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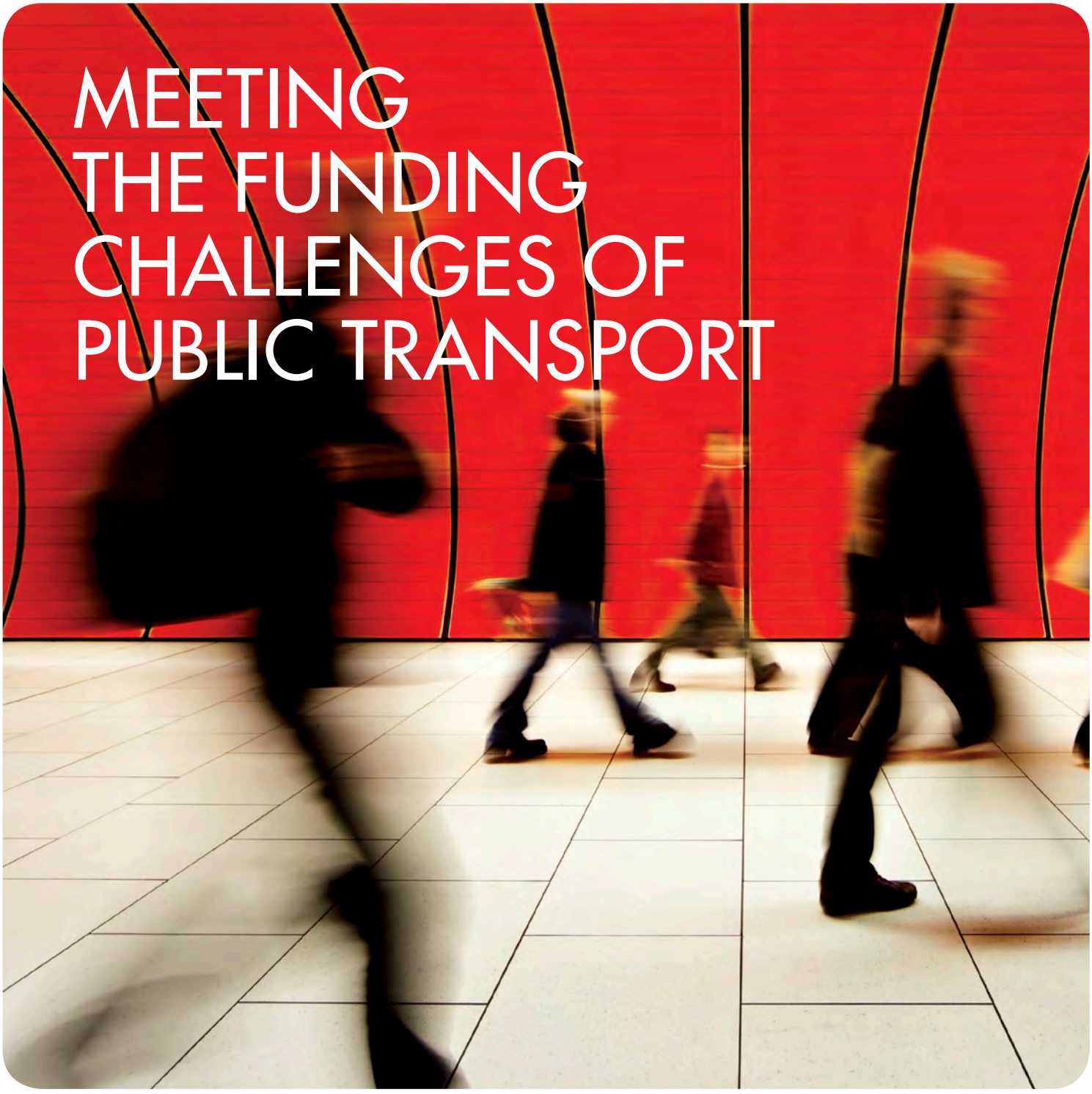
MEETING THE FUNDING CHALLENGES OF PUBLIC TRANSPORT



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TOURISM & TRANSPORT FORUM

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1.0 EXECUTIVE SUMMARY

An effective and efficient transport system, incorporating both public transport and the road network, is an important building block for Australia's continued economic growth, environmental health and social well-being.

A well-utilised public transport system brings economic benefits such as cost savings associated with reduced congestion and improved job creation, competitiveness and liveability. Public transport also underpins Australia's environmental goals, by helping to reduce greenhouse gas emissions and air pollution and lessen our dependence on oil. In addition, a well-designed public transport system encourages greater social inclusion and results in numerous health and safety benefits.

A NEED FOR ACTION

To sustain Australia's future economic and population growth aspirations, the role that public transport plays will need to grow, increasing pressure on the sources of its funding. Over the last five years, the number of public transport trips in Australia has grown at over twice the rate of population growth and at an even greater rate when compared to private transport (e.g., car). This modal shift is expected to continue. Combined with projected population growth and the demands of accommodating an increasing proportion of elderly passengers, the pressure on funding of public transport is now and will continue to be a considerable challenge, particularly given that only one-third of the approximately $5.2 billion total operating cost is recovered by farebox revenue, while the other two-thirds is funded by state government subsidies. Furthermore, the funding requirement for capital works is set to increase to over $20 billion per annum over the next decade as much needed major upgrades and expansions are implemented. There is clearly an urgent need to plan strategies to ensure that the public transport systems in Australia are sustainable into the future.

This report, commissioned by the Tourism & Transport Form and prepared by L.E.K. Consulting, identifies prospective strategies that will help Australia meet the future funding challenges of public transport. The report is structured in four sections; the first two introductory sections ("The Public Transport Investment Imperative" and "Cost Challenges") highlight the economic, environmental and social benefits of public transport, explain the importance of future investment, and describe the factors that are putting increased pressure on public transport funding. The two main sections of the report ("Revenue Generating Initiatives" and "Cost Saving Initiatives") present ten revenue generating initiatives and six cost saving initiatives which may be implemented as a means of improving the cost position of public transport. Of these, ten have been prioritised as the "most prospective" and "very prospective" initiatives to pursue (six revenue generating and four cost saving initiatives). These strategies have been implemented to varying degrees in Australian and international cities and have been shown to have positive impacts financially and in contributing to the broader economic, environmental and social objectives of public transport

REVENUE GENERATING INITIATIVES

Of the ten revenue generating initiatives that have been summarised in this paper, six have been prioritised when assessed on their magnitude of financial impact and support for broader public transport objectives; each varies as to the ease with which it can be implemented. The four most prospective of the six initiatives are:

- **Optimising fare structures:** Of the revenue generating initiatives, this has the highest potential financial impact and is one of the most controllable and straightforward levers that government can pull. In addition to regular fare increases in line with CPI (which some governments already implement), there are specific opportunities to further optimise fares in some cities. These include eliminating reduced fares during the afternoon peak and/or increasing the differential between peak and reduced fares to gain extra revenue in the peak and futher encourage people to travel at underutilised times of the day. However, implementation of fare increase strategies during the peak requires political will and may need to be phased in over time.
- **Transit oriented development (TOD):** Developing residential housing, retail and commercial spaces, including key services such as health and education around transit hubs, is an important strategy to increase Australia's urban density, improve cost recoveries, increase public transport use and improve the efficiency of infrastructure provision. Where the demand for full mixed use TODs does not exist, increasing the density of housing around public transport corridors is also an important strategy to pursue. In the short term, revenue can be generated for the public transport system by capitalising land adjacent to stations, selling air rights above stations and by tax increment financing. In the longer term, higher levels of patronage will improve return on investment. While TOD has the potential to positively transform the living and commuting patterns of a city, it requires long-term coordination between state, federal and local governments and the involvement of transport operators and local councils. It also requires the appropriate legislation to ensure proper alignment between urban planning and transport infrastructure.
- **Congestion charging:** If successfully employed, congestion charging has the potential to reduce congestion, reduce emissions and raise revenue. Overseas case studies have demonstrated that congestion charging is most successful when there is a robust public transport network that provides a viable transport alternative; this can typically require significant investment in upgrading existing transport infrastructure. Given the physical layout of Australian cities and general travel patterns, a targeted facility charging scheme, where tolls are moved from city by-pass roads to city centre and arterial roads, appears the most viable option. Although a congestion charging scheme is unlikely to result in significant surplus revenues once the capital costs of upgrading the public transport network have been considered, the result will be a better planned and integrated public transport network, which fulfils the main goal of the revenue generating and cost saving initiatives. Congestion charging also has the ability to further encourage patronage growth as part of a well-planned and integrated road and public transport system.
- **Growing patronage:** Growing patronage is a revenue-generating strategy that should not be neglected given its strong support of broader transport objectives. As a net revenue raising measure, it will be most effective if growth can be focused in the off peak. If growth occurs in the peak period, it may require significant capital investment to increase capacity.

There are a further two initiatives that represent the next most prospective opportunities:

- **Implementing infrastructure levies** in the form of additional taxes on new housing and commercial developments, particularly in fringe suburban growth areas, can result in a moderate financial benefit. However, to minimise the impact on housing affordability, levies might be best applied in the form of tax increment financing, whereby the government provides a loan upfront to ensure that the essential infrastructure is provided, and this is paid back in the form of property taxes as property values rise.
- **Smartcard** technology in one form or another has been implemented or planned for all major transport networks in Australia. Although the direct revenue uplift from this technology (in the form of a percentage of non-transit purchases) is limited, this technology has the potential to transform an operator's understanding of customer behaviour, improve customer service and introduce variable fares.

Finally, four other revenue generating initiatives were identified that have lower revenue generating potential or are more difficult to implement, although may be successful on an opportunistic basis. These initiatives include *reviewing the discount levels* on concession fares, *improving station retailing, increasing advertising* and *reducing fare evasion.*

COST SAVINGS INITIATIVES

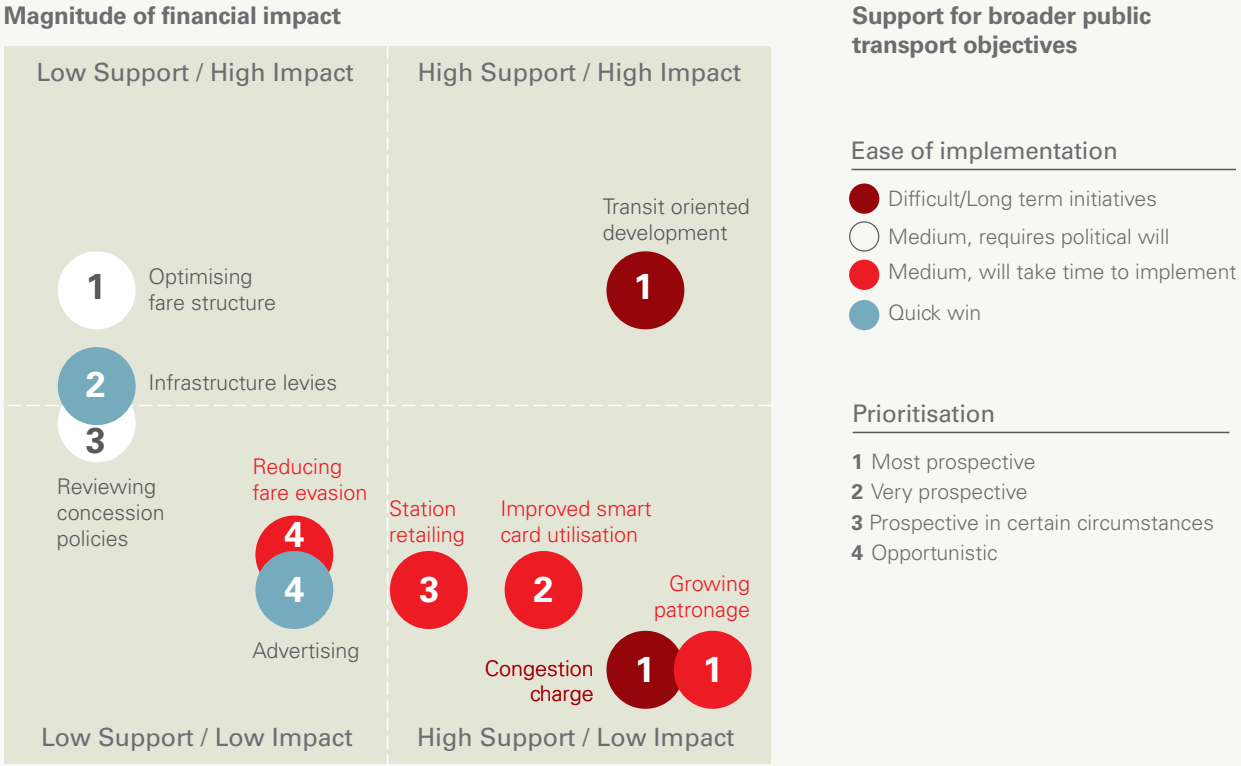
In addition to realising additional sources of revenue, it is critical that public transport operates as cost efficiently as possible. Due to the fact that costs are approximately three times greater than revenue[1], a 1% reduction in costs has three times the impact on an operator's cost position as a 1% increase in revenue. In Australia, the capabilities and legacies managed by operators and the resulting cost performance observed varies widely. Cost performance is driven by a range of factors including industrial environment, age and repair of infrastructure, prevailing policy settings, and most importantly, the focus and capability of management around managing costs.

Each operator has areas in which they are more cost efficient and areas in which they are less, and there is no one-size-fits-all strategy that can be pursued. Six major initiatives have been identified in this paper which address some of the largest cost areas within a public transport operation. Of these six major initiatives, four have been prioritised based on the magnitude of potential cost savings, ease of implementation and consistency with the broader economic, environmental and social goals of public transport:

- **Improving asset productivity:** Efficiencies in asset productivity can be realised in a number of ways, including improving fleet availability, improving average speeds per vehicle and ensuring capacity per vehicle is matched to demand. While implementation of these improvements

Figure 1

Revenue initiatives financial impact vs support for broader public transport objectives



1 L.E.K. analysis

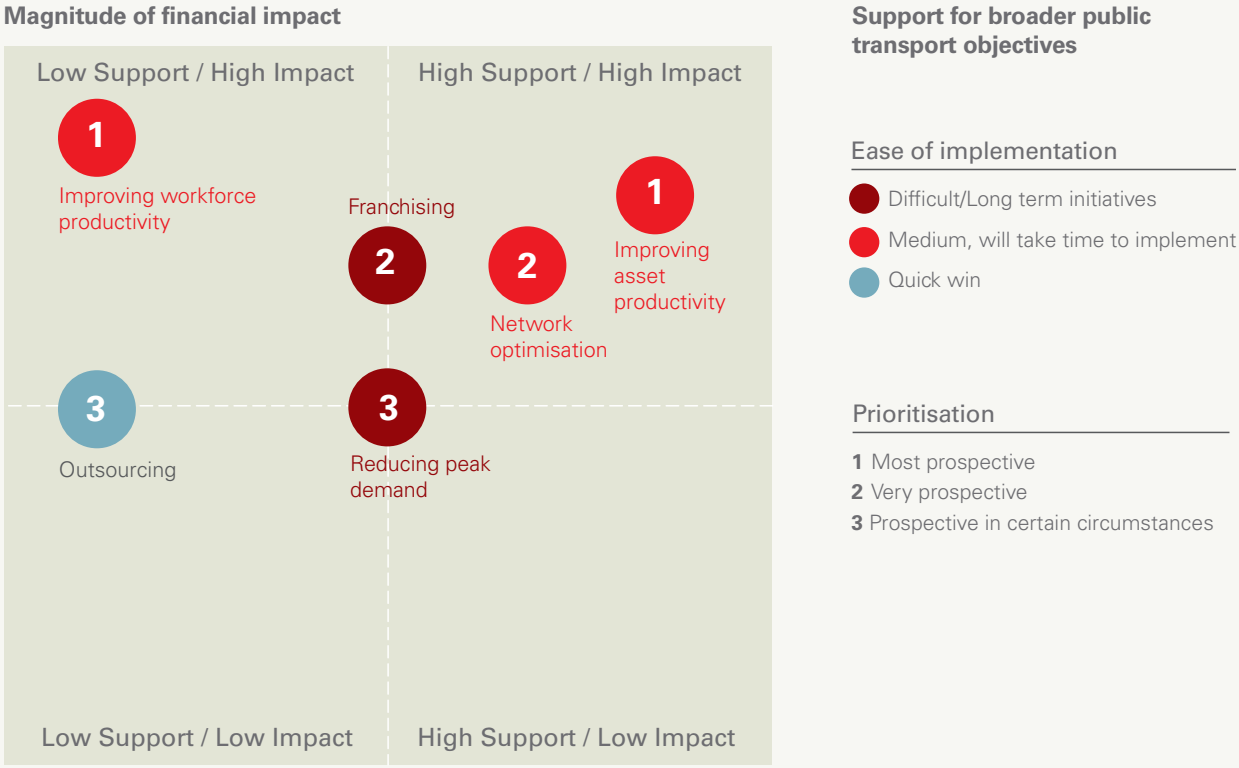
may require varying levels of investment and have different time horizons, lifting the number of passenger kilometres per asset can result in considerable cost savings through improved cost recoveries per asset and reduced capital requirements.

- **Improving workforce productivity:** Labour is a significant proportion of the operating costs of public transport operators, ranging from 60-80% of costs for rail operators to 40-60% for bus operators. Improving workforce productivity by ensuring that staff are deployed efficiently can therefore have a significant impact on an operator's cost position. There are a number of areas where workforce productivity can potentially be improved, such as managing sick leave, better utilising technology in specific functions, combining operational roles with customer service roles, matching customer service more closely with passenger movements and head office efficiency. Unless accompanied by an increase in service levels, this initiative is likely to result in a reduction in staff levels and therefore implementing these strategies will be challenging in terms of political hurdles, customer perceptions and union pressures, among others. Careful consideration of the benefits and risks and the development of robust implementation plans will be essential.
- **Network optimisation:** Creating an integrated, intermodal public transport system that closely aligns asset deployment to service demand can result in considerable efficiencies, removing underutilised and redundant services. Faster journey times, more frequent services and more seamless interchanges also improve the customer experience. Realising the full benefits of network optimisation will be challenging; it will require close coordination and planning between all modes of public transport and the government.
- **Franchising:** The basic premise of franchising is that private operators have strong commercial incentives to operate costs efficiently and therefore are more likely to implement strategies such as optimising routes, maximising asset utilisation and minimising overheads. This commercial imperative is also a way for governments to manage and maintain service performance. In addition, many private operators can introduce innovation and global best practice from their international operations. However, experience in Australia and globally has shown that the success of franchising is highly dependent on the contract structures and incentives that are put in place.

In addition, two other cost saving initiatives have been described in this paper. Outsourcing is widely used as a way to decrease costs and/or improve the quality of the outcome of non-core activities. Spreading peak demand is another way that operators can realise cost savings through a reduction in fleet requirement. Several options have been considered to motivate and enable people to move from the peak (and in particular the super peak) to the off peak, including increasing the price differential between peak and off peak pricing, encouraging switching to alternative modes of transport and encouraging employers to introduce flexible working hours.

Figure 2

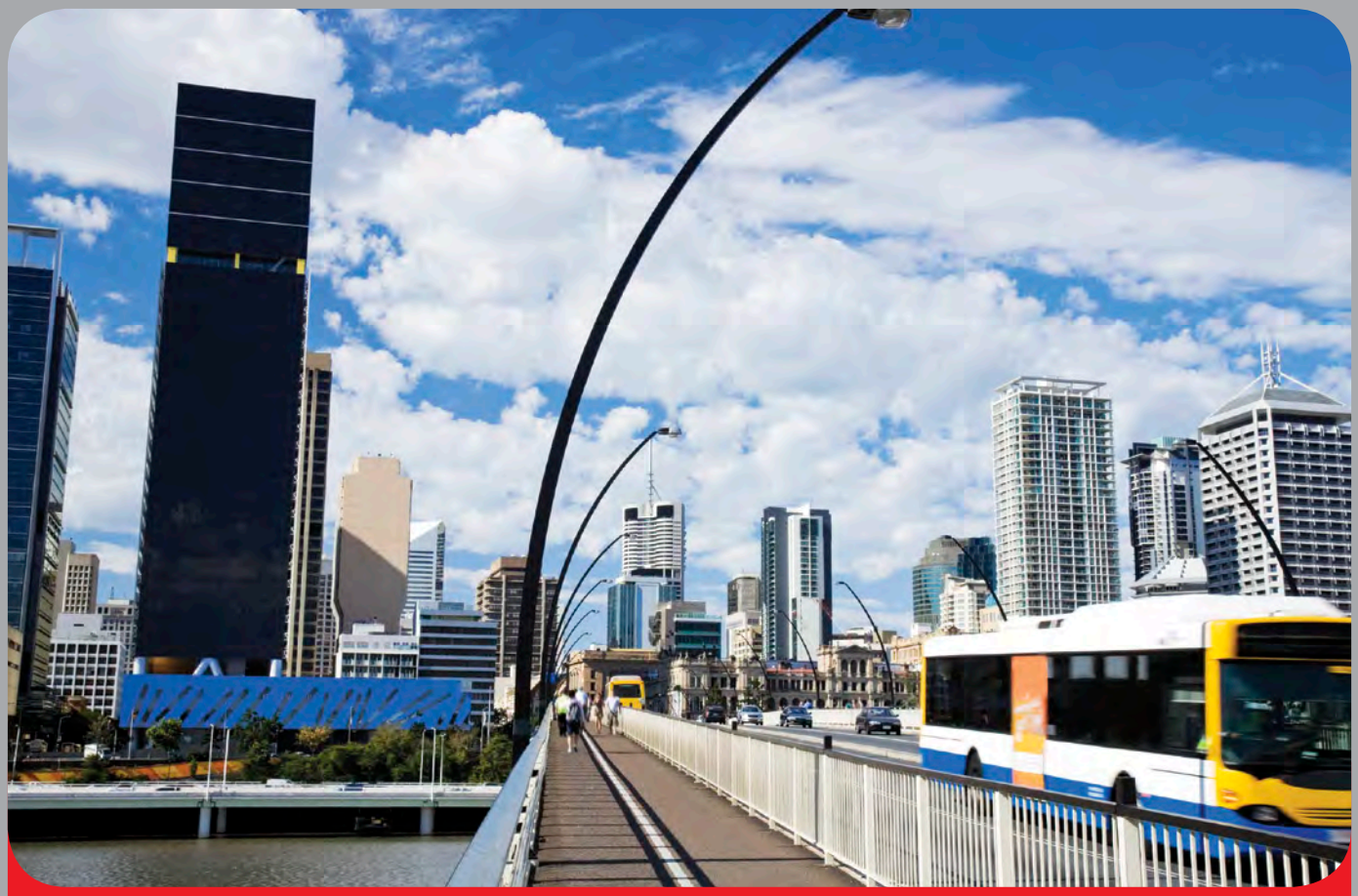
Cost initiatives financial impact vs support for broader public transport objectives



History has shown that these strategies can be difficult to implement or sustain, but Melbourne's recent 'early birds travel for free' offer has appeared, in the short term, to have met with some success.

REINVESTMENT INTO PUBLIC TRANSPORT

It is imperative that public transport systems are the prime beneficiary of these strategies if it is to be a positive contributor to Australia's future growth rather than a liability. This requires the reinvestment of cost savings and revenue generated to improve and expand public transport services and to ensure integration with the road network. Although this may be difficult to achieve all the time due to the pressures facing governments and private operators, implementing the initiatives outlined in this paper will create a more efficient and effective, and therefore sustainable, public transport system into the future.



2.0 THE PUBLIC TRANSPORT INVESTMENT IMPERATIVE

The existence of an effective and efficient transport system, which incorporates both the public transport system and the road network, is critical to developing an economically vibrant and liveable city. This section of the paper describes the current public transport use in Australia, the overall benefits of public transport and the importance of future investment in public transport.

2.1 CONTEXT

Since 1977, overall public transport patronage in Australia[2] has grown by 83%, compared to a population growth of 46%[3] over the same time period. Over the past 5 years, public transport passenger kilometres have accelerated by 3.6% per annum. This has been most pronounced in Melbourne and Brisbane where growth has exceeded 5% per annum, but other Australian capital cities have also experienced above average growth during this period. This high growth rate has created both opportunities and challenges to public transport in terms of managing service levels and maintaining value for money.

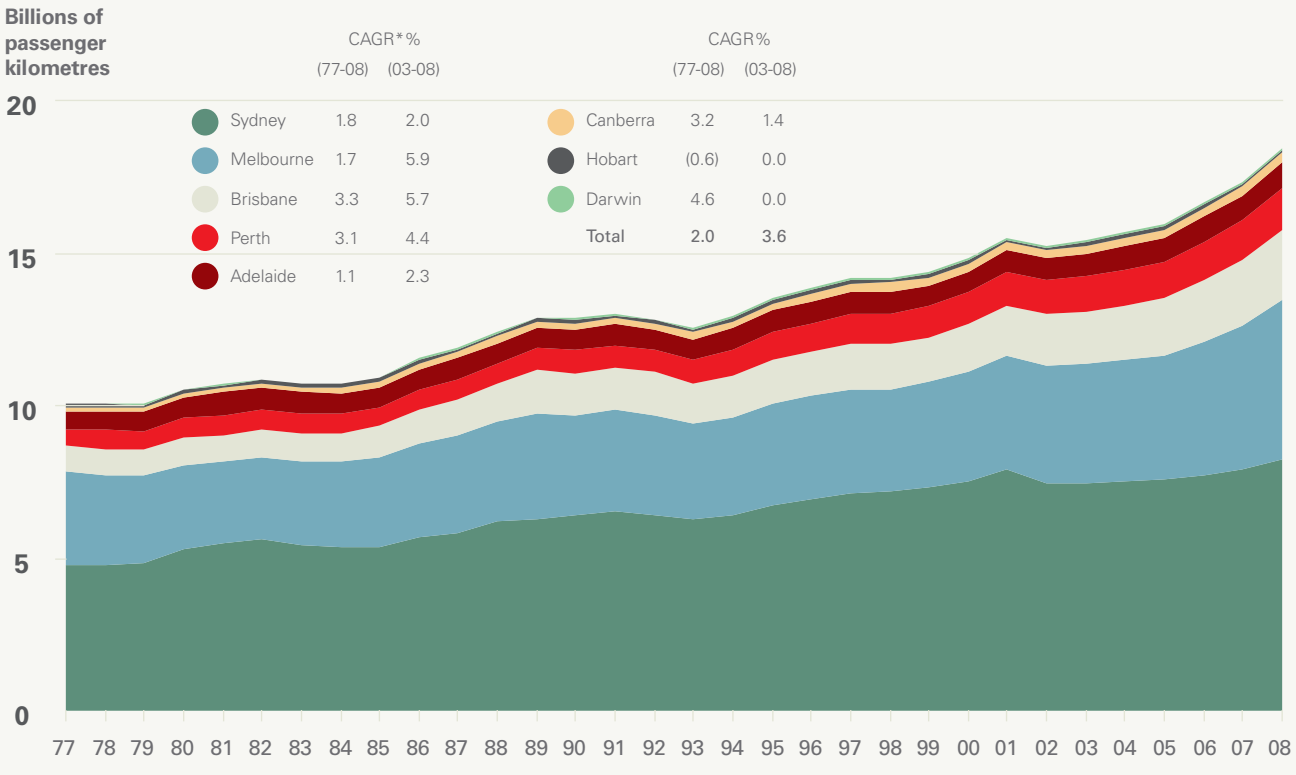
Rail is the largest mode of public transport in Australia with 60% share of passenger kilometres, followed by buses. Ferries and light rail have a small share nationally, but are important in the local areas that they serve. Each city has a unique profile which is a reflection of historical planning, urban footprint and geography.

Rail dominates in the most populous cities of Sydney, Brisbane and Melbourne, while buses have the largest share in Perth and Adelaide. Darwin, Canberra and Hobart are currently serviced by buses only, although some of these cities are planning for or are considering the development of a light rail network (Figure 4).

Australia has a high dependence on cars by international standards. Of the 158 billion passenger kilometres completed across all Australian capitals in 2008, the overwhelming majority (89%) were completed by private car[4]. An international comparison of public transport mode share (based on journeys to work) shows that Australian cities are below European cities and some of the largest cities in the US, including New York and Chicago (Figure 5)[5]. Sydney has the highest public transport mode share among Australian cities, at only 21% share. However, the low overall share of public transport in Australia does not reflect the importance of public transport to certain populations. For example, 77% of people who work in Sydney's CBD use public transport to get to and from work[6].

Figure 3

Long term public transport patronage growth in Australian state capitals (1977-08)

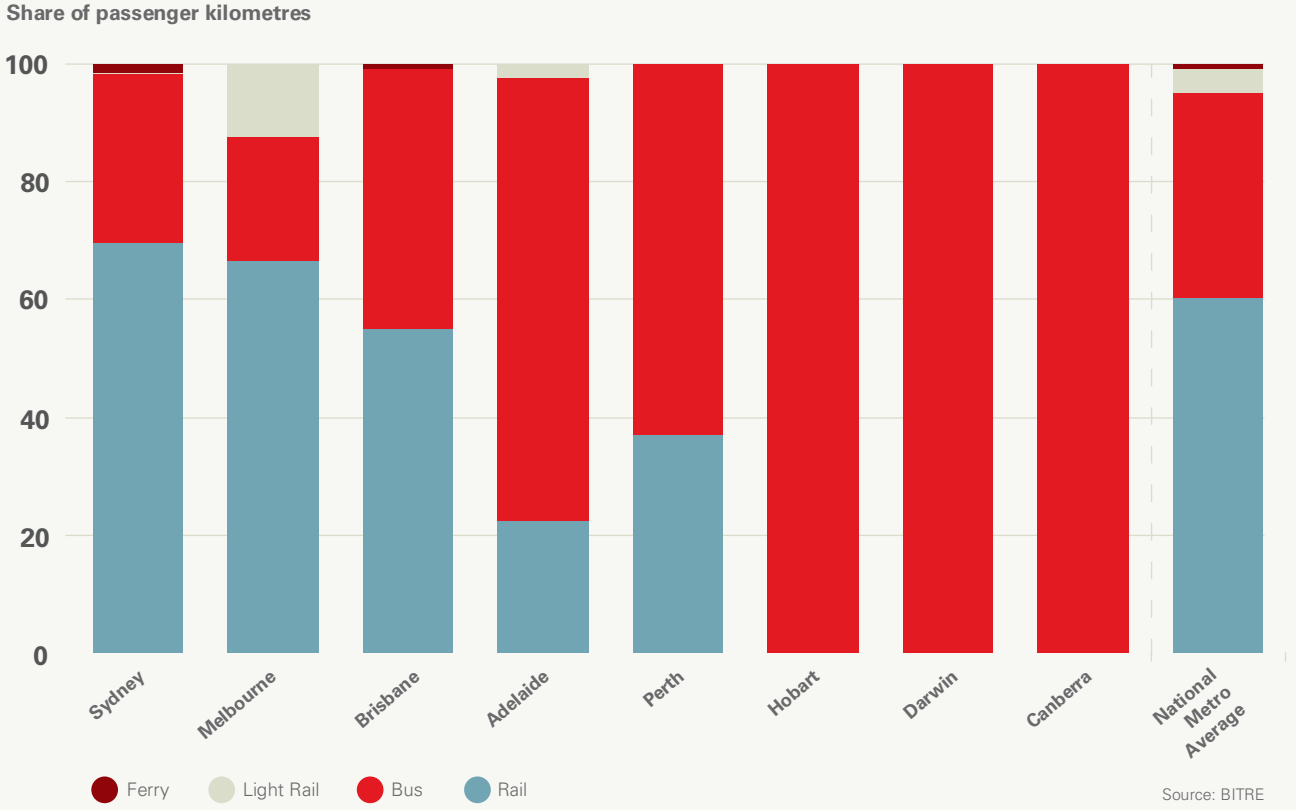


*CAGR: Compound Annual Growth Rate. Source: BITRE

2 Statistics relate only to state and territory capitals
3 Australian transport statistics yearbook, Bureau of Infrastructure, Transport and Regional Economics, 2009; ABS, cat. no 3105.0.65.001
4 Australian transport statistics yearbook, Bureau of Infrastructure, Transport and Regional Economics, 2009
5 American Census Bureau, 2008 ; EU Census, 2004; Australian Census, 2006
6 NSW State of the Environment Report, NSW Department of Energy, Climate Change and Water, 2009

Figure 4

Mode share of public transport



One of the key drivers of the low mode share of public transport in Australia is the low population density of Australian cities (Figure 6)[7]. As a result, a smaller proportion of people reside in the catchment area of the public transport network. Low population density in Australia has been exacerbated over the past 50 years by new housing developments that have pushed the boundaries of the outer fringes and have been planned for car commuting with little provision for public transport.

One of the consequences of a high dependency on cars and a low population density is that transportation costs in Australian cities (both private and public transport) as a proportion of each city's wealth (GRP)[8] are among the highest in the developed world.

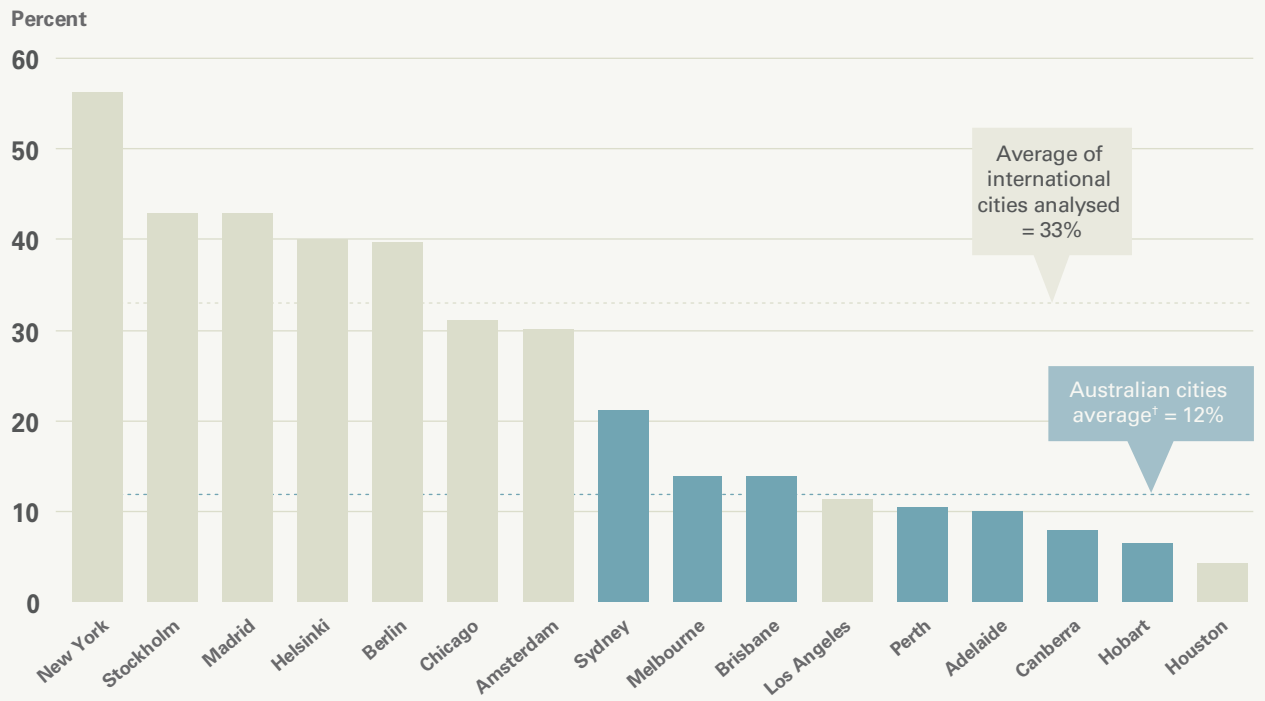
If our cities are to grow sustainably in the future, significant investment will be required in all forms of transport infrastructure. There is no doubt that private vehicles will continue to play an important role - an efficient transport network needs to integrate both road and public transport. However, it is critical that all of the benefits that public transport can offer (including both monetary cost and positive externalities) are considered when transport planning and funding decisions are made. This will ensure that the national economy and Australia's quality of life is not constrained by congestion and lack of mobility. The positive externalities that can be achieved from a greater investment in public transport are described in Section 2.2 following.

7 Submission to the Inquiry by the Victorian Competition and Efficiency Commission into managing Transport Congestion, Victorian Department of Infrastructure, 2006

8 Overcoming Automobile Dependence, Newman and Kenworthy, 1999

Figure 5

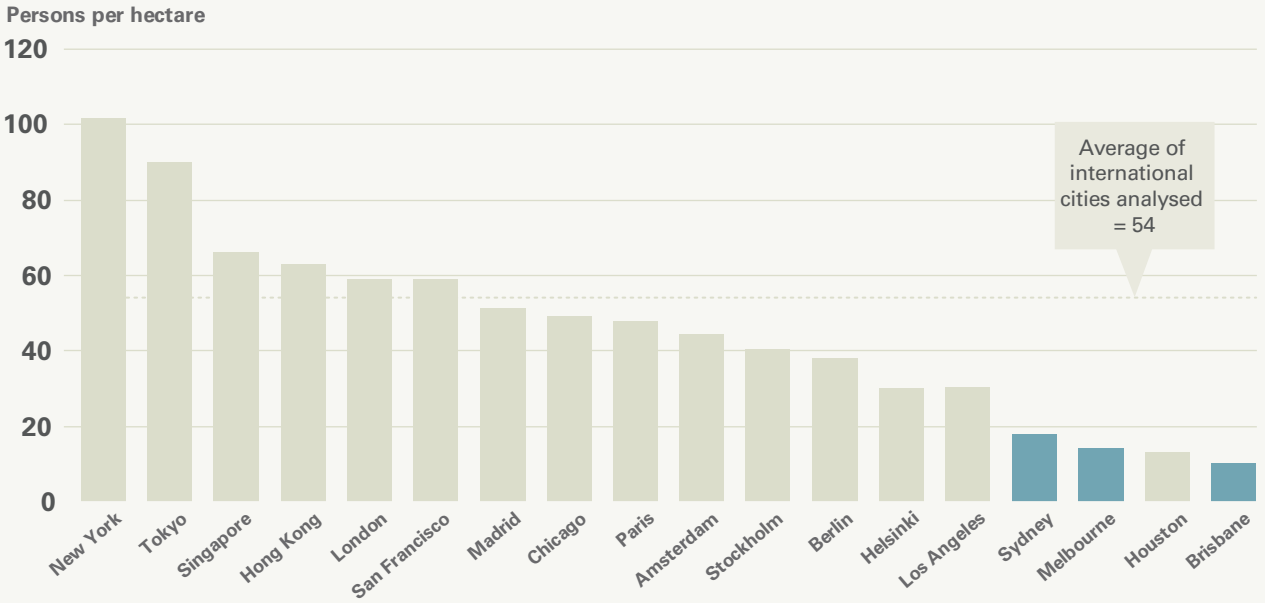
Public transport patronage - share of trips to work*



Note: *For Australian and US cities the figures represent percentage of workers and for European cities represent the percentage of trips to work.
† Average of Australian cities, not weighted for population. (If weighted for population, average = 16%)
Source: US Census – 2008, EU Census – 2004, Australian Census – 2006

Figure 6

Population densities in major cities (2004)



Note: Population density statistics appear to vary widely between sources. Source: EU Urban Audit (2004), US Census Bureau, DOI (2006)

2.2. THE BENEFITS OF PUBLIC TRANSPORT

A well designed and utilised public transport system brings a range of economic, environmental and social benefits. These include a decrease in the costs associated with congestion as well as the economic benefits of improved job creation, competitiveness and liveability. Public transport can also help to reduce Australia's greenhouse gas emissions, air pollution and our dependence on oil. In addition, good public transport provision results in greater social inclusion and has numerous positive health and safety effects (Figure 7).

Figure 7

Benefits of Public Transport

Economic benefits

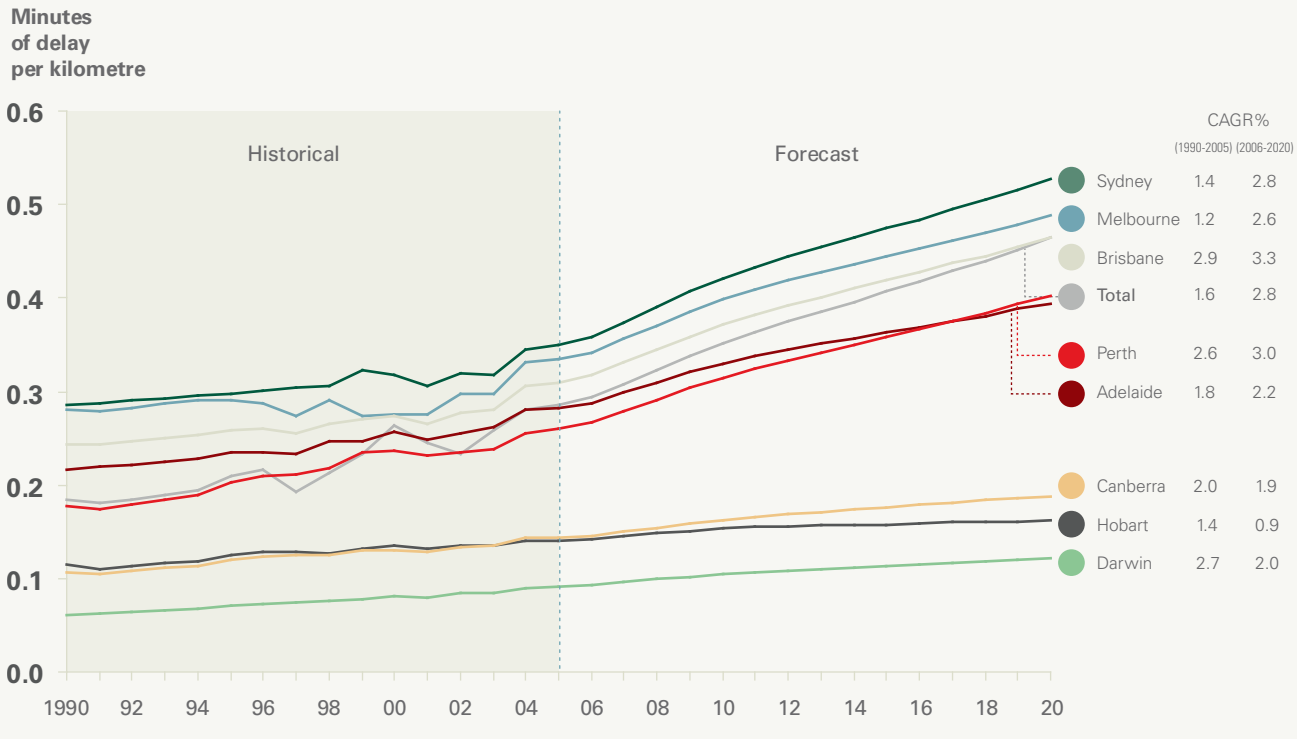
Reduced congestion

One of the most obvious effects of a modal shift towards public transport is a reduction in congestion. Congestion is broadly defined as the value of excess time and resources that are incurred due to traffic in Australia. Congestion has been worsening over time with delay times increasing by 1.6% per annum in capital cities since 1990 and this is expected to worsen in the next ten years (Figure 8)[9]. Congestion has negative economic, social and environmental consequences. The economic impact is time spent in traffic which represents a quantifiable cost to businesses and individuals. From an environmental perspective, congestion causes increased air pollution and fuel consumption. In terms of social impacts, congestion results in deteriorating health, safety and 'liveability' outcomes.

The economic costs of congestion are significant. Estimates from the Bureau of Infrastructure, Transport and Regional Economics indicate that the costs associated with congestion are expected to more than double from 2005 to over $20 billion per annum by 2020 (Figure 9)[10] - representing approximately 2% of Australia's GDP.

Figure 8

Time delay due to congestion in Australian cities (1990-20F)

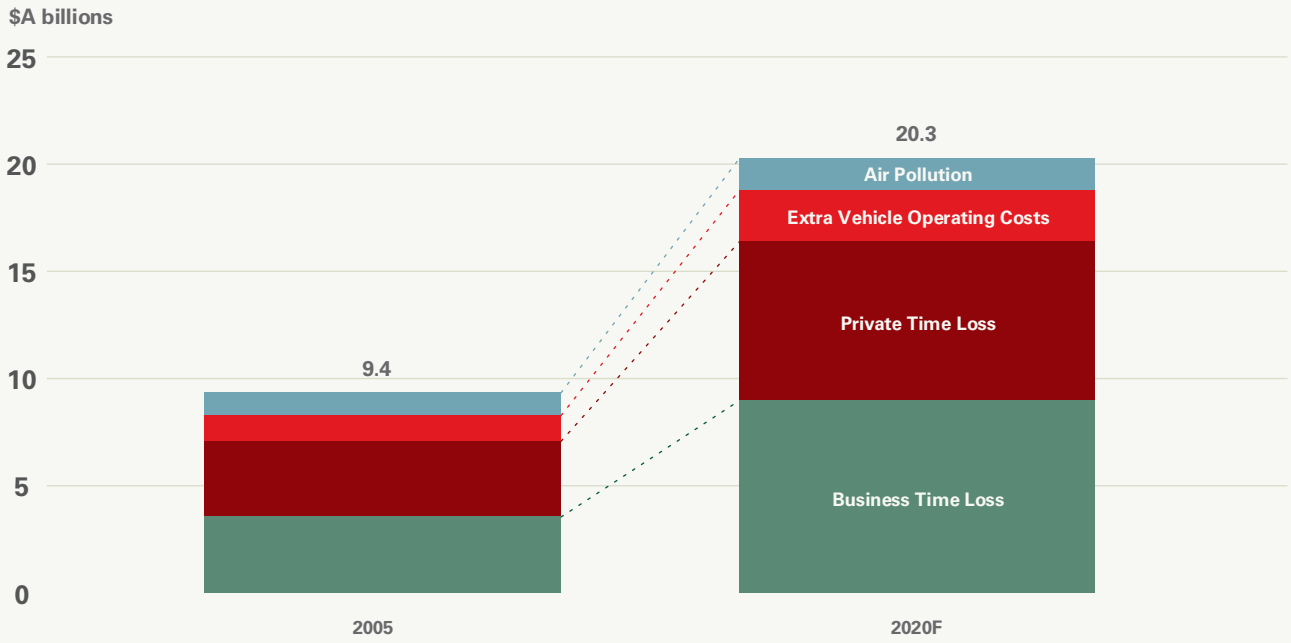


Source: BITRE Working Paper 71 – 2007

9 Estimating urban traffic and congestion cost trends for Australian cities, Working paper 71, BITRE, 2007

10 Estimating urban traffic and congestion cost trends for Australian cities, Working paper 71,BITRE, 2007

Figure 9
Costs of Congestion



Source: BITRE

The most significant cost of congestion is lost time for businesses, resulting in inefficiencies in areas such as inventory management. In addition to the extra time taken by freight vehicles, the uncertainty of arrival times forces businesses to keep higher levels of inventory than would otherwise be possible under "just-in-time" practices. Furthermore, businesses and individuals suffer when employees face long commuting times or delays as productivity is diminished and personal time is eroded.

In addition to the cost that each motorist suffers by entering traffic, it is important to remember that each additional motorist increases the level of congestion faced by all other motorists. This results in exponential growth in the costs of congestion as the average travel speed slows at an increasing rate with each new vehicle.

It is well established that a properly designed public transport system can be a solution to congestion by reducing the number of cars on the road. A recent Megacities survey commissioned by The Economist Intelligence Unit has revealed that infrastructure development is the highest priority for enhancing economic competitiveness[11].

Job creation, competitiveness and liveability

Public transport delivers several direct economic benefits in terms of job creation and competitiveness. More jobs are created and more income (i.e., economic activity) is generated for every dollar invested in public transport compared to other industries. A 1999 Texas case study showed that a US$1 million investment resulted in $1.2 million in regional income generated and 62.2 jobs created. The same investment in automobile expenditures resulted in US$300,000 in income generated and 8.4 regional jobs created[12].

National competitiveness is a measure of the sustainable level of prosperity that can be earned by a country. More competitive nations are more likely to grow faster in the medium to long term and have solid economic foundations upon which to drive continued productivity gains into the future. According to the World Economic Forum, one of the key pillars of competitiveness is infrastructure. Extensive and efficient infrastructure drives competitiveness by enabling goods and services to get to market and workers to get to their jobs. Of the top 15 ranked countries in the Global Competitiveness Index, 11 of them also score in the top 15 for railroad infrastructure. Only Australia, the US, the UK and Norway feature in the top 15 for competitiveness but fall outside the top 15 for rail infrastructure[13].

11 Megacity Challenges: a stakeholder perspective, Economist Intelligence Unit (undated)

12 Automobile Dependency and Economic Development, Victoria Transport Policy Institute, 2002

13 The Global Competitiveness Report 2009-10 - World Economic Forum, 2009

Improved energy security

Australia's continued high dependence on cars poses potential problems relating to energy security. Australia is currently only approximately 50% self-sufficient for transport fuels and this percentage is forecast to decrease to 20% by 2030[14].

In 2005 it was argued that "if Australia were thrown back on its own oil resources tomorrow it would have enough supplies for just nine years and four months. Sometime in 2014 the heavily transport-dependent economy would literally grind to a halt"[15]. Recognising this, the Jamison Group has argued that Australia should reduce its oil dependence by 50% by 2050[16]. With global demand for oil continuing to rise and some evidence suggesting that world oil reserves are becoming depleted, it is highly likely that world oil prices will continue to increase. Australia's reliance on imported transport fuels could become problematic as it will continue to negatively affect balance of payments, worsen economic competitiveness and reduce social inclusion.

Two trends can work to offset these issues. First, increases in investment in sustainable fuels and associated infrastructure may help drive a reduction in Australia's reliance on transport fuel. Though this would not address the problem of congestion, the creation of an alternative fuels industry would markedly improve Australia's energy security. Second, improving the level of patronage on public transport can help improve energy security by lessening Australia's required fuel imports as well as tackling congestion. As discussed by the Jamison Group[17], public transport is significantly more economical in terms of energy requirements than private vehicles and so increased public transport use correlates strongly with improved energy security.

Environmental benefits

Reduced greenhouse gas emissions

A material environmental benefit of greater public transport use is a reduction in greenhouse gas emissions. Transport is the third largest contributor to Australia's greenhouse gas emissions, growing by 27% between 1990 and 2006[18]. Australia also has one of the highest levels of transport-generated carbon emissions in the world on a per capita basis. For example, Melbourne's per capita emissions are twice those of London[19]. Road traffic is by far the largest component of these emissions with passenger cars accounting for 87% of transport emission and 7.7% of total Australian greenhouse gas emissions[20]. A modal shift to public transport would significantly decrease the level of transport-related emissions, travelling by car in peak hour emits up to six times more emissions than travelling by public transport[21].

Reduced air pollution

Exposure to air pollutants is estimated to result in over 2,400 deaths nationwide annually, primarily as a result of cardiovascular problems, bronchitis and other respiratory diseases[22]. Public transport can help reduce the negative impacts of air pollution in two ways. First, travel on most forms of public transport results in significantly lower exposure to air pollutants than travel by car. Rail travel has the lowest exposure levels, while cycling and walking also have relatively low exposure levels. Travel by bus has the same levels of exposure as car, although to lower levels of volatile organic compounds[23]. Second, motor vehicles are a major cause of transport-related air pollution, therefore increasing the mode share of public transport would reduce total pollutants being generated.

Social benefits

Improved social inclusion

An important benefit of an investment in public transport infrastructure is an improvement in social inclusion. There are certain segments of society that have a particularly high reliance on public transport, including the elderly, the disabled and those in lower income groups. Without public transport or with inadequate public transport, there is a risk of social exclusion that results from not having access to employment, education, friends and family, community resources and health services[24]. A well functioning public transport system can help provide these groups with the resources necessary to lead productive and fulfilling lives.

Improved health and safety

Public transport also provides health and safety benefits. On a per passenger kilometre basis, both bus and train travel are significantly safer than car travel and there is evidence to suggest that a mode shift to public transport would save lives[25]. Furthermore, it has been suggested that dependence on cars is closely linked with a sedentary lifestyle and associated health problems. This link has been supported by studies which have shown that train commuters walk an average of 30% more steps per day than car commuters[26].

These health benefits have also seen reductions in public health costs. Using estimates of future riders in the development of a light rail system in Charlotte, North Carolina, a simulation study analysed the effects of public transit on physical activity (daily walking to and from the transit stations) and area obesity rates, to calculate the potential yearly public health cost saving. The results predicted that the light rail system could provide cumulative public health cost savings of US$12.6 million over nine years[27].

A shift towards public transport use would increase general levels of activity as the distance of walking / bike riding required to access public transport is greater than that required when using private cars. Another health concern that can be caused by congestion is high levels of stress among motorists which has increasingly manifested itself in incidents of road rage.

For all of the reasons cited above, greater investment in public transport infrastructure and the increased patronage that it would drive would have sustained and tangible environmental, social, economic and health benefits.

14 Moving People: solutions for a growing Australia, Australasian Railway Association, 2009
15 It's no time to be over a barrel, Australian Policy Online, Fels, A. and Brenchley, F, 2005
16 A roadmap for alternative fuels in Australia: Ending our dependence on oil, The Jamison Group, 2008
17 Ibid.
18 Moving People: Solutions for a growing Australia, Australian Railway Association, 2009
19 Ibid.
20 National Greenhouse Gas Inventory 2007, Department of Climate Change and Energy Efficiency, 2009
21 Ibid.
22 Air pollution death toll needs solutions, CSIRO, 2004
23 National Passenger Transport Agenda, Australasian Railway Association, 2006
24 No Way to Go: Transport and Social Disadvantage in Australian Communities, Monash University, 2007
25 International Road Safety Comparisons: The 2007 Report, Department of Infrastructure, Transport, Regional Development and Local Government, 2009
26 A Morning Stroll: Levels of Physical Activity in Car and Mass Transit Commuting, Werner, R. and Evans G., 2007
27 Estimating the Effects of Light Rail Transit on Health Care Costs, Stokes, MacDonald and Ridgeway, 2008

2.3 A NEED FOR ACTION

In order to realise the considerable benefits of public transport described in Section 2.2, it will be necessary to plan for and adequately fund growth in the public transport system. Over the next few decades the total size of the transport task will increase due to:

1. Modal shift to public transport;
2. Demographic changes, including population growth and the age composition;
3. An increase in the freight task;
4. Rising cost of car use; and
5. Changing employment patterns.

Public transport modal shift

Continued modal share shifts towards public transport are likely and (as explained in the previous section) desirable. Over the last five years, trips on public transport have grown at 3.6% annually, more than double the growth in population in most capital cities, while car trips have been growing slightly below population growth at 1.1% (Figure 10)[28].

Several factors have been identified as drivers of a future modal shift towards public transport. Some of these factors will also increase the costs of providing the extra transport, further increasing the public transport task.

Demographic changes

Australia's population is currently forecast to grow to 35.9 million by 2050[29], with most of this growth occurring in Australia's major cities. This represents a growth rate of 1.2% pa, necessitating significant investment in new infrastructure to ensure that the public transport system is adequate to accommodate this growth.

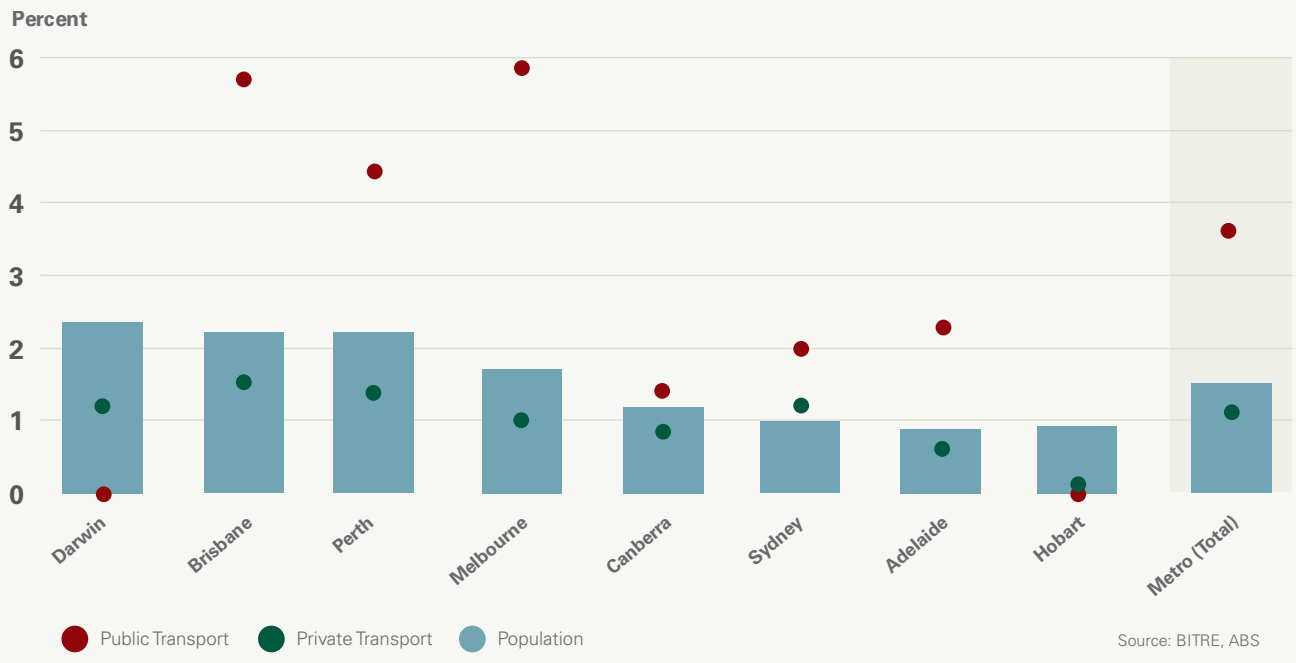
The composition of the population is also changing. The ageing population is likely to be a major driver of both modal share shift and rising costs. The proportion of the population older than 65 is forecast to increase from 15% to 23% by 2050 (Figure 11)[30]. The elderly are more likely to be dependent on public transport due to the increased incidence of sensory and cognitive disability[31] which will contribute to the overall modal shift. This will be combined with the fact that transport systems will need to be expanded and adapted to accommodate lower levels of mobility. The Federal Disability Discrimination Act requires modification of existing stations, stops and buses / rollingstock, and also specifies guidelines which need to be incorporated into the design of new vehicles and stations / stops that are introduced to public transport networks.

Increase in freight task

The freight task in Australia, which currently represents 7% of kilometres travelled, has been growing at double the rate of GDP and is expected to increase by 88% between 2003 and 2020[32]. This will increase road congestion, which as discussed

Figure 10

Annual growth rates of population and public and private transport (2003-08)

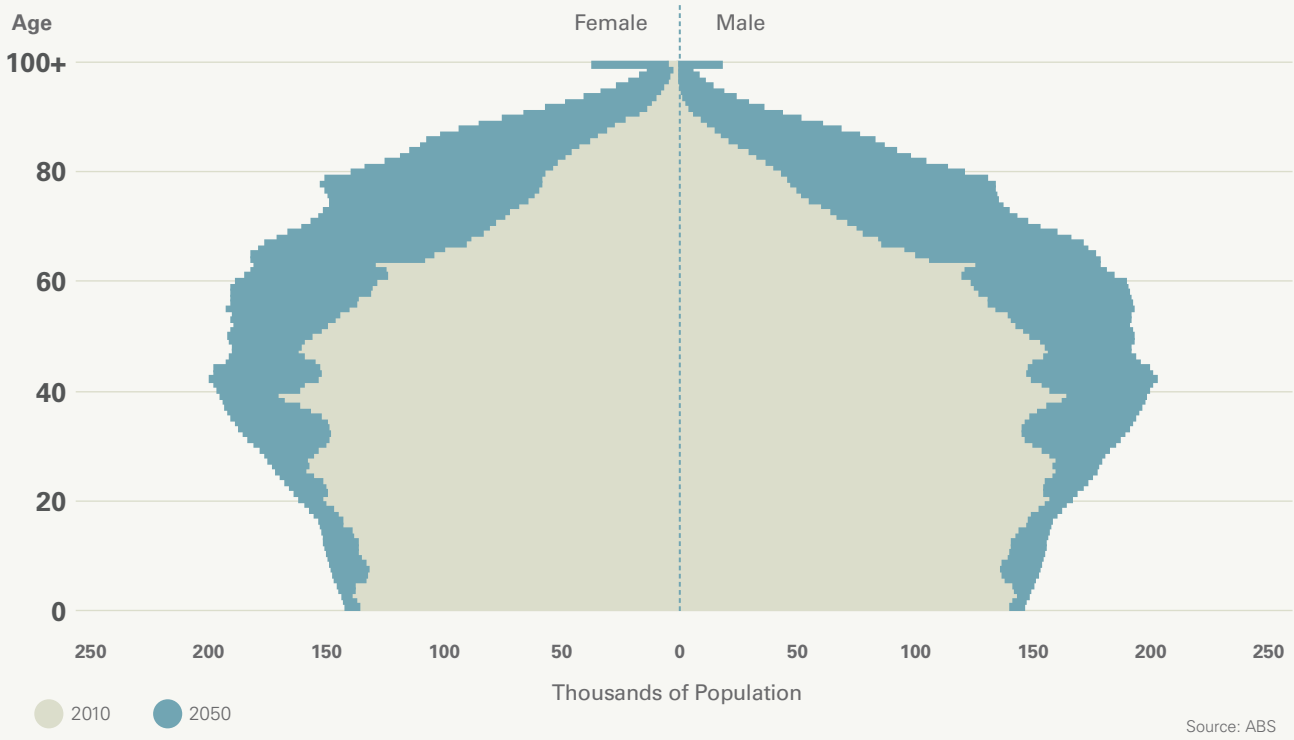


28 Australian transport statistics yearbook, Bureau of Infrastructure, Transport and Regional Economics, 2009; ABS, cat. no 3105.0.65.001

29 Australia to 2050: Future Challenges, Federal Treasury, 2010
30 ABS, cat. no. 3222.0
31 No Way to Go: Transport and Social Disadvantage in Australian Communities, Monash University, 2007
32 Emissions trading: how will it affect transport?, Australian Trucking Industry, 2008

Figure 11

Australia's ageing population (2010 - 2050F)



in Section 2.1 has significant negative impacts that can be alleviated considerably through greater use of public transport. In addition, growth in the freight task will increase the rail freight requirement. This will present particular challenges in cities such as Sydney, where freight and passenger rail share the same tracks. Significant investment has been committed in Sydney to separate the passenger and freight rail networks to relieve congestion and ensure sufficient train paths, but it is likely that further investment in the rail system will be necessary to accommodate the forecast growth[33].

Rising costs of car use

The tangible and intangible costs of owning and operating a personal car have a considerable impact on the use of public transport. It is likely that the operating costs for existing passenger cars will continue to rise, despite any investment in sustainable fuels for new cars. Therefore, there is likely to be a continued shift to public transport, counteracting the impact of the record low price of buying a new car. Four specific trends are expected to help drive this shift.

Firstly, as noted in Section 2.1, congestion is a major issue and will continue to worsen as the population grows, particularly at key 'bottlenecks' (e.g. inner city areas, road intersections) where it is difficult to relieve congestion by simply building more roads. Since congestion wastes considerable time and can lead to stress, it has tangible economic and social costs to motorists. Furthermore, even given the significant investment taking place to transition Australia to the use of alternative fuel technologies in motor vehicles, as discussed earlier in Section 2.2, congestion will remain a key ongoing issue.

Secondly, after remaining relatively flat throughout the 1990s, the price of petrol in Australia has increased by 5.4% per annum since 2003 (Figure 12)[34]. As oil becomes scarce due to continued increases in demand and depletion of supply and a carbon price is imposed to limit climate change, the price of petrol is likely to continue to rise. The continued increase in the costs of car use are likely to accelerate the shift towards greater public transport patronage.

Thirdly, as the cost of land used to house cars rises, particularly in inner-city areas, it will become increasingly expensive and difficult to park cars, creating a disincentive to own cars for inner city residents and for CBD work places to provide parking. The cost of available land is expected to continue to rise due in part to rising house prices and increasing parking space levies, applied by governments to actively reduce the number of cars entering the CBD.

For example, in 2009, the NSW Government passed the *Parking Space Levy Act 2009*, increasing the levy on private spaces across Sydney in an attempt to reduce traffic congestion. Starting in July, the annual levy for off-street, non-residential parking spaces increased to $2,000 from $950 in the city, North Sydney, and Milsons Point business districts[35].

Lastly, it is becoming increasingly likely that the current exemptions afforded to cars from fringe benefits tax will come under review. By basing the level of exemption on the distance company cars are driven, the current system provides

33 National Passenger Transport Agenda, Australasian Railway Association, 2006

34 ABS cat. no. 6401.0

35 Media Release: Increase to the Parking Space Levy, NSW Office of State Revenue, 2009

Figure 12

Metropolitan petrol prices (1990-2009)

Note: *Average price of unleaded petrol in Australian capital cities for the December quarter

Source: ABS

incentives for car use and disadvantages public transport. Accordingly, fringe benefits has been identified as an area of potential reform by the Henry Tax Review[36]. If this reform is to take place, it will substantively increase the costs of driving for those with company cars which in turn is likely to increase public transport patronage.

Changing employment patterns

Employment patterns are also evolving, with more flexible working hours and changes to working patterns driving an increase in the share of jobs located outside the CBD. Additionally, some governments have been pursuing the decentralisation of employment by forming new job-focused districts outside the CBD.

For example in its Metropolitan Strategy[37], the NSW Government plans to spread jobs, services and housing across a number of centres outside the Sydney CBD, including Parramatta, Liverpool and Penrith. To accommodate changes of this nature, service levels during off peak hours and to non-CBD destinations will need to increase, both within existing transport networks and beyond. The risk of launching any decentralisation strategy is that the local transportation network will fail to support the growth of the region unless it receives appropriate investment.

A case to illustrate this is Norwest Business Park, one of Australia's largest master planned business communities, built 30 minutes outside Sydney CBD, but only accessible by road. The government is planning to develop a rail link to relieve traffic congestion, however the proper infrastructure is not expected to be built until 2024 at the earliest[38]. To prevent a modal shift away from public transport and towards the car, existing transport networks must be expanded to provide adequate supporting infrastructure to meet the changing economic landscape.

Future public transport requirements

Even if public transport were to maintain constant modal share, the projected population increases would lead to a corresponding increase in demand for public transport of 27% by 2030 and as much as 59% by 2050. However, were the mode shift to public transport away from car to continue at the current rate[39], public transport capacity would need to expand by approximately 70% by 2030 and 190% by 2050[40]. This poses a significant investment challenge.

36 Australia's Future Tax System, Attorney General's Department, 2009
37 NSW Metropolitan Transport Plan, NSW Government, 2010
38 Media Release: North West Rail Link, NSW Premier Kristina Keneally, 21 Feb 2010
39 Rates are for the past 10 years
40 L.E.K. analysis

3.0 COST CHALLENGES

3.1 RISING PUBLIC TRANSPORT COSTS

Public transport is primarily funded through state government funding, where it represents a substantial component of state budgets, and farebox revenue paid by users. This investment is used to fund ongoing operating costs and capital costs. With the projected increase in the public transport task as described in Sections 2.1 and 2.2, it is inevitable that the costs of operating and maintaining Australia's transport networks will continue to increase.

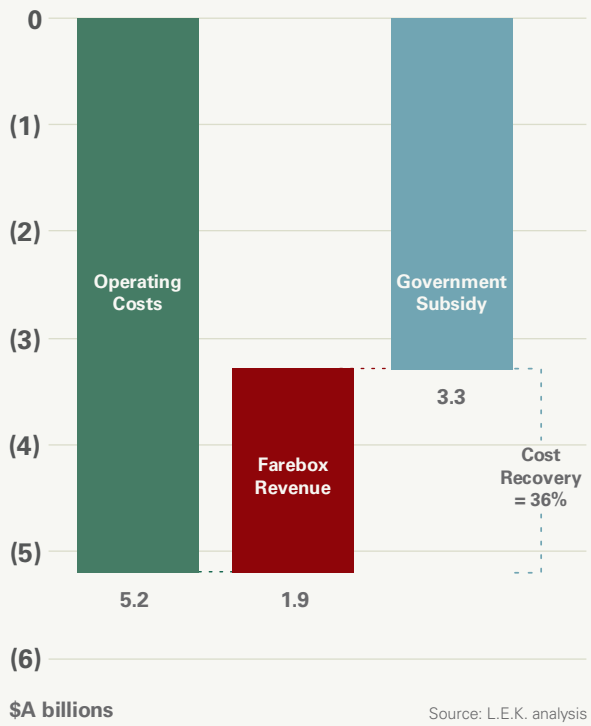
Operating costs

The annual operating cost of public transport in Australia's five major cities is estimated to be around $5.2 billion. Fares from passengers contribute $1.9 billion annually and the balance is funded by Government subsidies[41]. Overall, approximately 36% of the total operating cost is recovered (Figure 13)[42].

The level of cost recovery in each of Australia's five largest cities ranges from 25-45% on average across all transport modes. On the whole, bus services achieve higher levels of cost recovery than train services, though there is substantial variation within each mode. For instance, some high density bus routes can break even, despite a typical recovery for buses of 30-40%. This average level of cost recovery on Australian transport compares poorly with international cities, where public transport systems recover 60% of operating costs on average (Figure 14)[43].

Figure 13

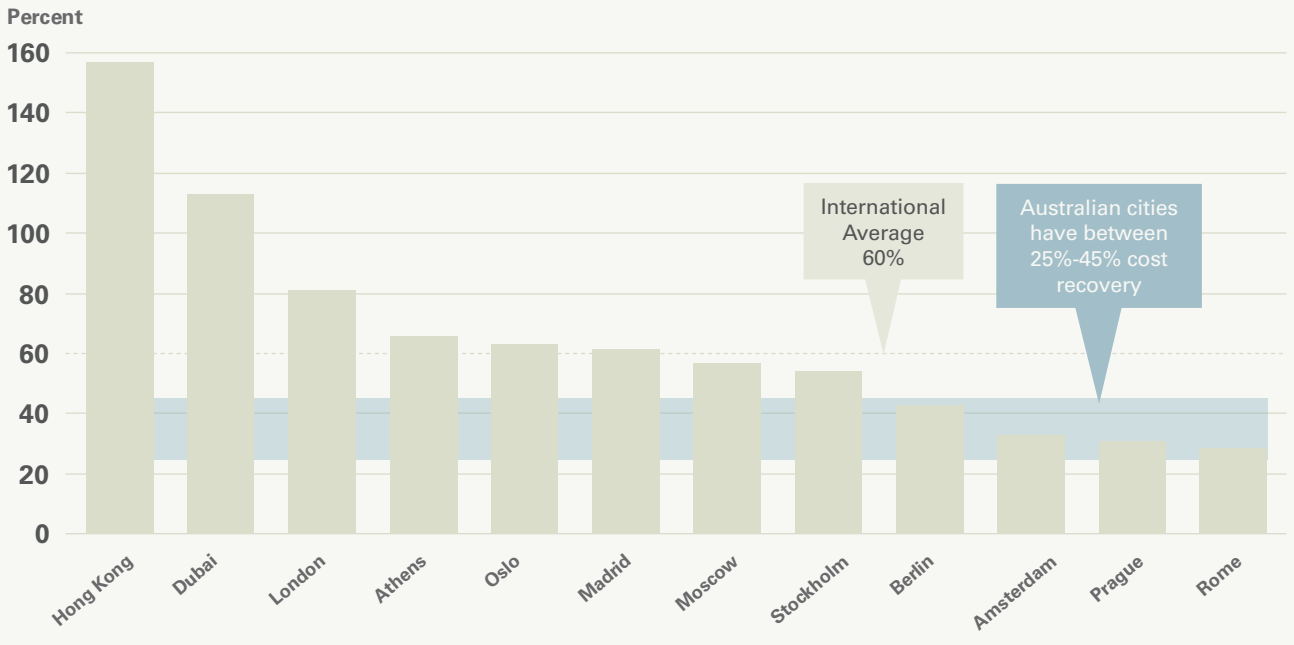
Approximate public transport cost recovery - five major cities (2008-09)



Source: L.E.K. analysis

Figure 14

Public transport cost recovery of major international cities



Source: Mobility in Cities Database, L.E.K. analysis

41 Transport operator annual reports; L.E.K. estimates
42 Excludes wholly private transport operators
43 Mobility in Cities Database, International Association of Public Transport, 2001

This disparity in cost recovery is driven by:

- Low population densities in Australian cities (as discussed in Section 2.1);
- Comparatively generous concession policies (as discussed in Section 5.2.2); and
- Higher cost due to operational inefficiencies (as discussed in Section 6.1).

Some of the ways by which each of these factors can be addressed will be discussed in Sections 5 and 6.

Capital costs

In addition to operating costs, capital works are required to upgrade and expand the transport system. Over the last 50 years, the vast majority of government funds have been allocated to building roads rather than improving public transport networks. Over this period, there has been a long term total decline in capital investment in transport infrastructure (both roads and public transport) as a percentage of GDP. This trend has been reversed in the last ten years, but the 40 year backlog will take considerable resources to address (Figure 15).

Looking forward, substantial resources will be required to fund the planned list of public transport projects. Analysis of planned expenditure by state and federal governments indicates that approximately $21 billion will be spent annually to 2020, compared to $17.5 billion that was spent in 2007[44].

In recent years, the Commonwealth Government has recognised the need to invest in transport infrastructure. It has committed $4.6 billion in the 2009-10 budget to develop metropolitan rail networks. In addition, most state governments have implemented transport plans outlining future expenditure on transport infrastructure. For example, in February 2010, the NSW State Government announced a 10 year, $50 billion metropolitan transport plan which outlines planned transport infrastructure expenditures. Funding the required capital investments in public transport is a key challenge for governments at all levels and the community at large.

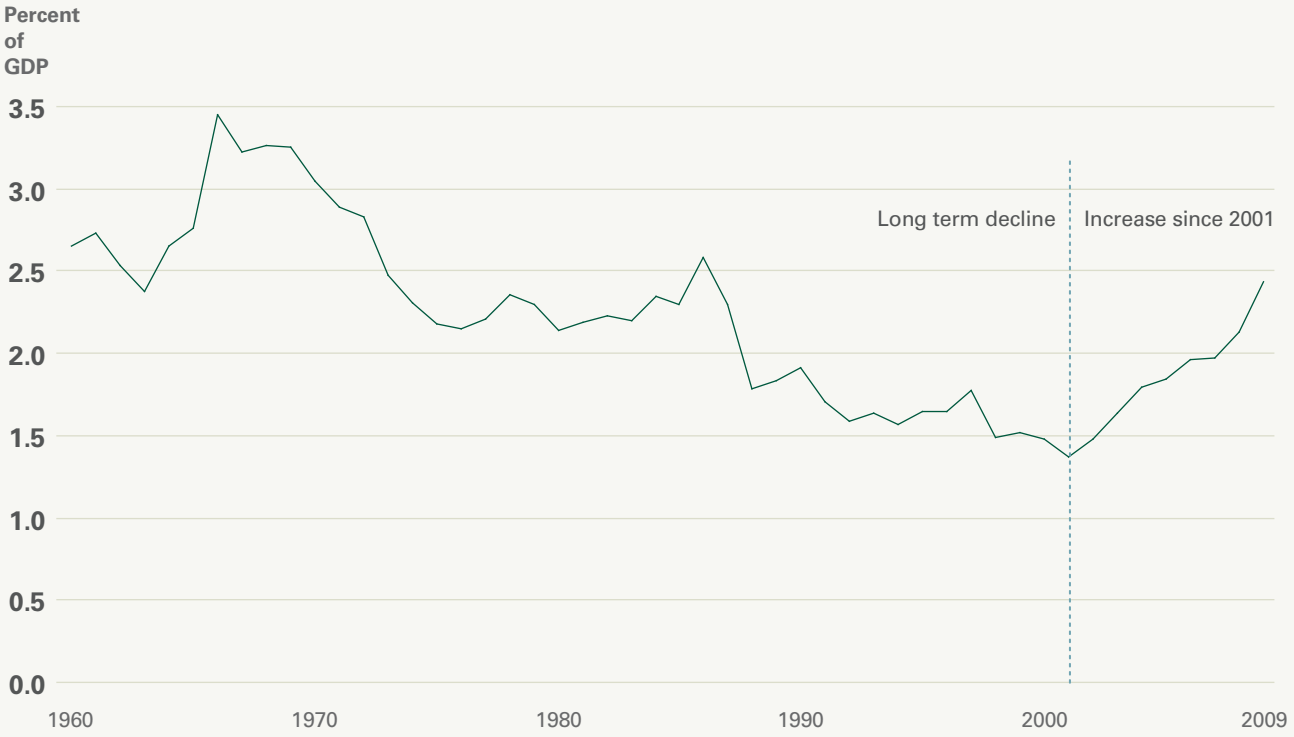
3.2 COMPETITION FOR GOVERNMENT SPENDING

In 2008-09, public transport, at an estimated $21 billion of combined capital and operating expenditures, made up just 6% of the overall state and federal government expenditures (totalling $338 billion in the 2009-10 budget). As a percentage of GDP, public transport expenditure is far lower at 1.7%[45].

Given that fiscal conservatism is the stated economic policy of both major political parties, there will be significant competition for government funds in the coming years. Additionally, many of the demographic and environmental pressures (discussed in Section 2.3) that will increase demand for public transport will also put pressure on government budgets. For example, addressing the growth and ageing of Australia's population and managing the transition to a low

Figure 15

Transport infrastructure fixed capital formation as percent of GDP (1960-09)



Note: Machinery and Equipment and non-dwelling construction in the transport and storage industries
Source: ABS Cat 5204.0

44 Treasury websites for each state government

45 Treasury websites for each state government, ABS cat. no. 5206

carbon economy will place a significant burden on all levels of government.

Demographically, the number of people at least 80 years old is expected to quadruple in the next 40 years, putting substantial pressure on government expenditures on health, aged care and pensions. These age-related expenditures are expected to increase from 7.5% of GDP in 2010 to over 12.5% by 2050 (Figure 16)[46]. The ageing population will also put pressure on economic growth as labour participation rates will fall, presenting additional challenges in funding future spending requirements.

In the future, new government initiatives might also put pressure on the Australian economy. Notwithstanding recent announcements that the federal government will shift its focus away from the emissions trading scheme (ETS) until at least 2012, it is estimated that if climate change is not mitigated through a reduction in carbon emissions, the overall cost to the Australian economy could be up to 8% of GDP by 2100[47]. Furthermore, moves to make the energy industry in Australia less reliant upon coal will require significant investment in new energy sources and grids.

More broadly, managing the effects of climate change has the potential to require large amounts of government funding. Drought conditions, which have persisted over the past decade, may worsen due to changing rainfall patterns and the Murray-Darling Basin remains fragile. Both of these issues will continue to have significant consequences for the agriculture industry which in turn is vital to Australia's food security. The water supplies of Australia's major cities will also come under strain due to both the anticipated increases in population and also changing rainfall patterns[48]. Much of the forecast growth in the population is expected to be concentrated in cities, many of which already have low dam levels and the need to establish water resources will require investments in large capital projects such as recycling facilities and desalination plants.

3.3 INCAPACITY OF STATE GOVERNMENTS TO RAISE REVENUE

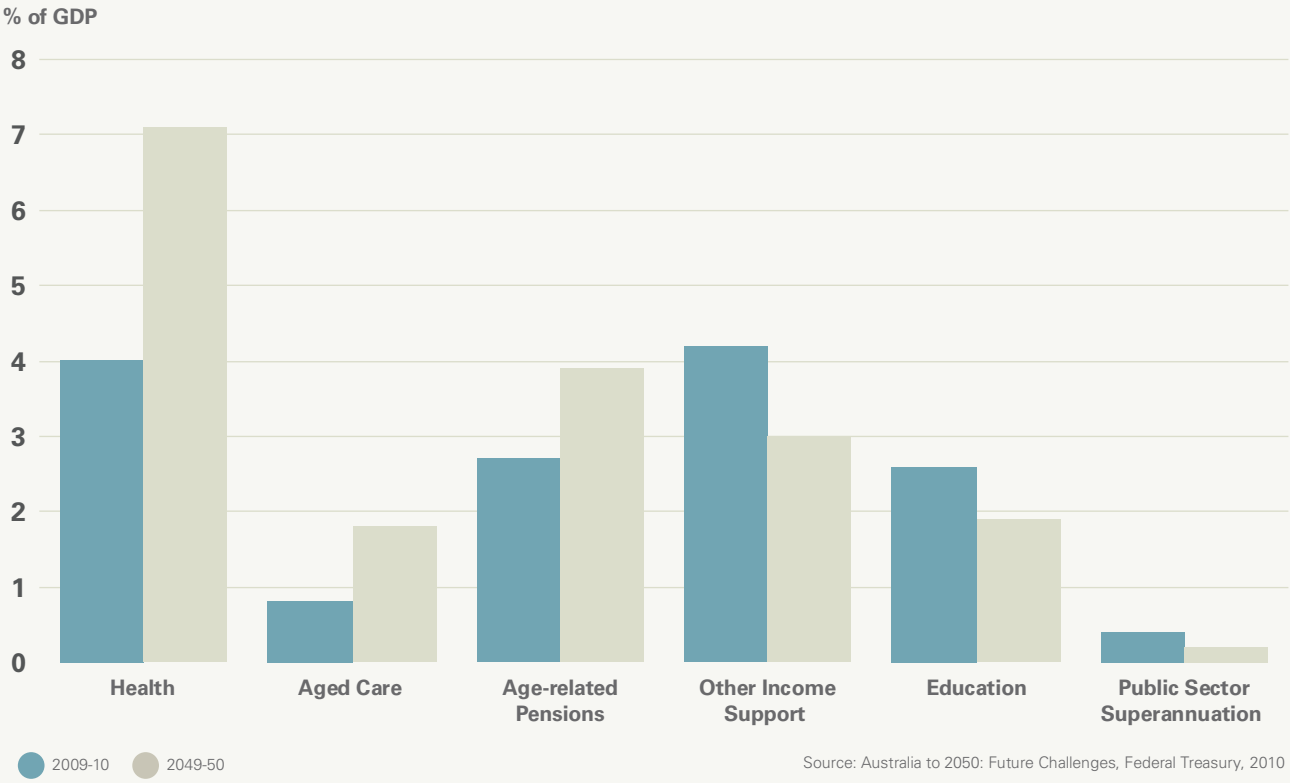
As noted in the Henry Tax Review, there is a significant vertical budget imbalance in Australia. That is, the states' own revenue sources are insufficient to fund their expenditure responsibilities, while the Australian Government's revenue sources are greater than required to meet its expenditure responsibilities. Accordingly, the states are reliant on federal government distributions for 45% of their revenue[49].

An additional problem faced by state governments is that a large part of the taxation revenue they receive is transaction based. Their three greatest sources of revenue – stamp duty, distributions from federally collected GST and property tax – are all strongly cyclical, so when the economy slows, state government revenues decrease.

However, state governments are required to subsidise approximately two thirds of the operating costs of public transport systems every year regardless of economic conditions, as well as providing the majority of funds for capital expenditure.

Figure 16

Projections of Federal Government spending by sector



Source: Australia to 2050: Future Challenges, Federal Treasury, 2010

46 Australia to 2050: Future Challenges, Federal Treasury, 2010
47 Ibid.
48 Ibid.
49 Australia's Future Tax System, Attorney General's Department, 2009

4.0 APPROACH TO PRIORITISING NET COST IMPROVEMENT INITIATIVES

As discussed in Sections 1 to 3, the operating and capital funding requirements of Australia's public transport network will continue to increase as the networks expand to meet future demand. This will put additional pressure on the finances of state and federal governments at a time when there is increasing competition to fund health care, issues associated with climate change and other services. State governments are the primary funders of both operating and capital expenditures for the public transport system but have a limited ability to raise revenue. This will put increasing pressure on state budgets.

All of these factors demonstrate how important it is to examine what more can be done to manage the net costs of providing public transport services in order to reinvest these savings into further expansion of the network. This paper explores potential strategies that can be employed to raise additional revenues to fund public transport and options available to reduce transport costs.

The strategies discussed are:

Revenue generating initiatives

Increasing farebox revenue

- Optimising fare structures
- Reviewing concession policies
- Reducing fare evasion
- Growing patronage (especially off peak or on underutilised modes)

Commercialising public transport assets

- Advertising
- Station and public transport retail

Cross subsidisation

- Congestion charging
- Improved smartcard utilisation

Urban intensification

- Transit oriented development
- Infrastructure levies

Cost saving initiatives

Asset cost savings

- Improving asset productivity
- Spreading peak demand
- Network optimisation

Labour cost savings

- Improving workforce productivity

Leveraging private sector capabilities

- Outsourcing
- Franchising (which can enable many of the above initiatives)

The discussion that follows in this paper introduces each of these initiatives and provides an overview of the most prospective approach for adoption of the initiative in Australia. This suggested approach has been developed based on a series of case studies which bring to life examples of the strategies being put into practice either within Australia or overseas.

To aid prioritisation of each of the initiatives, an assessment has then been conducted on its potential impact on the public transport cost position and its feasibility, in terms of support for broader public transport objectives and the ease with which it can be implemented.

Magnitude of impact

The financial impact has been based on the estimated potential annual size of the savings that could be achieved, net of costs, should the initiative be successfully implemented. This figure has then been converted into a percentage of the total Australian public transport operating cost base that could be saved. Based on this analysis, an overall impact rating ranging from 'negligible' to 'very high' has been assigned to each initiative (Table 1).

Table 1

New cost impact assessment criteria

Net impact	Description
Negligible	The initiative has a very low impact (less than $10 million annual savings) or risks actually increasing public transport's net cost position
Low	The initiative will generate savings of $50 million or less (less than 1% of costs)
Medium	The initiative will have a material impact on the overall cost base, generating savings of up to $100 million per annum or 2% of total costs
High	The initiative will have a significant impact on the public transport cost base, with savings of up to $250 million per annum or 5% of total costs
Very High	The initiative has the potential to generate over $250 million savings per annum, allowing for a noticeable improvement in public transport provision should the savings be reinvested

Support for broader public transport objectives
Each of the initiatives will also be assessed on the degree to which they support the economic, environmental and social objectives for an improved public transport system, as described in Section 2.2, 'The Benefits of Public Transport'. While some of the initiatives will have a very low or negligible impact on Australia's public transport cost position, they are strongly aligned with broader economic, social and/or environmental objectives, are self funding, and may therefore be a high priority for policy makers regardless of their low impact.

Conversely, certain initiatives may be effective revenue raising or cost saving strategies, but counter-intuitive to at least one of the objectives. The rationale for implementing these initiatives would therefore need to be considered carefully.

Ease of implementation
Finally, the ease of implementation is also important to consider. Under this heading come issues such as the political likelihood of success, time that the initiative would take to implement and the level of economic risk (in terms of implementation risk, especially if the project is particularly costly or the costs are uncertain, and risk of failure to achieve the expected revenue benefits).

Image courtesy of RailCorp

5.0 REVENUE GENERATING INITIATIVES

5.1 INTRODUCTION

There are a range of initiatives that have been implemented in Australia and internationally that have succeeded in generating additional revenues to fund public transport. These initiatives can be broadly grouped into four categories, as laid out below:

Increasing farebox revenue

- Optimising fare structures
- Reviewing concession policies
- Reducing fare evasion
- Growing patronage (especially off peak or on underutilised modes)

Commercialising public transport assets

- Advertising
- Station and public transport retail

Cross subsidisation

- Congestion charging
- Improved smartcard utilisation

Urban intensification

- Transit oriented development
- Infrastructure levies

There is significant variation across Australia as to the degree to which these strategies are already being deployed. Many have been implemented to varying degrees in some Australian cities and not at all in others and therefore the discussion below is as much about highlighting Australian best practice as it is about discussing international examples where best practice has been exhibited.

As laid out in Section 4, the discussion of each initiative will provide an introduction to the 'theme', an overview of the initiative, a recommended proposed approach to be adopted in Australian states and a series of case studies highlighting Australian and international examples where relevant. Following this will be a discussion around the estimated financial impact of the initiative, the degree to which it supports broader public transport objectives and the ease with which it can be implemented.

5.2 INCREASING FAREBOX REVENUE

As discussed in Section 3.1, farebox revenue in Australia covers 25-45% of the total operating costs of public transport. Strategies to increase average yield per journey or to increase the overall number of journeys (or both) play an important role in bridging the gap between costs and revenues.

Yields can be lifted in three main ways:

1. Optimisation of fare structures by adjusting fares (upwards and downwards as appropriate) to maximise revenues at specific times of day or for specific journey types;
2. Reviewing concession policies to examine the appropriateness of tightening the conditions for granting concession, or reducing the entitled level of concession discounts; and
3. Reducing the level of fare evasion.

Clearly, the price of tickets and patronage levels are strongly linked. Demand for the service must be relatively inelastic when fares are adjusted upwards to ensure that the strategy generates rather than reduces revenue. Furthermore, given the considerable benefits of increased public transport use laid out in Section 2.2, it will be important to strike a careful balance between yield management and patronage levels to ensure that these broader objectives are being met.

It is also important to note that the above yield strategies may not be implemented concurrently. While it is possible to combine a focus on reducing fare evasion (strategy 3) with either a strategy that optimises fares or potentially reduces the availability of concession fares, combining strategies 1) and 2) would require careful consideration. Moreover, significant fare increases and reductions in concession holders' allowances are likely to be inherently unpopular and their financial benefits need to be considered against factors such as political acceptability, a strong, communicable public case for change and the ability to implement.

The potential to increase farebox revenues will be discussed below.

5.2.1 OPTIMISING FARE STRUCTURES

Overview

Fare levels on most modes of public transport in Australia are set based on a combination of historic fare levels and regulated increases. They tend to be overseen by state regulators and/or the state government.

Therefore operators - including privately-held entities - tend to have little latitude to set fares independently and fare levels can become a highly politicised short term issue. For example, the fare freeze that was implemented following the union action on the rail network in 2003 in Sydney made it harder for commuters to accept substantial increases subsequently when RailCorp / IPART tried to raise cost recovery from farebox back to 2003 levels.

Historically, therefore, significant fare increases have been implemented over a period of several years due to public resistance to such adjustments. The long term decision on the appropriate fare level tends to be based on a range of considerations, including: positive externalities, cost considerations, level and quality of service, price elasticity of demand and future transport needs.

Positive externalities

The underlying argument behind the proposition that public transport should be at least in part subsidised by the taxpayer rests heavily on the fact that public transport use generates 'positive externalities'; i.e. there are benefits of public transport use above and beyond those benefits accrued by the user. These 'external benefits' take the form of reduced congestion, reduced air pollution, reduced risk of accidents and the 'agglomeration impact' of transport on the economic growth of a city. Some of these positive externalities are discussed in the 'Benefits of Public Transport' Section 2.2. IPART has calculated the positive externalities of rail use in Sydney to be $1.9 billion per year[50] in real terms by 2012.

50 Review of CityRail's Fares 2009-2012, Independent Pricing and Review Tribunal, 2008

Cost considerations
Given that the costs of the provision of public transport need to be covered by someone, whether they are the passenger or the taxpayer, the fare level is likely to bear some relation to the overall level of costs for providing the service. Fares tend to be adjusted in response to increases in operating costs or major capital expenditures, and are in part based on a pragmatic judgement about the level of subsidisation the state can afford.

Level and quality of service
It can be important for passengers to feel like they are getting value for money from the public transport system and therefore, if for some reason, the level of service becomes compromised it is likely that prices would be adjusted downwards or frozen to reflect this. Similarly, material improvements in service provision might be met by price increases. Furthermore, for price increases to be communicated palatably to customers, it might be necessary to provide commitments of service improvements to accompany any price increases.

Price elasticity of demand
The price elasticity of demand will determine the responsiveness of demand to a change in price. Economic theory suggests that most public transport modes are price inelastic because of: 1) the lack of availability of close substitutes for public transport; 2) transport tends to be viewed as a necessity; and 3) public transport occupies a relatively small proportion of the average consumer's expenditure. A frequently-used rule of thumb, known as the Simpson–Curtin rule, is that each 3% fare increase reduces ridership by 1%. Sydney's experience is consistent with this finding, with CityRail reporting an average elasticity of -0.29 which becomes even more inelastic for a 'commuter' Travel Pass (Figure 17).

Future transport needs
The broader political philosophy regarding the trade-off between a "user-pays" system and public subsidisation links into the cost and externality debates above. Trade-offs exist between maximising public transport use today and ensuring funds will be available for future system upgrades that extends its reach to a broader cross-section of the community, and meets the needs of a growing population.

Most prospective approaches

Blanket fare increases have been occasionally applied in Australia and, due to low demand elasticity, have been effective at raising revenue. Today, many major cities in Australia have commenced planning such increases.

However, there may be scope to further optimise fare structures to generate incremental revenues and maximise yields through differentiated fare adjustments. Initiatives could include:

1. For Sydney, Melbourne and Perth, eliminating off-peak fares during the afternoon peak;
2. Increasing peak fares further so that there is a greater differential between peak and off-peak;
3. Implementing greater differential in fares by line or geographically; and
4. In the longer term, using the possibilities offered by smartcard technology, to introduce granular differentiation based on time of day, user segment and geography.

Figure 17
CityRail fare elasticities by ticket type (2008, pre-introduction of MyZone)*

Ticket type	Fare on a 20km route (AUD per ticket)	Fare elasticity
Single (return)	4.20 (8.40)	-0.48
Off-peak return	6.00	-0.23
Rail Pass / Flexi Pass	34.00 (7-day)	-0.28
Travel Pass	41.00 (Red Weekly)	-0.12
Average		**-0.29**

*Review of CityRail's Fares 2009-2012, Independent Pricing and Review Tribunal, 2008

Case studies

Optimising average fare levels

Overall, Australian fares appear to be broadly in line with international comparators at current exchange rates (although taking a long-term view of the exchange rate shows that Australia may have lower average fares compared to some US and European cities). However, there are significant variations in average travel distances, fare structure and discounting which make direct pricing comparisons difficult. In Washington D.C., for example, passengers on the Metrorail pay a flat rate on all routes travelled whereas in most Australian cities (except Sydney, where fares are broadly distance based), train operators adopt a fixed fare per geographic zone of travel. In Singapore, fares on the MRT are strictly distance based[51] where every incremental km of travel is charged.

A domestic comparison of single trip metropolitan train tickets across cities indicates that Sydney and Melbourne have the most expensive fares and Perth the cheapest, though this may at least be partially a function of the different sizes of the metropolitan area within each city (Figure 18).

Beyond inflation-based fare increases, Queensland has committed to significant public transport fare rises, while Melbourne and Sydney have both experienced above inflationary increases but have fares on hold in the near term:

- In Queensland, fares are being increased over the next five years to reduce the State Government subsidy from around 75% to 70%. In January 2010, fares were restructured to place a 30% price differential between single paper tickets and single go card trips.
- Melbourne increased fares by 10% on average in 2004 at the same time as Zone 3 was abolished and incorporated into Zone 2. Since then, fares have risen at intervals, generally in line with inflation, and this was the case for the 5% fare increase in 2009, which accounted for inflation from the prior two years. For 2010, a fare freeze has been announced across all modes of public transport.
- In Sydney, fares are on hold until at least April 2011 following the introduction of 'MyZone' tickets in April 2010. Under MyZone most passengers realised fare reductions with a small minority (less than 10% of journeys) seeing a small increase. The introduction of MyZone superseded IPART's 2008 determination on 2009-2012 fare levels, which planned an increase in peak single and weekly rail fares of between 13% and 25% over a four year period, a reduction in off peak fares to encourage travel outside of the peak and 3.5% increases in bus fares each year until 2013. These fare determinations aimed to ensure that passengers made a fair contribution to the efficient costs of providing services, while still giving some consideration to the estimated size of externalities and elasticity of demand for the services.[52]

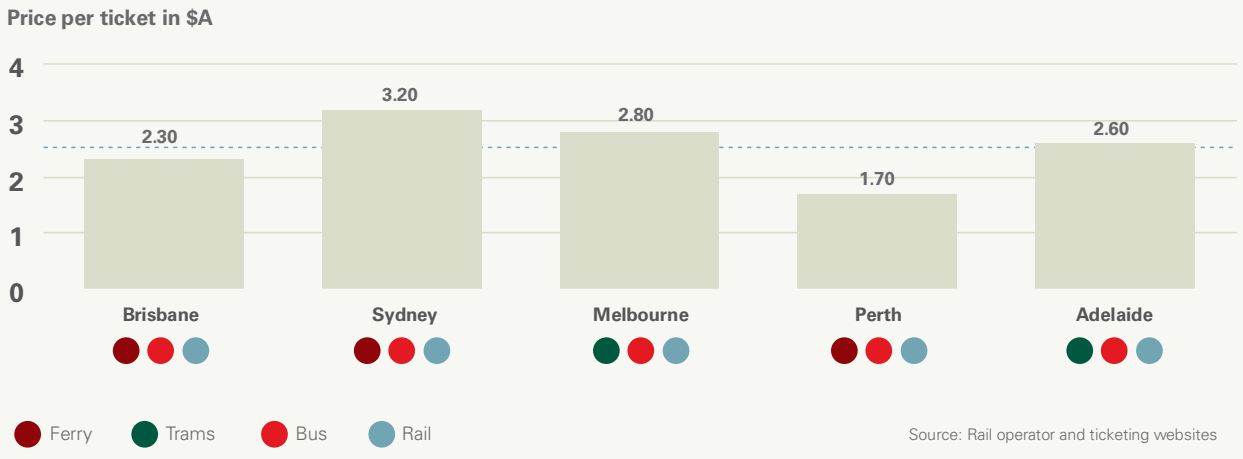
Australian governments and regulators appear to have recognised the case for higher fares in Australia (relative to international standards) on the basis of higher public transport infrastructure costs to accommodate the widely dispersed Australian population, residing in low density areas. However, it is important to ensure that the price points are at an appropriate level to maximise patronage and asset utilisation as well as raising revenue.

Differentiated fares by time of day

A potential alternative to an across-the-board increase in fares is the utilisation of differential pricing by time of day. Differential pricing is not a new concept in public transport, but it is not as well understood or used as effectively as in other industries. For example, airlines have among the most sophisticated yield management practices. Similar to public transport operators, airlines seek to maximise revenue from a fixed asset base and differentiate prices on individual services according to a complex and automated pricing model.

Figure 18

Prices of single-trip metropolitan-only train tickets in Australian cities (as at April 1st 2010)



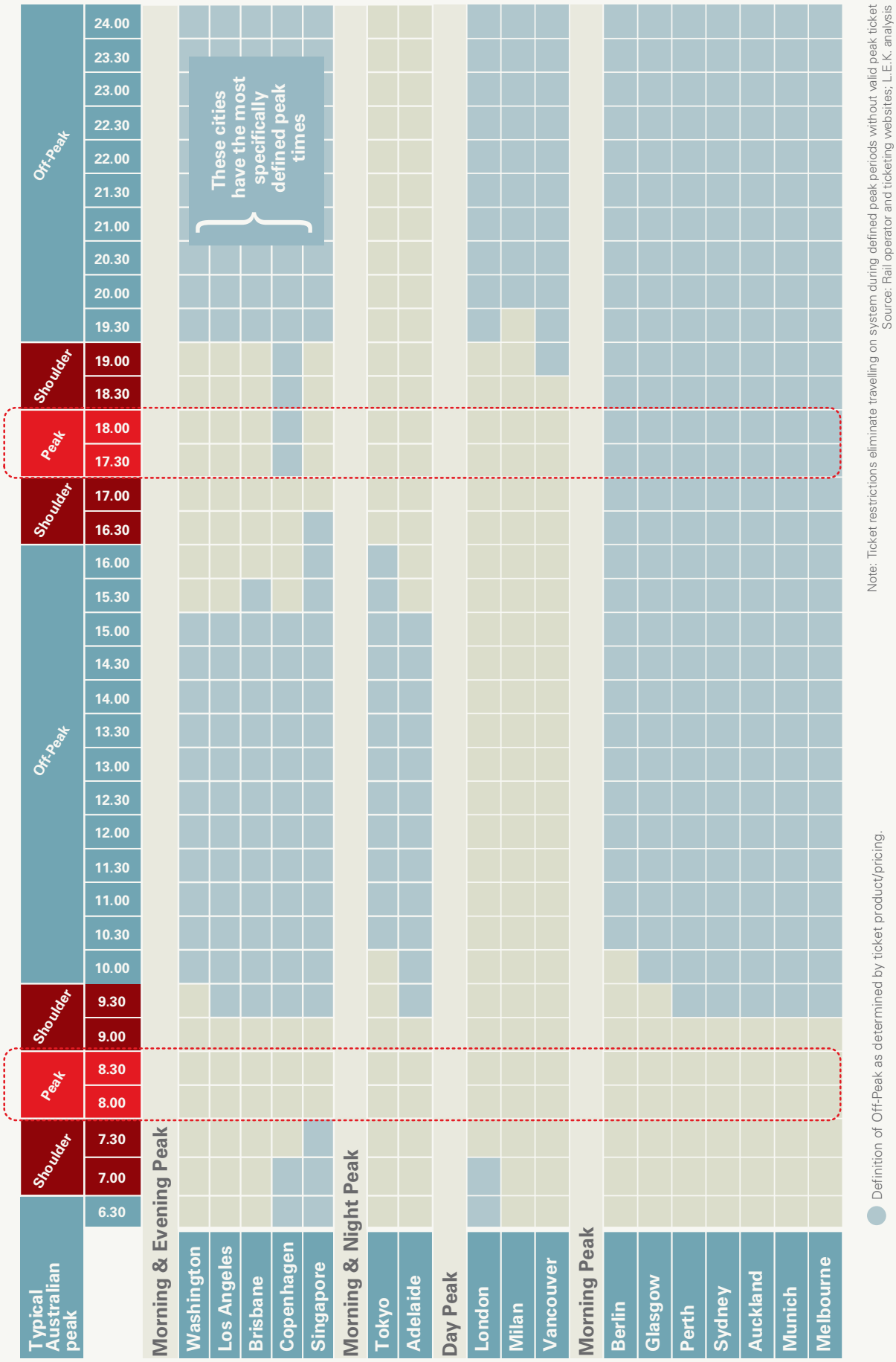
Source: Rail operator and ticketing websites

51 Analysis of fare levels based on data from operator websites

52 Review of CityRail's Fares 2009-2012, Independent Pricing and Review Tribunal, 2008

Figure 19

Timing of peak periods on global rail networks



Without the use of complex pricing models, simply differentiating fares by time of day can help to maximise yields. The Victoria Transport Policy Institute (2007) suggests that demand elasticities for off-peak travel are typically 1.5 to 2 times higher than peak-period elasticities. This is consistent with evidence from Sydney, London and Chicago that implies that travellers are more likely to absorb price increases in the peak, than in the off peak[53] on public transport.

Increasing the price differential between peak and off-peak may also deliver other benefits:

- Improving capacity utilisation by encouraging public transport riders to move from crowded peak periods to less crowded shoulder or off peak periods; and
- Improving return on investment on capacity additions by reflecting the higher marginal cost of carrying an extra passenger in the peak compared to the off-peak.

Australian cities are at the forefront in using differential peak versus off-peak rail fares. Only 40% of major rail networks world-wide - including all of the Australian networks - provide some form of off-peak product. A similar observation holds for other forms of transport, including buses, trams and ferries, where there has been limited time-based differentiation in pricing structures in Australia or elsewhere.

Nevertheless, there is scope to increase revenues in Sydney, Perth and Melbourne by removing off-peak tickets in the afternoon peak and moving to a 'morning and evening / night peak' or day peak system (Figure 19) as is operated in Adelaide and Brisbane.

There is also scope for increasing the price differential between peak and off-peak fares, in particular in Brisbane and Melbourne.

Of the cities that do offer an off-peak discount, analysis suggests that the discounts offered by Sydney, Melbourne and Brisbane operators are at the low end. Assuming demand during the peak is as inelastic as it is thought to be, these cities could significantly increase farebox revenue by increasing the fare differential (Figure 20). Under South-East Queensland's plans for fare increases, the off-peak discount on *go card* trips will rise from its current level of 10%, to 15% in 2011 and 20% in 2012[54].

Melbourne's recent 'early birds travel free' initiative discussed in Section 6.2.2 exemplifies the fact that strategically lowering fares at certain times of the day could actually improve the overall cost position by reducing peak asset requirements.

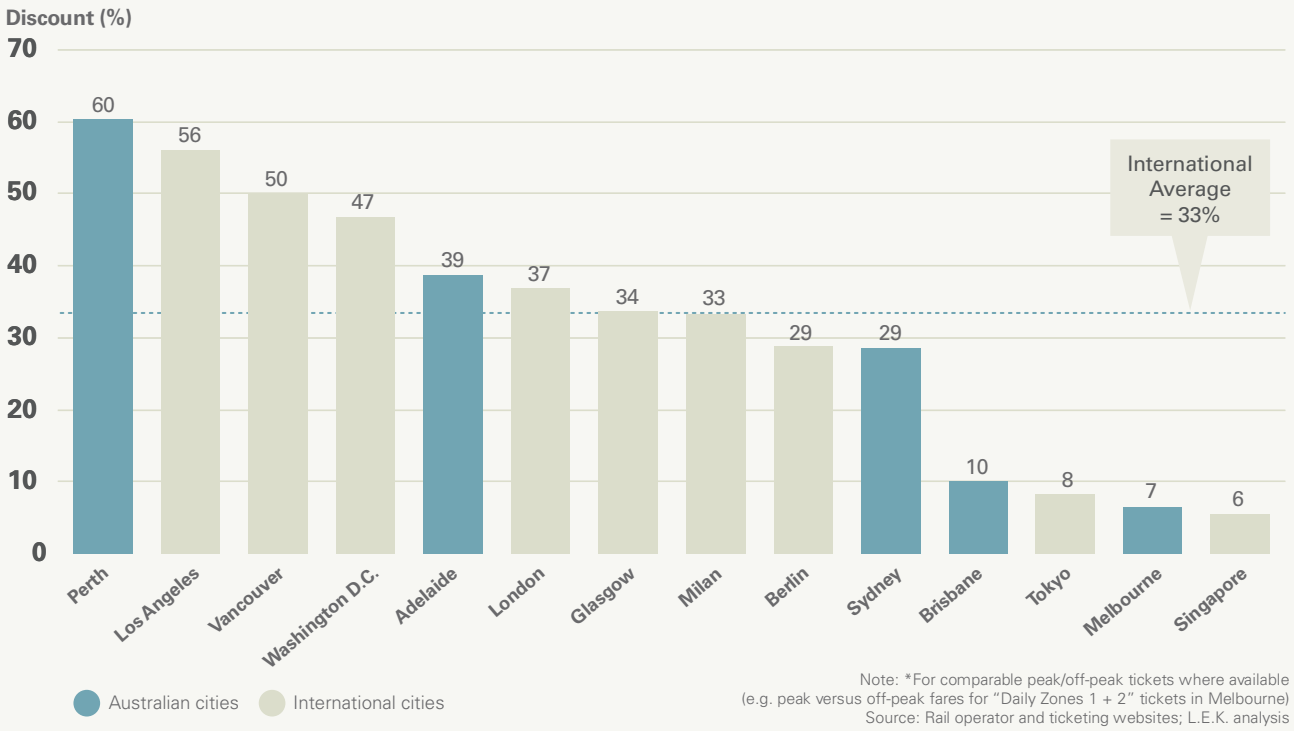
As discussed in Section 5.4.2, more opportunities for subtle price differentiation across different times of the day will be available in the next two to five years once smartcard systems are fully operational. Brisbane and Perth already have working systems, with Melbourne recently launching myki and Sydney's smartcard system currently in development. Benefits can include a more granular differentiation of fares between the peaks, shoulders and off-peak periods.

Differentiated fares by geography

Another option that will become increasingly viable after the introduction of smartcards is fare differentiation by geography or by line/route. For example, elasticity of demand on trains

Figure 20

Discount on peak fares for travelling off-peak on global rail networks



Note: *For comparable peak/off-peak tickets where available (e.g. peak versus off-peak fares for "Daily Zones 1 + 2" tickets in Melbourne)
Source: Rail operator and ticketing websites; L.E.K. analysis

53 Demand for Public Transport, a Practical Guide, TRL et al, 2004

54 TransLink Transit Authority

in the outer suburban areas is likely to be higher than in city centre locations due to lower levels of congestion and more parking options. With trains and buses relatively empty during the outer suburban sections of the route, there may be scope to lift both patronage and overall revenue by selectively reducing fares on chosen routes. There may also be opportunities to increase revenues on specific lines in inner city areas by reducing ticket prices. For example, from many locations catching the Airport Link to Sydney Airport may be more expensive for two or more passengers than the cost of sharing a taxi. Reducing fares on this service may potentially lift overall revenues.

Impact and feasibility

Magnitude of impact
Assuming that sufficient opportunities can be found to lift average fares, the benefits on the overall cost position of public transport relative to other cost and revenue initiatives would be **medium** to **high**. This depends on the degree to which each state felt an above inflationary increase would be tolerable, and whether the price increases were implemented in the peak only or both peak and off-peak.

Based on an estimated price elasticity of -0.19[55] in the peak and -0.33[56] in off peak periods, a 10% increase in peak fares would generate an additional $90 million annually in farebox revenues (1.8% of total operating costs), while a 20% increase in peak fares would lift revenue by $190 million annually (3.6% of total operating costs).

A 20% increase in peak fares would also have the effect of decreasing peak capacity requirements by an estimated 4% and this would allow reductions in both capital and operating costs.

These benefits would have to be evaluated against the cost of implementing such measures, which will be lower under smartcard systems. Additionally, it is important to consider the impact of any decrease in public transport patronage as a result of these strategies. As a result of a new fare strategy, some passengers would remain on public transport, while others would switch to alternative modes such as car, bike or walking. Those journeys that switch to car would result in an increase in negative externalities associated with car travel, diminishing the overall benefits accrued from the fare strategy.

Support for broader public transport objectives
Any decrease in patronage caused by increases in fares will be contradictory to the economic, social and environmental goals laid out in Section 2. Specifically, by making public transport more expensive, increasing fares may worsen road congestion and air pollution, increase carbon emissions and inhibit social inclusion. Accordingly, decreases in the positive externalities of patronage need to be balanced against the increases in farebox revenue generated by price increases.

However, the inelastic nature of the demand curve for public transport implies that only a small proportion of passengers will be deterred from using it, particularly in the peak period, even in response to relatively large fare rises. This indicates that there will be little behavioural change on the part of passengers and that the impact of fare increases upon congestion and its related effects will be limited.

With regards to social inclusion, many of the passengers who would be at risk of social exclusion from a fare rise, such as the elderly, the disabled, students and school children, already have access to heavily discounted concession tickets. The remaining demographic at risk of no longer being able to afford to use public transport would be low income workers who need to travel in the peak. This could be addressed through a means tested 'public transport allowance' paid each year on completion of the tax return or some other similar mechanism.

Ease of implementation
As noted, fare increases tend to be politically unpopular. In practice, it is likely that increases would need to be accompanied by noticeable improvements in services in order to gain credibility and acceptance, or to be phased in over a number of years.

Under paper or magnetic-strip ticket systems, execution risk of implementing differential fares is significant on buses, trams and ferries. To properly implement differentiated peak fares, buses, trams and ferries would require new time sensitive ticket technology capable of detecting if the appropriate ticket is being used. This technology already exists on most Australian train networks. This is not an issue with smartcard systems and may point to waiting for such systems to be fully operational before implementing network-wide differentiated fares.

5.2.2. REVIEWING CONCESSION POLICIES

Overview

The goal of concession fare pricing, whereby discounts of up to 50% are offered to eligible passengers, is to ensure that all segments of society have access to public transport. In Australia, concession fares are offered to groups who are likely to have below average income levels or who are particularly dependent on public transport, such as children, students, seniors, people with disabilities and war veterans.

Concession policies have a material impact on cost recoveries. For example, the number of journeys taken using concession fares and the level of discount offered equates to an overall dilution in farebox revenues of approximately 23% across Melbourne and Sydney (Figure 21).

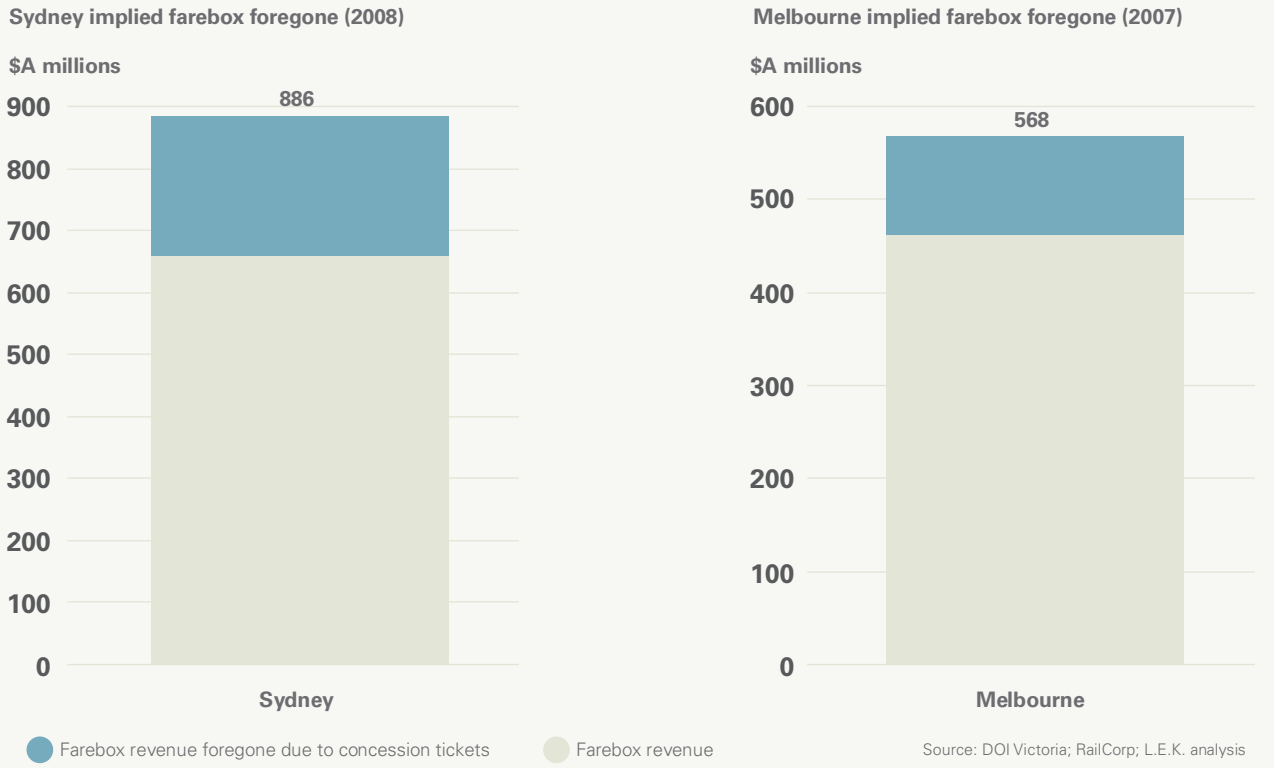
With the growth and ageing of the population, the proportion of people entitled to concession fares under the current system will increase significantly in the future. This is likely to spark a debate into the rationale for offering whole sectors of society, with varied income levels, access to the same concession discounts. For example, some retirees have access to large 'nest eggs' and are in comfortable financial positions; likewise children of wealthy parents are likely to have little problem affording public transport. Meanwhile, some full price passengers who are in employment are still struggling to break even, such as low income workers with dependents.

While conducting a review into the topic of concession fare eligibility is unlikely to be popular or straightforward, understanding the rationale behind different entitlements will help to contribute to the sustainability of the entire system.

55 Demand for Public Transport, a Practical Guide, TRL et al, 2004
56 Ibid.

Figure 21

Implied farebox revenues foregone in Sydney and Melbourne



Most prospective approaches

Domestic and international benchmarks suggest that most Australian cities offer comparatively generous concession allowances. While it is important to ensure affordability for lower income groups, it is likely that many of those currently eligible for a concession are wealthy enough to pay for their own ticket, while the 'working poor' are not eligible. It might therefore be worthwhile to launch a review into the following potential strategies:

- A reduction in the level of concession discount for all or specific concession types;
- Tightening the concession eligibility criteria through means testing; and/or
- A reduction of concession fare discounts or restrictions to use during the peak.

Any reductions in the level of concessions are likely to be extremely unpopular and the rationale for any change would need to be clearly conveyed to the public.

Case studies

Reduction in the level of concession discounts

Benchmarks suggest that there is significant variation in the concession policies amongst Australian and international cities.

On the whole, Australian cities have relatively broad and generous concession policies when compared with major US and Asian cities, suggesting that there may be scope to reduce concession discounts.

Within Australia, the level of concession discount varies markedly from state to state. This may be due more to historical precedent than on a needs-based analysis, potentially presenting opportunities for harmonising such discounts across states. For example, the discount for student concession tickets is 63% in Perth but only 50% in Sydney. The discount in Melbourne is 38% for 2 hour tickets, lifting to 50% for weekly, monthly and yearly tickets. In South-East Queensland, the discount for students that are eligible for STAS (School Transport Assistance Scheme) is up to 100%, while the discount for those that are not STAS-eligible is 50% for bus and ferry and 66% for rail.

Means testing concession eligibility

An alternative approach could be to determine eligibility for concessions through means testing. Accordingly, concessions could be determined according to need, as is their original purpose. This would ensure that public transport would remain affordable for those in need of concessions while still reducing the overall level of concession fares. However, such means testing is likely to be costly to implement and these costs would need to be weighed against the increases in farebox revenue that means testing concessions could generate. These implementation costs would be mitigated somewhat by smartcard technology which would make the application of different fares for individuals easier.

Reduction of concession discounts in the peak

There may also be an opportunity to increase farebox revenues by limiting the number of people who are eligible for a concession discount during the peak. In Sydney it is estimated that between 25% and 37% of peak passengers are eligible for concession discounts of 50% (Figure 22)[57].

Given that the marginal cost per additional traveller in the peak is considerably higher than the marginal cost in the off peak, there are significant incentives to move concession holders into the off peak, and reducing concession discounts in peak periods is likely to achieve this aim.

Impact and feasibility

Magnitude of impact

The impact of reducing concession discount availability during the peak (likely the most feasible concession policy) would have a **medium** impact on the overall cost position of public transport relative to other cost and revenue initiatives.

Reducing peak concessions by half, on average, could generate a revenue uplift in the order of $100 million annually which represents 2% of total costs[58]. Halving both peak and off peak concessions would have an even greater effect, generating approximately $170 million (3% of total costs).

These estimates are based on the assumption that approximately one third of peak passengers are eligible for concession fares[59] which, on average, are priced at half the price of full fares. It is also estimated that, faced with higher fares, some passengers will migrate to off-peak travel whilst others will switch to another mode of travel. If means testing is incorporated as part of a concession policy, then the initial set up and ongoing assessment of eligibility would involve some additional cost that has not been included in the potential revenue estimates.

An additional financial benefit from restricting concessions in the peak will come from reduced pressure on peak capacity and the ability to delay investments in new capacity.

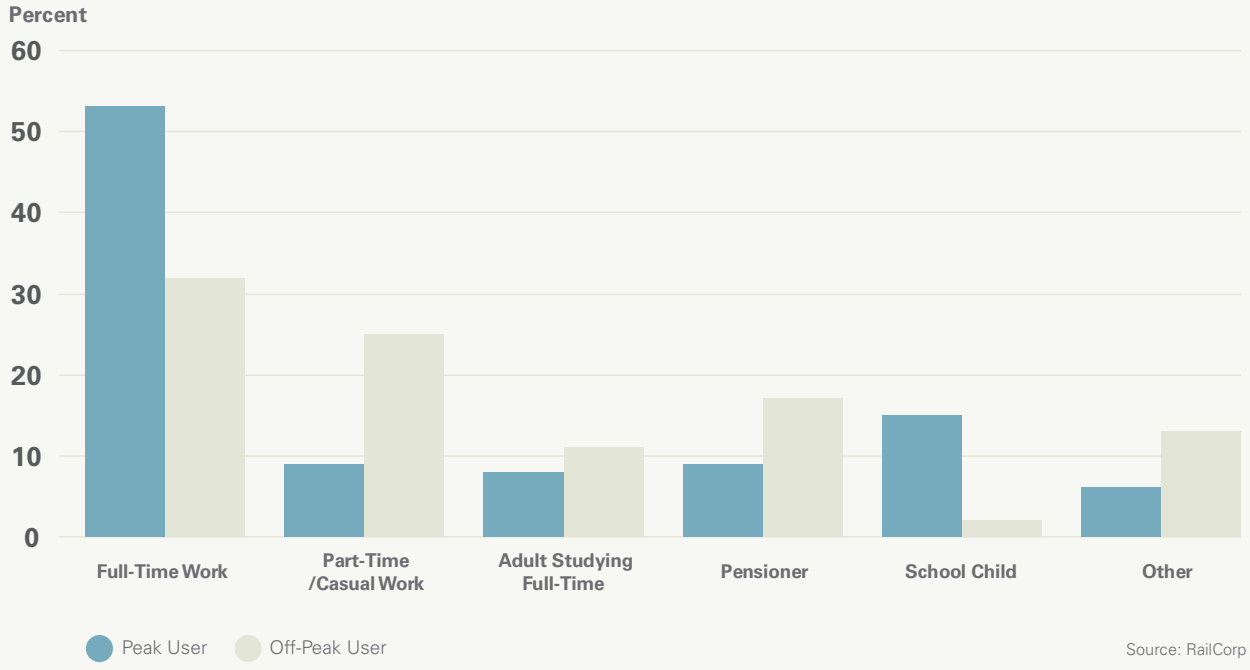
Support for broader public transport objectives

Concession fares serve an important purpose in ensuring that everyone in society, even the most vulnerable groups, can afford to access Australia's transport system. However, as discussed in the previous section on pricing, it is also essential that the transport needs of future Australians are considered. To achieve this balance, it is important to reassess the discounts that are being offered, and to whom, to ensure that discounts are being received by those who really need them.

Unlike full-fare commuters, concession holders are less likely to travel if the cost of doing so increases. A proportion will revert to other modes, including walking and cycling, others will have access to a car but most are likely to travel less.

Figure 22

Labour force status of CityRail's passengers - 2005



57 Household Travel Survey, TDC, 2005 quoted in IPART'S Review of CityRail Fares 2009-12, IPART, 2008

58 Assuming school children continue travelling during the peak, pensioners, adult students and unemployed passengers all have an off-peak elasticity (-0.33), and that half of the shifted passengers move to the off-peak, half move away from public transport

59 Based on Sydney patronage distribution as shown in Figure 22

Table 2

Discounts offered to concession travellers in selected cities

City	Percentage discount by percentage group type							
	Children	Primary students	Secondary students	Tertiary students	Seniors / pensioners	People with disabilities	War veterans / widow(ers)	Low income / unemployed
Adelaide	Free for children up to 5 years of age	67% on comparable multi-trip tickets; 50% on comparable single-trip and day-trip tickets		50%				
Brisbane	Free for children up to 5 years of age	Up to 100% if STAS eligible. For non-STAS, bus and ferry is 50%, and rail is 66%		50%				Nil
Perth	Free for children up to 6 years of age	$0.50 flat fare for all routes		63%		Free	63%	
Sydney	Free for children up to 5 years of age	50%			$2.50 flat fare on all single / return tickets	50%		
Melbourne	Free for children up to 4 years of age	38% for 2-hour tickets; 46% for daily tickets; 50% for weekly, monthly and yearly tickets						
London	Free for children up to 6 years of age	64%		30%	Free			64%
New York	Free for children up to 44 inches tall	Nil			49%		Nil	
Washington	Free for children up to 5 years of age	49%		Nil	49%		Nil	
Hong Kong	Free for children up to 3 years of age	49%					Nil	
Tokyo	Free for children up to 6 years of age	50%	Nil			50%	Nil	
Singapore	Free for children up to 0.9 metres tall	43%			s$0.68 for off peak travel	Nil		
Auckland	Free for children up to 5 years of age	40%		32%	Free for off peak travel	40%		Nil
Vancouver	Free for children up to 5 years of age	30%					Free for war amputees	Nil

This may have a favourable impact on the environment but at the cost of reduced activity and increased social isolation.

In this respect means-testing eligibility could address some of these issues.

Encouraging those travelling on concession fares to travel outside peak times could prove to be beneficial overall by helping to reduce peak period crowding, improving the comfort and reliability of peak services.

Ease of implementation
There is likely to be significant public resistance to blanket reductions in concession entitlements, so any changes would need to be justified based on affordability for those groups affected (e.g. by explaining that pensioner concession entitlements would be means tested so that those who really need a discount are receiving it). An increase in concession fares in the peak is likely to be a more palatable option and this could be staggered over several years.

As in the discussion of greater peak versus off-peak price differentiation, time sensitive ticketing systems would be required to enforce the payment of full fares by concession holders during the peak. This may require improvements to ticketing systems.

5.2.3 REDUCING FARE EVASION

Overview

Estimates of Australia-wide fare evasion vary widely. On Sydney trains and buses it is estimated at a rate of 2% and 1% respectively[60], equivalent to $11.9 million in foregone revenue on trains and $2.1 million in foregone revenue per year on buses. In Melbourne the evasion rate is believed to be around 6% on buses, 14% on trams and 8% on trains and Metlink estimates that this costs $62 million annually[61]. In South-East Queensland, the fare evasion rate on trains is 7%, and 3.2% and 1.9% respectively on buses and ferries[62].

The difference between the fare evasion estimates may be due in part to the fact that fare evasion is difficult to accurately measure and monitor, especially in instances in which passengers travel on invalid tickets or between non-gated stations and stops. On buses in particular, ticket inspections are often performed at off-peak times as buses are too crowded to board in the peak and this may coincide with higher than recorded levels of fare evasion[63]. Moreover, as is highlighted in Metlink's revenue protection plan, levels of fare evasion are lower when customers perceive that fares represent value for money and so customers may be more inclined to fare evade when trains and buses are overcrowded.

While some fare evaders fail to buy a ticket altogether, a large proportion of fare evaders are either using a ticket that is too low in value for the distance of journey that they wish to make, or are using a concession ticket to which they are not entitled. For example, RailCorp's October 2005 fare evasion survey indicated that 38 percent of ticket irregularities related to the misuse of concessions such as travelling on a concession ticket without a valid concession pass[64].

Metlink, in its Network Revenue Protection Plan, has identified three categories of 'fare evaders':

- Inadvertent Evaders - person is unaware they have the wrong type of ticket;
- Opportunistic Evaders - person realises that they can "get away with" not buying a ticket due to open barriers, over-crowded trams etc; and
- Economic Game Players - person realises that on the whole it is cheaper to never buy a ticket, or buy a cheaper ticket than the one they are entitled to and risk getting a fine.

Operators also miss out on revenue from unpaid fines which are issued when fare evaders are caught. For example, in NSW only one in four fines for fare evasion are paid within twelve months, which means that RailCorp and Sydney Buses are losing approximately $16 million in infringement revenue[65].

60 Fare Evasion on Public Transport, NSW Audit Office, 2006
61 Metlink Network Revenue Protection Plan, Edition 7 - 2010, 2009
62 TransLink Transit Authority, 2010
63 L.E.K. 'mystery shopper' observations conducted in 2010
64 Fare Evasion on Public Transport, NSW Audit Office, 2006
65 Ibid.

Table 3
Potential revenue protection initiatives on rail

Focus Area	Strategies to consider	Examples of Application in Other Geographies	Evaders Targeted
Enforcement	Ensure that staff at barriers are able to issue penalty notices	Rail barrier staff in Melbourne are authorised to issue penalty notices, freeing up resources for on-train patrolling	Game Players, Opportunistic Evaders
	Utilise Intelligence Based Deployment of revenue protection resources	In 2008, Melbourne introduced the Intelligence Based Deployment Model (IBDM) to allocate Authorised Officers based on time and place at which offences have been occurring. Preliminary results show a significant increase in the level of fines issued	
Penalty Regime	Increase fare evasion penalties and introduce sliding penalty scale	Many public transport providers have adopted the sliding penalty scale. In London, failure to pay the correct fare leads to the imposition of a £50 penalty fare plus the price of the original ticket; persistent fare evaders can be fined up to £1,000	Game Players
	Consider providing an incentive for early payment of fines and remove the 'first time warning' system to fine people on the spot	There are a number of networks that use this strategy to increase the percentage of penalties collected. For example, in London a penalty fare is halved if paid within 21 days	
	Incentivise / penalise operators to reduce fare evasion through contractual obligations	Private public transport contracts for Sydney, Adelaide and Perth buses provide a modest patronage incentive to align interests between operators and the public transport authority regarding revenue collection	Game Players
System Closure	Create closed train stations by installing fare gates at exits (only where economically justified)	International networks seek to maximise the proportion of passengers traveling through gated stations. The implementation of automated ticketing in London in 1989 is estimated to have reduced fare evasion by two-thirds and is indicative of the success that can be achieved	Opportunistic Evaders
Fare Structure	Introduce smart cards which make it straightforward for people to pay Introduce partnership agreements (e.g. integration of student cards with rail cards)	Octopus Cards currently double as workplace access control cards and school administrative cards	All
Education	Simplify fare structure to reduce confusion amongst customers	The MyZone reforms to Sydney's ticketing have led to a massive simplification of the ticketing scheme	Inadvertent Evaders
	Inform public of changes planned to tackle fare evasion	Metlink Melbourne ran similar public education campaigns (e.g. 'Fare Evasion Karma' campaign)	Game Players
Ticketing Channels	Increased pre-sale of tickets (e.g. online top-ups of smart cards) decreases the ability to exploit fare evasion opportunities as they arise	The London Oyster Smartcard allows passengers to top up their balance online or over the phone; failing that, there are top up machines in every station which accept cash (coins and notes) as well as credit and debit cards. Tickets purchased via the Oyster system are heavily discounted relative to 'traditional' paper tickets incentivising Oyster usage	Opportunistic Evaders
	Ensuring that ticket machines at stations / on public transport are in working order accept coins and cards, and provide change also reduces excuses for not having a valid ticket	Security cameras to guard against vandalism Machine hardening, monitoring and cash handling	
Monitoring	Gaining a better understanding of travel patterns to begin to isolate areas which have high fare evasion risk	Closed smartcard systems, where passengers are required to swipe in and out at the end, allow operators to monitor travel patterns far more closely to understand where revenue protection officers should be located	All

Case studies

A review of the experience of Australian and international operators with curtailing fare evasion highlights the need for combined approaches encompassing appropriate staff numbers, capabilities and powers, legislation, system design, fare structure and more generally instilling the right mindset in the community. A strong implication of this is the impossibility to transfer revenue protection strategies wholesale across systems with different legacy characteristics. Each operator needs to balance the following dynamics to arrive at an effective revenue protection strategy:

- **Customer economics** - the fare should be lower than the expected fine "daily equivalent" based on the fine level and checking rate, e.g. if the daily fare is $5.10 and the fine is $100, a passenger making 40 trips a month (two trips per day) needs to experience a check rate greater than 2.5% to make fare evasion economically unattractive. On the flip side, if the penalty rate is set too high, it may become prohibitively expensive, encouraging more people to refuse to pay it at all.
- **Target checking rate** - the checking rate should be set at a level which is high enough to make customers experience that they are checked on a regular basis.
- **Operator economics** - the marginal cost of the last revenue protection officer / resource employed should not exceed the marginal increase in 'protected' revenue.

Therefore, depending on the network characteristics and procedures already in place, some or all of the revenue protection strategies in Table 3 should be considered.

Impact and feasibility

Magnitude of impact
Reducing fare evasion would have a **medium** impact on the overall cost position of public transport relative to other cost and revenue initiatives. Assuming that 10% of all fares are evaded (based on an average across modes from Metlink estimates in Melbourne), total fare evasion Australia-wide could be in the region of $230 million. If the average fine for fare evasion is $100, hiring an additional revenue protection officer, who can conservatively check 75 tickets per day, at a salary of $80,000 would reap approximately $200,000 in revenue, meaning that the net marginal contribution of additional resources devoted to reducing fare evasion is around 60%. So, decreasing fare evasion by 50% (i.e. $115 million) would cost $50 million in staff costs and would generate net revenue of approximately $65 million or 1.2% of total operating costs.

Support for broader public transport objectives
Implementing measures to reduce fare evasion does not contradict any other policy objectives. Assuming that a well designed fare system is in place, ensuring that everyone is paying the correct fare should be a priority. In fact some of the measures to improve revenue protection may also improve other aspects of the customer experience. For example, adding extra transit officers to check tickets may help passengers to feel safer on public transport.

Ease of implementation
Cost effective reduction in fare evasion is not easy to achieve and requires careful consideration of how to deploy resources most efficiently, as well as effective systems for collecting payment of penalty fares to ensure that costs are being recouped. The implementation of smartcard systems throughout Australia should assist in reducing evasion, particularly among the opportunistic and inadvertent segments who will be more likely to pay the correct fare if it is made easier and more transparent for them to do so.

However, it is likely that some strategies to reduce fare evasion will have considerable financial or political risks associated with them including:

- The cost of installing barriers at stations may outweigh the potential revenue protection benefits;
- Potential unpopularity of the removal of a first time warning regime, which gives first time offenders the benefit of the doubt; and
- Potential unpopularity of employing more enforcement staff due to arguments regarding becoming a "nanny-state".

5.2.4 GROWING PATRONAGE

Overview

Patronage growth rarely results in a decrease in the net cost of running public transport. In Australia's public transport systems, farebox revenues always fall short of the cost of providing the service. However, on a marginal cost basis, the situation is very different between peak and off-peak. In the peak, in particular the super-peak (60 to 90 min of the morning and afternoon peaks), patronage growth requires loss-making capacity additions. This is not the case in the peak shoulders, contra-peak (peak periods, in the opposite direction to the main flows) and off-peak periods where spare capacity is available.

Nevertheless, from a whole-of-transport system perspective, even peak patronage growth generates external benefits, such as reduced congestion, reduced pollution and improved quality of life. Moreover, it should be noted that as the majority of congestion occurs in peak periods, increases in peak patronage will have the greatest impact on congestion levels. Thus, while increasing peak patronage may have a neutral or even negative impact on net subsidies, it will have the greatest indirect benefits.

The table below summarises the qualitative impact of patronage growth across three dimensions:

- On the net cost of running public transport;
- On road congestion; and
- On other externality factors, such as pollution and road toll.

Adopting strategies to lift patronage can be revenue generating if targeting periods other than the super peak, and is favourable to the broader transport policy objectives in most cases. However, in the short-term it may require significant investment in extra capacity (vehicles, rolling stock, rail infrastructure) given overcrowding on some routes across the major capital cities.

Over the last five years, Australian public transport networks have seen significant rates of patronage growth. For example, metropolitan rail patronage has grown at approximately 11% p.a. in Melbourne, 8% p.a. in Perth and 6% p.a. in Brisbane. Although there has been some growth in Sydney and Adelaide, growth levels have been far more subdued at 2% and 1% respectively (Figure 23)[66].

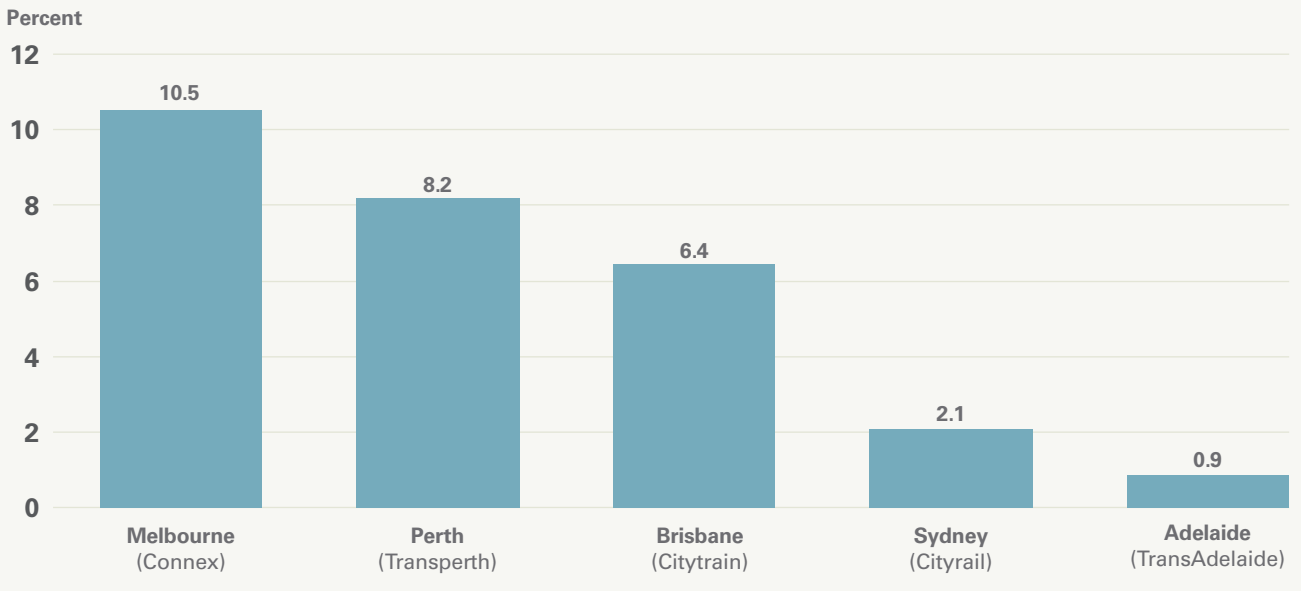
66 Rail operator annual reports

Table 4
Patronage growth qualitative impacts

Type of patronage growth	Impact	Employer impact	Employer benefit
	Public Transport Cost	Congestion	Other externality benefits
Growth in super-peak			
Growth in peak-shoulders			
Growth in contra-peak			
Growth in off-peak (day)			
Growth in off-peak (night)			

Favourable Neutral Unfavourable

Figure 23
Australian metropolitan rail patronage - annual growth rates (2004-08)



Source: Rail operator annual reports and statistics; Government statistics

This growth in patronage has been concentrated around the peak (both morning and evening). As a result, most of the capital city networks experience at least some degree of overcrowding, which needs to be taken into consideration in any patronage growth strategies. Any significant growth in peak patronage will require large capital investment, particularly for rail. However, there are some lower cost ideas to increase marginal capacity in these systems.

Most prospective approaches

Although any patronage growth in public transport has favourable effects on road congestion and other externalities such as pollution and road toll, growth in the peak is costly and is most likely a cash negative proposition for public transport.

Therefore, strategies to increase peak patronage have an important place in the context of long-term urban and transport strategies but are not the main focus of this paper.

From a net cost reduction perspective, the focus of strategies to increase patronage growth in public transport should be to:

- Grow patronage in periods (eg. off-peak) and line sections (e.g. contra-peak, non-CBD centric lines) where spare capacity exists or can be cheaply created; and
- Improve the capacity utilisation of rolling stock and vehicles in the peak periods and at the same time attract new customers to use the achieved increases in available capacity.

The level of patronage on public transport is driven by a range of factors:

- **Underlying travel demand:** This is driven by the size of the population in a particular suburb or region and the degree to which each resident needs to travel, either for work or for leisure. Governments can play a role in boosting travel demand over the long term by encouraging transit oriented developments (discussed further in Section 5.5.1) and ensuring that the overall city environment is conducive to employment and leisure activities.
- **Relative cost:** This is driven by perceptions of the cost of public transport fares relative to the cost of the same journey in a car. Factors that can be used to influence public transport costs include:
  - The fare level at the relevant location and time of day (see Section 5.2.1);
  - Other transport forms / goods and services that are included in the price; and
  - Any special event / attraction offers that are included in the ticket price (e.g. if public transport is included in the price of a ticket for a sports event).
- **Car costs:** includes the variable costs of petrol, car parking and any road charges, as well as the fixed costs of buying, registering and insuring a car in the first place (although once the car has been purchased these tend not to be included in the mind of the motorist as they are sunk costs).

  Many of the car cost factors can be influenced by long term policy decisions, including:
  - Increases to parking charges (already high in most CBDs around Australia);
  - Congestion charging (See Section 5.4.1);
  - Increases to fuel duties (petrol in Australia is currently less than half the price per litre of petrol in Italy, France, Germany, UK and Japan but slightly more costly than in the US[67], but would impact country motorists where congestion is not an issue as in cities); and
  - Changes to fringe benefits tax legislation to remove the exemptions currently afforded to company cars etc.
- **Relative journey times:** The time that public transport will take relative to the car is a key consideration in modal choice. This is influenced by levels of car congestion relative to public transport journey times, which will in turn be driven by:
  - Frequency of public transport services (which will determine waiting time);
  - Coverage of services (and degree to which passengers can access them conveniently);
  - Journey time while on board public transport; and
  - Intermodal connectivity, including availability of commuter car parks and park and ride schemes.
- **Customer experience:** In the car, congestion levels are the critical factor determining the quality of the travel experience. On public transport, customer experience is influenced by a range of factors, including:
  - Level of crowding (impacted by frequency of service and other capacity related measures);
  - Customer service and information availability;
  - Retail offering (see retail Section 5.3.2) and general look and feel; and
  - Perceptions of safety.

Of the above drivers of patronage, the two that can be most directly influenced by public transport providers are 'relative journey times' and 'customer experience'. The key factors contributing to reduced journey times and improved customer experience on public transport can also be grouped depending on whether they are high cost or low cost. This distinction is laid out below together with examples of low cost measures which have been effective at boosting patronage.

Reducing journey times

Reducing journey times offers significant benefits on two fronts:

- Faster asset runs allow for the delivery of more services given a constant vehicle or rolling stock fleet size; and
- Shorter journey times make public transport more appealing to the travelling public, generating patronage growth to fill the increased capacity and generate additional farebox revenue.

However, realising the capacity benefits of improving journey times in rail often requires significant investments in track infrastructure and these need to be accounted for when considering these strategies.

67 International Fuel Prices 2009, German Federal Ministry for Economic Cooperation and Development, 2009

Smaller (although still substantial) investments in new technologies that can help reduce journey times include:

- On trains, reduce dwell times and improve average speeds through safety systems and procedural improvements (such as improving access to the train through crowding reduction measures discussed below). This frees up rolling stock capacity that can be used to increase peak frequency provided the capacity of the track allows it;
- On buses, reduce journey times by providing live route tracking and GPS bus signalling to give buses priority at interchanges (as seen in Melbourne's Smartbuses) and giving drivers real time information and incentives to keep to timetable (though Stockholm's experience indicates that these incentives can be difficult to set);
- Improve intermodality of the transport system (e.g. through more intermodal connections and timetable synchronisation) to allow a reduction in the overall journey time (generating patronage growth) and removal of route duplications (increasing peak capacity). TransPerth and TransAdelaide have seen patronage increases since moving to intermodal integrated timetables. A focus on intermodality should also include expanding and improving park and ride facilities and commuter car parks, which could both boost patronage and earn revenue in their own right; and
- For buses, increase the availability of dedicated bus lanes that enable improved travel speeds and reliability. As described in Section 6.2.1 Improving Asset Productivity, Brisbane currently has 24km of dedicated busways with more due to open in 2011. According to TransLink, buses travelling in busways can carry over 7 times more passengers per hour compared to an average urban bus in a general traffic lane.

Customer services and information

Research suggests that train passengers who perceive their commute as unpredictable experience greater levels of stress. Thus, increasing predictability through access to information, particularly real-time information, may improve the overall customer experience and increase patronage[68]. Washington Metro's planned "Metro Channel" is an example of how operators can communicate with passengers in real-time during the entire service[69] , through:

- LCD displays available throughout the entire Metro property including on-board trains; and
- provision of information regarding the journey duration and progress, incidents and general instructions (e.g.; safe and fast alighting).

A combined strategy: SmartBus in Melbourne

The SmartBus initiative was first launched in Melbourne in 2002 and was aimed at improving suburban bus services by providing an alternative time efficient link between the suburbs. This continuing initiative has seen the ongoing purchase of new buses and has cost approximately $290 million.[70] SmartBus consists of the series of suburban and orbital bus routes around Melbourne.

Key improvements achieved by the program have included an increase of frequency; longer hours of operation; upgrading of bus stops to include shelters; introduction of real-time information on bus arrival; wheelchair accessible bus access; installation of a signal priority at the majority of intersections and introduction of bus priority lanes at many locations.

Results from the improvement in the service were impressive and led to a substantial uplift in bus patronage (Figure 24). The government continues to invest in new routes and the size of the network is projected to reach 370km by 2012.[71]

Reducing overcrowding

Reducing peak crowding creates the joint benefits of improved capacity utilisation, by squeezing more capacity out of the existing assets, and patronage uplift in response to less crowded transport conditions.

Crowding is a major cause of customer dissatisfaction for rail operators[72]. Some small reductions in crowding can be achieved through the following measures:

- Reconfigure vehicles; and
- Better passenger dispersion (encouraging people to move away from middle carriages in rail, moving people from doors to middle of carriage).

Reconfigure Vehicles

Rail operators can increase peak capacity by optimising the interior layout of their current fleet. For instance, operators can use seating arrangements to free up latent vehicle capacity. Research demonstrates that longitudinal seating on rolling stock offers significantly more capacity than transverse seating (row seating) without necessarily sacrificing a large proportion of seats. Transperth have had some success in increasing carriage capacity of their older A-series rolling stock by moving from transverse 2x2 seating to longitudinal seating. Total capacity (seating and standing) increased by over 17%, while seating capacity went down by 6%[73]. Operators are also introducing carriages with folding seats in order to provide flexible capacity; during the peak more passengers are accommodated but off-peak passengers can opt for a seat.

Similarly, operators can also configure vehicles to encourage passenger movement into the middle of the carriage in order to increase capacity utilisation. For example, on trains, passengers tend to crowd around doorways which limits the number of people carried by the carriage. By implementing overhead ceiling rails and hanging grips, passengers can more easily move into the centre and, importantly, safely reach the doors as their destination station approaches.

Encourage passenger dispersion

Research shows that passengers tend to over occupy the middle carriages of a train at the expense of the end carriages. When passengers on a platform see that the middle carriages are crowded, they may choose to wait for the next even when spare capacity is available in the end carriages. This is especially likely to occur during the peak when train frequency is high and platforms are crowded. Thus, scope exists for rail operators to increase the capacity utilisation of their fleet by encouraging passengers to spread along the platform. This is facilitated by platform announcements, platform staff that remind passengers to disperse along the train and internal gangways / passageways that connect carriages so that passengers can easily move to the ends of the train whilst onboard.

68 The Morning Rush Hour: Predictability and Commuter Stress, Evans et al., 2002
69 The Metro Channel, WMATA, 2008
70 Victorian Department of Transport Website - http://www.transport.vic.gov.au/
71 SmartBus plan will not work in current form, The Age, 2008
72 E.g. RailCorp Customer Service Improvement Program Survey Results, 2008
73 Transperth media release (2009), L.E.K. analysis

Figure 24

Results of the introduction of the SmartBus in Melbourne*

Routes	Patronage boarding before	Patronage boarding 2 years after	Patronage percentage increase	Service percentage increase
703	1.28m per annum	1.57m per annum	23%	22%
888/9	0.87m per annum	1.18m per annum	36%	53%
Control	47.9m per annum	49.8m per annum	4%	0%

*Introducing increased demand for public transport – experience in Australia, Association for European Transport and Contributors, 2005.

Marketing

Ensuring that the benefits of the public transport offering is well communicated is a (relatively) low cost, but high impact approach to patronage growth, in particular in the off-peak. This has proved to be particularly successful in the case of the 'TravelSmart Behaviour Change Program' first trialled in South Perth and now rolled out in many cities around the world. TravelSmart focuses on 'Individualised Marketing' which takes a household by household approach to personalise marketing and support to achieve the best modal shift results. Perth saw an uplift of public transport usage of 8% or more in all of the suburbs where TravelSmart was rolled out, and a reduction in car km of between 7% and 17% over the same period[74].

Safety

Safety is one of the primary concerns of public transport users and so improving the perception of safety on rail and buses can be a key driver of patronage, especially in off peak times (and for night and late night services on buses) when stations and vehicles are less crowded and safety is a greater concern. Various operators have had success in this regard by implementing such initiatives as a greater focus on station retail, wider use of closed circuit cameras, employment of additional security staff and better lighting of platforms.

Event Levies

Working with events organisers to ensure that public transport costs are included in the price of the event ticket is a practical and effective way of increasing off-peak public transport usage to the event, helping to eliminate associated congestion and parking problems that the event could otherwise cause, while also covering the cost of the transport provision. This is an initiative that is already used to good effect in several cities around Australia including Adelaide and Sydney. Any opportunities to extend the use of event levies more broadly to other events, or to include other less obvious goods and services would be worth careful consideration.

74 Introducing increased demand for public transport – experience in Australia, Association for European Transport and Contributors, 2005

Impact and feasibility

Magnitude of impact

Growing patronage will have a **negligible** to **negative** impact on public transport cost position, but is not to be ignored as a strategy due to its strong alignment with overall public transport objectives. As mentioned, the time of day that the increase in patronage occurs is an important factor. However, in most cases the cash flow impact of growing patronage will be at best small compared to yield enhancing initiatives.

While any increase in patronage during the peak periods would require investment to expand capacity and accordingly would likely dilute rather than increase net revenue, increases in off-peak patronage could increase net revenue. Assuming that spare capacity is available, a 5% increase in off-peak patronage would lead to a revenue uplift of around $40 million which represents 0.7% of operating costs, while a 10% increase in off-peak patronage would generate a revenue uplift of around $70 million or 1.4% of costs[75]. This however does not account for any investments necessary to achieve this uplift and the net effect is likely generally to be at best cash flow neutral.

Support for broader public transport objectives

On the other hand, growing public transport patronage at all times of the day or the week has positive societal effects:

- Macroeconomic benefits through reduced road congestion, enhanced mobility for public transport and car users as well as freight road operators;
- Environmental benefits through reduced car kilometres travelled and reduced car idle time; and
- Social benefits through better public transport resulting in improved social inclusion of populations that rely on it.

75 Assuming off peak revenues across Australia of $730m, based on the assumption that patronage is 50:50 peak to off-peak and weighted average off-peak discount is 22% (based on ticketing information from transport operator websites)

Ease of implementation
Growing patronage through improvements in public transport services is a continual public transport policy objective but is not necessarily easy to achieve without significant extra investment to improve the public transport network.

The political dividends are significant (primarily because it reduces public discontent). However, when improvements in public transport provision are obtained at the expense of road capacity, there are also political risks involved. The key challenges arise from the extensive planning, stakeholder and workforce consultation required to significantly improve service provision while keeping operating costs under control.

5.3 COMMERCIALISING PUBLIC TRANSPORT ASSETS

Due to the continued increase in public transport patronage (as discussed in Section 2.1), more passengers are spending more time on public transport networks. Accordingly, finding ways to engage and resonate with them offers significant revenue generation potential. Although the benefit can be small in terms of direct revenue uplift, these initiatives are attractive as they offer additional benefits by providing convenience for passengers and improving perceptions as to the cleanliness, safety and attractiveness of networks.

For both advertisers and retailers, public transport provides a unique opportunity to target specific demographics at specific points in their day and capitalise on a 'captive' audience.

5.3.1 ADVERTISING

Overview

Although not a new concept, public transport remains an attractive advertising medium. It offers high exposure to specific groups of people such as CBD workers and tourists, presenting a unique opportunity for advertisers to reach their target audiences. Also, on-system advertising such as at train stations and inside vehicles creates a captive environment allowing the advertiser to increase the length of time each individual is exposed to the advertising message. In addition, rapid expansion of the communication channels and technologies available to advertisers on public transport permits advertisers to continuously grow the impact that the advertising message has on target audiences. The use of technology also provides the opportunity to deliver real-time information, jointly with advertisements, on media that are funded by the advertisers and hence provide tangible customer service benefits. These opportunities have not been exploited to their full potential on Australian public transport networks.

Most prospective approaches

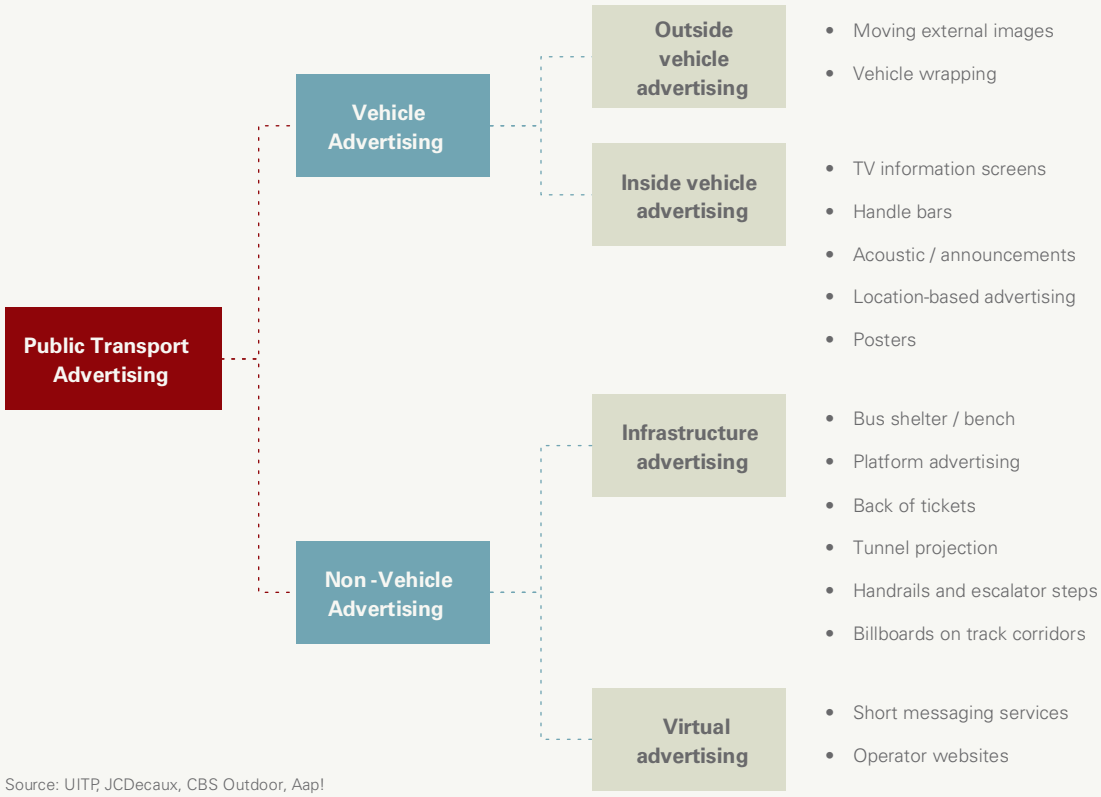
There are a variety of opportunities to generate advertisement revenues from three key sources: vehicles, public transport infrastructure and virtual platforms. Be it at stations and stops, outside or on-board vehicles, on train corridors, in tunnels, on tickets, or through messaging or website services, advertising is a well accepted source of revenue which, if properly managed, also enhances the customer experience.

Ultimately, advertisers need to believe that the advertising format will yield them a return on their investment or it will not be viable. However, a better understanding by the operators of the value of traveller footfall and strategic approach to partnerships and value sharing with advertising companies will help to increase the likelihood of successful relationships with advertisers. The key opportunities for increased revenue potential in this area for Australian public transport providers are around:

- More widespread use of on-board advertising;
- Better utilisation of station precincts by introducing 'station domination';
- New technologies incorporated alongside traditional static advertisements;
- Using non-traditional spaces to communicate advertising messages; and
- Developing and advertising through virtual communication channels.

Figure 25

Examples of public transport advertising



Source: UITP, JCDecaux, CBS Outdoor, Aap!

Case studies

Outside vehicle advertising

Outside vehicle advertising is widely used across the world and has the widest audience reach amongst the advertising formats on public transport. Mobility of the vehicles allows the advertiser to reach audiences in different parts of the transport system, as well as people who are not users of public transport (eg., people walking or travelling in cars), creating a 'moving billboard'. Outside vehicle advertising can take a variety of forms ranging from simple banners/posters on the side of the bus or train to fully 'wrapped' vehicles or moving external images on the side of the vehicle.

The majority of bus services around Australia are currently using this form of advertising but there may be scope to improve the effectiveness through full 'wrapping' of the vehicle as opposed to advertising on the back and side only (see London case study). This form of advertising is much more common on buses and trams, which operate on roads, than on trains, which operate in designated corridors. This form of advertising can be attractive to high profile brands and can generate up to $50,000 per vehicle per annum.

London example

Vehicle advertising represents one third of all outdoor advertising in Britain. Recent research done at the London Metropolitan University found that among the whole spectrum of vehicle advertising the most effective form was the 'wrapped' format in which the advert covers the entire vehicle[76]. London Transport has been utilising this form of advertisement across a large percentage of their bus fleet ever since the restriction around London buses only being red was removed.

Inside vehicle advertising

Inside vehicle advertising gives advertisers an opportunity to communicate a much more complex message since audience attention is captured for a longer period of time. Although the audience is limited to the passengers on the network, it allows advertisers to target specific demographic and social groups of commuters by line and even time of day or specific geographic location.

Again, there is a significant variety of forms in which the inside vehicle advertisement can be delivered, such as TV screens, advertising announcements, location based advertising and others. However, in Australia the majority of inside vehicle advertisement comes in the form of static banners/posters which have a lower impact on the audiences in comparison to more dynamic formats. However, the cost of installing a more dynamic format needs to be balanced against the potential benefits and may only be viable on the most highly utilised routes.

Copenhagen example

In Denmark, JCDecaux launched an infotainment system inside the buses of Copenhagen. In total, 86 screens were installed on 43 buses showing a series of programs meant to inform and entertain passengers during their journey. The content included information about public transport, latest news, time and temperature as well as adverts.

76 Brands on The Run, Behind the Spin, 2008

Figure 26

Vehicle advertising - internal and external

Non-vehicle advertising

Non-vehicle advertising includes posting of commercial messages on the platforms, at stations and at bus/tram shelters. Some of the latest forms of non-vehicle advertisement on the public transport system also include tunnel advertising, advertising on the back of tickets and using track corridors for advertising to passing cars and trains.

In Australia, non-vehicle advertising is used across all modes and is quite widespread. However, there may be opportunities to exploit assets even further, particularly with regard to advertising in track corridors. This has proved to be an effective advertising format in Adelaide where TransAdelaide has been able to utilise track corridors effectively.

Aside from generating revenue, this form of advertising also decreases maintenance and cleaning costs of the infrastructure assets such as bus and tram shelters as many of the contracts transfer these responsibilities onto the agents who sell the advertising space.

"Station domination" examples

'Domination' of a key commuter intersection with a single commercial messages is a very effective way to reach a large potential consumer base. Key Melbourne train stations such as Flinders Street, Southern Cross, Richmond, Flemington and Box Hill stations have been ideal platforms for advertisers to effectively deliver their messages to hundreds of thousands of commuters on a daily basis.

Expanding the number of locations where 'domination' advertising strategy is utilised would result in a positive revenue impact for many Australian public transport operators.

Examples of use of non-traditional spaces

In order to increase impact, advertisers have started to utilise new spaces such as escalator handrails and steps advertisements, tunnelling advertisements and event inspired ads.

Bicycle rental schemes at European train stations are also often exploited by advertising agencies. A rental scheme similar to the system in Paris is planned for Brisbane, so this may offer another innovative platform for advertisements.

Examples of use of new technologies

Many overseas public transport networks have incorporated digital technology alongside static advertising to increase the impact of their message on commuters. The London Underground and many Asian public transport systems have been rapidly increasing their use of video content within their advertising mix. A key consideration in Australia is whether there are any stations with sufficient footfall to justify investment in costly technology by an advertiser.

Virtual advertising

Finally, virtual advertising offers two mediums through which operators can generate incremental advertising revenue: short messaging service (SMS) advertising and operator website advertising. The size of these opportunities would be driven by the total "mailing list" for SMS and total internet traffic drawn to operator websites. Advertising revenue can be gauged based on CPM rates (i.e., cost per thousand impressions), which might range from $5 to $20 per CPM. CPM rates would be applied to either the number of people reached through SMS communications or the number of people visiting the operator websites.

Figure 27

Examples of "station domination" advertising

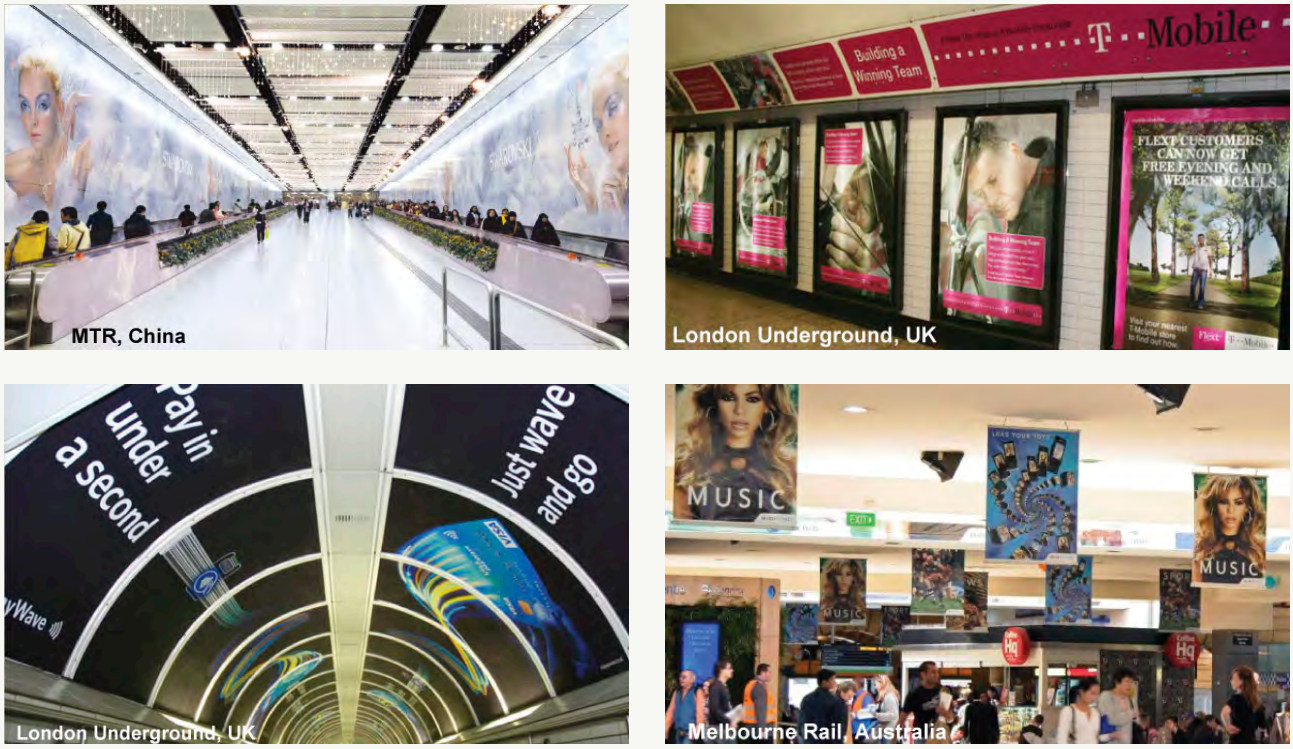


Figure 28

Innovative use of spaces for advertising

Figure 29

Example of digital advertising campaigns on public transport

Using SMS to communicate with public transport riders, operators can generate revenue by driving higher ridership numbers and by selling advertising space on the SMS messages to a third party. TramTRACKER (introduced by TransdevTSL to Yarra Trams in late 2006) is an example of a service that provides riders information on public transport options, indirectly generating revenue through greater utilisation and farebox revenue. Customers can receive service information through SMS on their mobile phones. Transport for London also offers a free mobile service where customers can sign up for a travel alert service, with personalised SMS alerts warning customers of service delays. Space on these messages can be sold to a third party - an "official sponsor" - of the public transport messages (imagine a third party logo accompanying all SMS communication).

Developing a robust and attractive operator website would offer another virtual advertising opportunity. Selling advertising space on official public transport websites offers a high margin opportunity for incremental revenue. Both Transport for London and NYC's Metropolitan Transportation Authority websites are examples of platforms that offer riders full menus of schedules, maps, service changes and other crucial news items. Developing a website with the same level of up-to-date, relevant information would be crucial for driving internet traffic and increasing the virtual advertising revenue opportunity. However, even the two operators noted have yet to capture revenue from selling any advertisement space on their websites.

Impact and feasibility

Magnitude of impact
Improving station advertising is likely to have a **low** impact on the overall public transport cost position.

Financial returns from this revenue source are likely to be quite moderate and may be volatile based on economic conditions. International estimates indicate that the share of the advertising revenue on public transport networks does not tend to represent more then 10% of total operating costs even on the world's largest networks. Given that many of Australian networks are characterised by low population densities and a small CBD centre with few stations, the possible achievable share of this revenue type is probably lower. In addition, there may be a political influence on what subjects are acceptable (eg., no "junk" food advertising, no alcohol advertising) which could further reduce the potential revenue from advertising.

In CityRail's recent Customer Service Improvement Program Report, it was estimated that the revenue opportunity from an improved focus on advertising and retail combined on the CityRail network is $15 million[77]. This implies that the nationwide opportunity is unlikely to exceed $50 million per year.

Overseas experience shows that public transport networks do not bear the additional costs of advertising. The costs for the installation of the necessary infrastructure (eg. TV screens in the carriages) are usually borne by the advertisement agents who in turn are given the right to sell the space to the potential advertisers. This has also been borne out in Australia, where the installation and removal of wrapping on vehicles is paid for by the contractor.

A judicious approach to advertisement deployment improves the look and feel of facilities and vehicles and can also provide useful local information (e.g. on local shows and events) to travellers.

Support for broader public transport objectives
Advertising as a means of additional revenue generation would not directly support any of the broader transport objectives and therefore the effect would be neutral.

There is often a mixed reaction by the public to advertisements on the side of transport. For example, where advertising has been added to new trams over the last five years, a large number of people had no objection to the adverts or were in favour of them, but there were also a large number of complaints.

Ease of implementation
There are few political and social barriers to expanding the role of advertising on Australian public transport systems, provided advertising content is not offensive.

A challenge to the success of this strategy may be willingness of the advertisers to invest in new, more costly or relatively untested forms of advertising on Australian public transport, such as digital screens and making use of less conventional spaces.

5.3.2 STATION AND PUBLIC TRANSPORT RETAIL

Overview

Retail offerings at stations and on public transport can help to achieve the dual aims of generating increased revenues and providing increased utility for passengers. However, the low density characteristics of the Australian networks make the rationale for a retail offering marginal in many stations, especially as demand can be very 'peaky' meaning that retail offerings are required for four hours per day during the peak periods but are not widely used outside those times.

Despite the Australian rail networks having generally low levels of patronage density, the largest train stations in each city typically either house or are surrounded by retail space. For example, Brisbane Central Station rents out significant amounts of retail space within the station itself, while both Melbourne's Central Station and Sydney's Wynyard Station are inside larger shopping centres and do not receive any revenue from the retailers that surround the stations.

Transport operators have the potential to increase revenue and improve the attractiveness and appeal of the network by making the retail offering more convenient, relevant and exciting. There may also be the opportunity to manage the retail network more efficiently and to introduce retail offerings at additional stations by making the station retail offering attractive to non-public transport users as well as passengers.

77 Customer Service Improvement Program, RailCorp, 2008

Most prospective approaches

Maximising opportunities for a compelling retail offering wherever possible will act as a revenue raising mechanism and also enhance customer experience. The following strategies should be considered:

- Improve the effectiveness of current in-station retailing to make the offering more convenient, relevant and exciting. This includes the introduction of time of day and location-specific retail offer to match the needs of the travelling and footfall public;
- Leverage the benefit of partnership models with interchange retail specialists;
- Attract non-public transport customers; and
- Introduce retail offerings in additional stations.

Case studies

Several international networks have well-established, innovative and profitable retail offerings. These networks have high passenger throughput and are largely concentrated in a few super-stations, such as the Hong Kong MTR network. In Australia where patronage at stations is much lower, innovative strategies to increase the appeal and success of the retail network need to be adopted to ensure that it is successful.

Improving the effectiveness of station retailing

The most obvious way to increase the effectiveness of in-station retail is to make the offering more convenient, relevant and exciting. In much the same manner that airports design their retail offering to meet the particular requirements of their customers, there is the potential for train stations to meet the specific needs of public transport patrons. To this end it is important to consider whether the store is to be located inside or outside the ticketing gates as the demands of customers at these points is likely to be different. Furthermore, to cater to their customers effectively, train stations need to consider the time of day that journeys are taking place (and the average wait times at those times of day), the purpose of the journeys, the geographic location of the station and the stage of the journey that the customer is at.

Formats that would work particularly well in this regard are outlets such as temporary newspaper stands and coffee carts at outer-suburban stations in the morning peak and convenience and grocery stores at city stations in the afternoon peak so that commuters can stock up for dinner on their way home. There may also be types of retail and commercial offering that are suited to stations that have yet to be fully exploited and could be experimented with. For example, there may be merit in experimenting with further placement of gyms (such as at Toowong station in Brisbane) and in the increase in the number of ATMs on platforms.

Case study: Coffee HQ, Melbourne

The first Coffee HQ cart appeared at Flinders Street Station in Melbourne in 2000. Continuing success of the business is attributed to its simple business model. Coffee carts are located in high volume stations, where there is no or very little competition and the target market is captive. Therefore the carts are located either on the platforms or next to escalators in the paid areas of the station in all of Melbourne's CBD stations. Currently there are 8 coffee carts across five stations.

Figure 30

Coffee HQ cart at Parliament Station in Melbourne

Partnership models in retail networks

Another manner in which greater revenue could be derived through in-station retailing is through more effective management of retail networks. The three options for retailing are full outsourcing of retail, in-house retailing and a risk-sharing model in which the rent and some of the upside (if the retail format is successful) are shared between the station owner and the retailer. Fully outsourced retail outlets are the norm on public transport around the world as they ensure that the retail offering is of the best quality and that the station operator does not have to shoulder any risk if the retailer does not succeed.

There may be scope to improve the efficiency of the outsourcing of retail space by establishing partnerships with retailers that span the entire network by renting them space in multiple stations. This would have multiple advantages to both the train stations and to the retailers. Stations would benefit as it would offer greater consistency across stations and less administrative work, while the retailers would benefit through economies of scale and the ability to share best practices etc. This already occurs in various places around the world with Marks and Spencer operating 39 "Simply Foods" outlets in train stations, hospitals and airports in the UK. System-wide franchising agreements have not yet come to prominence in Australia and may present opportunities for both retailers and public transport operators.

Attracting non-public transport customers

A further method of increasing the revenue of in-station retail is to make the offering attractive to non-users of public transport. One manner to do this would be to have retail

outlets turned "both ways" in the sense that they open both into the station proper and also into the street. This would encourage casual passers-by to shop at the retail outlet without having to enter the station and would therefore significantly increase the footfall of retail outlets at certain stations, especially during non-peak hours during which in-station retail outlets often struggle to attract customers. However, this is difficult to do except for magazine and coffee shops / delis.

Introducing retail offerings in additional stations
Due to the low density of Australian public transport networks, many stations do not have sufficient concentrations of passengers to support retail outlets. In these instances there is insufficient motive for retailers to rent space in the station from train operators. Accordingly, it may be more appropriate in these stations to adopt a risk-sharing or in-house model of retailing.

This has been the approach of UK rail operator Merseyrail which introduced its own retail concept "M2Go" in 2006. The M2Go outlets comprise a combined ticket booth and kiosk which sells chilled products including a range of sandwiches and ready meals, but also offers coffee and tea. The "M2Go" concept is not aimed at profit generation but at improving customer experience and attitude towards rail and accordingly all profits are reinvested in station design. In addition to helping fund ongoing station improvements, the M2Go stores have been instrumental in improving the ambience of stations and overall customer experience, and significantly improving perceived security[78]. The French rail networks provide examples of the successful utilisation of loss-making shops at stations of low footfall in idle times to improve customer security.

Impact and feasibility

Magnitude of impact
The introduction of station retailing is likely to have a **low** impact on the overall public transport cost position.

It is likely that the overall revenue generation through in-station retailing will be small. Hong Kong MTR has one of the most sophisticated retail offerings and it comprises approximately 9% of total system revenues (and an even higher proportion of total costs since Hong Kong MTR's cost recovery is estimated to be over 150%). Given that Australia's networks are smaller and much less concentrated, the total potential in Australia is significantly less. Not only do not all stations have sufficient patronage to support retailing but of those that do, many if not most already have significant amounts of retail.

Based on an assumed customer penetration rate of 10% and an average customer spend of $5, an in-station retail outlet would require footfall of around 4,500 to make an acceptable return. Based on these assumptions, there are approximately 100 stations nation-wide that can support retailing in addition to those that already do. Assuming an average retail rental of $40,000 per annum, the revenue uplift potential to transport operators of station retail is around $4 million annually which only represents 0.1% of costs. Thus, while station retailing can improve the customer experience and perhaps boost patronage it will not have a significant impact on cost recovery.

Support for broader public transport objectives
Complementary to improving the customer experience, improved security and transit-oriented development (TOD) objectives. In-station retailing would also be highly complementary with smartcards if, following from international examples, smartcards could be used for purchases at vending machines and convenience stores within the station.

Ease of implementation
New station fit-outs would be required to revamp the station retail facilities which could be relatively costly. International experience suggests that these costs are usually borne by the network operator, increasing the risk of return of this initiative. However, it may be possible to share some of the cost with the new retailers, in the context of partnerships.

There may also be impediments to the introduction of certain types of shops. Increasing certain types of station retailing may be impeded by current laws regarding consuming food and beverages on platforms and on trains.

5.4 CROSS SUBSIDISATION

There are a number of transport related initiatives that governments can undertake which, though they would not directly influence farebox revenue or operating costs, are worthy of further discussion.

The implementation of congestion charging and the improved utilisation of smartcards have been selected for further discussion. International experience has shown that if applied in the right manner, smartcards possess significant potential as independent generators of revenue and as elements within broader public transport policy.

Not only do they generate revenue which may be used to cross-subsidise public transport networks, but they can also indirectly facilitate the success of other initiatives and strongly align with broader transport objectives. The key factors in assessing the attractiveness of these initiatives are:

- The extent to which they are complementary with other initiatives;
- Their ability to generate net revenues;
- The percentage of net revenues that are reinvested in public transport; and
- The extent to which the upfront investment required is prohibitive.

78 Merseyrail website - www.merseyrail.org

5.4.1 CONGESTION CHARGING

Overview

Congestion charging is one means by which cities have tried to alleviate road traffic congestion and generate additional revenues which can be used to fund improvements in public transport and road infrastructure. The premise of congestion charging is that road users should pay for the negative externalities they create by travelling in congested areas at peak times. An effective congestion charging scheme has the potential to benefit both public transport and road users.

International experience has shown that, if successfully employed, congestion charging is able to reduce congestion, reduce emissions and raise revenue. However, as discussed in a Bureau of Infrastructure, Transport and Regional Economics (BITRE) working paper, the perception that congestion charging is a "magic bullet" that will achieve all three outcomes simultaneously is misguided. If congestion charging is implemented without clearly stated objectives then there can be conflict between competing aims which lessens the overall effectiveness of the scheme[79].
An example of these conflicting objectives can be found in the discounts offered to hybrid and other low-emissions cars by many congestion charging schemes. While such discounts are consistent with environmental objectives, they conflict with the objectives of cutting congestion and raising revenue.

Furthermore, the more successful a scheme is at effecting behavioural change and reducing congestion, the less cars will enter charge zones and overall revenue will drop, although to public transport operators this would likely be mitigated by a mode shift to public transport.

Due to these conflicts of interest, the recently published Henry Tax Review[80] sees congestion charging as one key building block in a broader road taxation strategy, noting that it is a more efficient means of addressing and reducing congestion than the current reliance on fuel excises. The proposed road taxation structure would rely less on fuel excises, incorporate a carbon price to tackle climate change more directly and include distance based road usage charges for heavy vehicles to cover the costs of the extra wear and tear they cause. The difference between the different regimes of road taxation are displayed in Figure 31.

It must also be noted that a comprehensive public transport network that is well-planned and integrated with the road network is a fundamental prerequisite for an effective congestion charging scheme. Without a viable public transport alternative, increasing the costs incurred by drivers will not lead to a behavioural change and will be ineffective in reducing congestion. Accordingly, in most instances the implementation of a congestion charging scheme has been accompanied by significant investment in transport infrastructure to ensure that viable public transport alternatives exist. This is a particularly important consideration for people who have limited flexibility

Figure 31

Possible road taxation structures*

Current arrangements		Introduction of carbon pollution reduction scheme (CPRS)		System based on targeted taxes and charges	
Target	Instrument	Target	Instrument	Target	Instrument
General revenue raising	Fuel taxes, state taxes on motor vehicles	Climate change	CPRS	Climate change	CPRS
		General revenue raising	Fuel taxes, state taxes on motor vehicles	Congestion	Location and time based charges
				Road usage	Mass, location and distance based charges
				Other social costs	Specific taxes, charges or regulations
				Efficient revenue raising	Fuel tax, annual registration

*Australia's Future Tax System, Attorney General's Department, 2009

79 Moving urban Australia: Can congestion charging unclog our roads - Working paper 74, BITRE, 2008

80 Australia's Future Tax System, Attorney General's Department, 2009

in terms of journey times, such as work start and finish times for police, nurses, retailers etc.

Most prospective approaches

There are three types of congestion charging that international cities have employed:

- Area charging - applied to the use of a vehicle within a specified area;
- Cordon charging - applied to vehicles crossing specified borders; and
- Facility charging - applied to vehicles moving along a specified roadway.

A targeted facility charging scheme appears to be a potentially viable option in Australia, where tolls are moved from city by-pass roads to city centre and arterial roads, with prices varying according to time of day.

The success of these schemes in California is instructive, as many relevant characteristics are shared between Californian and Australian cities, such as high car usage and low population density. Moreover, as many toll roads already exist, E-Tags are widely owned and implementing facility charges would therefore involve less of a requirement for additional investment.

Case studies

Different forms of congestion charging have been adopted by over 20 cities worldwide with most citing a desire to reduce traffic congestion and emissions as the primary objectives of the scheme. Though there have been examples of facility-charging and area-charging, cordon-charging is by far the most prevalent implementation method.

London - Area Charging

The most well-known congestion charging scheme is the area-charging scheme implemented by London in 2003. Although there has been much debate as to its economic effects, overall the scheme is viewed as a technical and political success. A 2007 Transport for London report suggests that traffic in the congestion zone was 16% lower than before the implementation of the scheme and travel times 30% shorter[81]. The scheme generated net revenues in the order of £137 million in 2007/08[82]; however, there has been little consensus as to the efficiency of the scheme as most of the reductions in traffic have taken place outside peak times and the set-up costs of the scheme were extremely high. According to the Bow Group, the scheme generated a net revenue of £10 million[83] over the first five years of its operation (including capital costs) - not nearly enough to cover the costs of the improvements in public transport that the scheme required.

Stockholm - Cordon Charging

Stockholm implemented a cordon-charging scheme to limit traffic in the city centre in August 2007. By charging drivers in peak periods more heavily than those in the off-peak, the scheme explicitly tried to smooth traffic throughout the day. The scheme has been a success - reducing road traffic by 20%[84] and generating close to €50 million annually[85]. It is also interesting to note that despite only 31% of the population being in support of the scheme before it was implemented, within 9 months, approval ratings had increased to 67%.

California - Facility Charging

A good example of facility charging has been the "91 Express Lanes" on the 91 Freeway in southern California. The charges levied on use of express lanes vary throughout the day and throughout the week to a maximum during the Friday afternoon peak. Some roads feature even greater variation in tolls, with the ability to vary tolls in real time to account for the levels of congestion. The average speed in express lanes is over four times faster than in free lanes and the throughput on the charged lanes is almost double that of free lanes[86], both of which indicate that the imposition of congestion charging has reduced traffic congestion.

Congestion Charging in Australia

Australia currently has no examples of what would typically be described as congestion charging, though there are numerous road tolls which are geared towards achieving cost-recovery rather than targeting congestion explicitly.

Furthermore, in certain instances the charging of tolls on city by-pass routes actually worsens congestion in city centres. For example, the toll charged on Sydney's Cross-City Tunnel can only be avoided by driving through the centre of the city.

Early 2009 saw the first movements towards congestion charging on the Sydney Harbour Bridge and Harbour Tunnel with the introduction of time of day charging. However, given it is only $1 more expensive to travel during the peak period, it has been largely ineffective in effecting behavioural change.

The major stumbling blocks for traditional cordon or area congestion charging in Australia's CBDs are likely to be three-fold:

- Lack of political will, partly because congestion is currently not bad enough to motivate calls for change among motorists;
- Insufficient public transport options to give motorists who wish to cross the city from outer suburbs a viable alternative; and
- Insufficient natural boundaries to allow cities to cost-effectively police a cordon charge.

However, a more targeted facility charging scheme appears to be a potentially viable option, where tolls are moved from city by-pass roads to key roads in the city centre and heavily used arterial roads, with prices varying according to time of day.

Prior to implementing a comprehensive facility charging scheme, it would be important to test its impact on a small scale first, to understand and adjust for potential issues as they arise and prior to a more comprehensive roll-out, investment in adequate public transport is essential to give people true transport options would be essential.

81 Impacts Monitoring - Fifth Annual Report - Central London Congestion Charging, Transport for London, 2007
82 Transport Strategy: A Decision-Makers' Guidebook, Institute of Transport Studies, University of Leeds, undated
83 London Under Livingstone - an evaluation of labour's mayor, The Bow Group, undated
84 Moving urban Australia: Can congestion charging unclog our roads - Working paper 74 , BITRE, 2008
85 Transport Strategy: A Decision-Makers' Guidebook, Institute of Transport Studies, University of Leeds, undated
86 Moving urban Australia: Can congestion charging unclog our roads - Working paper 74 , BITRE, 2008

However, while the implementation of facility charging is practically viable, insufficient political will and public transport alternatives remain issues that need to be resolved.

Impact and feasibility

Magnitude of impact
The introduction of congestion charging is likely to have a **negligible** to **low** impact on the overall public transport cost position but is strongly supportive of other public transport objectives so should not be ignored as a strategy.

The direct revenue effect to public transport of implementing congestion charging is unlikely to be significant. Each of the international examples discussed demonstrates that congestion charging can successfully reduce traffic congestion, reduce emissions and raise revenue. However, the majority of revenue generated by congestion charging does not currently flow into public transport. For example, in Stockholm the money is re-invested in road infrastructure.

In other cities, the additional revenue is used to offset other road-related taxes or is treated as any other source of revenue and added to the general pool of government funds. Moreover, it should be noted that the costs required to improve public transport networks to levels that make congestion charging feasible can be extensive, as in the case of London's area charging scheme.

Support for broader public transport objectives
Assuming the congestion charging scheme is successful in reducing congestion, it would support most of the broader transport objectives. As it is most commonly charged as a flat fee and in no way scaled for varying levels of income, there is the potential that congestion charging could be seen as regressive, though the prevailing view is that while the overall impact of a congestion charging scheme may be mildly regressive, it is not sufficiently so to be an impediment. Moreover, if revenue generated by congestion charging is used to fund substantive improvements in public transport networks then the goal of social inclusion can also be supported by congestion charging.

Ease of implementation
Planning a congestion charging scheme is likely to be a time-consuming process given the level of public and political debate that would need to precede it. For example, implementing a facility charging scheme is likely to generate extensive debate as to what the charges should be and which roads are subject to charges, in addition to details such as the coverage of the scheme, how the charges are calculated, plans for how revenue will be reinvested into improving the public transport system and developing integrated solutions with the road network. Effective communication with the public and full transparency and accountability on how the surplus funds will be used will be critical to the success of a congestion charging scheme.

However, the technology that would be required for facility charging already exists on toll roads in Australia, so assuming the political will was there, a roll-out of congestion charging should in theory be possible.

5.4.2 IMPROVED UTILISATION OF SMARTCARDS

Overview

Smartcards, which allow public transport trips to be paid for using a rechargeable card, are becoming the norm within public transport systems everywhere. Most Australian cities have introduced, or are introducing, smartcards. They can accrue direct revenue benefits to a transport operator (where, as with a credit card, they generate a commission from non-ticket related purchases of goods and services), as well as indirect benefits, including promoting increased public transport usage, facilitating differential pricing and reducing the costs associated with ticket sales.

Using smartcards to perform the role of a charge card could be financially profitable if there is mass uptake and the card can be used in a range of applications both on and off public transport. However, international experience to date has not yet demonstrated the scale of this upside. Even in systems with high smartcard penetration and a wide range of retail options (eg., Hong Kong) customer use of smartcards for non-transit purchases has not been significant. It should be noted that this may in part be due to policy decisions that reflect the main aim of the scheme which is to encourage uptake rather than drive revenues.

At a minimum, Australian cities are well placed to benefit from the indirect benefits that smartcards can offer. First, the use of smartcards can make the implementation of differential pricing easier. Smartcards are able to automatically differentiate fares according to the distance travelled and the time of day, without increased collection costs and limiting confusion among customers. Thus, off peak discounts are easier to implement, as in London, and charges directly proportional to the distance travelled can be employed, as in Seoul. South East Queensland has already moved in this direction by offering 10% discounts for off-peak travel and 50% discounts for customers who use public transport more than 10 times in a week. Ultimately, transport operators will be able to develop far more sophisticated yield management practices, as airlines have been doing for years.

Second, smartcards enable operators to collect information on customer behaviour and public transport usage patterns, thus building a detailed understanding of how to improve services to better match customer demands (eg., timetabling, asset utilisation). Linked to this is the ability for public transport operators to build direct relationships with each individual customer, paving the way for cross promotional and customer loyalty schemes, which can promote public transport usage and also provide benefits for local attractions and local economies.

Third, the reduction in paper ticketing may also result in lower station staffing requirements. As smartcards can be recharged online or over the phone, there is less requirement for ticket sales within stations, reducing the need for ticketing staff and freeing up space within stations. To further this aim, Perth has provided incentives for customers to top up their smartcards online by providing discounts.

Fourth, smartcards also have the potential to improve the overall customer experience and the efficiency of the network by reducing dwell times on buses. As seen in "Pre-pay" buses in Sydney, removing cash payments on buses can have a significant impact on total trip times and improve

efficiency. For example, in London, as a result of 98 per cent of bus commuters now using Oyster Cards, boarding rates have increased from 10 to 40 passengers per minute and it is estimated that in South East Queensland the implementation of Go Cards has resulted in a time saving of up to seven minutes on average bus services[87].

Finally, if properly employed, Smartcards can be used as a means of reducing fare evasion. Recorded data on travel patterns and card use also means authorities are better equipped to detect and deter fare evasion. Data that reveals each instance in which a smartcard is registered at a fare collection point can be used to identify individuals with patterns of use that suggest deliberate and sustained fare evasion. With the requirement for smartcard holders to register their personal details, the task of prosecuting serial fare evaders is made considerably easier. Similarly, the dispatch of transit inspectors can be targeted at areas with higher incidence of illegal or irregular card use, thus allowing for more efficient use of resources in this area.

Most prospective approaches

Improving smartcard utilisation promises many benefits.The key opportunities for an increased revenue potential in this area for Australian public transport providers are around:

- Using databases of user behaviour to optimise timetables and fare structure;
- Minimising dwell times on buses and trams and improving overall system efficiency;
- Implementing differential charging;
- Providing an enhanced multimodal travel experience; and
- Reducing fare evasion.

Case studies

International

Hong Kong was the first city to employ contactless smartcards with the rollout of Octopus Cards in 1993. Octopus cards are rechargeable, interoperable cards that contain stored value from which fares are automatically deducted when the card is scanned at computerised gates. Since their roll-out, non-transit applications of the smartcard have been added, allowing the cards to be used to make a wide range of purchases included payments for items at convenience stores, petrol stations, vending machines and parking meters.

The Octopus Cards generate revenue for the transport operator (MTR) as commissions are charged on each non transit transaction. However, the profit generated by the cards is relatively low, despite Octopus Cards having 95% penetration of those aged 16 to 65[88]. The 20.6 million cards in circulation generate only $38 million in profit, which equates to less than $2 per card[89]. As the MTR is only partly owned by the Hong Kong Government and Octopus is only partly owned by the MTR, the revenue actually received by the government is only $24 million[90], or approximately 2% of total operating cost.

87 Smartcard ticketing on public transport, TTF, 2010
88 Annual Report , Hong Kong MTR, 2009
89 Annual Report , Hong Kong MTR, 2009; Octopus Holdings Ltd website
90 MTR website; KCR website

The London Oyster system, launched in 2003 and fully rolled out across all suburban rail services by January 2010, has been hailed as a great success, with over 98% of commuter bus journeys now ticketless and at least 80% usage across the entire transport system. Evidence suggests that London's buses have been able to significantly reduce journey times by a fourfold reduction in boarding times[95]. A credit card variant of the Oyster card was launched by Barclaycard in September 2007 and is called OnePulse. The card combines standard Oyster card functionality with Visa credit card facilities. The Barclaycard OnePulse incorporates contactless payment technology, allowing most transactions up to £15 to be carried out without the need to enter a PIN (unlike the Chip and PIN system).

Though smartcards have been implemented in at least 46 countries around the world and in most of the world's major capital cities, their success has been somewhat mixed. While the cards have increased convenience, patronage and overall customer satisfaction levels, they have often been costly to implement and have generated little additional revenue.

Australia

For a variety of reasons, Australian cities have been relatively slow to adopt smartcard technology. However, since 2007, Brisbane, Melbourne, Perth and Hobart have rolled out smartcards and Adelaide and Sydney have recently announced that they will do the same. Part of the reason for Australia's slow uptake of smartcards has been the experiences of Sydney and Melbourne. After have been first announced in 1996, the Sydney T-Card was slated for rollout prior to the Sydney 2000 Olympics. However, the project was cancelled in 2008 at a cost of over $60 million due to technical difficulties and delays. It has resumed at a predicted cost of $1.2 billion.

A further application of smartcard technology would be to make smartcards interoperable across states in Australia, allowing travel on all Australian public transport systems using the same card. This could have benefits to those that travel within Australia and to public transport operators. However, at this stage, this is a long-term concept that would require careful consideration of the benefits, costs and risks.

Impact and feasibility

Magnitude of impact

The benefits from the extension of smartcard functionality to include non transit applications are likely to be **low**. However, the overall savings that can be achieved in costs of sales from improved smartcard utilisation is **medium.** This however excludes the cost of implementing the smartcards in the first place, which is likely to be sizeable. The Myki system in Melbourne will reportedly cost $850 million[91], while in NSW the new smartcard ticketing system being developed by the Pearl consortium is expected to cost $1.2 billion over 15 years[92] ($80 million pa). Strategies around patronage stimulation, yield maximisation and cost savings will be required to cover investment of this scale.

As discussed above, the direct revenue uplift from smartcards is limited. Even if the penetration rate reached 95% and non-transit commission revenue per card reached $2 per annum as has happened in Hong Kong, the revenue uplift would only be $25 million or 0.5% of costs. However, due to the entirely different characteristics of Australian networks in terms of population density and patronage, such figures are never likely

91 'Outsmarted: Victoria Pays the Price', The Age, February 2010
92 http://www.smh.com.au/nsw/shell-of-a-task-londons-oyster-creator-scores-tcard-contract-20100410-s02z.html

to be reached and the direct revenue uplift from smartcards would be even lower.

An additional direct benefit of smartcards would be the potential to lower cost of sales. The majority of station staffing costs are attributable to ticketing staff, many of whom could be removed if it became common practice to recharge the cards online or over the phone. If this were to be done and each rail operator were able to reduce the difference between their costs of station staff per passenger journey and that of the country's leading operator in this respect, the cost savings would be in the order of $130 million which represents 2.5% of total operating costs.

Furthermore, smartcards generate many indirect benefits and many of these will help to improve the overall efficiency of transport networks.

Support for broader public transport objectives
The implementation of smartcards aligns closely with broader transport objectives as it is likely to increase convenience, customer satisfaction and patronage.

Ease of implementation
Implementing a new smartcard ticketing system is costly and can be risky from a technical and political standpoint. Once the system is implemented, the ability to generate direct and indirect benefits will depend on a number of factors, including:

- The level and rate of uptake that the smartcard can achieve;
- The degree to which the technology in each system has the functionality and flexibility to translate 'swipes' into meaningful data;
- The degree to which the operator has the internal expertise to make effective use of smartcard data and build customer relationships (e.g. data mining and marketing skills etc); and
- The level of coordination that it is possible to achieve across different operators within the same network.

5.5 URBAN INTENSIFICATION

As noted in Section 2.1, there is a close link between urban population density and public transport cost recovery. Accordingly, one of the key challenges of public transport provision in Australia is that Australian cities are sparsely populated. Reversing the ongoing trend of urban sprawl, by increasing population density combined with adding local jobs (known as 'intensification'), is of fundamental importance if Australian public transport networks and social infrastructure more broadly, are to achieve sustained improvements in the levels of cost recovery and therefore remain viable and relevant as the population grows.

Two initiatives that show potential in addressing this ongoing planning failure by prioritising urban intensification are transit oriented development and the introduction of infrastructure levies. While transit oriented development actively encourages development within the existing city footprint, infrastructure levies discourage expansion of urban boundaries.

Transit oriented development represents a major opportunity to promote urban intensification and generate incremental revenues as it has the threefold advantage of increasing overall urban densities, aligning population and work centres with public transport provision and directly generating revenue through the sale of land and air rights and tax increment financing.

Infrastructure levies are a complementary strategy by discouraging urban sprawl and prioritising brownfield development. In addition to their direct revenue generation potential, both of these measures have a central role to play in the densification of urban populations and the subsequent benefits this will bring in terms of public transport cost recovery.

5.5.1 TRANSIT ORIENTED DEVELOPMENT

Overview

Transit oriented development (TOD) involves increasing the density of developments and facilities around transport hubs. TODs are designed to encourage public transport use and include medium to high density residential housing, retail and commercial space and key services such as health, education and government. Strong links between residential and commercial spaces are created, removing the need to travel long distances for work or leisure and maximising the revenue and level of asset utilisation that can be generated from public transport which benefits from being a significantly more convenient option.

Studies from San Francisco have shown that those living within 800 metres of public transport are more than twice as likely to use it as those who do not[93]. The mixed usage of land not only creates more interesting neighbourhoods, but facilitates more public transport-compatible households, enabling commuters to avoid congested roads by transferring to readily available public transport alternatives.

Best-practice TOD suburbs integrate different modes of transport and create a 'critical mass' of public transport, providing focal points for government funding and attracting private sector investment. By providing higher residential densities outside the CBD, TODs encourage the decentralisation of public and private services and bring them closer to suburban population centres. Thus, transit oriented development assists in breaking the pattern of 'hub and spoke' development in cities by creating a network of 'alternative CBDs' served by cross-city transport corridors.

Transit oriented developments provide opportunities for both short and long term revenue generation. In the short term, asset owners can capitalise any land adjacent to stations (by renting or selling it to residential or commercial developers) and air rights above stations. This remains a significant opportunity in Australia, where large areas of airspace above transport hubs in key areas of our capital cities remain available for development. In the longer term, a TOD policy would need to be coordinated by the state or federal government to ensure alignment of urban planning and transport infrastructure. Some of the incremental revenues generated from TOD communities would be directly attributable to the TOD scheme (e.g. revenue from sale of air rights), but the majority would be linked to TOD but less easy to quantify.

Role for "Tax increment financing"
One of the key hurdles to initiating transit oriented development projects is the large capital investment required. Tax Increment Financing (TIF) offers a novel method of financing TODs by providing the necessary capital in the form of loans (also known as 'growth area bonds') backed by expected future increases in property tax revenue that

93 TTF Transport Position Paper: The Benefits of Transit Oriented Development, TTF, 2010

the development will generate. This model has been used in the United States for over 50 years and has the advantage of moving the provision of projects beyond the electoral or budget cycle.

The Property Council of Australia has endorsed the 'Growth Area Bonds' approach and suggested that it be trialled under a pilot programme in NSW in a location that has remained stagnant and has not grown under the current mix of levies and charges[94].

Though it presents a means of raising funds for TOD, tax increment financing does present risks of its own. As it can be difficult to project and therefore appropriately capture the incremental property tax revenue generated by the creation of TODs, predicting the time frame in which the bonds can be paid off is difficult. However, if the proper due diligence is performed prior to initiating a Tax Increment Financing-funded TOD project, Australian cities can potentially utilise the concept to realise their development goals.

Most prospective approaches

Developing a TOD strategy around major transport hubs is critical to ensuring the long term sustainability of Australia's cities.

However, it is not easy to achieve and requires a holistic, coordinated long term planning approach across federal and state government, transport operators and local councils. To that end it may be necessary to establish a federal cross-agency body similar to Western Australia's TODCC (TOD Coordinating Committee) to ensure that an appropriately coordinated approach is taken. Furthermore adopting legislation that supports tax increment financing schemes should also be considered.

To free up the capital required to build a successful TOD state governments should pursue two options:

- Sale of land and air rights where appropriate to release funds; and
- Tax increment financing in advance of the development to provide the upfront capital required.

Case studies

TOD Success Stories
Many international cities have successfully implemented TODs and generated significant incremental revenues as a result. The hallmarks of successful developments have been good planning and effective coordination between land use and transport policy.

Hong Kong
The Hong Kong MTR has successfully employed TODs as a driver of revenue. By playing an active role in the development of real estate above and around large stations, the MTR has significantly increased the value of their air rights and reaped significant additional revenue to the point that real estate development has been their largest generator of profit, reaping $4.67 billion HK in 2008[95]. A large part of this success is attributable to the premiums paid for residential and commercial space within TODs in Hong Kong. Empirical work undertaken by the Lincoln Institute of Land Policy has shown that for units built within TODs price premiums exceed 30%[96], which is indicative of the revenue uplift that can be generated through integrated land and transport planning.

United States
A 2008 study by the Centre for Transit Oriented Development has shown that properties of all types located in TODs can generate significant price premiums. As illustrated in Figure 32, the prices of all types of real estate benefit from being in TODs with retail and commercial properties showing the biggest price premiums in the US. In Dallas, the construction of the Dallas Area Rapid Transit (DART) system has had a marked impact upon development. A study undertaken by the University of North Texas in 2007 found that in the 8 years the DART system had been in operation, the total value of projects attributable to DART was US$4.26 billion and the annual contribution to local and state tax revenue was US$127 million per annum[97].

Tax Increment Financing is a well-established practice in the United States with 49 states having legislation that is supportive of TIF. Dallas, Texas offers a recent example of where a Tax Increment Financing was employed to encourage transit oriented development projects in three areas adjacent to DART light rail stations. The success that the City of Dallas had in launching this program is illustrative of the fact that this type of financing could be instrumental in the financing of a transit oriented development strategy in Australia.

Copenhagen
The City of Copenhagen's famous Five Finger Plan, originally developed in 1947, which encouraged development along five city rail corridors and dictates urban density levels, is considered a textbook example of transit oriented development and is made possible by national planning guidelines for transport and development which prioritise sustainability.

London
London has recently embarked on a large TOD project in the redevelopment of King's Cross Station. In addition to incorporating the largest interchange station on the London underground and an international train station, the redevelopment houses 2,000 new homes and apartments, large amounts of retail and office space as well as a university, a school and 10 new parks and squares.

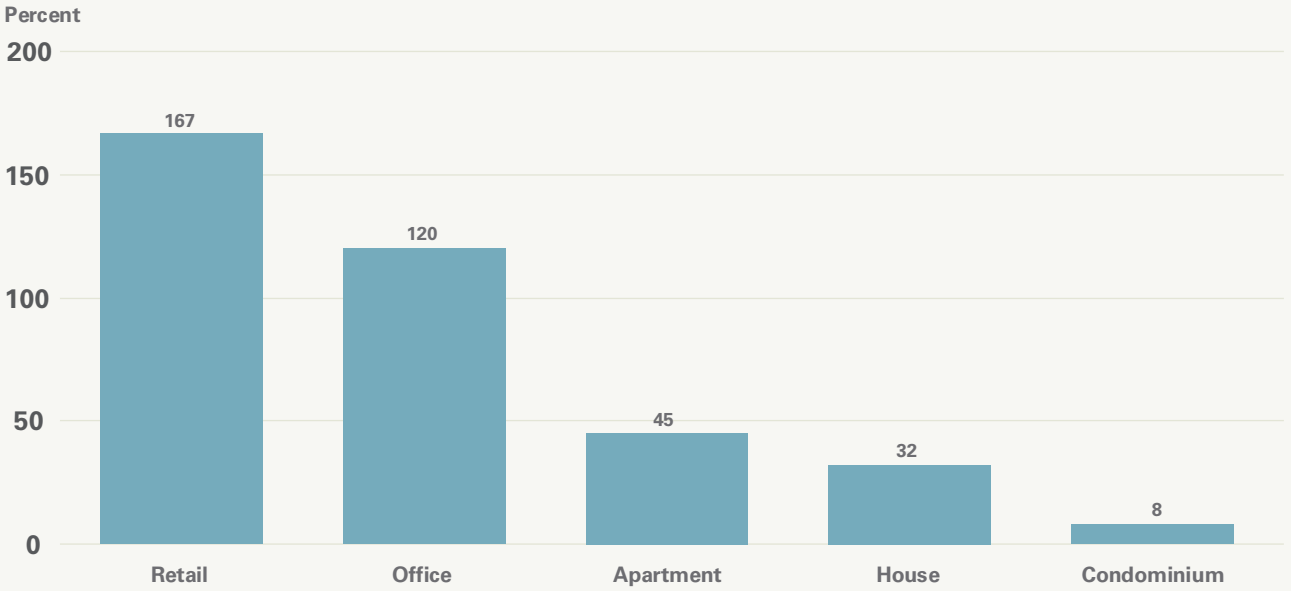
Australian examples of TOD
Some examples of hubs around train stations already exist in Australia, though they were not necessarily planned as TODs. Subiaco in Perth is often used as an example of a highly successful mixed and planned TOD. In Sydney, Chatswood, North Sydney and St. Leonards stations on the North Shore are all hubs that incorporate both bus and train networks and form the basis of significant commercial, residential and public services centres. In Melbourne, South Yarra, East Richmond and Balaclava stations are all surrounded by large retail offerings.

Although Australians cities have been slow to actively embrace transit oriented developments, in recent years their benefits have been explicitly acknowledged and they have been incorporated into transport development plans. For example, Western Australia has created a multi-agency Transit Oriented Development Co-ordinating Committee (TODCC);

94 http://www.propertyoz.com.au/Article/Resource.aspx?media=1581
95 Annual Report, Hong Kong MTR, 2008
96 Rail and Property Development in Hong Kong Working Paper, Lincoln Institute of Land Policy, 2008
97 TTF Transport Position Paper - The Benefits of Light Rail, TTF, 2010

Figure 32

Maximum TOD property price premiums generated in the US



Source: Lincoln Institute of Land Policy

Queensland's *Connecting SEQ: 2031* transport plan identifies key corridors along which associated development must take place within 800 metres of public transport stations and stops. In Adelaide, a TOD is planned at Bowden Village (old Clipsal factory site), which is a large site close to the city served by a rail line, with a tram line and buses in the near vicinity. This is part of the 30-year Plan for Greater Adelaide which has designated 14 TODs to be developed[98].

New South Wales is perhaps the least advanced with regards to embracing TODs due to a lack of interdepartmental coordination and issues relating to state-specific development laws. There is still much potential to exploit airspace rights, even in central Sydney (e.g. above Central Station). The government's recent announcement of a Sydney Metropolitan Development Authority may start to pave the way for a more coordinated, sustainable and long term planning framework.

Issues with TOD in Australia

There have been several reasons cited for the slow implementation of TODs. The most obvious of these is that land prices in Australian cities are not high enough to make developing above and around rail lines commercially viable. Building costs are significant as they include penalties for disrupting existing transport services, the challenges of dealing with noise and vibrations from train services and costs of building decking over rail lines and the necessity to build stronger-than-normally-required structures in the event of "worst-case scenarios".

Moreover, any problems that are encountered during construction can have disastrous financial and political ramifications. For these reasons, a development planned in Melbourne's inner-east called "Operation Double Fault" has thus far failed to eventuate, despite having been originally proposed in 2006 and supported by a high-profile consortium. So, while it is widely acknowledged that there is much potential to develop on and around rail corridors in Australian cities, at present commercial incentives are not sufficient to drive the process.

Additionally, there have been political barriers to successful TOD implementation. Local councils are strongly resistant to development due to collective scepticism of high density housing which does not sit well with the "Australian dream" of a four bedroom house with a backyard. The rezoning and compulsory acquisition of land required for TODs has been described as "Soviet command and control" by the NSW Opposition[99], which is indicative that there is little bipartisan support for transit oriented development.

A final reason that may have played a role in the reluctance to implement TODs has been the inability of existing transport networks to accommodate any increases in demand. This has been cited as a reason for the lack of development above train stations in Melbourne[100] and it is reasonable to suggest that a similar factor may be at play in other Australian cities.

Overcoming the issues in Australia

As has been argued throughout this paper, densification and intensification of urban areas is key to creating a sustainable transport system in the future and it is therefore critical that state policymakers begin to actively plan around TODs, promote them and remove barriers to their realisation. While TODs are often seen as the 'holy grail' of city design, even development of six storey, as opposed to two storey, housing on key transport corridors will help to improve the sustainability of cities in the future. While large-scale high profile projects with major developers may be seen as the ideal, even small scale brownfield re-developments run by small, local developers can slowly start to change the face of Australian cities. However, current planning laws are often not conducive to these small scale brownfield re-developments, which needs to change if the necessary urban densification is going to succeed.

98 Adelaidenow.com.au

99 Extract from conversation on ABC Stateline, 2010

100 Covering our Tracks, The Age, 2010

Impact and feasibility

Magnitude of impact
The potential revenue impact from TODs in Australia is **high** in the short term due to the opportunities to sell land around the public transport assets and in the longer term to improve the utilisation of Australian public transport.

If properly implemented, transit oriented development offers the potential for significant revenue generation in Australian cities. Though revenues from air rights are likely to be more modest in Australia than they are in high rise cities such as Hong Kong, they would still be able to generate some extra revenue and begin a move towards a broader TOD policy. It is estimated that the land occupied by the rail corridor in inner-eastern Melbourne alone is worth approximately $4 billion, which is indicative of the value that could be generated by moving the rail line underground and developing a TOD precinct above.

Furthermore, the willingness of people to pay a price premium to live in properties within transport oriented developments will increase land values and associated government tax revenues and could be used to fund any further infrastructure costs. TODs would also help to improve the economic case for investment in transport infrastructure by increasing patronage, which in turn would improve cost recovery and reduce congestion. Indirect benefits of TOD include the potential to generate business development and employment opportunities, to grow and diversify the housing stock and to reduce the economic costs of greenhouse gas emissions.

Support for broader public transport objectives
Transit oriented development strongly aligns with broader transport policy objectives in that it encourages public transport patronage, reduces dependence on car usage and fosters social inclusion by creating closely integrated and easily accessible neighbourhoods.

Ease of implementation
In the short term, sale of air rights might be possible assuming transport operators coordinate with local councils to ensure that planning permission is granted, or state planning laws are introduced which permit high density developments along rail corridors. Though this has proven difficult thus far, there is no reason, given a persuasive political campaign, it cannot happen in the near future.

In the longer term it will be critical to focus on full integration of land use planning policies, urban strategies and community needs to ensure that the potential benefits of TOD policies are fully realised. Poorly planned or ill-considered 'jobs closer to home' schemes can result in a share loss for public transport, meaning that the likely origin of workers and location of public transport requires careful analysis. For example, Macquarie Park and Homebush business centres in Sydney are not major centres of public transport usage despite a railway station close by, due to the 'city centric' nature of the network which makes driving quicker and cheaper for many commuters who can take advantage of the readily available free parking. This again emphasises the need for fully coordinated planning which considers employment, housing and public transport at a holistic level.

In some states this will require a change in mindset and processes, but the potential rewards are significant in terms of liveability and increased cost effectiveness of assets.

5.5.2 INFRASTRUCTURE LEVIES

Overview

Infrastructure levies, in their current format, are additional taxes charged on new housing and commercial developments and exist to help fund the necessary infrastructure in fringe suburban growth areas. The levies are designed to ensure that new communities have adequate provisions of health, education and transport services and they are applied to any new residential development. To this end, infrastructure levies serve a constructive purpose in constraining excessive urban sprawl and encouraging greater population density, as well as raising additional revenues. Without infrastructure levies there is the potential for new suburbs on the urban fringe to have inadequate services, or to have adequate but costly and underutilised services which require significant taxpayer subsidisation. Despite this rationale, it must be noted that existing infrastructure levy schemes are not without criticisms and issues, some of which it may be possible to alleviate through improved land release planning and processes, but some of which are more difficult to remedy.

Most prospective approaches

Infrastructure levies are an important and necessary feature of city planning since they create appropriate incentives to ensure that new developments are coupled with the essential infrastructure and services needed to create sustainable and liveable communities.

However, in their current format, infrastructure levies are criticised due to the potential distortionary impact that they can have on the supply of new properties and the resulting property price inflation.

In the short term, in cities where infrastructure levies already exist (Sydney, Melbourne and Brisbane), attention must be given to planning processes to make sure they are fully coordinated with transport providers and local councils to free up brownfield land for development and to ensure that money collected from levies is directly re-invested in the greenfield communities where it originated.

Over the medium to long term, trialling the effectiveness of 'Tax increment financing' (see Section 5.5.1) is recommended in selected locations to test its effectiveness over the medium term as an alternative to an upfront infrastructure levy. In cities where infrastructure levies do not currently exist, it is recommended that tax increment financing schemes are also trialled and implemented.

Case studies

As it currently stands, the level of infrastructure levies on new residential developments varies significantly across the country. While South Australia, Western Australia and Tasmania do not impose infrastructures levies, the levies charged by New South Wales, Queensland and Victoria are significant.

Where infrastructure levies have been implemented, they have become a contentious political issue and have received significant media attention due to concerns that rising infrastructure levies are worsening housing affordability. This is a heated topic in Australia and in Sydney in particular,

which has become one of the least affordable cities in the world. The increase in the Growth Area Infrastructure Contribution (GAIC) to $95,000 per hectare in Melbourne has been heavily scrutinised[101]. In Sydney and Brisbane the fact that total infrastructure levies increased by 466% and 279% respectively between 1995 and 2006 to up to $66,000 has attracted strong criticism from both developers and opposition political parties[102].

In NSW, the increase in infrastructure levies has been driven by rapid increases in 'section 94 levies' and state government Special Infrastructure Levies. Section 94 levies are imposed by local councils and are used to fund community, recreation, transport and drainage facilities, tree planting and streetscaping while state government Special Infrastructure Levies are used to fund roads, schools and emergency services.

Both of these levies have been controversial as much of the revenue collected by local councils has not been spent for its intended purposes and there are concerns that revenue collected by the state government unfairly burdens new home owners for services that are shared by all taxpayers. Furthermore, there are complaints that not enough land is being released for development, contributing to housing shortages and inflated house prices. This has been further exacerbated by the uncertain economic conditions generated by the global financial crisis (GFC) and rising interest rates, acting as a deterrent to financers to invest in the construction of new homes in greenfield areas.

Despite the controversy surrounding them, infrastructure levies support the principles of TOD and help to ensure that higher cost-to-serve outer suburbs are not being built without a mechanism in place to ensure that the extra costs are in part being covered in the development phase. The optimal design and implementation of an infrastructure levy scheme requires consideration of the lessons learned to date in New South Wales, Victoria and Queensland. For example, one of the reasons that infrastructure levies in their current format appear to be particularly unpalatable is because they are a large, upfront cost. Another solution would be to charge new residents over time, rather than in an upfront lump sum, for instance through their rates bill, or to trial the 'Tax increment financing' approach (see Section 5.5.1) which has been recommended by the Property Council of Australia. Tax increment financing involves the government paying a bond to fund the new infrastructure, which is paid back by the growth in property taxes generated by that investment. Both of these schemes would be likely to have a less distortionary impact on the upfront price of the property while still ensuring that adequate infrastructure could be provided.

Feasibility and impact

Magnitude of impact

Implementation of infrastructure levies nationwide would be expected to have a **medium** to **high** impact if the same levies were applied and a proportion of the revenues was reinvested back into public transport as in Sydney currently.

If the approximately 30,000 greenfield developments on the fringe of all Australian state capitals were charged at the same rate as those in Sydney's outer suburbs ($66,000), the increase in the pool of funds for transport infrastructure would be significant.

Using these assumptions, the total uplift in revenue available for public transport from a nationwide implementation of infrastructure levies is approximately $180 million, which equates to 3.4% of operating costs. This takes into account the fact that developments in Sydney, Melbourne and Brisbane are already levied to varying degrees and that 10% of the levies are allocated to public transport infrastructure.

An alternative source of revenue could potentially be generated by placing levies upon existing residents who gain the benefits of new infrastructure projects. As existing properties in the vicinity of newly created TODs will benefit from increased services and see increases in their property valuations, it is not unreasonable to suggest that they should pay some form of infrastructure levies. Though in reality, given they will be being applied not to new developments but to existing properties, these new infrastructure levies would be indistinguishable from other forms of locally administered taxation.

Support for broader public transport objectives

The impact of changes in infrastructure levy legislation upon transport usage is likely to be positive, as it will encourage infill developments and decrease urban sprawl. Furthermore, provided that (in a departure from current practices) the levies are effectively reinvested into provision of infrastructure in the new areas, public transport patronage within new suburbs would be much greater than in the absence of the levies.

The issue of infrastructure levies goes hand in hand with transit oriented development. As TODs are typically brownfield as opposed to greenfield developments, they require less in the way of new infrastructure and subsequently are subject to lesser infrastructure levies. For example, in 2006 the average infrastructure levy paid for a new home unit in Randwick was only around 10% that paid for a new house in Liverpool[103]. It could be argued however that as these infill developments have greater access to existing infrastructure they should have to pay more to access it; but in reality this is already factored into the inflated house prices in those areas.

However, by increasing average house prices, infrastructure levies are likely to have a negative effect on social inclusion.

Ease of implementation

It is likely that any attempt to significantly increase infrastructure levies in states which already have them would face significant opposition due to the issue of housing affordability. There is already a significant amount of negative press about infrastructure levies so any attempts to increase them in any form are unlikely to be well received by developers, who seem to hold considerable sway in state politics, and by the electorate generally. However, in those states that currently do not have infrastructure levies, it may be possible to introduce them if they are combined with government policies designed to free up brownfield land for development.

Imposing infrastructure levies upon existing properties is also likely to be unpopular. Moreover, as these levies would need to be varied at the local council level it, would require significant legislative change for them to be implemented and require substantial administrative expense. The likelihood of this achieving bipartisan political support is expected to be very low.

101 Growth Areas Infrastructure Contribution Information Sheet, Growth Areas Authority, Victorian Government, 2008
102 National Housing Infrastructure Costs Study, The Property Council of Australia, 2006
103 Ibid.

5.6 SUMMARY OF REVENUE GENERATING INITIATIVES

In order to understand the various priorities and trade-offs, each of the revenue initiatives has been assessed on the dimensions of financial impact, support for broader public transport objectives and ease of implementation. The resulting matrix (Figure 33) reveals some interesting trade-offs.

None of the revenue initiatives discussed in this paper has been rejected as inappropriate for implementation, but prioritising initiatives remains instructive for strategy and policy formation. We would suggest the following relative prioritisation of each of the revenue initiatives evaluated (Table 5).

Figure 33

Financial impact vs support for broader public transport objectives matrix.

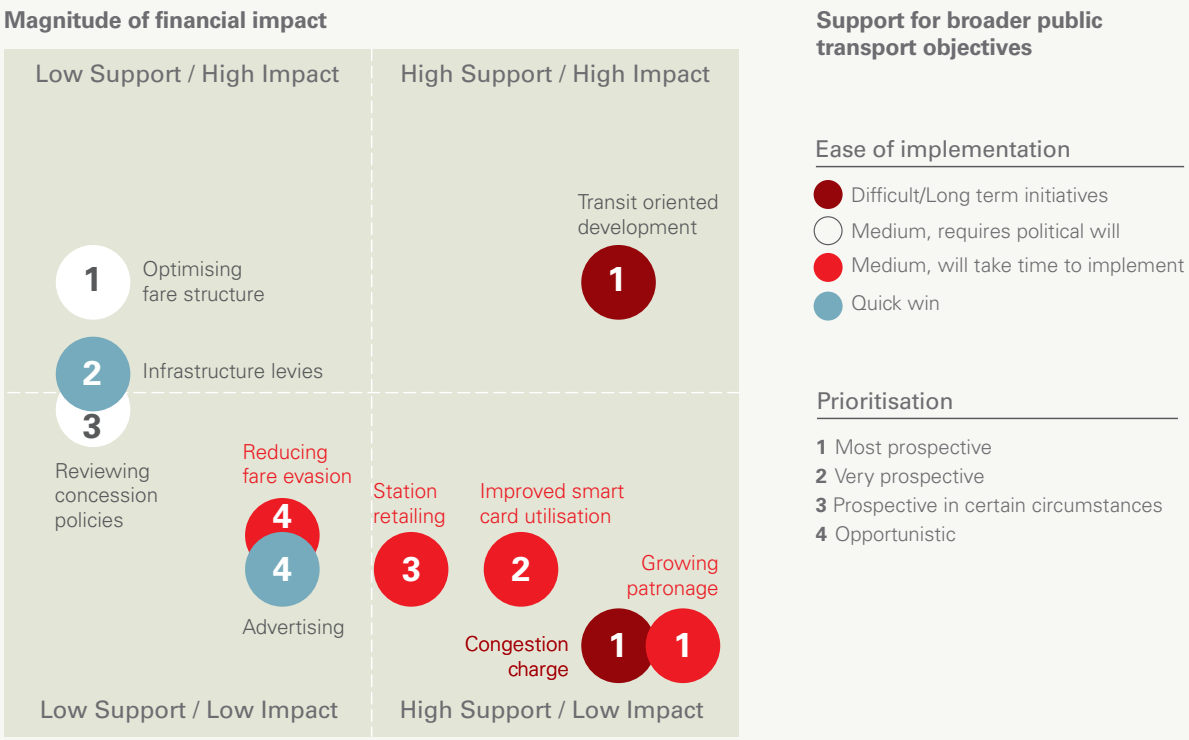


Table 5
Proposed revenue initiatives prioritisation

Priority	Initiative	Time scale*	Rationale for priority scoring
1 Most prospective	Optimising fare structures	Short term	If applied appropriately and with sensitivity to social policy objectives should have minimal impact on demand and has the potential to significantly boost revenues.
	Growing patronage	Medium term	Strongly supports broader public transport objectives; should therefore be central to future policy formation, despite the fact that it is unlikely to result in material net cost savings.
	Transit oriented development	Long term	Could facilitate a major step change in urban density, facilitating the conditions for 'mass transit' style frequencies; in the short term significant revenue opportunities exist from the sale of land.
	Congestion charging	Long term	Strongly supportive of broader public transport policy objectives; thus there is a strong case to prioritise despite the likely negligible impact on public transport revenues.
2 Very prospective	Infrastructure levies	Short term	Despite unpopularity and potential inflationary impact on house prices, infrastructure levies help to prevent creeping infrastructure costs resulting from urban sprawl, consistent with TOD objectives, as well as being a material revenue stream.
	Improved smartcard utilisation	Medium term	Once smartcards have been fully implemented in all cities, operators have the opportunity to use them to achieve both direct and indirect cost savings as well as improved customer service and satisfaction.
3 Prospective in certain circumstances	Reviewing concession policies	Medium term	Reducing eligibility of concession holders to travel in the peak or eligibility for concessions altogether could generate significant extra revenues, but will require an extensive debate into the merits and demerits of current concession entitlements.
	Station retailing	Medium term	Although a low revenue generator, station retail can significantly improve public transport atmosphere and ambience, helping to boost patronage.
4 Opportunistic	Advertising	Short term	The potential for revenue uplift is low, as is the support for broader public transport objectives, but this is a quick win, relatively uncontroversial initiative that would be worth implementing.
	Reducing fare evasion	Medium term	Time and resource intensive, with a relatively low payback; does little to support broader policy objectives.

*Long term = 5+ years to implement; Medium term = 2-5 years; Short term = Less than 2 years.

6.0 COST SAVING INITIATIVES

6.1 INTRODUCTION

In addition to identifying opportunities to generate additional revenue, there should be a strong focus on making public transport operations as cost efficient as possible, since a 1% reduction in costs has three times the impact on an operator's cost position as a 1% increase in farebox revenues.

As noted in Section 3.1, Australia's relatively high transport costs are a combined result of low population densities in Australian cities, which require more service km and track length per capita than many international cities, and also operational inefficiencies.

Managing operating costs is at the heart of what good operators do. In Australia, the capabilities and legacies dealt with by operators and the resulting cost performance observed varies widely. Each operator has areas in which they are more cost efficient and areas in which they are less, and there is no one-size-fits-all strategy that can be universally pursued. Cost performance is driven by a range of factors including industrial environment, age and repair of infrastructure, prevailing policy settings and, most importantly, the focus and capability of management around managing costs.

This paper presents some high level themes and perspectives that can be used to drive cost efficiencies, focused on the largest components of an operator's cost base, but it is important to recognise that implementing some of these changes and capturing the possible improvements can be very difficult.

The largest portion of operating costs for a public transport operator is labour costs, which represent 60-80% of total operating costs for a typical rail operator and 40-60% for a typical bus operator. When costs are grouped into major activity categories, approximately 40% of both bus and rail costs are spent on asset management and maintenance, with the remaining 60% comprised of overheads and service delivery costs.

Based on this cost breakdown, the following initiatives will be discussed in this paper:

Asset cost savings

- Improving asset productivity
- Spreading peak demand
- Network optimisation

Labour cost savings

- Improving workforce productivity

Leveraging private sector capabilities

- Outsourcing
- Franchising (which can enable many of the above initiatives)

It should be noted that the success of each of these initiatives rests on an informed and careful understanding of the potential trade-offs involved and safeguards and mechanisms that are required to minimise risk.

6.2 ASSET COST SAVINGS

Each of the three 'asset cost savings' initiatives laid out in this paper have one primary aim: to increase the total number of passenger km achieved by the public transport asset base for a given level of expenditure.

The most direct way that asset cost savings can be achieved is by reducing the upfront capex costs paid for the assets. One way this could be achieved is to purchase (where at all possible) new vehicles / carriages 'off the shelf' rather than using a bespoke design. An extension of this policy would be to coordinate procurement functions across different operators to achieve a volume discount on the purchase of assets.

In addition to these upfront savings that operators should strive for, there are also a number of initiatives that can be pursued to increase the total number of passenger km that each asset achieves, thereby reducing costs per passenger km. These are:

- By improving the **productivity of existing assets** on existing routes, each vehicle or train carriage will achieve more service km, and hence will be able to carry a larger volume of passengers;
- By **spreading peak demand,** utilisation levels are more even throughout the day and total asset requirements are reduced, meaning that capacity if better utilised; and
- Finally, by **optimising routes** within and across modes, the asset base can be made available and relevant to the maximum number of passengers, which will increase the number of passenger km.

Asset related savings are potentially large. As described in Section 6.1, direct fleet costs relating to maintenance and housing of the fleet and related infrastructure represent at least 40% of total public transport operating expenditure. When adding finance costs and depreciation, the percentage of the overall cost base is much higher at 50-60%.

Finally, costs to actually run and operate the fleet, which encompass all operational costs, such as driver, fuel and signalling costs, can also be reduced when assets become more productive, which also results in indirect cost savings.

Other indirect benefits from these initiatives can accrue from improving the passenger experience through reduced journey times, lower levels of crowding, and additional (and more relevant) services. This may lead to increased patronage and therefore a revenue uplift.

6.2.1 IMPROVING ASSET PRODUCTIVITY

Overview

Asset productivity is measured by governments and transport operators in terms of service km per vehicle, service km per seat or, in terms of passenger service, km per vehicle. Asset productivity is driven by the following factors:

- The percentage of total fleet that is in service at any given time, often referred to as fleet 'availability';
- The average speed at which the vehicle operates;
- The average number of carriages or seats per vehicle; and

- The number of passengers that can be accommodated on each vehicle.

High levels of asset productivity can lead to direct savings resulting from a reduction in the number of units required in the fleet, which can have a tangible impact on the approximately 40% asset related costs that transport operators spend every year, including depot, staffing and fuel costs. Depreciation and fleet replacement capex costs can also be reduced if each vehicle is being used more efficiently.

The impact of improved asset productivity on maintenance costs will vary depending on the efficiency of current maintenance practices. Where efficient maintenance practices are already in place and asset availability is above average, maintenance costs could increase per vehicle with improved asset productivity due to greater wear and tear and increased overtime from night work that results from the extra service km. Conversely, if maintenance practices are not at best-practice levels, it could be possible to improve both asset utilisation and maintenance efficiency simultaneously.

In addition to the direct, asset related savings, improved asset productivity can also lead to significant labour savings driven by faster travel times, as well as other related savings such as reduced driver and guard costs per service / passenger km as a result of a higher average speed, and even reduced fuel costs due to less stopping and starting.

Initiatives to reduce each of the drivers of asset productivity will be discussed below.

Most prospective approaches

It is likely that material improvements in fleet productivity will require focusing on each of the underlying factors which drive productivity. These are:

1. Improving fleet availability, through improvements in maintenance practices, investments in new fleet and fleet standardisation;
2. Improving average speeds by reducing dwell times, providing greater right of way for buses on roads and improving signalling systems on the railways; and
3. Ensuring that the capacity per vehicle is matched to demand as closely as possible and increasing the loading factor per vehicle wherever possible.

Case studies

Improving fleet availability

The most direct method of reducing fleet requirements (or increasing fleet capacity) is by improving the efficiency and effectiveness of maintenance practices. This ensures that as great a percentage as possible of the fleet is available at any given time. The availability of rollingstock for Australian train operators shows scope for improvement; the highest availability amongst electric multiple units (EMUs) of international operators is 98%[104]. One way in which maintenance standards have been proven to be improved for a given level of expenditure is by outsourcing the maintenance function to a private company (also discussed in section 6.4.1 'Outsourcing').

Another key driver of availability is the age of the fleet, which is often outside an operator's control. Transport operators face a trade-off between the higher maintenance costs and lower availability of an older fleet which is more prone to breakdowns and the capital expenditure required to invest in a new fleet. Managing this trade-off is an important factor in determining the rate of fleet replacement and maximising asset utilisation.

Maintenance efficiency can also be improved by having a uniform fleet. This allows for uniform maintenance practices and lower spare part costs (See Sydney Ferries Case Study below).

In rail, the quality of track infrastructure costs also has a significant impact on asset utilisation. A worn and ageing track can result in much faster wear and tear on rolling stock, make accidents more likely and reduce the speed at which trains are able to travel. For example, in the US, track defects are the second largest cause of accidents and "slow zones" exist in which trains must slow down due to poor track quality[105]

Case study: Sydney Ferries

Sydney Ferries is characterised by several factors that are detrimental to asset utilisation. The current fleet of 28 vessels has an average age of 19 years and consists of 6 different classes resulting in a complex, time consuming and uneconomical maintenance task. The availability of vessels averaged 86% in 2009-10[106].

Other causes of inefficient asset utilisation are congestion at Circular Quay during the morning peak, which drastically increases dwell times, and inefficient co-ordination with other modes of public transport at either Circular Quay or Manly, the two most utilised wharves. Although the required reforms are likely to require significant investment (e.g. new fleet) and time (e.g. industrial reform), Sydney Ferries has much scope for improvement in asset utilisation.

Improving average speeds

Improving the average speed of services can significantly improve asset productivity by lifting the ratio of service km per service hour. As discussed in Section 5.2.4, it can also have a positive impact on patronage by reducing journey times.

Average speed can be increased through a range of initiatives, including:

- Reducing dwell times (on all modes);
- Providing greater right of way on roads; and
- Improving signalling systems on rail.

Reduced dwell times

By reducing the time required to load and unload passengers, each bus and train can run more trips and therefore carry more passengers in a given time period - "Saving five seconds at 12 stations means gaining a minute" [107].

For buses, the primary manner in which dwell times can be minimised is through cashless ticketing which can significantly increase embarkation speed. For example, the introduction of cashless or "prepaid only" buses in Sydney and

104 Benchmarking identifies good practice in rolling stock maintenance, Railway Gazette International, 2006

105 United States Federal Railroad Administration Office of Safety Analysis Website: http://safetydata.fra.dot.gov/officeofsafety/

106 Sydney Ferries Fleet Availability and Reliability 2009-10.

107 Independent Public Inquiry - Long Term Public Transport Plan for Sydney, Christie et al, 2010

Brisbane has improved running time on these services[108], but implementation has highlighted the need to ensure adequate ticket vending options and to ensure that both tourists and locals, especially in the offpeak, have adequate information to understand where and how to purchase a prepaid ticket[109].

For trains, reduction in dwell times can be achieved through improvements in station and train design to improve the speed at which passengers get on and off the train, and also the speed at which the doors themselves open and close.

For example, passengers tend to converge in the middle of trains, crowding the middle carriages, while the ends are relatively empty, which increases the time it takes people to get on and off. Dwell times can be reduced by dispersing patrons more evenly along the platform, either through changes to station design, greater use of public announcements or through employing additional staff.

Within a carriage, train design can also have an impact on dwell times. Placement and format of handholds can encourage people to crowd at the doors. Options to encourage people to spread away from the doors include non-seatback handholds, seating along the outside of carriages and folding seats. Trials with carriages featuring modified hand rail systems have been well-received by customers and have shown a reduction in entry and exit times.

Greater right of way on roads

Bus and tram journey times can be significantly reduced by granting right of way at busy intersections. Bus lanes have been installed in most states and have had a positive impact on journey times. However, bus lanes can be made ineffective when cars are parked in the lanes (due to commercial vehicles unloading goods, taxis dropping people off or cars parked in the off-peak when bus lane parking is permitted). However, the implementation of GPS technology that provides buses with priority at major intersections has the potential to materially impact journey times[110].

In Brisbane, busways – dedicated roads for buses that improve travel speeds and reliability – are the backbone of the bus network. There are currently 24km of busways with more due to open in 2011. According to TransLink, busways can carry up to 12,000 passengers per hour in each direction, whereas a general traffic lane with an average urban bus utilisation can carry a maximum of about 1,600 people per hour. There are currently about 60 million trips taken on Brisbane's busway network each year.

Melbourne has also made progress in this respect through the introduction of the *Think Tram* project. The implementation of traffic management measures, use of new technology to improve traffic flow and amendments to road rules are anticipated to increase the travel times and reliability of tram services on key tram routes throughout the city[111].

Improved signalling systems

Improvements in signalling systems generate specific opportunities for trains. Currently signalling systems cause up to 60% of all infrastructure delays in train networks[112]. Moreover, at present, train speeds are set relatively conservatively to mitigate the possibility that human error could cause accidents. By incorporating Automatic Train Protection systems, which effectively automate signalling systems, this possibility is eliminated and trains can travel at higher average speeds as has been experienced on many of Europe's rail networks.

British Rail and Channel Tunnel Case Study[113]

British Rail developed and trialled two Automatic Train Protection (ATP) systems in response to the Clapham train crash in 1988. The systems were installed and continue to operate on two lines: The Great Western main line from Paddington to Bristol, and the Chiltern line from Marylebone to Aynho Junction (Banbury). ATP equipment is fitted to trains operated by First Great Western, Chiltern Trains and Heathrow Express.

In both systems, on-board computers are provided with information on the condition of the line and signals ahead. If the driver fails to control the train, the system intervenes to stop the train. Data transmission to the train is intermittent, taking place as the train passes over loops and beacons placed in the track. As such train speed is not always optimised, as there may be a delay between improvement in conditions ahead and passage of information to the on-board parts of the system.

The most modern systems provide full automatic train protection. The Transmission-Voice-Machine 430 (TVM-430) cab signalling system used in the Channel Tunnel and fitted to Eurostar and Class 92 locomotives on the Channel Tunnel Rail Link provides continuous updates of the status of the line ahead using coded signals transmitted to the train and displays speed profiles to the driver. On-train components calculate safe speeds using known information on the train's capabilities. Line side signals are not used. In the event of a failure trains are brought safely to a stop. This allows trains travelling through the Channel Tunnel to travel at up to 300 km/h[114].

Carrying more passengers per vehicle

Carrying more people per vehicle is another way to maximise asset productivity. This can either be achieved through increasing the capacity of each vehicle (e.g. through adding extra carriages, length, or height), or by finding ways to fit more people into the same capacity and 'increase the loading'. Each of these approaches is discussed below:

Increased capacity per vehicle

Increasing the capacity of vehicles used during the peak by adding extra carriages, length or height to the vehicle should allow a greater number of people to be transported for the same staff costs (e.g. drivers, guards etc). However, this must be balanced against cost considerations and infrastructure constraints (e.g. platform length constraints if adding extra carriages, bridges and tunnels if adding extra height.) Sydney's double deck trains are also sometimes criticised for causing longer dwell times at stations (while passengers are boarding and alighting as it takes longer for them to reach the doors) which reduces average speed.

Conversely, during the offpeak, it may be worth reducing the number of carriages per train which would allow for substantial maintenance savings. The Christie Report highlights the fact that in Sydney, the running of eight-car trains at weekends may

108 It takes an average of 3 seconds to board with a prepaid ticket and an average of 11 seconds when paying a cash fare (StateTransit Authority of New South Wales, 2007)
109 Improving Efficiency: An evaluation of Sydney Buses 'Bondi Bendy' prepay service, STA NSW, 2006
110 Bus Priority at Traffic Signals: Investigating the Options, Hounsell, N. B., University of Southhampton, 2004
111 VicRoads website
112 Customer Service Improvement Program, RailCorp, 2008
113 ORR Website, 18 February 2008, http://www.rail-reg.gov.uk/server/show/nav.1560
114 New high-speed rail line opens to link Britain to Europe, Channel NewsAsia (MediaCorp News), 2007

be unnecessary, as passengers tend to bunch up in the middle of the train, leaving the outer cars almost empty. This measure might slightly increase crewing costs because of the need to split and rejoin trains, but could have a significant impact on rolling stock and infrastructure maintenance costs. An added benefit is that it would be easier for guards and transit officers to monitor passenger security if dealing with four cars instead of eight[115].

Potential for increasing the capacity also exists on buses. For example, selected bus routes in several cities already operate with longer 'articulated' buses (e.g. 333 'Bondi Bendy' in Sydney which saw an increase in patronage of 4% the year after the longer buses were introduced[116]). The drawback on the bus network is that capacity cannot be reduced again in the off-peak without retiring some buses and sacrificing frequency; larger buses therefore need to be deployed strategically to ensure they are serving areas of consistently high demand.

Increased loadings
On average, Australian trains carry much lower peak loads per m^2 of standing space than is the norm overseas. The most crowded Australian trains reach approximately 2 passengers per m^2 at their peak, versus 4 passengers per m^2 for the highest peak load European and US cities and up to 5 passengers per m^2 in Hong Kong and Bangkok[117]. While it must be noted that Australian journey lengths are often longer than in other global cities, it might be possible to increase the target loading level on many routes. Many of the measures that could be adopted to facilitate an increase in average loading could also help to make passengers feel more comfortable in crowded conditions and help to increase patronage. These are discussed in Section 5.2.4 'Growing Patronage'. For example, increasing the level of on-board real-time information can reduce the levels of anxiety experienced by passengers in crowded carriages. This can help reduce the discomfort of crowding which in turn "helps ease the flow of passengers"[118] and increases overall customer satisfaction.

Impact and feasibility

Estimated financial impact
The estimated impact from this initiative is expected to be **high.** A reduction in required fleet sizes allow significant cost savings. Rolling stock maintenance costs will be reduced as will other running costs such as fuel and staffing. There are also indirect benefits, including a potential patronage uplift if journey times are reduced and reliability improves.

Furthermore, as the fleet size is reduced, up-front capital requirements for replacement and depreciation expenses also decrease. This has the potential to be a significant saving as depreciation and amortisation can account for up to 23%[119] of total costs for train operators.

Cost saving benefits need to constantly be balanced with the upfront cost of upgrading the assets. For example, the replacement of six of the Sydney Ferries fleet and wharf upgrades is expected to cost $709 million[120]. However the Walker Report in 2007 believed the government should go even further, stating that an entire fleet replacement is an utmost priority to ensure long term cost control targets are achieved, "otherwise, stagnant passenger numbers, mounting maintenance costs and problematic reliability will compound the present unsatisfactory state of affairs"[121].

Support for broader public transport objectives
Improving asset productivity should have a positive effect on the passenger experience, which supports the objective of achieving a modal shift towards public transport.

Ease of implementation
The initiatives vary in ease of implementation from one operator to another and one initiative to another. Improving maintenance practices has the potential to raise industrial relations issues and can be politically sensitive, depending on the degree to which resources need to be redeployed. None of the other initiatives is likely to be politically controversial since they will improve passenger experience in tandem with achieving cost savings.

Some initiatives also require significant investment in new systems (e.g. GPS in buses, signalling systems on rail), while others are relatively less costly and simpler to implement (increasing loadings per train carriage).

6.2.2 SPREADING PEAK DEMAND

Overview

Across Australia, public transport networks encounter systematic 'peaks' in demand during weekday mornings and afternoons. While these peaks are approximately two hours in duration, within this period there is also an intense 'super peak' that typically lasts for 30-45 minutes[122].

Public transport providers operate at maximum capacity and typically employ their entire available fleet during the peak and super peak periods. With peak demand continuing to grow, public transport operators are having to increase capacity; the Victorian Government recently ordered 37 new Xtrapolis trains which are currently being introduced into service[123]. Thus, the total asset requirements of a public transport operator are generally dictated by the capacity needed to service the peak.

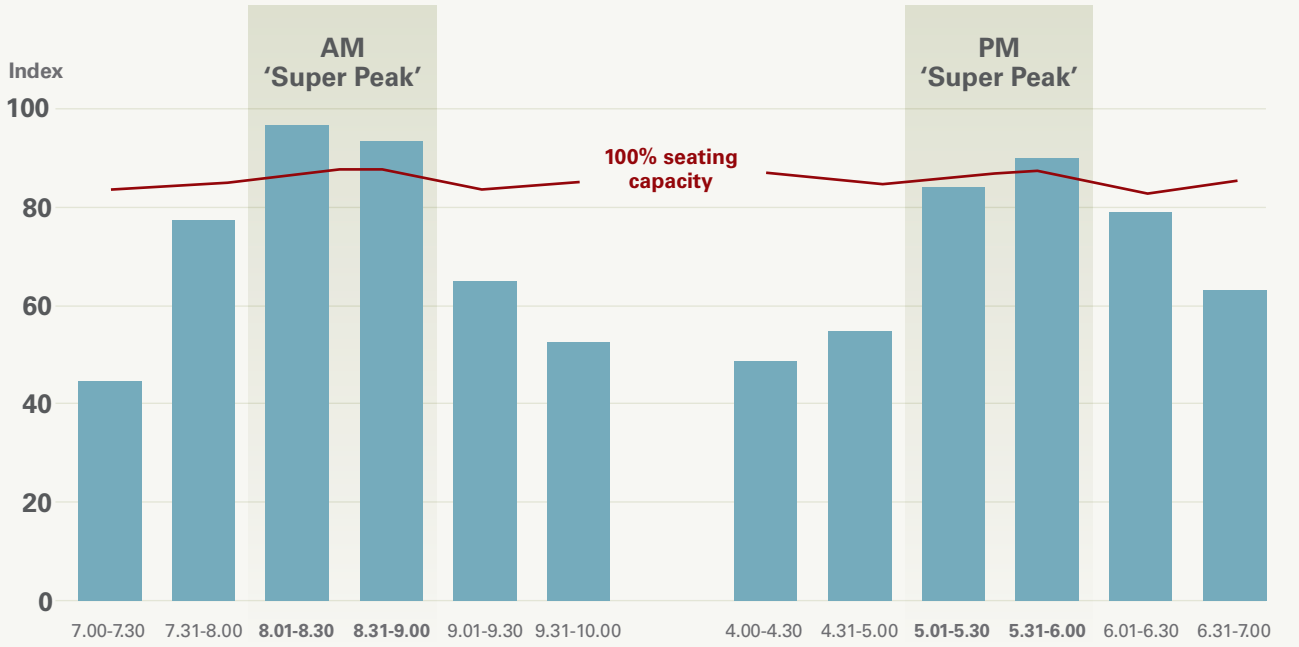
With patronage levels much lower outside the peak periods, assets tend to be poorly utilised throughout the majority of the day. As a result, it is clearly in an operator's best interest to smooth patronage demand over a larger time period in order to reduce maximum asset requirements. This could lead to greater asset productivity, resulting in savings in upfront and ongoing capital expenditure and maintenance costs among others, as discussed in Section 6.2.1.

However, shifting customers out of the super-peak and peak periods is a challenge, since a large proportion of these passengers are commuting to and from work, school or university. Most of these peak commuters have limited flexibility over when they travel due to low employee start-time flexibility and other personal constraints (e.g. school commitments and family responsibilities). Research examining the travel behaviours of peak commuters in Melbourne estimates that only 10-20% of CBD employees have access to start time flexibility[124].

115 Independent Public Inquiry - Long Term Public Transport Plan for Sydney, Christie et al, 2010
116 Improving Efficiency: An evaluation of Sydney Buses 'Bondi Bendy' prepay service, STA NSW, 2006
117 L.E.K. interview and questionnaire program;
118 AUS / NZ Customer Director, Alstom Transport, 2009
119 Annual Report, RailCorp, 2009
120 Metropolitan Transport Plan, NSW Government, 2010
121 Report of the Special Commission of Inquiry into Sydney Ferries Corporation, Bret Walker SC, 2007
122 National Passenger Transport Agenda, Australasian Railway Association, 2006
123 New passenger trains finally running, ABC News, 2010
124 L.E.K. Research 2008

Figure 34

Typical daily passenger demand profile for a metropolitan rail network



Source: Operator Data

However, coupled with the measures described in Section 6.2.1 to accommodate more passengers on each asset, even achieving a 5% reduction in peak patronage could have a significant impact on peak asset requirements.

Most prospective approaches

While there is no single 'silver bullet' strategy to reduce peak demand, operators and policy makers can implement a combination of strategies to provide suitable incentives to encourage a shift from the peak to the off peak. These are:

- Increase the price differential between peak and off peak;
- Encourage switching to alternative modes of transport; and
- Encourage employers to introduce flexible working hours.

Case studies

Increase the price differential between peak and off peak

In theory, there are two pricing strategies that can be employed to encourage peak passengers to travel outside the peak: increase peak fares or discount off peak fares (or both in combination). As discussed in Section 5.2.1, Victoria Transport Policy Institute research (2007) suggests that elasticities for off-peak travel are typically 1.5 to 2 times higher than peak-period elasticities, which is supported by research in Melbourne, suggesting that only a small proportion of commuters have access to start time flexibility.

This means that a discount on off-peak fares alone is unlikely to result in any meaningful shift in patronage from peak to off peak. Trials in Sydney indicate that while there is some shifting of travel patterns, especially initially, factors such as the inability to alter work hours and the lack of actual change in the cost of continuing to travel in the peak will mean that in the long term reducing off-peak fares alone is not an effective strategy.

For a peak fare rise to be effective, it is expected that prices would have to increase by a significant margin (greater than 20%) before it is likely that a major shift away from the peak would occur. However, notwithstanding the potential political and social fallout from such a policy, an increase in peak fares could materially improve the cost position of Australian public transport as a combined revenue raising and cost reducing initiative.

Melbourne 'early birds travel free' case study[125]

In 2009, Melbourne introduced a free "early bird" ticket which allows passengers to travel for free before 7am, to help cope with up to 12 percent per annum growth in train usage, concentrated in a morning 'super peak' between 7:30am and 9am.

According to Jim Betts, the Director of Public Transport for Victoria, the scheme has been "hugely successful", shifting "3000 people, or three train loads, to earlier services, where three extra trains would cost $60-$70 million".

125 'Discount fares on the cards for Melbourne's commuters', The Age, 2009

The free early bird travel is now expected to continue and further off-peak discounts are under consideration. There is optimism that when the Myki smartcard is fully operational it will give the flexibility required to give people extra incentives to travel off peak.

Encourage switching to alternative modes of transport
In order to reduce peak demand, public transport operators and policy makers can encourage passengers to explore alternative modes of transport such as cycling and walking for short-trips. This is a strategy being adopted by Transport for London (Figure 35).

However, in order to facilitate this initiative, operators need to provide passengers with the necessary amenities. For instance, the introduction of cycle hire schemes, as seen in many European cities including Paris and Copenhagen, where bicycles are available for hire at docking stations located across the city and at transport interchanges, has proved to be a successful scheme.

Encourage flexible work hours
By introducing flexible work hours, commuters are empowered to change their travel behaviours. There are three apparent alternative work time options that increase start-time flexibility without reducing office contact hours.

Firstly, employers can offer 'flexitime' where employees can choose their arrival and departure times, provided that they complete the required number of work hours. Thus, an employee's start and finish time can be varied on a day-to-day basis to fit individual commitments. To ensure cultural continuity and employee interactions, employers may set core hours during the middle of the day which all employees must be present.

Secondly, organisations could offer employees the option to take up staggered work hours. This is similar to the 'flexitime' option, except start and finish times are fixed for each employee.

Finally, employees could opt for a compressed work week where they are allowed to work more hours per day but work fewer days per week (or per pay period). This would usually involve starting earlier and finishing later.

The table opposite (Figure 36) assesses the advantages and disadvantages of different flexible work hours schemes. A compressed working week would be likely to have the most favorable impact on crowding on public transport, because it actually results in fewer journeys overall. It would be especially successful if employees were encouraged to have their 'day off' at different times during the week, as opposed to say, all on a Friday or all on a Monday. Overall, a range of schemes should be advocated so that businesses can select the most appropriate options depending on their specific requirements.

Impact and feasibility

Estimated financial impact
The overall impact of spreading peak demand is expected to be **medium**. As discussed, many peak travellers do not have access to work time flexibility, with only 4% of passengers likely to switch even if the differential between peak and off peak fares is widened by 20%. However, it is reasonable to assume that this 4% reduction can be achieved overall if pricing initiatives are combined with increased workplace flexibility and other modal options (e.g. cycling). This could potentially free up 4% of 'super peak' capacity, which may help to reduce asset costs by a corresponding amount. Reducing total asset requirements by 4% would lead to significant maintenance and depreciation savings.

Support for broader public transport objectives
Encouraging a switch to alternative modes of public transport or biking, and encouraging flexitime (especially when it results in a lower overall number of trips) are both strategies that are supportive of environmental and social transport objectives, and may also contribute to a more productive workforce (due to health gains from more exercise if switching to walking to biking and less travelling time).

As discussed in Section 5.2.1 'Optimising fare structures', price increases are less supportive of social objectives, especially in the magnitude needed to meaningfully shift demand from the peak to the off-peak. They could also cause a rise in car usage if people are shifting to private cars rather than to walking, cycling or altered working hours.

Ease of implementation
None of these potential initiatives is easy or straightforward to achieve. Price increases tend to be politically unpopular and businesses are likely to need some compelling (possibly financial) incentives to encourage them to switch to flexible working hours. The strategy to encourage switching to alternative modes of transport will require a focus on marketing (see 'Travel Smart' case study in Section 5.2.4), and on infrastructure (footways, cycle racks, bike hire schemes etc).

Figure 35
Transport for London; Walking and cycling initiatives

Tfl alternatives strategy

2010 Cycle hire scheme

In London, a cycle hire initiative will be introduced in 2010 where bicycles will be available for hire 24 hours a day with docking stations located across London.

TfL walking improvements map

In order to encourage walking, TfL are making improvements to walking routes (e.g. clearer signage, improved pedestrian crossings) across London.

Figure 36

Flexible working hour options

	Description	Employer impact	Employer benefit	Workplace popularity	Impact on Peak PT
Flexitime	Employees are allowed to select arrival and departure times, given that they complete the required amount of work hours Start and finish time can be varied on a day-to-day basis to fit individual commitments Most employers would set core hours during which all employees must be present	Increased staff motivation and commitment Increased productivity Higher employee retention Increased administration Reduced performance monitoring	✓ ✓ ✓ × ×		
Staggered work hours	Employee start and finish times are staggered Start and finishing times are fixed and cannot be varied on a day-to-day basis Working time arrangement would provide a core period when all workers are present	Extended operating hours Improved employee motivation and morale Increased operating cost (security, power) Reduced core contact hours	✓ ✓ × ×		
Compressed work week	Employees are allowed to work more hours in fewer days but work fewer days per week / pay period. This would usually involve starting earlier and finishing later	Increased productivity Improved employee motivation and morale Higher employee retention Reduced employee interaction Reduced core contact hours	✓ ✓ ✓ × ×		

Favourable Neutral Unfavourable

6.2.3 NETWORK OPTIMISATION

Overview

Network optimisation focuses on ensuring that public transport services are deployed around the network in the closest possible alignment to the level of demand for the services and that all modes of transport are planned together to create the most cost effective and fastest options for travel from point A to point B. This helps to boost cost recoveries by ensuring that farebox revenues are maximised with the lowest cost outlays necessary.

In the extreme cost efficient scenario, the network would be configured to minimise overlap between intermodal services, with routes on which the cost recovery is the lowest being eliminated altogether and stations where patronage was below a certain level being closed. However, the requirement for cost efficiency is constantly being balanced by policy makers against the need to ensure that the network is as socially inclusive as possible and ensuring that convenience and journey times are sufficiently attractive to promote public transport patronage.

Network optimisation includes both route optimisation on each individual mode, as well as optimisation of the entire network across modes.

Most prospective approaches

To make public transport as relevant for the largest proportion of the population at the lowest possible cost, a more "connective" network, with shorter routes and strategic interchanges, can be more suitable. Pre-requisites for the success of such a scheme are:

- Well planned interchanges and improvement in network information;
- Fare structure which does not penalise changes between transport modes; and
- Careful network wide planning across all modes to make the most efficient use of available capacity.

Case studies

Route optimisation

There are a number of factors that drive the most optimal route design in a city. Routes need to be optimised based on:

- The population of residents in each region around the network
- The travel patterns of the residents by location
- The travel patterns of residents by time of day
- The likely modal choice of each resident (which in turn can be at least partly influenced by the frequency and quality of services on offer)

As highlighted in Section 2.1 the challenge faced by policy makers around Australia is that public transport is irrelevant to large portions of the population, due to the issues of low population density, urban sprawl and the fact that many people do not work in the CBD, even though most services are CBD-centric. By trying to make sure that as many routes are served as possible, the complexity of public transport systems has grown, but due to the fact that there are so many possible combinations of trips over such a large area, services are still, in many cases, neither relevant nor sufficient.

'CBD-centric' to 'connective' network: case study

In many cities, there are no high-frequency and reasonably direct bus services for key linkages between major activity centres in the inner city. Rather, the only frequent service options require passengers to go via the CBD despite these suburbs often having the greatest population densities[126].

A way to improve connectivity while containing overall spend is to rethink the traditional CBD-centric networks and move to a series of more frequent 'connective' configurations, which would allow passengers to reach many more destinations by public transport, increase frequencies and reduce journey times. This would not impact the densest, highest frequency peak routes, (e.g. express direct CBD-bound services.) However, for the less patronised routes or during the off-peak, it could certainly be an option to provide a more cost effective yet more comprehensive service.

Figure 37 depicts a transport configuration which maximises the number of direct bus routes from each residential area of a city to each workplace activity area. This yields a network of nine routes, where people typically do not need to change to get to any of the activity centres. Due to the large number of routes on the network, the city may only be able to afford to run services every 30 minutes.

Figure 38 shows a "connective" network. Instead of running a direct route between every residential area and every activity centre, there is a direct route from each residential area to just one activity centre, but the network designers make sure that all the resulting routes connect with each other at a strategic point. Because there are now only three routes instead of nine, buses can run on each route three times as frequently as under the "no change" option in Figure 30, at the same total cost. So instead of a service every 30 minutes, there is a service every 10 minutes. Sydney's metrobus strategy demonstrates a move to such a system, with a series of cross-city routes intersecting at a common interchange.

Asking people to change buses is politically unpopular, so the "no change" option is the politically safe solution, but from the standpoint of journey time and cost efficiency it may be sub-optimal.

Assuming that a single bus route from any residential area to any activity centre, under any of these scenarios, is 20 minutes, with the "connective" network, the middle of the diagram is halfway, so it is 10 minutes from there to any residential area or activity centre.

Under the "no change" scenario, a service runs directly from Residential Area 1 to Activity Area 2 every 30 minutes, so on average the waiting time is 15 minutes. Once the person is on the bus, the travel time is 20 minutes. So the average trip time takes 35 minutes.

Under the "connective" option a service leaves Residential Area 1 every 10 minutes, so the average waiting time is 5 minutes. There is then a 10 minute ride to the interchange point. The person gets off this bus and waits for the next bus to Activity Centre 2, which also runs every 10 minutes, so the average wait time at the interchange point is again 5 minutes. Finally, the ride from the interchange point to Activity Centre 2 takes 10 minutes. So the average trip time is 30 minutes.

This example illustrates the fact that a network that requires passengers to change can get them to their destination faster than a network with the same total operating cost that does not. Furthermore, it allows peoples to complete a much greater combination of trips in a faster time. For example, travelling from Residential Area 1 to Residential Area 3 takes 50 minutes on the "no change" network once average waiting time is considered, but only takes 30 minutes under the "connective" network configuration.

Other advantages include the fact that it may encourage more people to travel on public transport as people can travel spontaneously and know there is a service whenever they need it and it may make the network simpler and easier to understand.

However, there are also a number of issues that need to be overcome to ensure that it is successful including:

- People tend to be resistant to having to change transport modes. UK research indicates that passengers are willing, on average, to spend four minutes longer on their journeys if this means they will avoid having to make a connection.[127] People who rarely use public transport, people who have impaired mobility and people who are making a particular journey for the first time are all more likely to have a stronger than average aversion to interchanging. Therefore a focus on clear information and easily accessible and wheelchair friendly interchanges is required.
- A "connective" network requires a ticketing system that allows free inter-modal transfers. The use of smartcard technology should allow such an interchange friendly fare structure (as is the case on the London Oyster Card) and also allow more data on travel patterns to be gathered to facilitate better network planning.

South East Queensland case study

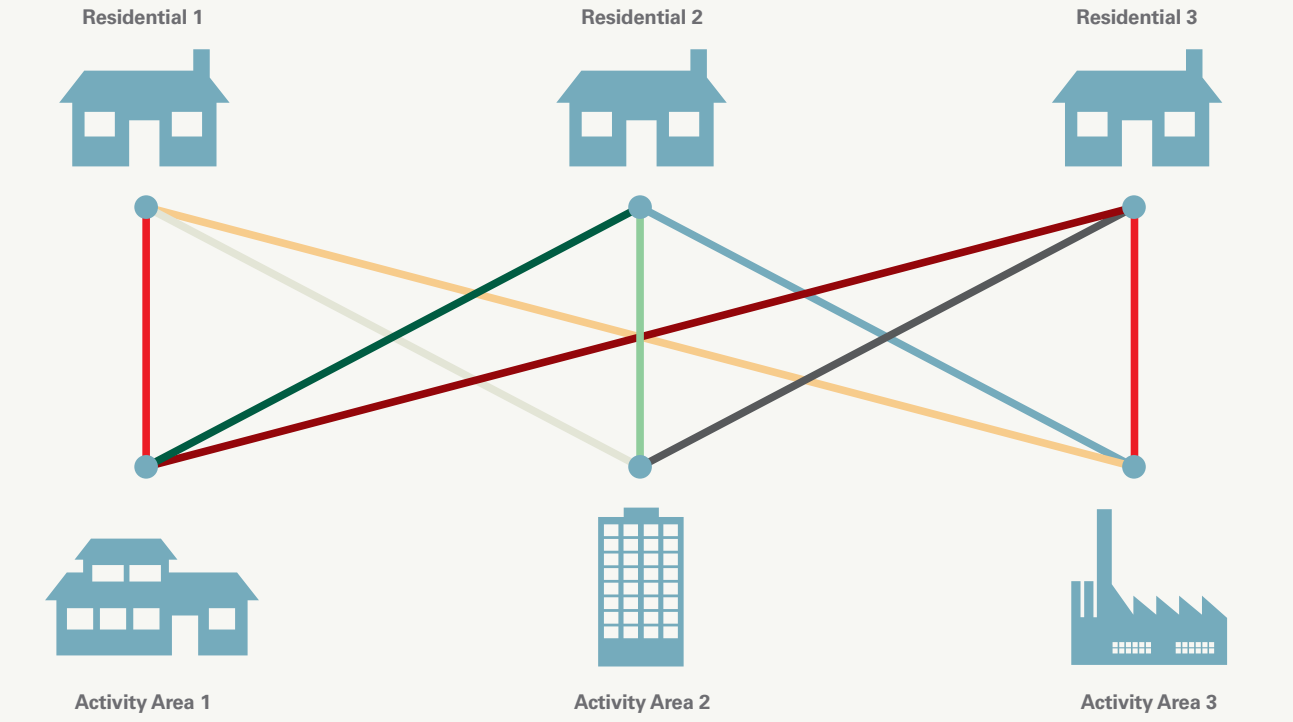
The TransLink Network Plan 2010 outlines South East Queensland's plan for a high frequency priority (HFP) network, as: a network of fast, frequent, reliable and direct services which will form the backbone of the public transport system, running along major corridors and connecting activity centres and residential communities. The network of HFP routes will be clearly identifiable, with consistent branding of stations, stops, ferry terminals and signage. New services will be introduced to cater for cross town and inter-regional travel. The high frequency priority network will be supported by local

126 "Independent Public Inquiry - Long Term Public Transport Plan for Sydney", Christie et al, 2010

127 Intermodal transport interchange for London, Best Practice Guidelines, 2001

Figure 37

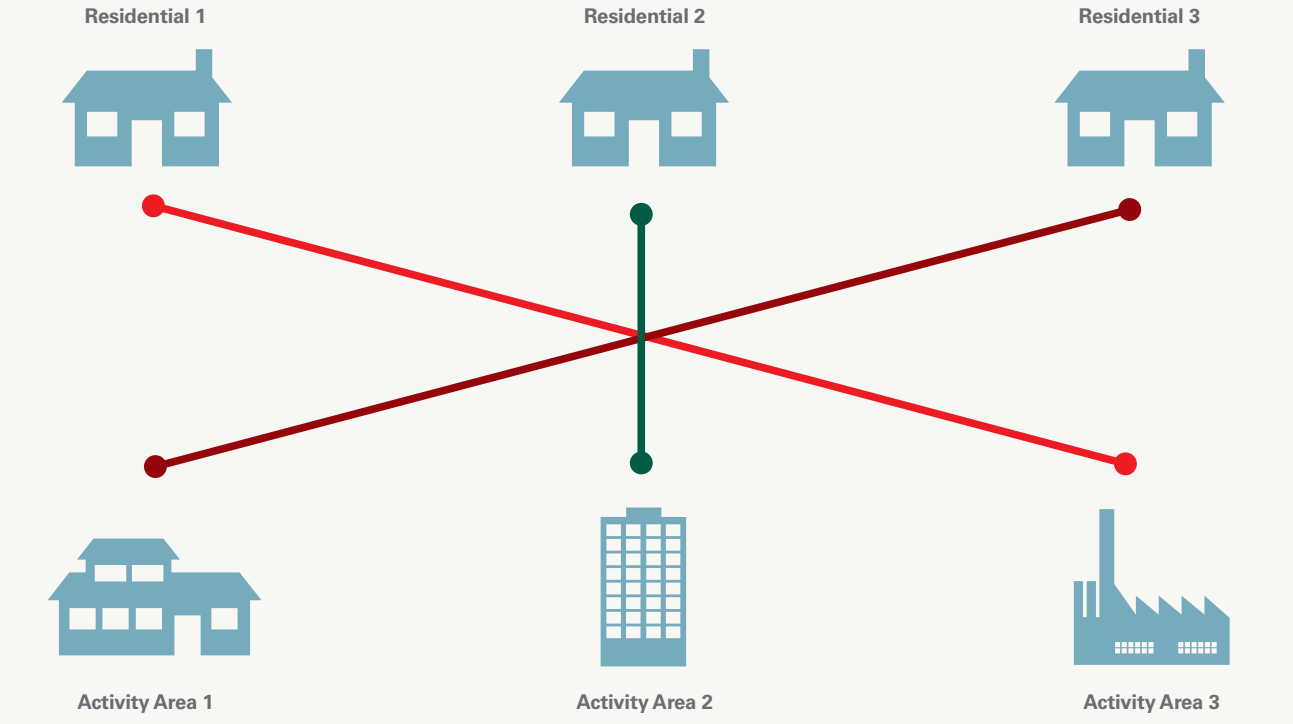
The "no change" network: nine routes, each with a service every 30 minutes



Source: "Independent Public Inquiry - Long Term Public Transport Plan for Sydney", Christie et al, 2010

Figure 38

The "connective" network: three routes, each with a service every ten minutes



Source: "Independent Public Inquiry - Long Term Public Transport Plan for Sydney", Christie et al, 2010

services. In the future, fast, frequent and reliable travel from A to B will no longer require a journey into the city, with cross town services providing more direct connections.

Intermodal network optimisation
The bus case study discussed above can also apply in a whole network scenario. In a rational transport planning process, bus, rail, light rail, trams and ferries are always thought about as part of one network. Furthermore, the mode of travel to the public transport is always considered, whether it is by car, on foot or by bicycle. "Park and ride" and "kiss and ride" options are all the more important to improve access for residents in a city's outer suburbs.

The more connectivity and the less duplication there is between each of these modes, the more efficiently and cost effectively the whole network will run. Reducing the inconvenience and uncertainty that can be associated with making an interchange also has a big impact. Improved integration can offer quicker, more convenient journeys by public transport and, by extending network flexibility and coverage, open up new journey opportunities. This will both benefit existing passengers and enable and encourage others to leave their cars at home.

Complete network optimisation can also help with overcrowding issues, due to the fact that some routes should enable inbound rail passengers from outer areas to connect to buses at an earlier point, thus freeing up some capacity on these trains for the last parts of their trips into the CBD. In Sydney, to take just one example, the recently announced[128] light rail extension plans will allow bus passengers to alight earlier in the journey (e.g. at Central) and complete their journey on the light rail, which will improve journey times and prevent the bus congestion and slow journey times along Elizabeth Street and George Street.

In the short term, improvements in inter-modal connectivity could be achieved through relatively simple measures such as timetable synchronisation or 'pulse timetabling', an advantage of the 'Zurich Model' and marketing and awareness raising campaigns to demonstrate the interchange options available. A comprehensive multi modal website can help to achieve this (e.g. Transport For London's 'Journey Planner') by allowing customers to type in their origin and destination and see the modes and connections available to them on public transport and / or foot / bicycle.

Impact and feasibility

Estimated financial impact
Over the long term, the benefits of network optimisation could be expected to be **high**. The focus of this strategy is to improve services for the same cost, rather than saving on costs. However, it should also facilitate higher recoveries due to higher levels of patronage, especially during the off-peak when more destinations can easily be reached by public transport.

Support for broader public transport objectives
Aspects of route optimisation strategy have the potential to harm social inclusion aims, e.g. where services are cut for particularly low demand suburbs. Furthermore, the implementation of a 'connective' strategy may cause some dissatisfaction and disadvantage travellers with impaired mobility where direct services are cut in favour of shorter services requiring interchange.

However, overall the initiatives should have a positive impact on accessibility and lift usage of public transport overall. By making services more frequent and journey times shorter, route optimisation makes public transport a more convenient option for many passengers which would lift patronage and thus reduce congestion. Moreover, the creation of interchanges would provide ideal hubs around which transit oriented developments could be planned.

Ease of implementation
Network optimisation is without doubt a medium to long term strategy that requires careful planning. There are a number of impediments to its implementation:

- **Political** – it is likely that certain suburbs will be disadvantaged by any route changes which may lead to local activism;
- **Technical** – connective intermodal public transport networks require ticketing systems that allow intermodal transfers;
- **Administrative** – if different operators run the different modes of public transport then it may be difficult to co-ordinate an integrated timetable; and
- **Physical** – as mentioned a connective public transport network requires interchanges at which inter-route and inter-modal transfers can take place. In many cases, such interchanges may not yet exist and will require construction which may be expensive and time consuming.

6.3 LABOUR COST SAVINGS

Transport operators are constantly striving to use their labour force as efficiently as possible, within the constraints of political and policy settings, industrial relations environments and the need to maintain staff presence to provide a good level of customer service.

For that reason, any major labour cost saving initiative needs to be accompanied by a review of passenger needs and transport policy in general to ensure that it supports broader aims, particularly where frontline staff are concerned.

6.3.1 IMPROVING WORKFORCE PRODUCTIVITY

Overview

Ensuring that staff are deployed in the most efficient and productive way possible will have a direct and potentially significant impact on public transport operating costs. Although labour costs do vary across the different modes of public transport, for rail operators it is not uncommon for labour costs to represent 60-80% of total operating costs, whereas labour is more likely to account for 40-60% of operating costs for bus operators.

People are employed on a network for a range of different customer service, operational and back office related functions. On a rail network, the key customer facing roles include station staff, authorised / transit officers and security officers; operational roles include drivers and guards, signalmen and track and rolling stock maintenance staff; back office staff include control room operators and head office staff, such as HR, IT, finance and marketing.

128 Metropolitan Transport Plan, NSW Government, 2010

On a bus network the staff requirement is lower because there is no need to have people deployed to maintain below rail infrastructure or manage signalling etc, but staff are still needed as drivers, transit / revenue protection officers, and for fleet maintenance in the depots, as well as in the head office.

As shown during Victoria's 'Kennett Reforms', which commenced in 1992 as a response to a public transport system in financial crisis, there is potential to significantly increase staff productivity and make substantial savings. Savings were achieved through streamlining maintenance practices, rationalising workshops and removing train guards and conductors on trams. The reform process lasted approximately three years and involved cost savings of $250m over four years (over 20% of annual costs)[129].

These productivity improvements were achieved amid some very specific industrial and political conditions immediately after a state election, and the risk of industrial action or political fallout arising from such sweeping reforms should not be underestimated. This is further discussed in 'Ease of implementation'.

It is also critical to ensure that cuts do not mean that customer experience or safety are compromised. Nevertheless, often savings can be made in tandem with an improvement in customer service and any opportunities to make staff roles more customer oriented should be explored.

Most prospective approaches

Solutions for increasing staff productivity vary significantly by mode of transport, and also by operator, as some operators will have already implemented reforms to increase productivity whereas some have not. However, some themes for consideration are:

- Removing barriers to improved productivity (e.g. EBA constraints, etc);
- Using technology to reduce staff requirements in specific functions;
- Redefining roles to reduce duplication and achieve a multi-skilled workforce;
- Matching customer service staff more closely with passenger movements; and
- Sharing head office functions.

Case studies

Removing barriers to improved productivity
A number of barriers exist to improved productivity of staff on a public transport network. These can include:

- Enterprise Bargaining Agreement (EBA) rules designed to safeguard safety or working conditions which have unintended consequences;
- Excessive hierarchy or poor management practices;
- Poor hiring practices or low retention rates;
- Abuse of sick leave;
- Tenure based awards system that does not incentivise good performance; and
- Insufficient training for front-line staff.

Understanding and investigating ways to overcome these barriers should be the cornerstone of a productivity improvement exercise.

EBA case study
Enterprise bargaining agreements (EBAs) held between public transport operators and transport unions are designed to ensure adequate and safe working conditions are available to the workforce. However, in some instances they can have the unintended consequences of fostering inefficient work practices.

For example, some EBAs mandate the time and duration of a break to prevent driver fatigue. However, in some instances this means that the majority of drivers need to switch over for their break during the morning peak (assuming drivers start at 5am and need a break after 3-4 hours), significantly decreasing overall driver utilisation rates. Exploring options to either extend time on duty prior to a break, or stagger shifts and increase the proportion of part time staff could yield significant savings.

Using technology to reduce staff requirements in specific functions

Technology can be used to help to reduce staff numbers or make staff more effective in existing roles. Examples include:

- Electronic signalling systems can reduce the need for signalling staff
- Conspicuous and well advertised CCTV and panic buttons can reduce the perceived need for security staff / transit officers;
- Revenue protection technology (e.g. ticket barriers) can reduce the need for transit officers;
- Reliable and user friendly ticket machines can reduce the need for ticket office staff (smartcards that can be topped up online can play a similar role); and
- Driverless trains can significantly reduce driver costs. For example, Docklands Light Rail is a driverless system, and it has very low staff costs due to automated operation and use of technology at stations for safety and enforcement.

CCTV case study
Public transport security staff perform an important function. Concerns about safety and security on trains rank high in customer satisfaction surveys. For example in a RailCorp 2008 survey, they both featured in the top 5 indicators[130]. Security issues experienced on the trains range from vandalism and petty crime to more serious offences such as assault and sexual offences.

Many rail operators have invested heavily in security infrastructure. For example, in addition to deployment of 600 transit officers, CityRail has CCTV cameras on 273 out of 275 platforms on its network and by 2013 expects to have CCTV in 64% of its rollingstock[135]. A Long Line PA to all stations allows the CCTV room operator to make announcements on platforms. When an emergency button is pressed, the CCTV image appears at the monitoring station and the CCTV operator can use Long Line PA to communicate directly to the platform. If necessary, transit officers are deployed or the police are called.

129 L.E.K. interviews

130 Customer Service Improvement Program, RailCorp, 2008

However, CCTV is currently not seen as a crime prevention measure by CityRail customers[135], suggesting that more can be done to promote their existence and the fact that they are subject to constant "live human monitoring". In particular, success stories could be publicised (e.g. "heart attack victim saved" etc) to ensure that passengers are aware that they are a genuine rapid response mechanism.

This would allow CityRail either to reduce the number of transit officers for the same level of general security and safety or increase the passengers' sense of security for the same costs (potentially the more favourable strategy since transit officer also play a revenue collection role).

Redefining roles to reduce duplication and achieve a multi-skilled workforce

The redefinition of roles to reduce duplication and achieve a multi-skilled workforce could boost productivity. For example, some train services may have a guard, transit officer, revenue protection officer, security guard (eg., Chubb) and a mobile cleaner. Merging a number of the roles would help to reduce staff costs on each service.

The first step to achieving the merging of several roles might be to combine operational roles with customer facing roles where possible. Examples include:

- Equipping transit officers with PDAs (personal digital assistants) to allow them to conduct effective revenue protection activities[131] while also making passengers feel more secure on public transport[132];
- Changing the role of guards on trains so that they also carry out a revenue protection function; and
- Ensuring the staff at stations are approachable and help to add to the sense of security and information transfer to passengers rather than being purely a 'passive' presence.

Some of these measures are likely to require retraining and / or rehiring. For example on the CityRail network, transit officers have received training and improved their customer service skills through three months off site training and three months of on the job training. After the training was upgraded in 2005, complaints against them fell by 39% and now only around 3% of complaints are about transit officers[133]. Melbourne's new rail franchisee Metro Trains has also shown its focus on staff re-training through the announcement of a Metro Training Academy and Rail Careers Centre, based on a similar model that has had success with the Honk Kong MTR[134].

Matching customer service staff more closely to passenger movements

Ensuring that customer demand is matched as closely as possible to customer requirements is an effective way to make sure that every staff member is as productive as possible. Initiatives can include:

- Balancing staff and patronage distribution at stations, and considering an increase in the footfall threshold for unmanned stations; and
- Optimising staff presence by time of day at stations.

Case study: Peak and off-peak staff management

Globally, public transport networks encounter fluctuations in passenger volumes over the course of a day. For example, on a typical line on Melbourne's passenger rail network, passenger loads can exceed 900 passengers per train during the morning and afternoon peaks and then decrease to only 100 passengers per train during the off-peak.[135] In 2008, the RailCorp network experienced a similar phenomenon, with staffing levels highest at midday when passenger levels were at their lowest.

Recognising this as a critical issue, in 2009 RailCorp embarked on a substantial staffing reform program which significantly improved the alignment of staff levels at stations with passenger flows (Figure 39).

Station staff costs can be reduced by increasing the flexibility of rosters in order to reflect the changes in passenger demand at different times of the day. By introducing a staff / station deployment model that has a variable roster system, an operator can better match staff to patronage distribution and reduce the total number of station staff. To support a more variable rostering system, public transport operators will need to utilise more part time and contract staff.

Sharing head office functions

Established in 2003, Metlink is Melbourne's public transport body responsible for industry-wide functions such as marketing, providing passenger information, complaints handling, data collection and revenue protection. Metlink is wholly owned by the train and tram metropolitan franchisees but its services are provided to all operators (including V/Line and the Bus Association of Victoria) and to the state under contract[136].

Metlink is considered one of the most successful components of the Victorian (re)franchising process and its value emanates from subsuming the functions of three previously distinct bodies and providing consistent services to all public transport providers. By performing a series of roles that were previously carried out by a number of disparate organisations, Metlink is able to provide a level of coordination and efficiency that would otherwise be unattainable. Although the primary objectives of Metlink was to increase industry-wide co-operation, the benefits of Metlink extend to decreasing the duplication of roles and increasing the efficiency of work practices.

Impact and feasibility

Magnitude of impact

The potential cost savings from improvements in workforce productivity are **high** to **very high**. As mentioned, the Victorian Government was able to achieve savings in the order of 20% of total costs by implementing an aggressive series of reforms.

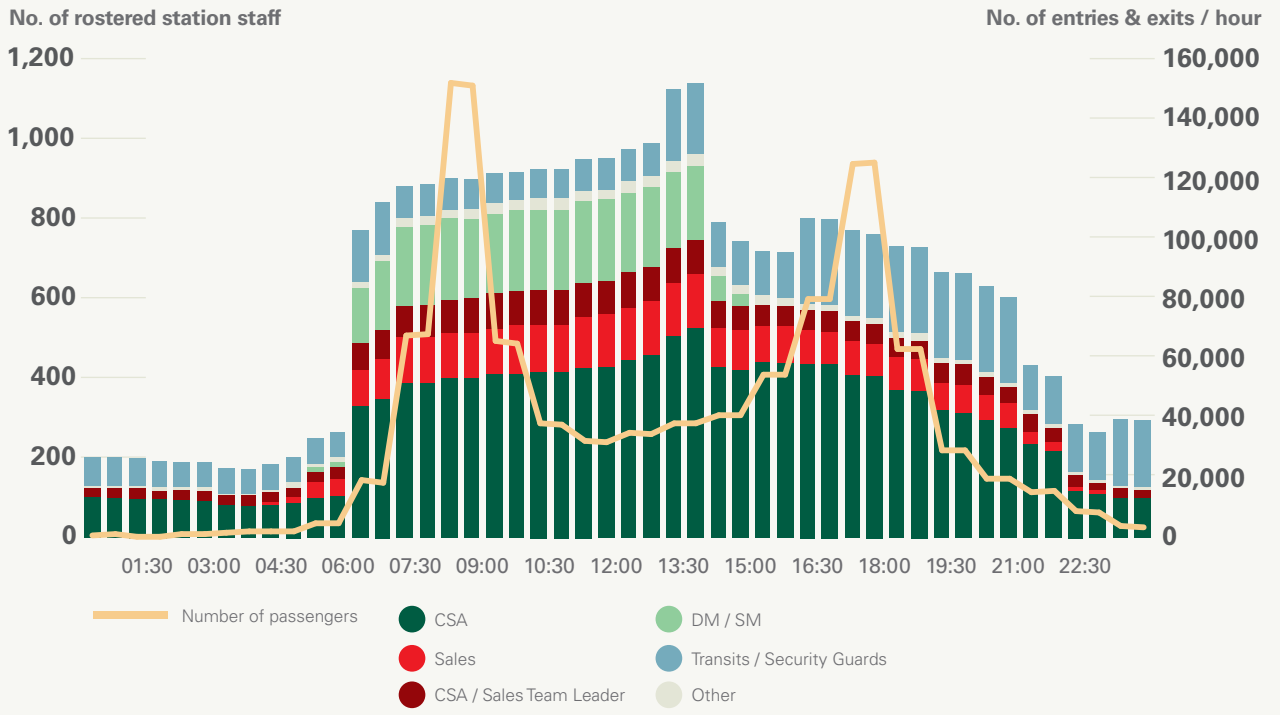
Support for broader public transport objectives

Workforce productivity improvements have the potential to damage customer service and make passengers feel less safe and secure on the network. Any cuts, particularly to front-line staff, therefore need to be considered very carefully before being implemented. Furthermore, redundancies and reductions in award wages may form an element of the productivity increases that are implemented and are likely to have a significant social impact. Moreover, if industrial action

131 This would include both the ability to identify repeat fare evaders and to issue tickets
132 Customer Service Improvement Program, RailCorp, 2008
133 Customer Service Improvement Program, RailCorp, 2008
134 On track for massive makeover, The Australian, 2009
135 National Passenger Transport Agenda, Australasian Railway Association, 2006
136 Public Transport Partnerships: An overview of passenger rail franchising in Victoria, Department of Infrastructure, Public transport Division, 2005

Figure 39

CityRail rostered station staff and passenger exits 2008*



*Customer Service Improvement Program, Railcorp, February 2008. Source: Railcorp

takes place as a result of workforce productivity reforms then there will be wider social and economic implications.

For these reasons, any changes need to be made with a great degree of thought and care. With sufficient training and allocation of staff where passengers most need them, it may be possible for customer service to improve, even while staff become more efficient.

Ease of implementation

There are some notable challenges associated with implementing staff cost reduction strategies that need to be considered.

- Political hurdles: the public transport sector is a highly unionised environment and reducing staff is likely to be met with significant union resistance. Moreover, many transport operators will only be able to operate within the constraints of existing customer service charters and state-specified employee requirements. Any major workforce reforms would need to be supported 100% by the state government to ensure their success, as was the case during Victoria's 'Kennett Reforms'.
- Customer perceptions: as discussed earlier in the section, a reduction in station staff or security staff may result in increased customer dissatisfaction or perceptions of lack of security which would need to be managed.
- The challenges of making staff more customer service focused: retraining staff with a customer service focus is often not an easy task. Not only can the training be time-consuming but often the public's perceptions of public transport workers are so ingrained that they can be difficult to change. Moreover, many public transport staff, such as ticket officers, do not perform tasks that particularly lend themselves to being focused on customer service.
- Upfront costs: while evidence suggests that minimising workforce reform can yield cost savings, it is important to ensure that all direct and indirect costs from reducing or redeploying staff are taken into consideration. These costs range from one-off redundancy payments to less obvious costs such as having to purchase additional technology to maintain customer service levels in the case of station staff (e.g. ticket vending machines).

6.4 LEVERAGING PRIVATE SECTOR CAPABILITIES

Many governments and transport operators around the world have sought the expertise and involvement of the private sector in the provision of public transport in an attempt to improve their cost position, the level of services that they offer, their customer service offering or a combination of all three. Private sector involvement can be as limited as the outsourcing of a specific, isolated function over a short time period, or it can be as large as a full scale privatisation in which all of the assets are transferred to a private third party.

In any scenario, the bidding process, contracts and incentive structures put in place are key to the eventual success of the scheme, but the benefits can be substantial.

6.4.1 OUTSOURCING

Overview

In public transport, outsourcing refers to an arrangement where an operator enters into a contract with a private supplier to perform an activity / function that was previously provided internally[137], often through a competitive tendering process[138].

Generally, both the public and private sector will outsource their ancillary functions while continuing to perform core functions in-house. Outsourcing can result in direct and indirect cost savings and/or quality improvement since the outsourced provider often has specialist skills, expertise and cost efficiencies (eg. economies of scale, better utilisation of staff and equipment).

Access to improved skills and technologies
Contractors are specialists in their field. In more complex areas such as IT, they are more likely to be able to invest in attracting high quality talent and utilising the latest technologies. Operators are therefore able to access a higher level of skills and expertise for a similar (or in some cases lower) cost than they would have if they retained the function in-house.

More efficient management practices and other indirect costs
Outsourcing firms often have more cost efficient work and management practices than non-specialists due to economies of scale in areas such as staff utilisation / rostering and purchasing. Cost savings could also occur through the minimisation of overheads and training costs associated with the outsourced activity. In addition, outsourcing can in some cases result in a reduction in the requirement for the operator to purchase and hold capital equipment (eg., hardware and software associated with IT and call centres).

Commercial / market pressure
Contracted organisations often have greater incentive to use resources and capital more efficiently than internal providers. Compared to public operators, private organisations are inherently motivated to pursue cost efficiencies as they are subjected to commercial pressures necessitating profit maximisation. Also, when an operator decides to outsource a function, it is typically done with the objective of reducing the cost of that function while maintaining adequate service levels, or improving the quality of the outcome with the same cost. Thus, as well as being inherently focused on cost reduction, contractors are also motivated to develop cost efficient practices so that they can submit a low-cost bid in order to secure work[139].

Most prospective approaches

Within public transport provision, there are many areas of operation that can be outsourced, such as:

- Customer facing functions - security, cleaning and station staff;
- Maintenance functions - fleet and track maintenance; and
- Head-office functions - call centres and information technology.

The extent to which these functions are already operating efficiently within each organisation will determine the potential strategy that could be adopted with respect to outsourcing.

Case studies[140]

Customer facing functions
Many customer-facing functions fall outside what would be described as the core competencies of public transport operators and these functions are widely outsourced, resulting in either cost reductions or service improvements or both. For example, one Australian operator was able to decrease cleaning costs per passenger by over 10% through outsourcing whilst maintaining a level of 96% cleanliness. Despite deliberately not choosing the lowest cost tender, the operator still ranks favourably to operators in other cities on a cost per passenger basis[141].

Maintenance functions
In some cases, cost savings can be realised by outsourcing maintenance services to contractors who are better able to access economies of scale. For example, a large Australian rail operator has identified opportunities to realise significant cost savings per unit km from engaging in a competitive tendering process to outsource maintenance functions. This is due to the skills and technology that the outsourced parties would bring to the table with a Design Build & Maintain contract. It is estimated that outsourcing maintenance at industry best practice cost levels could save a rail network over $100 million in annual rolling stock maintenance costs - a cost saving of over 50%[142]. It is however to be noted that when the unionised workforce is transferred wholesale to the private contractor, efficiency improvements may be difficult to obtain.

Head-office functions
A prominent example of outsourcing head-office functions is the contract entered into between RailCorp and Fujitsu to operate its IT systems. The outsourcing of IT has several benefits including "the creation of a more reliable computing environment, improving service levels, increasing information security and lowering overall ICT costs" and is indicative of the advantages of outsourcing such functions[143].

137 The Australian Experience of Public Sector Reform, Australian Public Service Commission, 2003
138 Contracting for services in the NSW Public Sector: 1996 Survey Findings, NSW Treasury Research and Information Paper, 1997
139 Competitive Tendering as a Contracting Mechanism for Subsidising Transport, Hensher & Wallis, 2005
140 Outsourcing in the Public Sector, NSW Parliamentary Library Research Service, 1997
141 L.E.K. experience
142 L.E.K. Experience
143 Vicky Coleman, RailCorp CIO, 2006

Feasibility and impact

Magnitude of impact
This initiative could have a **medium** impact, unless multiple functions are outsourced in combination in which case the impact could potentially be higher.

Experience shows that outsourcing can produce continued savings in the functions outsourced, as well as potential one-off benefits. The degree to which benefits can be realised depends on the efficiency of the operations in question prior to outsourcing, as well as the success of the contract negotiation.

Support for broader public transport objectives
The cost savings (or quality gains) that can be achieved through outsourcing contribute to creating a more cost effective transport network, thus positively impacting Australia's overall economic competitiveness. However, one of the consequences in many cases of greater efficiency is overall reduction in staff required to do the same amount of work. It is also argued that blue-collar workers performing manual labour (e.g. cleaning, staffing stations etc) are disproportionately impacted by outsourcing. This is at odds with the broader public transport objectives of job creation.

Ease of implementation
Even within the public sector, the practice of competitive tendering and contracting out services is well established. Nonetheless, there are some common problems that ensure public transport agencies need to focus on best practice contract design. These include:

- Loss of control and performance management;
- Difficulty in creating an integrated customer experience, especially if customer facing functions are outsourced across different contractors;
- The need to maintain contract flexibility to be able to respond proactively to customer needs or conditions as they arise; and
- Opposition from unions can also be a hurdle to outsourcing and can lead to political pressures.

6.4.2 FRANCHISING

Overview

Over the last twenty years, a significant number of privatisations and long term franchising agreements have been completed in the transport industry around the world. Full privatisation is difficult as public transport provision is often a loss-making operation, and governments still need to maintain long-term control of assets for planning and investment (especially on the railways, but this can also be true on buses). As a result, franchising models are often a more suitable option where a private operator is responsible for managing and operating the system but financial and strategic support is still provided by the government.

This has been accompanied by an ongoing debate about the extent to which the private sector is able to achieve material cost savings over the public sector and, if they are, what impact this might have on service levels. However, many franchised systems around the world have realised cost and service benefits with the application of best practice contract design and tendering.

It must be noted that some public operators in Australia are very efficient and provide high levels of customer service. In these circumstances, the potential benefits from franchising can be negligible. However, the cost efficiency of rail and bus operators around Australia varies significantly and franchising could have a positive impact on some of the less efficient public operators.

Australia has a mix of private and public transport operations. Bus systems have been at least partially franchised in all states, while rail is still in public hands with the exception of Victoria and light rail in New South Wales (Figure 40).

Economic rationale for franchising
Proponents of private involvement in public transport maintain that a key reason private operators can realise cost savings is that they are subject to commercial pressure and are therefore inherently motivated to maintain and increase profitability. While both public and private operators have a clear focus on operating efficiently, private operators may be more likely to:

- Optimise routes;
- Maximise asset utilisation;
- Minimise overheads; and
- Introduce innovation.

Private organisations are also thought to be able to leverage significant, often global, experience and expertise from running multiple public transport franchises. This can enable the operator to deliver a better customer experience by introducing new ideas. Three notable examples in Melbourne:

- Veolia introduced an innovative new SMS data service in 2003 which delivered updates and information to train subscribers to enable them to alter their travel patterns based on timely information. This technology was originally developed by Veolia in France.
- TramTRACKER was introduced by TransdevTSL in late 2006. It provides customers with real time information on the next three trams arriving at a particular stop. Customers can receive service information through their mobile phone, SMS or online, or in 40 cafes in Melbourne's CBD.
- Metlink is Melbourne's public transport body and is wholly owned by the train and tram metropolitan franchisees. One of the first initiatives Metlink implemented was to replace the existing signage (created by each operator independently) with a new wayfinding system that provided clear, co-ordinated information about services, tickets and fares and that was consistent across the multi-modal system. The system was a great success and was awarded the best signage/environment design at the 2005 Melbourne Art Directors Club Awards.

It is also suggested that private operators are able to achieve more cost efficient operations by reducing labour costs as they are highly incentivised to negotiate more favourable award rates and are generally more resistant to pressure from unions compared to government (eg., threats of strike action or unfavourable media exposure). Commercial imperatives also mean that private operators can bring a very disciplined approach to managing contracts. Having said that, step changes in labour costs as a result of major industrial reform are best implemented by government prior to franchising, as seen in Melbourne's rail franchising in 1999.

Figure 40
Overview of public transport in Australian states

	Western Australia	South Australia	Queensland	Victoria	New South Wales
Governing Organisations					
Government Regulator	Department of Transport	Dept. for Transport, Energy and Infrastructure	Department of Transport and Main Roads	Department of Transport	Transport NSW
Customer Facing Organisation	Transperth	Adelaide Metro	TRANSLink	metlink	131500.com.au Transport Info Information for people on the move
Bus					
Public Operators			Brisbane Transport		Sydney Buses*
Main Private Operators	(11 contracts) Path Transit Swan Transit	(7 contracts) Torrens Transit Transitplus	(16 contracts) Veolia Bus Service Logan City Bus Service	(> 29 contracts) Grenda Corporation VenturalBus Lines	(> 11 contracts) Busways ComfortDelGro
Rail					
Public Operators	Transperth TransWA(Regional)	TransAdelaide	QR CityTrain and Traveltrain (Regional) Gold Coast Light Rail	V/Line (Regional)	CityRail CountryLink(Regional)
Main Private Operators				Metro Trains Melbourne (MTR Corporation, John Holland Group and UGRail)	Metro Transport Sydney (Light Rail and Monorail)
Tram					
Public Operators		TransAdelaide			
Main Private Operators				Yarra Trams (KDR Melbourne)	
Ferry					
Public Operators	Transperth				Sydney Ferries
Main Private Operators	Captain Cook Cruises		Brisbane Ferries Transdev		

Note: *Includes Western Sydney Buses and Newcastle Buses and Ferries

Most prospective approaches

Franchising can provide benefits to Government and the public in areas such as cost efficiencies and customer service. While these benefits are not exclusive to franchising (and indeed some public operators may lead the industry in certain areas), franchising can be a valuable catalyst for bringing a clear focus on performance due to strong commercial incentives and pressures. In order to realise the benefits of franchising, history has shown that the most prospective approaches to franchising incorporate best practice tendering processes, franchising models and contract structures.

Case studies

Melbourne Rail Franchising

In the mid 1990s, due to a desire to improve operational efficiency, service quality and financial performance, the Victorian Government embarked on a process of privatising public transport by splitting Melbourne's train and tram system into five franchises. In 1999 through a competitive tendering process, the franchises were awarded to three separate franchisees (National Express, Connex and Yarra Trams). In the first couple of years post-franchising, the new operators improved on time running and reliability by 35%, increased service frequency by 10% and patronage grew by 3% per annum[144].

However, after two - three years it became clear that despite the improvements in service levels, the operators were not meeting their bid projections due to lower than expected revenue growth and inability to achieve cost reductions, particularly since significant cost savings had already been realised during industrial reforms prior to privatisation. This was exacerbated by flaws in the original contract arrangements, such as the revenue allocation methodology and the infrastructure maintenance regime. In addition, risk was disproportionately transferred to the operators, particularly in terms of the farebox revenue risk. The result was a financial crisis of such magnitude that some of the risk was effectively transferred back to the taxpayer in the form of additional payments to the franchisees. National Express withdrew in 2002 and V/Line services were returned to the government.

In 2003, the government restructured the scope of the franchise contracts to move from four operators to two - one for trains ('TrainCo') and one for trams ('TramCo'). Yarra Trams and Connex re-negotiated the franchise agreements on an exclusive basis to operate the tram and rail systems, respectively. A new contractual regime provided more effective risk and upside sharing mechanisms.

In 2009, the Victorian Government refranchised the railways through an international tender, changing both operators. KDR (Keolis / Downer EDI) is now operating the trams and MTM is now operating the trains for an 8 year period. MTR, the largest shareholder in MTM, is the operator of the Hong Kong metro system and is widely considered to be both cost efficient and innovative. Accordingly, there has been much speculation that the new operators may be able to further improve levels of customer service through introduction of innovations from overseas into the rail network[145].

144 Expression of Interest Brief - Melbourne Metro Tram and Train Franchises 2009
145 New train, tram operators for Melbourne, The Age, 2009

The Melbourne rail franchising process has had its share of challenges, but the resulting criticisms of franchising may at times have been exaggerated[146].

Accordingly, the Victorian Auditor General has described the Victorian transport operators as providing "good value for money"[147] and overall Melbourne's rail franchising is widely considered to be a "qualified success"[148]. As described in Table 6 overleaf, when judged according to the five overriding objectives that the privatisation was to achieve, the results of franchising are generally positive.

Sweden rail franchising

The Swedish experience with rail franchising is indicative of both the benefits that can be generated and the problems that can arise. The benefits have primarily come in terms of improved cost-effectiveness and increased patronage. Franchising has led to reductions in required government subsidies in the order of 20% and there has been strong growth in passenger kilometres, exceeding the growth rates of all other modes[149].

However, there have been recurrent problems relating to the franchise contracts. These contractual disputes have manifested themselves in disrupted services and the replacement of rail services with buses, culminating in a legal dispute between one of the rail operators and the government. Moreover, as has been the case in many instances, the bidders were overly ambitious in their bids which led to rail operators going bankrupt in 2000 and 2005 and a third bankruptcy was only avoided due to a government bail out[150].

Overall, the key lesson from Sweden's experience is that there is potential for significant cost savings to be generated through franchising, though it is of vital importance that the operators have a sufficient level of experience and that contracts are written in such a way that ensures service levels are maintained.

Bus franchising

Franchising of bus services in Australia and abroad is more common than franchising of rail services. In part this is because it is easier to create separate franchise areas for buses compared to rail due to the integrated and interdependent nature of rail systems. Most Australian cities have introduced bus franchising on some level and, though results have been somewhat mixed, overall the results have been positive.

Perth bus franchising

In response to the McCarrey report which concluded that the then monopoly public bus authority, the Metropolitan Transport Trust (MTT), was operating inefficiently and failing to meet changing commuter needs, the West Australian Government undertook a process of bus reform via franchising in 1993. Initially, half of the bus services were put to competitive tendering and half were run by the government, but in 1998 the remainder were contracted to the private sector and the MTT ceased operations.

146 Victoria's public transport: Assessing the results of privatisation, Institute of Public Affairs, 2007
147 Franchising Melbourne's train and tram System, Auditor General of Victoria, 2005
148 Victoria's public transport: Assessing the results of privatisation, Institute of Public Affairs, 2007
149 Rail privatisation and competitive tendering in Europe, Built Environment, 2009
150 Ibid.

Table 6

Assessing the results of Melbourne's rail franchising as at 2007

Objective	Outcome	Comment	Result
Secure a progressive improvement in the quality of services.	Some improvement in reliability and punctuality, more consistent in trams than trains, commuters no longer inconvenienced by strikes and stoppages.	65 new trains and 95 new trams have been introduced into the system. There has been an 11.4% increase in the overall number of service kilometres.	Positive
Secure a substantial and sustained increase in the number of passengers using the public transport systems.	Patronage has risen strongly.	Patronage has risen by 37.6% on trains and 25.5% on trams since privatisation.	Positive
Minimise the long term costs of public transport to the taxpayer.	There have been no substantial cost savings to taxpayers – but there has been no real increase in costs either.	The proposed $1.9 billion in savings has not eventuated. Government subsidy for operating costs has remained stable.	Neutral
Transfer risk to the private sector.	Risk was transferred to the private sector, though some was returned with re-franchising in 2003 to enable more sustainable balance.	Overall the level of risk borne by the government is lower than pre-franchising.	Slightly Positive
Ensure that the highest standards of safety were maintained.	The high safety standards have been maintained.	No major crashes until recent incident involving collision with a freight train near Craigieburn Station.	Neutral

Source: Victoria's public transport: Assessing the results of privatisation, Institute of Public Affairs, 2007

The aims of the reforms were to reverse the long terms trends of increasing operating costs and decreasing patronage and to achieve cost effective service improvements. The franchising model that was adopted saw the ownership of the buses and supporting infrastructure remain with the state in addition to maintaining control of the setting of fares, routes and service standards. This was all to be administered through the state body Transperth while the franchisees were responsible for the operations of services.

The results of these bus reforms have been generally positive. In the first four years of the reforms, cost reductions of approximately 20% were achieved and the number of services increased markedly, increasing total service kilometres by 15% by 1998-99[151]. As depicted in Figure 41, the level of government subsidy per service kilometre dropped steadily in the early years of the scheme indicating that, from a government perspective, franchising offered good value for money.

However, franchising was unable to reverse the decline in patronage which fell 7% between 1993 and 1999[152]. Moreover, while service reliability improved in some of the franchise areas, it worsened in others, leading to significant disparities in levels of customer satisfaction. Thus, while bus franchising in Perth was a substantial success in terms of cost savings, it was unable to generate the full range of benefits that had been anticipated.

151 Bus reform: further down the road; a follow on examination into competition reform of Transperth bus services, Auditor General of Western Australia, 2000

152 Bus reform: further down the road; a follow on examination into competition reform of Transperth bus services, Auditor General of Western Australia, 2000

Adelaide bus franchising

In 1993, following a change in government, a series of reforms was undertaken in Adelaide, wherein the State Transit Authority was dismantled and the city's bus services were competitively tendered. Over the next several years, these tenders were awarded to both private and public operators and this system operated until 1998, at which time it was the subject of a governmental review.

This review showed that the system had not been as successful as had been hoped in terms of generating a competitive supplier market and encouraging innovation and service enhancement.

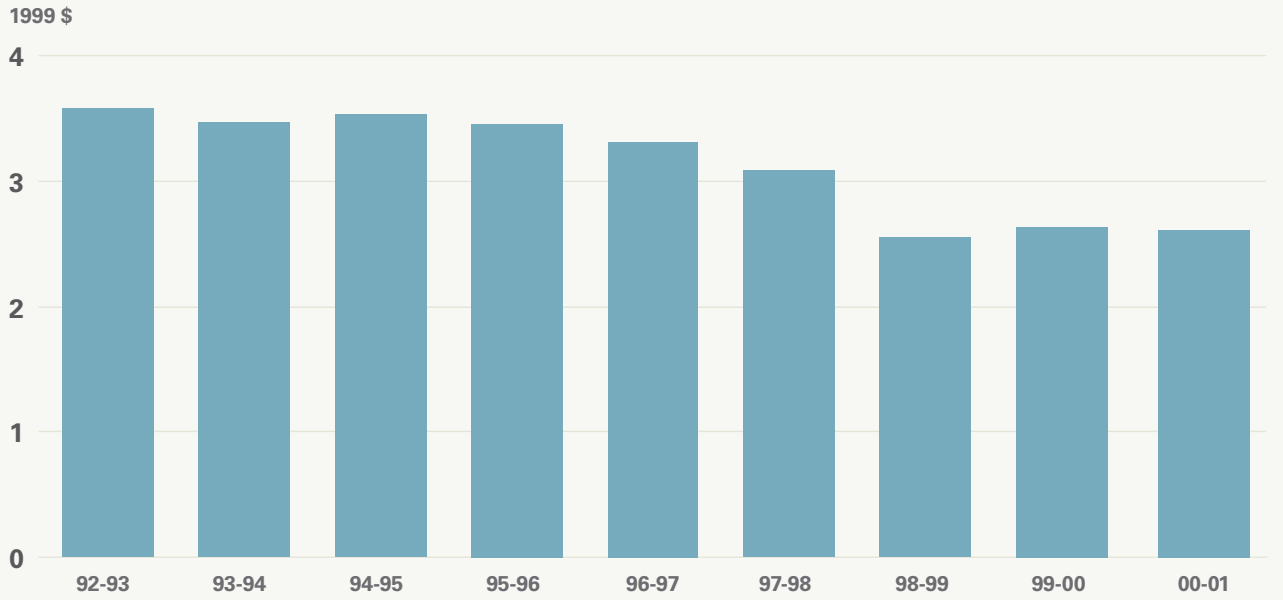
As a result, the Passenger Transport Act was amended and a new stage of franchising began. The key amendments involved the duration and phasing of contracts, the tender process, arrangements for service specification and development, the basis for contract payments and contract administration and included a specification of the guiding principles which were to dictate the contract terms.

The outcomes of this second stage of franchising have been almost universally positive. After having fallen at an average rate of 2.9% per annum between 1982 and 1995, patronage has risen by 2-3% per annum since franchising[153]. Despite 14% more service kilometres being operated in 2007 than in 1995, overall operating costs had decreased by around 15% and on time running performance had increased as had most other service measures. Thus, on almost all metrics, Adelaide's experience with bus franchising has been positive. However, it is noteworthy that this success required careful amendment to the original franchising arrangements.

153 Adelaide bus service reform: Impacts, achievements and lessons, Research in Transportation Economics, Bray and Wallis, 2008

Figure 41

Government subsidy per service kilometre (1993-2001)



Note: Figures for 99-00 and 00-01 are estimated.

Source: Bus reform: further down the road; a follow on examination into competition reform of Transperth bus services, Auditor General of Western Australia, 2000.

Sydney bus franchising

In Sydney, private bus operators are able to operate at 20-30% lower labour costs than public operators[154]. However, Sydney's experience with bus franchising, while generally successful, is also indicative of some of the issues that need to be carefully managed.

Specifically, when bus franchising is undertaken it is important to ensure that contracts are established in such a way as to encourage connectivity between services of different operators. This was an issue in Sydney's experience with bus franchising under the original contracts in the late 1990s. Multiple private operators were entitled to keep fare revenue and were disinclined to operate outside their defined areas, hampering network coverage and connectivity. This was addressed by the Unsworth Reforms in the early 2000s which saw farebox revenue turned over to the government and payments to the operators based on service kilometres[155], allowing for better network planning and optimisation of routes.

Additionally, problems can arise with bus franchising in the absence of an integrated ticketing system. As there is no way to integrate the fares between the operators, and thus no way to prevent riders' fares from going up if they have to connect between one operator's services and another's, overlap between services is inevitable. This can lead to buses from different operators serving almost identical routes, as happened with the STA and Forest Coach Lines between Chatswood and Warringah Mall prior to the introduction of MyZone[156].

Provided these pitfalls are avoided, bus franchising is a promising area with the potential to achieve further cost reductions. At the moment, private bus operators exist in all key cities in Australia; nonetheless, there are opportunities to 1) increase number of bus service providers to increase competition and/or 2) contract out routes that are still serviced by publicly-owned bus operators.

Feasibility and impact

Magnitude of impact

The magnitude of the impact of franchising varies significantly but when successful, the benefits in terms of public transport cost savings are **high**. Success is contingent upon various factors such as: 1) the existing structure of the public transport network in the city, 2) the extent to which reforms have already been made, 3) whether the reforms take place in the rail or bus sector, 4) the political landscape and the willingness to engage in industrial reforms, and 5) the extent to which private-public agreements effectively align the interest of private operators and those of the public, and 6) the political will to enforce contractual agreements.

Empirical evidence tends to suggest that with rail franchising, a large proportion of cost savings are one-off and are derived soon after the initial reforms are undertaken, as seen in Melbourne's experience with franchising rail services. With bus franchising, however, it appears that there is more scope in achieving and sustaining lower ongoing operational costs which is consistent with Sydney's experience.

Support for broader public transport objectives

Depending on the stipulations of the franchising contracts that are entered into, there may be scope for franchisees to raise fares or remove services, both of which could potentially reduce patronage and hinder social inclusion. However, past experience has shown that franchising tends to lead to improvements in service quality and increased patronage and therefore strongly supports broader transport objectives.

154 Independent Public Inquiry - Long Term Public Transport Plan for Sydney, Christie et al, 2010
155 Ibid.
156 Ibid.

Ease of implementation
While moving to a franchise structure can result in benefits, there are a number of challenges and risks that need to be managed to ensure success. Franchising of bus services has been successfully implemented in all states, but franchising of rail services is more challenging and politically sensitive. However, it may be possible to run a pilot on a line by line or sector by sector basis, prior to a full network franchise arrangement. This would be lower risk and easier to explain to the public prior to privatisation of a whole network.

In any franchising process, one of the highest risk and most critical areas to get right is contract design. The design of an efficient and effective contracting regime necessarily involves the consideration of numerous parameters, including the following:

- **Industry structure** (vertical versus horizontal; separate versus integrated) is an important consideration, particularly in rail;
- An important dimension of a franchise contract is **contract scope** (eg., route-based, area-based). In many circumstances, an area-based system that incorporates route-based elements is preferred;
- **Contract duration and renewal** provisions need to consider levels of risk the operator should bear, payback periods for investments and ability to deliver network and service innovations;
- Setting contracts of appropriate **scale** is critical in order to maintain operator efficiency while encouraging competition;
- There are tradeoffs around different levels of operator **concentration** which can vary from one to many;
- The **operating experience** and stage of maturity of each operator is also an important consideration;
- **Risk allocation** in a franchise model must work to best align the interests of operators and authorities;
- The contract must establish robust and transparent **KPI / incentive regimes;**
- In terms of **contracting processes,** different requirements exist to achieve a successful tender or negotiation process. Although either can be effective, a well-executed negotiation process can more easily lead to a positive and productive working relationship between government and operator;
- **Roles and responsibilities** between operator and government need to be clearly defined. Government should retain strategic responsibilities and operators should retain operational tasks, while a combination of both should be involved in the more tactical areas of service planning and route optimisation. Operators should be encouraged to retain an entrepreneurial mindset;
- In order to facilitate the implementation of **service modifications,** the contract should include a simple formula for small adjustments and clear process for major changes;
- **Asset and infrastructure management** requires strong oversight by the government in rail, even if these functions are implemented by the operator; and
- Appropriate **end of term arrangements** are required to prepare a system for effective contestability at the end of the contract term.

Care must also be taken in balancing the needs of all stakeholders. For example, explicit and well-thought through institutional arrangements need to be put in place to enable inter-operator collaboration. Relationships with labour unions also need to be considered - generally, private operators are not able to deliver wholesale IR reforms in a highly unionised workforce if they are not introduced and at least partially implemented prior to privatisation.

6.5. SUMMARY OF COST SAVING INITIATIVES

As with the revenue initiatives in Section 5.6, each of the cost saving initiatives has been assessed on the dimensions of financial impact, support for broader public transport objectives, and ease of implementation. The resulting matrix (Figure 42) reveals the potential trade-offs.

Prioritising initiatives is instructive for strategy and policy formation. We would suggest the following relative prioritisation of each of the cost initiatives evaluated (Table 7).

Figure 42

Cost initiatives financial impact vs support for broader public transport objectives.

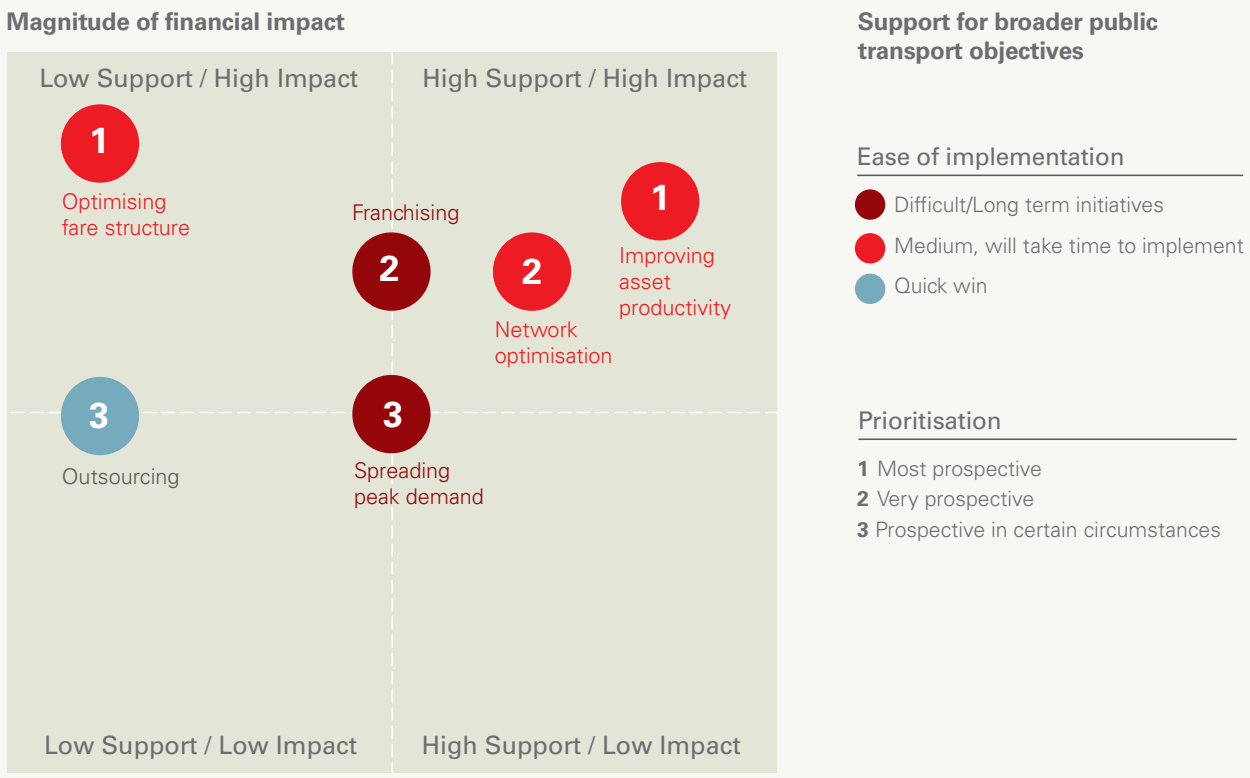


Table 7

Proposed cost initiatives prioritisation

Priority	Initiative	Time scale*	Rationale for priority scoring
1 Most Prospective	Improving workforce productivity	Medium term	The largest area of potential cost savings; but care must be taken that customer service standards are not compromised and redundancies are minimised (e.g. by reallocating staff to more productive tasks).
	Improving asset productivity	Medium term	Significant direct asset and maintenance related cost savings, as well as indirect benefits in the form of shorter journey times and more reliable vehicles for passengers, and lower labour requirement per passenger km.
2 Very prospective	Network optimisation	Medium term	On some networks there are likely to be significant opportunities to optimise routes within modes and also across different modes. Successful implementation will cut costs per passenger as well as increasing relevance of public transport to more people and improving journey times.
	Franchising	Medium term	Potential for significant cost savings and innovation; can also motivate governments to make improvements prior to a sales process. However, the success of the franchise is highly dependent on contract structures and incentives that are put in place.
3 Prospective in certain circumstances	Outsourcing	Short term	Can help to decrease costs and improve quality in specific areas; savings potential is not as high as in franchised model and motivation of operator to improve services not as strong (not incentivised by contract structure to increase farebox).
	Spreading peak demand	Long term	May be successful at the margin with the minority of people who are able to vary their work hours; depending on policies implemented, risks being counter intuitive to the aims of lifting patronage.

*Long term = 5+ years to implement; Medium term = 2-5 years; Short term = Less than 2 years.

7.0 CONCLUSION

An efficient and effective public transport system is an essential building block that will be required for Australia to achieve its growth aspirations. In addition, a well designed and utilised public transport system brings a range of economic, environmental and social benefits. These include a decrease in the costs associated with congestion as well as the economic benefits of improved job creation, competitiveness and liveability. Public transport can also help to reduce Australia's greenhouse gas emissions and air pollution and reduce our dependence on oil. Good public transport provision also results in greater social inclusion and has numerous positive health and safety effects.

The funding of public transport is a persistent challenge for Australian state governments. This challenge is likely to grow more acute as various economic, environmental and demographic changes lead to continued population growth in Australian cities and increased usage of public transport. Accordingly, closing the public transport funding gap is of great importance to ensure a sustainable public transport system into the future.

This paper, commissioned by the Tourism & Transport Forum and prepared by L.E.K. Consulting, has presented ten revenue generating initiatives and six cost saving initiatives which may be implemented as a means of improving the cost position of public transport. Of these, ten have been prioritised as the "most prospective" and "very prospective" initiatives to pursue (six revenue generating and four cost saving initiatives). These initiatives are summarised in Table 8 below.

It is critical that the public transport system is a primary beneficiary of implementing these types of strategies through reinvestment into public transport infrastructure and services. A well-functioning transport system, incorporating both public transport and the road network, is essential to ensure that Australia continues to grow and prosper into the future.

Table 8
Summary of initiatives

Priority	Revenue generating initiatives	Cost saving initiatives
1 Most prospective	• Optimising fare structures • Growing patronage • Transit oriented development • Congestion charging	• Improving workforce productivity • Improving asset productivity
2 Very prospective	• Infrastructure levies • Improved smartcard utilisation	• Network optimisation • Franchising
3 Prospective in certain circumstances	• Reviewing concession policies • Station retailing	• Outsourcing • Spreading peak demand
4 Opportunistic	• Advertising • Reducing fare evasion	–

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