGA residents cycle to work. Of all trips by bike, recreation is the most frequent purpose, and the number of recreational events has increased in recent years. Cycling fatalities and injuries have remained relatively constant between 2000 and 2008. **[5.0]**

Cycling in NSW: the administrative framework

Each level of government has a role in developing and maintaining cycling infrastructure and policy. In concert with State and Local Governments, the Commonwealth sets transport objectives, sets infrastructure objectives, and provides funding. The NSW BikePlan guides NSW Government investment in cycling infrastructure. The BikePlan allocates lead responsibility to seven administrative bodies, whilst several other bodies are more peripherally involved. A ten year vision has been set: to establish a Metro Sydney Bike Network that links major centres and creates a strategic cycle network in inner Sydney; and invest in cycleways in regional NSW and cities like Newcastle and Wollongong. Together with the NSW Government, local councils have a leading role in the provision of cycling infrastructure in NSW. Each local council makes its own policy and investment decisions regarding cycling infrastructure. **[6.1, 6.2 and 6.3]**

Comparing Sydney with other Australian capital cities

In 2006, of all Australian capital cities, Sydney had the lowest percentage of trips to work by bike and the lowest percentage of the population who were regular cyclists. Aside from Darwin, Sydney also had the lowest annual growth in the number of people cycling to work. A more detailed comparison with Melbourne reveals that Melbourne has: twice the amount of journey-to-work cycling; three times the rate of growth in cycling; proportionally more cycling for commuting purposes; better cycling advocacy; and spends roughly three times more per capita on cycling. These differences can be partially explained by Melbourne's more suitable topography and climate. **[7.0]**

Comparing Sydney with selected international cities

Commuter cycling is much higher in some European countries than in Australia: for example, an average of 27%, 19% and 10% respectively of commuters in Holland, Denmark and Germany cycle to work. In contrast, only 0.7% of commuters in Sydney cycle to work. Much of this can be explained by significant differences in expenditure on cycling, cycle-friendly policies and infrastructure, and higher government commitment to cycling. Sydney has lower levels of cycling than San Francisco, arguably a city of comparable topography. With roughly double the amount of investment per capita, San Francisco has demonstrated that cycling levels can be increased with an appropriate mix of investment, government commitment and policy options. **[8.0]**

...

Policy recommendations and case study findings

Many policy recommendations are found in the relevant literature and case studies. These recommendations can be grouped into several categories, including: cycle-specific planning; bike schemes; information, campaigns and events; safer road layout; restrictions on car use; education; and integration with public transport. **[9.0]**

1.0 INTRODUCTION

The place of cycling in NSW transport policy has been the subject of significant debate in recent months, in the media and in Parliament. New initiatives have been introduced at the State Government and Local Government level. In part, the increased media attention is the result of controversies arising from infrastructure works being undertaken by the City of Sydney.[1] Another aspect to the debate is the recent suggestion that bicycle helmet laws should be repealed to increase the uptake of cycling.[2]

The debate about cycling is of course part of a broader discussion of transport policies in NSW. Transport issues in Sydney and NSW include: congestion; sustainability; access; cost; and provision. One possible response to these challenges is 'active transport', which refers to walking and cycling. As a policy option, cycling is increasingly on the agenda[3] because of its transport, health, environmental, social and economic benefits.

This paper focuses on cycling in NSW, primarily as a transport option for commuting. A broad picture of cycling and transport policy at Commonwealth, NSW and Local Government levels is first provided. Next, cycling as a transport option is contextualised by: consideration of the transport issues facing NSW and Sydney; a summary of cycling's costs and benefits; and identification of factors that influence uptake of cycling as a transport option. After presenting some key cycling statistics, the remainder of the paper investigates the administrative framework for cycling at Commonwealth, State and Local Government levels, and compares cycling in Sydney with all other Australian capital cities and several selected international cities. The paper concludes by reviewing the policy recommendations identified in the literature on cycling in Australia and internationally. International evidence suggests that cycling may be a viable transport option for Sydney. However, several questions remain to be answered, including what areas of transport and land-use planning and policy need to be altered in order to increase the uptake of cycling as a policy option in Sydney.

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1 See for e.g. Sunday Telegraph, July 18 2010. *Cycle lane anger*.

2 SMH, 16 August 2010. Call to repeal law on bicycle helmets.

3 See for e.g. Australian Senate, Rural and Regional Affairs and Transport References Committee, August 2009. *Investment of Commonwealth and State funds in public passenger transport infrastructure and services*.

2.0 CYCLING IN TRANSPORT POLICY: OVERVIEW

Policies at Commonwealth, NSW and Local Government levels have shaped cycling in NSW. Figure 1 identifies the policies and plans specifically concerned with cycling.

The Australian Bicycle Council coordinates the implementation of the Australian National Cycling Strategy 2005-2010 (see Figure 1). This Strategy follows the 1999 strategy Australia Cycling: The National Strategy 1999-2004. Rather than set the specifics of cycling policy or prescribe funding allocation, each strategy sought to coordinate approaches to cycling across Australia. The strategies therefore focused on identifying the benefits of cycling and setting objectives and priorities. The most significant difference between the two strategies is the absence of goals in the most recent strategy.

Action for Bikes: BikePlan 2010 is a ten-year plan that was released by the RTA in 1999 (see Figure 1). This plan had four aims: establish a series of bicycle networks across NSW; improve safety; improve personal and environmental health; and make cycling a viable transport alternative. Cycling infrastructure development and inclusion of cycling in transport planning has been assisted by guidelines such as the NSW Bicycle Guidelines and Planning Guidelines for Walking and Cycling. Action for Bikes: BikePlan 2010 was succeeded by the NSW BikePlan on 16 May 2010 (see further section 6.2).[4]

In 2007, the City of Sydney released the Cycle Strategy and Action Plan 2007-2017 (see Figure 1). This Plan seeks to achieve an interconnected system of sustainable neighbourhoods connected by sustainable transport (see Box 1). It has six aims, some of which take the form of specific cycling rate targets (see Figure 1). Six action plans are included as a means of achieving these targets. The City of Sydney situates the Plan within the framework established by the Commonwealth and NSW Governments. Achieving its six aims is intended to meet Commonwealth and State Government objectives, and will be directed by the NSW Bicycle Guidelines and the Planning Guidelines for Walking and Cycling (see also section 6.3)

Box 1: Cycling Strategy and Action Plan 2007-2017 Vision (City of Sydney)

Sydney will be a bicycle-friendly environment where people of all ages can use bicycles for enjoyment and as an equal transport choice.

The City and its villages will be interconnected by a high quality cycling network that cyclists from children to the elderly feel safe and comfortable on.

Our community will recognise the important role of cycling in improving the quality of City life and community health; better environmental sustainability and reduced traffic pollution.

Cycling and walking will be the natural first choices for medium and short trips and local activities in our City villages.

[4] NSW Government, 16 May 2010, *Historic investment in NSW biking*. The NSW BikePlan will be described in more detail in Section 5.2.

Figure 1: Cycling-specific transport policies and plans in NSW

Commonwealth Government

Australia Cycling: The National Strategy 1999-2004 (Austroads, 1999)

Vision: Increased cycling for transport and recreation to enhance the well-being of all Australians

Goal: Double bicycle use by the year 2004

Objectives: (1) coordinated and collaborative implementation of the strategy (2) integration of cycling into policy and planning (3) facilities exist that support increased cycling (4) safety for cyclists is continuously improved (5) the benefits of cycling are recognised by decision makers and the community (6) cycling incorporated into education, training and professional development

The Australian National Cycling Strategy 2005-2010 (Austroads, 2005)

Vision: More cycling, to enhance the well-being of all Australians

6 priorities: (1) improving coordination of activities relevant to increased cycling in the appropriate portfolios of Australian, State, Territory and Local governments (2) including cycling as an essential component in integrated transport and land use planning in all spheres of government(3) creating infrastructure and facilities that support increased cycling (4) enabling and encouraging safe cycling (5) providing leadership and developing partnerships to support and promote cycling in Australia(6) developing the skills needed to undertake actions that will increase cycling

NSW Government

Action for Bikes: BikePlan 2010 (RTA, 1999)

$251 million to be invested over 10 years to create an average of 200km of cycleways per year

4 point action plan: (1) improve the bike network (2) make it safer to cycle (3) improve personal and environmental health (4) raise community awareness

NSW Bicycle Guidelines (RTA, 2003)

Best practice bicycle infrastructure planning to achieve the four point action plan set out in Action for Bikes: BikePlan 2010

Planning Guidelines for Walking and Cycling (DIPNR, 2004)

Designed to assist land-use planners improve consideration of walking and cycling in their work

New South Wales BikePlan (RTA and DECCW, 2010)

Targets: (1) Increase the share of short trips by bike in Greater Sydney for all travel purposes to 5% by 2016 (2) Double the use of cycling to get to work, across all of NSW, between 2006 and 2016

Bicycle infrastructure plan: (1) $80 million over 10 years to connect Sydney's district centres by building missing links in the Metro Sydney Bike Network (2) $78 million over 10 years to fast-track subregional bike networks for Parramatta, Liverpool and Penrith to grow cycling in these three River Cities (3) At least $5 million every year for regional cities and local councils across NSW to complete neighbourhood cycleway networks

Local Government

Cycle Strategy and Action Plan 2007-2017 (City of Sydney, 2007)

6 Aims: (1) Increase the number of trips by residents by bicycle from 2% in 2004 to 5% in 2011, and to 10% by 2016 (2) Increase the number of bicycle trips between 2 and 20 km made in the City of Sydney, as a percentage of total trips to 20% by 2016 (3) Create and maintain a cycling friendly environment in Sydney and improve the safety of cycling (4) Develop a culture of cycling as a normal transport choice, equal with walking and public transport and preferred to private travel (5) Increase the proportion of Sydney cyclists who feel comfortable and confident when they are cycling in the City and ensure that it is 80% or higher by 2016 (6) Reduce the number of collisions and injuries involving bicycles and achieve a reduction in the number of reported incidents

6 Action Plans: (1) Cycling City Action Plan (2) Cycling Equity Action Plan (3) Cycling Safety Action Plan (4) Cycling Promotion Action Plan (5) Cycling Trip Facilities Action Plan (6) Cycling Infrastructure Action Plan

Inclusion of cycling as a transport option in national transport policy has gradually receded within the past ten years. The National Charter of Integrated Land Use and Transport Planning (see Figure 2) was a high level agreement between the Commonwealth, State and Territory Transport and Planning Ministers agreed to in 2003. Its objective was greater integration of land use planning and transport across agencies, jurisdictions and levels of government to facilitate effective and sustainable urban and regional development across Australia. This is the only national policy within which cycling has formed a specific component of the relevant objectives of the policy. The subsequent AusLink White Paper (see Figure 2) released in 2004 made brief mention of cycling and active transport, but focused primarily on road and rail infrastructure. AusLink was subsequently renamed the Nation Building Program by the Commonwealth Government. However, the Nation Building Program gives minimum space to cycling.[5] The most recent national transport policy – the National Transport Policy Framework: A New Beginning (2008) – makes no mention of cycling (see Figure 2). This is despite the fact that cycling as a transport option would satisfy several of the priority areas identified in this framework. A final version of a national transport policy is yet to be released.

Several NSW planning and transport policies are indirectly related to cycling in NSW: Action for Transport 2010: An integrated transport plan for Sydney[6]; City of Cities; the Urban Transport Statement[7]; the State Infrastructure Strategy 2008-09 – 2017-18; Towards Sydney 2036; the Metropolitan Transport Plan: Connecting the City of Cities; and the NSW State Plan (see Figure 2). Action for Transport 2010 aimed to create a cycleway network in Sydney through the Bike Plan 2010 (see Figure 1). Subsequent policies have also included cycling as a transport option and these are considered in greater depth in section 6.2.

The first nationwide local government transport strategy was launched at the National Local Roads & Transport Congress in July 2006.[8] The Local Government Roads and Transport Strategy 2006-2016 has five core components, none of which refer to cycling as a transport option (see Figure 2). In 2010, the Australian Local Government Association released The National Local Roads and Transport Policy Agenda 2010-20. This Agenda included cycling with the aim of reducing car dependency and encouraging adoption of active transport. Inclusion of cycling in the transport policy of particular local governments, such as Sustainable Sydney 2030, is covered in more depth in section 6.3.

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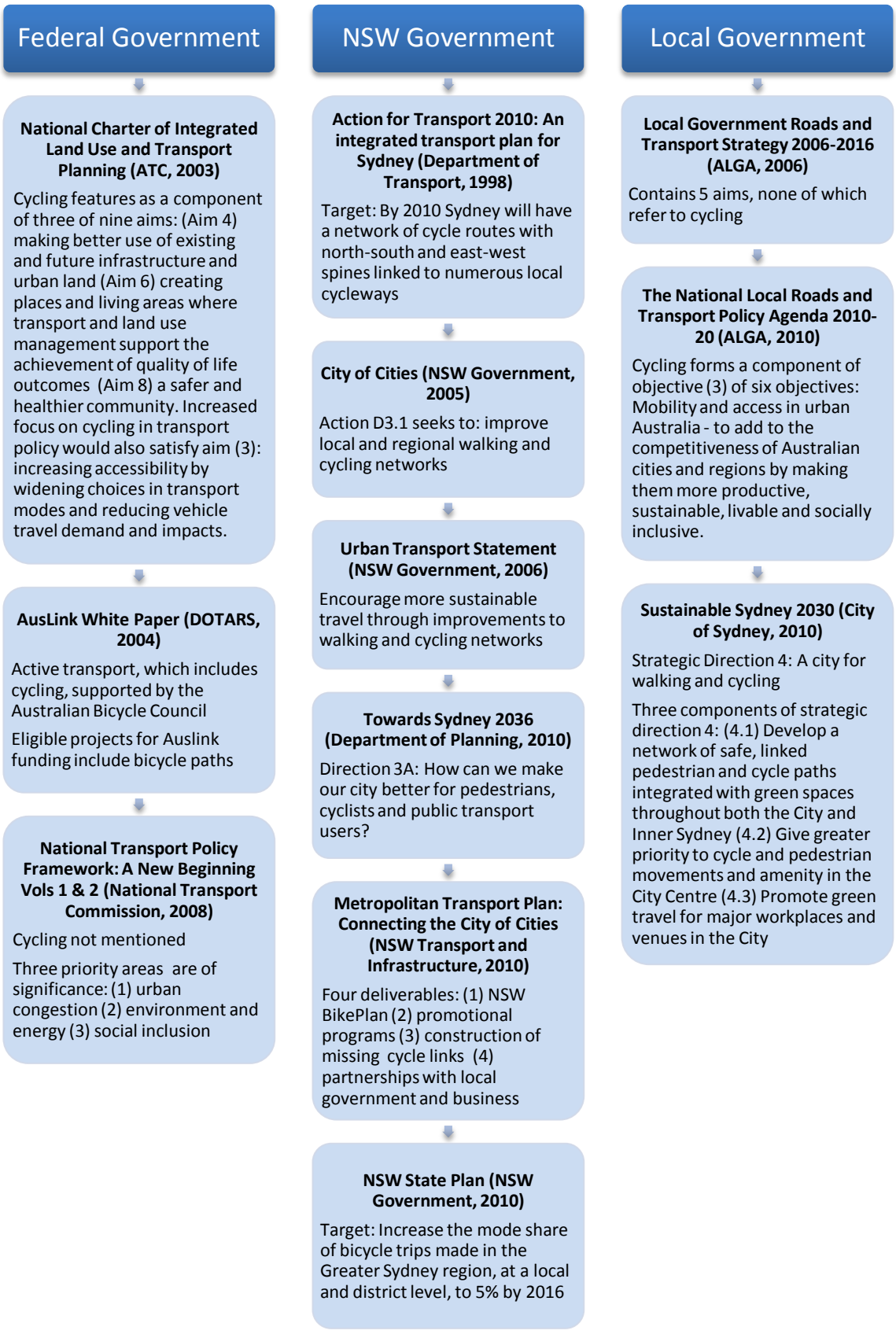
5 See for example: Department of Infrastructure, Transport, Regional Development and Local Government, 2010. *Investing in Australia's Future: Building our transport and community infrastructure*.

6 Department of Transport, 1998. *Action for Transport 2010: An integrated transport plan for Sydney*.

7 NSW Government, 2006. *Urban Transport Statement*.

8 Australian Local Government Association, 2010. *National Local Roads and Transport Congress 2006*, accessed 8/7/2010.

Figure 2: Other transport policies and plans relevant to cycling in NSW



3.0 TRANSPORT ISSUES FACING NSW

Cities globally face numerous challenges, such as growing populations, levels of consumption and the environmental impacts of urbanisation. Transport systems are shaped by these challenges, and create their own problems. Box 2 summarises the transport issues facing NSW. In a recent Transport Opinion Survey, 9% of NSW respondents nominated infrastructure as one of the two highest priorities facing Australia, and 11% nominated transport. NSW residents were also amongst the least positive respondents when it came to the state of transport today, and amongst the least optimistic about the state of transport in a year's time.[9] The significance of transport issues for NSW is also supported by the recent State of the Environment report (2009). All transport indicators in the report were in poor or moderate condition, and the transport energy consumption indicator was deteriorating (see Table 1). The remainder of this section briefly reviews some key NSW transport issues.

Box 2: Transport issues in NSW

- Car dependency
- Congestion
- Greenhouse gas emissions
- Air quality
- Vulnerability to changing oil prices
- Energy consumption
- Travel times
- Mode of transport
- Number of travellers per mode
- Transport technology
- Fuel efficiency
- Availability and quality of public transport
- Pedestrian and cycling facilities
- Access to transport

Table 1: State of the Environment 2009 – NSW Transport Indicators[10]

Indicator	Status	Trend	Information Availability
Public transport use (overall and trips)	Moderate status	Improving	✓✓✓
Vehicle kilometres travelled (total and per person)	Poor condition	Recovering	✓✓
Mode of transport to work (Sydney only)	Moderate status	Improving	✓✓✓
Energy consumption per transport output	Moderate status	No change	✓
Transport energy consumption (total)	Poor condition	Deteriorating	✓

Car dependency is growing faster than population growth in Australia, something which needs to be addressed to mitigate problems like greenhouse gas emissions and congestion. Congestion cost Australia $AUD9.4 billion in 2005, and is projected to cost $AUD20.4 billion by 2020. Sydney has the worst congestion management of all Australian capital cities[11], despite ranking

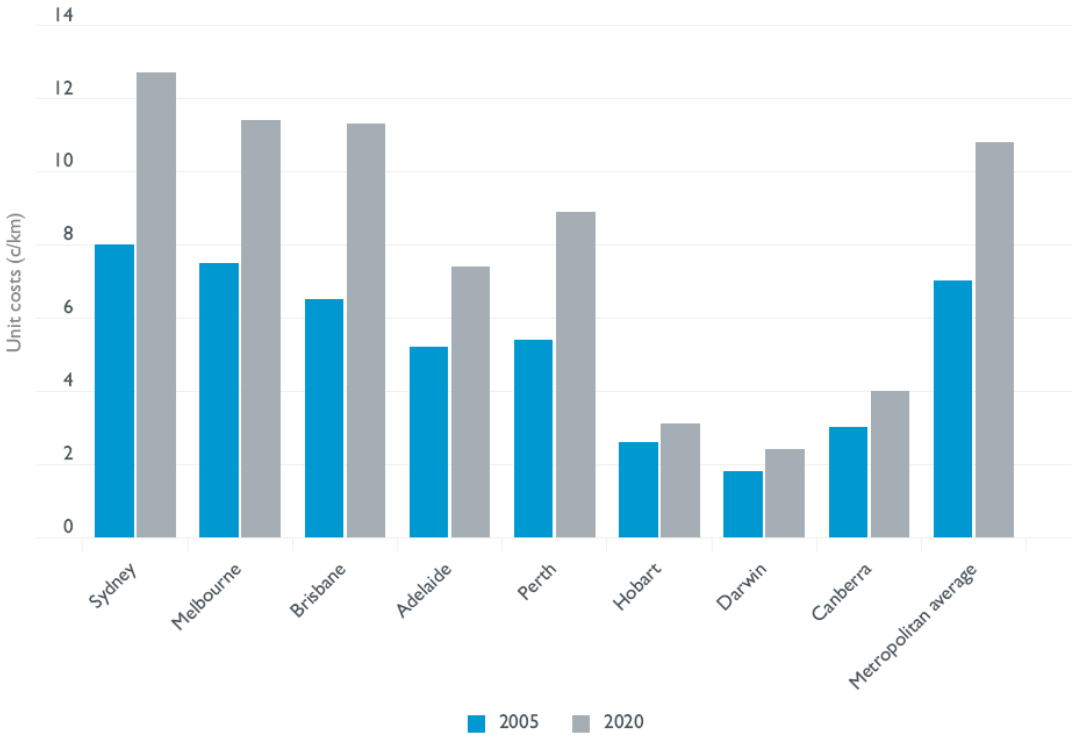
9 Institute of Transport and Logistics Studies, June 2010. *Transport Opinion Survey, Quarter 2, June 2010*.

10 Derived from: Department of Environment, Climate Change and Water, 2009. *New South Wales State of the Environment 2009*, p:89.

11 KPMG, June 2010. *Spotlight on Australia's Capital Cities: An independent assessment of city planning systems*.

favourably in comparison with international cities.[12] Sydney's congestion costs are forecast to worsen, not only in absolute terms (from 8c/km to almost 13c/km), but also in comparison to growth in congestion costs in other capital cities (see Figure 3).[13] Congestion has resulted in increased travel times over the past decade in Sydney, thereby negatively affecting quality of life.

Figure 3: Average unit costs of congestion for Australian capital cities[14]



Australia's urban transport system is structurally vulnerable to increasing oil prices.[15] Australia is expected to face a $AUD25 billion trade deficit in petroleum products by 2015.[16] This vulnerability is accentuated by increasing energy consumption in the transport sector. Transport was the second highest energy-consumer in 2008, accounting for 24% of all energy consumed.[17] The

12 PricewaterhouseCoopers, 2010. *Cities of opportunity*.

13 Infrastructure Australia, 2010. *State of Australian Cities 2010*. A report by the Centre for International Economics in 2005 calculated that Sydney's congestion would rise from $12.1 billion in 2005 to $16.6 billion by 2020 (Centre for International Economics, 2005. *Sydney's transport infrastructure: The real economics*). Another report projected a 68% increase in congestion cost per capita in Sydney from $862 in 2006 to $1448 in 2020 (KPMG, June 2010. *Spotlight on Australia's Capital Cities: An independent assessment of city planning systems*).

14 Infrastructure Australia, 2010. *State of Australian Cities 2010*, p54.

15 Infrastructure Australia, 2010. *State of Australian Cities 2010*.

16 Cycling Promotion Fund, June 2008. *Economic Benefits of Cycling for Australia*.

diminishing supply and increasing cost of energy required by transport is arguably one of the most serious issues facing NSW Government transport policy.[18]

The most significant environmental issues connected with transport are greenhouse gas (GHG) emissions and air quality. Transport was responsible for 14.1% of Australia's total GHG emissions in 2008[19], and road transport was responsible for 87% of these emissions.[20] Road transport emissions equalled 74,252 gigagrams of CO_2-equivalent in 2007. This figure is projected to rise to 90,270 gigagrams of CO_2-equivalent by 2020, an increase of 21.6%.[21] Transport is also partially responsible for poor air quality in major Australian cities. Respiratory conditions and exposure to urban air pollution now account for 2.3% of all deaths in Australia.[22] Sydney ranks poorly on air quality indicators in comparison with other Australian cities.[23]

Addressing transport issues in NSW requires consideration of the costs and benefits of each transport mode, the potential for technological change, and recognition of the necessity of an integrated, multi-focal approach to transport policy. Studies that recommend adopting multi-focal transport policy advocate policies such as: increasing public transport; reducing the amount of travel; a shift to 'active transport' (i.e. walking and cycling); reducing car dependence; and addressing non-transport factors such as urban density.[24]

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17 Infrastructure Australia, 2010. *State of Australian Cities 2010*.

18 Bunker, R., 2008. A Plenitude, Plethora or Plague of Plans? State Strategic Plans, Metropolitan Strategies and Infrastructure Plans, *Built Environment*, 34(3):319-332.

19 Infrastructure Australia, 2010. *State of Australian Cities 2010*.

20 Australian Sustainable Built Environment Council, February 2010. *Cities for the Future: Baseline report and key issues*.

21 Bureau of Infrastructure, Transport and Regional Economics, 2009. *Greenhouse gas emissions from Australian transport: projections to 2020*, Working Paper 73.

22 Infrastructure Australia, 2010. *State of Australian Cities 2010*.

23 Australian Conservation Foundation, 2010. *Sustainable Cities Index: Ranking Australia's 20 largest cities in 2010*.

24 See for example: Glazebrook, G., February 2009. *Designing a Thirty Year Public Transport Plan for Sydney: Main Report*; Christie, R., February 2010. *Independent Public Inquiry: Long-Term Public Transport Plan for Sydney: Preliminary Report*; Stanley, J., Barrett, S., 2010. *Moving People: Solutions for a growing Australia*, Bus Industry Confederation, Australasian Railway Association, and the International Association of Public Transport; Australian Sustainable Built Environment Council, February 2010. *Cities for the Future: Baseline report and key issues*.

The key question that arises is not whether cycling can solve transport problems, but to what degree cycling can contribute to addressing transport issues in NSW? There is ongoing debate about the place of cycling in transport policy and the best methods for increasing cycling rates.

Arguments for increased investment in cycling include: 90% of all car trips are less than 5km, which is an ideal distance for cycling;[25] more roads may decrease congestion in the short term, but encourage car dependency and lead to more congestion in the long term; road building is the most expensive transport option;[26] cars bear the highest user and external transport mode costs;[27] and cycling has amongst the lowest figures for operating cost per kilometre, energy consumption and greenhouse gas emissions for any transport mode.[28]

Arguments against increased investment in cycling include: the cost-effectiveness of cycling and the difficulty in assessing demand;[29] the 7:1 ratio of walking to cycling in Sydney – Australian cities with the highest walking rates have the lowest cycling rates; and, the increase in cycling may not come at the expense of car driving but of walking and public transport.[30] Section 4.0 reviews the costs and benefits of cycling, and the factors that influence cycling uptake as a transport option.

25 Cycling Promotion Fund, June 2008. *Economic Benefits of Cycling for Australia*.

26 Australian Conservation Foundation, 2010. *Sustainable Cities Index: Ranking Australia's 20 largest cities in 2010*.

27 Glazebrook, G., 2009. Taking the Con Out of Convenience: The True Cost of Transport Modes in Sydney, *Urban Policy and Research*, 27(1):5-24.

28 Lenzen, M., 1999. Total requirements of energy and greenhouse gases for Australian transport, *Transportation Research Part D*, 4:265-290.

29 AECOM, April 2010. *Inner Sydney Regional Bicycle Network: Demand Assessment and Economic Appraisal, prepared for City of Sydney*.

30 Mees, P., O'Connell, G., Stone, J., 2008. Travel to Work in Australian Capital Cities, 1976-2006. *Urban Policy and Research*, 26(3):363-378. That cycling comes at the expense of walking and public transport is not necessarily the case. The research paper makes the assumption without any analysis. The three modes of transport (cycling, walking and public transport) are significantly different in terms of time and infrastructure requirements, and are therefore not necessarily interchangeable.

4.0 CYCLING: COSTS, BENEFITS, AND THE FACTORS THAT INFLUENCE CYCLING UPTAKE

Research on the costs and benefits of cycling, and the factors that influence the uptake of cycling by the public as a transport option, has proliferated in recent years. This is a result of the success of cycling as a transport option in many European cities (see section 8.0) and the pressure, arising from congestion and sustainability concerns, to resolve transport issues in major cities (see section 3.0). The costs, benefits and factors summarised in this section are those primarily related to the use of cycling as a transport option rather than a recreational option.

4.1 The costs and benefits of cycling

Identifiable benefits from increased levels of cycling for commuting can be categorised as follows: transport; environmental; social; economic; and health (see Table 2). Reduction in traffic congestion is one of the most frequently cited benefits. Other transport benefits include: reduced pressure on public transport systems; an extended catchment for public transport services; and the relative time-efficiency of cycling versus other forms of transport over short distances.[31] The transition from commuting by car to commuting by bike will reduce air, noise and water pollution and greenhouse gas emissions. It is estimated that every car trip which is replaced by a bike ride saves the community 60c/km due to reduced greenhouse gas emissions and reduced road maintenance costs.[32]

Table 2: Benefits from cycling as a means of commuting[33]

Transport	Environmental	Economic	Social	Health	Other
Can reduce pressure on strained public transport systems	Reduces greenhouse gas emissions	Employs people in retail, repair and service, information production, planning and tourism	Improved access and equity in urban mobility	Reduces prevalence of diseases that result from inactivity e.g. obesity	Increased cycling produces benefits for retail centres
Requires relatively inexpensive infrastructure	Reduces air pollution	Reduces roadway upkeep costs	Strengthens communities – builds social capital	Reduces traffic crash risk and safety costs	Increase in local property values
Time-efficient for short journeys	Reduces noise pollution	Cheap transport option	Improves quality of life	Improves productivity at work	Tourism opportunities
Reduces congestion	Reduces water pollution	Reduces parking costs	Improves liveability		

31 City of Sydney, 2007. *Cycle Strategy and Action Plan 2007-2017*.

32 Australian Bicycle Council, 2010. *Benefits of cycling*, accessed 9/7/2010.

33 Sources: See Appendix A.

There are several public and private economic benefits that can result from increased levels of cycling. Public benefits include reduced roadway upkeep costs, and the public benefits that accrue from the other types of benefits (e.g. health). For example, a 2008 Commonwealth Government funded report found cyclists saved the economy a total of $AUD144.3 million in 2006.[34] Of this total, $AUD63.9 million came from saved congestion costs, and $AUD72.1 million came from reduced health costs. Cycling is a cheap transport option and can also save commuters parking costs. Cycling is estimated to cost 1c/km, in comparison with 50c/km for a car.[35] It can also save a commuter who cycles 10km each way to work $AUD770/year.[36] In 2007, the bike industry in Australia was worth $AUD1 billion,[37] employing people in retail, repair and service, information production, planning and tourism.

There are social dimensions to the economic benefits derived from cycling: people in low socio-economic circumstances are the most vulnerable to changes in oil prices, and are more likely to be reliant upon cars due to poor public transport provision.[38] Cycling is therefore an important means by which equity in access to mobility can be achieved.[39] Cycling also has many health benefits. Diseases that result from inactivity include: coronary heart disease; stroke and cerebro-vascular events; high blood pressure; cholesterol; stress; anxiety and depression; obesity; type 2 diabetes; osteoporosis; and colon and breast cancer. The direct gross cost of physical inactivity in Australia in 2006/07 was $AUD1.49 billion,[40] and the national cost of obesity was $AUD21 billion in 2006.[41]

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34 Bauman, A., Rissel, C., Garrard, J., Ker, I., Speidel, R., Fishman, E., 2008. *Cycling: Getting Australia Moving: Barriers, facilitators and interventions to get more Australians physically active through cycling,* Cycling Promotion Fund, Melbourne.

35 Australian Bicycle Council, 2010. *Benefits of cycling*, accessed 9/7/2010.

36 City of Sydney, 2007. *Cycle Strategy and Action Plan 2007-2017*.

37 Cycling Promotion Fund, 2007. *Cycling – moving Australia forward: A discussion on the social, economic and environmental benefits of cycling*.

38 Dodson, J., Sipe, N., 2005. *Oil Vulnerability in the Australian City,* Urban Research Program, Griffith University.

39 Glover, L., 2009. *Bicycling Infrastructure in Australia: A Review of Current Policy Issues, Australian Centre for the Governance and Management of Urban Transport*.

40 Bauman, A., Rissel, C., Garrard, J., Ker, I., Speidel, R., Fishman, E., 2008. *Cycling: Getting Australia Moving: Barriers, facilitators and interventions to get more Australians physically active through cycling,* Cycling Promotion Fund, Melbourne.

41 Cycling Promotion Fund, 2007. *Cycling – moving Australia forward: A discussion on the social, economic and environmental benefits of cycling*. This report also made the point that the health benefits derived from cycling far outweigh the safety risks associated with cycling.

Quantifying the costs and benefits of investing in cycling infrastructure is limited by a lack of rigorous methodologies and the difficulty in estimating demand.[42] Despite these limitations, cost-benefit analyses from a number of studies are instructive concerning the potential benefits that could be derived from investing in cycling infrastructure (see Table 3). One of the most recent studies was conducted by AECOM for the City of Sydney. This report, which analysed the costs and benefits of the proposed Inner Sydney Regional Bicycle Network, found that an estimated net economic benefit of $AUD507 million would result from its construction at a benefit-cost ratio of 3.88:1. Were this Network to achieve the NSW State Plan target of cycling having 5% mode share by 2016, the Network would generate up to $AUD1.8 billion net economic benefit at a benefit-cost ratio of 11.08:1. The AECOM report quantified the following benefits in calculating the benefit-cost ratio: decongestion; vehicle operating costs savings; parking cost savings; travel time savings; journey ambiance; health benefits in the form of reduced mortality and absenteeism savings; accident costs; reduced air pollution; reduced noise pollution; greenhouse gas reduction; reduced water pollution; reduced urban separation; and reduced pressure on government infrastructure and services.[43] Figure 4 displays the relative economic benefits from each of these factors. According to this figure, the most valuable benefits are: decongestion; travel time savings; absenteeism and productivity benefits; and journey ambiance.

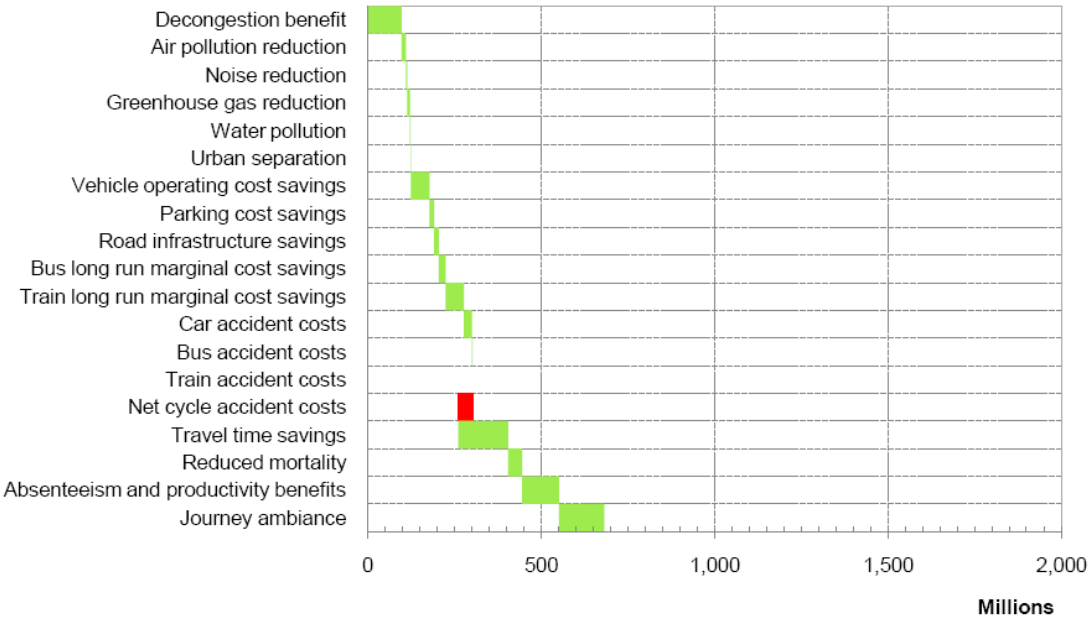
42 AECOM, April 2010. *Inner Sydney Regional Bicycle Network: Demand Assessment and Economic Appraisal, prepared for City of Sydney*.

43 AECOM, April 2010. *Inner Sydney Regional Bicycle Network: Demand Assessment and Economic Appraisal, prepared for City of Sydney*. Additional non-monetary benefits identified in the report include: improved journey time reliability; improved integration with public transport; public transport decrowding; improved equity and accessibility outcomes; potential for wider economic benefits beyond the transport sector; improved localised economic activity; and reduced energy dependence.

Table 3: Bike infrastructure project cost-benefit ratios[44]

Project name	Cost-benefit ratio
Fremantle Cycling Infrastructure[1]	1.5:1
Amsterdam Bicycle Network[1]	1.5:1
Delft Bicycle Network[1]	1.7:1
Sydney Metropolitan Strategic Cycle Network[3]	0.8:1 – 3.1:1
East Perth to Maylands Principal Shared Path[2]	3.3:1
Inner Sydney Regional Bicycle Network[4]	3.88:1
Norway Cycling Infrastructure[1]	5:1
TravelSmart South Perth[1]	13:1
India Bicycle Corridor (Delhi)[1]	20:1

Figure 4: Breakdown of benefits from cycling according to AECOM estimates[45]



44 Sources: (1) Australian Bicycle Council, 2010. *Benefits of cycling*, accessed 12/7/2010; (2) Bauman, A., Rissel, C., Garrard, J., Ker, I., Speidel, R., Fishman, E., 2008. *Cycling: Getting Australia Moving: Barriers, facilitators and interventions to get more Australians physically active through cycling,* Cycling Promotion Fund, Melbourne; (3) PricewaterhouseCoopers, April 2009. *Evaluation of the costs and benefits to the community of financial investment in cycling programs and projects in New South Wales: Final Report.* Roads and Traffic Authority of NSW and the Department of Environment and Climate Change; (4) AECOM, April 2010. *Inner Sydney Regional Bicycle Network: Demand Assessment and Economic Appraisal, prepared for City of Sydney*.

45 AECOM, April 2010. *Inner Sydney Regional Bicycle Network: Demand Assessment and Economic Appraisal, prepared for City of Sydney,* p:viii.

4.2 Factors that influence cycling uptake

There are several factors that affect the uptake of cycling as a transport option by the public. Most research advocates the adoption of multi-focal policy in order to improve cycling rates.[46] According to this research, cycling needs to be made much easier before it will significantly increase transport mode share, especially given different types of riders have different infrastructure requirements.[47] Policy therefore needs to address multiple factors in order to increase cycling adoption (see Box 3).[48] For example, safety is one of the most significant barriers to cycling adoption.[49] Paradoxically, it has been

Box 3: Factors that influence uptake of cycling as a transport option

- Health
- Confidence
- Knowledge of cycling routes
- Cycling skills
- Topography
- Time
- Distance
- Social norms
- End-of-trip facilities
- Bicycle infrastructure
- Road behaviour
- Speed
- Safety/risk
- Traffic level
- Traffic fumes
- Travel time
- Image of cyclists
- Level of understanding of the benefits of cycling
- Climate
- Employment density and activity intensity
- Existence and spacing of employment and service centres
- Local land use mix
- Neighbourhood design and street layout
- Local accessibility to transport options
- The quality and extent of public transport
- Affordability of housing across suburb locations
- Affordability of public transport fares
- Levels of car ownership
- Socio-economic status
- Cultural tradition
- Funding

46 See for example: Pucher, J., Buehler, R., 2008. Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany. *Transport Reviews*, 28(4): 495-528; Glover, L., 2009. *Bicycling Infrastructure in Australia: A review of current policy issues*. Australian Centre for the Governance and Management of Urban Transport.

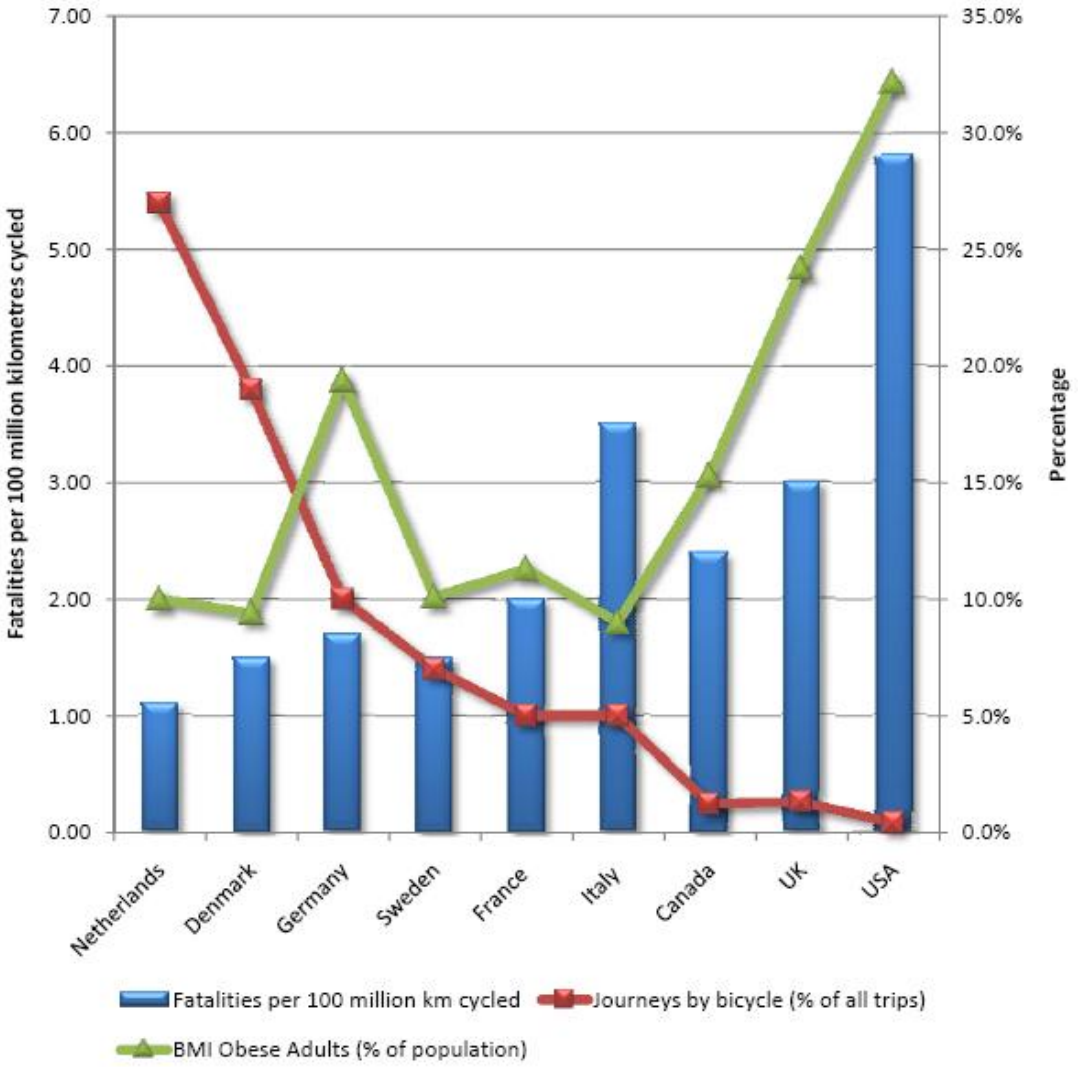
47 Rissel, C., Merom, D., Bauman, A., Garrard, J., Ming Wen, L., New, C., 2010. Current cycling, bicycle path use, and willingness to cycle more – findings from a community survey of cycling in southwest Sydney, Australia. *Journal of Physical Activity and Health*, 7(2): 267-272.

48 Box 3 sources: Rietveld, P., Daniel, V., 2004. Determinants of bicycle use: do municipal policies matter? *Transportation Research Part A*, 38:531-550; Turner, J., 2007. *Reversing the Cycle: An investigation into how Greenhouse Gas emissions can be reduced through the development of cycling in Sydney*. Honours Thesis, University of Sydney, School of Geosciences; Bauman, A., Rissel, C., Garrard, J., Ker, I., Speidel, R., Fishman, E., 2008. *Cycling: Getting Australia Moving: Barriers, facilitators and interventions to get more Australians physically active through cycling,* Cycling Promotion Fund, Melbourne; AMR Interactive, July 2009. *Research into Barriers to Cycling in NSW: Final Report*. Roads and Traffic Authority and Department of Climate Change and Environment; Australian Sustainable Built Environment Council, February 2010. *Cities for the Future: Baseline report and key issues*.

49 Safety issues are one of the main factors less women ride to work than men. Australia has one of the lowest percentages of women's share of bicycle journeys at 21%, in comparison with the USA (25%), UK (29%), Denmark (45%), Germany (49%) and the Netherlands (55%) (Bauman, A., Rissel, C., Garrard, J., Ker, I., Speidel, R., Fishman, E., 2008. *Cycling: Getting Australia Moving: Barriers, facilitators and interventions to get more Australians physically active through cycling,* Cycling Promotion Fund, Melbourne).

demonstrated that *increasing* the proportion and amount of cycling *reduces* the risk of road injuries and fatalities (see Figure 5). Much of this has been put down to 'safety in numbers', but other factors are also important, such as infrastructure and motorist awareness of cyclists.[50] Policy recommendations suggested in the research to address the factors listed in Box 3 are summarised in section 9.0.

Figure 5: Cycling fatalities decrease as daily travel distances increase[51]



50 Pucher, J., Buehler, R., 2008. Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany. *Transport Reviews*, 28(4): 495-528.

51 Infrastructure Australia, March 2009. *Cycling Infrastructure for Australian Cities*. Background Paper, p:12.

5.0 NSW AND SYDNEY CYCLING STATISTICS

More bicycles than cars were sold in Australia between 2001 and 2008. In 2008, 19% more bikes (1,203,648) were sold than cars (1,012,164).[52] In 2005, 42% of households in Sydney owned at least 1 bicycle, an increase of 4% since 2001. The same report found that the majority of cyclists in 2005 were under 30 years old, were students or unemployed, lived in a house, and lived in a family household with children. Cyclists were also less likely to have a drivers licence and more likely to earn $AUD78,000 or more per year.[53] With 83.1% of cyclists being male, cycling is the most male-dominated mode of transport after trips by truck and trips by motorbike/scooter.[54]

Table 4: Sydney trips by mode (average weekday)[55]

Mode	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
	'000 (%)							
Vehicle driver	7,686 (48.4)	7,939 (48.8)	8,106 (48.9)	8,114 (49.0)	7,952 (38.2)	7,992 (48.1)	8,080 (47.6)	8,015 (47.0)
Vehicle passenger	3,462 (20.8)	3,465 (21.3)	3,483 (21.0)	3,559 (21.5)	3,470 (21.0)	3,550 (21.4)	3,642 (21.4)	3,635 (21.3)
Total vehicle	11,148 (70.1)	11,405 (70.1)	11,589 (70.0)	11,674 (70.4)	11,422 (69.3)	11,542 (69.4)	11,722 (69.0)	11,650 (68.3)
Train	775 (4.9)	779 (4.8)	779 (4.7)	768 (4.6)	794 (4.8)	815 (4.9)	863 (5.1)	890 (5.2)
Public bus	558 (3.5)	561 (3.4)	555 (3.3)	562 (3.4)	582 (3.5)	579 (3.5)	592 (3.5)	598 (3.5)
Private bus	335 (2.1)	330 (2.0)	331 (2.0)	320 (1.9)	342 (2.1)	344 (2.1)	370 (2.2)	387 (2.3)
Ferry	37 (0.2)	43 (0.3)	47 (0.3)	47 (0.3)	38 (0.2)	37 (0.2)	38 (0.2)	39 (0.2)
Total public transport	1,706 (10.7)	1,710 (10.5)	1,712 (10.3)	1,696 (10.2)	1,756 (10.6)	1,775 (10.7)	1,863 (11.0)	1,915 (11.2)
Walk only	2,741 (17.2)	2,825 (17.4)	2,905 (17.5)	2,870 (17.3)	2,973 (18.0)	2,964 (17.8)	3,035 (17.9)	3,118 (18.3)
Bicycle	101 (0.6)	115 (0.7)	124 (0.7)	113 (0.7)	115 (0.7)	114 (0.7)	119 (0.7)	106 (0.6)
Taxi	115 (0.7)	118 (0.7)	119 (0.7)	124 (0.7)	117 (0.7)	121 (0.7)	113 (0.7)	127 (0.7)
Other	83 (0.5)	97 (0.6)	112 (0.7)	98 (0.6)	110 (0.7)	112 (0.7)	135 (0.7)	134 (0.8)
Grand Total	15,895 (100.0)	16,270 (100.0)	16,561 (100.0)	16,574 (100.0)	16,493 (100.0)	16,628 (100.0)	16,987 (100.0)	17,051 (100.0)

52 Cycling Promotion Fund, 2009. *Cycling Promotion Fund Annual Report 2008/09*.

53 Road and Transport Authority, April 2008. *Cycling in Sydney: Bicycle ownership and use*.

54 Parsons Brinckerhoff, December 2008. *Cycling in New South Wales: What the data tells us*. Prepared for the Premier's Council for Active Living.

55 Adapted from: Transport Data Centre, 2010. *2008/09 Household Travel Survey: Summary Report* p:26. This table applies to the Sydney Greater Metropolitan Area, which includes the Newcastle, Illawarra and Sydney Statistical Divisions.

Cycling forms a minor component of all trips. In 2008, 0.6% of all trips in the Sydney Greater Metropolitan Area (or 119,000 trips) were undertaken by bike (see Table 4). There was an increase of 0.6% in the number of trips by bike between 2001 and 2009. In comparison, car trips increased by 0.6%, total public transport trips increased by 1.7%, and walk-only trips increased by 1.9%.

According to ABS journey to work data, 0.72% of all trips to work in 2006 in the Sydney Greater Metropolitan Area (or 13,784 trips) were undertaken by bike (see Appendix B).[56] There is a large amount of variation between Local Government Areas (LGA) in the Greater Metropolitan Area. Wollondilly has the lowest rate of cycling, at 0.13%, while Marrickville has the highest rate at 2.47% (see Table 5). LGAs like Newcastle, Shoalhaven and Wollongong have considerably higher rates of cycling than the Sydney average. The LGA with the highest rate of cycling in NSW is Byron, and several other LGAs in regional NSW also had a cycling rate above the average of the Sydney Greater Metropolitan Area. However, most regional NSW LGAs had very low numbers of commuting cyclists.[57] According to the 2006 census, cycling in all NSW LGAs formed a minor component of the journey to work. The most significant travel mode in every LGA was as the driver of a car (see Appendix B).

Table 5: Rates of cycling to work in NSW by Local Government Area[58]

Highest rates of cycling							
Inner Sydney		Outer Sydney		Greater Sydney		Regional NSW	
LGA	%	LGA	%	LGA	%	LGA	%
Marrickville	2.47	Manly	1.30	Newcastle	2.04	Byron	3.25
Sydney	2.03	Warringah	0.86	Shoalhaven/ Wollongong	1.05	Clarence Valley	2.24
Leichhardt	1.81	Pittwater/ Wingecarribee	0.67	Hawkesbury	0.98	Albury	1.70
Lowest rates of cycling							
Inner Sydney		Outer Sydney		Greater Sydney		Regional NSW	
LGA	%	LGA	%	LGA	%	LGA	%
Canterbury	0.38	Wollondilly	0.13	Cessnock	0.40	N/A	N/A
Hunter's Hill	0.39	Baulkham Hills	0.23	Gosford/ Kiama	0.47	N/A	N/A
Rockdale	0.46	Campbelltown/ Kogarah	0.27	Blue Mountains	0.49	N/A	N/A

56 It is important to note that journey to work data from the census can be unreliable given (1) it measures transport data for one day of the year and (2) it cannot take seasonal and weather changes into account.

57 See Parsons Brinckerhoff, December 2008. *Cycling in New South Wales: What the data tells us*. Prepared for the Premier's Council for Active Living p:20.

58 Source: ABS, June 2010. *NSW State and Regional Indicators, June 2010 (Cat. No. 1338.1)*; ABS, 2006. *2006 Census of Population and Housing, 2006 Census Tables (Cat. No. 2068.0)*. See further Appendix B for all Sydney Greater Metropolitan Area LGAs and select regional NSW LGAs.

Of note are the changes in bicycle mode share between census years (see Table 6). Bicycle mode share increased the most in Inner Sydney LGAs, whereas bicycle mode share decreased in the majority of LGAs in Greater Sydney (see also Appendix C). Some LGAs with the highest levels of cycling to work remained stable or decreased between 2001 and 2006 (e.g. Sydney and Shoalhaven).

Table 6: Relative change in bicycle mode share in NSW by Local Government Area between 2001 and 2006[59]

Highest mode share changes					
Inner Sydney		Outer Sydney		Greater Sydney	
LGA	%	LGA	%	LGA	%
Burwood	42	Holroyd	16	Hawkesbury	5
Lane Cove/ Marrickville/ Randwick	23	Manly	14	Maitland	-4
Willoughby	22	Fairfield	11	Lake Macquarie	-10
Lowest mode share changes					
Inner Sydney		Outer Sydney		Greater Sydney	
LGA	%	LGA	%	LGA	%
Hunters Hill	-19	Wollondilly	-50	Port Stephens	-41
Woollahra	-6	Hurstville	-24	Cessnock	-31
Sydney	-1	Campbelltown	-19	Shoalhaven	-23

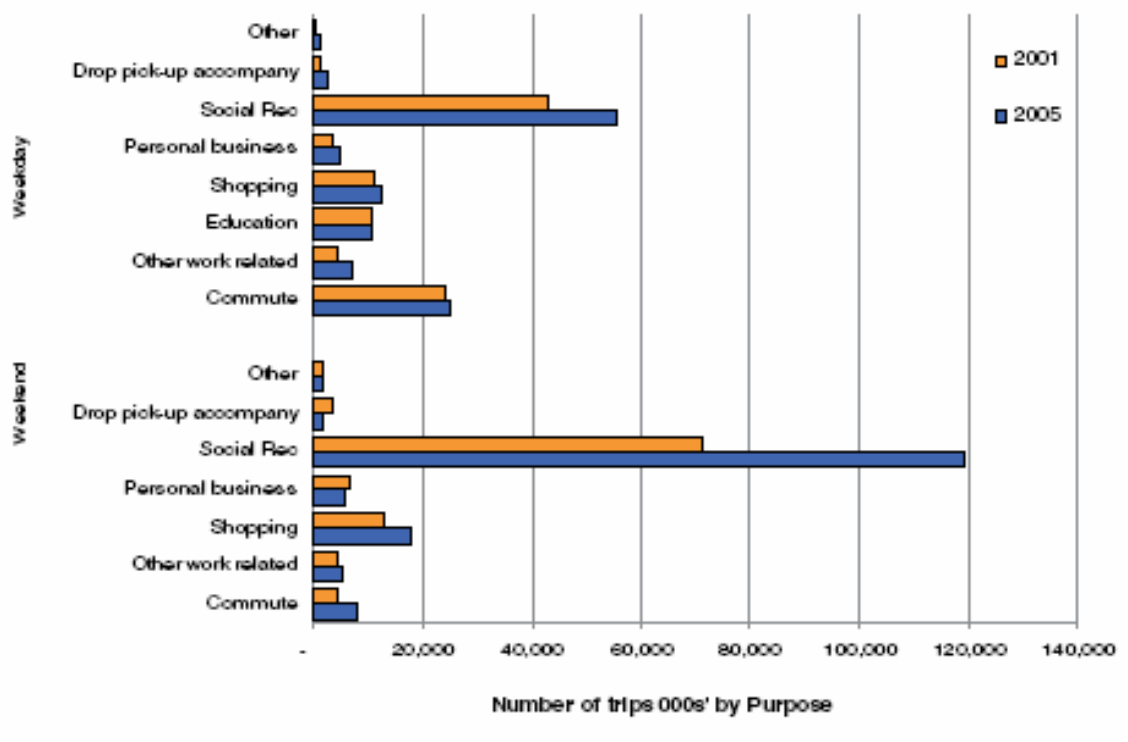
Commuting is the second largest purpose of bike trips during weekdays in the Sydney Greater Metropolitan Area (see Figure 6). Both during the week and on weekends, the most significant purpose of cycling is social recreation. There has been a marked increase in the popularity of cycling events in Sydney, such as the Sydney Spring Cycle, the MS Sydney to the Gong Ride, and NSW Bike Week.[60] There has also been an increase in commuting events such as National Ride2Work Day and National Ride2School Day.[61]

59 Source: New, C., Rissel, C,. May 2008. *Cycling to work in Sydney: analysis of journey-to-work Census data from 2001 and 2006*. Health Promotion Service Sydney South West Area Health Service. See further Appendix C for all Sydney Greater Metropolitan Area LGAs.

60 NSW Government, 2010. *Spring Cycle*, accessed 22/7/2010; Sydney to the Gong, 2010. *Sydney to the Gong: MS Bike Ride*, accessed 22/7/2010; Road and Traffic Authority, 2010. *NSW Bike Week*, accessed 22/7/2010.

61 Bicycle Victoria, 2010. *Ride to Work*, accessed 22/7/2010; Bicycle NSW, 2010. *National Ride2School Day 2010*, accessed 22/7/2010.

Figure 6: Purpose of bike trips in the Sydney Greater Metropolitan Area[62]



Measuring trends in crashes involving cyclists is difficult as not all non-fatal bike crashes are reported.[63] Nevertheless, recent data indicate that cyclist fatalities and injuries in NSW are stable, if not decreasing (see Table 7). This mirrors the situation at the national level.[64] However, per capita rates of casualty are misleading as they do not control for exposure. For example, Melbourne and Sydney had similar per capita injury rates between 2001 and 2006, but Melbourne had twice the number of work trips per capita, suggesting that cycling is safer in Melbourne.[65]

62 Road and Transport Authority, April 2008. *Cycling in Sydney: Bicycle ownership and use*.

63 NSW Centre for Road Safety, 2009. *Road Traffic Crashes in New South Wales: Statistical Statement for the year ended 31 December 2008*.

64 Austroads, 2009. *National Cycling Data and Indicators*.

65 Pucher, J., Garrad, J., Greaves, S., 2010. Cycling down under: a comparative analysis of bicycling trends and policies in Sydney and Melbourne, *Journal of Transport Geography*, In press.

Table 7: Cyclist casualties in NSW between 2000 and 2008[66]

Year	Killed	Injured
2000	6	1,218
2001	13	1,142
2002	13	1,292
2003	9	1,107
2004	16	1,116
2005	13	1,188
2006	7	1,179
2007	14	1,163
2008	8	1,090

Despite recent increases in commuting by bike and cyclists participating in social events in Sydney, cycling remains a marginal mode of transport. Cycling is much more frequently a recreational pastime than a means of commuting. Cycling rates also vary considerably between LGAs. Differential rates of cycling can be attributed to institutional and socio-cultural factors, and these will be explored through case studies in the remainder of this paper.

66 NSW Centre for Road Safety, 2009. *Road Traffic Crashes in New South Wales: Statistical Statement for the year ended 31 December 2008*.

6.0 CYCLING IN NSW: THE ADMINISTRATIVE FRAMEWORK

This section reviews the administrative structures that govern cycling and the range of policies and programs currently proposed or being implemented. Most of this section focuses on what is happening at the State and Local Government level. However, in combination with the State and Local Governments, the Commonwealth plays an important role in setting transport objectives, setting infrastructure objectives, and funding provision.

Just as there are factors that influence the uptake of cycling by commuters, so too are there factors that influence the adoption of cycling by policy-makers. These factors are varied and interact in an unpredictable fashion. Recent research has categorised these factors under five themes: land use planning and development; public transport infrastructure and functionality; walking and cycling infrastructure; political commitment and institutional practice; and societal culture.[67] This section focuses primarily on cycling-specific policy and cycling in Sydney.

6.1 Commonwealth Government

The 2005 Inquiry into Sustainable Cities by the House of Representatives Standing Committee on Environment and Heritage made the following recommendation:

> The committee recommends that the Australian Government provide adequate funding to develop new programmes and support existing programmes, such as TravelSmart and the National Cycling Strategy, that promote and facilitate public and active transport options.[68]

A recent background paper released by Infrastructure Australia has also emphasised the importance of Commonwealth Government support for cycling as a valid transport option. This support is required not only to keep cycling on the agenda, but also to enable Australia to catch up with international best practice.[69] Recent Infrastructure Australia reports to COAG have also recommended cycling as a transport policy option for reducing congestion and improving the efficiency and sustainability of Australian cities.[70] This section

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67 Cole, R., Burke, M., Leslie, E., Donald, M., Owen, N. 2010. Perceptions of representatives of public, private, and community sector institutions of the barriers and enablers for physically active transport. *Transport Policy*, In press.

68 Standing Committee on Environment and Heritage, August 2005. *Inquiry into Sustainable Cities*, House of Representatives, Commonwealth Government: p81.

69 Infrastructure Australia, March 2009. *Cycling Infrastructure for Australian Cities*. Background Paper.

70 Infrastructure Australia, May 2009. *National Infrastructure Priorities: Infrastructure for an*

briefly reviews the Commonwealth Government organisations, policies and programs that affect cycling in NSW.

The Australian Bicycle Council (ABC) was established in 1999 to implement Australia Cycling: The National Strategy 1999-2004 and the most recent national strategy, the Australian National Cycling Strategy 2005-2010. The ABC reports directly to the Austroads Council, and through it to the Standing Committee on Transport and then to the Australian Transport Council (see Figure 7). These reporting requirements include monitoring the implementation of the National Cycling Strategy. ABC membership comprises representatives from Commonwealth, State, Territory and Local Government, the bicycle industry and cyclist user groups (see Box 4)[71]. The National Cycling Strategy operates within the broader national framework established by the National Transport Commission's National Transport Policy Framework: A New Beginning and funding guidelines set by Infrastructure Australia and the Department of Infrastructure, Transport, Regional Development and Local Government.

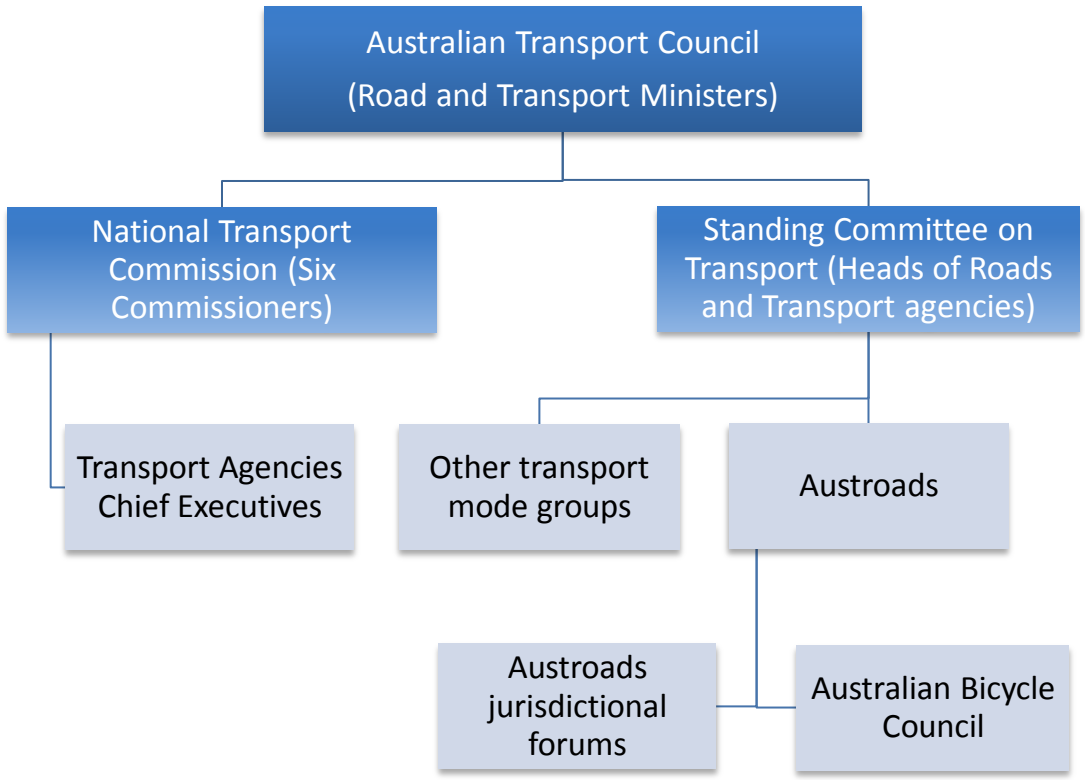
Box 4: Australian Bicycle Council Membership

- A chairman nominated by Austroads
- A representative from the Department of Infrastructure, Transport, Regional Services and Local Government (Cth)
- A representative from the Department of Environment, Water, Heritage and the Arts (Cth)
- A representative from the Department of Health and Ageing (Cth)
- A representative from each of the State and Territory road/transport agencies
- A representative from the Australian Local Government Association
- A representative from Bicycle Industries Australia
- A representative from Retail Cycle Traders Australia
- A representative from the Bicycle Federation of Australia
- An observer from Transit NZ

economically, socially, and environmentally sustainable future; Infrastructure Australia, June 2010. *Getting the fundamentals right for Australia's infrastructure priorities: An Infrastructure Australia report to the Council of Australian Governments*.

71 Box 4 source: Australian Bicycle Council, 2010. *About us*, accessed 20/7/2010.

Figure 7: Management and coordination framework for the National Cycling Strategy[72]



Several Commonwealth programs provide funding for cycling infrastructure (see Table 8). Each program has a set of criteria that determines which projects are successful in acquiring funding. The National Bike Path Program requires the partnering government – State, Territory or local – to jointly invest in the cycling infrastructure on a dollar-for-dollar basis. Other programs supported by the Commonwealth Government have promoted cycling across Australia, including: the Australian Bicycling Achievement Awards; the National Healthy Places and Spaces project guidelines; the National Ride2Work Day; and the Tour Down Under.

[72] Adapted from: Austroads, 2005. *The Australian National Cycling Strategy 2005-2010* and Australian Transport Council, 2010. *Australian Transport Council Structure*.

Table 8: Commonwealth cycling programs and funding sources[73]

Program	Details
Blackspot Program	A $AUD500 million program to address black spots for all road vehicles including bicycles
National Bike Path Program	$AUD40 million available as part of the Jobs Fund
Regional and Local Community Infrastructure Program	Part of $AUD250 million available to local government will be used for cycling infrastructure
Roads to Recovery Program	A $AUD1.75 billion program to be distributed to State, Territory and local governments for development of road infrastructure, including bicycle paths when they are constructed in association with a road
Strategic Regional and Local Community Infrastructure Program	An estimated $AUD35 million share of this program will be used to develop projects which improve cycling and walking infrastructure in communities

Despite the presence of funding, policies and organisations supporting cycling at the national level, Infrastructure Australia recently concluded that :

> The National Cycling Strategy, whilst correct in its overall intent, has not provided the mechanisms to deliver a significant increase in cycling participation rates across Australia.[74]

The capacity for the Commonwealth Government to keep cycling on the agenda and achieve international best practice is further limited by the absence of cycling from broader transport and land-use policy such as the National Transport Policy Framework: A New Beginning (2008). Infrastructure Australia recommended that a more decisive national commitment to cycling is required to address these limitations.

6.2 NSW Government

The NSW BikePlan identifies a number of key NSW Government bodies involved in cycling policy and programs: NSW Transport and Infrastructure; Department of Planning; Department of Environment, Climate Change and Water; Industry & Investment NSW; Department of Premier & Cabinet; Roads and Traffic Authority (RTA); and the NSW Centre for Road Safety. Each of these bodies has a lead role in implementing the priorities identified in the NSW BikePlan (see Table 9). The priorities are intended to be implemented in

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73 Sources: Australian Bicycle Council, 2009. *Australian Bicycle Council: Annual Report 2008-2009*; Department of Infrastructure, Transport, Regional Development and Local Government, September 2009. *Nation Building Program: Black Spot Projects – Notes on Administration*; Department of Infrastructure, Transport, Regional Development and Local Government, October 2009. *Program Guidelines for the Roads to Recovery Program*.

74 Infrastructure Australia, March 2009. *Cycling Infrastructure for Australian Cities*. Background Paper: p5.

association with other Government bodies and Non-Government Organisations (see Box 5). The NSW BikePlan ten year vision is: to establish a Metro Sydney Bike Network that links major centres and creates a strategic cycle network in inner Sydney (see Figure 8); and invest in cycleways in regional NSW and cities like Newcastle and Wollongong.

Box 5: Non-Government Organisations involved in cycling policy and planning in NSW

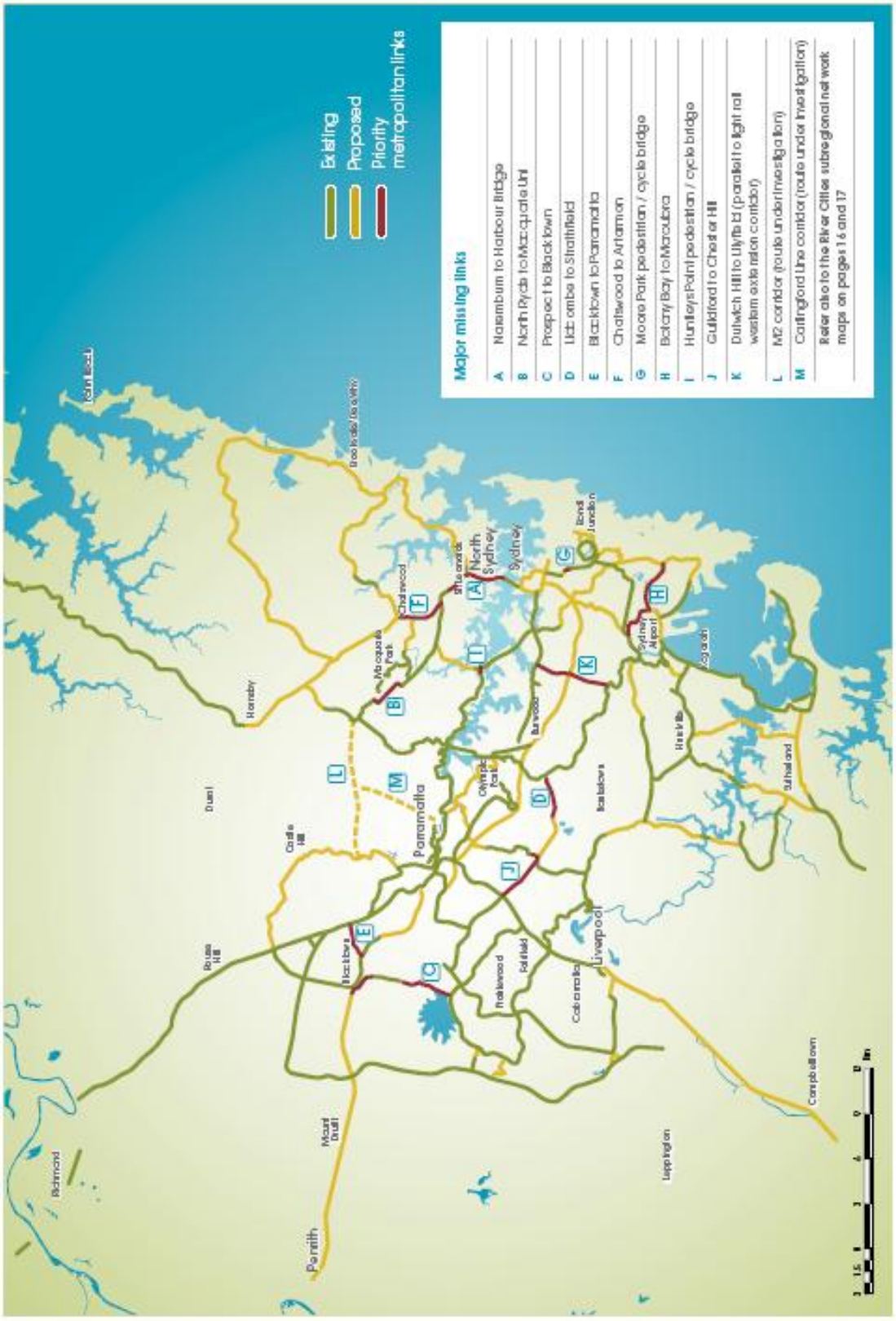
- Bicycle Federation of NSW
- Bicycle Motocross
- Bicycle NSW
- Bicycle User Groups
- Cycling NSW
- Mountain Bike
- National Roads and Motorists Association
- Parents & Citizens Federation of NSW
- Powerhouse Museum

Table 9: Key Government bodies and cycling priorities in NSW[75]

Organisation	Priorities
Department of Environment, Climate Change and Water	• Promote the installation and use of end-of-bike trip facilities at major destinations
Department of Planning	• Promote recreational bike-riding and access by bike to open spaces including Sydney Harbour and its tributaries • Plan cycling-friendly development decisions
Department of Premier & Cabinet	• NSW BikePlan to be delivered by partnerships of government, community and business stakeholders • Seek Commonwealth Government support in promoting bike-riding
Industry & Investment NSW	• Promote cycle tourism and community cycling events • Encourage local cycling-related small businesses
NSW Centre for Road Safety	• Support school communities in encouraging safe bike-riding • Promote and enforce road users' awareness of and responsibilities towards more vulnerable road users • Enforce or promote the use of the right safety equipment for bike-riding
NSW Transport & Infrastructure	• Promote combined travel by bicycle and public transport • Support car-free regional cycle touring
Roads and Traffic Authority	• Support local councils in building and increasing the use of local cycleway networks • Increase awareness of and access to existing cycle routes • Improve the provision of cycle facilities as part of major road projects and other roadworks • Promote the development of safe cycling skills • Ensure transport investment decisions are informed by the usage, costs and benefits of cycling • Assist the City of Sydney to promote cycling in Sydney

75 NSW Government, May 2010. *New South Wales BikePlan*. See Appendix D for a complete list of stakeholders in the New South Wales BikePlan.

Figure 8: Metro Sydney Bike Network[76]



76 NSW Government, May 2010. *New South Wales BikePlan,* p:11.

The RTA is one of the most important NSW Government bodies involved in administering cycling programs and policies. It was responsible for funding and constructing the regional bike routes laid out in Action for Bikes: BikePlan 2010, and is jointly responsible for implementing the NSW BikePlan and funding other cycling projects with local government.[77] Stakeholder input into cycling policy and programs comes through the NSW Bicycle Advisory Council, which advises the Minster for Roads through the RTA (see Box 6).[78]

Box 6: NSW Bicycle Advisory Council membership

- Independent Chairman
- Bicycle NSW
- Newcastle Cycleways Movement
- NSW Police Movement
- Senior RTA officer
- Senior NSW Transport & Infrastructure officer

Total estimated RTA expenditure on bicycle facilities in 2008-09 was $AUD29.3 million. Of this amount, more than $AUD5.6 million was provided in matching funding for 103 local cycleway projects in 80 council areas. In total, these funds built 53km of on-road cycleways and 44km of off-road cycleways (see Table 10). In comparison, total RTA expenditure on capital works in 2008-09 was $AUD2.262 billion (i.e. 1.3% of RTA expenditure was invested in bicycle facilities). RTA promotion involved the production and distribution of such brochures as Cycle to work, Getting around by bike, Safe cycling, and A handbook for bicycle riders; and supporting community events such as the City of Sydney Spring Cycle, the MS Sydney to the Gong ride, and National Ride2Work Day.[79]

77 Several local councils have been critical of RTA progress on the regional bike routes. For example, the 2007 Marrickville Bicycle Strategy notes that "during the past decade Council has proceeded with the development of its local routes while no progress has been made on the regional routes. This has resulted in an almost total lack of coherence and connectivity in the implemented 1996 network" (page 13). RTA expenditure on cycling infrastructure decreased between 2001 and 2006 (see New, C., Rissel, C,. May 2008. *Cycling to work in Sydney: analysis of journey-to-work Census data from 2001 and 2006*. Health Promotion Service Sydney South West Area Health Service).

78 Roads and Transport Authority, 2009. *RTA Annual Report 2008-09*.

79 Roads and Transport Authority, 2009. *RTA Annual Report 2008-09*.

Table 10: Major Road & Transport Authority cycleway projects (2008-09)[80]

Alfords Point Bridge Duplication: shared use path along the eastern side of the new bridge over the Georges River, Padstow Heights.
Great Western Highway – Leura to Katoomba, Section 2: shared use path along the northern side from East View Avenue, Leura, to Bowling Green Avenue, Katoomba.
Mamre Road, M4 Overpass Duplication: shared use path along the western side of the new bridge over the M4, St Marys.
Windsor Road – Windsor to MacGraths Hill: shared use path along southwest side from Flattes Lagoon Bridge to Macquarie Street, Windsor. Includes a bridge over South Creek.
Central Coast Highway – Ocean View Drive to Tumbi Road, Stage 2: shared use path along southern side from Ocean View Drive to Pitt Road, Wamberal.
New England Highway – Weakleys Drive Interchange: shared use path along eastern side from the Beresfield Smash Repairs' new driveway to Glenwood Drive, Thornton.
Chatswood to North Sydney: design development of the section from Merrenburn Avenue, Naremburn, to the Ridge Street Bridge, North Sydney.
Princes Highway, Lake Tabourie: completion of the shared use bridge and its approaches over Tabourie Creek, along the eastern side of the existing bridge.

Despite the recent release of a NSW BikePlan, which is closely connected to the NSW State Plan and Metropolitan Transport Plan, the inclusion of cycling in NSW transport and infrastructure policy has been somewhat uneven (see Figure 2).[81] City of Cities sought to improve local and regional cycling networks, but proposed few new initiatives.[82] Likewise, the Urban Transport Statement[83] proposed no new initiatives for increasing cycling and the State Infrastructure Strategy 2008-09 – 2017-18 only mentioned cycling on one occasion as a component of a larger road infrastructure project. Finally, the RTA Blueprint, released in 2008 and designed to implement the 2006 version of the State Plan[84] (which itself did not mention cycling), made no reference to cycling in its list of objectives for the period 2008-2018.[85]

The Metropolitan Transport Plan: Connecting the City of Cities seeks to connect land use planning in Sydney with the transport network. It adopts four policies for increasing cycling in Sydney: delivering the NSW BikePlan; delivering promotional programs; constructing missing cycle links; and developing

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80 Roads and Transport Authority, 2009. *RTA Annual Report 2008-09*.

81 For example, the Ministerial Inquiry into Sustainable Transport in New South Wales: options for the future was released in August 2003 and made very little mention of cycling as a transport policy option.

82 Searle, G., 2006. Is the *City of Cities* Metropolitan Strategy the Answer for Sydney? *Urban Policy and Research*, 24(4): 553-566.

83 NSW Government, 2006. *Urban Transport Statement*.

84 NSW Government, November 2006. *State Plan: A new direction for NSW*.

85 Source: Roads and Traffic Authority, March 2008. *Blueprint: 2008 to 2012 RTA Corporate Plan*.

partnerships with local government and business. The Metropolitan Transport Plan predicts that cycling trips in the Sydney Greater Metropolitan Region will increase from 159,000 in 2010 to 171,000 in 2020.[86] Although this represents an increase in cycling trips of 7.2%, as a proportion of the total number of trips it is a reduction from 0.75% to 0.72%.

The NSW BikePlan provides the framework by which the NSW State Plan aims to increase the bicycle mode share of trips of up to 10km made in the Greater Sydney region to 5% by 2016.[87] The BikePlan will invest more than $AUD158 million over ten years in three areas:

(1) $AUD80 million will be invested in connecting Sydney's district centres by building missing links in the Metro Sydney Bike Network;
(2) $AUD78 million will be invested in fast-tracking subregional bike networks in Parramatta, Liverpool and Penrith;
(3) At least $AUD5 million will be allocated every year to regional cities and local councils across NSW to complete neighbourhood cycleway networks.[88]

This equals an investment of $AUD20.8 million per year, whereas total NSW Government investment in transport infrastructure for 2010-11 is expected to total $AUD5.8 billion.[89] In other words, 0.36% of the State's investment in transport infrastructure in 2010-11 will be spent on cycling infrastructure. In comparison, the 1999 NSW cycling policy – Action for Bikes: BikePlan 2010 – invested $AUD251 million over 10 years with the aim of creating an average of 200 kilometres of cycleways per year. By 2008, an average of 233 km/year had been created across NSW.[90] Cycleway programs outlined in the NSW BikePlan include the NSW Coastline Cycleway Grants Program and the River Cities Bike Program (see Box 7).[91] More recently, the NSW Government

Box 7: Cycleway programs in the NSW BikePlan (2010)

- Metro Sydney Bike Network
- NSW Coastline Cycleway
- River Cities Bike Program – Parramatta, Liverpool and Penrith
- Local Councils Cycleways Program
- Cycle networks in Greater Metropolitan region centres will be improved – Newcastle, Lake Macquarie, Gosford, Wyong, Wollongong and Shellharbour
- North Ryde to Naremburn Cycleway
- M7 Cycleway

86 NSW Transport & Infrastructure, 2010. *Metropolitan Transport Plan: Connecting the City of Cities*.

87 The Sydney City Draft Subregional Strategy, a subplan of City of Cities, aims to increase the rate of cycling in Sydney City from 2% in 2006 to 10% in 2016.

88 NSW Government, May 2010. *New South Wales BikePlan*.

89 NSW Government, 2010. *Infrastructure Statement 2010-11, New South Wales Budget Paper No. 4*.

90 Road and Transport Authority, April 2008. *Cycling in Sydney: Bicycle ownership and use*.

91 Another sustainable transport program run by the NSW Government is SMILE –

has announced the construction of a cycleway alongside the light rail extension to Dulwich Hill.[92] The NSW Infrastructure Report Card 2010 concluded that:

> "While the 2010 *BikePlan* has the potential to increase the use of bikes, this will only occur if special funding programs and budgets for bike infrastructure are provided. Constructing new bike infrastructure from existing transport budgets will result in infrastructure being rolled out at a much slower pace than the community expects."[93]

Recent studies have identified cycling issues that need to be addressed in NSW. These include issues that relate to: lack of infrastructure; conflict over infrastructure; bike parking; integration with public transport; and organisations responsible for cycling infrastructure. A recent study of cycling infrastructure in Sydney concluded that:

> "Many of the existing facilities are poorly designed, not well maintained, unconnected, or more useful for recreation than for daily trips to work and school."[94]

Most cycling infrastructure in NSW does not provide an exclusive right of way for cyclists. For example, only 8km of 161km of cycleways in the Sydney CBD are exclusively for cyclists.[95] The most significant difficulty limiting analysis of cycling infrastructure in Sydney (and Australia wide) is the absence of consolidated data.[96]

Sustainable Mobility Initiatives for Local Environments, which is run by the Department of Environment, Climate Change and Water.

92 SMH, July 20 2010. *Government adds cycle and walking path alongside light rail extension*.

93 Engineers Australia, July 2010. *Infrastructure Report Card 2010: New South Wales*, p25.

94 Pucher, J., Garrad, J., Greaves, S., 2010. Cycling down under: a comparative analysis of bicycling trends and policies in Sydney and Melbourne, *Journal of Transport Geography*, In press.

95 See Glover, L., 2009. *Bicycling Infrastructure in Australia: A Review of Current Policy Issues, Australian Centre for the Governance and Management of Urban Transport* and Pucher, J., Dill, J., Handy, S., 2010. Infrastructure, programs and policies to increase bicycling: An international review. *Preventive Medicine*, 50:S106-S125 for identification and discussion of the different types of cycling infrastructure.

96 Glover, L., 2009. *Bicycling Infrastructure in Australia: A Review of Current Policy Issues, Australian Centre for the Governance and Management of Urban Transport*.

The possibility of a class action against cycling-specific infrastructure on Bourke St in the Surry Hills has recently been raised.[97] The class action has been proposed because of the impact on business due to the reduction in available car spaces. Recent research suggests there may be long-term economic benefit by replacing car parking with cycle lanes or bike parking. For example, a recent study in Melbourne found that each square metre allocated to bike parking generated $AUD31 per hour, compared to $AUD6 generated for each square metre used for car parking.[98] However, calculating the cost incurred during the transition from car-allocated space to bike-allocated space and the demand for cycling space is beset by methodological difficulties.[99]

Only limited bike parking and end-of-trip facilities are available in Sydney,[100] and when they are available they are often under-used due to lack of public awareness.[101] As a result, only 0.06% of all trips in Sydney in 2006 combined bike and public transport.[102] There is a lack of coordination in the provision of cycling infrastructure between different local councils, and between local councils and the RTA.[103] It is argued that this can be traced to, amongst other things, the historical absence of an institutional champion for cycling in Sydney.[104]

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97 SMH, July 19 2010. *Bourke Road bikeway bust*. For recent criticism of cycling in Sydney, see for example: SMH, July 1 2010, *Fraught obstacle course on Moore's 200km vision of city bike paths*; Sunday Telegraph, July 18 2010, *Cycle lane anger*; Daily Telegraph, July 23 2010, *To the one-track minds at Clown Hall: On yer bike*; *SMH, July 29 2010, Cyclists up against shock-jock ravings*.

98 Lee, A., March, A., 2010. Recognising the economic role of bikes: sharing parking in Lygon Street, Carlton, *Australian Planner*, 47(2):85-93.

99 See for example AECOM, April 2010. *Inner Sydney Regional Bicycle Network: Demand Assessment and Economic Appraisal, prepared for City of Sydney*.

100 Pucher, J., Garrad, J., Greaves, S., 2010. Cycling down under: a comparative analysis of bicycling trends and policies in Sydney and Melbourne, *Journal of Transport Geography*, In press.

101 Parsons Brinckerhoff, August 2009. *The provision and use of bicycle parking at Sydney region public transport interchanges: Results of facilities audit and cyclist questionnaire. Prepared for the New South Wales Premier's Council for Active Living*.

102 Parsons Brinckerhoff, August 2009. *The provision and use of bicycle parking at Sydney region public transport interchanges: Results of facilities audit and cyclist questionnaire. Prepared for the New South Wales Premier's Council for Active Living*.

103 Pucher, J., Garrad, J., Greaves, S., 2010. Cycling down under: a comparative analysis of bicycling trends and policies in Sydney and Melbourne, *Journal of Transport Geography*, In press; Christie, R., February 2010. *Independent Public Inquiry: Long-Term Public Transport Plan for Sydney: Preliminary Report*.

104 Lehman, R., Faber, M., August 2009. *Cycling at the centre: Using evidence to guide investment in active transport*. Presentation to the AITPM National Conference "Traffic beyond tomorrow …", Adelaide, South Australia, 5-7 August 2009.

6.3 Local Government

Together with the NSW State Government, local government has a leading role in the provision of cycling infrastructure in NSW.[105] An Australian Local Government Association survey found the average expenditure for local governments on bicycle related programs in 2005-06 across all of Australia was $AUD194,000, the majority of which was spent on infrastructure. Expenditure ranged from an average of $AUD366,000 for metropolitan councils to an average of $AUD116,000 for regional/rural councils. The survey also found that metropolitan councils were more likely than regional/rural councils to have a bike strategy or plan in place.[106] This section covers the City of Sydney's approach to bicycle programs in some depth before briefly comparing bicycle programs between a number of metropolitan and regional councils.

The City of Sydney has two cycling-related policies: Cycle Strategy and Action Plan 2007-2017 and Sustainable Sydney 2030 (see Figures 1 and 2). The council is actively seeking to increase cycling's share of travel in inner Sydney in order to: minimise greenhouse gas emissions; reduce reliance on traditional transport energy sources; maintain economic competitiveness; reduce city congestion; and improve health and wellbeing. Public support for investment into cycling infrastructure and programs is extensive. In a recent survey, 75% of respondents supported the construction of a new and comprehensive bike network in the Inner Sydney region, and 84% considered a good bike network in the Inner Sydney region to be of importance. Significantly, 67% of respondents felt that a safe and convenient bike network would make riding a more appealing transport option.[107]

The City of Sydney has committed to investing $AUD76 million over 4 years on bicycle related works, which includes cycleways and associated streetscape upgrades. Cycling promotion, education, behaviour change and other programs will be additional to the $AUD76 million.[108] This is a significant increase on the initial $AUD1.25 million assigned to implementing the Cycle Strategy and Action Plan 2007-2017, along with an additional $AUD750,000 per year for the first three years.

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105 Glover, L., 2009. *Bicycling Infrastructure in Australia: A Review of Current Policy Issues, Australian Centre for the Governance and Management of Urban Transport*.

106 Australian Local Government Association and Australian Bicycle Council, July 2007. *Cycling survey of Australian Local Governments July 2007*. 90% of metropolitan councils had a bike strategy, while only 51% of regional/rural councils had a bike strategy.

107 Galaxy Research, June 2010. *Cycleway Network Benchmark Study Inner Sydney Region: Prepared for City of Sydney June 2010*.

108 Fiona Campbell, City of Sydney, 27 July 2010. Personal comm.

Much of the City of Sydney's investment will be targeted at two overlapping programs: the Inner Sydney Regional Bicycle Network; and the Liveable Green Network. The Liveable Green Network is intended to provide a safe and attractive comprehensive network for walking and cycling across the City. It will connect main streets, Activity Hubs, activity precincts and open space. Plans are also being made to connect this Network into an integrated Inner Sydney network with adjacent councils.[109] Fifteen councils will implement the Inner Sydney Regional Bicycle Network between 2010 and 2017 (see Box 8). This Network will connect a series of nodes – employment centres, commercial centres, transport interchanges, and places of education – and create the coherency that is currently lacking within and between LGAs. 54km of cycleways will be added to create a total of 284km.[110] A recent AECOM study found that, whilst the Bicycle Network should increase cycling levels by 66% by 2016 and 71% by 2026, take up of cycling will have to almost triple relative to a do nothing scenario in order to meet NSW Government targets. Relative to doing nothing, it is estimated that development of the Inner Sydney Regional Bike Network will generate net economic benefits of $AUD507 million in today's prices at a benefit cost ratio of 3.88:1. If the demand levels required by the NSW Government targets are achieved, economic benefits could be as high as $AUD1.8 billion, at a benefit cost ratio of 11.08:1. However, it should be noted that additional initiatives and interventions will be required to deliver the level of estimated usage and economic benefits, the costs of which were not included in the AECOM analysis.[111]

Box 8: Local Government Areas participating in the Inner Sydney Regional Bicycle Network

- City of Sydney
- Ashfield
- Botany Bay
- Canada Bay
- Canterbury
- Lane Cove
- Leichhardt
- Marrickville
- Mosman
- North Sydney
- Randwick
- Rockdale
- Waverley
- Willoughby
- Woollahra

Investment in infrastructure varies considerably between LGAs within Sydney and across NSW. Table 11 presents figures for a sample of LGAs from across the State, chosen for having the highest or lowest rate of commuting by bike. Rates of cycling to work generally mirror the amount invested in infrastructure. However, it is difficult to draw many conclusions from Table 11, as little if any information was available on the types of cycleways in existence (e.g. on- or off-road), let alone the impact of the other factors identified in section 4.2. Nevertheless, this section on local government suggests that increased investment in cycling infrastructure and programs is likely to be cost-effective and is also likely to increase rates of commuter and recreational cycling.

109 City of Sydney, 2010. *Sustainable Sydney 2030*.

110 City of Sydney, April 2010. *Inner Sydney Regional Bike Plan Implementation Strategy*.

111 AECOM, April 2010. *Inner Sydney Regional Bicycle Network: Demand Assessment and Economic Appraisal, prepared for City of Sydney*.

Table 11: Select Local Government cycling policies and statistics in NSW[112]

LGA	Bike Plan	Expenditure	Cycling - travel to work (%)	Relative change in bicycle mode share, 2001-2006 (%)	Length of cycleways
Inner Sydney Local Government Areas					
City of Sydney	Yes (2007)	At least $76 million over 4 years from 2009/10	2.03	-1%	200km by 2014 with 55km of separated cycleways
Marrickville	Yes (2007)	$7,179,070 on cycleways over 10 years from 20061	2.47	23%	Planned construction of 95.26km over 10 years from 2006
Canterbury	Yes (2008)	$816,000 on bike paths between 2009 and 2014	0.38	8%	12km
Outer Sydney Local Government Areas					
Manly	Yes (1999)	$362,000 on cycleways (08/09)	1.30	14%	N/A
Wollondilly	No	$100,000 (10/11 Grant)	0.13	-50%	N/A
Greater Metropolitan Region Local Government Areas					
Newcastle	Yes (2009)	$22,149,900[2]	2.04	-16%	N/A
Wollongong	Yes (2006)	$1,469,386 in 2008/09	1.05	-15%	94km
Cessnock	Yes (1995)	$14,210 (07/08)	0.40	-31%	60km
Regional Local Government Areas					
Byron	Yes (2008)	$5,920,788 planned from 2007/08[3] and $368,000 was spent in 2008/09	3.25	N/A	100.1km in 2008 with 153.5km proposed for construction[4]
Clarence Valley	In progress	$290,000 in 09/10	2.24	N/A	N/A

Notes: (1) It is unclear to what degree these cycleways will be jointly funded by the RTA (2) This figure is from the proposed 2009 works program, but the period over which it is to be spent is unspecified (3) It is unspecified as to over what length of time this money will be invested (4) The Byron State of the Environment Report 2009 states that there was 59km of cycleways in 2009.

112 See Appendix E for a list of all the sources.

7.0 COMPARING SYDNEY AND OTHER AUSTRALIAN CAPITAL CITIES

Growth in cycling infrastructure in Australia has decreased since 2005 (see Table 12). Most cycling infrastructure is located in the Australian capital cities. However, it is instructive to briefly examine differences in cycling between the States and Territories before looking more closely at differences between the capital cities.

In 2006, NSW had the lowest proportion of cycling in the journey-to-work category, the second lowest proportion of the population participating in recreational cycling, and the second highest level of injuries to commuter cyclists compared to all the other States and Territories (see Table 13). NSW also had one of the lowest rates of increase in the proportion of commuters cycling to work.

Table 12: Annual addition to cycle routes by States and Territories[113]

	Years				
	2005	2006	2007	2008	2009
On-road (kilometres)	222	212	320	268	146
Off-road (kilometres)	170	150	116	76	53
Total built annually (kilometres)	392	362	436	343	199
Annual change		-8%	21%	-21%	-42%

113 Austroads, 2009. *National Cycling Data and Indicators*.

Table 13: State and Territory cycling statistics[114]

State	Journey-to-work 2001 (%)	Journey-to-work 2006 (%)	% increase in number of people cycling to work (2001 to 2006)	Injuries per 1,000 people (2006)	Injuries per 1,000 commuter cyclists (2006)	Injuries per 1,000 recreational cyclists (2006)	Adult cycling participation (%) (2009)	% of population participating in recreational cycling (2006)
NSW	0.78	0.80	8%	0.42	142.0	9.2	8.3%	4.6
ACT	2.29	2.52	21%	0.61	52.4	6.7	16.10%	9.0
NT	3.86	3.48	-8%	0.50	37.2	10.1	14.8%	4.9
QLD	1.60	1.37	2%	0.46	86.6	9.7	10.2%	4.7
SA	1.14	1.40	34%	0.39	74.7	7.2	8.4%	5.5
TAS	0.78	0.89	28%	0.45	144.8	11.4	9.3%	3.9
VIC	1.11	1.34	33%	0.47	91.9	9.0	10.7%	5.2
WA	1.23	1.21	12%	0.41	86.3	6.0	10.7%	6.8

114 Sources: Parsons Brinckerhoff, December 2008. *Cycling in New South Wales: What the data tells us*. Prepared for the Premier's Council for Active Living; Austroads, 2009. *State & Territory Cycling Data and Indicators*; Cycling Promotion Fund, 2008. *Bicycle Sales 2008*.

Table 14: Capital city cycling statistics[115]

Capital City	Journey-to-work 2001 (%)	Journey-to-work 2006 (%)	% increase in the number of people cycling to work (2001 to 2006)	% of the population who are regular recreational cyclists (2008)	Bicycles/ person (2004)	Population density (population/ city area) (2008)	Average annual rainfall (mm)
Sydney	0.62	0.70	8.99%	1.43	0.29	363.9	1215
Canberra	2.29	2.53	15.89%	3.07	0.65	429.3	633
Darwin	4.17	3.89	-7.08%	3.03	N/A	1080.6	1715
Brisbane	1.16	1.14	12.66%	2.26	0.45	330.6	1146
Adelaide	1.25	1.59	31.25%	2.10	0.42	641.8	601
Hobart	1.33	1.58	25.32%	2.12	0.61	154.3	620
Melbourne	1.04	1.40	42.57%	2.04	0.37	443.1	647
Perth	1.18	1.25	16.44%	1.82	0.59	298.3	869

115 Sources: Parsons Brinckerhoff, December 2008. *Cycling in New South Wales: What the data tells us*. Prepared for the Premier's Council for Active Living; Bauman, A., Rissel, C., Garrard, J., Ker, I., Speidel, R., Fishman, E., 2008. *Cycling: Getting Australia Moving: Barriers, facilitators and interventions to get more Australians physically active through cycling,* Cycling Promotion Fund, Melbourne; Austroads, 2009. *Capital City Cycling Data and Indicators*; Australian Bureau of Statistics, December 2009. *Australian Demographic Statistics, Catalogue 3101.0*; Pucher, J., Garrad, J., Greaves, S., 2010. Cycling down under: a comparative analysis of bicycling trends and policies in Sydney and Melbourne, *Journal of Transport Geography*, In press.

Sydney fares comparatively badly with the other Australian capital cities on cycling statistics (see Table 14). In 2006, it had the lowest percentage of journeys-to-work by bike and the lowest percentage of the population who are regular recreational cyclists. Aside from Darwin, Sydney also had the lowest annual growth in the number of people cycling to work. These results may be explained in part by two factors: first, Sydney has one of the lowest population densities of all the capital cities; and second, Sydney has the highest annual rainfall aside from Darwin.

Cycling levels in Melbourne are roughly twice as high as those in Sydney, and have been growing three times as fast in recent years. Much of this difference can be explained by such underlying environmental factors in Melbourne as topography and climate (see Table 15). Melbourne has higher cycling rates when compared on a variety of different dimensions, including: bicycles/person; percentage of people who cycle every day; journey-to-work; and number of recreational cyclists. Part of the reason for the difference may be historical: Melbourne has had consistently higher bicycle share of work trips since 1976.

Cycling in Sydney is more likely to be recreational than work-related, as demonstrated by: the percentage of cycling trips for social-recreational purposes on an average day; and the tendency for cycling to have a higher mode share of all trips on the weekend (see Table 15). Two possible factors may explain this. First, despite an increase in cycling infrastructure in recent years, only 2% of on-road facilities are fully separated bike lanes. Second, many recently constructed cycleways are more useful for recreational cycling than commuting – only a quarter of RTA funded cycleways since 2000 have served routes leading to commercial and employment centres.[116]

Melbourne has recently introduced a Bicycle Account, modelled after the Copenhagen Bicycle Account. This has two components: an annual survey of cyclists in order to detect and prioritize problem and gauge progress; and statistics on trends in cycling infrastructure, safety, cycling levels, and cyclist behaviour over time.

[116] Pucher, J., Garrad, J., Greaves, S., 2010. Cycling down under: a comparative analysis of bicycling trends and policies in Sydney and Melbourne, *Journal of Transport Geography*, In press.

Table 15: A comparison of cycling in Sydney and Melbourne[117]

Feature	Sydney	Melbourne
Bicycles/person (2004)	0.29	0.37
% of people who cycle every day (2004)	1.0%	2.1%
Journey-to-work mode share (2006)	0.70%	1.40%
Increase in the number of people cycling to work (2001 to 2006)	8.99%	42.57%
Inner city share of trips to work by bike	2.2%	4.8%
% increase in use of key cycle routes between 2005 and 2008	38%	76%
Weekend/weekday bicycle share of all trips	1.1%/0.7% (2005)	1.1%/1.2% (2004)
% of cycling trips on an average day for social-recreational purposes	53%	27%
% of cycling trips on an average day for the purpose of commuting	27%	39%
Bicycle work trips by women	17%	25%
% of people who are regular recreational cyclists (2008)	1.43%	2.04%
Ride-to-work day participants (2008)	10,000	60,000
Expenditure per capita per annum on cycling (2007)	$1.29	Approx. $4
Bicycle Account	No	Yes
% of primary schools offering cycling training courses (2008)	Less than 10%	30%
Car ownership per 1,000 residents (2005)	515	594
Kilometres driven per capita per annum (2005)	10,506	11,918
Public transport mode share (2006)	21.2%	13.9%
Walking mode share (2006)	4.9%	3.6%
Network permeability for cyclists	Low	High
Topography – maximum change in height in travelling across the city	50 metres	35 metres
Average annual rainfall	1215mm	647mm
Total land area (population density – persons/km^2) (2008)	12,145 km^2 (363.9)	8,806 km^2 (647)
Inner city urbanized area (population density – persons/km^2) (2006)	1,687 km^2 (2040)	1,705 km^2 (1570)
Trip distance: >30km/<10km/<5km (%)	19.4/32.9/15.1	12.8/36.0/15.5

117 Sources: Parsons Brinckerhoff, December 2008. *Cycling in New South Wales: What the data tells us*. Prepared for the Premier's Council for Active Living; Bauman, A., Rissel, C., Garrard, J., Ker, I., Speidel, R., Fishman, E., 2008. *Cycling: Getting Australia Moving: Barriers, facilitators and interventions to get more Australians physically active through cycling,* Cycling Promotion Fund, Melbourne; Austroads, 2009. *Capital City Cycling Data and Indicators*; Australian Bureau of Statistics, December 2009. *Australian Demographic Statistics, Catalogue 3101.0*; Pucher, J., Garrad, J., Greaves, S., 2010. Cycling down under: a comparative analysis of bicycling trends and policies in Sydney and Melbourne, *Journal of Transport Geography*, In press; Harper, H., 2007. On Ya Bike, *Big Issue Australia*, No. 277, p14-17.

The introduction of the Bicycle Account may be due in part to stronger bicycle advocacy in Melbourne. Melbourne's stronger cycling culture is also suggested by: higher levels of participation in recreational cycling events; greater attendance at the national Ride-to-work day (see Table 15); and the perception that Sydney drivers are more aggressive towards cyclists.[118] Higher levels of cycling education in Melbourne may also be a factor in maintaining a strong cycling culture. More primary schools provide cycling training in Melbourne than Sydney, and more communities in Victoria participate in TravelSmart, a program that advocates sustainable methods of transport.

Further, environmental factors may play an explanatory role in cycling differences between Melbourne and Sydney. Melbourne is generally flatter and has half the annual rainfall (see Table 15). Sydney is less densely populated than Melbourne (according to total land area it has less persons/km^2 and journeys to work tend to be longer). However, the population density of Sydney, when only considering the inner city urbanized area, is a third more than that of Melbourne, which suggests that there may be potential for cycling as a transport mode in Sydney.

118 Pucher, J., Garrad, J., Greaves, S., 2010. Cycling down under: a comparative analysis of bicycling trends and policies in Sydney and Melbourne, *Journal of Transport Geography*, In press.

8.0 COMPARING SYDNEY AND SELECTED INTERNATIONAL CITIES

Countries such as The Netherlands, Denmark and Germany became international leaders in cycling through conscious, nation-wide changes to transport and land-use policies that favoured walking, cycling and public transport over the private car from the 1970s onwards. Since then, cycling as a transport mode in Europe has risen significantly. The European Union, European Economic and Social Committee, and 27 European cities, signed the Charter of Brussels in 2009.[119] This represented a commitment to a number of objectives, including a target of at least 15% for cycling's share of all transport by 2020. Other countries have increased levels of cycling despite possessing some of the same limiting factors as Sydney, such as hilly and discontinuous topography (e.g. San Francisco and Seattle), cold or rainy climates (e.g. Minneapolis, Ottawa, Portland, and Vancouver) and lack of a utilitarian cycling culture (e.g. Bogota, Barcelona, and Paris).[120] This section draws comparisons between Sydney and selected international cities, then briefly reviews two case studies: San Francisco, because of its topographical similarities to Sydney; and Copenhagen, because it is a world leader in cycling.

8.1 International comparison

As a means of commuting, the average share of cycling in Australia is comparable to countries like USA, the UK and Canada (see Figure 9). However, leading countries like Germany, Denmark and Holland have, on average, much higher levels of commuting by bike. Other European countries, such as Austria, Switzerland, Belgium, Sweden, Italy, France and Ireland, also have higher average rates of cycling.[121] The Australian position, and Sydney's in particular, is compared with that of selected international cities and countries in Figure 9.

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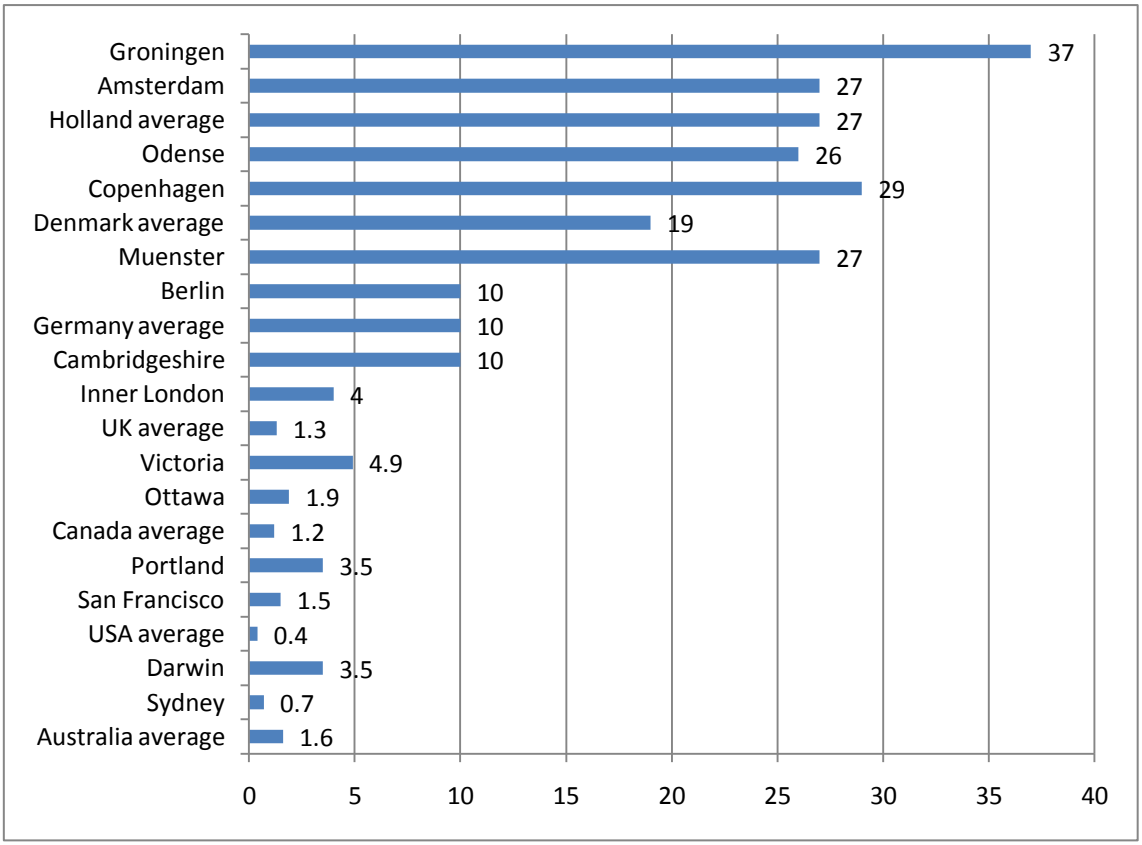
119 These cities are: Brussels, Milan, Munich, Sevilla, Tartu, Reggio Emilia, Houten, Edinburgh, Copenhagen, Aalborg, Helmond, Breda, Hertogenbosch, Tilburg, Eindhoven, Toulouse, Bordeaux, Timisoara, Gdansik, Izmit, and the US city of Portland. See road.cc, 31 May 2009. Charter of Brussels 1: Edinburgh backtracks on 15% target, accessed 2/8/2010.

120 Pucher, J., Buehler, R., 2008. Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany. *Transport Reviews*, 28(4): 495-528.

121 Infrastructure Australia, March 2009. *Cycling Infrastructure for Australian Cities*. Background Paper.

Figure 9: International comparison of commuter cycling as a percentage of all trips to work (2006)[122]



8.2 Copenhagen

The Danish National Government has played a critical role in raising cycling levels in Denmark in general, and Copenhagen in particular.[123] Its National Bicycle Action Plan consists of three parts. First, "Cycling into the 21st century", jointly formulated by the National Association of Local Authorities, the Association of County Councils in Denmark and the Minister of Transport, sets out the political aims for bicycle traffic. Second, "Promoting safer cycling – A strategy", developed by the Minister of Transport, combines measures for the benefit of all cyclists. Third, "Collection of cycle concepts", prepared by the

122 This data was acquired from 2005/2006 sources by the following reports: Pucher, J., Buehler, R., 2008. Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany. *Transport Reviews*, 28(4): 495-528; Infrastructure Australia, March 2009. *Cycling Infrastructure for Australian Cities*. Background Paper; Lehman, R., Faber, M., August 2009. *Cycling at the centre: Using evidence to guide investment in active transport*. Presentation to the AITPM National Conference "Traffic beyond tomorrow …", Adelaide, South Australia, 5-7 August 2009.

123 Pucher, J., Buehler, R., December 2007. At the Frontiers of Cycling: Policy innovations in the Netherlands, Denmark, and Germany. *World Transport Policy & Practice*, 13(3):9-56.

Road Directorate, is aimed at officials in county councils and authorities. A cycling laboratory was also established – the "national cycle town" of Odense – where different ideas and practices could be tested and evaluated. Together, these initiatives are intended to enable county councils, local authorities and other participants to develop and implement integrated, mutually suportive policies and programs.[124]

A key aspect of cycling in Copenhagen is its integration into broader metropolitan and transport planning. Cycling forms a central component of Copenhagen's 2008 city vision: Eco-Metropolis: Our Vision for Copenhagen 2015.[125] The vision has four themes:

(1) World's best city for cycles
(2) Climate Capital
(3) A green and blue capital city
(4) A clean and healthy big city.

Three cycling goals were set for 2015:

(1) In Copenhagen at least 50% of people will go to their work place or educational institution by bike
(2) The number of seriously injured cyclists will drop by more than half compared to today
(3) At least 80% of Copenhagen cyclists will feel safe and secure in traffic.

With Copenhagen's 519,000 people owning 560,000 bikes between them, Copenhagen has labelled itself the "City of Cyclists".[126] According to the City of Copenhagen Mayor of Technical and Environmental Administration:

> "Cycling is as natural for Copenhageners as brushing their teeth. And that again is because cycling is one of the key parameters for urban planning. In other words, in Copenhagen we have managed to prove together that the bicycle is the modern metropolis' preferred mode of transport."[127]

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124 European Conference of Ministers of Transport, 2004. *National Policies to Promote Cycling: Implementing sustainable urban travel policies: Moving ahead*.

125 See also: City of Copenhagen, 2008. *A Metropolis for People: Visions and Goals for Urban Life in Copenhagen 2015*.

126 City of Copenhagen, August 2009. *Copenhagen City of Cyclists – Bicycle Account 2008*.

127 City of Copenhagen, August 2009. *Copenhagen City of Cyclists – Bicycle Account 2008*.

Cycle Policy 2002 – 2012: City of Copenhagen directs cycling investment and programs in Copenhagen. Investment in cycling has recently been increased, with DKK 185 million to be invested on cycling infrastructure between 2008 and 2012.[128] Four policy initiatives are particularly innovative: a preference for separate bike paths, such that they have come to be called 'Copenhagen Lanes'[129]; 'Green Waves' – the synchronisation of traffic lights so that Copenhagen cyclists can maintain an average traveling speed of 20km/h[130]; a free bike rental program[131]; and the Copenhagen Bicycle Account.

The Copenhagen Bicycle Account was first released in 1995, and has been produced by the City of Copenhagen every two years since 1996.[132] The Account summarises the state of cycling development in Copenhagen by analysing residential survey data and DTU Transport, Survey of Transport Behaviour data. It is interesting to note that most indicators on perceptions of cycling in Copenhagen have a downward trend (see Table 16). This is despite an increase in the percentage of people that cycle to work or education in Copenhagen rising from 30% to 37% between 1996 and 2008, and the provision of 345km of separate bike paths, 14km of bike lanes, and the planned addition of 50km of separate bike paths and 110km of green bicycle routes in 2004.[133]

128 City of Copenhagen, 2008. Eco-*Metropolis: Our vision for Copenhagen 2015*. This is equivalent to $AUD35,795,840 (XE, 2010. *Universal Currency Converter*, accessed 10/8/2010).

129 Glover, L., 2009. *Bicycling Infrastructure in Australia: A Review of Current Policy Issues, Australian Centre for the Governance and Management of Urban Transport*.

130 City of Copenhagen, August 2009. *Copenhagen City of Cyclists – Bicycle Account 2008*.

131 Pucher, J., Buehler, R., December 2007. At the Frontiers of Cycling: Policy innovations in the Netherlands, Denmark, and Germany. *World Transport Policy & Practice*, 13(3):9-56.

132 City of Copenhagen, 2004. *Cycle Policy 2002 – 2012: City of Copenhagen*.

133 Pucher, J., Buehler, R., December 2007. At the Frontiers of Cycling: Policy innovations in the Netherlands, Denmark, and Germany. *World Transport Policy & Practice*, 13(3):9-56.

Table 16: Copenhagen Bicycle Account 2008 findings[134]

Question	Year						
	1996	1998	2000	2002	2004	2006	2008
Copenhagen as a city for cyclists	7	8	8	8	8	8	9
Cyclist sense of safety	6	6	6	6	6	5	5
Amount of cycle tracks	6	6	7	6	6	6	6
Cycle track width	7	7	6	5	5	5	4
Condition of cycle tracks	5	5	4	5	5	5	5
Condition of roads	2	3	2	3	3	3	3
Bicycle parking generally	4	3	4	3	3	3	3
Combining cycling and public transport	5	4	5	5	5	6	5

It is argued that at least five issues need to be addressed in order to improve cycling in Copenhagen. First, more money needs to be invested in maintaining cycling infrastructure.[135] Second, congestion affects several key bike paths during rush hours. A cause of this problem has been the increase in cargo bikes, as 25% of Copenhagen families with two children own one.[136] Green Waves are one of the policies adopted by the City to address this issue. Third, despite significant improvements in safety, with a decrease in the number of seriously injured cyclists from 252 to 121 between 1996 and 2008, the percentage of cyclists that feel safe has dropped from 60% to 51% during the same time period. The City of Copenhagen speculates that this could be due to media coverage of serious accidents. Policy options adopted to address the problem include widening bike paths, building more separate bike paths and making intersections safer.[137] Fourth, coordination of cycling with public transport requires improvement. This is partially being addressed by dealing with the fifth issue: a lack of bike parking.

134 City of Copenhagen, August 2009. *Copenhagen City of Cyclists – Bicycle Account 2008*.

135 Pucher, J., Buehler, R., December 2007. At the Frontiers of Cycling: Policy innovations in the Netherlands, Denmark, and Germany. *World Transport Policy & Practice*, 13(3):9-56.

136 City of Copenhagen, August 2009. *Copenhagen City of Cyclists – Bicycle Account 2008*. There are two types of cargo bikes: freight bikes and bikes with cargo trailers attached. These are used for transporting significantly more than can be carried on a normal bike, for example: shopping; and children.

137 City of Copenhagen, August 2009. *Copenhagen City of Cyclists – Bicycle Account 2008*.

8.3 San Francisco

Box 9: San Francisco cycling bodies, policies and reports

California Department of Transportation:
California Transport Plan (2006)
California Blueprint for Bicycling and Walking (2002)
Metropolitan Transport Commission:
Change in Motion: Transportation 2035 Plan for the San Francisco Bay Area (2009)
Regional Bicycle Plan for the San Francisco Bay Area: 2009 Update (2009)
2001 Regional Bicycle Plan for the San Francisco Bay Area (2001)
San Francisco Municipal Transportation Agency:
City of San Francisco 2009 Bicycle Count Report (2010)
San Francisco Bicycle Plan (2009)
2008 San Francisco State of Cycling Report (2008)
San Francisco Planning Department:
Transit Center District Plan (2009)
San Francisco County Transportation Authority
Countywide Transportation Plan (2004)
San Francisco Bike Coalition
Report Card on Bicycling: San Francisco 2008
Report Card on Bicycling: San Francisco 2006

The organisations involved in cycling administration in San Francisco have produced a number of policies and reports (see Box 9).[138] These policies and reports include state, metropolitan and city-specific bicycle plans, and a biannual report card on bicycling. San Francisco has adopted a number of innovative cycling policies along with the biannual report card on bicycling. These include: car-free street days; bicycle traffic lights; bike education programs for adults and youth;[139] retrofitting public transport to carry bikes; a Bike Month; and a Bike Sharing Program.[140] The City aims to: increase bike moe share to 10% of all trips by 2010;[141] reduce bike fatalities and injuries by 25% by 2035; and create a Regional Bicycle Network of 2,100 miles.[142] $USD1.89 billion is expected to be invested on cycling in San Francisco by regional and county administrative bodies between 2010 and 2035 – roughly 1% of total transport infrastructure expenditure.[143] An injunction against the San Francisco Bicycle Plan has prevented its implementation since 1996. The injunction was brought against the City and County of San Francisco by two anti-cycling advocates. It was granted because the City had failed to conduct an environmental review of the project in violation of the *California Environmental Quality Act 1970*. Work on the Bike Plan will probably resume now that an Environmental Impact Report on the Bike Plan has been completed.[144]

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138 Two further related bodies are the San Francisco Bicycle Advisory Committee and the California Bicycle Advisory Committee.

139 Alliance for Biking & Walking, 2010. *Bicycling and Walking in the United States 2010 Benchmarking Report*.

140 League of American Bicyclists, 2010. *2010 Bicycle Friendly America*.

141 Urban Transportation Caucus, August 2007. *Urban Transportation Report Card*.

142 Metropolitan Transport Commission, 2009. *Change in Motion: Transportation 2035 Plan for the San Francisco Bay Area*. This figure is equivalent to 3380 kilometres.

143 Metropolitan Transport Commission, 2009. *Regional Bicycle Plan for the San Francisco Bay Area: 2009 Update*.

144 San Francisco Bicycle Coalition, 2010. *Bike Plan Lawsuit*, accessed 5/8/2010.

Despite the Bike Plan injunction, San Francisco is recognised as one of the leading cities for cycling in the USA, being amongst the top third of cities for all cycling indicators. One of the most significant factors influencing cycling rates in San Francisco is the degree of cycling advocacy present in the city. San Francisco has the second highest advocacy capacity rating of all US cities, and the highest per capita membership of advocacy organisations, with one member for every 76 residents.[145] Cycling increased by 53.5% between 2006 and 2009. In 2008, cycling made up 2.5% of all trips to work and 6% of all trips in the City of San Francisco.[146] For the metropolitan area of San Francisco, cycling made up 1.5% of all trips to work.[147] Cycling rates varied significantly by gender and ethnicity. In 2009, 29% of all cyclists were women and, for example, in 2008 Asians made up 32% of San Franciscans but only 12% of frequent cyclists.[148] In a 2008 survey, residents and cyclists identified safety and infrastructure issues as the most significant impediments to increase cycling in San Francisco. Distance and topography were 6th and 8th out of 11 choices of barriers to increased cycling.[149]

8.4 Statistical comparison: Sydney, Copenhagen and San Francisco

A statistical comparison of Sydney, Copenhagen and San Francisco provides some insight into the factors that may work for and against increased cycling rates in Sydney. Cycling rates in Copenhagen can, in large part, be attributed to the innovative approaches to cycling adopted by the City of Copenhagen and the priority given to cycling as a transport option, as seen most convincingly in the relative degree of investment allocated to cycling (see Table 17). Further factors in Copenhagen that probably contribute to high cycling rates include having half the average annual rainfall and having a higher population density. The main limiting factor in Copenhagen, according to the statistics in Table 17, is the average minimum temperature of -2^{o}C. It can also be noted that Copenhagen had only 5 cycling related fatalities in 2008, despite having a much higher rate of cycling than Sydney.

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145 This figure is only applicable to the City of San Francisco (population 764,976), not the entire metropolitan area of San Francisco. This is equivalent to over 10,000 members (Alliance for Biking & Walking, 2010. *Bicycling and Walking in the United States 2010 Benchmarking Report*)

146 San Francisco Municipal Transportation Agency, January 2010. *City of San Francisco 2009 Bicycle Count Report*.

147 Pucher, J., Buehler, R., 2009. Integrating Bicycling and Public Transport in North America, *Journal of Public Transportation*, 12(3):79-104.

148 San Francisco Municipal Transportation Agency, January 2010. *City of San Francisco 2009 Bicycle Count Report*; San Francisco Municipal Transportation Agency, 2008. *2008 San Francisco State of Cycling Report*.

149 San Francisco Municipal Transportation Agency, 2008. *2008 San Francisco State of Cycling Report*.

Table 17: A comparison of cycling in Sydney, Copenhagen and San Francisco[150]

Feature	Sydney	Copenhagen	San Francisco
Bike mode share of journey-to-work trips for the whole city	0.78% (2006)	37% (2008)	1.5% (2009)
Inner city bike mode share of journey-to-work trips	2.2% (2008)	55% (2008)	2.5% (2008)
National average of bike mode share for journey-to-work trips	1.6% (2006)	19% (2006)	0.4% (2006)
Bicycle mode share for all trips	0.6% (2008)	25% (2005)	6% (2008)
Bicycle work trips by women	17% (2006)	45% (National 2005)	29% (2009)
Injuries (fatalities)	8 (1090) (2008)	5 (N/A) (2008)	23 (2298) (2006)
Ride-to-work day participants	10,000 (2008)	N/A	75,000 (2008)
Expenditure per capita per annum on cycling	$AUD1.29 (2007)	DKK165 ($AUD31.92) (2006)	$USD2.48 ($AUD2.71) (2010)
Funding as % of all transport expenditure	0.36% (2010)	N/A	1% (2009)
Bicycle Account	No	Yes	Yes
Public transport mode share for journey-to-work	23.3% (2008)	28% (2008)	9.7% (2009)
Average annual rainfall	1215mm	613mm	565.9mm
Temperature range (average minimum in winter to average maximum in summer)	8°C to 25.9°C	-2°C to 20.4°C	8°C to 21.8°C
Total population	4,419,075	1,899,427	4,203,898
Total land area (population density – persons/km^2)	12,145 km^2 (363.9) (2008)	2,923 km^2 (649.8) (2010)	9,128.2 km^2 (460.5) (2010)
Inner city urbanized area (population density – persons/km^2)	1,687 km^2 (2,040) (2006)	455.61 km^2 (2,592.7) (2010)	600.7 km^2 (1,346.7) (2010)

150 Sources: City of Copenhagen, August 2009. *Copenhagen City of Cyclists – Bicycle Account 2008*; Pucher, J., Buehler, R., December 2007. At the Frontiers of Cycling: Policy innovations in the Netherlands, Denmark, and Germany. *World Transport Policy & Practice*, 13(3):9-56; Wikipedia, 2010. *Copenhagen*, accessed 6/8/2010; San Francisco Municipal Transportation Agency, 2008. *2008 San Francisco State of Cycling Report*; Wikipedia, 2010. *San Francisco*, accessed 6/8/2010; Metropolitan Transport Commission, 2009. *Regional Bicycle Plan for the San Francisco Bay Area: 2009 Update*; Alliance for Biking & Walking, 2010. *Bicycling and Walking in the United States 2010 Benchmarking Report*; Transport Data Centre, 2010. *2008/09 Household Travel Survey: Summary Report*; Weatherzone, 2010. *Sydney Long-term averages*, accessed 6/8/2010. $AUD equivalent expenditure per capita on cycling was calculated using this website: XE, 2010. *Universal Currency Converter*, accessed 6/8/2010.

Factors that have increased cycling in San Francisco include: a strong advocacy movement; high public participation in cycling events like ride to work day; roughly double the investment in cycling in comparison to Sydney; and half Sydney's average annual rainfall (see Table 17). As San Francisco has relatively low public transport use, other forms of transport including cycling may present as more attractive transport options.

A factor often cited as limiting cycling in Sydney is topography, a factor that would seem to be shared with San Francisco.[151] Despite this similarity, to date San Francisco has managed to achieve double the cycling share of trips to work across the whole city (see Table 17). No comparable topographical statistics of the three cities were found so that, despite Copenhagen being reportedly flatter than cities like Sydney, there is no way of gauging the relative importance of topography on cycling levels. A 2004 study that examined the effect of several factors on cycling rates in Dutch municipalities found that "a hilly city will have the effect of decreasing its bicycle use by as much as 74%". However, the methodology of this study seems flawed and unsuitable for application to analysing cycling in other cities.[152]

Two other factors included in Table 17 limit increased levels of cycling in Sydney compared to Copenhagen and San Francisco: limited expenditure on cycling on a per capita basis and as a percentage of total transport expenditure; and double the average annual rainfall. Another factor of importance in comparing cycling rates that has not been included in Table 17 (due to non-comparable data) is the proportion and length of cycleways that are separate from roads. The absence of separate cycleways has been found to be an important barrier to cycling by several studies.[153]

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151 See for example: Pucher, J., Garrad, J., Greaves, S., 2010. Cycling down under: a comparative analysis of bicycling trends and policies in Sydney and Melbourne, *Journal of Transport Geography*, In press.

152 Rietveld, P., Daniel, V., 2004. Determinants of bicycle use: do municipal policies matter? *Transportation Research Part A*, 38:531-550: p544. As far as can be inferred from the methodology described in the article, the methods used to take topography into account seem flawed. The topographical factor was comprised of a ranking of cities on a scale of 0 to 1 according to their altitude above sea level. There is no necessary correlation between altitude above sea level and the internal topography of a city such that altitude can be used as a substitute for how flat or otherwise a city may be.

153 See for example: Galaxy Research, June 2010. *Cycleway Network Benchmark Study Inner Sydney Region: Prepared for City of Sydney June 2010*.

9.0 SUMMARY OF POLICY RECOMMENDATIONS AND CASE STUDY FINDINGS

Based on the available research, there are a range of policy options available for increasing cycling in Sydney. Much of the literature recommends a coordinated, multi-faceted approach that adopts policy options which will work well together.[154] According to the research, in order to be successful cycling infrastructure and planning needs to be integrated into all transport infrastructure and planning and into all land-use planning. It is also important to remove the generalised costs that limit uptake of cycling as a transport option and simultaneously make competing modes of private transport more expensive.[155]

Many of the recommendations contained in Table 18 have been implemented in the case studies briefly examined, and have been a factor in increasing cycling as a transport option. Each policy recommendation is arranged under sub-headings, and its status in Sydney is described. Often-cited recommendations include: coherent cycle networks; end-of-trip facilities; separate bike lanes; bike share/hire programs; promoting benefits of cycling; regular bike account; school education programs; driver education; traffic calming; less or more expensive car parking; integration with public transport; and more bike parking. Recommendations not mentioned previously in this paper include: increasing travel speed for cyclists; introducing electric-powered bikes due to topographical barriers; company bikes instead of company cars; ciclovia – having car-free Sundays on certain roads; police-administered tests for school children to ensure they can cycle safely (as in Germany, Holland and Denmark); traffic calming – reducing traffic speeds to 5km/h in local streets; and higher costs for owning and running a motor vehicle.

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154 See for e.g. Pucher, J., Buehler, R., 2008. Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany. *Transport Reviews*, 28(4): 495-528.

155 Rietveld, P., Daniel, V., 2004. Determinants of bicycle use: do municipal policies matter? *Transportation Research Part A*, 38:531-550.

Table 18: Policy recommendations for cycling from the literature[156]

Recommendation	Status in Sydney
Planning for cyclists	
Direct cycle routes	Many cycleways are not connected to transport hubs or employment centres
Coherent cycle networks	Most networks are ad hoc; Responsibility - RTA and local government
Audits of cycle plans	N/A
End-of-trip facilities	Promotion responsibility - Department of Environment, Climate Change and Water
Green transport plans for workplaces and schools	N/A
Contraflow cycling on one-way streets	N/A
Separate bike lanes	City of Sydney has recently started building some
Cycling integrated into land-use planning and urban design	A few examples – e.g. City of Sydney
Introduce more mixed-use land-use and requirements for bike facilities in new developments	A few examples – e.g. City of Sydney
Reallocate road space for cycling lanes where necessary	City of Sydney has commenced building separate cycleways in 2010
Coherent signage and design standard	Some
Attractive and safe cycleways	N/A
Green Wave – synchronisation of traffic lights for the benefit of cyclists	No
Increased travel speed for cyclists	No
Electric-powered bikes – increase wattage limit permissible without registration to 300W	No
Bike schemes	
Bike share program	No
Company bikes	N/A
Financial incentives e.g. schemes organised by employers	N/A
Information, campaigns and events	
Enforced safety requirements e.g. reflectors	Yes – helmets; no riding under the influence; follow road rules; promotion responsibility - NSW Centre for Road Safety
Promotion of bike routes	Responsibility - RTA and local government
Cyclist of the year awards	N/A
Cycle to work campaigns	Responsibility - NSW Centre for Road Safety
Cycle to work ride	Responsibility - NSW Centre for Road Safety
Promoting benefits of cycling	Responsibility - NSW Centre for Road Safety, RTA and Department of Health
Bike to school days	Responsibility - NSW Centre for Road Safety, RTA and Department of Health
Community cycling events	Yes
Mass marketing campaign	No
Regular bicycle account	No
Cycling demonstration areas	No
Ciclovia – car-free Sundays on certain roads	No

156 See Appendix F for a list of all sources by topic.

Support bicycle user groups	N/A
Bike trip planning websites	N/A
Education	
Networks, seminars and conferences	N/A
Research & development	N/A
Adult education	Responsibility - RTA
(Mandatory) school children education	Responsibility - RTA
Driver education – awareness of cyclists right to use roads	Responsibility - NSW Centre for Road Safety and RTA
Education programs targeted at specific groups	N/A
Police-administered test for school children to show they can cycle safely	No
Safer road layout	
Traffic calming – residential zones (30km/h)	No
Traffic calming – home zones (5km/h)	No
Cycle crossings	No
Intersection treatment e.g. staggered stop lines	No
Traffic lights for cyclists	No
Remove and replace drainage cages from roads	N/A
Restrictions on car use	
Replace car parking with bike parking	N/A
Road closure – inner city	No
Less free parking for cars – invest funds raised into public transport, bike and walking infrastructure	No
Congestion charges	No
Car free zones or streets	No
Higher petrol taxes	No
Higher motor vehicle taxes and registration fees	No
More stringent and expensive vehicle licensing	No
Bike-public transport integration	
Promote benefits of bike-public transport integration	Responsibility - NSW Transport & Infrastructure
Trains with bike racks	No
Buses with bike racks	No
Bike parking at transport hubs	Some
Bike garages – provide rental, repairs, parts and accessories, bike washing, showers and lockers etc.	No
Ensure bike routes are integrated with public transport hubs	Very little
Better bike parking	
Safe, secure and/or sheltered bike parking	N/A
Bike parking at schools, workplaces and major destinations	N/A
Economic support	
Tax deductions for cyclists	No
Increased Commonwealth Government investment	Department of Premier & Cabinet to seek support in promoting bike-riding
Free bike registration and engraving of numbers on bikes to prevent theft	No

Tax breaks to purchase bikes	No
Organisational	
Create a multi-agency working group – transport, roads and traffic, environment, planning, health, education, local government	No
Bike councils – public participation in bike planning along with government and other stakeholders	Yes – RTA has a Bicycle Council
Traffic laws	
Special legal protection for children and elderly cyclists	No
Motorists assumed by law to be responsible for almost all crashes with cyclists	No
Strict enforcement of cyclist rights by police and courts	N/A
Remove mandatory helmet use	No

10.0 CONCLUSION

As a result of environmental and other considerations, including traffic congestion on Sydney's roads, cycling has been in the news of late. At all levels of Australian government, policies have been introduced to encourage cycling as a healthy, convenient and cost-effective mode of personal transport. Nevertheless, it remains the case that, as a component of NSW transport policy, cycling occupies a minor place in overall transport planning. Adoption of cycling by local councils in NSW is uneven. Compared to most other Australian capital cities, Sydney lags behind in its adoption of cycling as a transport option. Equally, Australia generally lags such countries as Germany, Holland and Denmark in this respect.

This paper has summarised the costs and benefits of cycling, and the transport issues currently facing NSW. International examples suggest that cycling can be a feasible transport option for large cities. Likewise, the literature suggests a variety of policy recommendations. If cycling is adopted by all levels of government as a significant transport option, an integrated, multi-faceted approach will be required that draws on many of these policy recommendations.

APPENDIX A

Table A: Resources that identify the benefits of cycling

Title	1	2	3	4	5	6
Reports and Research						
Cycling – Moving Australia Forward (2007)	X	X	X	X	X	X
Cycling: Getting Australia moving: Barriers, facilitators and interventions to get more Australians physically active through cycling (2008)	X			X	X	
NSW BikePlan – Comments from the Cycling Promotion Fund (2008)	X	X	X	X	X	
Economic benefits of cycling for Australia (2008)	X	X			X	
Evaluation of the costs and benefits to the community of financial investment in cycling programs and projects in New South Wales (2009)	X	X	X	X	X	X
Bicycling infrastructure in Australia: a review of current policy issues (2009)		X	X	X	X	
Inner Sydney Regional Bicycle Network (2010)	X	X	X	X	X	
Commonwealth Government Policies						
Australia Cycling: The National Strategy 1999-2004 (1999)	X	X	X	X	X	
The Australian National Cycling Strategy 2005-2010 (2005)	X	X	X	X	X	
NSW Government Policies						
Action for Transport 2010: An integrated transport plan for Sydney (1998)		X		X	X	
Action for Bikes: BikePlan 2010 (1999)	X	X		X	X	
Planning guidelines for walking and cycling (2004)		X	X	X	X	X
City of Cities (2005)		X	X		X	
Towards Sydney 2036 (2010)					X	
NSW BikePlan (2010)	X	X		X	X	X
Metropolitan Transport Plan: Connecting the City of Cities (2010)		X			X	
NSW State Plan (2010)	X				X	
Local Government Policies						
Cycle Strategy and Action Plan 2007-2017 (2007)	X		X		X	
Sustainable Sydney 2030 (2010)	X	X			X	
Websites						
Australian Bicycle Council – Benefits of cycling	X	X	X	X	X	
University of Central Florida – 28 reasons to bike	X	X	X	X	X	

Key: (1) – Transport benefits (2) – Environmental benefits (3) – Social benefits (4) – Economic benefits (5) – Health benefits (6) – Other benefits

APPENDIX B

Table B: Travel to work by Local Government Area for the Sydney Greater Metropolitan Region and select regional Local Government Areas (2006)

Local Government Area	Car as driver		Car as passenger		Train		Bus		Walked only		Bicycle		Total trips[1]
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Inner Sydney Local Government Areas													
Ashfield	7,361	46.29	717	4.35	4,437	26.92	981	5.95	897	5.44	159	0.96	16,485
Botany Bay	8,353	57.74	1,125	7.78	231	1.60	2,582	17.85	942	6.51	203	1.40	14,466
Burwood	5,640	48.10	652	5.56	3,090	26.35	397	3.39	678	5.78	65	0.55	11,726
Canada Bay	18,207	62.70	1,500	5.17	2,178	7.50	3,053	10.51	977	3.36	251	0.86	29,037
Canterbury	26,510	60.34	3,098	7.05	7,200	16.39	1,493	3.40	1,409	3.21	169	0.38	43,931
Hunter's Hill	3,089	66.95	224	4.95	6	0.13	568	12.31	157	3.10	18	0.39	4,614
Lane Cove	7,353	55.51	627	4.73	663	5.00	2,429	18.34	895	6.76	124	0.94	13,247
Leichhardt	12,106	50.37	1,149	4.78	209	0.87	5,301	22.06	1,582	6.58	435	1.81	24,034
Marrickville	14,228	44.01	1,541	4.77	6,579	20.35	3,729	11.53	2,267	7.01	799	2.47	32,328
Mosman	5,604	51.94	446	4.13	41	0.38	2,240	20.76	632	5.86	82	0.76	10,789
North Sydney	11,703	38.65	1,111	3.67	4,091	13.51	5,452	18.01	4,316	14.25	270	0.89	30,280
Randwick	26,184	52.02	2,809	5.58	240	0.48	12,297	24.43	3,783	7.52	752	1.49	50,331
Rockdale	20,839	58.05	2,314	6.45	6,706	18.68	994	2.77	1,433	3.99	166	0.46	35,900
Sydney	19,651	29.48	2,405	3.61	8,006	12.01	10,068	15.10	18,760	28.14	1,355	2.03	66,663
Waverley	12,414	48.63	1,240	4.86	1,926	7.54	2,454	9.61	1,762	6.90	404	1.58	25,530
Willoughby	13,310	49.82	1,311	4.91	4,290	16.06	3,302	12.36	2,466	9.23	206	0.77	26,714
Woollahra	10,396	50.17	1,159	5.59	1,970	9.51	2,065	9.97	2,110	10.18	172	0.83	20,720

Table B source: ABS, June 2010. *NSW State and Regional Indicators, June 2010 (Cat. No. 1338.1)*; ABS, 2006. *2006 Census of Population and Housing, 2006 Census Tables (Cat. No. 2068.0)*.

Notes: (1) Total trips includes trips by the following modes recorded in the ABS data but not included here: motorbike/scooter; other; and two or more methods of travel (2) The regional NSW LGAs included in this Table were selected according to a map in *Cycling in NSW: what the data tells us* (2008) as they had the highest numbers of commuting cyclists outside of the Sydney Greater Metropolitan Area.

Table B cont'd: Travel to work by Local Government Area for the Sydney Greater Metropolitan Region and select regional Local Government Areas (2006)

Local Government Area	Car as driver		Car as passenger		Train		Bus		Walked only		Bicycle		Total trips[1]
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Outer Sydney Local Government Areas													
Auburn	11,736	57.29	1,539	7.51	4,248	20.74	199	0.97	819	4.00	107	0.52	20,486
Bankstown	38,858	68.57	4,190	7.39	6,357	11.22	753	1.33	1,499	2.64	211	0.37	56,673
Baulkham Hills	54,252	77.75	4,067	5.83	1,303	1.87	3,442	4.93	1,264	1.81	157	0.23	69,775
Blacktown	70,340	68.61	7,970	7.77	9,922	9.68	1,499	1.46	2,001	1.95	391	0.38	102,525
Camden	16,457	79.66	1,216	5.89	457	2.21	155	0.75	355	1.72	64	0.31	20,658
Campbelltown	36,598	67.27	4,160	7.65	6,224	11.44	574	1.06	1,032	1.90	148	0.27	54,404
Fairfield	40,367	70.00	5,487	9.51	4,221	7.32	977	1.69	1,213	2.10	227	0.39	57,671
Holroyd	21,831	65.33	2,429	7.27	4,166	12.47	8889	2.66	976	2.92	151	0.45	33,414
Hornsby	40,077	64.04	3,213	5.13	9,070	14.49	1,413	2.26	2,256	3.60	233	0.37	62,585
Hurstville	17,244	59.89	1,638	5.69	6,204	21.55	317	1.10	977	3.39	104	0.36	28,791
Kogarah	12,756	59.92	1,212	5.69	4,277	20.09	240	1.13	905	4.25	57	0.27	21,287
Ku-ring-gai	23,907	64.11	1,656	4.44	6,043	16.20	615	1.65	1,138	3.05	139	0.37	37,292
Liverpool	42,017	71.33	4,452	7.56	3,568	6.06	1,137	1.93	1,700	2.89	277	0.47	58,902
Manly	8,122	53.15	715	4.68	29	0.19	2,093	13.70	1,054	6.90	199	1.30	15,280
Parramatta	34,134	61.33	3,571	6.42	7,643	13.73	2,005	3.60	2,896	5.20	167	0.48	55,652
Penrith	51,694	73.19	5,185	7.34	4,378	6.20	556	0.79	1,596	2.26	314	0.44	70,631
Pittwater	16,381	76.20	1,154	5.37	29	0.13	1,588	7.39	798	3.71	145	0.67	21,497
Ryde	24,948	62.64	2,229	5.60	2,853	7.16	4,792	12.03	1,685	4.23	216	0.54	39,830
Strathfield	6,878	57.05	667	5.53	2,507	20.79	273	2.26	461	3.82	44	0.36	12,057
Sutherland Shire	63,924	71.77	4,836	5.43	9,191	10.32	363	0.41	2,553	2.87	442	0.50	89,071
Warringah	39,197	67.89	3,488	6.04	103	0.18	7,557	13.09	2,349	4.07	497	0.86	57,734
Wingecarribee	11,152	79.05	980	6.95	175	1.24	88	0.62	712	5.05	95	0.67	14,108
Wollondilly	12,769	80.49	910	5.74	321	2.02	62	0.39	432	2.72	21	0.13	15,864

Table B cont'd: Travel to work by Local Government Area for the Sydney Greater Metropolitan Region and select regional Local Government Areas (2006)

Local Government Area	Car as driver		Car as passenger		Train		Bus		Walked only		Bicycle		Total trips[1]
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Greater Metropolitan Region Local Government Areas													
Blue Mountains	20,006	72.03	1,666	6.00	2,752	9.26	117	0.42	1,004	3.61	135	0.49	27,776
Cessnock	11,532	81.08	1,298	9.13	25	0.18	77	0.54	488	3.43	57	0.40	14,223
Gosford	38,323	71.37	3,962	7.38	3,471	6.46	744	1.39	1,536	2.86	253	0.47	53,693
Hawkesbury	18,999	77.52	1,566	6.39	613	2.50	77	0.31	941	3.84	240	0.98	24,508
Kiama	5,431	81.56	459	6.89	95	1.43	23	0.35	281	4.22	31	0.47	6,659
Lake Macquarie	51,757	82.63	4,542	7.25	546	0.87	914	1.46	1,370	2.19	370	0.59	62,639
Maitland	18,065	81.66	1,823	8.24	419	1.89	92	0.42	545	2.46	122	0.55	22,122
Newcastle	39,148	76.69	3,864	7.57	425	0.83	1,417	2.78	2,850	5.58	1,041	2.04	51,046
Port Stephens	15,240	80.05	1,529	8.03	27	0.14	211	1.11	870	4.57	145	0.76	19,039
Shellharbour	17,242	82.64	1,632	7.82	269	1.29	195	0.93	436	2.09	109	0.52	20,863
Shoalhaven	19,356	78.48	2,105	8.53	79	0.32	118	0.48	1,294	5.25	259	1.05	24,665
Wollongong	48,246	75.81	4,977	7.82	2,724	4.28	857	1.35	2,526	3.97	667	1.05	63,639
Wyong	34,082	77.75	3,584	8.18	1,088	2.48	513	1.17	1,066	2.43	219	0.50	43,837
Sydney Greater Metropolitan Area	1,256,584	65.85	123,399	6.47	157,505	8.26	96,347	5.05	90,944	4.77	13,784	0.72	1,907,691
Regional Local Government Areas[2]													
Albury	14,603	79.53	1,392	7.58	5	0.03	131	0.71	928	5.05	313	1.70	18,362
Byron	6,627	73.76	624	6.94	10	0.11	76	0.85	593	6.60	292	3.25	8,985
Clarence Valley	9,963	73.47	1,100	8.11	0	0.00	68	0.50	938	6.92	304	2.24	13,561
Coffs Harbour	15,896	75.71	2,063	9.83	9	0.04	157	0.75	1,017	4.84	293	1.40	20,995
Tweed	18,690	77.74	1,885	7.84	11	0.05	272	1.13	961	4.00	285	1.19	24,043
Wagga Wagga	17,765	76.46	1,872	8.06	4	0.02	209	0.90	1,635	7.04	255	1.10	23,234

APPENDIX C

Table C: Travel to work by bicycle by Local Government Area for the Sydney Greater Metropolitan Region between 2001 and 2006

Local Government Area	Bicycle used on journey to work (2001)	All trips (2001)	Bicycle mode share (%) (2001)	Bicycle used on journey to work (2006)	All trips (2006)	Bicycle mode share (%) (2006)	% change in number of bicycles	Relative change in bicycle mode share, 2001 to 2006 (%)
Inner Sydney Local Government Areas								
Ashfield	159	15,844	1.00	189	16,482	1.15	19	14
Botany Bay	186	13,845	1.34	214	14,462	1.49	15	10
Burwood	53	10,789	0.49	82	11,730	0.70	55	42
Canada Bay	176	43,178	0.41	193	29,041	0.44	10	8
Canterbury	216	26,236	0.82	280	43,931	0.96	30	17
Hunter's Hill	28	4,524	0.62	23	4,611	0.60	-18	-19
Lane Cove	109	13,498	0.81	132	13,248	1.00	21	23
Leichhardt	443	24,530	1.81	475	24,031	1.98	7	9
Marrickville	720	32,112	2.24	893	32,330	2.76	24	23
Mosman	85	11,242	0.76	95	10,790	0.88	12	16
North Sydney	264	29,570	0.89	293	30,278	0.97	11	8
Randwick	694	49,724	1.40	811	50,336	1.61	17	15
Rockdale	143	33,034	0.43	191	35,902	0.53	34	23
Sydney	1225	55,456	2.21	1,460	6,660	2.19	19	-1
Waverley	439	26,909	1.59	462	25,524	1.81	8	14
Willoughby	172	24,772	0.69	227	26,714	0.85	32	22
Woollahra	211	21,494	0.98	191	20,720	0.92	-9	-6
Total	5315	436,756	1.22	6,211	456,791	1.36	17	12

Table C source: New, C., Rissel, C., May 2008. *Cycling to work in Sydney: analysis of journey-to-work Census data from 2001 and 2006.* Health Promotion Service Sydney South West Area Health Service.

Table C cont'd: Travel to work by bicycle by Local Government Area for the Sydney Greater Metropolitan Region between 2001 and 2006

Local Government Area	Bicycle used on journey to work (2001)	All trips (2001)	Bicycle mode share (%) (2001)	Bicycle used on journey to work (2006)	All trips (2006)	Bicycle mode share (%) (2006)	% change in number of bicycles	Relative change in bicycle mode share, 2001 to
Outer Sydney Local Government Areas								
Auburn	92	16,672	0.55	124	20,483	0.61	35	10
Bankstown	294	55,967	0.53	256	56,677	0.45	-13	-14
Baulkham Hills	178	61,737	0.29	176	69,775	0.25	-1	-13
Blacktown	439	94,186	0.47	480	102,531	0.47	9	0
Camden	71	17,995	0.39	69	20,656	0.33	-3	-15
Campbelltown	268	52,903	0.51	224	54,405	0.41	-16	-19
Fairfield	226	56,701	0.40	256	57,663	0.44	13	11
Holroyd	145	32,178	0.45	174	33,417	0.52	20	16
Hornsby	293	59,860	0.49	297	62,585	0.47	1	-3
Hurstville	138	27,315	0.51	111	28,786	0.39	-20	-24
Kogarah	70	19,829	0.35	64	21,288	0.30	-9	-15
Ku-ring-gai	179	36,996	0.48	162	37,288	0.43	-9	-10
Liverpool	356	55,515	0.64	329	58,899	0.56	-8	-13
Manly	215	15,501	1.39	242	15,281	1.58	13	14
Parramatta	295	52,297	0.56	311	55,658	0.56	5	-1
Penrith	465	68,436	0.68	415	70,632	0.59	-11	-14
Pittwater	194	22,070	0.88	168	21,496	0.78	-13	-11
Ryde	257	39,585	0.65	246	39,831	0.62	-4	-5
Strathfield	39	10,156	0.38	51	12,056	0.42	31	10
Sutherland	571	88,726	0.64	522	89,072	0.59	-9	-9
Warringah	520	56,132	0.93	568	57,733	0.98	9	6
Wingecarribee	105	12,982	0.81	106	14,109	0.75	1	-7
Wollondilly	46	13,953	0.33	26	15,866	0.16	-43	-50
Total	5,456	967,689	0.56	5,377	1,016,186	0.53	-1.45	-6.15

Table C cont'd: Travel to work by bicycle by Local Government Area for the Sydney Greater Metropolitan Region between 2001 and 2006

Local Government Area	Bicycle used on journey to work (2001)	All trips (2001)	Bicycle mode share (%) (2001)	Bicycle used on journey to work (2006)	All trips (2006)	Bicycle mode share (%) (2006)	% change in number of bicycles	Relative change in bicycle mode share, 2001 to 2006 (%)
Greater Metropolitan Local Government Areas								
Blue Mountains	235	27,261	0.86	198	27,774	0.71	-16	-17
Cessnock	81	12,559	0.64	63	14,224	0.44	-22	-31
Gosford	374	50,933	0.73	340	53,687	0.63	-9	-14
Hawkesbury	250	23,912	1.05	270	24,509	1.10	8	5
Kiama	41	6,223	0.66	35	6,660	0.53	-15	-20
Lake Macquarie	405	57,532	0.70	395	62,635	0.63	-2	-10
Maitland	125	17,969	0.70	147	22,122	0.66	18	-4
Newcastle	1170	44,894	2.61	1,116	51,050	2.19	-5	-16
Port Stephens	229	16,626	1.38	154	19,040	0.81	-33	-41
Shellharbour	138	18,960	0.73	127	20,864	0.61	-8	-16
Shoalhaven	311	21,509	1.45	274	24,665	1.11	-12	-23
Wollongong	835	60,596	1.38	744	63,643	1.17	-11	-15
Wyong	253	38,269	0.66	247	43,839	0.56	-2	-15
Total	4,447	397,243	1.12	4,110	434,712	0.95	-8	-16

APPENDIX D

Government stakeholders: Aboriginal Affairs NSW; Australian Bicycle Council; Communities NSW – Sport and Recreation; Centennial Park & Moore Park Trust; City of Sydney; Department of Environment, Climate Change and Water; Department of Education & Training; Department of Human Services; Department of Health; Department of Planning; Department of Premier & Cabinet; Department of Services, Technology and Administration; Industry & Investment NSW; Land & Property Management Authority; National Parks & Wildlife Service; NSW Centre for Road Safety; NSW Transport & Infrastructure; Office of Fair Trading; Premier's Council for Active Living; Parramatta Park Trust; Roads & Traffic Authority; Sydney Harbour Foreshore Authority; Sydney Olympic Park Authority.

Non-government stakeholders: Bicycle Federation of Australia; Bicycle Motocross; Bicycle NSW; Bicycles User Groups; Cycling NSW; Mountain Bike; National Roads and Motorists Association; Parents & Citizens Federation of NSW; Powerhouse Museum.

APPENDIX E

Sources for Table 11:

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- Byron Shire Council, August 2008. *Byron Shire Bike Strategy and Action Plan (Bike Plan)*
- Clarence Valley Council, June 2009. *2009/2010 Budget and Management Plan*

APPENDIX F

Table F: Sources for Table 18

Recommendation	Sources
Planning for cyclists	
Direct cycle routes	(1) (6)
Coherent cycle networks	(1) (6) (11) (13) (14) (18)
Audits of cycle plans	(1)
End-of-trip facilities	(1) (8) (9) (13)
Green transport plans for workplaces and schools	(1)
Contraflow cycling on one-way streets	(1) (10)
Separate bike lanes	(2) (5) (8) (9) (10) (11) (13) (14) (15)
Cycling integrated into land-use planning and urban design	(3) (6) (13) (18)
Reallocate road space for cycling lanes where necessary	(4) (7)
Introduce more mixed-use land-use and requirements for bike facilities in new developments	(15)
Coherent signage and design standard	(5) (6) (7) (10)
Attractive and safe cycleways	(6)
Green Wave – synchronisation of traffic lights for the benefit of cyclists	(5) (10)
Increase travel speed for cyclists	(12) (13)
Electric-power bikes – increase wattage limit permissible without registration to 300W	(18)
Bike schemes	
Bike share/hire program	(1) (5) (9) (10)
Company bikes	(1) (5) (14)
Financial incentives e.g. schemes organised by employers	(8)
Information, campaigns and events	
Enforced safety requirements e.g. reflectors	(1)
Promotion of bike routes	(1)
Cyclist of the year awards	(1)
Cycle to work campaigns	(1)
Cycle to work ride	(3) (8)
Promoting benefits of cycling	(1) (5) (8) (10) (13)
Bike to school days	(3) (15)
Community cycling events	(3) (5) (10)
Mass marketing campaign	(3) (4)
Regular bicycle account	(4) (5) (10) (15)
Cycling demonstration areas	(4)
Ciclovia – car-free Sundays on certain roads	(10)
Support bicycle user groups	(13)
Bike trip planning websites	(5) (8)
Education	
Networks, seminars and conferences	(1)
Research & development	(1)
Adult education	(3) (10) (15)
(Mandatory) school children education	(2) (3) (4) (5) (10) (11)
Police-administered test for school children to show they can cycle safely	(11)
Driver education – awareness of cyclists right to use roads	(2) (3) (5) (8) (10) (13) (14) (15)
Education programs targeted at specific groups	(10) (12) (15)
Police-administered test for school children to show they can cycle safely	(11)

Safer road layout	
Traffic calming – residential zones (30km/h)	(2) (5) (7) (10) (11) (13) (14)
Traffic calming – home zones (5km/h)	(5) (14)
Cycle crossings	(1)
Intersection treatment e.g. staggered stop lines	(1) (2) (4) (5) (10) (14) (15)
Traffic lights for cyclists	(1) (5) (7) (10) (14)
Remove and replace drainage cages from roads	(4)
Restrictions on car use	
Replace car parking with bike parking	(1) (5)
Road closure or restricted access in inner city	(1) (3) (5) (11)
Less free parking for cars – invest funds raised into public transport, bike and walking infrastructure	(1) (3) (5) (10) (11)
Congestion charges	(3) (10)
Car free zones or streets	(5) (10)
Higher petrol taxes	(5) (11)
Higher motor vehicle taxes and registration fees	(5) (11)
More stringent and expensive vehicle licensing	(5) (11)
Bike-public transport integration	
Promote benefits of bike-public transport integration	(2)
Trains with bike racks	(1) (4) (7) (11) (16)
Buses with bike racks	(1) (4) (10) (11) (16)
Bike parking at transport hubs	(4) (9) (11) (16)
Bike garages – provide rental, repairs, parts and accessories, bike washing, showers and lockers etc.	(5) (16)
Ensure bike routes are integrated with public transport hubs	(4) (5) (7) (9) (10) (11) (13) (14) (16)
Better bike parking	
Safe, secure and/or sheltered bike parking	(1) (5) (7) (8) (10) (13) (14)
Bike parking at schools, workplaces and major destinations	(2) (5)
Economic support	
Tax deductions for cyclists	(1)
Increased Commonwealth Government investment	(3) (11) (18)
Free bike registration and engraving of numbers on bikes to prevent theft	(10)
Tax breaks to purchase bikes	(5)
Organisational	
Create a multi-agency working group – transport, roads and traffic, environment, planning, health, education, local government	(4)
Bike councils – public participation in bike planning along with government and other stakeholders	(5)
Traffic laws	
Special legal protection for children and elderly cyclists	(5) (14)
Motorists assumed by law to be responsible for almost all crashes with cyclists	(5) (6)
Strict enforcement of cyclist rights by police and courts	(5) (6) (11) (14)
Remove mandatory helmet use	(17)

Sources:

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(4) Cycling Promotion Fund, October 2008. *NSW BikePlan Comments from the Cycling*

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(5) Pucher, J., Buehler, R., 2008. Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany. *Transport Reviews*, 28(4): 495-528
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(17) Curnow, W., 2008. Bicycle helmets and public health in Australia. *Health Promotion Journal of Australia*, 19(1): 10-15
(18) Bicycle Federation of Australia and the Cycling Promotion Fund, February 2006. *Submission to the Inquiry into Australia's Future Oil Supply and Alternative Transport Fuels*.