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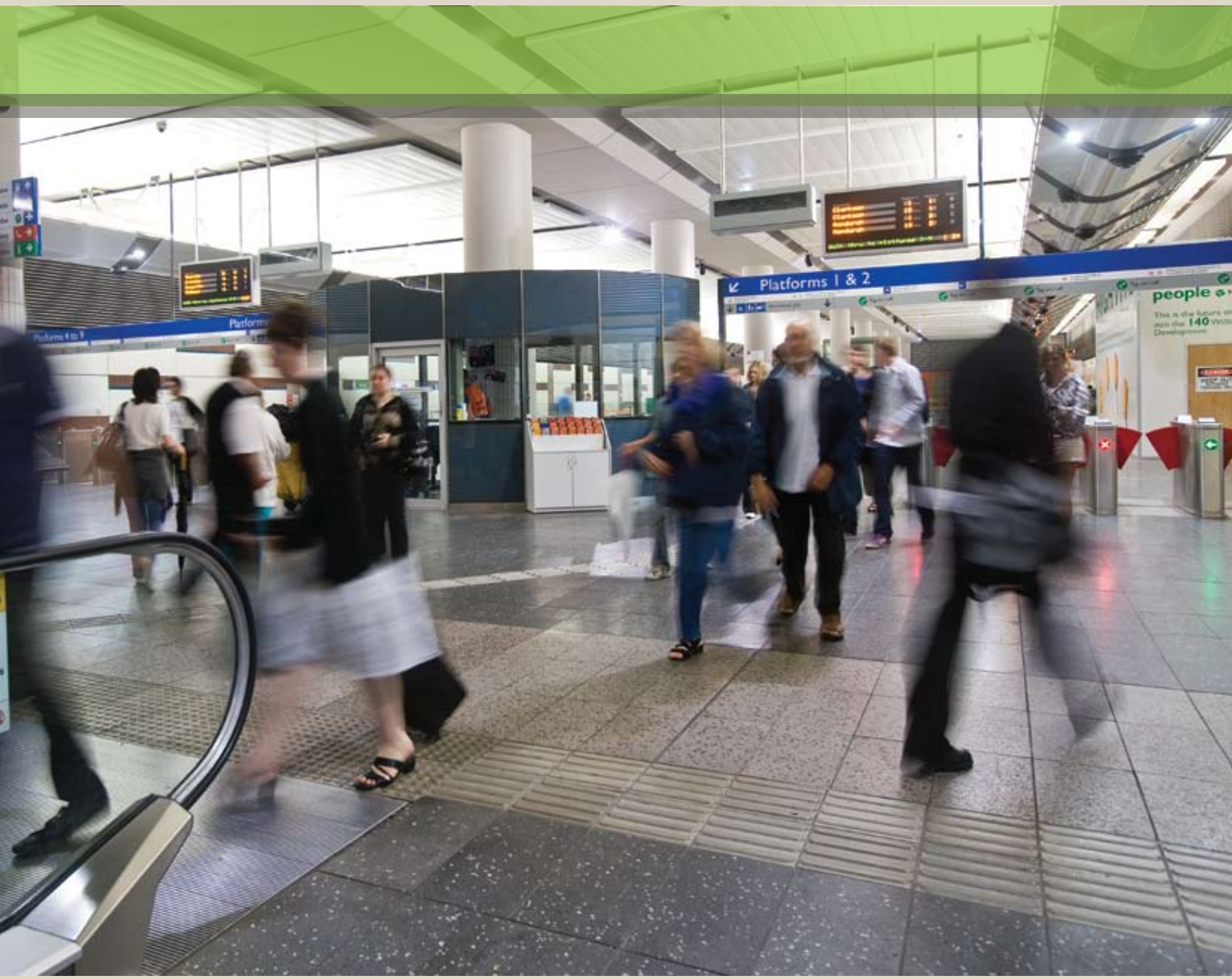
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Foreword

This report is a collaborative publication produced by the three leading groups representing the public transport industry in Australia (the Australasian Railway Association, the Bus Industry Confederation and the International Association of Public Transport–UITP).

It has been jointly authored by John Stanley (Adjunct Professor, Institute of Transport and Logistics Studies, University of Sydney) and Simon Barrett (Managing Director of L.E.K. Consulting, Australia).

The report is targeted at key policy makers in Commonwealth and State Territory Governments, with an interest in, or responsibility for, transport policy and related areas.

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Executive Summary

National land transport policy issues and directions

Australia's current land transport systems are not sustainable in economic, environmental or social terms. To substantially improve the sustainability of Australia's land transport systems, national land transport policy for at least the next decade needs to be framed around outcomes:

a. **Congestion management:** to manage congestion costs, improving economic competitiveness and quality of life in our cities;

b. **Environmental improvement:** to achieve substantial cuts in transport greenhouse gas emissions;

c. **Social inclusion:** to ensure adequate accessibility options are available for all Australians (and international visitors);

d. **Health & safety:** to make the transport system safe and encourage healthier transport choices; and,

e. **Energy security:** to increase our energy security by reducing our reliance on imported fossil fuels.

This report focuses primarily on the people elements of the land transport task.

The key **Policy Objectives** that are required to improve the sustainability of our transport systems are:

> Changing the modal balance for transport away from such a high dependence on motor vehicles;

> Improving the environmental performance of all transport modes but particularly of cars and trucks; and

> Ensuring that travel opportunities are available to all, irrespective of personal circumstances.

These three policy objectives can be translated into six major **Program Directions**:

i. **Reducing the demand for travel**
   > Land use planning (increased density, co-location)
   > Maximising opportunities for walking and cycling

ii. **Achieving a shift to lower carbon transport modes**
   > Cars to public transport, walking and cycling
   > Trucks to rail

iii. **Improving vehicle utilisation**
   > Higher car occupancy
   > More efficient freight movements

iv. **Reducing vehicle emissions intensity**
   > More efficient vehicles
   > Smaller passenger vehicles
   > Alternative fuels
   > Intelligent transport systems
   > Better driving practices

v. **Increasing mobility opportunities**
> Provision of reasonable base public transport service levels
> Using existing public transport opportunities (e.g. school and community buses) more effectively

vi. **Creating a more sustainable freight network**
> Focus on freight movement to ports, hubs and to connect key manufacturing/distribution centres

A seven point national plan

These initiatives would be encouraged by the following National Land Transport Seven Point Plan.

1. **Increased investment in public transport**. (see Sections 2.7 and 4)

2. **Freight capacity investment and efficiency improvements** (see sections 3.2.3 and 3.2.7)

3. **Road pricing reform**, and reallocation of road space to prioritise low emission modes (see Section 3.2.3, 3.2.7 and 5.4)

4. **Improved accessibility for all** with the establishment of Regional Accessibility Planning Councils, behavioural change programs. (see Sections 3.2.1 and 3.2.5)

5. **More compact, walking and cycling friendly urban settlements**. (see Section 3.3)

6. **Improved fuel efficiency**. (see Section 3.2.4)

7. **Improvements in transport research and information**—implementation of a National Transport Research Program (see Section 5.2)

The public transport role

Australian public transport systems and services must play a larger role in future national land transport solutions, as a key means of improving the sustainability of these systems. Service improvements must be delivered in an efficient manner, to assure value for money to governments and the community.

Public transport system and service development should encompass:

> delivering improved customer service;
> investing in network extension and service enhancements;
> making better use of existing infrastructure;
> driving improved land use and transport planning; and,
> maximising value for money for Government.

The report outlines a range of ways in which Australian public transport services can be improved to enable the sector to enhance the sustainability of Australia's land transport systems. It also identifies ways in which public transport service efficiency can be improved.

Following the lead now being provided by COAG, Federal and State funding support for the implementation of substantially improved public transport systems and services should be dependent upon both the existence of State integrated strategic planning systems, including land use and transport systems, and also upon the existence of programs that help to assure efficient service delivery is achieved. Benchmarking can help to provide this assurance and should be part of the assessment criteria for any funding request to the Federal Government to assist upgrade public transport systems/services.

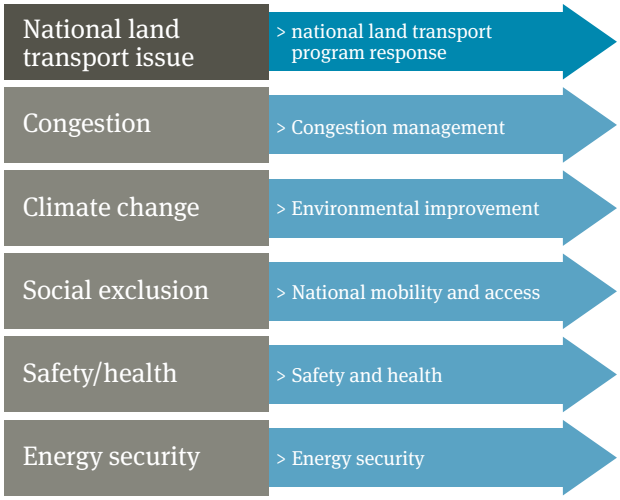
The case for federal funding

The sustainability issues confronting Australia's land transport systems are very significant and growing in magnitude. They affect all Australians. While the cities are the areas of greatest concern, regional and rural areas also confront many of the issues (e.g. the road toll, greenhouse gas emissions, social exclusion, economic competitiveness related to infrastructure provision and energy security). Because of the scale and geographical spread of these issues, national policy and program responses are required for effective solutions. This must, involve the Federal Government showing leadership and working in partnership with others. Some issues require a specific Federal policy and program response. The sheer scale of the financial requirement means that state-based budgets wil not be sufficient to equip Australia's cities with adequate transport services.

The recently announced Federal provision of over $4 billion towards a number of transformational urban public transport initiatives under the Building Australia Fund, on recommendation from Infrastructure Australia, demonstrates that the Federal Government recognises the importance of transformational change. The December 2009 COAG Communique supports this acceptance.

Programming for outcomes

Federal government involvement in land transport must contribute to the resolution of a number of national issues that are severely impacted by land transport services/ system performance. The following **national land transport program structure** is proposed.



The chart indicates the alignment between the critical national land transport issues and the proposed outcome-based response programs. A program structured along these lines encourages an integrated, "modally-agnostic" approach to the pursuit of solutions to land transport problems, which is important for achieving transformational change—as distinct from an approach that is simply more of the same. Program elements in each area would need to include a wide range of measures for maximum effectiveness. This would include measures associated with (for example) infrastructure improvement, system regulation, and operations management, etc. A clear set of national key performance indicators should be developed and monitored, to measure progress against these critical policy goals.

Because of the long time period that will be required to implement many of the changes (especially those related to developing more compact urban land use patterns), long term funding commitments will be fundamental to the achievement of effective outcomes. Rolling five year Federal funding commitments, with provisions to guarantee minimum flows, will be vital to driving transformational change. These should support State/ Territory (and local government in some cases) five year plans.

The national interest issues discussed in this report require transformational change, not simply "more of the same". The focus for Federal funding support should be on **capital assistance to projects that lead transformational change and improve the national interest outcomes** identified in this report. In some cases this assistance will be the majority of the funding required for a particular initiative. In others it will simply be top-up funding, to support private sector funding. The top-up could be in recognition of identified external benefits from the initiatives in question that the private sector is unable to capture as in some port projects.

The Federal Government should not involve itself in the operation of land transport systems that are currently State/Territory or local government responsibilities but should influence the development direction of those systems in ways that contribute to better outcomes when assessed against the national interest issues raised in this report. In providing funding support along such lines, the Federal Government needs to assure itself that outcomes represent social value for money and that funding recipients do not simply substitute Federal money for State/Territory/local government money. The use of performance benchmarking, a comprehensive planning approach and subsequent performance monitoring can protect against these risks.

An important consideration in structuring Federal financial support for land transport infrastructure is whether to adopt a formula-based approach to distribution of funding allocations (primarily to States and Territories) or to rely on a bid process, where bids are submitted in accordance with pre-specified criteria and allocations are made to those proposals which best meet the criteria, irrespective of geography. The latter approach characterises the Infrastructure Australia approach. The former is closer to the basis for current Federal allocations of land transport financial assistance (basically road funding). An argument for including at least an element of formula funding within a Federal financial assistance program for land transport is that to do otherwise would unfairly penalise a jurisdiction that has put in additional past effort at its own expense and currently has a smaller backlog than others, simply because of greater effort. It is proposed that a part of Federal land transport financial assistance should continue to be formula-based and part be based on transport-plan based project submissions.

Sustainable funding—road pricing reform

A **reformed transport pricing regime** should become the basis of a sustainable approach to national land transport policy.

A reformed road pricing system should cover all vehicle classes and all costs attributable to road use. Possible options to structure such a charging system include:

1. a use-based charge to cover carbon costs (the current Carbon Pollution Reduction Scheme curiously proposes offsetting the carbon price for cars by excise offsets for three years, a system that is at odds with the purpose of emissions trading);
2. a usage-based charge to cover the costs of road construction and maintenance attributable to lighter vehicles;
3. tonne kilometre charges for the additional road damage attributable to heavy vehicles;
4. a use-based charge to cover the external cost component of accident costs;
5. use-based charges to levy vehicles for air pollution costs; and,
6. a congestion pricing scheme to make users accountable for the congestion costs attributable to their road use, by time and location.

Existing fuel excise and registration charges would be abolished and replaced by the above charges. There would need to be an Intergovernmental Agreement to implement such a system, because the incidence and scale of revenue flows would differ substantially from the current arrangements.

Overview

The national land transport policy framework outlined above, which focuses mainly on people movement, is based on:

- identification of the critical national land transport issues that require a national response for their resolution;
- formulation of a comprehensive, outcome-driven approach to national policy/program structure;
- implementation of a set of planning processes that feed the policy/program structure in an integrated manner;
- concentration of Federal land transport assistance funding in seven categories to promote outcome achievement.

The proposals should place Australia in a strong position to provide a world class 21st century land transport system.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Context

Context

Effective transport systems are a vital foundation of competitive economies and of liveable, inclusive communities. They enable the efficient and safe movement of people and goods that is critical to our quality of life. Our roads, public transport, footpaths and cycle ways provide us with opportunities to access family and friends, jobs, recreation, education, health care and the many other activities that contribute to individual and community wellbeing.

Our transport systems, however, also cause a number of serious economic, environmental and social problems. For example, they cause significant congestion in our cities and are a major source of greenhouse gas emissions, which are implicated in climate change. Our high dependence on fossil fuels for transport also poses issues for energy security, given declining domestic oil supplies, rising oil prices and concerns over "peak oil".

Countries from Europe to North America, and elsewhere, have recognised these pervasive influences of transport and the importance of a national approach to transport policy, to maximise the potential benefits from an effective and efficient transport sector. As a result, in recent years transport has typically become a much more significant element of national policy agendas. This increasing policy interest is partly a reflection of inadequate spending on transport infrastructure during the 1970s, 80s and, in some cases, the 90s, as transport investment fell as a proportion of Gross Domestic Product (GDP) in many countries around the world.

In an increasingly globalised business world, the impacts of declining transport infrastructure spending on economic competitiveness (reflected in growing congestion costs) has rung alarm bells in many countries (e.g. the US, Canada, and many European countries).[1]

Underinvestment in transport infrastructure was observed in Australia as Governments reined in budget deficits, and increasingly looked to the private sector for investment. Gross Fixed Capital Formation (GFCF) in the key economic infrastructure sectors (transport and storage; electricity, gas and water; and telecommunications) declined substantially as a proportion of GDP over the four decades from the early 60s. From 6 per cent of GDP at that time, GFCF in economic infrastructure fell to half this level by the 1990s. (Figure 1.2). A similar trend was observed for transportation infrastructure (Figure 1.3). Over half of the decline in GFCF from the early 60s to late 90s was accounted for by declining investment in the transport sector.

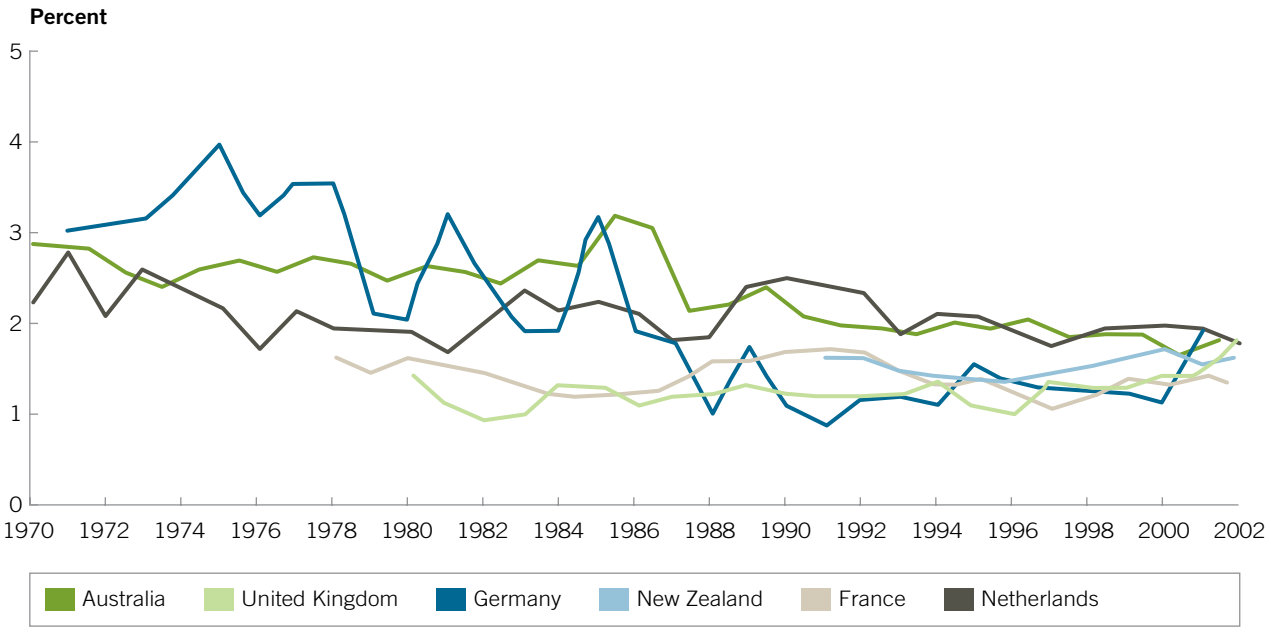
Infrastructure spending actually fell or went sideways in the late 80s and through the first half of the 90s. During this period there was a significant national focus on increasing the efficiency with which existing infrastructure was used, with much previously government-owned infrastructure shifting to the private sector, as part of the National Competition Policy reforms. These reforms increased market pressures on infrastructure provision and operation, and delivered important efficiencies in some sectors, including land transport.

While infrastructure investment has risen strongly over recent years, there remains a significant backlog of expenditure. Road use has grown strongly over the last twenty years, both in terms of freight tonne kilometres and vehicle kilometres. In particular, the growth in freight movements has been significantly greater than GDP growth. (Figure 1.4). With this continuing increase in road use, the relative neglect of transport infrastructure investment is increasingly being reflected in the growing congestion levels on our urban roads. The public transport equivalent is increasing capacity constraints in the face of rapidly growing patronage levels, especially on rail systems.

The Bureau of Transport and Regional Economics has estimated that road congestion cost Australia $10 billion annually in 2005, or about one per cent of GDP, and that this cost will double by 2020.[2] Capital city road use by cars has flattened over the past few years (see Figure 2.1 below), suggesting that freight traffic growth is currently the major contributor to increasing congestion. This has implications for pricing policy reform, discussed in Section 3.2 below.

1 Appendix 2 summarises Canadian and US interest in this area.
2 Bureau of Transport and Regional Economics (2007), Estimating urban traffic and congestion cost trends for Australian cities, *Working Paper no. 79*, Canberra.

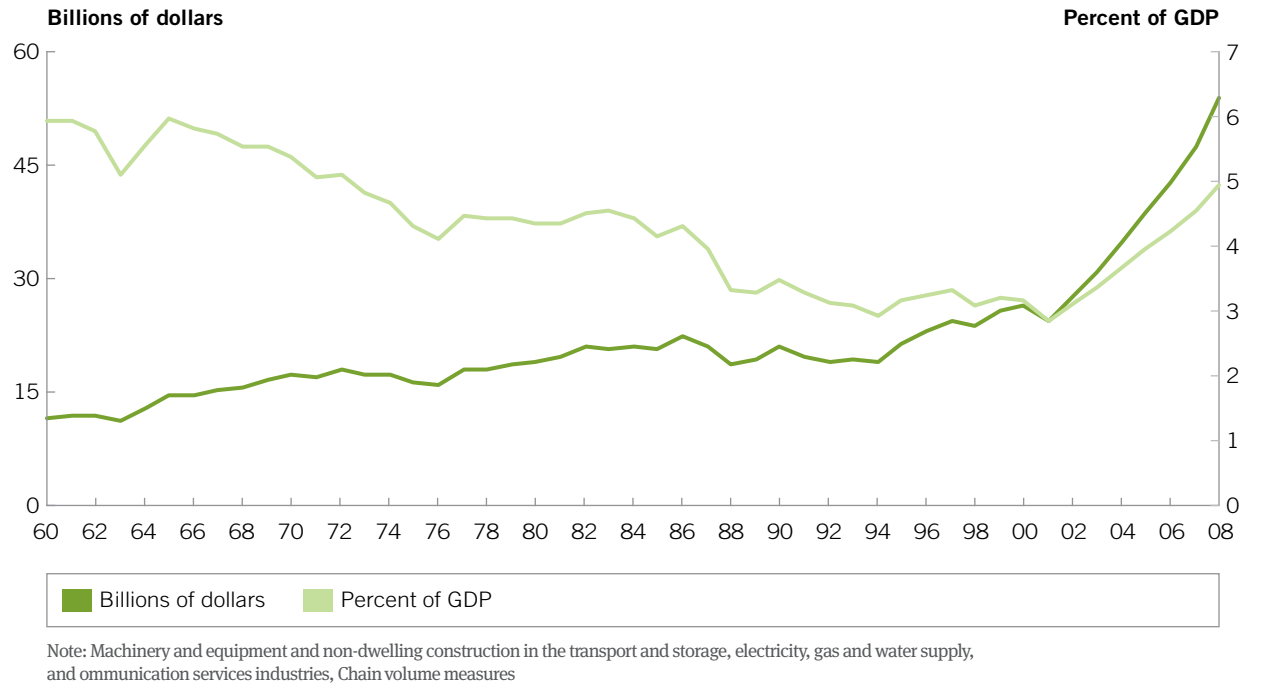
Figure 1.1: Transport and storage gross fixed capital formation as a proportion of GDP (FY1970–2002)



Note: Australian data is sourced from the ABS while international data is sourced from the OECD

Source: Australian Bureau of Statistics (2002), *Australian System of National Accounts*, Cat. no. 5204.0, ABS, Canberra; OECD (2002), *Structural Analysis Database*

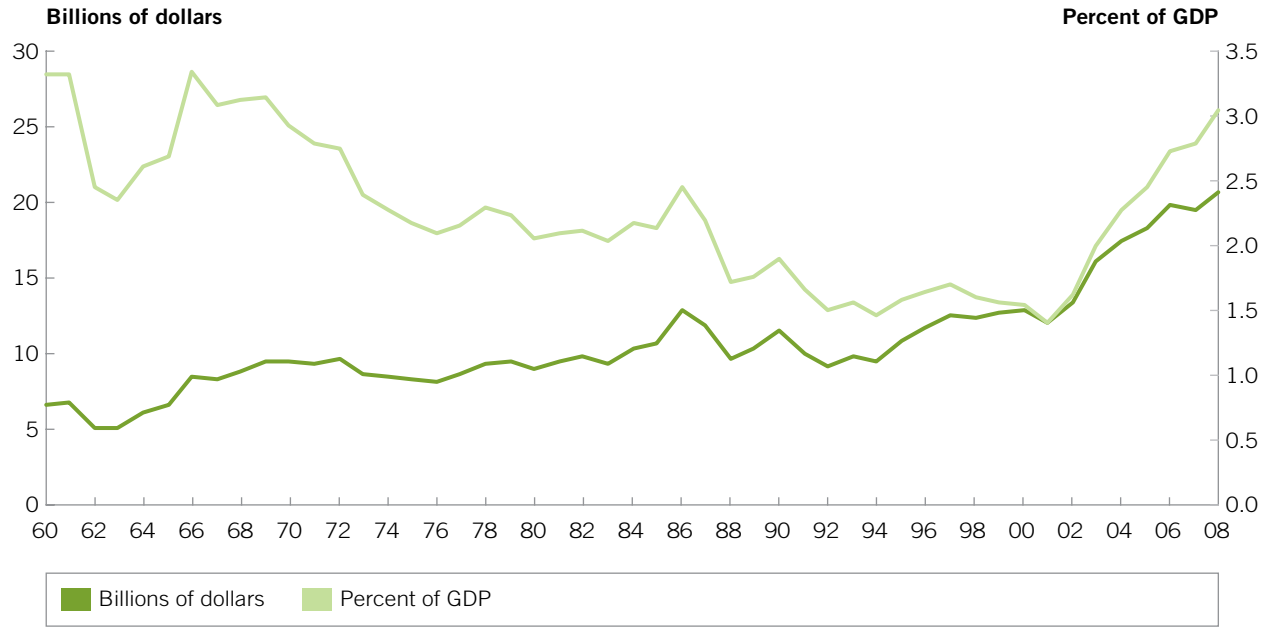
Figure 1.2: Transport, utilities and communication infrastructure fixed capital formation (FY1960–2008)



Note: Machinery and equipment and non-dwelling construction in the transport and storage, electricity, gas and water supply, and ommunication services industries, Chain volume measures

Source: Australian Bureau of Statistics (2008), *Australian System of National Accounts*, Cat. no. 5204.0, ABS, Canberra

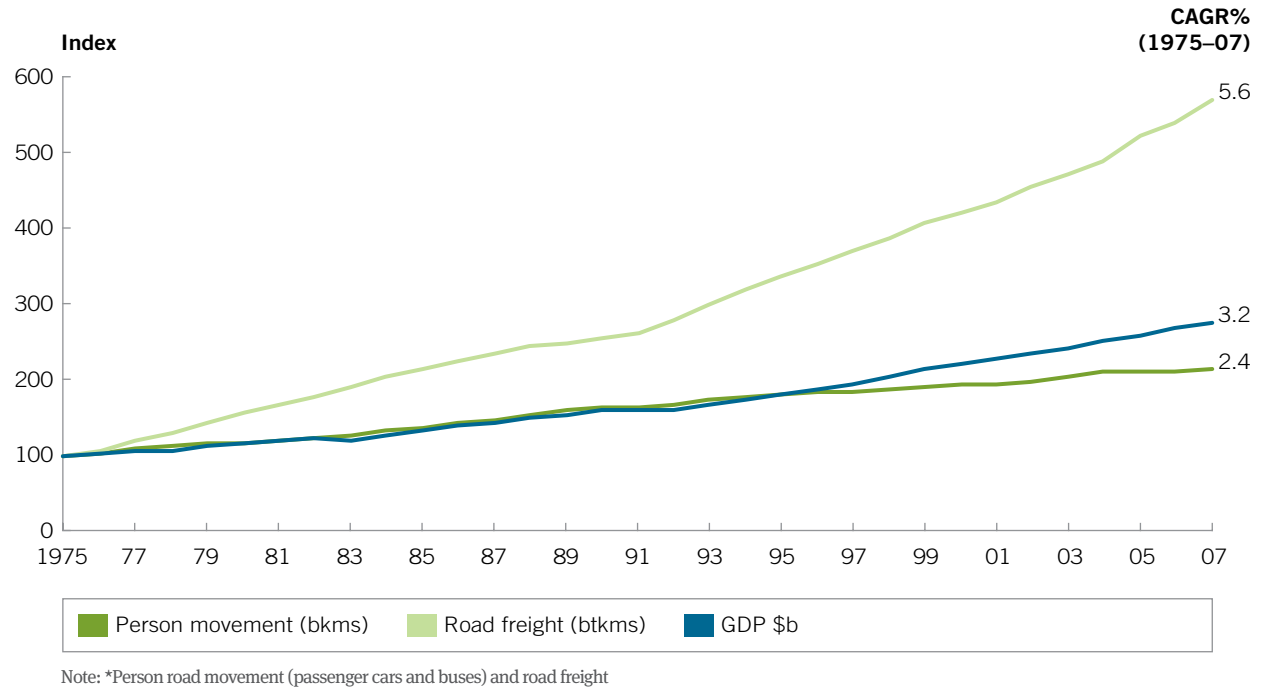
Figure 1.3: Transport infrastructure fixed capital formation (FY1960–2008)



Note: Machinery and equipment and non-dwelling construction in the transport and storage industries, Chain volume measures

Source: Australian Bureau of Statistics (2008), *Australian System of National Accounts*, Cat. no. 5204.0, ABS, Canberra.

Figure 1.4: Growth in Australian road task (FY1975–2007)



Note: *Person road movement (passenger cars and buses) and road freight

Source: Bureau of Infrastructure, Transport and Regional Economics (2009), *Australian Transport Statistics Yearbook 2009*, Department of Infrastructure, Transport, Regional Development and Local Government, Canberra; Australian Bureau of Statistics (2008), *Australian System of National Accounts*, Cat no. 5204.0, ABS, Canberra

A strong recovery in spending on economic infrastructure in recent years has helped tackle some infrastructure backlogs, but the consequences of three decades of a declining expenditure share are increasingly apparent and have been reported by groups such as the Business Council of Australia[3] and Infrastructure Partnerships Australia.[4]

The increasing national focus on transport policy in many countries is driven by growing concerns about greenhouse gas emissions and the urgency of the transport sector responding to rising GHG concentrations. At the May 2009 OECD International Transport Forum held in Leipzig, for example, it was widely acknowledged that national transport policy makers should lead sectoral responses to climate change before finance and energy policy specialists impose solutions on the transport sector. The recently announced UK greenhouse gas emission reduction target of 34 per cent on 1990 levels by 2020 gives transport a major role in emissions reduction.[5] Hybrid buses are of considerable interest in the US and there is growing examination of high speed rail in both Europe and the US, partly because of the good greenhouse gas emissions performance of this mode. While the emissions intensity varies from country to country, the GHG emissions are estimated at 4 kg of CO_2 emissions per 100 passenger kms for high speed rail, compared to 17 kg of CO_2 emissions per 100 passenger kms for air travel.[6] Given that the Melbourne-Sydney air route is the fourth busiest in the world[7], the Australian East Coast is potentially a strong candidate for high speed rail.

Congestion and greenhouse gas emissions are major examples of market failures or externalities, which require efficient corrective governmental actions. The scale of costs and other consequences associated with Australian transport congestion and GHG emissions alone is such as to warrant an Australian national land transport policy response. Other issues noted in Section 2 (e.g. the road toll, social exclusion, energy security) add further weight to the case for a national policy response. Australia remains, in fact, one of the few developed economies without a clearly enunciated national land transport policy that encompasses all modes of surface transport, the lack of focus on public transport being a notable gap for many years.

Over the past thirty years, Australian Federal Government involvement in land transport has been predominantly focused on the road sector, both via funding support for road maintenance and upgrading and regulation of road use. Federal land transport funding over the thirty year period from 1974 to 2004 totalled $62 billion, of which $58 billion was road funding.[8] Rail freight and urban transit received Federal funding support of just $4 billion over this same period.

Since the election of the Rudd Government, there has been a marked increase in Federal Government involvement in land transport; the 2009–10 Budget committed over $4 billion to support public transport development. However, Australia still lacks a comprehensive statement of the vision or goals that are being pursued by such involvement.

This report is designed to contribute to the development of an Australian national transport policy, focusing on land transport and primarily, but not solely, on people movement. It also seeks specific actions from the Commonwealth Government, in those areas where it has direct influence. The structure of the report is as follows:

- Section 2 provides details on the critical transport issues that demand a national transport policy response in Australia, focussing primarily on people movement. However, it also addresses certain freight issues because **integrated** approaches to transport policies and programs are widely recognised as delivering the most effective outcomes;
- Section 3 outlines the nature of the responses that will address root causes and enable identified issues to be effectively tackled;
- Section 4 sets out proposals for how Australia's public transport systems should be improved in coming years, to enable them to contribute effectively to tackling the problems outlined in Section 2;
- Section 5 proposes how the Federal Government should participate within this national response.

3 Business Council of Australia (2009), *Groundwork for growth: Building the infrastructure that Australia needs*, Business Council of Australia, Melbourne.
4 Infrastructure Partnerships Australia (2007), *Australia's Infrastructure Priorities: Securing Our Prosperity*, Infrastructure Partnerships Australia, NSW.
5 http://news.bbc.co.uk/2/hi/science/nature/8150919.stm
6 Figures based on the situation in Europe. Australia's near-total reliance on coal for the generation of electricity would suggest that emissions by high speed trains in Australia would be higher
7 Official Airline Guide (2007), *Media Release: OAG reveals latest industry intelligence on the busiest routes*
8 UITP (2006), *UITP (Australia/New Zealand) Members' Daily News Summary*, The International Association of Public Transport Australia-New Zealand (UITPANZ).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National Transport Issues

National Transport Issues

Around the world, there is remarkable similarity of the key transport issues that are the focus of national governments. These issues include:

- traffic congestion, where costs are persistent, high and increasing, with consequences for economic competitiveness and city liveability;
- transport energy consumption, where the high reliance on, and increasing demand for, fossil fuels has consequences for greenhouse gas emissions and energy security;
- the social exclusion confronting many people because of poor mobility or access opportunities, including people in outer suburbs, and remote areas and communities;
- the air pollution consequences of current transport choices;
- the safety and health consequences of current transport choices; and,
- ageing transport infrastructure (which accentuates many of the other concerns listed above).

These issues are of national concern because they impinge severely on what are the universal national goals of:

- economic competitiveness
- environmental sustainability and
- social inclusion.

All of the problems cited relate to transport in cities but all except air pollution and congestion are also relevant to regional and remote areas.

Box 1: The major national transport problems are common internationally

"In one way or another, transportation plays a vital and essential role in all social and economic activities... It is inexorably intertwined and interdependent with the economic and social fabric of our society."[9]

"The surface transportation system of the United States is at a crossroads. The future of our nation's well-being, vitality, and global economic leadership is at stake. We must take significant, decisive action now to create and sustain the pre-eminent surface transportation system in the world."[10]

"Across the world, cities face many common transport issues. Typically they include growing traffic congestion, pollution, greater car dependency, buses caught in city congestion, and aging transport infrastructure. This in turn reduces urban quality of life, has impacts on people's health and can impede economic growth."[11]

2.1 Traffic congestion, competitiveness and liveability

The Bureau of Transport and Regional Economics has estimated that road traffic congestion cost Australia almost $10 billion nationally in 2005 and that this cost will double by 2020.[12] All capital cities are affected, with the Bureau estimating that congestion cost Sydney $3.5bn in 2005, Melbourne $3bn, Brisbane $1.2bn, Perth $0.9bn and Adelaide $0.6bn, with smaller costs in other capital cities. These costs represent significant economic waste, adversely affecting industry competitiveness and reducing the liveability of our cities. The widespread incidence and scale of congestion indicates a need for national solutions.

While congestion is not a new phenomenon, there is a growing international recognition of its connections to economic competitiveness and city liveability. This is perhaps most obvious in relation to the added costs congestion creates for freight transport and inventory management, but is now increasingly being recognised as important in relation to the growth of trade-exposed knowledge-intensive activities, such as higher order business and professional services, finance, high tech manufactures and biotechnology. These activities typically have many locational options and liveability for the skilled staff employed in these sectors is a key determinant of location.

9 Transport Canada (2008), *Transportation in Canada: An Overview*, Minister of Public Works and Government Services, Canada, p. 4.
10 U.S. National Surface Transportation Policy and Revenue Study Commission (2007), *Transportation for Tomorrow: Report of the National Transportation Policy and Revenue Study Commission, Volume 1*, December, p. 1.
11 MVA (2005), *World Cities Research: Summary Report*, Report prepared for the U.K. Commission for Integrated Transport, p. i.
12 Bureau of Transport and Regional Economics (2007), Estimating urban traffic and congestion cost trends if or Australian cities, *Working Paper no. 79*, Canberra.

These links are widely recognised. For example, the recent US Transportation Research Board paper on *Critical Issues in Transportation* highlights the economic consequences of an ageing infrastructure stock for competitiveness[13], a theme echoed by the US National Surface Transportation Policy and Revenue Study Commission in its recent report.[14] More broadly, the links between transport infrastructure development and economic competitiveness were recently highlighted in an Economist Intelligence Unit report, *Megacity Challenges*, in which a survey across 25 megacities revealed transportation infrastructure development as the highest infrastructure priority for enhancing economic competitiveness.[15]

At a more local level, there is growing evidence that the accessibility of suburban sub-centres is important in helping to combat congestion, foster employment and residential growth in these locations. This is an important element in fostering more compact cities, a widespread policy objective of many governments internationally at present. Public transport is an important means of providing local/sub-regional access to many such locations.[16]

An important aspect of road congestion is the high rate of cost increase for additional units of traffic growth (high "marginal social costs of congestion" in economic jargon). One implication of this cost relationship is that small reductions in congestion levels can generate large savings (benefits). For example, US research has calculated that marginal peak period congestion costs for an urban freeway average 6–9 cents per vehicle mile when traffic travels faster than 50 mph, and up to 37 cents per vehicle mile when traffic flows at less than 40 mph.[17] UK research has suggested that urban congestion costs (in the UK) can be cut by over 40 per cent if congestion pricing reduces urban traffic volumes by about 4 per cent.[18] School holiday traffic levels in Australia typically involve slightly larger traffic reductions, illustrating the significant congestion gains to be achieved from small reductions in volumes. However, if the benefits of such a reduction in traffic volumes and associated congestion costs are to be sustained, measures are needed to limit any subsequent traffic generation caused by lower congestion costs. Pricing solutions and capacity reductions are a way to achieve this outcome, as discussed in Section 3.2 below.

Road traffic volumes for person movement in Australia have flattened off in recent years in Australian capital cities. Figure 2.1 below, showing data for six Australian capital cities, suggests that there was a distinct flattening in the growth profile for each city but particularly for the larger cities, from 2003–04. In terms of kilometres travelled per capita, this slowdown is even more dramatic (Figure 2.2). While car passenger kilometres increased by 20.8 per cent across the six cities shown in total, in the decade from 1989–90 to 1999–2000, the growth rate slowed to only 10.6 per cent over the ensuing eight years to 2007–08, with most of this growth being in the first half of this period. Rising fuel prices are, no doubt, one factor contributing to this pattern, with 2005–06 being the start of the recent period of high fuel prices. Average 2005–06 fuel prices were over 10 per cent above 2003–04 prices and 2006–07 prices increased even faster. This flattening in growth of car traffic in the capital cities will have slowed the growth in road congestion costs.

Figure 2.3 shows public transport patronage data, with the upwards patronage trends that have been apparent since the early 90s receiving a solid boost from 2003–04, again most noticeably in the larger cities. Public transport patronage in the six cities shown, in total, increased by 13.6 per cent between 1989–90 and 1999–2000 but accelerated to grow by 24.9 per cent in the eight years to 2007–08. Public transport has clearly gained market share from the car in the capital cities over this period. There have been many contributing factors behind this rise including fuel price rises, increased public transport service levels, road congestion and environmental concerns, and strongly growing CBD employment in some cities. While the growth in congestion on road systems may have slowed somewhat, this has been joined by growing congestion (crowding) on public transport systems as a consequence of this rapid growth in public transport modal share.

The growth experience in Australian cities is unique, even by global standards. Patronage growth on some urban rail systems in Australia over the last 5 years has been higher than observed in any other major system (Figure 2.4).

13 United States Transportation Research Board (2006), *Critical Issues in Transportation*, Washington DC.

14 United States National Surface Transportation Policy and Revenue Study Commission (2007), *Transportation for Tomorrow*: *Report of the National Surface Transportation Policy and Revenue Study Commission*, December.

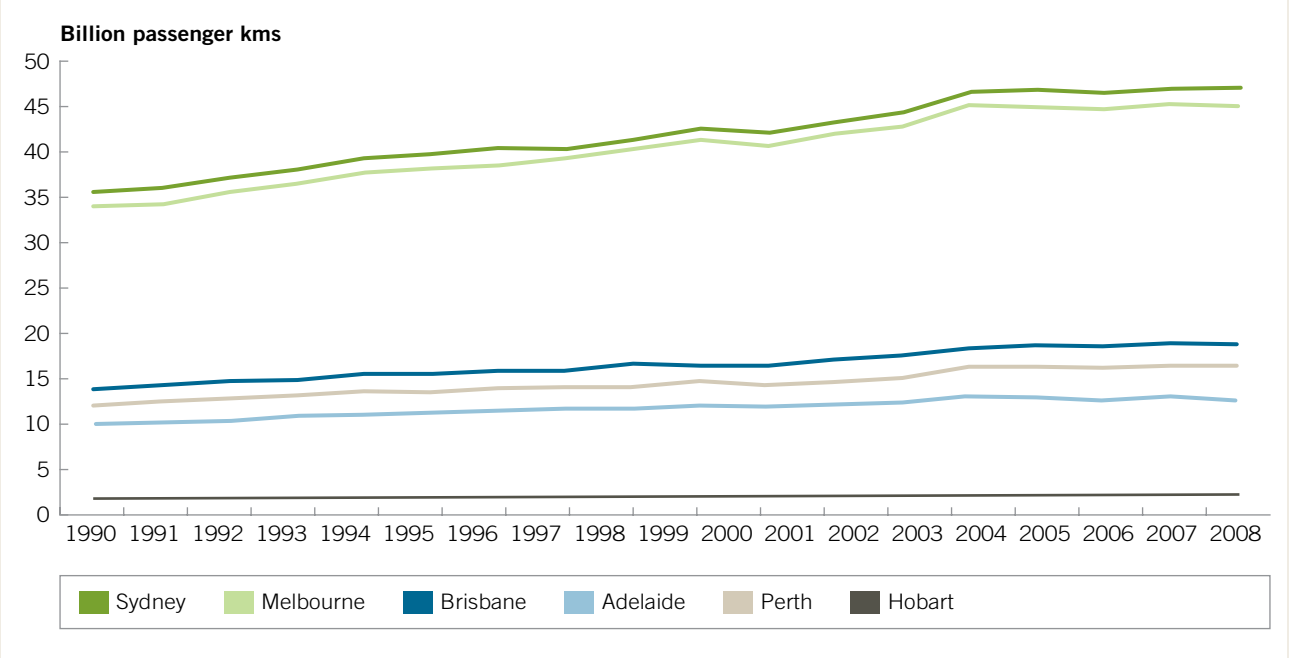
15 Economist Intelligence Unit (nd)., *Megacity challenges: a stakeholder perspective*. Research project conducted by Globescan and MRC McLean Hazel. Sponsored by Siemens.

16 Public transport also plays an important role in facilitating tourism, including in and around capital cities.

17 Herbert Levinson (1995), *Freeway Congestion Pricing: Another Look*, Transportation Research Record 1450, (www.trb.org) pp. 8–12.

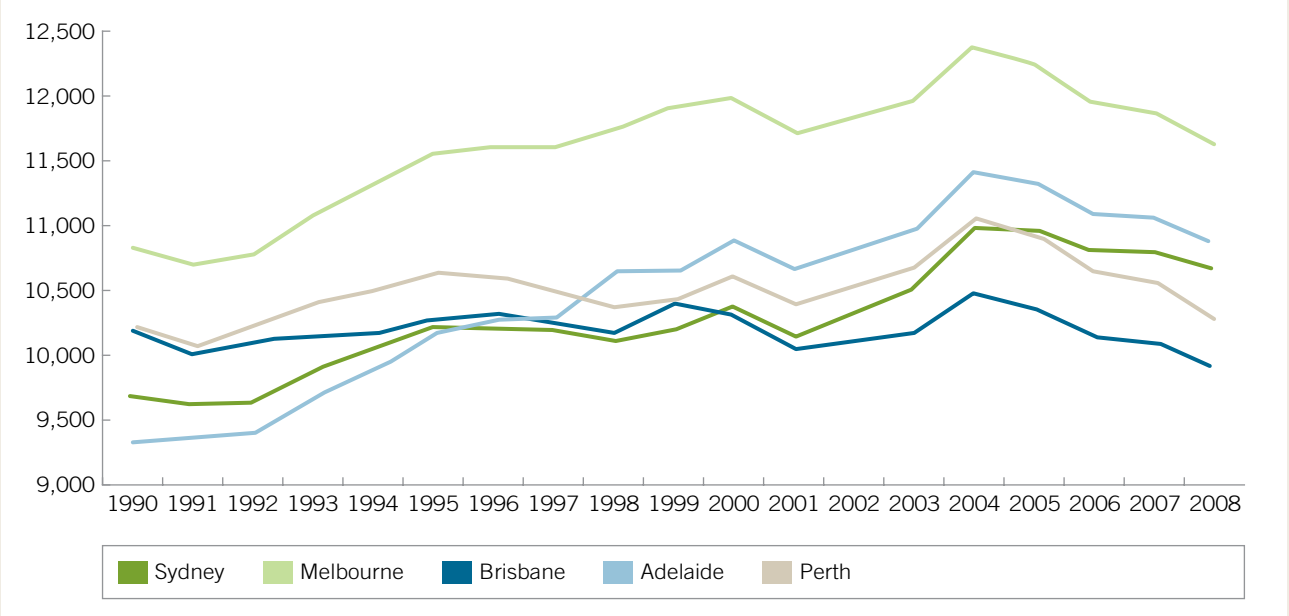
18 Department for Transport (2004), *Feasibility study of road pricing in the UK—Report, Appendix B: Modelling Results and Analysis*, Report to the Secretary of State, Table B3.

Figure 2.1: Total car passenger kilometres for capital cities (FY1991–2008)



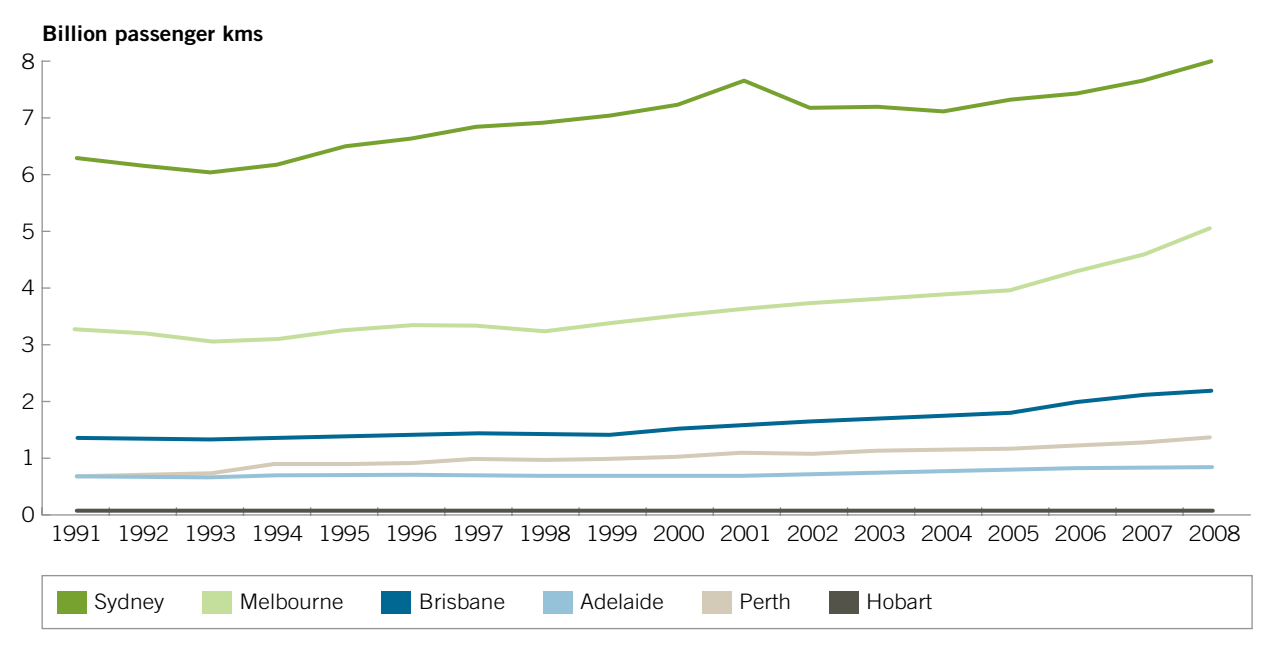
Source: Bureau of Infrastructure, Transport and Regional Economics (2009), *Australian Transport Statistics Yearbook 2009*, Department of Infrastructure, Transport, Regional Development and Local Government, Canberra.

Figure 2.2: Estimated car passenger kms per capita (FY1990–2008)



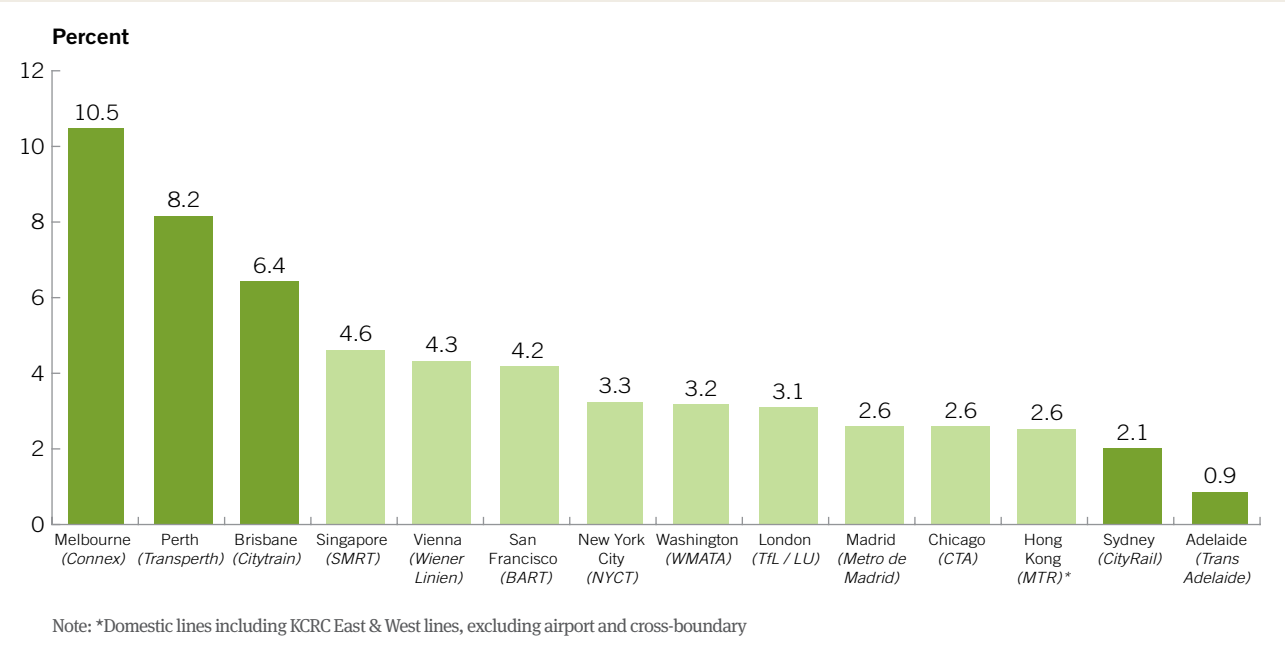
Source: Bureau of Infrastructure, Transport and Regional Economics (2009), *Australian Transport Statistics Yearbook 2009*, Department of Infrastructure, Transport, Regional Development and Local Government, Canberra; Australian Bureau of Statistics (2009), *Regional Population Growth*, Cat. no. 3218.0, ABS, Canberra;

Figure 2.3: Public transport use in capital cities (FY1991–2008)



Source: Bureau of Infrastructure, Transport and Regional Economics (2009), *Australian Transport Statistics Yearbook 2009*, Department of Infrastructure, Transport, Regional Development and Local Government, Canberra.

Figure 2.4: Rail patronage growth per annum in major international cities (2004–08)



Note: *Domestic lines including KCRC East & West lines, excluding airport and cross-boundary

Source: Rail operator annual reports and statistics; Government statistics; L.E.K. Analysis

Melbourne, Brisbane and Perth all stand out at both a national and international level. While fuel prices rises have been common across all cities, different local factors appear to be important also. In Melbourne a very strong increase (32 per cent between 2000 and 2008) in Central Business District employment has underpinned growth in train use in particular, and a 26 per cent increase in bus service kilometres between 2005–06 and 2008–09 has been very important in driving high growth in bus patronage (of 28 per cent over the same period). In Brisbane, there has been a rapid expansion of bus service kilometres, while in Perth a major rail extension has been completed. Each of these cities has also made great efforts to integrate the various modes of transport, through changes to fares, signage and improved interchanges and timetabling.

The important conclusion emerging from this recent experience is that public transport can help to ease growing road congestion pressures if public transport service levels are good enough and employment growth is strong in major urban nodes. However, growing public transport use has been accompanied by increasing crowding on many services. Load breaches on Melbourne's rail system have grown by over 500 per cent in three years, as patronage numbers have continued their rapid growth[19]. If public transport is to continue its contribution to reducing congestion pressures, then investment in increased capacity is vital.

The same trend of a flattening off in urban car use noted for Australian capital cities has been observed, for example, in the US. The most recently published US estimates of congestion (for 2007 conditions) prepared by the Texas Transportation Institute (TTI) suggest that road congestion (measured as traffic delay) was about one per cent less in 2007 than in 2006 (but congestion costs still increased in real terms, because of rising time values).[20] The TTI suggests that high fuel prices have been the major influence on this development. Figure 2.5 shows that roadway vehicle kilometres travelled in the United States for all vehicles is growing at a slower rate than that experienced in the 1980s. It is also possible that, in both Australian and US cities, the prevalence of urban congestion is itself starting to influence traveller behaviour and to slow growth in road use.

The challenges of managing road congestion and city liveability are likely to be further exaggerated by strong population growth anticipated for Australian cities. Recent projections prepared by Treasury show that Australia's population will grow by c.63% over the next 40 years, instead of c.33% as estimated two years ago, to 35 million people by 2049.[21] The increase is driven by higher fertility rates, a greater number of women of child-bearing age, and increased net migration.

In addition to the impact of overall population growth, Australia also faces a significant ageing of its population base. The number of Australians over 55 is expected to increase from 5.6m to 10.6m between 2010 and 2050.[22] Older Australians without access to motor vehicles rely heavily on public transport, and will be at increasing risk of social exclusion. Also, transport systems will need to continue to adapt to cater for a larger number of elderly patrons. The continued roll out of many DDA measures (e.g. low floor buses, lifts etc) will be beneficial in this regard.

2.2 Climate change (greenhouse gas emissions)

Australia is one of the world's highest per capita emitters of greenhouse gases and our transport emissions are particularly high. Globally, the transport sector is responsible for almost 15 per cent[23] of greenhouse gas emissions, which are implicated in climate change. Transport's **share** in Australia is smaller because of the high emissions intensity of our coal-based electricity generation; however, our **per capita** GHG emissions from the transport sector are high. By way of example, per capita transport GHG emissions for Brisbane are over three times those for London, while Melbourne's emissions are twice those of London.

Transport contributes about 14 per cent of Australian greenhouse gas emissions and emissions from the sector are growing faster than from any other sector, except stationary energy. Australia's 2006 transport emissions were 27 per cent above 1990 levels (Figure 2.6) and, by 2020, transport emissions are projected to be about two-thirds higher than in 1990, even allowing for some emission-reducing initiatives (Figure 2.7).

19 Research by Professor Graham Currie at Monash University

20 Schrank, D and Lomax, T. (2009), *Urban Mobility report*, Texas Transportation Institute, July.

21 Reported in The Australian (18 September 2009) *Population to now hit 35 million by 2049* http://www.theaustralian.com.au/news/nation/population-to-now-hit-35-million-by-2049/story-e6frg6nf-1225776279746. Accessed 7 December 2009.

22 Australian Bureau of Statistics (2008) ,*Population Projections, Australia*, Cat. no. 3222.0, ABS, Canberra;

Road transport is easily the largest source of Australian transport GHG emissions, accounting for 88 per cent of sectoral emissions in 2006 (Figure 2.7). While aviation emissions are growing faster than those from road transport, the road transport contribution is so dominant that it is still projected to account for 86 per cent of Australian transport emissions by 2020.

The magnitude and growth rate of transport emissions suggest that climate change mitigation policies are likely to have a very significant influence on national and international transport policies and programs in coming years.

Stern[24] and Garnaut[25] have canvassed the need for high emitting developed countries to **reduce** greenhouse gas emissions by 80 per cent by 2050, to help stabilise global temperature increases to 2 degrees C. This reduction target has recently been legislated in the UK, in the Climate Change Act 2008. An 80 per cent target for high emitting developed countries received further impetus at the July 2009 G8 leaders' meeting, where leaders agreed to a goal of having industrialised nations reduce their greenhouse gas emissions by 80 per cent by 2050, as part of a worldwide goal of a 50 per cent cut in such gases from all nations, rich and poor.

Although Australia has currently adopted a 2050 target of 60 per cent cut in emissions, this seems unlikely to be sustainable for such a high emitting country, with a target of 80 per cent for 2050 (or higher) looking increasingly likely.[26] Australia will need to achieve a dramatic change in the trajectory of its transport GHG emissions for the sector to contribute to emission reductions in any way approaching this magnitude. Section 3.2 and Appendix 1 of this report identify the nature and scale of transport changes that Australia would need to achieve if it was to aspire to cut its transport emissions by about 80 per cent by 2050.

A Carbon Pollution Reduction Scheme (CPRS) is intended to form the core of Australia's efforts to reduce greenhouse gas (GHG) emissions and this will add, long term, to fuel price pressures. For example, a commonly mentioned future carbon price of about $A60/t[27] is equivalent to an increase of about 16c/L in fuel costs, comparable to some of the changes in fuel prices seen in recent years. While the Federal Government Carbon Pollution Reduction Scheme has announced an excise tax offset to carbon prices for cars for three years, this is unlikely to continue long term, such that the CPRS should be expected to increase fuel prices over the long term, a necessary development if that scheme is to provide improved price signals to road users to cut emissions. In addition to carbon pricing, this report argues in Section 3 that a wide range of complementary measures will also be needed to make significant reductions in transport GHG emissions.

A recent survey of consumer attitudes to climate change has demonstrated some interesting results in the area of transport, with significant implications for Governments. Consumers said they were most likely to reduce their transport emissions by reducing their number of trips, switching to a more efficient vehicle or walking or cycling. Increased use of public transport was rated fourth on the list of actions. However, when asked what actions Governments should be taking to reduce transport emissions, over 60% of consumers nominated "improve public transport". (Figure 2.8)

2.3 Social inclusion

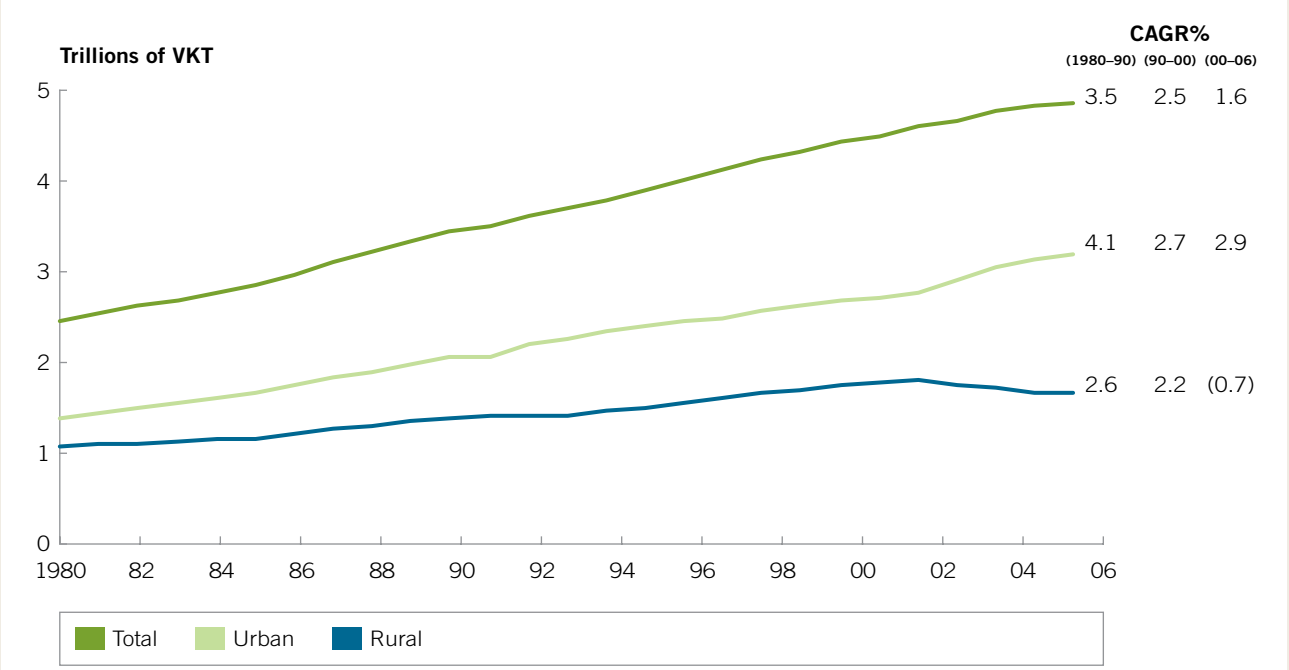
It is well established that mobility is an important influence on people's ability to participate in society. Poor mobility can be a significant contributing factor to social exclusion. In car dependent societies like Australia, the lack of car availability, in particular, is well known to be a significant constraint on social inclusion and economic participation. The 2006 Australian Census, for example, showed that:

- 13 per cent of people were aged under 18 and 4 per cent were aged 80 or over, both groups likely to have low access to cars;
- 10 per cent of households did not have a car;
- 24 per cent of single person households did not have a car; and,
- nearly 50 per cent of households had only one car.

These simple numbers suggest that transport is likely to be a concern for significant numbers of Australians.

23 World Resources Institute (2009), *Climate Analysis Indicators Tool Version 6.0*, Washington, DC.
24 Stern, N. (2006), *Stern Review on the Economics of Climate Change*, HM Treasury, London.
25 Garnaut, R. (2008), *The Garnaut Climate Change Review Final Report*, October.
26 The Intergovernmental Panel on Climate Change has consistently underestimated the rate of growth of GHG emissions and emerging scientific evidence suggests climate stabilization may require GHG concentrations to be reduced to about 350ppm, not 450ppm. These two considerations suggest that targets above 80 per cent may well emerge in coming years (particularly for high emitting countries like Australia if equal per capita emissions were to become the basis for setting international targets).
27 McKinsey and Company (2008), *Carbon Capture & Storage: Assessing the Economics*, McKinsey Climate Change Initiative.

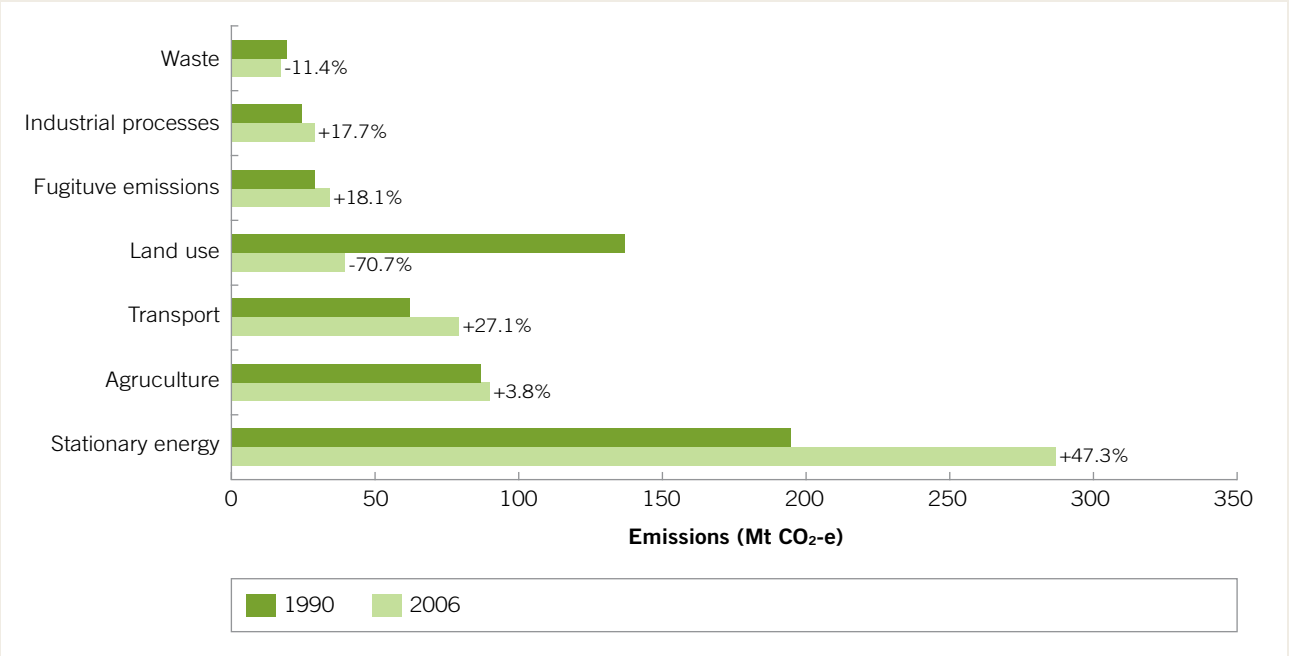
Figure 2.5: Vehicle kilometres travelled—United States (1980–2006)



Note: Years 1981–85 and 86–90 interpolated

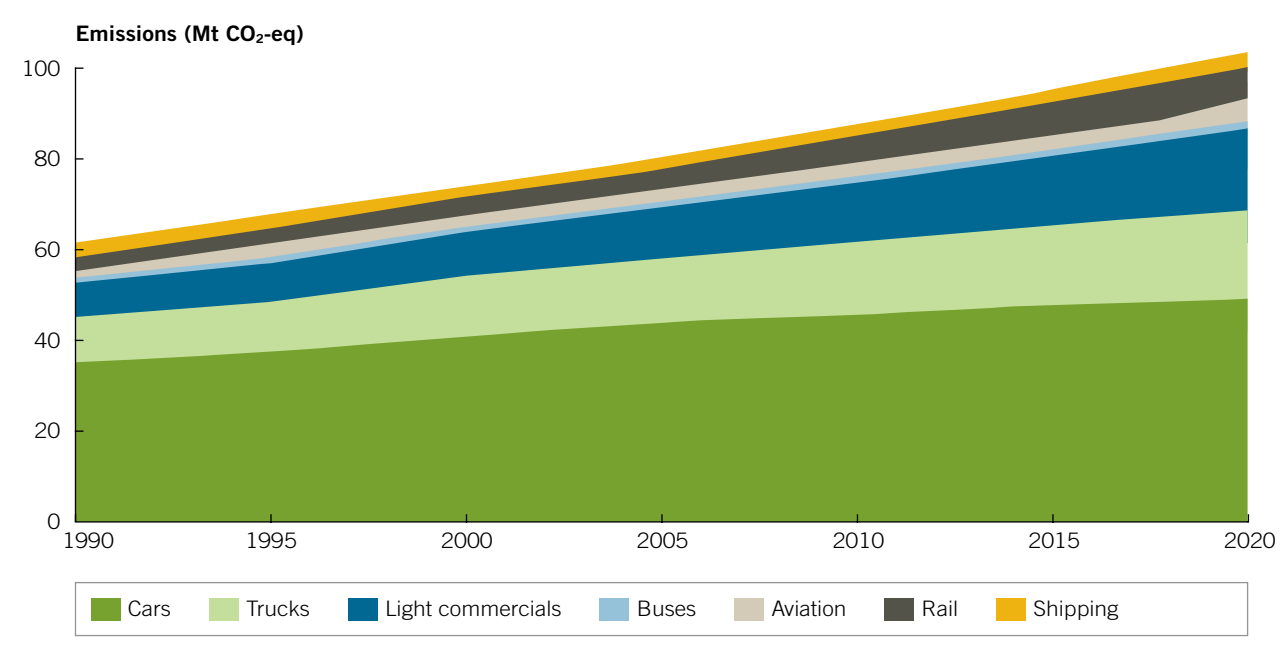
Source: Federal Highway Administration (2009), *Highway Statistics*, U.S. Department of Transportation, Washington, DC.

Figure 2.6: Australian Greenhouse Gas Emissions (1990–2006)



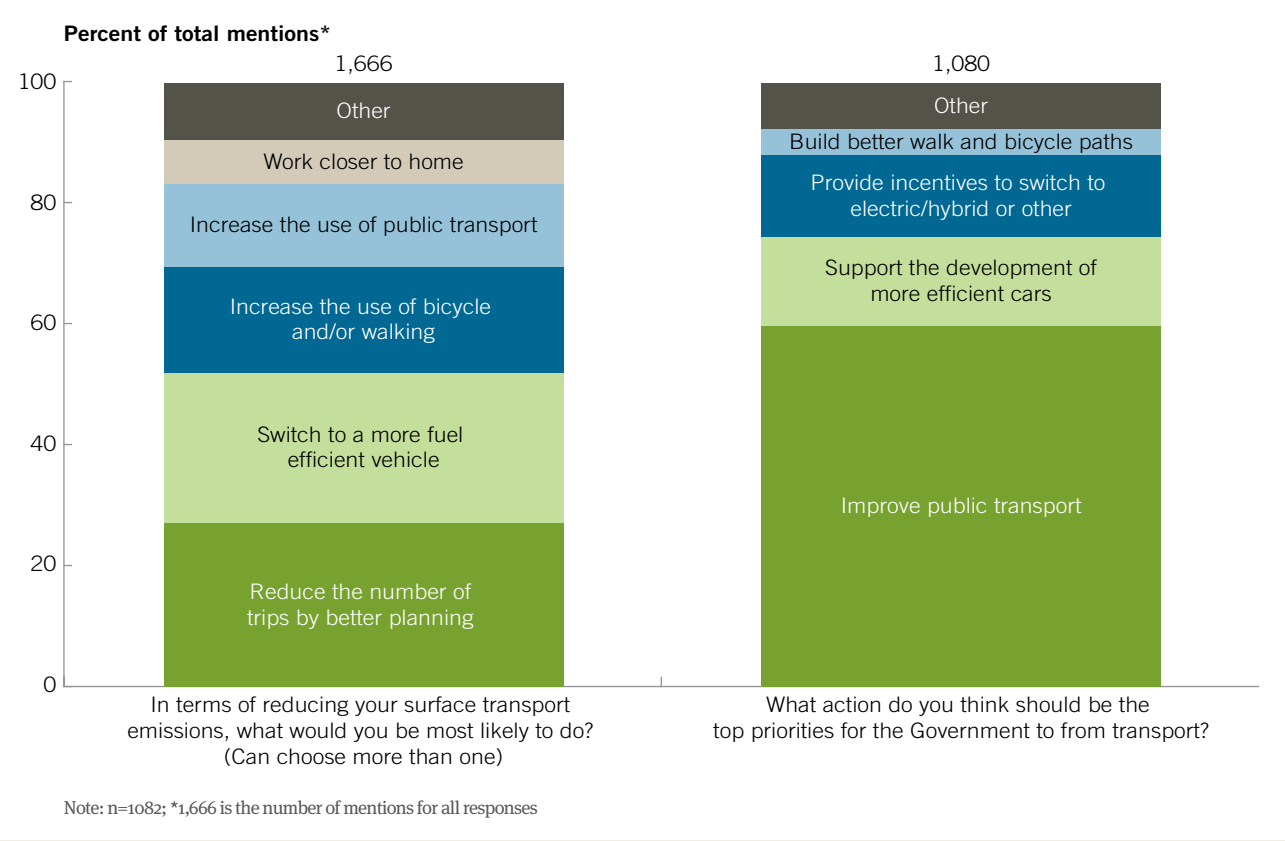
Source: Australian Greenhouse Emissions Information System (2008) *Australia's National Greenhouse Accounts*, Department of Climate Change, Canberra

Figure 2.7: Australian transport greenhouse gas emission projections (1990–2020F)



Source: Bureau of Infrastructure, Transport and Regional Economics (2009), *Greenhouse Gas emissions from Australian Transport: Projections to 2020, Working Paper 73*, Department of Infrastructure, Transport, Regional Development and Local Government, Canberra

Figure 2.8: Consumer attitudes to transport emissions



Note: n=1082; *1,666 is the number of mentions for all responses

Source: L.E.K. Survey and Analysis.

No Way to Go: Transport and Social Disadvantage in Australian Communities[28] presents a range of Australian examples supporting the links between mobility and social inclusion, across a wide range of differentiating factors. For example, transport disadvantage is a common problem for young people, especially in rural areas, and for older Australians, especially as the capacity to drive diminishes. Lack of income is frequently a compounding factor. Physical capacities are also an important influence on mobility opportunities.

One important recent study[29] has shown how urban dwellers living in the outer suburbs are most vulnerable to the impact of high fuel prices and high mortgage interest rates. In both urban fringe and regional areas the high level of car dependency means people have little choice but to incur high fuel costs if they wish to maintain lifestyles. The term "forced car ownership" has been used to describe the situation where low income households buy two or more cars to achieve the mobility levels they need, even though this may consume a very large proportion of the household budget.[30] While the current lower petrol prices and interest rates have eased these pressures, the medium to longer term outlook is for fuel prices to remain high, under pressures such as peak oil (discussed further below in Section 2.4).

Another current study is finding significant links between mobility and social exclusion. This study has undertaken comprehensive surveys of personal characteristics and travel behaviour of a sample of Melbourne and Latrobe Valley residents, finding that people at greater risk of being socially excluded tend to engage in fewer activities and to travel less.

Two noteworthy characteristics from the Melbourne sample reflect the relatively greater transport disadvantage faced by people living in outer suburbs.

1. People living in outer suburbs make about the same number of trips as those living in inner suburbs but travel almost twice as far in so doing (a function of relatively low accessibility in outer areas).
2. Public transport service availability in outer Melbourne is less than one-third that in inner Melbourne.

Statistical analysis of the factors associated with a high degree of risk of social exclusion identified mobility as a significant contributor. When only a small number of trips are made per day, an additional trip has high value.[31] The availability of adequate public transport services is the main way through which people at risk of social exclusion because of transport disadvantage can be assisted to reduce this risk. Service levels that can help meet this inclusion objective are considered in Section 3.2.

Box 2: The Importance of mobility for social capital

A Monash University (Australian Research Council supported) study into links between mobility, social exclusion and well-being asked survey respondents which activities they most commonly encountered difficulties in accessing. Visiting friends and relatives (22%), enjoyment (getting out and about—20%) and sports/leisure (18%) were the most frequent responses overall. For those most at risk of social exclusion, enjoyment (getting out and about) was rated as the most frequent problem. These answers indicate the importance respondents place on building their social capital, which the study's analysis has shown can be an important way of reducing the risk of social exclusion.

Research recently undertaken by the National Institute of Economic and Industry Research for the Australian Farm Institute[32] shows that the typical rural and regional dweller in Australia has much lower accessibility to services than those living in metropolitan areas. Core services are typically available within a distance of 1.4 kilometres in metropolitan areas, compared to over 30 kilometres in rural Australia and townships (with obviously wide variability). Prima facie, this data is strongly supportive of a need to focus on access opportunities for rural and regional Australia to enhance prospects of social inclusion, in addition to outer urban areas.

In regional areas, most people rely on the car for access opportunities. All-weather road access is a fundamental requirement for these people, to maximise opportunities for social inclusion. Public transport service provision is less in regional areas and often not available, especially in remote Australia. Community transport plays an important role in regional areas in providing travel opportunities for many people who are at risk of social exclusion.

28 Currie, G., Stanley, JR and Stanley, JK (2007), *No Way to Go: Transport and Social Disadvantage in Australian Communities*, Monash University e-Press, Clayton.
29 Dodgson, J and Sipe, N (2006), *Shocking the Suburbs: Urban Location, Housing Debt and Oil Vulnerability in the Australian City*, Urban Research Program, *Research Paper No. 8*, Griffith University, June.
30 Currie,G (2009), Australian Urban Transport and Social Disadvantage, *Australian Economic Review Forum on Urban Transport*, Vol 42, no. 2, pp 201–208.
31 The research suggests that an additional trip to a person at risk of social exclusion is worth about $20 on average, with higher values at lower income levels, double the value that is currently used in transport evaluations. See Stanley. J.K., Hensher, D.A., Stanley, J.R, Currie, G., Greene, W and Vella-Brodrick, D (forthcoming), Social Exclusion and the Value of Mobility, *Journal of Transport Economics and Policy*.
32 National Institute of Economic and Industry Research (2009), *Essential Services in Urban and Regional Australia—a Quantitative Comparison*, Prepared for the Australian Farm Institute

2.4 Oil prices and energy security

Problems of social equity that have a transport origin have been compounded in recent times by high oil prices. For example, capital city average retail petrol prices increased fifty per cent between 2002–03 and 2007–08.[33] Diesel prices in Melbourne increased nearly 50 per cent between June 2007 and June 2008. These fuel price rises appear to have significantly affected people's travel behaviour. One recent Australian study[34] identified that the most common responses to the fuel price rises were:

- do multiple activities in a single trip (44 per cent of respondents but higher for those at greater risk of exclusion);
- make fewer trips by driving (35 per cent);
- travel less overall (31 per cent);
- travel to places which are closer (30 per cent);
- travel the same but pay more (29 per cent overall but 39 per cent for those with two or more risk factors for social exclusion, indicating a lack of mobility options for many people who are at risk of exclusion);
- share car with others (20 per cent).

Increasing public transport patronage levels have been observed in many Australian cities, partly as a response to rising fuel prices.

The causes of the recent rapid rise in fuel prices are the subject of much debate. However, there is a growing concern that the rises reflect, in part at least, long term structural imbalances between oil demand and supply and that "peak oil" is close, if not already at hand. While the 2008/09 Global Financial Crisis has mitigated these concerns in the short term, rising long term oil prices are generally acknowledged as likely. For example, the Chief Economist at the International Energy Agency, has recently warned that most of the world's major oil fields have passed their peak production and that an "oil crunch" could derail recovery from the global recession.[35]

Allied to the question of high oil prices is the growing import burden this is imposing on the Australian economy. Petroleum imports (petroleum oils and oils from bituminous minerals, crude) totalled $10.5bn in 2005 but had risen quickly to $18bn in 2008. Reducing the reliance on fossil fuels for land transport (passenger and freight), as is required to respond to climate change pressure, would help to ease such balance of payments pressures.

Rising oil prices are an indication of supply shortages, relative to demand. This adds an additional dimension to the oil price question—the issue of energy security. Australia is currently about 50 per cent self–sufficient for transport fuels. This share is reducing and by 2030 is projected to be at about 20 per cent. This increases Australia's vulnerability to supply restrictions/shortages. Any such limitations in availability would have adverse economic consequences, depending on the scale of restriction. Diesel is generally regarded as being more likely to be subject to such scarcity than petrol, because of Australia's greater dependency on imported diesel.[36] Shortages would thus directly impact on freight movement and on the bus and coach industries, which are today very dependent on diesel for energy.

Rising oil prices and questions of securing adequate supplies of transport energy impact on all key goals: economic competitiveness (cost and product availability consequences of rising prices and possible reduced fuel availability); environmental sustainability (current fossil fuels are carbon intensive whereas alternatives will need to be less so); and social exclusion (the price impact but also via the impacts of any rationing of availability by non–price measures, where impact will be particularly severe on car-dependent people living in outer suburban and regional areas).

2.5 Safety and health

About 1450 or more people are killed annually on Australia's road system. In contrast, fatalities associated with rail, marine and aviation transport sum to a little over 100 a year. While the number of road fatalities was about halved from 1980 to 2003, there has been little progress in cutting the number of fatalities since that year.

Over the same period the number of serious road injuries has been increasing quite markedly. About 30,000 people were seriously injured on Australia's roads around 1980. This number was cut to just above 20,000 by the first half of the 1990s but had climbed back to 30,000 by 2005.

33 Bureau of Infrastructure, Transport and Regional Economics (2009), *Australian Transport Statistics Yearbook 2009*, Department of Infrastructure, Transport, Regional Development and Local Government, Canberra, Table 11.4.

34 Currie, G. And Delbosc, A. (2009), *Investigating Transport Disadvantage, Social Exclusion and Well being in Metropolitan, Regional and Rural Victoria: Field Survey report—Main Metropolitan Survey*, Australian Research Council Industry Linkage Program Project LP0669046, Institute of Transport Studies, Department of Civil Engineering, Monash University, March.

35 Quoted in *The Age*, 3rd August, 2009. http://news.theage.com.au/breaking-news-world/iea-official-warns-of-shrinking-oil-supplies-report-20090803-e6is.html

36 David Lamb (CSIRO) presentation to 2008 BusVic Annual Maintenance Conference and Expo.

Australia's road safety performance with respect to fatalities is better than the OECD median performance. For example, Australia had about 1.1 road traffic deaths per 10,000 registered motor vehicles in 2007, marginally below the OECD rate median rate (of 1.2). Australia was 9th lowest out of 23 OECD countries for which comparable data was published.[37] However, Australia remained well above the results for Iceland, Japan, the Netherlands, the Scandinavian countries, Switzerland and Great Britain (around 0.7–0.9). The disparity in terms of fatalities per 100,000 population is worse for Australia, partly because of our lower public transport modal share. However, on a per kilometre travelled basis, Australia has the sixth lowest rate amongst OECD countries for road fatalities.

Viewed in terms of deaths per billion passenger kilometres, BITRE data shows that, in 2004, rail was about twenty per cent better than road (rail = 4.14; road = 5.20).[38] Separate data on road deaths involving buses indicates 1.4 deaths per billion passenger kilometres, well below the rate for road as a whole. Achieving a significant mode shift from car to bus or rail would save lives in Australia.

1450 fatalities and 30,000 serious injuries remain an unacceptable outcome from a community viewpoint. While placing a monetary value on loss of life is unacceptable to many people, recent research at the Institute for Transport and Logistics Studies at University of Sydney suggests that a value of $5–7 million per life lost represents an appropriate "willingness-to-pay" value for lives lost in road accidents, ignoring health, policing and other costs incurred to prevent accidents.[39] This implies a cost of about $10 billion annually for a road-user valuation of fatalities, to which must be added the costs to prevent and treat fatal and serious injury accidents (less insurance payments deducted). As a consequence, the value of a modal shift from car to safer travel modes, such as public transport, will be significant.[40]

In addition to the problems associated with road safety, there is growing community concern about links between a sedentary lifestyle, reliance on car travel and health status.

Physical inactivity is a key risk factor for chronic disease, but a growing number of people are not achieving the recommended levels of physical activity necessary for good health…the majority of Australians do not get enough physical activity.[41]

For example, 52 per cent of women, 67 per cent of men and 25 per cent of children are overweight or obese in Australia and the prevalence of obesity has more than doubled in the last 20 years. One third of Australian children are considered to be at risk of developing obesity-related health problems (e.g. type II diabetes) and, overall, inactivity has been estimated to cost $14b annually in Australia.[42] This is larger in scale than road congestion costs, although the transport/mobility contribution to the $14bn total is not identified.

Figure 2.9 illustrates the increased dependence that has developed on the motor vehicle for personal travel. It shows how the mode split for travel to school in Sydney has changed dramatically over the 30 years from 1971. Whereas active transport (walking/cycling and public transport) accounted for over 80% of Sydney trips to school in 1971, that share had halved by 2000–03, with car use increasing from 15% to a massive 57%. Much international experience is similar. This Australian trend is partly due to changes in workforce participation of women, with children now more likely to be dropped off by an adult on the way to work. It is also believed to be due to growing concerns about the safety of children walking or cycling to school, with programs like the "walking school bus" emerging as a response. Reversing this trend and encouraging walking, cycling and incidental exercise (including walking to/from public transport) would help to reduce the problem of obesity associated partly with growing car dependency. It would also have additional benefits in terms of reduced traffic congestion.

37 Department of Infrastructure, Transport, Regional Development and Local Government (2009), *International Road safety Comparisons: The 2007 Report*, July.
38 Bureau of Infrastructure, Transport and Regional Economics (2008), *Australian Transport Statistics Yearbook 2007*, BITRE, Canberra ACT, Table 9.3i.
39 Hensher, D.A., Rose, J. M., de Dios Ortuzar, J. and Rizzi, L.I. (2009), *Estimating the willingness to pay and value of risk reduction for car occupants in the road environment*, Transportation Research Part A, doi:10.1016/j.tra.2009.06.001
40 And much higher than is currently measured, because the recent ITLS value is several times the value of life currently used in Australian transport cost-benefit analyses.
41 Cobiac, L., Vos, T. and Barendregt, J. (2009), *Cost-effectiveness of Interventions to Promote Physical Activity: A Modelling Study*, PLoS Medicine, http://www.plosmedicine.org.home.action, accessed 14th July 2009.
42 KPMG (Econtech) & Medibank Private (2008), *The Cost of Physical Inactivity*.

2.6 Air pollution

The operation of land transport systems contributes to problems of air pollution, primarily in our cities. A National Environment Protection Measure (NEPM) sets national standards for the six key air pollutants to which most Australians are exposed: carbon monoxide, ozone, sulphur dioxide, nitrogen dioxide, lead and particles. Under the Air NEPM, all Australians theoretically have the same level of air quality protection. The standards are legally binding on each level of Government.

A 2004 report indicated that urban areas were reporting levels well below national standards for four of the six criteria pollutants but that ozone and particle levels, both of which are linked to motor vehicle use, have remained relatively high (at or above air quality levels), particularly in some cities, and shown no discernible downwards trend.[43] More recent data suggests fewer exceedences.

Ozone is formed by the reaction of oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) in warm, sunny conditions. This secondary pollution is a particular issue in NSW for the Sydney Region, where motor vehicles are the most significant source of these precursor pollutants (responsible for about 71% of NO_x and 38% of anthropogenic VOC emissions).[44] Victorian EPA data, however, indicates that Melbourne has almost no days that exceed health standards for ozone.[45]

Particles smaller than 10 micrometres can exacerbate existing respiratory and cardiovascular disease and lead to increases in hospitalisations and premature death. The contribution to particulate emissions from motor vehicles is estimated at 12 per cent for Sydney. The national goal for particles (PM_{10}) is generally being met in Sydney, except in years with bushfires or dust storms, while research continues on the significance of smaller particles.[46]

It has been estimated that air pollution from motor vehicles accounts for more than 500 early deaths in the Sydney Region per annum and over 1,000 hospital admissions, and that the health costs of motor vehicle emissions in that city are estimated to be between $600 million and $1.5 billion per annum.[47]

The recent tendency for car use in capital cities to plateau is encouraging in terms of air pollution but freight traffic is still growing strongly and is an important source of particulate emissions. Measures that achieve a mode shift away from motor vehicles will assist to tackle air pollution problems, as will measures to improve vehicular emission performance (e.g. continuing implementation of emission standards in line with those in Europe).

Given the generally improving performance for air pollutants and the national program of regularly tightening motor vehicle emissions standards, following the lead from places like Europe, air pollution is not currently seen as an area requiring additional national focus in terms of land transport policy.

2.7 Growing funding requirement

The steady growth in the overall transport task has significant financial consequences for users, and more particularly for Governments who fund the majority of infrastructure and provide operating subsidies.

Transport expenditure comprises 6–12% of State budgets and 2% of the Federal budget and is steadily rising. Capital expenditure on transportation grew from $8–9bn p.a. in 2000–02 to over $20bn by 2008. Public sector expenditure (including that delivered by the private sector such as some privately financed toll roads) accounted for over half of total expenditure and grew strongly through the last decade. (Figure 2.10).

Public transport requires considerable subsidies to cover the gap between fare box revenues and costs. Subsidies for public transport have been rising rapidly, as Governments expand network coverage, increase service frequency and address maintenance backlogs. In 2005 it was estimated that the total operating cost of public transport in Australia (excluding capital costs) was $4.9bn per annum, with farebox revenue of $1.6bn or 32% of costs.[48] Since then, costs in all cities have been growing at a rapid rate (typically in the range of 4–8% p.a.), driven by service growth, wage inflation, energy prices and other factors.

43 Department of Environment and Heritage (2004), State of the Air: Community Summary 1991–2001.
44 http://www.environment.nsw.gov.au/soe/soe2006/chapter3/chp_3.3htm
45 http://www.epa.vic.gov.au/air/vehicles/vehicle_emissions
46 ibid.
47 Bureau of Infrastructure, Transport and Regional Economics (2005), *Health Impacts of Transport Emissions in Australia: Economic Costs*, *Working Paper 63*, BITRE, Canberra ACT.
48 Australasian Railway Association (2006), *National Passenger Transport Agenda*, p.22.

Typical fare box recoveries for most Australian cities are 25-30%, meaning that Governments subsidise 70–75 cents of every dollar of transport expenditure (before considering capital expenditure). Even if fare levels grow at the same pace as inflation, there is persistent structural growth in this subsidy requirement. (i.e. if costs are $100, and farebox is $30, even if both amounts rise with inflation of say 3%, the subsidy requirement grows from $70 to $72.1). In reality, transportation costs have typically been growing faster than overall inflation, worsening the cost recovery outcome.

The funding requirement of transport is becoming very significant, more so given the pressure on Government finances since late 2008.

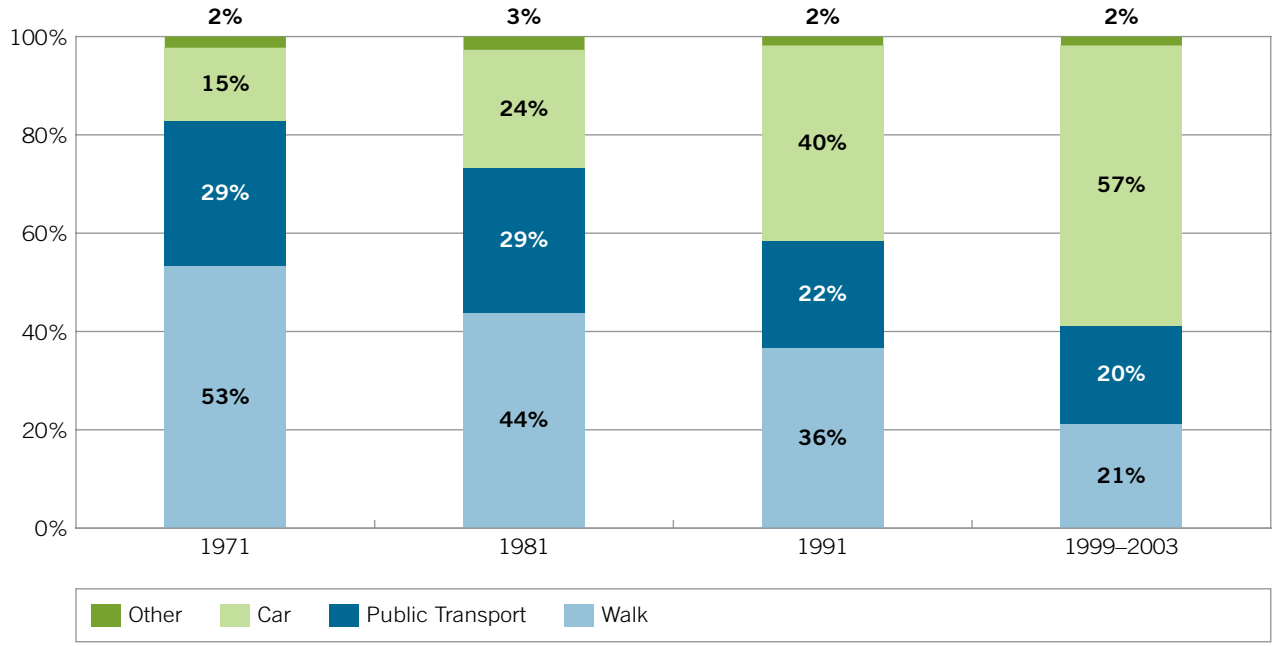
2.8 Summary of key issues

Australia's current land transport systems face some major sustainability problems. Current travel choices for people and freight movement have resulted in:

- congestion costs of about $10 billion annually, and rising;
- relative greenhouse gas emissions that are exceeded by few countries. At a carbon cost of $60/t, the 80 Mt CO_2-e road transport emissions constitute an externality of about $5 billion annually;
- a road toll of about 1,450 or more annually, costed at almost $10 billion annually in terms of the fatality cost alone (excluding injury costs and hospital and related costs to deal with accidents);
- many people being at risk of social exclusion because of our high reliance on the motor vehicle; and,
- a significant and rising funding requirement on Governments.

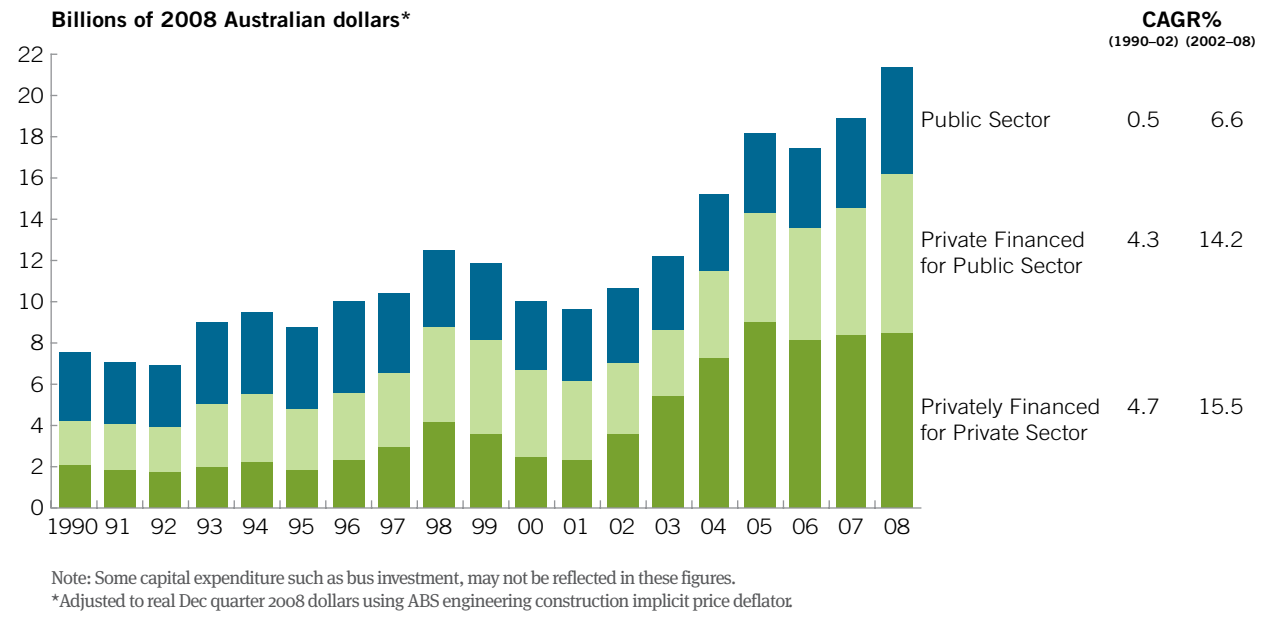
These are major national issues that flow from our current travel patterns and choices. These, in turn, derive to a significant extent from our low density land settlement patterns, particularly in our cities. Improving the sustainability of Australia's land transport systems for people movement cannot be separated from the need to re-shape our cities. Immigration and settlement policy needs to explicitly consider transport demand implications. Travel and land use systems need to be reconfigured to reduce the need to travel, increase travel choices and make travel by low impact modes easier. The same principles should also apply to freight movement. At the same time, the motor vehicle will remain critical for land transport movement of people and freight. Therefore the environmental and safety performance of the motor vehicle must be transformed if it is to continue play such a role.

Figure 2.9: Mode splits for travel to school in Sydney (1971–2003)



Source: New South Wales Ministry of Transport (2008) *Transport Data Centre*, Sydney

Figure 2.10: Transport construction real expenditure by entity completing construction (1990–2008)



Note: Some capital expenditure such as bus investment, may not be reflected in these figures.
*Adjusted to real Dec quarter 2008 dollars using ABS engineering construction implicit price deflator.

Source: Australian Bureau of Statistics (2008), *Engineering Construction Activity*, Cat. no. 8762.0, ABS, Canberra; Australian Bureau of Statistics (2008), *Consumer Price Index*, Cat. no. 6401.0, ABS, Canberra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three

A Land Transport Policy for Australia

A Land Transport Policy for Australia

3.1 Integrated approaches for sustainable outcomes

Australia's current land transport system is not sustainable in economic, environmental or social terms:

- there has been a shortfall in infrastructure investment in land transport;
- congestion costs are high and rising, reducing our economic competitiveness and the liveability of our cities;
- road transport greenhouse gas emissions are high and growing quickly;
- there is little demonstrable progress on reducing transport-related social exclusion;
- the road toll remains unacceptable, with serious injuries rising markedly and fatalities remaining at about 1,450 annually;
- obesity is increasing; and,
- our energy security is diminishing.

State governments, in particular, have been targeting the issues raised above for a number of years. The evidence that these issues are generally getting worse, not better, indicates that **transformational change**, not the incrementalism of the past, will be required to deliver more sustainable long term outcomes. This was the conclusion from the Australian Davos Connection Infrastructure Summit held in October 2008. The Summit concluded that land transport and urban transport/land use were two particular areas where such transformational change was required.[49]

To substantially improve the sustainability of Australia's land transport systems, national land transport policy for at least the next decade needs to be framed around:

- managing congestion costs and improving economic competitiveness and liveability as it is affected by land transport;
- achieving substantial cuts in transport greenhouse gas emissions;
- ensuring adequate mobility options are available for all Australians (and international visitors);
- making the transport system safer;
- encouraging healthier transport choices; and
- increasing our energy security, by reducing our reliance on imported fossil fuels.

Policy approaches need to be integrated, and focus on sustainability.

An "integrated approach" in this context means:

- consistently and comprehensively pursuing goals of economic competitiveness, environmental sustainability and social inclusion (triple bottom line outcomes);
- consistency between policy measures to address the critical national transport issues, across the three levels of government, other stakeholders and sectors, not just via land transport policy. While land transport must be the primary focus in the search for solutions through national land transport policy, solutions to land transport problems will often arise elsewhere, such as in land settlement policies and programs or from social policy changes. To be effective, these policies must be integrated.

A compelling reason for pursuing an integrated approach is that there is often not a one-to-one alignment between issues and solutions. For example, measures that reduce road congestion may also cut greenhouse gas emissions and enhance, or reduce, the risks of social exclusion from mobility origins, while also cutting the road toll. An integrated policy package should seek to maximise beneficial outcomes across as many problem areas as possible, to deliver maximum value for money.

The key **Policy Objectives** that are required to improve the sustainability of our transport systems are:

1. changing the modal balance for transport of people and goods away from such a high dependence on motor vehicles to methods of transport with less impact on the triple bottom line;
2. improving the environmental performance of all transport modes but particularly of cars and trucks, because of their dominant roles; and
3. ensuring that travel opportunities are available to all, irrespective of personal circumstances.

These three elements should form the core elements of national land transport policies, with the goal of achieving more sustainable outcomes on the triple bottom line. These three policy objectives can be translated into six major **Program Directions**, with indicative actions of the type shown below.

ii. **Reducing the demand for travel**
   - Land use planning (increased density, co-location)
   - Maximising opportunities for walking and cycling

ii. **Achieving a shift to lower carbon transport modes**
   - Cars to public transport, walking and cycling
   - Trucks to rail

49 Australian Davos Connection (2009), *ADC Infrastructure 21: From Incrementalism to Transformational Change*, Australian Davos Connection, Melbourne.

iii. **Improving vehicle utilisation**
   > Higher car occupancy
   > More efficient freight movements

iv. **Reducing vehicle emissions intensity**
   > More efficient vehicles
   > Smaller passenger vehicles
   > Alternative fuels
   > Intelligent transport systems
   > Better driving practices

v. **Increasing mobility opportunities**
   > Provision of reasonable base public transport service levels
   > Using existing public transport opportunities (e.g. school and community buses) more effectively

vi. **Creating a more sustainable freight network**
   > Focus on freight movement to ports, hubs and to connect key manufacturing/distribution centres

Figure 3.1 summarises the logic structure for the national land transport policy proposals that follow.

3.2 An integrated national land transport policy

Integration must be a cornerstone of Australia's national land transport policy. Table 3.1 shows how the policy directions set out in Figure 3.1 can positively impact on a number of the critical national land transport issues identified. Most measures can help to address several of the critical issues. In discussing possible policy and program initiatives to deliver a more sustainable land transport system for Australia, focusing particularly on people movement, the categories of measures indicated in Table 3.1 are used as the basis for discussion. Because of the centrality of the concept of integration, it is not possible to deal with people movement and ignore freight. The report thus includes some discussion of freight, particularly where it has strong interfaces with people movement.

Measures 1 to 6 are discussed in more detail below, including how each is likely to impact on key goal areas. In discussing these various measures, a climate change scorecard is progressively assembled in Appendix 1 of this report, to show the potential cumulative impacts on greenhouse gas emissions (as an indication of the integrated nature of the package).

Stanley et al. (2009)[50] have prepared indicative estimates of road transport GHG emissions as at 2050, with an 80 per cent reduction implying total cuts from the road transport sector of about 125 Mt CO_2-e as at 2050, against indicative projections for that year, or 57Mt against land transport emissions in 2000. Those estimates are summarised in Appendix 1.

3.2.1 Reduce the demand for travel

Personal travel is the result of people undertaking activities at places that are separate to where they are located. The closer the desired activities are to the present location, the shorter the trip and the lower in general the congestion, emissions and accident contribution. Achieving reductions in travel is most achievable in urban areas and partly requires the structure of cities to change, so that more people live closer to where they work and play. Most Australian capital cities are aiming to achieve more compact settlement patterns (e.g. through mixed use densification), but low density growth on the fringe is still the dominant pattern.

Progress in implementing more compact urban settlement patterns in Australia's major cities needs to be accelerated. Figure 3.2 shows the slow pace of urban densification in Australia's capital cities, with growth rates of only 1–2% per annum experienced. Figure 3.3 illustrates how per capita emissions are related to density. Significant density increases can help lower total emissions, a matter that is considered further in Section 3.4. Countries like Germany, for example, have been very successful in this regard. Car kilometres per person in Germany are less than half what they are in the US, partly because German population density over its developed land area is three times greater than in the US.[51]

Changes in urban structure take time to impact significantly on travel patterns. Travel behaviour change techniques, such as Australia's *TravelSmart* program, can also have a positive incremental impact on trip patterns (car trip rates and trip chaining), in the short term. Successful *TravelSmart* programs have reduced car kilometres by up to twenty per cent[52] and have been applied in a range of travel circumstances.

50 Stanley, J, Hensher, D.A. and Loader, C. (2009), Road transport and climate change: stepping off the greenhouse gas, *Transportation Research A, Policy and Planning*, doi:10.1016/j.tra.2009.04.005

51 Buehler, R., Pucher, J and Kunert, U. (2009), *Making Transportation Sustainable: Insights from Germany*, Report Prepared for the Brookings Metropolitan Policy Program, April.

52 Stopher, P.R., Y. Zhang, J. Zhang, and B. Halling (2009). *Results of an Evaluation of TravelSmart in South Australia*, Paper presented to the 32nd Australasian Transport Research Forum, Auckland, September.

Figure 3.1: Developing a basis for national land transport policy

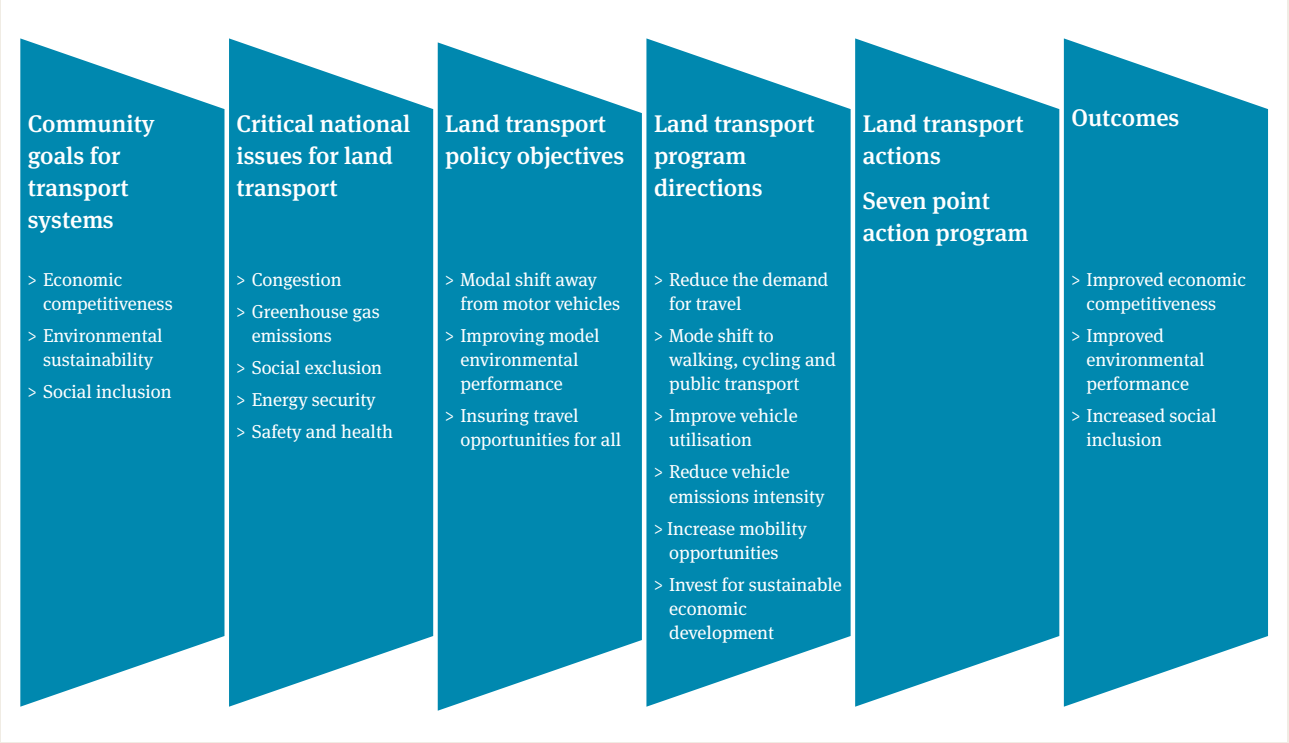
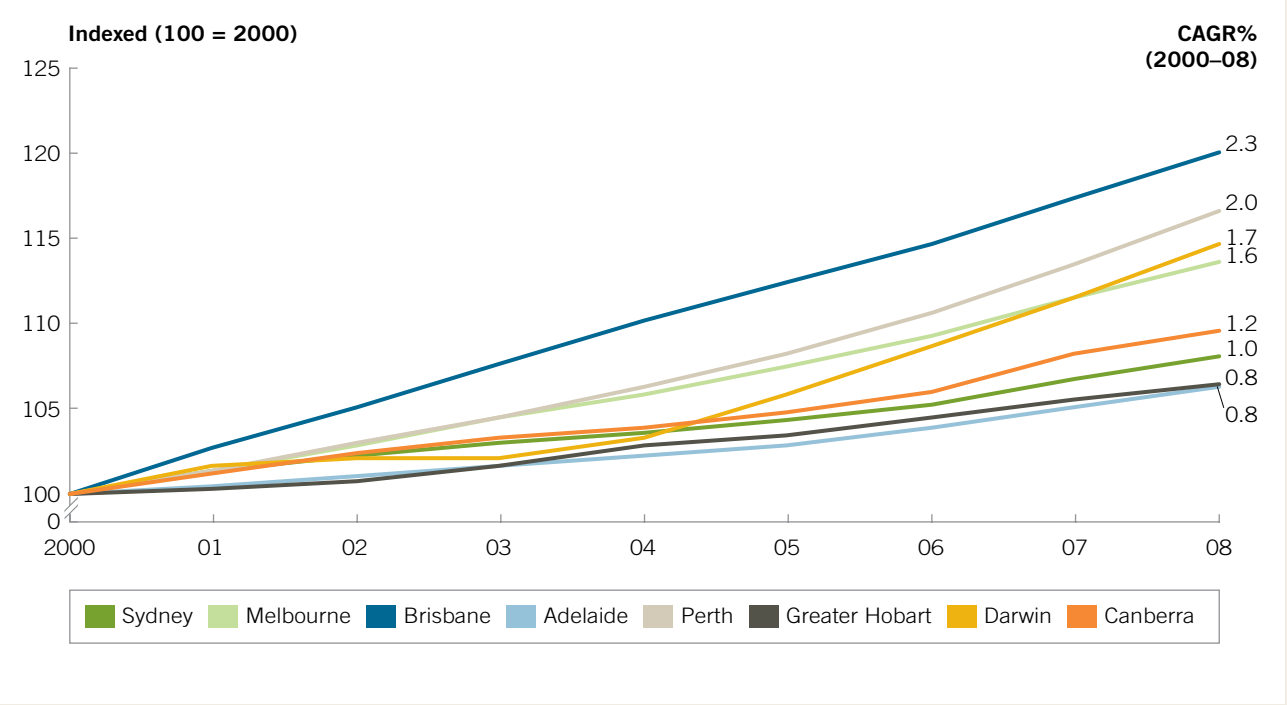


Table 3.1: Alignment of measures and their expected benefits

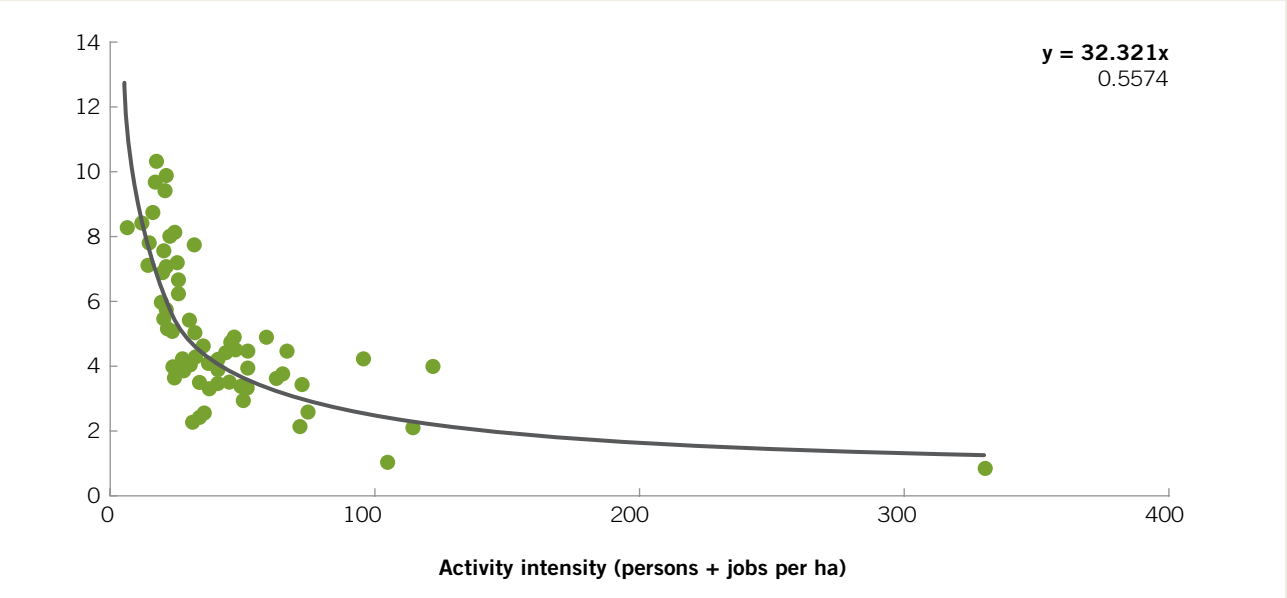
Critical national land transport issue	1. Reduce the demand for travel	2. Mode shift to walking, cycling and public transport	3. Improve vehicle utilisation	4. Reduce vehicle emissions intensity	5. Increase mobility opportunities	6. Creating a more sustainable freight network
Congestion	Yes	Yes, with suitable infrastructure provision, to ensure congestion is not shifted to another mode	Yes, provided traffic generation is managed	Neutral	Neutral	Needs to minimise road traffic generation
Greenhouse gas emissions	Yes	Yes	Yes	Yes	Depends on how provision is made. Low emission modes best.	Focus on fuel-efficient flows
Social exclusion	Should target shortening trip lengths, not eliminating activities	Yes. Because these means of travel are low or no cost, they are inherently relatively inclusive.	Yes. This is a common way people at risk of social exclusion improve their mobility options	Price increases may have negative impacts	Yes	Neutral
Energy security	Yes	Yes	Yes	Yes	Neutral	Needs fuel efficient modes
Safety/health	Yes	Yes	Yes	Neutral	Yes	Risk area

Figure 3.2: Australian capital cities gross population density (2000–08)



Source: Australian Bureau of Statistics (2008), *Regional Population Growth*, Cat. no. 3218.0, ABS, Canberra

Figure 3.3: Activity Intensity and Daily Per Capita GHG Emissions in Sydney and Melbourne



Source: Trubka, R., Newman, P. Bilsborough, D (2008), *Assessing the Costs of Alternative Development Paths of Australian Cities*, Curtin University Sustainability Policy Institute and Parsons Brinckerhoff Australia, Perth.

3.2.2 Mode shift from cars to walking, cycling and public transport

A general strategy for reducing road congestion, transport GHG emissions, the road toll and to improve energy security and increase personal activity levels is to increase the relative amount of walking, cycling and the use of public transport.

Given the relatively high proportion of urban trips that are less than five kilometres in length, a greater share of personal travel by walking and cycling should be feasible, if suitable facilities are provided. If land use policies and programs give greater emphasis to more compact settlement patterns, this should facilitate even higher modal shares for walking and cycling. In Germany, for example, walking and cycling account for one trip in three, about twice the current Australian share. Most Australian cities are well suited to cycling, with relatively friendly terrain. However, conflict with other road users, particularly cars and trucks, raises safety issues for cyclists. Provision of dedicated cycle paths/road space increases the safety of this form of travel. Public transport (bus, tram, train, ferries) typically carries between about six and 14 per cent of motorised trips in Australian cities (depending on the city) and about 7.5 per cent of all capital city trips in total. Melbourne's public transport mode share has risen remarkably in recent years, from 9 per cent of motorised trips to 14 per cent. This makes the Government's earlier mode share target of 20% of motorised trips by 2020 appear more realistic than just 4–5 years ago. Strong public transport patronage growth is also being experienced in some other Australian cities, with Perth (for example) showing double digit growth in 2008–09 (see Figure 2.3).

Using greenhouse gas emissions as an illustration of the benefits of increased public transport mode share, Figure 3.4 shows how a small modal shift from car to public transport can cut GHG emissions by about two-thirds for peak travel and by about 95 per cent for off-peak travel.

The prospects for a higher mode share (20% plus) of motorised trips in the medium term (and for shorter trip lengths and increased walking and cycling) would be enhanced if a comprehensive road pricing regime was to be introduced, including congestion charging, to make road users accountable for the full costs of their travel choices (including congestion costs, GHG emissions, air pollution costs, road damage, noise costs and accident costs that are external to insurance cover). The effectiveness of road pricing in cutting traffic congestion levels is illustrated by the London congestion pricing scheme, where traffic levels initially dropped by about 20 per cent in the congestion charging area, assisted by a substantial increase in bus services.[53] Road pricing reform is now supported by Australia's peak motoring organisation, the Australian Automobile Association.[54] The Henry review of taxation policy has recently discussed the possibility of road pricing as part of broader reforms to the overall tax base. Road pricing reform is further discussed in Section 3.2.7.

Complemented by substantial improvements in public transport service levels, including on-road priority, a 20 per cent public transport mode share target (as a share of motorised trips) by 2020 is feasible for Australia's capital cities, particularly if fuel prices remain high. This will be associated with much higher mode share in the peak, where public transport plays a vital mass transit role.

3.2.3 Improve vehicle utilisation (cars and trucks)

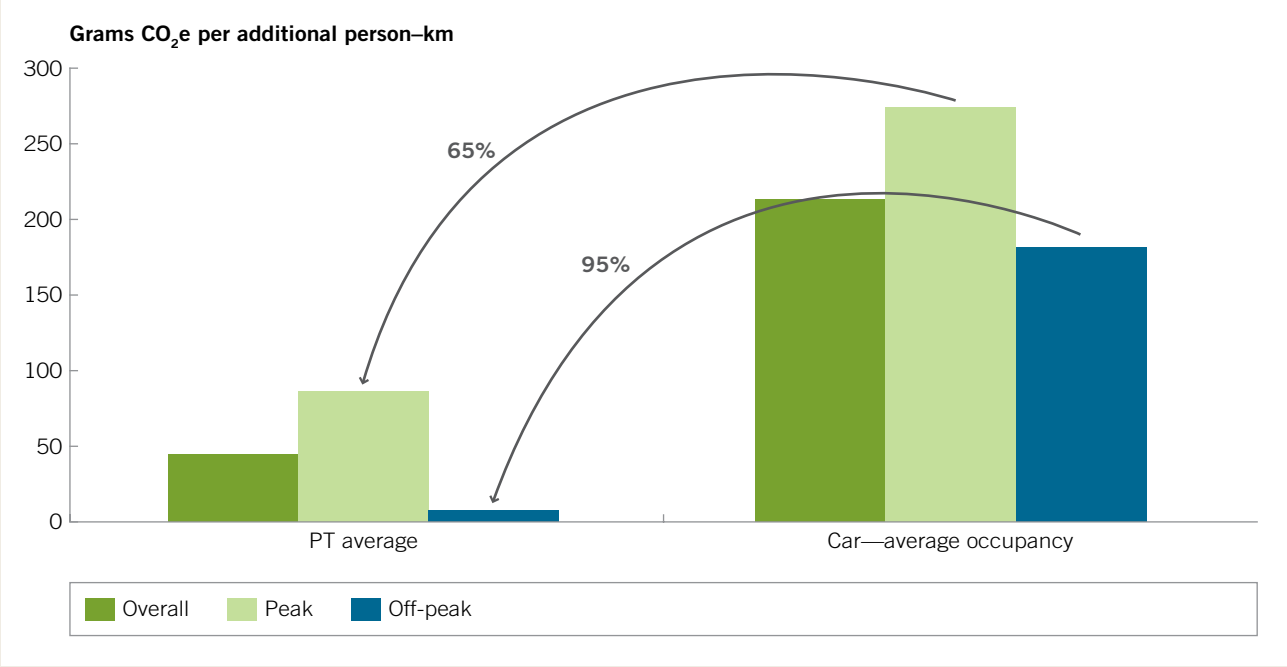
Car occupancy rates are typically low in Australia. For example, metropolitan occupancy rates in Melbourne are 1.2, and morning peak occupancy rates on Melbourne's freeways are lower.[55] Figure 3.5 shows that vehicle occupancy rates across Australia have been declining over time.

With the high dependence on cars for urban personal travel, increasing occupancy rates offer a real opportunity to cut congestion, emissions and many other adverse consequences of car use, provided this is achieved by lowering the number of cars on the road. This should be a major focus of policy attention. Transit lanes that give priority to high occupancy vehicles should be more commonplace in our cities, to encourage ride sharing and greater use of public transport. Allowing cars with three or more people to travel in these lanes, or occasionally two or more, and ensuring that transit lanes achieve much faster travel times than remaining lanes, would provide a strong incentive to increase occupancy. Also, motoring associations should promote a campaign among their members to car share as a more usual practice, raising awareness of the greenhouse (and other) benefits of this practice.

The aim of improving the capacity utilisation of the existing vehicle fleet to reduce road congestion, vehicle emissions etc., extends to trucks as well as cars. BITRE suggests that Australia's freight task in 2006–07 was 507 billion tonne kilometres.[56] 2002–03 data suggests that

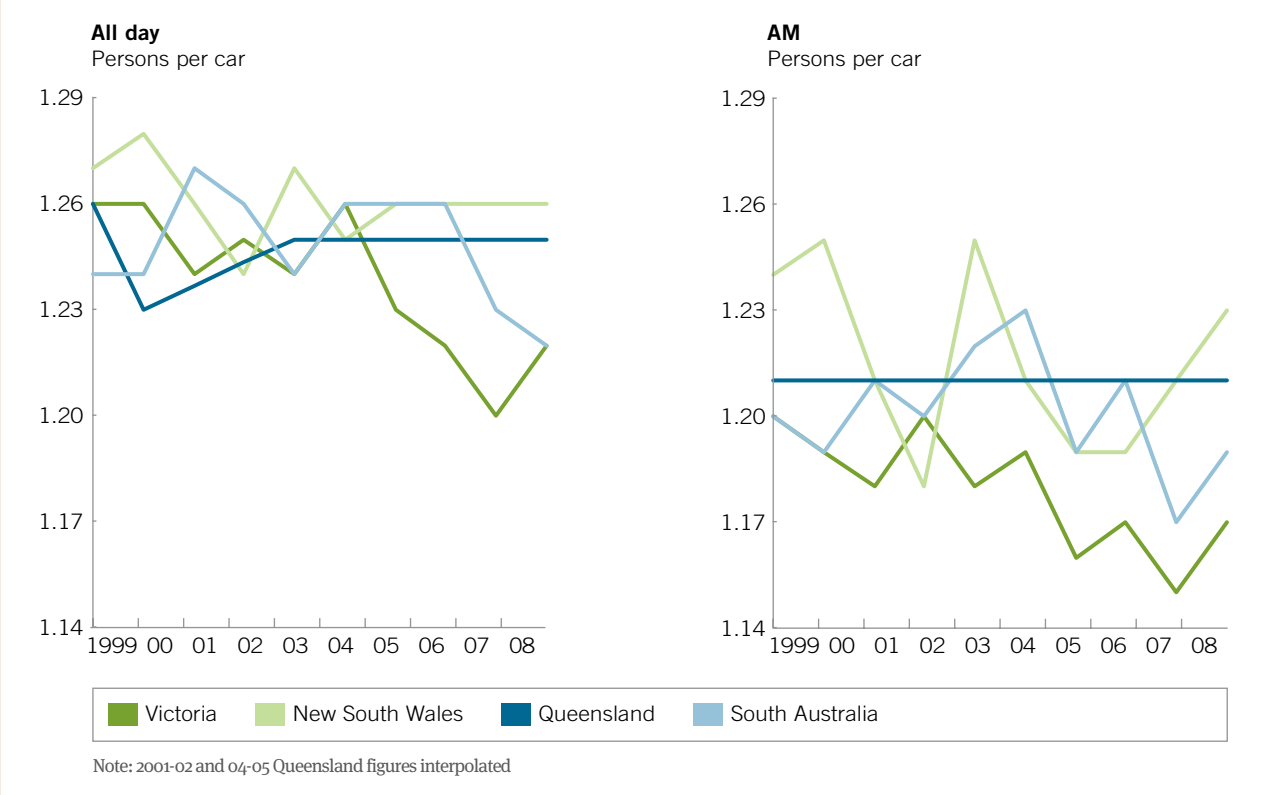
53 See http://www.abd.org.uk/london_congestion_charge_report2007.htm Initiatives for bus and pedestrian priority traffic have tended to keep congestion levels high, suggesting that a fixed price regime may not be the best way to manage the road network.
54 Australian Automobile Association (2009), *Road Pricing on Reform Agenda*, Media release.
55 Vicroads (2009), *Traffic Monitor: Traffic System Performance Monitoring 2007/08*, Melbourne.
56 Bureau of Infrastructure, Transport and Regional Economics (2009), *Australian Transport Statistics Yearbook 2009*, Department of Infrastructure, Transport, Regional Development and Local Government, Canberra.

Figure 3.4: Incremental GHG Intensity of Passenger Transport in Melbourne (2007/8)



Source: Victorian Department of Transport (2008)

Figure 3.5: Car occupancy rates (1999–2008)



Source: Austroads (2009), *National Performance Indicators*, Association for Australian and New Zealand road transport and traffic authorities, Sydney

about two–thirds of the task is bulk freight and one third non-bulk. Table 3.2 presents summary indicators of the distribution of this freight task across modes and broad movement categories for 2002–03 (the latest year for which detailed data is published by BITRE). Coastal shipping and rail dominate the bulk markets and road has about eighty per cent of the non-bulk market. This report focuses on the non-bulk area.

Table 3.2: Australian domestic freight task (2002–03)

(Billion tonne kilometres)

Indicator	Road	Rail	Coastal Shipping	Total
1. Total	151.0	159.8	114.8	425.6
2. Bulk	45.3	130.1	106.3	282.4
3. Non-bulk	105.7	31.0	8.5	146.8

Source: Bureau of Infrastructure, Transport and Regional Economics (2009), *Australian Transport Statistics Yearbook 2009*, Canberra.

Freight movements overall are projected by the Bureau of Transport and Regional Economics[57] to continue strong growth, doubling between 2000 and 2020. While road freight tonnes moved have been growing roughly in line with economic growth (Gross Domestic Product), road freight tonne kilometres (tkms) have grown much faster than GDP (Figure 1.4). While some of this growth in tonne kilometres will be accounted for by longer travelling distances that are required in Australia's growing cities, it suggests there are likely to be opportunities to meet the same freight task that is currently moving by road in a more efficient manner. Two major areas to consider for reducing the growth in road freight tonne kilometres are (1) improving the efficiency of truck movements and (2) shifting greater volumes of freight onto rail.

Road freight efficiency can be improved in many ways. One important way is through use of higher capacity vehicles (e.g. B-triples[58]), utilising performance-based standards to extend access opportunities beyond what might otherwise be possible for such vehicles. Australia is a leader in terms of the development of such vehicles and the access regimes within which they operate. Facilitating greater innovation in vehicle design, while developing infrastructure (e.g. bridges) that is more suited to higher payloads, is an important way to allow fewer, more efficient trucks on the roads, and reduce the adverse impacts of truck use (e.g. congestion, emissions) on a per tonne kilometre basis. Separating trucks from the general traffic stream in key corridors, such as corridors to/from ports, would also improve productivity.

Higher utilisation of trucks through better scheduling would reduce the number of unproductive trips. Surveys of trucks operating around the Port of Melbourne, for example, showed that, on average, half the container slots were empty, and 37 per cent of container trucks carried no containers at all.[59] A survey completed on Fremantle Inner Harbour found that of all trucks operating, 27% were travelling completely empty, carrying no containers at all.[60] Increased back-loading, through more integrated scheduling, could increase truck utilisation, reducing emissions from unproductive trips. In addition, shifting freight traffic from congested peak periods to other times of the day would also result in lower emissions.

3.2.4 Reduce vehicle emissions intensity

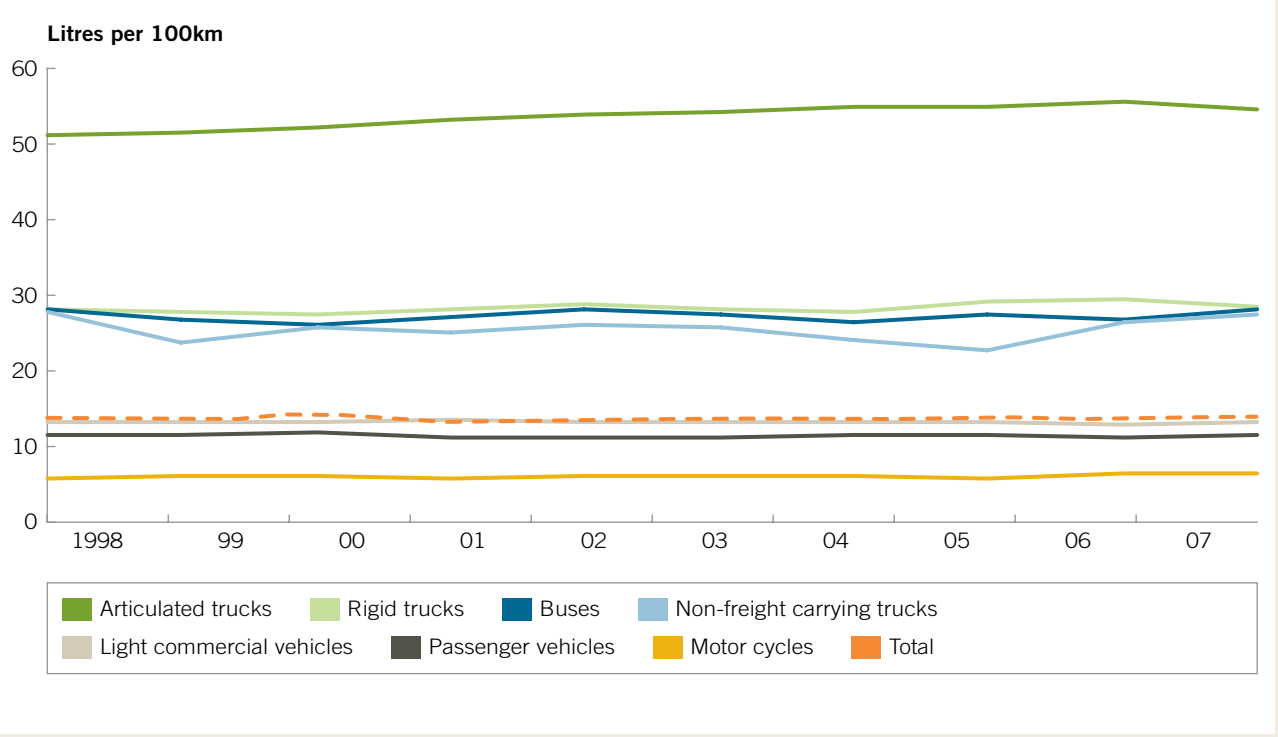
Many initiatives described in this report can have positive impacts on several of the national land transport policy issues identified. Improving the emissions performance of the vehicle fleet is more targeted in the scope of its impacts but is central to the degree to which Australian greenhouse gas emissions from land transport can be significantly reduced in the coming years.

Figure 3.6 shows that the overall fuel intensity of Australia's road transport fleet showed little improvement over the period between 1990 and 2006. For example, average fuel economy for cars fell just five per cent from 1990. For light commercial vehicles, the reduction was even less. While engines have been becoming technically more efficient, Australians have been buying larger and heavier vehicles, offsetting the potential fuel savings. Many governments have continued to use six cylinder vehicles in their fleets. A recent NTC report[61] found that in 2008, government fleet buyers had the highest average vehicle emissions (238 g/km), followed by business buyers (233 g/km), and then private buyers (210 g/km).

Figure 3.7 shows that Australia's (voluntary) emissions targets for new vehicles are still well above those adopted by Japan, China and Europe. In terms of CO_2 emissions, the best Australian manufactured car is the 4 cylinder Camry, at 210g/km. The hybrid Camry will be around 126–147g/km. By way of comparison, the Toyota Prius is 106g/km. The European Commission is currently considering future new car targets of 95g/km in 2020 and 70g/km in 2025. These numbers show how far Australia has to go to catch up with Europe and Japan, in particular.

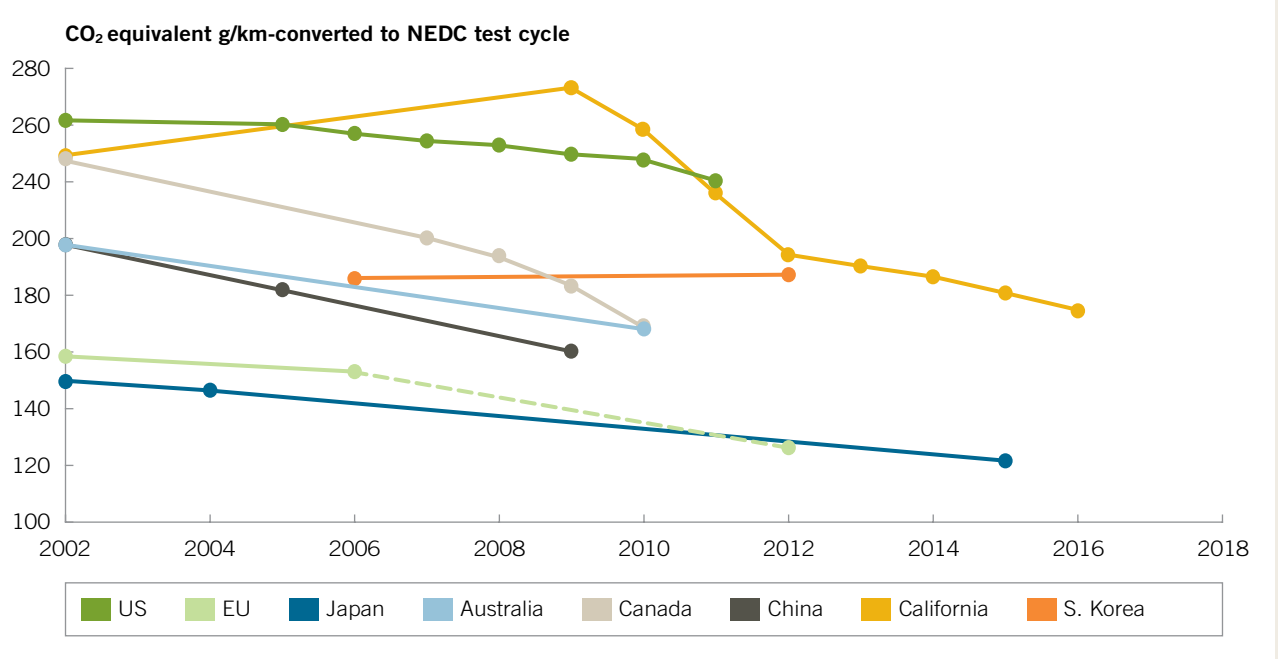
57 Bureau of Transport and Regional Economics (2006), *Freight Measurement and Modelling in Australia. Report 112*, BTRE, Canberra ACT.
58 A prime mover with three trailers.
59 Port of Melbourne Corporation (2006), *Port truck utilisation survey*, Melbourne.
60 Western Australia Department for Planning and Infrastructure (2004), *Fremantle Inner Harbour Container Movement Study.*
61 National Transport Commission (2009), *Carbon Emissions from New Australian Vehicles Information Paper.*

Figure 3.6: Average Australian fuel consumption (1998–2007)



Source: Australian Bureau of Statistics (2007), *Survey of Motor Vehicle Use,* Cat. no. 9208.0, ABS, Canberra

Figure 3.7: New Car Emissions Performance Targets (2002–18F)



Source: International Council on Clean Transportation (2007)

Because Australia is largely an importer of heavy vehicle chassis from overseas, the scope for reductions in GHG emissions from motor vehicles over the next decade or so will need to rely primarily on achievements from the car fleet, where our emission performance has much room for improvement. In the longer term, it will be important that both light and heavy vehicles, and public transport vehicles (rolling stock, buses, ferries) will make very dramatic reductions in their emissions intensity (improvements in their fuel/energy efficiency).

Alternative fuels such as gas and biofuels can contribute to lower overall road transport GHG emissions and their use is expected to grow, especially second generation biofuels.[62] There is also considerable interest in electric vehicles, with the possibility that these could function as storage devices for surplus electricity generated intermittently by renewable sources such as solar and wind. Electric vehicles are likely to show rapid market penetration, with urban distribution tasks being particularly suited to such vehicles. At the 2009 International Transport Forum in Leipzig, for example, one CEO expressed a strong interest in operating an extensive electric distribution fleet within five years and senior Australian transport executives have expressed similar sentiments, recognising that "some clients are prepared to pay to be green", even if additional cost is involved.

3.2.5 Increase mobility opportunities

Section 2.3 argued that mobility is an important influence on the risk that people may be or may become socially excluded. Social exclusion might be triggered by socio-economic factors, age, disability, and geographic isolation. Australian research has demonstrated the important role that provision of a reasonable base level of public transport services in urban areas can play in enabling most people to have the opportunity to engage in most of the activities they wish to pursue, most of the time.

This provides people with the opportunity to connect with friends, their community and to build social capital. This base service level can be thought of as the "minimum service level", seen as the foundation of a "social transit role" performed by public transport. Appropriate minimum service levels will vary by location but, in outer urban areas, will typically be something like an hourly service within 400 metres of properties, from 6.00am to 10.00pm. This intent needs to be balanced with due consideration of value for money from taxpayer funded services. If patronage on these services falls below a certain level, then scheduled services may not be the most effective way of meeting community needs. It is therefore appropriate that service levels change with population numbers and densities, and that alternative approaches are implemented (e.g. demand responsive services or taxi vouchers). Most Australian cities have such minimum service guidelines. Thoughtful implementation will enhance the benefit that public transport can deliver in terms of enhancing social inclusion.

The Bus Industry Confederation's research into mobility opportunities in regional Australia indicates that there are a number of opportunities. Providing improved access opportunities by public transport will sometimes be achieved by improving route bus service levels. In other situations, it can be achieved by increasing the use of existing school bus services, with suitable contractual variations to encourage greater use of these vehicles, or it may be met by use of community transport services.

When allowance is made for school transport services, regional route bus services and community transport, it is apparent that there are many resources currently being devoted to providing mobility for various categories of people who are often transport disadvantaged, in regional Australia. However, eligibility criteria tend to exclude some categories of traveller and/or types of trips, even when there is often physical capacity for additional travellers to have their needs met. Institutional barriers often stand in the way. Regional ideas and understanding should be tapped to identify such opportunities. Regional Accessibility Planning Councils across Australia, comprised of key regional stakeholders with an interest or involvement in personal transport/accessibility, should be formed to (inter alia) identify the most pressing regional needs to improve regional social inclusion as it is affected by transport and to also identify ways for getting better use from existing transport resources to meet these needs. An important element among the possibilities in regional areas will be the maintenance of all-weather road access, because of the critical role of road in facilitating access and mobility opportunities in regional Australia.

62 Where food security is of less concern than for some current sources of alternative fuels.

3.2.6 Protecting those at risk

Implementation of policies and programs to positively foster social inclusion as it is affected by land transport should be an important element in national land transport policy. In addition, it is important to ensure that policy measures implemented to tackle the other critical national land transport policy issues do not impact adversely on those at risk of social exclusion. In terms of the specific proposals in this report, the implementation of road pricing would be of most concern, since these measures are potentially regressive. For example, low income households living in outer suburban areas would incur higher car travelling costs from road pricing, yet people living in these areas were noted as typically being most transport disadvantaged (and, in consequence, of being at relatively greatest risk of social exclusion from transport origins). In regional areas, in contrast, the cost of car travel would be expected to fall under externality-based pricing, with positive distributional consequences.

The other proposal likely to have adverse distributional consequences is the mandatory imposition of European vehicle emissions standards. This will increase the price of new vehicles and probably lead to low income people holding old vehicles for longer. However, an offsetting influence is likely to be a swing to smaller and more fuel-efficient vehicles, which should save costs.

A number of the measures considered in this paper can be used to positively discriminate in favour of those likely to be adversely impacted by the proposed reform of road pricing. Reformed road pricing arrangements will generate very substantial revenue flows to government (the particular benefiting government depending on the arrangements under which such a reform is implemented). Part of this revenue can be used to fund place-based measures to improve mobility opportunities for disadvantaged people. For example, improved public transport services can be targeted at areas where low income people are highly represented and current services are relatively poor (e.g. many outer urban and regional areas).

Urban design that provides greater opportunity for walking and cycling can also improve the opportunities available for low income individuals. This opportunity can be further enhanced by inclusion of affordable housing in areas where development densities are being increased. Careful use of the revenue streams from road pricing reform (and from emissions trading) can thus provide a key to mitigation of adverse distributional consequences of measures proposed in this report. Going further, they also open the possibility for more positive discrimination if the political will exists.

3.2.7 Creating a more sustainable freight network

The ADC Infrastructure Summit[63] highlighted a number of problems confronting general (non-bulk) freight, including:

- bottlenecks in cities/accessing ports and airports, accentuated by high growth rates in freight volumes (e.g. access to inter-modal terminals and ports by road and rail, track conflicts between passenger and freight rail services, road and port terminal congestion);
- historical underinvestment (particularly in the north-south rail corridor but also in enabling interconnection between manufacturing centres and key ports/hubs);
- inappropriate price signals;
- multiple regulations and outdated practices (state-based regulatory regimes inhibiting productivity improvements); and,
- rapid growth in emissions.

The kinds of initiatives which will improve freight efficiency, sustainability and contribute to improved economic competitiveness more generally, include:

- investment in large scale, multi-user inter-modal terminals in the larger capitals (to improve road and rail freight);
- investment in road and rail infrastructure to better separate freight from urban passenger transport;
- capital works to allow double stacking on the north-south rail corridor;
- investments to attract port shuttle traffic to rail, relieving congestion around ports (especially in Sydney and Melbourne);
- developing container ports away from centres of the capital cities;
- completing capital city limited-access orbital roads, particularly to meet road freight distribution needs and to extend labour catchments for those living in areas with relatively poor job accessibility; and,
- road pricing reform.

63 Stanley, J, Hensher, D.A. and Loader, C. (2009), Road transport and climate change: stepping off the greenhouse gas, *Transportation Research A, Policy and Planning*, doi:10.1016/j.tra.2009.04.005

The last of these issues, road pricing, is worthy of further elaboration. Fundamental to improving the efficiency of resource use in land transport is a pricing system that requires users to meet the marginal costs attributable to their travel decisions. Road use in Australia currently lacks such a system. The US National Surface Transportation Policy and Revenue Study Commission recently estimated future US land transport investment requirements, noting that "widespread pricing reduced additional investment requirements by 30 per cent" but argued that there would still remain a major investment task to be undertaken, much larger than is currently underway in the US.[64]

Many commentators, including the Productivity Commission[65] , Professor Ross Garnaut[66] and the CRC for Rail Innovation[67] have concluded that Australia's heavy vehicle charges have several shortcomings. While the Australian road pricing system for trucks implemented by the National Transport Commission is structured to charge heavy vehicles for their road damage costs, subject to some charge averaging provisions, other external costs of road use are ignored by pricing systems. Heavy vehicles only pay "marginal cost" for use of the network, including a share of joint costs, making no contribution to other external costs. These external costs are particularly substantial in congested urban areas and urban areas account for 45 per cent of total truck kilometres and 80 per cent of light commercial vehicle kilometres[68]. As it stands, the NTC charges are likely to promote a less efficient mode of transport (heavy vehicle road freight) over more efficient transport (rail), particularly because of the neglect of most externalities.

The Bus Industry Confederation[69] estimated average external costs of articulated truck use in urban areas at 49–73c/L, excluding congestion costs. These costs would be considerably higher today. Congestion costs are the largest single external cost of urban road use and would more than double the 49–73c/L external costs of articulated truck use in peak periods. None of these external costs are charged to truck use, except for road damage costs. Road pricing reform should make freight shippers take these external costs into account to ensure an economically efficient transport system as a whole.

To further cut road congestion and emissions arising from the freight sector, rail must play a larger role in freight movements, especially in capital cities, given the strong growth projected in freight flows through some ports and the likely impacts on liveability. Critical to achieving a larger role for rail is fast-tracking the establishment of inter-modal freight terminals in Australia's major cities, especially in relation to port and interstate freight movements. If external costs were charged for road use by trucks, more intermodal freight hubs would become financially viable and the rate of growth of road freight would reduce, as logistics processes are reviewed, with corresponding reductions in GHG emissions.

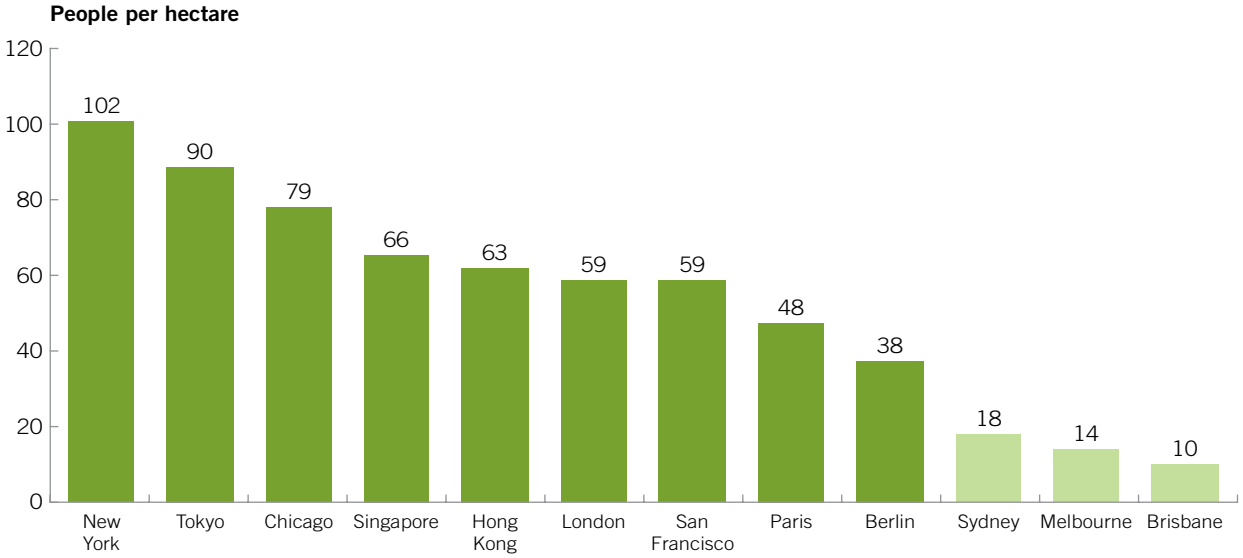
3.3 The impact of urban structure

Many of the initiatives described in this report will benefit from urban development policies and plans that facilitate more compact urban settlement patterns. Australian cities are among the most widely dispersed in the world (Figure 3.8). More compact cities can help to reduce travel distances (e.g. because of closer proximity of trip origins and destinations), make walking and cycling easier and improve the economics of public transport service provision. Through these impacts it can contribute to cutting road congestion costs, improving air quality, lowering the road toll, improving health and reducing GHG emissions. A related benefit of developing more compact urban settlement patterns is the encouragement of what are termed the "consumption externalities" of cities, such as restaurants, cultural facilities, etc, which act as attractors for many knowledge workers.

A recent study[70] examined the effects of urban form and public transport supply on travel mode choices and annual vehicle travel in 114 US cities. Population centrality, the jobs-housing balance, city shape and density were found to have a significant effect on the amount of vehicle travel. The effect of moving a sample of households from a city like Atlanta (733 persons per km2; 7000 rail miles of service/km2; 10,000 bus miles of service/km2) to a city with the characteristics of Boston (1202 persons/km2; 18,000 rail miles of service/km2; 13000 bus miles of service/km2) is a reduction in annual vehicle travel of 25 per cent. This reduction is driven by differences in public transport supply, city shape and especially in population centrality (essentially compactness). While individual factors have only small impacts, the joint impact of the various factors is significant, emphasising the

64 US National Surface Transportation Policy and Revenue Study Commission (2008), *Volume I: Recommendations*, January, p. 45.
65 Productivity Commission (2006), *Road and Rail Freight Infrastructure Pricing*. Report 31, Canberra
66 Garnaut Climate Change Review (2008), *Interim Report to the Commonwealth, State and Territory Governments of Australia*, February.
67 CRC for rail innovation (2009), Freight *Infrastructure Issues*, Paper 6, Brisbane.
68 Bureau of Transport and Regional Economics (2006), *Freight Measurement and Modelling in Australia. Report 112*, BTRE, Canberra ACT.
69 Bus Industry Confederation (2001), *Getting the prices Right, Submission by the Bus Industry Confederation to the Commonwealth Fuel Tax Inquiry*, October.

Figure 3.8: Population density in major cities (2004)



Note: Population density statistics appear to vary widely between sources

Source: DOI (2006) *Victorian Department of Infrastructure's Submission to the Inquiry by the Victorian Competition and Efficiency Commission into managing Transport Congestion*, Melbourne; The Economist

importance of taking an integrated and systemic approach to reducing transport GHG emissions, including both land use and transport elements.

While urban structure only changes slowly, long term approaches must be taken to deliver substantial emission cuts and this will require land use to play a central role.

Similar conclusions emerge from a comparison by Buehler et al. between Germany and the US.[71] It was found that Americans travel by car about twice as much as Germans. The analysis suggests that transportation policies and spatial development (German cities are more compact than US cities) each account for 25 per cent of the explained variability in travel behaviour.

Compact, pedestrian and bicycle-friendly mixed use developments, containing medium to high density residential, office and retail uses within walking distances of rail stations (or tram/bus rapid transit routes), is sometimes called Transit Oriented Development (TOD). A number of studies have shown how such developments can reduce car use by 20 per cent or more. For example, a study in Seattle, Washington, found that in mixed-use TOD car use was reduced by about one-third, with public transport, walking and cycling playing correspondingly larger roles. Residents of TOD-like neighbourhoods in the San Francisco Bay Area had almost half the vehicle miles travelled of new suburban developments.[72]

In the Australian context, more compact urban development is likely to require a much greater focus on building activity levels (including residential populations) in our CBDs, increasing jobs and population in key urban nodes and increasing development densities along principal public transport corridors (higher density, low rise) and at major public transport nodes (e.g. around rail stations). Public transport investment will be needed along the major corridors to cater for the higher density mixed use developments and capacity expansion will be needed in several CBD-oriented public transport services, to cater for patronage growth. Failure to provide such capacity carries risks of CBD job loss, with associated losses of agglomeration economies, for which CBDs are important from an economic perspective, an argument well made by Sir Rod Eddington's East-West Needs study in Melbourne.[73]

70 Bento, AM, Cropper, ML, Mobarak, AM and Vinha K (2005), The Effects of Urban Spatial Structure on Travel demand in the United States, *The Review of Economics and Statistics*, 87(3), 466–478.

71 Buehler, R., Pucher, J. and Kunert, U. (2009), *Making Transportation Sustainable*, Metropolitan Policy Program at Brookings, April.

72 SYDEC, INC. (2007), *Long Term Transit Expansion Prospects*, Commission Briefing paper 4M–05, Prepared for National Surface Transportation Policy and Revenue Study Commission, May, 16.

73 Eddington, Sir Rod (2008), *Investing in transport: Overview—East West Link Needs Assessment*, March.

Professor Rob Adams of University of Melbourne and City of Melbourne has been promoting the multiple benefits of linear corridor development, in terms of lower energy requirements for transport and buildings, scope for local energy generation, water capture and roll-out of fibre to the property for high speed broadband. It is in this area of integrating urban public transport and land use that the interface between public transport, bicycles and pedestrians becomes very important. Easy pedestrian access to rail/bus routes, with stops that provide shelter, are basic requirements to attract people from their cars and reduce traffic congestion. The accompanying diagrams from Professor Adams illustrate how this might appear in a city like Melbourne. The prospective benefits are numerous and significant.

Inner Melbourne today

Inner Melbourne with higher density linear development

3.4 A package of measures

The various changes outlined in Section 3.2 and 3.3 above would be encouraged by the following land transport policy **Seven Point National Plan** The key actions are:

1. **Increased investment in public transport**. Continue to increase ongoing funding by all levels of government in public transport to meet existing and future demand, through increased service levels, improved connectivity (urban and regional) and wider transport choice. Priorities are discussed in Section 4 and focus on improvements in trunk services to increase modal share and improvements in local services to enhance prospects for social inclusion, while feeding trunk services. This action will also reduce congestion costs, cut the road toll, improve air quality and contribute to social inclusion.
2. **Freight capacity investment and efficiency improvements.** Invest in freight infrastructure, to reduce road congestion, and improve road safety, urban amenity and the environment. Invest in capacity for rail freight and inter-modal hubs, to assist a modal shift of freight towards rail, especially in congested areas and for long haul general freight movement. Improve freight efficiency to improve economic competitiveness

   (e.g. accelerated introduction of high productivity vehicles, accompanied by reform of road pricing; completion of limited access orbital roads in major cities).
3. **Road pricing reform**. This should involve replacement of existing charges (excise, registration) with charges that better reflect the full costs associated with road travel, including congestion costs, accident costs, health costs, road damage, air pollution and noise. This will deliver benefits of lower road congestion costs, reduced greenhouse gas emissions, lower air pollution levels and improved road toll and health outcomes. Further detail on how this initiative might work is provided in Section 5.4 below. In addition, road space should be reallocated to prioritise low emission modes (e.g. high occupancy vehicle lanes). This will help ease congestion costs as well as cut GHG emissions. It should also help lower the road toll and improve air quality, through promoting smoother traffic flow conditions.

4. **Improved accessibility for all.** Provide adequate mobility choices that provide reasonable and equitable access to family and friends, jobs, shops, services and recreation. Establish Regional Accessibility Planning Councils, to lead the examination of access and mobility problems in regional areas and a co-ordinated approach to tackling those problems, including making better use of existing resources. This area of investigation should, inter alia, produce proposals for minimum access levels for urban and regional Australia. Further implement behavioural change programs (e.g. Travel Smart). As with most measures above, this initiative will deliver benefits in terms of congestion reduction, improved road toll, improved air quality, better health outcomes as well as cutting GHG emissions. Recognising the interdependence between initiatives and need for an integrated approach to policies and programs, initiatives such as Travel Smart will work better if other measures in this plan are implemented as mutually reinforcing programs.
5. **Improvement of fuel efficiency**. Very large improvements will be needed, much more than is being achieved by Australia's current voluntary emissions performance system. Mandatory fuel efficiency targets in line with European thinking seem likely to be required to drive the rate of change that will be needed long term. A period of perhaps five years should be allowed to bring Australian emission standards into line with those in place at that time in Europe.
6. **More compact, walking and cycling friendly urban settlements**. This requires a much greater focus on delivering mixed use, polycentric cities and higher development densities along urban principal public transport corridors, while supporting strong CBDs. The achievement of increased urban densities as part of an integrated policy package should cut GHG emissions, contribute to social inclusion, to lowering total congestion costs, improving air quality and improving the road toll and health outcomes.
7. **Improvements in transport research and information.** Implement an integrated National Transport Research Program**,** to consolidate and extend existing knowledge of transport problems, opportunities and solutions. Australian land transport research is fragmented and there is little contact between researchers, with research relating to public transport faring poorly compared to that for road, car and freight movement. The US Transport Research Board model should be evaluated for its applicability to Australia.

Some of these initiatives can be implemented quickly and have an impact in the short term (within a few years). For example behaviour change programs and public transport upgrades that focus on bus can be in place and delivering benefits within two to three years. Mandatory vehicle emission standards take longer to have their full effect, because they impact on new vehicles. Changing the vehicle fleet takes over a decade. Similarly, urban structure tends to be set in the short term but can be influenced over the long term. The short term influence tends to come through behaviour change, the longer term impact through change in technology and urban structure.

The major impact of the proposed changes will take place in metropolitan areas, both in Australia and internationally, but regional and rural areas will not be immune to changes required to respond to climate change, in particular, because almost half the transport task of the road sector is performed outside our cities.

four

Public Transport Improvement Priorities

Public Transport Improvement Priorities

4.1 Scope

The development of a program for Australia's public transport system is one very important component of a national strategy to tackle congestion, climate change, social exclusion, energy security, the road toll and obesity.[74] The major focus of this program will be in the capital cities but regional and rural needs should not be forgotten. Within our cities, a public transport development program cannot be divorced from the need for pursuit of more compact forms of urban settlement and for road development programs that progress sustainable development objectives, rather than promoting continuing urban sprawl. A development program for public transport must necessarily:

- be long term in nature; and,
- involve all levels of government and the private sector to shape development, particularly because of the private sector role in urban development but also in public transport service delivery in most cities.

Against this background and recognising the issues identified in Section 3, what are the key improvement priorities for Australian public transport systems and services? This section of the report considers this question, while Section 5 considers the most appropriate Federal role in relation to public transport services.

4.2 The value of urban public transport enhancements

Investments and service enhancements to public transport can produce a large number of benefits.

Benefits to public transport users, resulting in more patronage:

- travel time/reliability savings;
- extended network coverage.

Benefits to operators (and governments):

- higher fare revenues;
- greater asset utilisation.

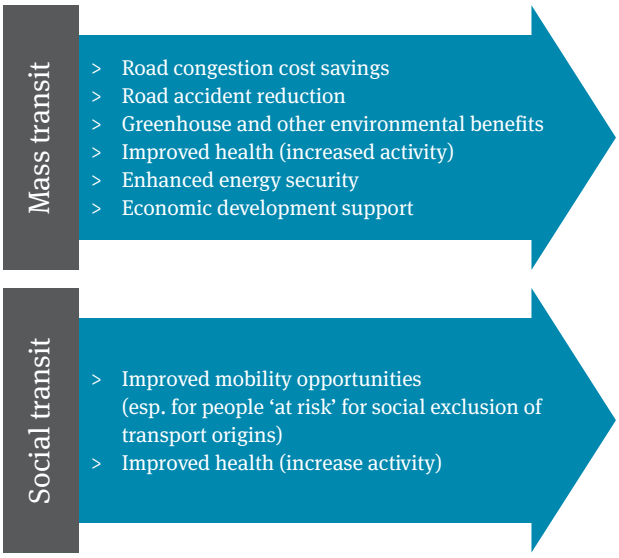
External benefits to the wider community:

- cost savings through reduced congestion;
- lower road accidents, with associated health care cost savings and reductions in trauma;
- public health benefits through fewer harmful emissions;
- less pressure on climate change from greenhouse gas emissions;
- improved energy security;
- economic development benefits from sustaining employment agglomerations;
- improved mobility opportunities for many people at risk of social exclusion for transport reasons.

It is the external benefits, in particular, that provide a public policy justification for government financially supporting public transport services.

Public transport service improvements can be largely classified as directed at either "mass transit" or "social transit". The benefits from "mass transit" services and service enhancements largely derive from achieving modal shift from car to public transport, the emphasis being on trunk services (with associated feeder services) operating during congested peak periods. These benefits are economic and environmental in nature, relating to reduced congestion, pollution and the like. "Social transit" initiatives improve mobility opportunities so as reduce the risk that people will be socially excluded, because of poor mobility options. Feeder public transport services operating at lower frequencies than trunk services will be mainly "social transit", even though they may also feed a trunk service. This latter area of transport policy has historically been given little attention. However, recent work has demonstrated that the current value ascribed to service improvements that increase trips for people at risk of social exclusion is well below the value that should be used.[75]

Figure 4.1: The benefits to society from mass transit and social transit



74 Public transport also plays an important role in tourism, especially in regional Australia. That role is beyond the purposes of the present report, being primarily seen as a component of national tourism policy.

75 Stanley, J.K., Hensher, D.A. Stanley, J.R.,Currie, G., Greene, W. and Vella-Brodrick, D (forthcoming), *Social exclusion and the value of mobility*, Journal of Transport Economics and Policy.

Comprehensive cost-benefit analyses of improved urban public transport systems and services, which seek to value many of these benefits, typically show benefit-cost ratios of 2–3, with a major quantified benefit being reduced costs of traffic congestion. For example, a Bus Association Victoria analysis of a $2 billion capital improvement package for train, tram and bus for Melbourne produced a benefit-cost ratio of 3.0.[76] In Canada, which generally has higher urban public transport service levels than Australia, a recent assessment of a 74 per cent increase in service levels suggested a rate of return of a strong 12.5 per cent would be achieved, with congestion cost savings being the major benefit.[77]

It was pointed out in Section 2.1 that, because congestion costs increase very rapidly in peak motoring situations, only small reductions in traffic volumes are needed to generate very substantial benefits.

4.3 Priority urban mass transit initiatives

This section outlines the major improvement priorities for public transport in Australia. These include

- delivering improved customer service;
- investing in network extension and capacity to enable service enhancements;
- maximising value for money for Government;
- making better use of existing infrastructure;
- driving improved land use and transport planning.

There are already many examples of significant improvement programs in Australia's cities, demonstrating the potential of well designed and funded programs. Some of these examples are described in Appendix 3, along with some notable international examples.

4.3.1 Delivering improved customer service

Key customer concerns include frequency of service, punctuality, seating, cleanliness and security. While there is no single reliable source of data, customer satisfaction levels for public transport have generally fallen over the past 3–4 years, as strong growth in patronage has led to significant increases in crowding levels on trains, trams and buses. Crowding has a range of negative consequences, including:

- increased loading/unloading times, leading to reduced punctuality;
- difficulty finding a seat, or being forced to stand for long periods;
- reduced passenger comfort; and,
- greater stress on customer facing staff.

Other dimensions of customer satisfaction have actually improved as new investment has been rolled out (e.g. new air-conditioned train carriages and buses, smart card ticketing, tram superstops, better passenger information). Since most transit systems operate at cost recovery of only 20–40%, incremental investment to induce patronage is rarely profitable. As a consequence customer service improvements need to be undertaken in partnership between both Governments, and operators, whether public or private.

4.3.2 Investing in network extension and capacity to enable service enhancements

System bottlenecks, or core capacity constraints, can limit or prevent a system catering for growing demand, with associated consequences for loss of market share to cars, which in turn exacerbates the externalities discussed in Section 2 (congestion, greenhouse gas emissions, social exclusion, the road toll, etc). Capacity constraints on urban public transport systems, especially rail systems serving the CBD of a capital city, can also lead to job dispersal from the CBD, with flow-on loss of agglomeration benefits and reduced liveability of the CBD and wider city.[78] The latter consequences are compounded by the difficulty of adding road capacity in inner areas of the capital cities.

"Mass transit" initiatives are generally likely to be of significant net community benefit. Detailed cost-benefit analyses are needed to show the value of specific initiatives, their relative priority and how they fit in to the development of a sustainable land use/land transport system. The following section illustrates some of the types of initiatives that are likely to show positive societal net benefits and be worthy of detailed assessment in specific contexts.

Service enhancement essentially involves upgrades to system capacities and service frequencies, both radial (CBD oriented) and circumferential. Radial services will be mainly heavy rail. Circumferential services will be mainly bus. The combination of the two (radial and circumferential services), should be supportive of development of key urban activity centres at interchange nodes and higher development densities at both nodes and along key trunk corridors.

76 Metlink (unpublished), *Breaking the Shackles: A Five Year Plan to Rejuvenate Melbourne's Public Transport*, Melbourne, April 2006.
77 HDR Decision Economics (2008), *The Optimal Supply and Demand for Urban Transit in Canada*, Report prepared for the Canadian Urban Transit Association, August.
78 Cambridge Systematics (2007), *Implications of Investments Targeted at Reducing Transit Passenger Bottlenecks*, Commission Briefing paper 4L–04, Prepared for National Surface Transportation Policy and Revenue Study Commission, March 3.

In some cases the radial trunk capacity upgrades will require metro type rail solutions. In others, Bus Rapid Transit (BRT) may be preferred to heavy rail, particularly where significant trunk capacity increases are required at relatively low cost. Bus Rapid transit services, operating at high frequency (15 minutes or less most of the day) and with on-road operating priority or own-right-of-way where possible, will be the most cost-effective means of providing high volume public transport services in such situations, as Canada and many other cities are demonstrating (e.g. York Region's Viva service in Toronto; Melbourne's SmartBus services).

The relatively low capital costs and short lead time on vehicle supply for BRT, compared to heavy rail, have often made the roll-out of this technology possible within a relatively short time frame (up to 5 years).

4.3.3 Maximising value for money

As noted in Section 2.7, transport is placing an increasing funding requirement on Governments, particularly State Governments. In that context, it is important to consider the value for money that Governments and taxpayers are achieving from new investment and operating subsidies.

Value for money can be thought about as both the effectiveness of the expenditure, in terms of driving desired policy outcomes, and the efficiency of that expenditure. Effectiveness is best measured by the outcomes delivered for a given level of investment or operational expenditure (for example, the number of passengers carried per service kilometre, or the avoidance of road congestion). Efficiency is best measured in terms of the cost of establishing, operating and maintaining transport operations (e.g. operating cost per vehicle kilometre).

Analysis undertaken by L.E.K. Consulting on behalf of the metropolitan rail operators reveals some surprisingly large differences in both the effectiveness and efficiency of rail networks around Australia, suggesting significant scope for improvement on both dimensions.

As the demands on the public purse continue to rise, operators will need to demonstrate efficient operational levels to justify continued increases in funding. By the same token, State Governments will need to make tougher decisions on issues such as fare levels and concession entitlements to ensure that cost recoveries do not fall even further.

The Commonwealth Government has a critical role to play in this area, helping the States to progress difficult reforms that negatively impact various stakeholder groups, but are nonetheless in the wider interest.

Sharing best practice on efficiency

Historically much of the public transport industry has been "siloed" along state lines, with limited sharing of best practice and efficiency levels. More recently there have been some concerted efforts to improve benchmarking and knowledge exchange between states and between operators.

For example, the ARA has established an annual inter-operator benchmarking initiative, with 6 operators participating. Cost and physical metrics have been collected for 50 plus KPIs over three years to allow the operators to compare performance on a like for like basis. Inter-operator working groups have been set up to improve knowledge exchange, in areas like station operations, customer information and train crewing.

There is significant potential for a similar initiative in the bus industry.

Where operations remain under public ownership, there is no real "competition", so extensive data sharing is feasible. Government departments have also been sharing information on costs and organisational structures, particularly as a number of them have been undergoing restructuring in the last 12 months. Such sharing and performance comparisons between operators and Governments can be very helpful in identifying and sharing best practices.

Optimising cost recovery via fare box

Cost recovery rates for Australian public transport are relatively low when compared to international benchmarks. While there are external benefits from public transport development, governments and regulators in each jurisdiction will have to consider if general taxation should continue to pay for such a large portion of public transport, or whether fare increases are justifiable and saleable. Canadian urban public transport systems typically have higher fares than Australian systems and this contributes to a higher cost-recovery rate[79]. Reforming road pricing would help to enable higher cost recovery rates to be pursued on public transport.

Effective management of capital programs

Once scarce capital funding has been allocated to projects, it is critical the projects are well scoped and managed to ensure that the project objectives are delivered on time and on budget. Unfortunately there are a significant number of examples of major transport projects in Australia that have not been well managed.

79 Chris Loader (2006), *Public Transport Experiences from North America and London—Opportunities and Ideas for Melbourne*, Bus Association Victoria.

L.E.K. Consulting has identified a number of critical best practices in transport infrastructure development:

- continuous and genuine **engagement with stakeholders** is a vital factor in successful transport infrastructure development;
- **communication with the public** needs to be integrated and consistent amongst the stakeholders. This makes an enormous difference when seeking public support, maintaining project morale and attracting a wide field of bidders for packages of construction work;
- detailed asset knowledge and clear understanding of cost causation are required to optimise **whole life costs**, based on trading off maintenance and construction costs;
- successful projects have benefited from extensive planning and up-front work, in order to be able to define **contracted packages** of work clearly to encourage competitive, fixed-price tenders;
- **risks** should be placed with the party that is best able to manage them. Given the scale of major infrastructure projects, they may need to be underwritten by Government, or through tailored insurance contracts;
- there is a trade-off between using longer blocks of **engineering access** for more efficient construction cost and maintaining the normal operation of services. Plans to manage disruption should be agreed early in the planning;
- diverting passengers to existing same-mode **replacement services** (e.g. rail to rail), where feasible, can reduce set-up costs and create a more seamless travel experience for passengers (e.g. compared to temporary train-bus-train replacement service);
- incentive-based **compensation regimes** relating to lost revenue are widely used where rail services are disrupted. When properly designed, such incentive regimes encourage an appropriate trade-off between minimising construction cost and reducing revenue loss (i.e. they encourage minimum cost to the total system);
- the importance of **handover** is often underestimated and overlooked in the planning stages of the project. Smooth handover processes involve service and infrastructure operators in the planning, testing and assurance activities during the construction phase.

An open discussion should be encouraged to discuss the relative merits and disadvantages of different methods of sharing risk exposure for capital programs, be that PPP or alternative management processes that can reduce public sector exposure.

Disciplined asset maintenance approaches

A key challenge in planning and delivering public transport services is obtaining the right balance between system maintenance/renewals requirements and system capacity expansion. The external benefits of public transport capacity expansion are relatively easy to enumerate and value. The same cannot be said of the benefits of maintenance/renewal expenditures. While some of the long term impacts of deferred maintenance may be the same as the consequences of forgoing capacity expansion (i.e. passenger loss to road, with consequential increased external costs of increased road use), maintenance/renewal activities tend to be risk-avoiding, with uncertainty surrounding the prospective impacts on patronage and external costs. For such reasons, many public transport systems treat maintenance/renewals as their first call on limited budget funds, as also tends to happen with road expenditures. In Canadian urban public transport, this approach is summed up as "State-of-good-repair", which is recognised as essential to retaining the existing patronage base and to maintaining efficient operations. Internationally, it is not uncommon for national governments to provide assistance to public transport in one form or another for state-of-good repair funding, albeit that this form of support tends to be decreasing.[80]

Labour reform

Currently, there are a broad range of work practices and terms and conditions that influence both efficiency and effectiveness of the different public transport operators. Private sector operators have a strong profit incentive to run efficient operations. However, public sector operators are subject to a range of community, political and industrial pressures which typically make it harder to achieve efficiency gains. There remain examples of out-dated and restrictive work-practices and low productivity that inhibit both cost effectiveness and customer focus. Public transport operators, and their Government owners/clients, need to work harder to improve work practices, to ensure that public transport services provide maximum value for money, and provide high levels of customer service.

Private sector involvement

There is mixed public and private sector involvement in Australian public transport. Rail systems are generally operated by the public sector, with the exception of Melbourne trains and trams. There are many large and

80 Metropolitan Knowledge International and McCormick Rankin Corporation (2009), *Investment in Transit Expansion, State of Good repair, or Both?—Final report*, report prepared for Transport Canada, March.

small private bus operations, and some large Government owned fleets (e.g. Sydney Buses, Brisbane Transport, ACTION).

A number of studies have demonstrated that private sector operations are generally more efficient than public sector operations. Wallis and Hensher, for example, report cost savings of 38 per cent between 1994 and 2001 from Adelaide's bus services being put in private hands and savings of 22 per cent between 1996 and 2001 from privatising Perth's bus operations.[81]

Contract models for private bus operations are quite mature, and in widespread use around the country and around the world. Continued ownership of bus operations by Governments or councils should be questioned given the demonstrable cost savings that can be realised through contracting out bus services. Contracting out rail services is more complex, and presents a number of unique challenges (e.g. maintenance standards, risk allocation, demarcation of roles). However, both the Melbourne experience, and successful models in many other countries suggests there is a strong prima facie case for franchising rail services, particularly where cost and service performance has been poor.

4.3.4 Make better use of existing infrastructure

Considering the large sums of money involved in new infrastructure, the public transport sector needs to strive to optimise its use of existing infrastructure and facilities.

Urban rail should focus on getting the existing systems running more efficiently, with adequate rolling stock, track (capacity and condition), signalling and control systems and station upgrades receiving investment support. Some of this investment will be replacement and some will involve an upgrade in technology, which will facilitate capacity expansion.

There are a number of possible steps that can be considered to increase service volumes, before significant new fixed infrastructure is procured. These differ somewhat by mode, but typically include:

- increasing the frequency of services up to the infrastructure threshold (as governed by signalling, track bottlenecks or rolling stock capacity);
- maximising the vehicle size (e.g. number of carriages per train set);
- reducing seating density to deliver an overall volume uplift within the same rolling stock and infrastructure capacity (rail);
- deploying double or single decker carriages: double decker carriages increase the volume carried on each train while single decker carriages allow quicker loading/unloading and hence increased frequency of services; and,
- revising signalling to increase capacity (train).

Drive off-peak patronage growth

Much of the recent growth in passenger travel has been in peak periods. Continued peak period patronage growth will be constrained by vehicle/rolling stock and infrastructure capacity. However, the scope for shoulder or off peak patronage growth is less constrained and offers important growth potential.

The growth of off peak leisure travel is responsive to lower prices and service reliability. Hence better structured off peak discounts and increased service reliability will be important factors in achieving off peak patronage growth.

Improved demand management to flatten peak demand

In terms of gaining maximum benefit out of the significant infrastructure and operating investment in public transport systems, there are opportunities to pursue demand management strategies, easing some of the peak pressure on transport infrastructure. A range of areas exist where the productivity of existing infrastructure could be significantly enhanced through improved utilisation. The following observations highlight this fact:

- most rail lines have unbalanced flows, classically a heavy inbound flow in the CBD direction in the morning and outbound in the afternoon, with much less utilisation of the passenger carrying capacity in the counter peak directions. More creative city planning to "balance the flow" by having destinations at other points along railway lines or at either end will allow the Government and community to get better productivity out of their rail system. Incentives to build commercial attractions/destinations at non CBD destinations could include Government tax incentives, local council rating schemes, etc;
- while certain rail and bus lines and services are very crowded, there is significant capacity on other routes. Alleviating crowding "hot spots" can reduce the perception of crowding on the public transport system more broadly;

81 Wallis, I. and Hensher D.A. (2007), *Competitive tendering for urban bus services—cost impacts: international experiences and issues*. In Macario R. Viegas, J and Hensher DA (eds) *Competition and Ownership in Land Passenger Transport* (Elsevier, Amsterdam).

> the "peaky" nature of public transport demand by commuters and students is pronounced. Government and/or industry innovations to spread work/school start and finish hours can help to spread public transport demand on major corridors, assisting not just rail systems but also road demand. The innovation of "flexible" working hours in the 1980s and 1990s appears thus far to have had minimal impact, as most of the workforce start and finish hours have, in reality, not changed. Spreading the hours of operation of our cities may also help to increase their vibrancy, with other economic benefits.

Unless these types of demand management and peak spreading strategies are implemented, Australia may end up building significant amounts of new infrastructure that will be inefficiently used (i.e. a high peak load factor and low off-peak loads).

Improving network inter-modality

The establishment of high density transport corridors is the principal step in achieving the critical density required for effective public transport. However, these transport corridors can be significantly widened by improving the interconnection between rail and other public (bus, light rail and ferry) and personal transport (bike & car) modes.

Intermodality can be enhanced by a number of different methods, including customer information, interchange facilities, timetable coordination and integrated fares & ticketing:

> passengers who are unsure how to incorporate public transport into their journey can benefit from schedules and maps of interconnecting services and multi-modal journey planners. Commencement and connection information should be combined with easy to understand directional signage describing location of services, platforms numbers and interconnecting services;

> in order to ensure the transition between modes of transport is convenient, adequate infrastructure supporting intermodality such as park-and-ride, kiss-and-ride space and cyclists facilities is required;

> to alleviate concerns over long connecting delays, timetables of interconnecting services should be coordinated and real time information exchanged between connecting services;

> passengers like to be able to use the same ticket for their entire journey. Hence the same fare should ideally cover all transport modes with limited or no penalties for taking a second or subsequent service (i.e. integrated fares).

4.3.5 Driving improved land use and transport planning

Effective land use policies to increase urban densities

Due to the inherent link between land use and transport policy, decisions on both need to be made in an integrated manner, to ensure that a common objective is achieved:

> land use decisions are often made before the efficacy of potential public transport travel options are evaluated;

> new developments for domestic and commercial buildings (i.e. offices, shops, etc) should be accepted and planned based upon the availability of accessible public transport, in addition to connections into the road network.

By way of example, new metro lines and stations in Hong Kong are seen as the mechanism for making possible high quality developments focussed around the metro. The value added to the property through metro connections is captured through selling development rights, providing a significant proportion of the funding for the metro. This opportunity has been given relatively little attention in Australia.

In recent years existing regulations and planning authorities in Australia have been comparatively weak and typically reactive, rather than pro-active:

> planning authorities can be too market driven and should be given greater power of intervention;

> transport projects should derive from a credible, integrated transport and land use plan, as a pre-condition for funding from state or federal sources.

A consistent and periodically updated land use plan is required for all states, and especially for the capital cities, to ensure new developments can be supported by public transport. The importance of this issue has recently been recognised by the Federal Government, who have announced to the Business Council of Australia[82] that an urban development agenda will be pursued in 2010 through the Council of Australian Governments. This agenda aims to produce national planning criteria and give national leadership on strategic urban planning for Australia's largest cities. Day to day planning and decisions would be left to the states, with national rules in place to intervene in urban planning to ensure cities are well-run and climate change-proof.

82 Kevin Rudd (2009), *Building a big Australia: Future planning needs of our major cities. Address to the Business Council of Australia*, Australian Government.

The December 2009 Council of Australian Governments' Meeting Communique indicates that progress is being made in progressing this agenda, with all States agreeing to have in place strategic planning systems and plans that meet agreed new national criteria, by January 2012. The Commonwealth has indicated that it will link future infrastructure funding decisions to these criteria, an important initiative to enhance the prospects for integration.

Effective transport policy and plans

As discussed in Sections 3.1 and 3.2, Australia would benefit significantly from a clear National Transport Policy to guide transport development. The policy would need to articulate clearly a vision for urban passenger and freight transport systems looking out to 2050, within which State and Territory transport plans can be developed. Passenger services cannot be considered in isolation from freight operations, as in many cities freight and passenger services share the same road or track.

The development of a long term vision will provide an important set of guiding principles for the evaluation of infrastructure projects. A lack of foresight on this issue will inhibit long term and transformational planning.

When a clear national transport policy is put in place, state governments will be able to develop their transport strategies and plans in a more coherent manner, and in alignment with national policies.

The key features and benefits of an integrated transport plan are highlighted in the figure below.

Over the last 20 years, the quality of transport planning in Australia has been highly variable, but generally poor. Some states have gone for many years without a transport plan. The Bus Industry Confederation[83], the Public Transport Users Association[84], the Western Sydney Regional Organisation of Councils[85] and Property Council of Australia[86] have all recognised the lack of consistency and follow through in Sydney and Melbourne transport planning, noting the absence of comprehensive and regularly updated transport plans. To achieve higher quality transport outcomes, this gap needs to be urgently addressed in those cities where it continues to be lacking.

4.4 Network extensions and enhancements

Over the last 30 years, Australia's cities have grown dramatically in size. However, the growth in public transport networks, particularly rail networks, has been very limited. State Governments in recent years have recognised the long term costs of poor public transport, and have begun to ramp up investment.

The table below, identifies some of the key state based public transport priorities. While the status of each of these priorities varies by state, they give a flavour for the areas of focus over the coming years.

4.5 Integrating Public Transport to a National Moving People Policy

Australian public transport systems and services must play a larger role in future national land transport solutions, as a key means of improving the sustainability of our land transport systems. Improved services can help to cut road congestion costs, reduce transport greenhouse gas emissions, foster increased social inclusion, help to lower the road toll, reduce obesity and improve energy security. However, service improvements must be delivered in an efficient manner, to assure value for money to governments and the community.

This section of the report has outlined a range of ways in which Australian public transport services can be improved to enable the sector to enhance the sustainability of Australia's land transport systems. It has also identified a range of ways in which public transport service efficiency can be improved. Following the lead now being provided by COAG, Federal and State funding support for the implementation of substantially improved public transport systems and services should be dependent upon both the existence of State integrated strategic planning systems, including land use and transport systems, and also upon the existence of programs that help to assure efficient service delivery is achieved. Benchmarking can help to provide this assurance and should be part of the assessment criteria for any funding request to the Federal Government to assist upgrade public transport systems/services.

83 Bus Industry Confederation (2009), *Submission to Senate Standing Committee on Rural and Regional Affairs and Transport, Investment of Commonwealth and State funds in public passenger transport infrastructure and services.*

84 Public Transport Users Association (2009), *Submission to Senate Standing Committee on Rural and Regional Affairs and Transport, Investment of Commonwealth and State funds in public passenger transport infrastructure and services.*

85 Western Sydney Regional Organisation of Councils (2009), *Submission to Senate Standing Committee on Rural and Regional Affairs and Transport, Investment of Commonwealth and State funds in public passenger transport infrastructure and services.*

86 Property Council of Australia (2009), *No plan, no money: Clear transport message for NSW*, Media release.

Figure 4.2: Features and Benefits of an Integrated Transport Plan

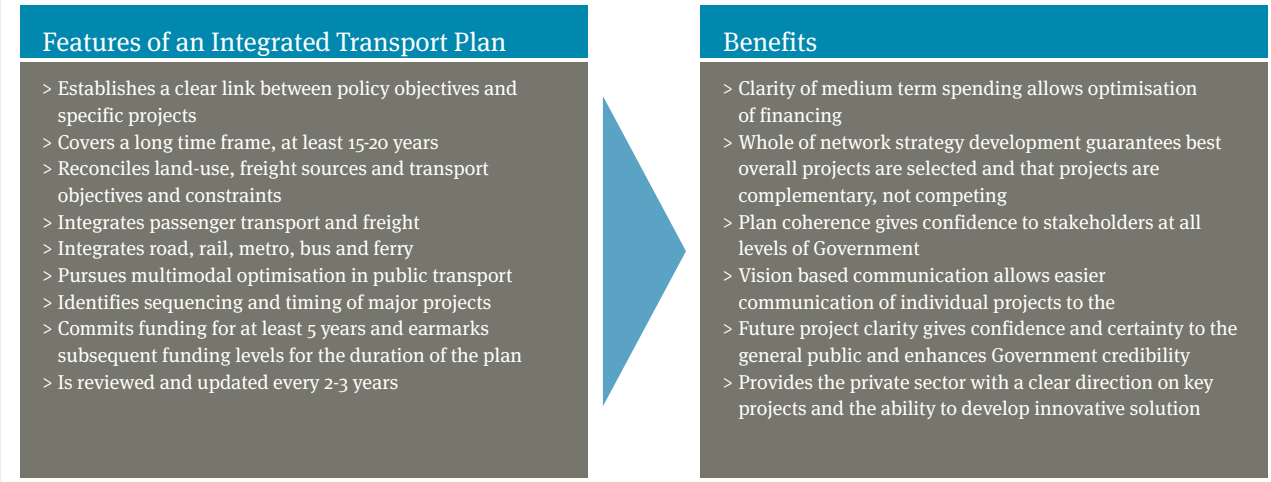


Table 4.1: Key state based public transport priorities

Sydney	> Key upgrades to the heavy rail system, including clearways projects, the SW rail link and a Fast North Shore Link from Chatswood to Wynyard; > construction of a metro network, including lines to the North-West, the West, the South-East, the North-East and Parramatta—Epping, as well as conversion of the existing heavy rail line from Epping to Wynyard for metro operation; > light rail networks based on Sydney and Parramatta CBD's; > six bus-based ring routes and additional ferry services; > development of a seamless multimodal system through use of high quality interchanges and integrated fares, ticketing, information and marketing; > more extensive provision of secure park and ride and bike *and ride* facilities. Source: Glazebrook, G (2009), *A Thirty Year Public Transport Plan For Sydney*, Sydney
Melbourne	> 70 new metro trains, costing more than $2.6bn to increase capacity by more than 40 per cent; > 50 new low floor trams, at a cost of $1bn; > up to 74 new V/Line carriages for the regional rail network; > regional rail link—a 40 km twin-track rail link from West Werribee to Southern Cross station via Tarneit and Sunshine to provide capacity for more than 9,000 extra passengers every hour at a cost of $4bn; > a new rail tunnel between west and east to increase capacity on the rail network by around 12,000 passengers every hour at a cost of $4.5bn; > rail extensions into growth areas, including Epping to South Morang, electrification of the Sydenham line to Sunbury, followed by Melton and Cranbourne East at a cost of $2.5bn; > $220m for new stations in growth areas, including Williams Landing, Caroline Springs and Lynbrook; > a $80m station upgrade to improve customer amenities, walkways, drop off areas and interchanges; > a program to boost buses in Doncaster to every 10 minutes in peak time in a $360m Doncaster Area Rapid Transit (DART) system; > a bus upgrade improvement program, including expansion of metro bus services into new suburbs ($500m) and a roll out of the SmartBus network ($290m); > $440m to eliminate grade separate crossings at critical locations. Source: Victorian Government (2008), *The Victorian Transport Plan: Overview*, Melbourne

Brisbane	> Purchase of 500 new "rigid equivalent" buses over 4 years; > $100m for walking, cycling and bikeways over 4 years; > a new bike hire scheme; > implementation of a bus Rapid Transit System , connecting the city's major centres with high capacity buses providing frequent station-to-station services; > purchase of six new CityCats over four years; > construction and operation of new and upgraded ferry terminals to build on the success of CityCats; > delivery of 64 new three car train sets over the coming few years; > a number of rail infrastructure projects, including a second CBD crossing to increase cross-river capacity, extension of the commuter rail line into Greenbank and the addition of the Darra to Springfield rail line; > rail capacity upgrades through track duplication or triplication on the Ipswich, Beenleigh/Gold Coast, Caboolture/Nambour and Ferny Grove lines; > an upgrade of public transport stops, interchanges and stations. Source: Brisbane City Council (2008), *Transport Plan for Brisbane 2008–2026*, Brisbane; QR Passenger Pty Ltd
Adelaide	> Coast to Coast light rail project, expanding the light rail network from Glenelg to the City and on to West Lakes, Port Adelaide and Semaphore; > delivery of six new European trans, increasing TransAdelaide's modern light rail fleet by 50% and providing more capacity; > Glenelg tram overpass, allowing traffic to flow freely allowing a non-stop north-south corridor; > Northern Connector expressway, which proposes a dual-use road and rail corridor, linking Northern South Australia with Adelaide and the Port of Adelaide; > Darlington major transport upgrade, allowing an extension of the Tonsley rail line, a new public transport interchange and a Park and Ride facility; > O-Bahn bus route city access extension, designed to reduce O-Bahn bus travel times to and from the city by up to 10 minutes; > 3000 fleet series railcar refurbishments, which consists of replacing internal fittings, painting externally, upgrading security systems, improving railcar layout, and increased customer information on-board; > outer harbour rail revitalisation, consisting of an upgrade of Port Adelaide station, a new outer harbour rail line and a number of level crossing upgrades; > $291m federally funded Seaford rail extension project, extending the Noarlunga rail line to Seaford to provide quick, quiet and reliable transport for the southern suburbs. The project includes a 1.2km elevated bridge over the Onkaparinga River and River road, three new road bridges, a station and bus/train interchange at the Seaford rail terminus, as well as a Park and Ride at Seaford Meadows station; > rail revitalisation projects at Gawler and Noarlunga, which includes several track upgrades; > Oaklands interchange project, providing increased security, a Park and Ride facility and bus and rail transfers. Source: Department for Transport, Energy and Infrastructure (2009), *New Connections—Delivering our transport future now*, Government of South Australia, Adelaide

Perth	Perth is currently building a 20 year public transport plan, which is expected to be delivered in the coming months. However, a recent Western Australia Liberal Party Transport policy document identified several key projects which it believes should be included in the 20 year public transport plan, including: > High capacity passenger rail services to major centres such as the Perth Airport and major hospitals; > rail services from Fremantle to the Southern rail line; > a new rail service to Ellenbrook Extension of the Northern Suburbs line to Butler, Brighton, Alkimos and beyond; > extending the Armadale line to Byford and examining the case for services to Mundijong; > the extension of high-speed future services to Bunbury, with possible extension of tourist services to Busselton. Source: Liberal Party of Western Australia (2008), *Election Commitments 2008: Transport Policy Platform*, Perth
Hobart	> $122m allocated for rail maintenance upgrades, including major refurbishments to rail bridges, improvements to level crossings and major replacement of wooden sleepers with steel sleepers; > increasing the attractiveness and reliability of bus services, by implementing a range of measures, including priority treatment for buses at intersections, bus lanes, real time travel information and identification of priority bus stops for improvement; > bus replacement project to provide a fleet of low floor, air conditioned vehicles > Western Shore public transport corridor implementation, which suggests the expansion of the current use of the (freight) rail corridor to include a dedicated commuter bus corridor; > priority bus lanes in various locations, including Tasman Bridge to City, and Macquarie Street > construction and upgrades to bus interchange facilities, including Sorell town, Kingston CBD, Glenorchy CBD, Hobart CBD; > ferry terminal projects, including a Kangaroo Bay and Sullivans Cove. Source: Hobart City Council (2009), *Sustainable Transport Strategy*, Hobart; Southern Tasmanian Councils Authority (2009), *Draft Southern Integrated Transport Plan for Public Consultation*, Hobart
Darwin	An Integrated Regional Transport Strategy is currently being developed by the Northern Territory Government
Canberra	An Integrated Transport Action Plan is being implemented by the ACT government funded with $250m over five years under the *Building the Future* program. Initiatives include: > building new bus lanes and bus priority measures; > progressively upgrading the bus fleet to meet disability standards; > providing free travel on ACTION buses for residents over the age of 75 years; > improving cycling and walking path networks, including parking options. Source: ACT Government (2008), *ACT Government Integrated Transport Framework*, Canberra.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Federal Involvement

Federal Involvement

5.1 Why the Federal Government must be involved

Drawing on the analysis of Sections 1 and 2 of this report, Section 3 concluded that Australia's current land transport systems are not sustainable in economic, environmental or social terms, because our

- congestion costs are high and rising, reducing our economic competitiveness and the liveability of our cities;
- road transport greenhouse gas emissions are high and growing quickly;
- transport/land use systems contribute to social exclusion and little progress is being made to tackle this problem;
- road toll remains unacceptable, with serious injuries rising markedly and fatalities remaining at about 1450 or more annually;
- obesity is increasing (partly due to more sedentary lifestyles);
- energy security is diminishing; and,
- land transport infrastructure investment levels have been too low, contributing to some of the above problems.

These issues are very significant and growing in magnitude. They affect all Australians to a greater or lesser extent, across all States and Territories. While the cities are the areas of greatest concern, regional and rural areas also confront many of the issues (e.g. the road toll, greenhouse gas emissions, social exclusion, economic competitiveness related to infrastructure provision). Because of the scale and geographical spread of these issues, national policy and program responses are required for effective solutions. This must, therefore, involve the Federal Government, showing leadership and working in partnership with others. Going further, some issues require a specific federal policy and program response, for reasons such as the international dimensions of the issues in question (e.g. climate change and greenhouse gas emissions) or other particular legislative responsibilities (e.g. motor vehicle emission standards). Last but not least, the sheer scale of the financial requirement means that state-based budgets may not be sufficient to equip Australia's cities with adequate transport services.

It was further argued in Section 3 that, for at least the next decade, national land transport policy should be framed around

- managing congestion costs and improving Australia's economic competitiveness and liveability as it is affected by land transport;
- achieving substantial cuts in transport greenhouse gas emissions;
- ensuring adequate mobility options for all Australians (and international visitors);
- making the land transport system safer;
- encouraging healthier land transport choices; and,
- reducing our reliance on imported fossil fuels.

The recently announced Federal provision of over $4 billion towards some transformational urban public transport initiatives under the Building Australia Fund, on recommendation from Infrastructure Australia, demonstrates that the Federal Government accepts much (at least) of this argument and recognises the importance of transformational change.

If the rationale for Federal involvement in land transport is to contribute to the resolution of a number of national issues (outcome related) that are severely impacted by land transport services/system performance, then there is a strong argument that Federal land transport policy and program involvement should be firmly focused on achievement of clear outcomes on these same specific issues. This is in contrast to support that is essentially modally based (such as road programs and public-transport programs). This change in focus is in line with the approach recently proposed for the US Federal Government by its National Surface Transportation Policy and Revenue Study Commission, which reported in early 2008 on future US Federal transport involvement. That Commission recommended collapsing over one hundred existing US Federal transport assistance programs down to just ten outcome-focused programs. It argued:[87]

In brief, the new user-financed Federal surface transportation program the Commission proposes will be performance-driven, outcome-based, generally mode-neutral, and re-focused to pursue activities of genuine national interest.

Such an outcome-based philosophy for land transport policies and programs should be adopted by the Australian Federal Government.

87 National Surface Transportation Policy and Revenue Study Commission (2008), Volume I: Recommendations, January, p. 10.

5.2 National land transport policy structure

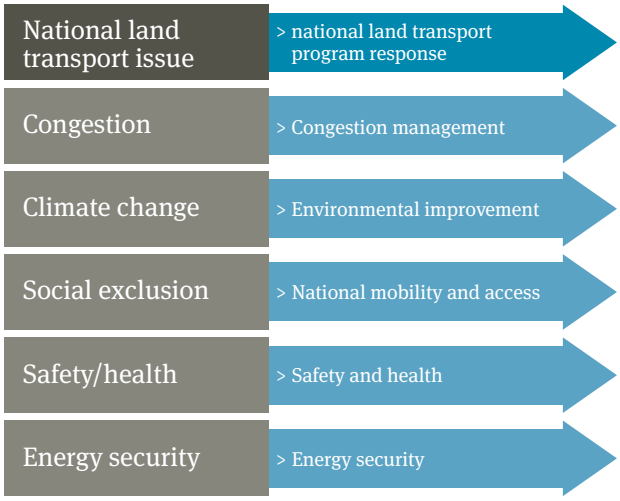
If an outcome-focussed approach is to be taken to national land transport policy, and associated programs, in Australia, with a focus on improving outcomes against the key nationally significant issues flagged in this report, the following **national land transport program structure** would seem appropriate (with examples of relevant initiatives):

- **Congestion management**—The purpose of this program area is to reduce the economic waste caused by congestion, while supporting economic competitiveness as it is affected by land transport. Relevant initiatives could include (for example): major Metro (rail) projects to strengthen the CBD and reduce the car mode share; Bus Rapid Transit initiatives to reduce car use and extend labour catchments; completing circumferential freeways/tollways to improve traffic flow and connect key economic centres, taking care to not accentuate urban sprawl; freeway ramp metering; high occupancy vehicle and toll lanes; and, congestion pricing;
- **Environmental improvement**—The major focus here would be on reducing land transport greenhouse gas (GHG) emissions, through measures such as: mandatory emission standards; public transport improvements to attract commuters from cars; and, travel behaviour change programs. Appendix 1 includes a more detailed discussion of a number of options in this area. In addition to a GHG focus, a range of other environmental considerations are also important in land transport, such as: reducing harmful emissions that are air polluting; reducing transport noise levels; protecting biodiversity as it is affected by transport system operation and water sensitive design. These all form part of the land transport planning and delivery system but the major national interest focus at present should be on reducing GHG emissions and continuing the progress that has been achieved in lowering air pollution from land transport;
- **National mobility and access program**—This program is about ensuring that Australians and international visitors have mobility options that enable reasonable access to family and friends, jobs, health and educational services, shops, recreation, etc, irrespective of personal circumstances (e.g. income, physical capacities), but recognising that access opportunities cannot reasonably be expected to be the same everywhere. Relevant program measures include: support for "social transit", including local public transport and HACC transport; local road programs that meet basic access requirements by ensuring all-weather access; tourism transport corridor upgrades; and, upgrading of existing public transport premises, infrastructure and conveyances to ensure equitable access for people with disabilities in line with legislative and regulatory requirements;
- **Safety and health**—The purposes of this program area are to reduce loss of life and serious injury levels from travel and to support healthier lifestyles as they are affected by travel choices. Relevant initiatives in transport safety focus on provision of safe infrastructure, safe forms of transport and safe user behaviour. Examples include accident black-spot programs, vehicle design requirements and driver training initiatives. Healthy transport programs focus on encouraging active transport (walking, cycling and public transport use) and the supporting initiatives that promote such behaviours (e.g. land use initiatives) and on ensuring that transport modes do not pose health risks from sources like toxic emissions;
- **Energy security**—this program is to encourage faster introduction of transport fuels that are not dependent on exhaustible resources. Relevant initiatives could include support for refueling-recharging networks required for energy sources such as gas and electricity, support for production of second generation biofuels, encouraging self-reliance on sustainable sources, encouraging travel by low emission modes of transport;
- **Freight transport**—freight movement is vital to a competitive economy. The national land transport policy focus should be on ensuring that key trunk corridors and gateways are provided for freight movement at best practice standards, while managing negative impacts associated with heavy vehicle movement, and that a safe operating environment is in place. Relevant initiatives could include: support for development of rail hubs and improved port access; upgrading key freight corridors, whether road or rail; further application of Intelligent Transportation Systems and vehicle-infrastructure integration; continuing effort on national productivity, safety and environment-based regulatory regimes through the National Transport Commission—e.g. mass and dimension flexibility through Performance-Based Standards; reform of pricing arrangements to help drive efficiency improvements;
- **Research and development**—a strong R&D base is fundamental to innovation, which helps to drive productivity growth and improved safety and environmental outcomes. R&D needs to encompass both technical R&D, but also best practice policy development and benchmarking. Australia has a relatively strong R&D base underpinning its road sector but not its public transport sector. A more concerted effort in policy and technical R&D would aim to do such things as improve planning processes in land transport and foster stronger land use/transport integration; promote R&D into suitable technologies for Australian land transport; supporting sharing of knowledge more generally, through establishment of an Australian Transport Research Board, along similar lines to the very successful US model.

Program elements in each area would need to include a wide range of measures for maximum effectiveness, as illustrated in some of the examples cited above. This would include measures associated with (for example) infrastructure improvement, system regulation, operations management, etc. A clear set of national key performance indicators should be developed and monitored, to measure progress against these critical policy goals.

Figure 5.1 indicates the alignment between the national land transport issues and the proposed outcome-based response programs. A program structured along these lines encourages an integrated, "modally-agnostic" approach to the pursuit of solutions to land transport problems, which is important for achieving transformational change—as distinct from an approach that is simply more of the same. Because of the long time period that will be required to implement many of the transformational changes (especially those related to developing more compact urban land use patterns), long term funding commitments will be fundamental to the achievement of effective outcomes. Policies and funding programs that fluctuate up and down in the short to medium term will not encourage the committed long term application that will drive an effective change to a sustainable land transport system. Five year Federal funding commitments, with provisions to guarantee minimum flows, will be vital to driving transformational change. These should be set in the context of supportive State/Territory (and local government in some cases) five year plans (see Section 5.3.1 below).

Figure 5.1: Aligning national land transport problems with outcome-driven programs



5.3 Federal and State/Territory roles

What roles might the Federal and State/Territory Governments most usefully play in implementing the national land transport policy directions outlined in this report? This matter needs to be considered on two important dimensions: roles in a direction-setting process and funding.

5.3.1 Direction setting

Congested roads, overcrowded public transport services and delays in agreeing, and then implementing, the kinds of changes that are needed to respond to such challenges in our cities (in particular) are symptomatic of a long term lack of strategic planning capabilities and associated investment in Australia's transport systems.

European transport researchers separate the strategic (S = policy), tactical (T = system design) and operational (O) stages of transport service and infrastructure planning and provision. It is at the tactical level (T) that sectoral system development directions are determined for a jurisdiction and where priorities between competing policy objectives are ultimately resolved, to the point of directional priority setting. It is here in the urban transport sector (for example) that questions such as how the desired balance between public and private transport will be achieved, the importance to attach to rail/road freight priority and how to deliver such priority, the links between transport systems/services and land settlement patterns, choice of public transport service levels, including service levels to meet social equity goals and the detail of transport pricing systems (public transport fares, road user charges) are settled.

International and Australian experience is that comprehensive transport policy statements that set out the governmental goals to be pursued in a sector like transport are unusual. Furthermore, the existence of integrated transport plans (e.g. for a city or larger region, set within the context of a land use plan) that set out system development requirements (including infrastructure development needs) to meet these goals, with clearly defined roles and responsibilities for delivering and updating the plans and maintaining long term plan currency (with regular update), is equally unusual. This has become known in some conversations as the "tactical level gap".

With some exceptions, this tactical level weakness reflects an inability, or unwillingness, on the part of State governments to take a long term strategic view of sectoral development needs and to maintain the commitment. While States have generally been poor in this area, the Commonwealth has typically seen little need to apply pressure for systemic change, other than in isolated cases (e.g. the Auslink program or the National Water Initiative). The establishment of Infrastructure Australia, to advise the Federal Government on infrastructure funding priorities from the Building Australia Fund, presents an opportunity to substantially improve strategic processes that underpin transport investment in Australia. The recent COAG decision with respect to strategic planning for Australia's cities is supportive of change.

An integrated approach to sustainable land transport should involve all levels of government working towards agreed national priorities.

> The Federal Government must take the lead in national issue identification, development of outcome-based policy priorities and in project priority determination where federal funding support is required.

> For State and Territory governments (and any local governments) participating in national land transport programs that are to be financially supported by the Federal Government, participation should:

1. adopt the National Transport Commission (NTC)/ Australian Transport Council (ATC)[88], performance based standards[89] which reflect expectations of the land transport system and which help to flag areas where extra improvement effort is needed;
2. routinely prepare high quality transport plans, and supporting land use plans, that prioritise (in benefit-cost terms, using an agreed NTC/ATC methodology) achievement of substantial progress against the national issues that have been identified, in close consultation with the Federal Government;
3. submit proposals for Federal funding support in accord with these plans and in line with the seven program categories outlined in Section 5.2 above;
4. reform project approval and delivery systems, to speed up the process of implementing major infrastructure projects;
5. monitor and report to the Federal Government on outcomes achieved (against the critical national issues) by major projects and other initiatives funded by the Federal Government as part of the national land transport policy;
6. participate in a reformed land transport pricing system, as outlined in Section 5.4 below;
7. continue to participate in national regulatory reform processes that enhance national land transport outcomes in line with national goals.

These criteria go further than the decision recently taken by COAG with respect to strategic planning for Australia's cities, primarily to strengthen the pressures for an integrated approach.

Strict compliance with these requirements should be a condition upon which receipt of any Federal funding assistance depends. Matching criteria could be attached to funding allocations from the federal Government to States/Territories and local government to reflect particular regional/local benefits from initiatives that are primarily in the national interest. States and Territory governments and local governments will also have State and regional priorities they will wish to pursue that sit outside the list of national issues but their strong participation in tackling national issues is important to effective outcomes in tackling such issues.

5.3.2 Federal funding

The 2009 Commonwealth Budget showed that the Federal Government accepts that it has a financial role in supporting the implementation of certain land transport projects that contribute to nationally significant outcomes. Notable amongst the funding commitments in that Budget was over $4 billion committed to urban public transport projects, breaking more than a decade of Federal non-involvement in public transport system improvement.

The national interest issues discussed in this report require transformational change, not simply "more of the same". Some of this transformation will involve doing things smarter (e.g. traffic control systems that improve flow; smart charging systems for road use). Other elements will involve costly infrastructure, such as new metro rail projects or bus rapid transit links. If the Federal Government is to support transformation of Australia's land transport systems, new funding will be essential to encourage subsidiary levels of governments to be involved. What characteristics should attach to such funding?

88 The standards were made by the NTC on 30 July 2008, and approved by the ATC on 3 October 2007. The latest version includes amendments that were consented to by the ATC on 7 November 2008.

89 National Transport Commission (2008), *Performance Based Standards Scheme : The Standards and Vehicle Assessment Rules*, Melbourne.

The focus should be on **capital assistance to projects that lead transformational change and improve national interest outcomes** identified in this report. In some cases this assistance will be the majority of the funding required for a particular initiative. In others it will simply be top-up funding, to support (for example) private sector funding. The top-up could be in recognition of identified external benefits from the initiatives in question that the private sector is unable to capture (e.g. as in some port projects).

Operational/delivery responsibilities mainly lie with subsidiary levels of government. The Federal Government should not involve itself in operation of land transport systems that are currently State/Territory or local government responsibilities but should influence the development direction of those systems in ways that contribute to better outcomes when assessed against the national interest issues raised in this report.

In providing funding support along such lines, the Federal Government needs to assure itself that funding recipients do not simply substitute Federal money for State/Territory/local government money. The use of a comprehensive planning approach and subsequent performance monitoring can protect against this risk.

An important consideration in structuring Federal financial support for land transport infrastructure is whether to adopt a formula-based approach to distribution of funding allocations (primarily to States and Territories) or to rely on a bid process, where bids are submitted in accord with pre-specified criteria and allocations are made to those proposals which best meet the criteria, irrespective of geography. The latter approach characterises the Infrastructure Australia approach. The former is closer to the basis for current Federal allocations of land transport financial assistance (basically road funding). An argument for including at least an element of formula funding within a Federal financial assistance program for land transport is that to do otherwise would unfairly penalise a jurisdiction that has put in additional past effort at its own expense and currently has a smaller backlog than others, simply because of greater effort. In such an environment a project-based funding approach can effectively reward laggards for their past lack of effort. It is thus proposed that a part of Federal land transport financial assistance should continue to be formula-based and part be based on transport-plan based project submissions.

In Section 4.2 above the question of whether "state-of-good-repair" (or maintenance) funding should be provided by the Federal Government to support public transport was considered. State-of-good repair initiatives are essentially in the category of operations management. Pursuing the national interest in sustainable land transport will require the Federal Government to be satisfied that such matters are being adequately managed by the responsible authorities (mainly State Governments) but intervention in the detail of such activities requires a stronger Federal operational level involvement than could be argued to be in the national interest. One condition of Federal funding support to land transport more generally should be the achievement by the responsible jurisdiction of state-of-repair performance standards that are agreed through an ATC process proposed in Section 5.3.1 above but Federal funding should focus on the capital upgrade side, given the imperative for transformational change.

5.3.3 Role of Infrastructure Australia

Infrastructure Australia (IA) has been created to advise governments, investors and owners of infrastructure on infrastructure gaps and bottlenecks that hinder economic growth and prosperity, with a strong focus on identifying investment priorities and policy and regulatory reforms necessary to enable timely and coordinated delivery of national infrastructure investment. From a governance perspective, infrastructure investment is just one (albeit important) element in a range of policy and program measures available to pursue community goals. Other possible measures include, for example, legislation/regulation (e.g. safety and environmental rules and regulations, competition rules governing access, etc), pricing and other demand management measures, and operational management regimes, including maintenance programs.

The most effective strategy for setting land transport policy directions in any jurisdiction is unlikely to be achieved if infrastructure priorities are divorced from overall sectoral planning and priority setting. While the Federal Government may need an entity like IA to advise it on economic infrastructure priorities across sectors, including transformational projects, this intervention must be fully integrated back through the sectoral processes that identify priorities.

5.4 Sustainable funding—road pricing reform

Transformational change to Australia's land transport systems will not come cheaply. Accurate estimates of cost will require detailed cost-benefit assessments of specific proposals that are targeted to improved outcomes on the specific national interest issues that have been raised in this report. However, the scale of land transport (including port) proposals reported on by Infrastructure Australia (IA) provides some indication of the magnitude of the challenge in financial terms, since the criteria for project selection in the IA assessments have much in common with the national issues flagged in this report. The Infrastructure Australia May 2009 report identified almost $60 billion worth of land transport projects (including ports, freight improvements, urban public transport and road initiatives), of which one-third by cost were ready to proceed and two-thirds required further investigation, the latter being regarded as forming a pipeline of future projects.[90] A number of further projects can be expected to join this pipeline as data is improved and analysis extended.

The 2009 Commonwealth Budget subsequently provided over $8 billion towards the cost of high priority ready-to-go projects supported by IA, half of which was for public transport projects. Once the pipeline is considered, however, the funding gap identified through IA processes remains substantial. The set of potential projects (and other policy initiatives) that would contribute towards improved outcomes against the critical national land transport-related issues listed in the present report is arguably larger than the identified IA list, because the national interest criteria flagged in the present report are wider than IA's criteria. For example, IA's seven themes to boost Australia's productivity, protect the environment and enhance Australians' quality of life, which were used to provide a framework for infrastructure priorities, exclude social exclusion. If it is accepted that ensuring the all Australians have a right to at least basic mobility options, then some national program support towards the achievement of this goal is desirable.

Some of the funding gap, whatever it may turn out to be, can be met by the private sector. However, the scale of the funding gap is expected to be such that it demands attention to sustainable funding sources. In the absence of sustainable funding sources, it will be extremely difficult to sustain progress towards desired outcomes.

In an address to the Bus Industry Confederation breakfast at the Australian Labor Party National Conference in July 2009, Professor Graham Currie proposed that a sustainable land transport funding approach should be based on **making the problem fund the solution**. Given that external costs are at the core of most of the wide range of national issues raised in the present report, a **reformed transport pricing regime** should become the financial heart of a sustainable approach to national land transport policy.

A fundamental principle for economically efficient resource use is that users should generally be faced with meeting the marginal (or additional) social costs attributable to their choices, a principle known as marginal social cost pricing. These costs include direct costs and external costs. If identifiable external benefits exist, these should also be taken into account in the pricing framework.

Australia's land transport pricing systems in general, and road pricing systems in particular, do not meet this test. While the Australian road pricing system for trucks and buses, implemented by the National Transport Commission, is structured to charge heavy vehicles for their road damage costs, subject to some charge averaging provisions, this pricing regime has two major shortcomings:

1. other external costs of road use are ignored in setting charges (external costs are particularly substantial in congested urban areas); and
2. there is no attempt to relate charges for road use to attributable costs for any other category of road user.

A reformed road pricing system should cover all vehicle classes and all costs attributable to road use. One possible way to structure such a charging system is to levy:

1. a use-based charge to cover carbon costs (the current Carbon Pollution Reduction Scheme curiously proposes offsetting the carbon price for cars by excise offsets for three years, a system that is at odds with the purpose of emissions trading);
2. a usage-based charge to cover the costs of road construction and maintenance attributable to lighter vehicles;
3. tonne kilometre charges for the additional road damage attributable to heavy vehicles;
4. a use-based charge to cover the external cost component of accident costs;

90 Infrastructure Australia (2009), *National Infrastructure Priorities*, May.

5. use-based charges to levy the more polluting vehicles for their health (air pollution) costs; and, perhaps most controversially,
6. a congestion pricing scheme to make users accountable for the congestion costs attributable to their road use, by time and location. At peak hours in the capital cities, for example, this charge would frequently be as high as $1/km, and higher on occasions.

Existing fuel excise and registration charges would be abolished and replaced by the above charges.[91] The peak group representing road users, the Australian Automobile Association, has proposed a pricing scheme that is very similar.[92] There would need to be an Intergovernmental Agreement to implement such a system, because the incidence and scale of revenue flows would differ substantially from the current arrangements.

The implication of such a reform would be that car travel would become cheaper in regional areas, where external costs are low, but more expensive in the city, especially at peak times. Demand for public transport use would increase, which would require additional services but provide an opportunity to also reform pricing of public transport travel, to improve cost-recovery (discussed further below). Truck movement costs would increase everywhere but most markedly in cities, which would lead to greater use of rail freight (e.g. intermodal hubs), increased capacity utilisation rates and increased use of high productivity vehicles. Logistics handling procedures will need to improve once it is no longer possible to pass substantial external costs off on to the wider community without redress.

Most of the components of such a scheme could be included in a vehicle kilometre charge that is levied based on the particular roads used, the traffic conditions at time of use and the vehicle emission performance and mass characteristics. New GPS technology is suited to such applications and the Dutch are leading the field in the development and implementation of such an approach to road user charging.[93] The US National Surface Transportation Policy and Revenue Study Commission has recommended a charging system along these broad lines for the US, noting that it would both improve the efficiency with which existing transport infrastructure is used and reduce the requirement for new infrastructure investment (by about thirty per cent).[94]

An essential requirement for the success of such a scheme is the transparent and accountable hypothecation of the revenue earned from these charges into improved transport systems and services or to the mitigation of the consequences of travel choices. This removes the public perception that the charges are simply another tax on consumers. **The public policy advantage of the proposed approach is that it directly connects the source of many of the national land transport issues discussed in this paper to a revenue source to tackle those problems.**

While the Dutch are leading the way on advanced road user charging, many other countries are well ahead of Australia in this area. For example, Swiss charging of heavy vehicles recognises some external costs caused by road use by such vehicles. Congestion pricing in Stockholm and London has led to a marked reduction in traffic volumes and congestion levels (and costs) in the charge areas.

Implementation of a reformed and comprehensive road pricing system in Australia would take several years to achieve. However, there is now considerable international research experience available from countries such as the Netherlands, the UK, Sweden, Germany, Switzerland and the US to speed up the lead time. This experience encompasses issues such as technology, business processes, dealing with privacy concerns and possible regressive distributional impacts. The Council of Australian Governments should require the Australian Transport Council to prepare a report by December 2010 setting out how a comprehensive road pricing system, including congestion charging, can be most effectively implemented in Australia.

One significant advantage of reforming road pricing is that this creates the opportunity to also reform pricing of public transport services. One reason why public transport services are financially supported by state governments (and some councils) is the failure to charge road users the external costs attributable to their decisions. Pricing public transport services at less than marginal social cost is defensible in second-best grounds in these circumstances. IPART consultants, for example, have estimated the extent to which Sydney's City Rail's costs could be supported by the State Government for such reasons.[95]

91 Fuel excise has the distinct disadvantage that it is not directly connected to the burden an individual road user places on the road system and is, therefore, unable to support any form of direct road user charging. In addition, vehicle fuel efficiency improvements reduce fuel excise payments per vehicle kilometre travelled, whereas most (not all) external costs of road user are unaffected by vehicle fuel efficiency improvements.

92 Australian Automobile Association (2006), *Submission to Productivity Commission Inquiry: Road and Rail Freight Infrastructure Pricing*, Canberra.

93 A road payment system based on a kilometre charge will be introduced in the Netherlands from 2011, with revenue from the system paid into an infrastructure fund. Pricing is intended to vary by location, time of day and the pollution characteristics of the vehicle. When initially introduced the system is likely to target heavy vehicles, with the entire road system covered by 2016. The system is not intended to generate extra national revenue but to have the costs of road use divided among road users in a different and fairer way.

94 National Surface Transportation Policy and Revenue Study Commission (2008), *Volume I: Recommendations*, January, pp. 45–47.

95 LECG (2008), *An empirical estimate of City rail's costs and externalities*, Report prepared for IPART, November.

If road users are required to meet the marginal social costs of their travel choices, the case for State governments (and others) still continuing to financially support public transport services is reduced to two key points:

- a case for supporting minimum service levels to support social inclusion; and,
- a case for supporting rail services, if they have declining long run costs (marginal social cost pricing on rail will lead to under-recovery of costs, unless an alternative pricing approach is adopted).

COAG should also require the Australian Transport Council to advise by December 2010 on how public transport pricing should be reformed to be consistent with the proposed road user charging system and with the policy principles set out in this report more generally (especially dealing with social inclusion issues).

5.5 Overview

The national land transport policy framework outlined above, which focuses mainly on people movement, is based on:

- identification of the critical national land transport issues that require a national response for their resolution;
- formulation of a comprehensive, outcome-driven approach to policy/program structure;
- implementation of a set of planning processes that feed the policy/program structure in an integrated manner;
- concentration of Federal land transport assistance funding in seven categories to promote outcome achievement.

The proposals should place Australia in a much stronger position to provide a 21st century land transport system.

More detailed work is required to fill out the fine details of how the system would operate, what transition arrangements would be required to move from current funding and other programs to the proposed structure and also to progress estimation of the most cost-effective program packages that are needed to achieve the transformational changes that this report has been proposing. The Federal Government's Infrastructure Australia initiative has provided a good launching pad for the proposed national land transport policy framework, which would integrate closely with IA's work program and provide a much more solid foundation for the assessments undertaken by that organisation. The proposed approach will also strengthen the Federal transport portfolio, giving it the responsibility to drive the reform process that is proposed, in partnership with other governments and the private sector.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CITY WEST
City Shuttle
NATURAL GAS

appendixes

Appendix 1:
Meeting Possible Future Climate Change Targets

It was argued in Sections 2.2 and 3.2 that Australia and other high emitting developed countries may face 2050 greenhouse gas (GHG) emission reduction targets of 80 per cent on 2000 levels. Section 3.1 set out a number of types of measures that can contribute to the meeting of such a stringent target, as follows.

1. **Reducing the demand for urban motorised travel**
   - > Land use planning (density, co-location)
   - > Maximise opportunities for walking and cycling
2. **Achieving a modal shift to low carbon modes**
   - > Cars to public transport, walking and cycling
   - > Trucks to rail
3. **Improving vehicle utilisation**
   - > Higher car occupancy
   - > More efficient freight movements
4. **Reducing vehicle emissions intensity (which will need to be the single greatest source of emission cuts)**
   - > More efficient vehicles (the largest single contributor)
   - > Smaller vehicles
   - > Alternative fuels (problematic at present)
   - > Intelligent transport systems
   - > Better driving practices

Figure A1.1 presents an overview of what the combinations of measures may imply for modal split between car travel, public transport and active transport (walk and cycle) for three scenarios, also showing the 2007 starting point. Vehicle emissions performance is the single most critical driver of outcome possibilities. The three scenarios are labelled as "2050 extreme efficiency", "2050 very high efficiency" and "2050 high efficiency", as a reflection of the assumed improvement rates in vehicle emissions performance in each case.

The "extreme efficiency" scenario assumes car emissions intensities fall 92 per cent on 2007 levels by 2050 and truck emissions fall 84 per cent. If the "2050 extreme efficiency" outcome can be achieved, then a ten per cent cut in urban car vehicle kilometres, plus the achievement across the other measures shown in Table A1.1, will meet the emissions reduction target.

Table A1.1 presents data for the "extreme efficiency" scenario and for the "high efficiency" scenario. The "high efficiency" scenario still embodies reductions in emissions intensity of 75 per cent for both cars and trucks by 2050, which is not dramatically poorer than the "extreme efficiency" scenario. However, to achieve the aggregate target of an 80 per cent cut in emissions by 2050 with the "high efficiency" scenario requires huge changes in behaviour with respect to car travel, walking, cycling and public transport use, as shown in Figure A1.1 and Table A1.1. For example, Figure A1.1 suggests an urban mode share for car of just 11 per cent if an 80 per cent emission reduction target is to be achieved but emission intensity only improves by 75 per cent. This is almost incomprehensible, emphasising the critical importance of motorised land transport being virtually **GHG emissions free** by 2050. That should be a national policy target.

Figure A1.1: Projected urban mode shares under alternative 2050 emission scenarios, consistent with an 80 per cent cut in land transport emissions from 2000.

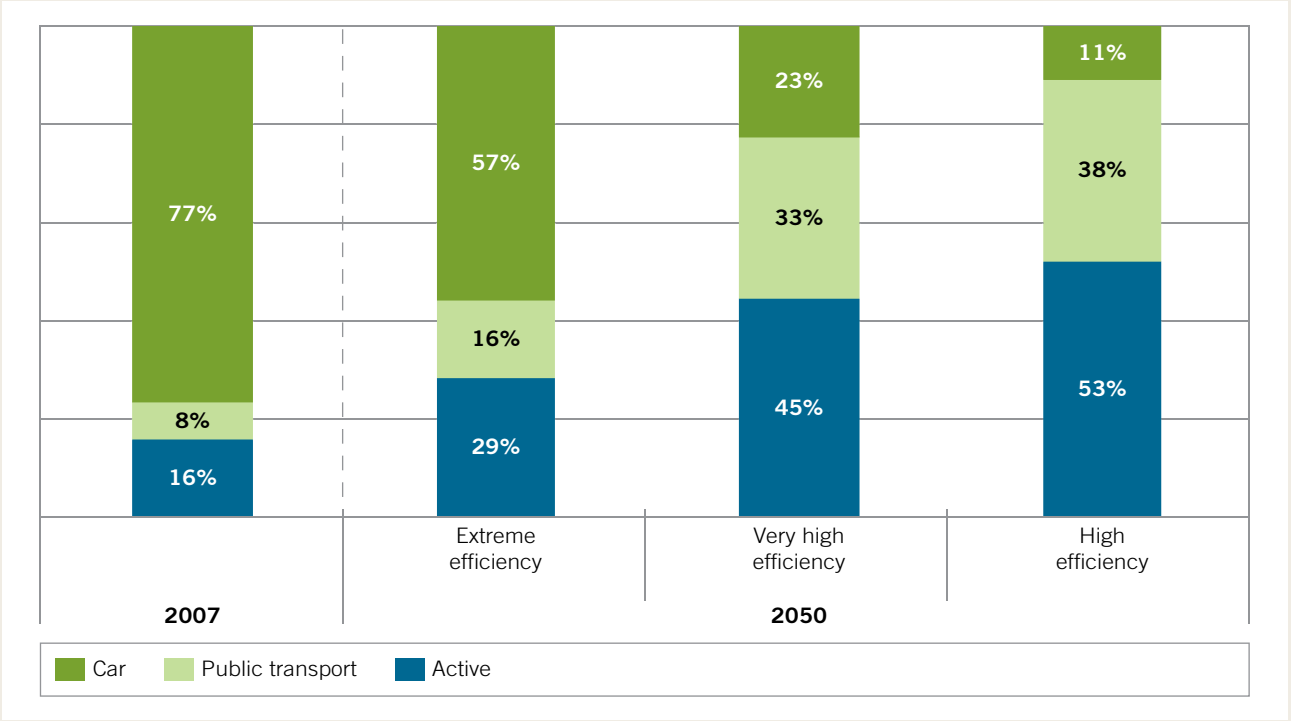


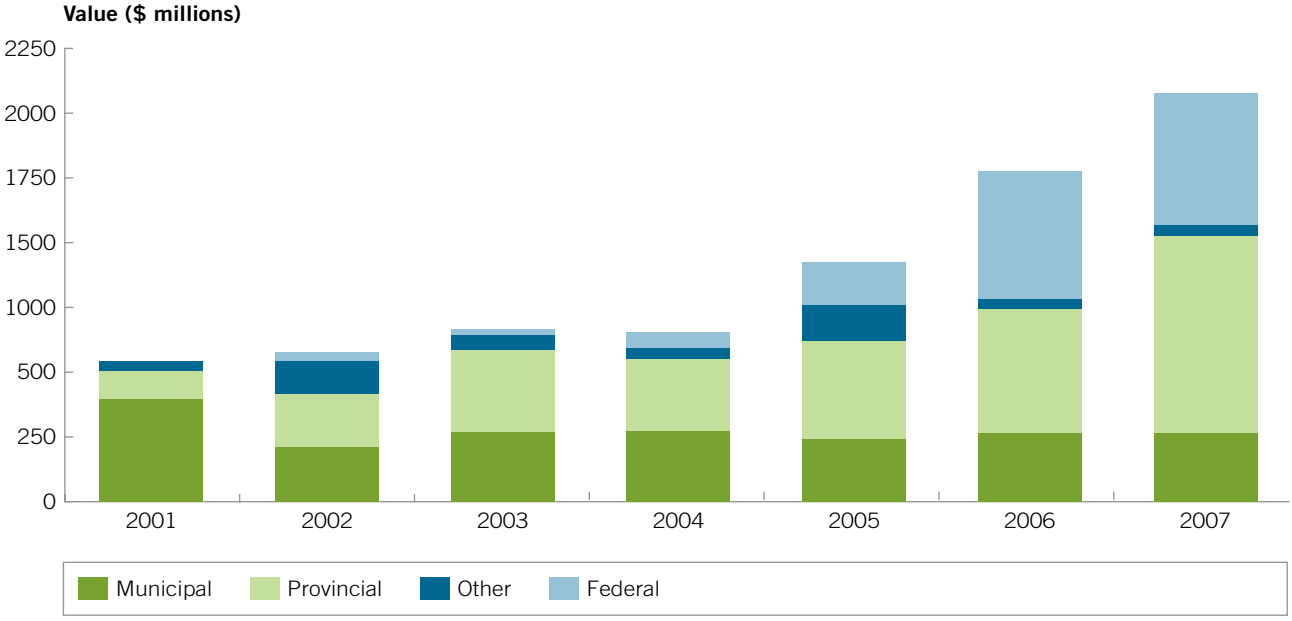
Table A.1: Road transport emission reduction scenarios that achieve an 80% cut below 2000 levels by 2050

Measure	Target	2007	2050 extreme efficiency	2050 high efficiency
1. Fewer or shorter car trips	Less car kms	–	10% (4 Mt)	30%
2. Shift from car to walk/cycle	Active transport urban mode share	16%	29% (11 Mt)	53%
3. Increase public transport mode share plus green rail power	public transport mode share (% urban trips)	7.5%	16% (4 Mt)	38%
	– car share (% urban trips)	77%	57%	23%
4. Increase car occupancy rate	People/car	1.4	1.70 (5 Mt)	2.8
5. Freight efficiency gain	Less fuel	–	30% (20 Mt)	80%
6. Car emissions intensity	Less than 2007	–	92% (36 Mt)	75%
	(grams/km)	220	18	54
– Truck emissions intensity	Less than 2007	–	84% (42 Mt)	75%
TOTAL REDUCTION			**80% (123 Mt)**	**80% (123 Mt)**

Source: Based on Stanley, Hensher and Loader (2009).

Appendix 2:
International Examples of Transport Policy and Funding

Figure A2.1: Governmental funding of Canadian Urban Public Transport Capital Investment (2001–2007)



Source: Figure supplied by the Canadian Urban Transit Association

Canada

Canada's major cities have much in common with Australian cities in terms of public transport services. Public transport mode shares tend to be a little higher in the best Canadian cities than in Australia, with Toronto and Ottawa being leading examples. For example, the City of Toronto had a very strong 24% of motorised trips, or 22% of all trips undertaken by public transport at the time of its 2001 transportation survey. The City's population at the time was 2.4 million. Mode share in the much broader Toronto region was also a strong 10% of all trips (population 6.5 million in 2001). Ottawa (population just over 1 million) achieved a public transport mode share of 13% of all trips and almost 16% of motorised trips in 2005, at the time of its transportation survey.

High mode shares in Canadian urban PT align with good service levels, in terms of frequency (headways), span of operating hours and days and reliable service delivery. These qualities mean that people in these cities can rely on public transport to meet the large majority of their personal travel needs, supporting the development of a public transport culture. While the car is still very dominant, committed support of public transport by government, primarily municipal government until recent years but increasingly by higher levels of government, has helped to facilitate strong patronage outcomes.

Canadian urban public transport systems in total have been experiencing sustained patronage growth of about 3% annually, well above population growth. public transport operators identified critical backlogs in service and supporting infrastructure (e.g. vehicles; track in the case of rail; BRT infrastructure; etc). The Canadian Urban Transit Association's most recent estimate of the Canadian urban public transport infrastructure deficit is $C40 billion for the 2008–12 period. Known funding sources of only $C20bn were identified. While this was a significant improvement on the 2006 estimate of $C15bn available, it still only meets half of the estimated infrastructure spending requirement. The Canadian Urban Transit Association is currently arguing that a substantial part of this gap should be funded as part of the Canadian Government's wider economic fiscal response to the Global Financial Crisis.

Figure A2.1 shows sources of Canadian urban public transport infrastructure funding over the period from 2001 to 2007 inclusive. Improving urban public transport has become a Federal Government priority over this period, particularly because of the recognised contribution public transport makes to improved liveability and economic competitiveness and because of its contribution to environmental credentials. Air quality and greenhouse gas emission performance have been powerful arguments supporting Canadian Federal public transport infrastructure funding support. The scale of Canadian federal investment in public transport has grown dramatically over the six year period shown, to about $C600 million in each of 2006 and 2007. Provincial investment has also increased, partly associated with matching requirements of federal funding support (and embodied in funding agreements). Local government plays a much stronger role in Canadian public transport than in Australia.

On the operating cost side, Canadian urban public transport systems have a relatively high cost-recovery rate (about 60%), higher than systems in strongly pro-public transport countries like France and Sweden, and about double the rate achieved in the US, Italy and the Netherlands. This is related in part to relatively high fares (user-pay) as well as higher efficiency which is possible due to better fleet utilisation resulting from more compact cities and better bi-directional traffic than in more car-oriented cities such as the US.

Operating cost funding support is derived almost entirely from municipal governments. Provincial Government funding is mainly on the capital side, with only about 6% of operating costs being sourced from provinces. Federal funding support is essentially all on the capital side. These funding arrangements contrast with the US, where Federal and State Governments contributed almost one-third of operating costs in 2005.

Canadian Federal public transport funding support has grown in stages. In the early years shown in Figure A2.1, funding was largely included as part of a wider set of infrastructure support programs, such as the Infrastructure Canada program, the Canada Strategic Infrastructure Fund, the Highways and Border Infrastructure Fund and the Municipal Rural Infrastructure Fund. Funding was essentially by application.

In 2005, the Federal Government committed to the New Deal for Cities and Communities and to transfer half of the federal excise tax on motor vehicle fuels (5 cents per litre) to Canadian communities by 2010, for transit and other environmentally sustainable infrastructure. This now amounts to $C2 billion per year and was recently made a permanent measure through the Gas Tax Fund. Also in 2005, the federal Government introduced two short term programs dedicating $C1.3 billion to transit capital needs, through to 2009. These two Funds were the Public Transit Fund ($C400m 2005–06) and two Public Transit Capital Trusts ($C900m over three years to 2009).

In 2007 the new $C8.8bn Building Canada Fund replaced several older infrastructure funds. It will invest in a variety of project categories including public transport until at least 2014, with matching requirements expected from provinces and municipalities. These later forms of funding assistance are primarily distributed on a per capita basis

In addition to these large funding initiatives, there is a range of smaller Canadian federal Government funding commitments that assist urban PT, including:

> Urban Transportation Showcase—$C35m over 8 years to 2009 to demonstrate best practice initiatives to cut GHG emissions. A number of transit initiatives have been supported under this program;

> Eco-MOBILITY—$C4m over the 2008–11 period to support travel demand management programs, which can include transit;

> Transit-Secure—$C80m over 2006–08 to improve transit security (75% Federal money and 25% from the recipient);

> Tax exemption for transit passes—a tax incentive that allows Canadians to deduct 15% of the cost of monthly or longer duration public transport tickets in annual tax returns, effective from July 2006.

Examples of some of the initiatives that have been assisted by Federal funding include:

> new bus rapid transit in the Greater Toronto area (e.g. York Region; City of Brampton);

> purchase of over 300 new buses (including almost half diesel-electric hybrids) and payments towards 156 new Toronto Rocket subway trains, for Toronto Transit Commission;

> new bus terminals in North Bay and Windsor Ontario; and,

> extension of Edmonton's light rail system.

While there has been significant funding commitment from the Canadian federal Government to public transport in recent years, there is still no long term Federal policy for PT. Involvement is still primarily project or proposal funding related, within a per capita grant framework. Canadian public transport advocates are seeking a stronger long term Federal policy level commitment to support of public transport, particularly in urban areas.

Some of the key conclusions from an examination of Canadian public transport performance are as follows:

> good public transport service levels are essential for strong patronage numbers and a growing market share;

> public transport can help meet national goals in areas as diverse as economic development, city liveability and environmental enhancement (air quality and climate change mitigation);

> partnerships across levels of government can play a very important role in upgrading public transport systems and services, to enable them to continue to provide the service levels that will allow them to continue to play significant roles in meeting these national goals;

- the Federal Government has a very important leadership role to play in taking public transport systems to their next level of development, which is critical to cater for continued patronage growth but requires considerable capital injection, beyond the resources of State (Provincial) and Local governments and public transport operators.
- private ownership of public transport service delivery is not a necessary condition for good performance. High levels of municipal (public) ownership in Canadian urban public transport, are delivering systems with high cost-recoveries and market shares.

United States

While Federal Government involvement in public transport is a relatively recent phenomenon in Canada, it has a much longer history in the US. Current US Federal involvement is primarily through the Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which has currency over the 2004 to 2009 period, providing $US 52.6 billion for transit over this period (about $US10bn in 2008). Its antecedents went back to the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), which began the TEA legislative series. Public transportation support from the US Federal Government, however, dates to well back before the TEA legislation.

Funding was provided out of General Revenues prior to 1983 and then from both a Mass Transit Account (MTA) set up under the Surface Transportation Assistance Act of 1982 and general revenues. The MTA receives a proportion of federal gas tax receipts to support public transport. Currently, 15.5% of the total per gallon tax on gasoline and 11.7% of the tax on diesel are dedicated to the MTA. This Trust Fund provides about 80% of total assistance for public transport, the general fund providing the remaining 20%.

As noted above, US Federal assistance for public transport includes both capital and operational support. The reasons for this support are generally the same as those indicated above for Canada. They reflect a federal recognition that public transport systems are important contributors to economic development and congestion reduction, to environmental sustainability, city liveability and to social inclusion. Social inclusion has been a stronger theme in US Federal public transport involvement than it has in Canada, reflecting what the US calls environmental justice agendas that extend back to the 60s. Canada has placed less emphasis on this issue as a rationale for federal involvement in urban public transport because Canadian public transport service levels have typically been higher than those in the US for cities of comparable size and shape. The consequence is that less specific emphasis needs to be devoted in Canada to the travel requirements of urban socially disadvantaged groups—mainstream services perform most of this role already.

Energy security has also been a strong theme in recent years in reasons why a strong public transport system is important to the US and why the Federal Government has a role to play, reflecting high levels of auto dependency. This theme has been stronger in the US than in Canada, possibly reflecting the large deposits of tar sands in Canada (high oil prices make these economically viable but they are known as dirty oil!).

Notable among US Federal assistance is the number and range of categories of assistance that are included, some of which are formula driven (accounting for $US28.5bn of the total of $US52.6bn in the current legislation). In addition to specific categories of assistance for disadvantaged groups (e.g. a program category for elderly individuals and individuals with disabilities; another called job access and reverse commute), the legislation provides assistance under such headings as (examples only): urban area formula program (a significant part of the total); capital investment programs, also a very significant part of the total ($US22.7bn); small transit intensive cities formula program (for cities with under 200,000 population); clean fuels formula program; new freedom program; bus and bus facilities; fixed guideway modernisation; new starts; metropolitan planning; state planning; research (various categories). It is not necessary to outline the detail of these programs, so much as to note that:

- funding amounts are substantial;
- the level of specificity in program categories is a clear indication that the Federal Government is seeking to influence development directions in public transport; and,
- the level of support for planning ($US560m, or over $100m annually) and research ($US374m or over $US 60m annually) is significant and demonstrates a recognition of the importance of strategic and evidence-based thinking in influencing the future of public transport.

It is arguable that there are too many categories of assistance provided in US Federal Government transport programs. This was a key conclusion in the 2008 report of the National Surface Transportation and Revenue Policy Commission (NSTRPC, itself established under SAFETEA-LU). That Commission identified 106 US Federal Surface Transportation Programs and has proposed that they be replaced by just ten. The ten are primarily defined in terms of outcomes sought, rather than inputs. Thus, for example much Federal funding support for urban public transport would shift from specifically designated transit programs (of which there are 20) to parts of other programs, such as “congestion relief” and “environmental

stewardship". There has been no decision at Federal level about changing the structure of assistance programs but BIC is strongly supportive of the outcome-based focus.

The NSTRPC report estimated future investment requirements in the US surface transportation system, including transit. It identified a currently sustainable (fundable from existing sources) investment level of $US 13bn annually but identified a requirement that this increase to between $US21–32bn through to 2020, with a funding gap of $US8–19bn. This was seen as requiring an increase in the gas tax of 4–10 cents a gallon to meet the funding gap. The large increase in transit (and other surface transportation) funding identified by the Commission led it to propose, inter alia, that a major national review of revenue options be undertaken, with congestion pricing or a vehicle mile tax being a central opportunity, because of its capacity to charge travellers for the external costs their choices impose on others (external costs).

The US situation has many similarities to Canada, although service levels tend to be lower and cost-recovery rates less. The national benefit of improved public transport services is widely acknowledged and the role of the Federal Government in helping to facilitate development is recognised and accepted by the Federal Government. The need for a major upgrade of infrastructure has been identified by an independent national commission, involving doubling transit investment levels, and the importance of this upgrade to public transport's capacity to fulfil its national roles in helping to cut congestion, reduce transport emissions, improve energy security, improve the safety of travel and give travel opportunities to disadvantaged groups has been emphasised by the NSTRPC report. The US Federal interest in specific categories of assistance is of interest, since it demonstrates a recognition of the range of beneficial impacts that transit can deliver.

A dedicated Federal public transport funding source exists in the US, which has assisted the continuity of Federal funding support. However, gas tax revenues are declining as road traffic growth slows and additional revenue sources are recognised as being needed to both sustain current investment levels and cater for system growth.

The US Federal focus on planning and research is notable. This encourages States and municipalities to take longer term, more strategic approaches to urban transport systems and enhances understanding of the key levers that can influence outcomes. This is a major gap in the Australian transport arena.

Appendix 3:
Best practice examples of public transport services and infrastructure

This section of the report lists a number of examples of international best practice in terms of public passenger transport. These examples include Australian and international examples

Australia

Brisbane Bus Rapid Transit (BRT)

As noted earlier in this submission, Brisbane has picked up on the technology of BRT and is rolling out an international best practice example. Patronage growth has been strong and costs are well below rail equivalents. The dedicated right-of-way allows fast, safe bus operation. The relatively low capital costs of BRT compared to heavy rail have generally made the roll-out of this technology possible within a relatively short time frame (up to 5 years often). Whether this is a transition strategy to other forms of public transport or an end in itself should be determined by how the market responds.

Metlink

Metlink is Melbourne's public transport marketing body, owned by the operators but working in close partnership with the State's Director of Public Transport who provides funding support and approves the Metlink Board's Marketing Strategy (but not the more detailed Marketing Plan). Metlink has a call-centre, journey planner, conducts system marketing campaigns, monitors patronage and fare evasion and brings the various modes together to discuss common problems. There has been considerable international interest in this approach to system marketing in a privatised delivery model.

Melbourne Bus Contracts

BIC mentions the Melbourne bus contracts because they are a reflection of an operating partnership between the Victorian private bus industry and State Government that has agreement on system development objectives and directions and uses the contracts to tie these to service delivery. The level of trust between the government and industry is high, meaning that both sides can draw on each other to deliver a better outcome for the travelling public. The delivery model provides value for money without compromising accountability and transparency.

Perth and Adelaide Bus Contracts

Operating within a competitive tendering regime, these contracts have delivered significant cost savings to their communities, together with high quality services. Some important innovations have occurred in service planning and marketing, such as the go-zone concept.

Warrnambool Accessibility Planning Committee

This regional group in south-west Victoria established itself to identify regional accessibility needs and to seek out the best ways to fulfil these needs, without relying on government funding to employ a project co-ordinator. It was a grass roots initiative that is helping to improve regional access opportunities.

International

Curitiba's Linear Urban Development and Bus Rapid Transit System

Curitiba is a Brazilian city, located well to the south of the country. It was an international pioneer of Bus Rapid Transit and has structured its urban development along linear corridors that form the spines of the BRT system. This linear form of urban development holds out much promise for Australian cities, because it substantially reduces pressures for urban sprawl but does not touch most of the existing suburban area, reducing political opposition to implementation. This set of initiatives dates back thirty years, with the importance of taking a long term sustained approach to better transport/land use integration being a key lesson.

Canadian Federal Public Transport Assistance

While this is less generous and less "fixed" than US Federal funding support, BIC believes that its less detailed prescription on where Federal funds should be spent (than in the US model) and its emphasis on intergovernmental agreements to assure alignment of intent is a good way for Australia to proceed.

US Transportation Research Board

The TRB has established itself as the premier forum/pathway for transport research in the US. Its annual conference is a massive event and involvement is widespread and extensive. BIC considers that Australia should adapt the TRB model to help promote and foster transport research in Australia.

London Congestion Pricing

While London's congestion pricing scheme is administratively cumbersome, its focus on carefully linking revenues to improvements in public transport helped gain political acceptance and the results have been very positive. Importantly, the scheme has attracted international attention to congestion pricing, which is a key area for reform if public transport is ever to achieve its potential. The leadership shown by the then London Mayor, Ken Livingstone, to get the scheme up, is a further best practice element in this case study.

Netherlands Road Pricing Reforms

Satellite-based road user charging will be implemented throughout the Netherlands, to reduce congestion and finance future road infrastructure. The "kilometre price" proposed is to be differentiated by location, environmental properties of the vehicle, and time of day (effectively a peak/off-peak or congestion charge)[96]. It is to be introduced for all vehicles on all roads in the entire country, starting with trucks in 2011 and phasing in a scheme for cars from 2012 to 2016. The Dutch government plans to scrap road tax as well as purchase tax on new cars when the system is introduced.

96 The road user charge scheme will be facilitated by GPS/speed sensor vehicle tracking, calculated by onboard electronic accumulating odometers, remotely assessing travel from central computers that are capable of applying a range of charging regimes. These include uniform road-use charges and congestion pricing (differential charging according to traffic conditions), including adjusted-upward charges for road use in remote areas (perhaps excluding local residents) where maintenance costs are high and distances travelled are relatively less. Graded distance fees can also be introduced if desired—possibly on equity grounds.

GRID www.thegrid.net.au