

# Achievable, affordable, essential sustainable transport for Melbourne

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## 1 The reality of climate change

Undeniably, climate change is the issue of our times.

To me the challenge for the world is clear – to keep global temperature increases below two degrees Celsius. If we do that we have a chance of steering the world through the climate change crisis, and avoiding dangerous climate change that would bring about six metre rises in sea levels, billions of deaths and massive extinctions. The latest science shows that to have a 50% chance of keeping global temperatures below two degrees we need to reduce emissions globally by 60% by 2030. To play our part that means in developed countries like Australia we have to reduce emissions by 80-90%.

I don't find that scary. I find that a challenge that we need to embrace. The costs of doing so are relatively low. The costs of not doing so are really really scary.

We can debate about just how much we in Australia need to reduce our greenhouse gas emissions ourselves, and the relative importance of technology transfer and international efforts to help rein in the potential emissions of India and China, but to me these debates are side issues. In the end it comes down to some plain clear facts. We need to act urgently so that the way we live, in Australia and throughout the world is far less carbon intensive. Every sector of the economy needs to be transformed. We have the technology to make it happen, what's needed is the political will and determination to set systems in place, to establish carrots and sticks, incentives and sanctions so the transformation takes place.

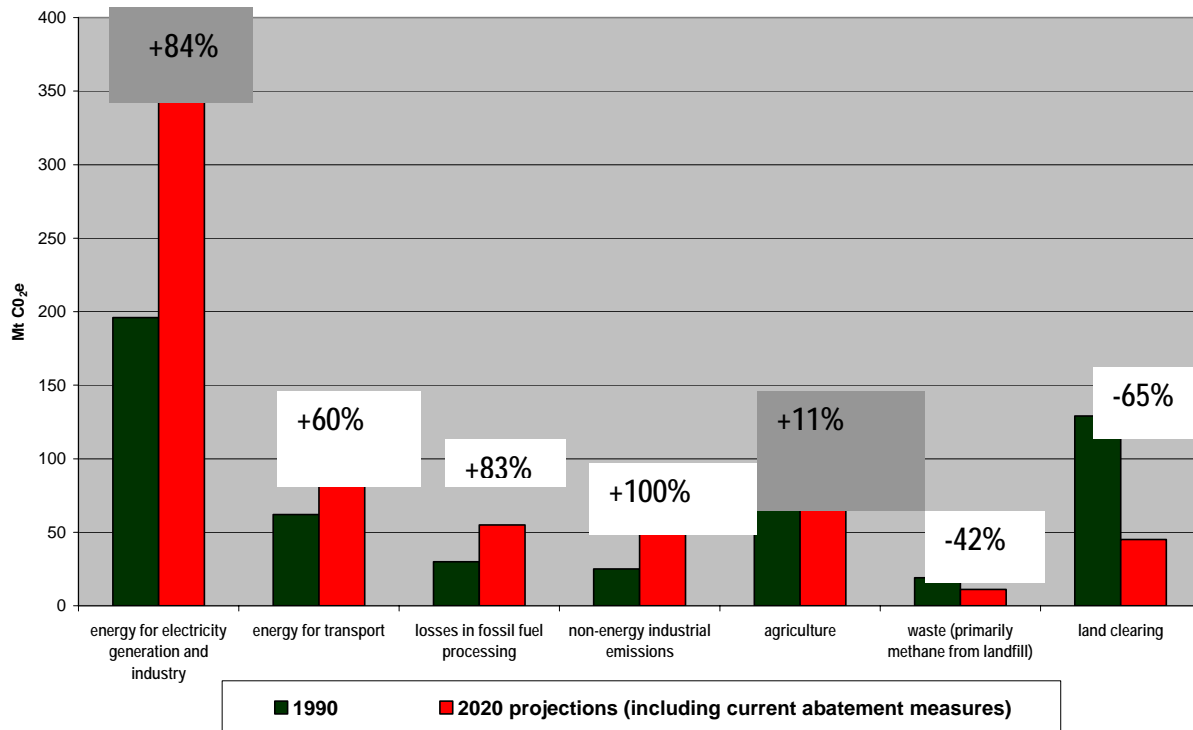
Without even talking about reducing carbon emissions, back to 1990 levels and beyond, the absolute priority for Victoria is to reign in our carbon emissions – to halt the increases, to turn the corner so they start on the downward trend.

The transport sector has to be part of this. In fact there is so much low hanging fruit, and great willingness of the community to act. And a huge imperative to do so.

## 2 Reducing greenhouse gas emissions from transport

After electricity generation, the transport sector makes the greatest single contribution to emissions growth in Australia. It contributes over 14% of the projected increase in emissions between 1990 and 2020. Almost all of this growth is from road transport.

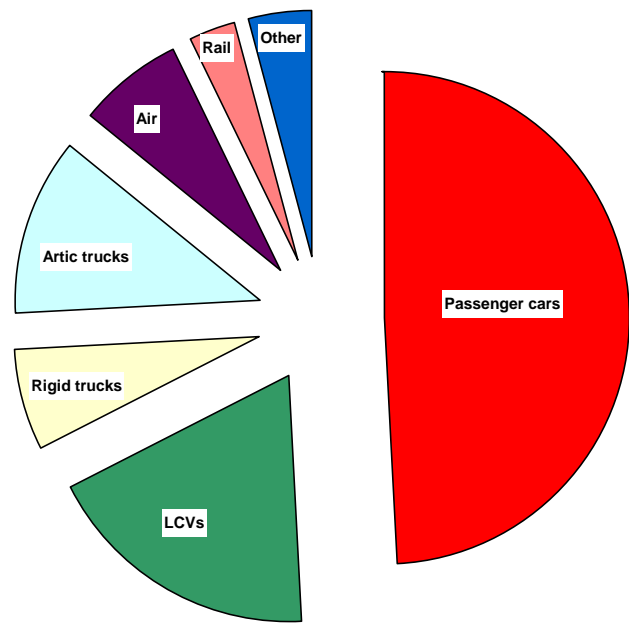
Passenger cars are the greatest single source of transport greenhouse emissions.



(Source: AGO (2006a): Tracking to the Kyoto Targets: Australia's Greenhouse Emission Trends, Dept of Environment and Heritage, Canberra)

Fig. 1: Projected growth in Australian greenhouse gas emissions

Current emission reduction programs are making little impact in the transport sector. The AGO says that current measures to cut transport emissions will be better than 'business as usual' by only 5%<sup>1</sup>. This includes current state government programs to improve public transport use.



(Source: AGO (2006b): Transport Sector Greenhouse Gas Emissions Projections)

Fig. 2: Projected sources of transport emissions in Australia in 2020

<sup>1</sup> AGO (2006b): Transport Sector Greenhouse Gas Emissions Projections, Dept of Environment and Heritage, Canberra.

The task is clear.

It is essential to act quickly and to take measures that have proven ability to deliver.

Most possible actions in the transport sector are not new. They have been discussed and tested internationally in various forms over many years as the means to deal with other urban transport problems. The speed and effectiveness of the likely contribution of these actions to reducing greenhouse emissions is well understood, and the conditions required for their successful implementation are clear.

The three broad approaches are:

- ‘cleaner car-use’ through fuel efficiency improvements, fuel substitution, and increased occupancy rates;
- reduced trip numbers and length through increased residential densities and clustering of trip destinations, and through changes to work practices;
- reduced car-trips through improvements to travel time and convenience for public transport, cycling and walking.

The policy frameworks and associated time-scales required to achieve substantial levels of greenhouse emissions reduction for each of these broad measures are set out below.

#### A. *Cleaner cars*

##### Fuel efficiency

The fuel efficiency of the Australian vehicle fleet is unchanged in 40 years with technological gains in fuel consumption traded off against add-ons like air-conditioning, and the marketing of heavier and more powerful cars and 4WDs<sup>2</sup>. Real reduction in the fuel consumption of the fleet will require stricter regulation and changes to industry policy.

The average age of the Australian car fleet has diminished in recent years, although it is still relatively high by comparison with other developed countries. More rapid changeover of the fleet is unlikely without significant government intervention at the Commonwealth level.

With fuel efficiency constant, past growth in greenhouse emissions from cars is the result of huge increases in vehicle numbers and the average distance that each car travels (measured together as vehicle kilometres travelled or VKT) and declining occupancy rates (currently around 1.4 over the whole day and year). The major impetus for this growth in VKT is the dramatic increase in road space and parking capacity, and the absence of realistic alternatives for many trips.

Future containment of VKT growth will require active disincentives for car-use, including an end to growth in road capacity and restrictions on the supply of parking, as well as improvements to the competitiveness of alternative modes. The urgent need to respond to the threat of climate change means that an absolute moratorium on all major new road-building projects in Melbourne is essential.

##### Fuel substitution

Options for fuel substitution include direct replacement of petrol and diesel with ‘bio-fuels’ or the development of alternatives to the internal combustion engine through various types of battery-powered vehicles where the energy input is not from fossil fuels. Most of these technologies are untested in financial terms and in the extent of their greenhouse emission reductions. In any case, timelines for large-scale implementation are well outside the critical 10 to 20 year emission-stabilisation horizon.

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<sup>2</sup> The average fuel efficiency of the Australian passenger vehicle fleet was 11.4 litres per 100 kilometres in 1963, peaked at 12.6 in 1976, and returned to 11.4 in 2001 and 11.7 in 2005 (ABS, Surveys of Motor Vehicle Usage)

In the long-term, however, replacements will be required for most of the transport energy currently generated from fossil fuels. It is unlikely that any fuel source will sustainably support current levels of travel demand:

*B. Physical changes for fewer and shorter trips*

Increased residential densities and the further development of activity centres can contribute to the *potential* for reduced transport emissions, but provision of good public transport services is essential if this potential is to be fully realised.

Without improved public transport, local opposition to urban consolidation will continue to centre on very real fears about increased traffic, increasing pressure on local government and the planning system in general.

In any case, changing density is a very a long-term project. Most of the population of Melbourne will continue to live in houses and sub-divisions that are already established. Fortunately, densities in much of Melbourne are the same or better than the densities in other cities that have achieved higher levels of public transport use.

Many people appear impervious to the evidence about Melbourne's density and continue to hold a strong belief that Melbourne is a very low-density city, and that this supposed low-density explains our poor public transport performance.

Part of the problem is that the 'low-density' myth supports pro-freeway arguments and provides an 'external' explanation for public transport failure. The problem is compounded because density can be calculated in many different ways<sup>3</sup>, and so any comparisons between cities have to be done carefully.

Many influential public statements about the difficulties faced in making improvements to public transport in Melbourne use flawed density or urban boundary comparisons.

The authors of *Melbourne 2030* (in section 2.1), wrongly claim that Toronto's density is nearly three times greater than that of Melbourne<sup>4</sup>. And, both Jim Betts<sup>5</sup> and the IPA<sup>6</sup>, in making an identical argument to reject the idea that Melbourne can learn from Zurich, say that Melbourne covers 100 times the area and has ten times the population of Zurich.

In fact, Zurich's enviable public transport system operates over the entire Canton of Zurich, an area of 1,834 km<sup>2</sup>, and it serves a population of over 1.3 million. In comparison, Melbourne's urbanised area in 2004 was around 2,100 km<sup>2</sup> (*DSE Melbourne Atlas*) and the population was 3.6 million. Nothing in these numbers should suggest we couldn't learn from Zurich!

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<sup>3</sup> The crucial factor in any residential density calculation is the way the area of the city is defined. Some calculations use total land area, others exclude farms, parks, roads or other non-residential uses. Varying definitions of city area according to administrative boundaries can also lead to problems where the density of an entire urban region is compared to a smaller inner-city area.

<sup>4</sup> In the Newman & Kenworthy data, the Toronto urban area is defined by the Metro Toronto boundary (around one-third of the contiguous 'built up' area) and excludes many non-residential land-uses within this boundary, giving a result of 41.5 per ha.. The Melbourne calculation uses a much larger urban area defined by the whole metropolitan region and includes parks and industrial land, with the result that Melbourne's recorded density is only 14.9 per ha..

<sup>5</sup> Jim Betts, 'Truth and untruth', circulated to DoI staff on 27 February 2006, available at [www.gamutcentre.org](http://www.gamutcentre.org).

<sup>6</sup> Richard Allsop (2007): 'Victoria's public transport: assessing the results of privatisation', Institute of Public Affairs, available at [www.ipa.org.au/files/ALLSOP\\_Transport.pdf](http://www.ipa.org.au/files/ALLSOP_Transport.pdf).

### C. Cutting the need to travel

Given the extent of greenhouse emission reductions required to avert catastrophic climate change, it is likely that the total amount of motorised travel undertaken in Melbourne will need to be cut back over time. Achieving such change is clearly a long-term project. Even in tackling reductions in travel to work, where potential strategies like working-from-home are already available to some, we are starting from a low base. Only 4.5% of those who worked on census day in 2001 did not travel.

### D. Shift some travel to public transport, walking and cycling

Public transport, walking and cycling already provide alternatives to driving for some trips. The 2001 Census<sup>7</sup>, shows that 17% of ‘journey to work’ trips are by these modes with a further 5% of people working from home.. There is clear potential to improve the performance of all non-car modes to reduce greenhouse gas emissions over the next decade. Fig. 3 shows approximate greenhouse emissions from different transport modes in Melbourne. Even at current occupancy rates, the average trip by public transport in Melbourne has lower greenhouse emissions than the same trip done by car.

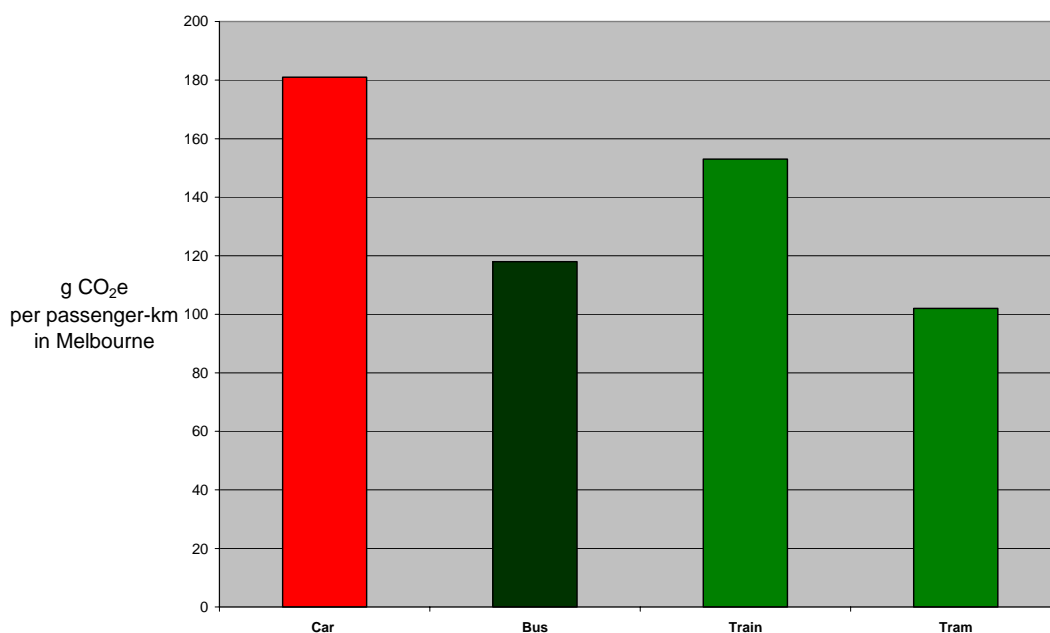


Fig. 3: Estimates of CO<sub>2</sub>e emissions by most-used motorised transport modes in Melbourne<sup>8</sup>

Improved public transport occupancy rates, particularly out of peak and for buses would further reduce greenhouse emissions from transport in Melbourne.

Proven ‘technologies’ exist to improve travel times and convenience of public transport. These have achieved reductions in car use cities that are very similar to Melbourne.

Walking and cycling are clearly better, in greenhouse terms, than either driving or using public transport. Walking is important, both for whole journeys and as part of most public transport journeys.

Even allowing for wintry weather on the August census day, cycling for transport purposes in Melbourne is at levels well below its potential. Census data shows that cycling to work in Melbourne dropped by more than 75% between 1951 and 2001. This fall was the result of an almost total collapse in ‘transport’ cycling

<sup>7</sup> The 2006 census JTW data will not be available until October or November 2007.

<sup>8</sup> See John Stone’s report to MTF for details of these estimates. Note that the electricity for Melbourne’s trains and trams is generated using brown coal which generates more than 30% greater CO<sub>2</sub>e emissions for the same energy output as the ‘black coal’ electricity that powers Sydney’s trains

in the suburbs offset by some growth in the inner city. There is evidence (from local councils and from Bicycle Victoria) that cycling numbers at some inner-city locations have increased substantially since 2001, but this improvement is coming off a very low base.

The major obstacle to growth in both walking and cycling is the priority given in most road management decisions to maintaining and improving conditions for the movement of large volumes of car traffic.

### 3 Priority actions for Melbourne

#### Priority one Co-ordinated policy approach

There is one over-riding lesson from the past half-century of living ‘experiments’ in the management of transport systems in cities around the world.

Experienced researchers<sup>9</sup> have concluded that growth in car-use slows significantly only when there are coordinated disincentives for car use and incentives for the alternatives, and an effective long-term plan to manage the location and shape of urban development.

Vuchic argues that many cities try to provide incentives for cars and for public transport by investing in both freeways and public transport. The outcome is generally a continued poor mode share for public transport but with increased spending on both modes. He also notes that some cities, though rarely in any explicit way, offer disincentives to public transport through deterioration, decrease or discontinuance of services. Despite many claims to the contrary, this is the hard truth of the Melbourne experience over most of the past 50 years.

No city in Australia has developed the necessary coordinated transport policy framework of disincentives for cars and incentives for the alternatives, though Perth has made some positive moves in this direction. So, it is no surprise that current ‘measures’ to reduce transport greenhouse emissions, reported by the AGO, are on track to achieve so little. They are simply fragments of uncoordinated policy continually undermined by the many policy and program decisions that are working in the opposite direction.

#### Priority two: Build a modern urban public transport network and services appropriate to the needs of residents and businesses in modern Melbourne

Current public transport services in Melbourne are the historic legacy of fragmented and competing train and tramlines largely built for a CBD-commuter market, and a confusion of bus routes that cater for a largely captive market of pensioners and school students.

Timetables and route layouts are complex, and confusing. Basic operating patterns were set during the first half of the 20<sup>th</sup> century, and they have become increasingly inefficient through decades of tinkering.

The apparent density of services seen in the inner and middle suburbs is often confused with existence of a high-quality network, making it easy for residents of inner and outer Melbourne, and their political representatives, to be set against each other in the competition for public transport improvements. A real urban public transport network in inner and middle suburbs would improve cost recovery and so provide additional resources to meet outer suburban public transport needs.

A modern ‘urban network’ will meet 21st century urban travel needs. Tomorrow’s public transport users will be more than just commuters and pensioners.

Modern network design and public transport infrastructure improvements will give all Melbournians the choice of travelling by fast, frequent, reliable, co-ordinated, affordable and safe public transport.

It goes without saying that the necessary infrastructure and service improvements are well beyond those the Government has committed to in ‘Meeting Our Transport Challenges’

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<sup>9</sup> For example, Vuchic (1999): *Transportation for Livable Cities*, Center for Urban Policy Research, New Jersey

MTF in 2005<sup>10</sup> summarised the needed improvements as:

- Increased rail capacity, primarily through operational, timetabling and signalling improvements, and duplication of single-track lines.
- Extensions to train lines and constructing additional stations in Melbourne’s outer urban growth areas and the Doncaster and Rowville corridors (see figure 4);
- Connecting all principal, major and specialised activity centres by high-frequency, 7-day-and-evening routes;
- Upgraded suburban bus services to serve all jobs and residents all day, every day

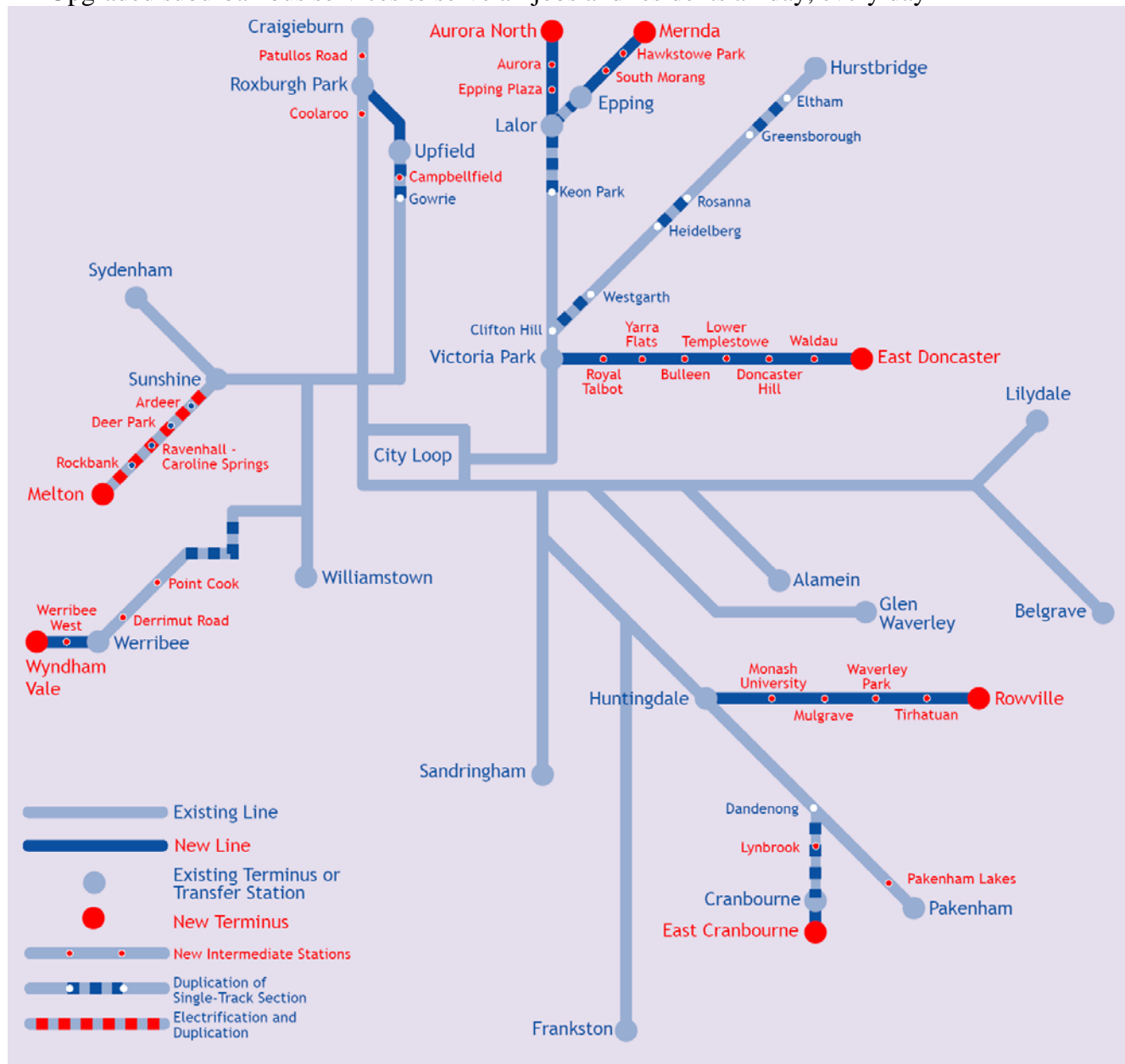


Figure 4. Required infrastructure expansion on Melbourne’s train system

<sup>10</sup> Scheurer, J, Kenworthy J and Newman P (2005) ‘Most Liveable and Best Connected? The economic benefits of investing in public transport in Melbourne. Metropolitan Transport Forum, Melbourne

The main principle behind the ‘urban network’ model is to use rigorous planning and high standards of service delivery to achieve maximum flexibility for travellers.

The flexibility for users is created by making it easy for travellers to transfer between different services or modes. The rigorous planning and high standards of service delivery are essential to make the system work for the greatest numbers of potential users, and to make the best use of existing tracks and vehicles.

	<p><b>An unlinked collection of low-frequency routes (a non-network)</b></p> <p>The area you can reach by a simple journey is restricted to walking distance from your closest line. Users need to have detailed information about timetables. Transferring is difficult and crossing points have little value.</p>
	<p><b>Some high-frequency services</b></p> <p>Good service along high-frequency lines makes some transfers more attractive, but only in the direction towards the high-frequency service. Increased frequencies on the best sections will do little to improve general conditions.</p>
	<p><b>The full network effect</b></p> <p>Many high-frequency lines create a <b>network</b>. In the same way that motorists use roads, travellers can go anywhere, anytime. Transfers open up many travel options.</p>

(Source: HiTrans (2005): Best Practice Guide 2: Public Transport – Planning the Networks; EU. See [www.hitrans.org](http://www.hitrans.org))

Fig. 5: Creating a network using the modern ‘urban public transport’ model

### **Priority three: Management and governance of public transport so that the design and operation of the network is managed in an integrated, accountable and transparent way**

A recent review of factors contributing to 'best practice' in urban transport, published in 2005 by engineers from the University of Toronto,<sup>11</sup> concluded that, while adequate finance, infrastructure and urban planning are important, the critical requirement for increased use of public transport is effective 'governance'. Good public transport needs an organisation for planning and service delivery with the necessary powers, skills and responsibilities.

Public transport 'governance' follows a common model in cities that have increased public transport use. In Perth, Vancouver, Munich and Zurich, for example, a small and focussed public agency has developed the plan for the modern urban public transport network.

In successful cities, the private sector often plays a role in the delivery of the services set out in a modern network plan. But, their role is much more constrained than is currently the case in Melbourne. Without these constraints, the cost of operating public transport in Melbourne has grown significantly since 1998 and the degree of risk faced by the private companies has been reduced with successive restructuring of the franchises<sup>12</sup>.

The argument for ending the current franchise arrangements in Melbourne when they expire in 2008 does not rely on an ideological preference for public ownership. The answer is not a return to the operating practices of the old Public Transport Corporation.

Simply, the current governance structure for public transport in Melbourne is too cumbersome and unfocused to deliver a modern network. Like all the modern cities that have delivered sustained growth in public transport use, we need a public agency that has the powers and the single-mindedness to drive the reorganisation of Melbourne's fragmented collection of public transport lines into a modern urban network.

### **Priority four: Urban development that is focussed and planned around sustainable transport modes**

This means not just the public transport improvements outlined above, but a range of other approaches:

- Pedestrianisation and improvements in cycling facilities: planning for people to arrive on foot and by bike rather than assuming they will arrive by car
- more room on roads for public transport, walking and cycling
- less parking and more expensive parking
- vibrant compact activity centres with sufficient people living in walking and cycling distance to support local businesses, public transport services, community services and other destinations

Local governments need to work hand in hand with the state and federal governments to plan and implement such centres, retrofitting established centres as required.

### **Priority five: Freight movement systems that are based on long term sustainability**

These would take as a given the issues associated with the supply of oil and the need to reduce greenhouse gas emissions. It would mean the governments policy of having 30% of port related freight transported by rail by 2010 would be viewed as a minimum rather than an 'aspirational' goal. To

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<sup>11</sup> C. Kennedy et al. (2005): The Four Pillars of Sustainable Urban Transportation, Transport Reviews, Vol. 25, No. 4, 393-414, July 2005.

<sup>12</sup> See Mees et al. (2006): Putting the Public Interest back into Public Transport, available at [http://www.gamutcentre.org/gamut\\_debates.htm](http://www.gamutcentre.org/gamut_debates.htm)

achieve this multi-user intermodal hubs in metropolitan Melbourne with rail shuttles to and from the port, shifting freight at the equivalent price or cheaper than road would absolutely, positively have to be in place by the end of this term of government.

#### 4 So what does this mean for new road infrastructure?

Let's put these things together.

I'm a Councillor at Maribyrnong, so for a particularly relevant example I'd like to focus on journeys to work from the western suburbs to the city. These journeys and the population growth in the western suburbs are a key driver of the stated need to build a new East-West link to increase road capacity to the inner city. The only times the current infrastructure, in particular the Westgate bridge, is at capacity is peak commuting times, so the journey to work is the most relevant statistic to consider.

Let's presume, as we need to if we are going to be even half way serious about reducing greenhouse gas emissions, that by improving public transport infrastructure in the ways outlined above we can increase public transport usage in the western suburbs to the state government's target of 20% of motorised trips. Currently in the western region the number of motorised journey to work trips undertaken by public transport is only 9%<sup>13</sup>. There is no up to date data on what the current proportion of motorised trips overall that are undertaken by public transport, but it would be expected that it would be considerably less than the proportion of motorised journey to work trips.

If public transport usage was increased just for the journey to work to 20% of trips this would mean a 13% reduction in the number of journey to work trips by car. This would mean that even taking the very high growth rates being experienced in the western suburbs into account (in 2005-06 estimated to be 2.7%)<sup>14</sup> this measure would soak up over five years growth in what would otherwise have been journey to work trips by car.

Now let's estimate that the journey to work trips by public transport could be a higher proportion still – let's say 30% which is not at all unreasonable given they are the easiest trips to cater for. This is particularly so for the journey to work trips from the western region where a relatively high proportion – some 31%<sup>15</sup> -, are made into the inner city. These are the easiest trips to cater for with our existing radial public transport infrastructure. A 30% mode share for journey to work trips would substitute for eleven years car trip growth at current rates.

Finally how about if we presume what may seem now like a totally pie in the sky rate of 40% of motorised journey to work trips to be made by public transport. In a world that is taking climate change seriously, and a public transport system which really rocks this doesn't seem unreasonable to me – it's less than the mode share that many European cities currently have, where many cities have half or even more of their motorised trips to work being undertaken by public transport.

Forty percent public transport mode share of motorised journey to work trips would mean that it would take some 17 years at current population growth rates before journey to work car trips would be back to today's levels.

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<sup>13</sup> ABS 2001 Census Journey to work data for municipalities of Brimbank, Hobsons Bay, Maribyrnong, Melton, Moonee Valley and Wyndham

<sup>14</sup> Western Transport Alliance submission to the East West Link Needs Assessment, June 2007

<sup>15</sup> Western Region Economic and Industrial Development Strategy prepared by Ration consultants to The Municipalities of Brimbank, Hobsons Bay, Maribyrnong, Melton and Wyndham and the Department of Sustainability and Environment (DSE) August 2006

Similarly we can look at freight. The government has a target of 30% of port related freight to be on rail by 2010. Currently none of the container freight trips which have origins or destinations in metropolitan Melbourne are on rail, and these are 70% of the total trips to and from the Port.

If 30% of these trips were on rail – quite achievable if we had intermodal transport hubs in Somerton, the Dandenong region and the western region – this would then translate into a 20% reduction in port truck traffic overall. Given that currently the Port generates 2000 truck movements a day<sup>16</sup>, and some 11% of the traffic on the Westgate bridge in the morning peak is trucks<sup>17</sup> this is a not insignificant reduction. Furthermore if not just 30% of freight was on rail but each port related truck journey carried an average of 1.0 container each instead of 0.8, then the current truck movements could be reduced from 2000 trucks a day to 1120. Or alternatively, the projected increase in freight movements could be absorbed by these measures for at least the next decade. (And this would give us time to assess whether these projected increases are in fact going to occur given the reality of climate change and peak oil.)

And then add in the effects of encouraging and facilitating more localised employment, and clustering this employment in activity centres as proposed in Melbourne 2030. SGS Economics and Planning have estimated that fully developed activity centres and transit cities as outlined in Melbourne 2030 would result in a 14% drop in vehicle kilometres travelled, and reduced traffic flows in peak times in 2030 compared to today.<sup>18</sup>

To me, its clear where our transport infrastructure priorities need to lie if we are to take climate change seriously.

Plan for growth in public transport patronage and freight on rail. Build the systems to make it possible, put in place the carrots and sticks to shift people out of their cars and onto public transport and our current perceived problems with road capacity will take care of themselves.

And the icing on the cake is that shifting people and goods this way is cheaper too – cities all over the world have demonstrated that very clearly.

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<sup>16</sup> pers comm. Data from Western Transport Alliance Freight Forum, June 2007

<sup>17</sup> Vicroads' 2005 Westgate Freeway Traffic Demand Study

<sup>18</sup> SGS Economics and Planning Metropolitan Structure and Economic Performance, 2006