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How WA got public transport right

Public transport policy in Australia: a density delusion?

Determining the Factors that Do and Do Not Influence the Demand for Less Polluting Modes of Passenger Transport: A Case Study of Kolkata, India

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Editorial

Recent events in the political life of the UK have given us all a splendid insight into the mind sets and ideological biases of senior politicians and decision takers in an advanced sophisticated and highly intelligent nation. The UK now has a coalition government consisting of the Conservative Party and its leader (now Prime Minister) David Cameron and the Liberal Democrat party and its leader (now Deputy Prime Minister) Nick Clegg. The coalition government has moved quickly to address its main concerns which revolve around reducing the deficit and stabilising the national economy. These are worthy objectives but transport policies and spending as always reveal that this simple objective is rather more complicated and involves a significant historical shift towards higher levels of mobility, higher spend on things that go fast and higher spend on things that the relatively rich use. This is also the case in reverse and funds are being cut for local facilities and services that would reduce the end to travel (i.e. increase accessibility within range of walk and cycle trips). There are no projects on the stocks to address the deplorable record of the UK's privatised and de-regulated buses that serve to deliver large profits to bus companies but poor quality services to users and there are no plans to sort out over-crowded ancient trains on urban rail systems around cities like Manchester and Leeds.

The first few months of coalition government have produced daily statements about the need to reduce public expenditure and reduce the deficit, but senior politicians are still committed to spending of £32 billion on high speed rail, £16 billion on a new railway line across London (Crossrail), new road building running at about £4 billion pa and maintaining the subsidy to aviation which runs at about £10 billion pa in the UK. At the same time the government has encouraged local authorities to cancel speed cameras which have a proven effect on reducing death and injury in the road traffic environment and the Minister of Transport, Philip Hammond, has announced that he will end the "war against motorists". Putting aside the fact that we have not noticed a "war against motorists" but rather the opposite, we appear to be facing a policy shift away from the world of sustainable transport, sustainable mobility, demand management and traffic avoidance. Ending the war against motorists might be more convincing if it was associated with ending the war against cyclists, pedestrians, children and the elderly who still suffer death and injury in the road traffic environment on a totally unacceptable scale.

The ideological shift towards fossil fuel hyper-mobility is further evidenced by the so-called "bonfire of the quangos" (see note). The government has abolished the Sustainable Development Commission which did splendid work pointing out that transport and mobility trends were actually contrary to the objectives of sustainable development and the growth of aviation was especially problematic for climate change and air quality around airports as well as for delivering agreed principles around "the internalisation of external costs". Abolition is an effective way of silencing

the voice of reason. Next on the list is "Cycling England" which has worked heroically to transform the poor quality performance of cycling policies and encouragement in England and has produced a 27% increase in cycling levels.

It is interesting to link the deficit discussion to the bale out of banks that cost the UK government £850 billion. Whilst not wishing to diminish the importance of reducing deficits it does look like enormous sums of money can be found for things that underpin the workings of financial markets and fiscal policy but not at all for things that increase and improve resilience, quality of life and allow our cities to operate in a highly efficient manner at a much lower total public and private costs. We have forgotten about externalities.

In a world increasingly at risk from very large environmental social and economic shocks linked to peak oil, resilience and climate change it does increasingly look like we are snatching defeat from the jaws of victory. A future dominated by diminishing amounts of fossil fuel availability, damaged food production and ecological systems as a result of climate change, billions of people living in poverty, large cities in China, India and Africa increasingly dominated by motorised transport at the expense of sustainability, and one million deaths in so-called road traffic "accidents" each year looks very bleak. A species that is encouraged to go further and faster as if movement is intrinsically a good thing may well look back to 2010 as a major missed opportunity to correct the intelligence deficit rather than focus on the fiscal deficit.

John Whitelegg
Editor

Note:

Quangos are "Quasi Autonomous Government Organisations" that have been set up with specific remits to deliver policy objectives or provide specialist expert advice. The full list of Quangos to be abolished/reformed has been published by the BBC
http://www.bbc.co.uk/news/uk-politics-11405096

Abstracts & Keywords

Determining the Factors that Do and Do Not Influence the Demand for Less Polluting Modes of Passenger Transport: A Case Study of Kolkata, India

Madhumati Dutta and Guruprasad Samanta

If we need to create a demand for less polluting modes of transport, we need to know what determines mode choice. Using sample data, we look at three groups of variables: socio-economic background of the transport user, characteristics of the trip and qualities of the mode used. We see that (for Kolkata) the first two groups of variables have little impact on mode choice. We then proceed to identify which of the modal qualities are more critical.

Keywords: Passenger transport, pollution, mode choice, incentives, policy

The following two articles by Paul Mees and John Stone have been reprinted from D!SSENT Number 32, Autumn/Winter 2010 with the kind consent of Lesley Vick and Kenneth Davidson, Editors, D!SSENT Magazine

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Public transport policy in Australia: a density delusion?

Paul Mees

Growing car use and dependency is not a universal phenomenon linked to increasing incomes and wealth. Zurich is the wealthiest city in the world but has very high modal shares for walking, cycling and public transport. This paper explores why this is the case and why Zurich has much better sustainable transport outcomes than most cities can manage.

Conventional reasoning is rejected. Zurich's successes are not the result of bigger budgets or linked to urban density explanations. The explanation lies in the high level of management and organisational integration and co-ordination across all modes of transport, something which is absent in Melbourne and Sydney. The paper is very critical of the organisation and delivery of public transport in Melbourne and Sydney.
The fragmentation and lack of co-ordination in rail transport services in Melbourne illustrates this difference. These problems are exacerbated by the Australian fascination with privatisation and public-private financing contracts.

Finally the paper turns to evidence around density and the modal share of public transport in a number of world

cities and shows that density is not a convincing explanation for the differences in public transport performance in these cities

How WA got public transport right

John Stone

Dissatisfaction with poor quality public transport is high in Melbourne and Sydney but Perth in Western Australia tells a very different story. Public transport use in Perth has grown by 32% in the period 1992-2005 and bus services feed into the new urban rail link, the Mandurah line.

This paper explores how and why this success story came about in a city that had been dominated by urban freeways and road building thinking for many years. Community campaigning and action groups played an important role in this transformation as did shifting political support that eventually moved away from road building towards urban rail and more importantly towards integration.

The establishment of an integrated public transport authority with control over rail and bus (Transperth) was inspirational and brought Perth into line with successful European cities like Zurich and with Vancouver in Canada. The challenge now for Australian cities is how to rescue Melbourne and Sydney by learning lessons from Perth.

Determining the Factors that Do and Do Not Influence the Demand for Less Polluting Modes of Passenger Transport: A Case Study of Kolkata, India

Madhumati Dutta and Guruprasad Samanta

1. Introduction

In the recent past, large cities of developing countries have not been able to do much about the pollution emitted by individual modes of passenger transport. In such circumstances, having a modal structure with more of less polluting (per person transported) or zero pollution modes becomes critical. However, as passengers cannot be forced to use the less polluting modes, the state has to both provide these modes and coerce passengers to use them. This paper, therefore, looks at the reasons behind modal choice, and thereby determines the policies required for modal shift.

The city chosen for this study is Kolkata[1], in India, a city with a very high population concentration at around 23,367 persons per square kilometre (Government of India 2001). One can identify 21 modes of transport in the city. Among motorised forms of transport, the city has buses, trams, autos (or three-wheelers), taxis, shared taxis[2], the metro, a circular rail, water-ferries and local trains as public transport. There are two types of private transport – two-wheelers and private cars. There are a variety of buses – the state has regular, 'special' and 'executive' fleets, and private buses may be categorised as regular, chartered[3], school buses and minibuses[4]. The non-motorised forms of transport are rickshaws, bicycles and walking. A survey (carried out in 2004) of a representative[5] sample of 750 households constituting 2720 individuals, and 280 commuters residing outside the KMC area (this proportion is based on the total numbers of residents versus the total number of non-resident commuters) (Dutta and Bhattacharya 2009) gives us the total kilometres covered in a year (by sample individuals) by each mode (Table 1). Table 1 tells us that 46 per cent of the kilometres covered are by walking, and 24 per cent is by the ordinary private bus. The metro and local train are responsible for another 12 per cent. Only around 3 per cent of the kilometres covered are by the three-wheeler and 1.3 per cent by the two-wheeler. Taxis, shared taxis, cars and hired cars are responsible for as little as 2 per cent of the kilometres covered.

A primary survey (see Dutta et al, 2008 for details on the survey) of the polluting modes of transport gives us data on average emissions of five pollutants per unit distance traversed (Table 2): this is summed to yield an aggregate figure

[1] More specifically, the Kolkata Municipal Corporation or KMC

[2] These are taxis that have a fixed route and carry five to six persons on a trip.

[3] These buses usually transport office goers.

[4] These are smaller than the regular size for private buses.

[5] In terms of residential spread, income groups, professions and income-class of the locality (Chatterjee et al. 1999; Ghosh 1999)

(column 7 of Table 2). Another survey of average occupancies of various modes (also detailed in Dutta et al, 2008) gives us Table 3. Using these two tables, we get estimates of emissions per unit distance divided by occupancy (Table 4)[6]. This, in other words, is the average pollution caused by the transportation of one individual (given the existing occupancy structure) living in Kolkata by one kilometre, using a particular mode. This is the critical characteristic of the mode that determines its impact on the level of air pollution in the city. Table 4 ranks the modes of transport according to the magnitude of this variable.[7] Of course, for seven modes the value of this variable is taken as zero – the tram, metro, circular rail, local train, rickshaw, bicycle and walking – as they do not cause any pollution on location.

On the surface this data may create the impression that the modal use structure is very environment friendly, as the high polluters (three-wheelers, two-wheelers, cars and taxis) are used for 6.3 per cent of the total distance covered. However, if we actually multiply column 2 of Table 1 and column 2 of Table 4 to obtain the *total* pollution emitted by each mode in the sample, we get Table 5, which tells us that the two-wheeler and three-wheeler cause the highest total pollution, and are responsible for 74 per cent of the aggregate. The ordinary private bus is responsible for another 15 per cent, and the taxi an additional 4 per cent. Clearly, the enormous contribution of the two and three-wheelers is because their unit emission is far higher than the other modes. The ordinary private bus is a medium level emitter (see Table 4), but its use is quite substantial, causing it to rank third in the list of offenders. Moreover, the low-occupancy four wheelers cause about 7.5 per cent of the pollution, and their number (as also the number of two-wheelers) is expected to increase at a rapid rate. It is thus crucial for those involved with transport policy to constantly endeavour to reduce the use of those modes (two-wheelers, three-wheelers, private cars, hired cars, taxis and shared taxis) which, on the one hand, are only responsible for a small fraction (6.3 per cent) of the transport requirement, whilst on the other they cause 81.4 per cent of the aggregate pollution.

2. What Determines Modal Choice?

If we are convinced that there is a need to try to change the modal use structure in Kolkata, we need to first identify the factors that determine modal choice. One can postulate that there are three sets of variables that can impact the choice of a particular mode of transport. They are (a) socio-economic characteristics of the transport user, (b) the nature of the trip, and (c) features of the mode itself. If the socio-economic background of the travellers as well as (to a large extent) the nature of a trip cannot really be changed by the state, whilst modal

[6] Note that we have used the same emissions data for (a) regular and special state buses, (b) ordinary, chartered and school buses and (c) taxis, share taxis and hired cars. This is because the same vehicles with similar maintenance levels are used for these purposes – it is only the occupancy that varies for these vehicles. On the other hand, we have used the same occupancy levels for private and hired cars and occupancy of 5 for share taxis as these run with this fixed number.

[7] In what follows, we refer to a mode as 'more polluting' or 'less polluting' based on this ranking.

features can, it is important to find out the influence the first two groups of variables have (in Kolkata) on mode choice, versus the third group of variables (qualities of the mode).

We have looked at three socio-economic features of the traveller – gender, age, and per capita household income. We have broken up the average per-person distance covered by gender, age groups and per capita household income groups (Tables 6, 7 and 8), and looked at the correlations (both rank and ordinary) between the data sets for each group. As, in general, these correlations are high (they are given with the tables), we can deduce that in Kolkata, these features do not have a major influence on mode use. We then looked at three features of the trip itself– purpose of travel, trip length and trip frequency.

We have identified 12 purposes of travel – work, education, children's school, children's hobby or tutor, shopping, meeting friends, meeting relatives, health, entertainment, hobbies/club, station/airport and other professionals (e.g. visiting one's lawyer). If, once again, we break up the distance covered (in a year) by each mode for each purpose (Tables 9a and 9b), we see that the correlations (both rank and ordinary) between the 12 sets of data is (with one or two exceptions) very high. We can therefore conclude that there are no major differences in mode use by purpose. Coming to trip length and frequency - mathematically, of course, the product of these equals the distance covered by a mode. So, from a 'modal choice' policy perspective, increasing distance and frequency of trips by non-polluting modes and decreasing the same for polluting modes are required. But of the two variables, distance affects the total less than frequency. If we look (in Table 10) at the average trip length as well as the total distance covered by the sample (also in Table 1) for each mode[8], we see that the correlation coefficients (ordinary and rank) are close to zero – from which we can infer that modes are not used more because they take you a long way. This is reasonable, of course, as people need to travel a variety of distances. On the other hand, the ordinary and rank correlations between frequency and mode choice (Table 11) are very high. Hence frequency has a much greater impact on total use.

The second point to note regarding distance is that different modes have different capabilities in terms of distance coverage on a trip (this is clearly seen in column 2 of Table 10). A transport user would have a specific distance she/he needs to cover on a trip - this distance would influence the mode chosen. Less or zero polluting modes like trains, the metro and buses go long distances. At the same time, very short distances may be traversed using non-motorised modes. The polluting modes (cars/taxis, two-wheelers and the auto) go both long and medium distances. If the mode does not emit zero pollution (even if it is less polluting), going a longer distance may ultimately result in a higher quantity of total pollution. Hence trip lengthening cannot be an option except if the mode consequently used emits no pollution. On the other hand, shortening a trip (so that non-motorised modes can be used)

[8] though for Table 8 we have clubbed some modes

would certainly facilitate pollution reduction. One can think of making certain facilities available within localities. This, however, would require land use planning that, at best, can take a long time to implement. What we can change more easily, however, is the *qualities* of the low or zero pollution modes that go longer distances – but we will get to that later.

Coming to travel frequency, the determining factor in total distance travelled by a mode (Table 11), we ask – why does one use a particular mode more frequently? One does so either because of its innate qualities, or because one has a destination (more frequently) that matches the average distance of the mode. Hence the only way that frequency of less polluting modes can be increased and that of more polluting modes decreased, is either by improving the qualities of the former, or by changing destination distances. We have already seen what the latter would imply, and the former is a separate policy variable that is to be discussed subsequently.

In sum, although the product of trip frequency and average distance equals the total distance travelled by a particular mode, they can either be impacted by changing modal qualities, an aspect that we shall discuss in the following section, or by land use changes that can only have a minor and long term role in a city that already exists.

3. Modal Features as Incentives for Modal Shift

This clears the field for encouraging the use of the less (or zero) polluting modes by improving their features. We have looked at 10 modal features: cost, travel time, travel comfort, waiting time, waiting comfort, access, safety, the need to transfer to another/other mode/s (let us call this 'mode transfer' in short), whether (in the case of the metro/circular rail/ferry/railway station) there is fringe parking, and whether the mode involves dealing with restricted parking or parking fines (the last two would only apply to private vehicles). We investigate in some detail which of these, when improved, act as incentives for (a) preventing the *purchase* of personal vehicles, (b) preventing shifts to more polluting forms of transport and (c) encouraging shifts to less polluting forms of transport. For this, we have used data on incentives that would induce shifts (to other modes/from current modes) for each kilometre of mode use.

3.1 Factors that Prevent the Purchase of Personal Vehicles

There were 19 persons (out of 3000) who said that they plan to purchase a car or two-wheeler, both highly polluting modes. There were 5 persons (amongst the 19) who said that nothing would induce them to refrain from buying the vehicle. For the others, incentives (in terms of improvements in the features of the modes currently being used by them) that would prevent it are listed in Table 12. We see here that travel comfort and travel time are very crucial in this decision process.

3.2 Incentives to Prevent a Shift to Vehicles that Pollute More

We next look at the responses, corresponding to each purpose and modal choice within this purpose, regarding a concrete plan to shift to a vehicle that pollutes more (by Table 4) than the present vehicle being used, and what would prevent this plan from being implemented.

Table 13 gives the modes *to* which a shift is planned, the corresponding distance, the percent of the total sample distance currently being covered (by the sample), and the incentives (in terms of improved modal features) that would prevent a shift.[9] On the whole, only 1.67%[10] of the total person-kilometres are in threat of shift. In terms of the number of persons, only 106 (3.53%) responded with one yes or more in the sample constituting 3000 persons.

However, some of the specifics are disturbing. We see that the taxi is the mode in greatest threat of being used more – there would be an increase by 67% of person-kilometres travelled by taxi. This is followed by the private car, with an increase by 20.5%, and the auto, by 16.8%. From the fourth column of Table 13 which lists the number of times a particular modal feature has been given as an incentive that would prevent the shift, we see that reductions in waiting and travel time, cost (presumably the shifts would be *prevented* if taxis and cars become more expensive) and an increase in travel comfort are most important. A reduction in the need to transfer modes is also not unimportant. The remaining features, on the other hand, are not at all important.

As regards the modes *from* which the shifting is planned, Table 14 tells us that the school bus is the greatest culprit in terms of shift as a percentage of the current distance being covered, followed by regular and special state buses, and the minibus. Also, though the shift from the ordinary private bus is not significant as a percentage, the absolute value of shift is very high. Therefore, buses as a group are being disliked more. The features whose improvement matter more are, of course, the same (in aggregate) as for Table 13 but this table shows us that the four most important features (wait and travel time, travel comfort and cost) are mentioned much more for the ordinary private bus.

3.3 Incentives to Get Transport Users to Shift from Heavily Polluting to Low or Zero Pollution Modes

To identify the incentives that would make transport users shift from heavily polluting to low or zero pollution modes, we choose five modes as our 'shift' modes, that is, the modes to which we want them to shift - buses, the metro, the circular rail, the local train and the ferry. Buses, as we have seen, are in the 'medium pollution' range, but they have qualities that make them an indispensable part of the transport fleet. Their network in Kolkata is very

[9] When we say 'cost' as an improved modal feature, we may mean either a reduction in the cost of the mode to be chosen, or a rise in the cost of the mode to be rejected, or both.

[10] This is obtained by dividing 114823, the total shift kilometers, by the *total* kilometers, 6803515 (see Table 1)

elaborate, making them more accessible, and reducing the need for transferring to other modes, which in turn reduces the total travel cost. The ferry is also in the medium pollution range, and it does not take up Kolkata's road space, thereby not contributing to congestion. Of the zero pollution modes, we have left out the tram and the non-motorised modes. The tram has been left out because it has already become an insignificant part of the total network and the low road space makes fixed-track public transport (on these roads) somewhat impractical. The non-motorised modes are only useful *within* localities – even the bicycle, which in some cities is a very useful and pollution free mode, cannot be used on major roads in Kolkata as the limited road space has not allowed the construction of separate bicycle paths, and sharing the roads with motorised transport is difficult and risky. We are thus left with the metro, local train and circular rail, all of which are zero pollution, and run on separate tracks.

We recorded, for each and every destination and every mode used for that destination that is in the most polluting category (two-wheeler, auto, taxi, share taxi, hired car and private car), what incentives would induce the user to shift to buses, the metro, the circular rail, the local train and the ferry.

Of the total kilometres covered by the more polluting modes (430553 kms), there are 100070 kilometres (23 per cent) that *cannot* be converted to any of the five modes, and 330483 kilometres that *can* be (77 per cent) (see Table 15). This is very encouraging. For obvious reasons, it would be most difficult to make those with two-wheelers and private cars shift to other modes (as they possess these modes and have therefore already paid part of the cost). It would be easiest to shift those using taxis and their equivalent, followed by the auto.

Table 16 records the total kilometres travelled by the more polluting modes and the following columns give the kilometres that can be shifted to each of the five shift modes, as well as the percentage of the total. The last row gives the total over all (polluting) modes. We see that very few users of personal vehicles (cars and two-wheelers) are willing to shift to anything much other than the metro, and even that percentage (at 30% for two-wheelers and 23% for cars) is not significant. The possible shift is particularly low for buses and the ferry. The percentages are larger for the other modes (auto, taxi, hired car and shared taxi) to all the five modes in general, although a shift to the metro is most easily accepted from *all* modes.

Let us now look at the improvements in modal quality that would be required to achieve the shifts. Table 17 gives us a count of the number of times each of the ten incentives has come up for the five types of modal shift.[11] This table helps us to identify the more important incentives for each category of shift. For buses, the three most important incentives are less travel time, less wait time and less mode transfer (travel comfort is a close fourth). For the four other modes, they are

[11] We again clarify that we have used the term 'cost' as an incentive – this may be in the form of lower costs for the shift modes as well as higher costs for the shiftable modes.

greater access, cost and less mode transfer, although cost is the third important factor for rail.

Now, using these ranks, we have set up Table 18, which shows, for each of the five modes, the shift kilometres for which one of the three most important incentives is required, or their combinations. Thus, for example, 13969 person kilometres would shift to buses if 'less travel time' is the only incentive provided, whilst 7741 kilometres would shift to buses if 'less wait time' is the only incentive. If both incentives are provided, the total person kilometres that would shift would be the sum of 13969, 7741 and an additional 17969 kilometres. Thus the sum of the distance values in a row gives the kilometres impacted if all three incentives are provided. Table 19 gives us these sums and hence the percent of total shift achieved through the provision of the three most major incentives for each shift mode. Hence, for example, reducing travel and waiting time and the need to transfer would achieve 85 percent of the total possible shift for buses.

4. Inferences and Policy Implications

In Kolkata, the socio-economic characteristics of the population do not have an influence on the chosen mode of transport. Even incomes are seen to have little influence, perhaps because the majority of the population belongs to the lower income groups. Although trip characteristics do have an impact on mode choice, changing them is not a very feasible option for policy makers. Still, the possibility of making certain facilities like medical services or shops available near residences, so that they can be accessed with the use of non-motorised modes, can be kept in mind.

Hence improving the features of the low or zero pollution modes emerges as the main policy instrument for their choice. It is encouraging to note that 77 per cent of the person kilometres travelled by our sample by the more polluting modes can be shifted to the less (or zero) polluting modes through improving their features. The most favoured 'shift' mode is the metro, and the least favoured 'shiftable' modes are the privately owned vehicles. Of the ten features that we have identified, we can say that travel and waiting time are most important for transport choice, and particularly so in the context of buses. Travel comfort is a third factor that would encourage the use of buses. Access is a major concern for the metro, local train, circular rail and ferry. Further, the difficulty of accessing these modes also increases the cost of using these modes and the need to transfer from/to other modes. Reduction in the need to transfer from one mode to another is a general need, which has an impact on time, the physical effort of changing modes and also cost. Those who can afford it choose personal vehicles because they provide comfort, and reduce travel time. Hence four modal features – waiting comfort, safety, fringe parking and parking restrictions, are not of much significance in the context of mode choice for pollution reduction in Kolkata. The rest, however, are all important, so that policy makers need to adopt a multi-pronged approach in improving the services provided by environment-friendly modes of transport.

Figures:

Table 1: Distance Covered by Sample Individuals in One Year, by Mode

Mode	Distance (kms.)	Percentage	Rank
Walking	3118565.0	45.83	1
Ordinary Private Bus	1602869.0	23.56	2
Metro	487363.1	7.16	3
Local Train	313280.7	4.60	4
Rickshaw	224955.8	3.31	5
Three-Wheeler	201695.0	2.96	6
Chartered Bus	197665.7	2.90	7
Bicycle	176286.6	2.59	8
Two-Wheeler	91257.6	1.34	9
Mini Bus	85585.3	1.26	10
Circular Rail	79748.0	1.17	11
Taxi	64622.9	0.95	12
Hired Car	31451.0	0.46	13
Private Car	31096.6	0.45	14
School Bus	25233.0	0.37	15
Ferry	20846.8	0.31	16
Regular State Bus	15864.8	0.23	17
Special State Bus	12728.4	0.18	18
Shared Taxi	10436.6	0.15	19
Tram	8133.8	0.12	20
Executive State Bus	3829.2	0.06	21
Total	6803514.9	100.00	

Source: Dutta and Bhattacharya, 2009

Table 2: Emissions of Pollutants per Unit Distance by Mode, gm/km

Mode	PM10	SO_2	NO_X	CO	HC	Total
Private Bus	0.1096	0.084	0.805	3.891	0.353	5.2426
State Bus	0.0833	0.143	0.784	0.602	0.423	2.0353
Executive State Bus	0.024	0.073	0.640	0.678	0.128	1.5450
Minibus	0.0996	0.130	0.623	1.992	0.393	3.2376
Taxi	0.0523	0.083	0.573	1.796	0.329	2.8333
Private Car	0.0246	0.036	0.239	0.686	0.205	1.1906
Three-Wheeler	0.0153	0.004	0.045	5.449	2.503	8.0163
Two-Wheeler	0.011	0.006	0.020	7.582	2.116	9.7350
Ferry*	0.275	0.289	1.217	4.939	1.074	7.7940

***** After consultations with transport experts and officers managing the ferry service, the actual ferry emissions have been divided by a factor of 10 to take into consideration the significantly lower impact due to the breadth of the river Hoogly, on which it runs, as well as other factors.

Source: Dutta et al, 2008

Table 3: Average Modal Occupancies

Modes	Weekday	Saturday	Sunday	Average
Three-Wheeler	3.8	3.8	3.8	3.8
Two-Wheeler	1.9	1.8	1.9	1.9
Taxi	3.4	3.3	3.7	3.4
Private /Rented Car	4.1	3.8	4.3	4.1
Regular State Bus	33.3	37.9	29.2	37.3
Special State Bus	35.8	30.3	27.9	33.7
Executive State Bus	24.3	18.0	42.0	21.0
Ordinary Private Bus	48.8	45.6	41.5	47.3
Chartered Private Bus	34.5	30.9	36.3	34.2
School Bus	32.8	28.9	-	32.1
Mini Bus	31.6	29.9	26.8	30.7

Source: Dutta et al, 2008

Table 4: Emissions per Kilometre Divided by Occupancy

Mode	Emissions Per Kilometre Divided by Occupancy	Rank
Two-Wheeler	5.1235	1
Three-Wheeler	2.1095	2
Taxi	0.8335	3
Hired Car	0.6900	4
Shared Taxi	0.5665	5
Private Car	0.2900	6
School Bus	0.1635	7
Chartered Bus	0.1530	8
Ordinary Private Bus	0.1110	9
Mini Bus	0.1055	10
Ferry	0.0996	11
Executive State Bus	0.0735	12
Special State Bus	0.0600	13
Regular State Bus	0.0545	14
Tram	0.0000	15
Metro	0.0000	15
Circular Rail	0.0000	15
Local Train	0.0000	15
Rickshaw	0.0000	15
Bicycle	0.0000	15
Walking	0.0000	15

Source: Dutta et al, 2008

Table 5: Total On-Road Pollution Emitted Due to One Year's Travel by Sample Individuals, by Mode

Mode	Pollution (gms.)	Rank
Two-Wheeler	467558.31 (38.70)	1
Three-Wheeler	425475.60 (35.20)	2
Ordinary Private Bus	177918.45 (14.71)	3
Taxi	53863.18 (4.45)	4
Chartered Bus	30242.85 (2.50)	5
Hired Car	21701.19 (1.79)	6
Mini Bus	9029.25 (0.75)	7
Private Car	9018.01 (0.75)	8
Shared Taxi	5912.33 (0.49)	9
School Bus	4125.59 (0.34)	10
Ferry	2077.76 (0.17)	11
Regular State Bus	864.63 (0.07)	12
Special State Bus	763.71 (0.06)	13
Executive State Bus	281.72 (0.02)	14
Tram	0.00 (0.00)	15
Metro	0.00 (0.00)	15
Circular Rail	0.00 (0.00)	15
Local Train	0.00 (0.00)	15
Rickshaw	0.00 (0.00)	15
Bicycle	0.00 (0.00)	15
Walking	0.00 (0.00)	15
Total	1208832.58 (100)	

Note: percentages are in parenthesis.

Source: Derived from Tables 1 and 4

Table 6: Average (Per Person) Distance Covered in a Year Using Each Mode, Females/Males, Sample Data

Mode	Average Distance, Males		Average Distance, Females	
	Kilometres	Rank	Kilometres	Rank
Ordinary Private Bus	760	1	251	2
Walking	507	2	1720	1
Metro	243	3	62	4
Local Train	155	4	42	5
Three-Wheeler	102	5	24	8
Chartered Bus	92	6	34	6
Bicycle	86	7	25	7
Rickshaw	55	8	100	3
Two-Wheeler	48	9	8	10
Mini Bus	47	10	6	12
Taxi	37	11	2	18
Circular Rail	26	12	10	9
Private Car	21	13	5	13.5
Hired Car	18	14	2	18
School Bus	11	15.5	8	11
Ferry	11	15.5	3	15.5
Special State Bus	7	17	1	20.5
Regular State Bus	6	18	5	13.5
Shared Taxi	5	19	1	20.5
Tram	3	20	3	15.5
Executive State Bus	1	21	2	18
Rank Correlation Coefficient: 0.87				
Ordinary Correlation Coefficient: 0.60				

Source: Primary Survey

Table 7: Average (Per Person) Distances Covered by Age Groups in a Year Using Each Mode, Sample Data, Kilometres

Mode	Age Group					
	0-16 (1)		17-60 (2)		>60 (3)	
	Average Distance	Rank	Average Distance	Rank	Average Distance	Rank
Walking	1657	1	1006	1	1397	1
Ordinary Private Bus	121	2	681	2	219	2
Three-Wheeler	41	3	69	7	53	5
Rickshaw	39	4	80	6	133	3
Bicycle	28	5	52	8	66	4
Taxi	23	6	20	12	12	13
Mini Bus	18	7	32	9	23	7
Metro	17	8	238	3	21	8
Local Train	11	9	145	4	33	6
School Bus	10	10	11	15	2	18
Tram	9	11	2	19.5	6	14
Private Car	8	12	13	14	19	9.5
Hired Car	6	13	15	13	0	20.5
Regular State Bus	4	14	4	17.5	2	18
Two-Wheeler	3	15.5	28	10	19	9.5
Special State Bus	3	15.5	4	17.5	2	18
Ferry	1	17.5	6	16	16	12
Executive State Bus	1	17.5	1	21	5	15
Chartered Bus	0	20	83	5	4	16
Shared Taxi	0	20	2	19.5	18	11
Circular Rail	0	20	24	11	0	20.5
Rank Correlation Coefficient: 1 & 2: 0.61, 1 & 3: 0.74, 2 & 3: 0.66						
Ordinary Correlation Coefficient: 1 & 2: 0.84, 1 & 3: 0.99, 2 & 3: 0.88						

Source: Primary Survey

Table 8: Average (Per Person) Distance Covered in a Year by Per Capita Household Income Groups Using Each Mode, Sample Data, Kilometres[#]

Mode	Per Capita Household Income Group			
	0-3745		>3745	
	Average Distance	Rank	Average Distance	*Rank*
Walking	2341	1	562	1
Ordinary Private Bus	319	2	393	2
Rickshaw	144	3	191	3
Three-Wheeler	63	4	76	6
Bicycle	59	5	10	14
Local train	39	6	26	9.5
Mini Bus	29	7	111	4
Metro	20	8	72	7
Taxi	16	9	12	13
Two-Wheeler	15	10	29	8
Private car	13	11	99	5
School Bus	10	12	26	9.5
Hired car	8	13	20	11.5
Chartered Bus	7	14	1	16
Tram	5	15	0	19.5
Shared Taxi	3	17	0	19.5
Special State Bus	3	17	1	16
Regular State Bus	3	17	20	11.5
Executive State Bus	2	19	1	16
Ferry	1	20	0	19.5
Circular Rail	0	21	0	19.5
Rank Correlation Coefficient: 0.83				
Ordinary Correlation Coefficient: 0.85				

This data is for those actually living in the city, not the commuters

Source: Primary Survey

Table 9a: Distance Covered in a Year, Mode-Purpose Combinations, Sample Data, Kilometres

Mode	Purpose											
	Work		Education		Relatives		Entertainment		Hobbies		Station/ Airport	
	Distance	Rank	Distance	Rank	Distance	Rank	Distance	Rank	Distance	Rank	Distance	Rank
Walking	1279069	1	512865	1	379261	1	55973	4	61174	1	45141	1
Ordinary Private Bus	420495	2	158531	2	292794	2	162581	1	28007	2	30800	2
Metro	133499	3	27351	7	67832	4	88133	2	4169	5	255	10
Bicycle	112316	4	33954	4	4600	13	242	16.5	306	14	127	13.5
Rickshaw	98099	5	32014	5	46119	5	1182	11	1890	8	1405	7
Local Train	86436	6	40854	3	72592	3	55461	5	5722	4	3435	5
Chartered Bus	82843	7	1940	11.5	5089	12	62885	3	357	12.5	0	19
Three-Wheeler	60442	8	31044	6	42163	6	5098	8	3014	6	7858	3
Circular Rail	55823	9	0	18.5	0	20.5	7974	7	0	20	0	19
Two-wheeler	44629	10	3880	10	2855	16	242	16.5	9846	3	127	13.5
Mini Bus	25591	11	7760	9	24428	7	2984	9	1737	10	2363	6
Ferry	18720	12	0	18.5	1586	18	30	21	102	17	255	10
Private Car	15639	13	970	14	3331	14	1077	12	357	12.5	766	8
Hired Car	11130	14	1940	11.5	7310	9	1590	10	1758	9	255	10
Shared Taxi	8530	15	970	14	317	19	182	19	153	15.5	0	19
Regular State Bus	7057	16	0	18.5	5678	10	242	16.5	153	15.5	63	15.5
Taxi	6032	17	0	18.5	23533	8	9359	6	2326	7	4855	4
Special State Bus	5687	18	0	18.5	5403	11	252	14	51	18	0	19
School Bus	4265	19	19402	8	0	20.5	91	20	0	20	0	19
Tram	1421	20	970	14	2316	17	242	16.5	970	11	63	15.5
Executive State Bus	0	21	0	18.5	3172	15	272	13	0	20	191	12
Total	2477723		874445		990379		456092		122092		97959	

	Rank Correlation Coefficient	**Ordinary Correlation Coefficient**
Work and Education	0.75	0.99
Education and Relatives	0.61	0.92
Education and Entertainment	0.41	0.43
Hobbies and Station/Airport	0.74	0.96

Source: Primary Survey

Table 9b: Distance Covered in a Year, Mode-Purpose Combinations, Sample Data, Kilometres

Mode	Purpose									
	Work		Friends		Health		Children's School		Shopping	
	Distance	Rank	Distance	Rank	Distance	Rank	Distance	Rank	Distance	Rank
Walking	1279069	1	257391	1	52195	2	133173	1	289783	2
Ordinary Private Bus	420495	2	28066	2	134840	1	18398	2	290123	1
Metro	133499	3	10382	4	8799	4	0	17	111884	3
Bicycle	112316	4	6614	6	352	10.5	9987	4	5181	12
Rickshaw	98099	5	9749	5	2465	8	11803	3	13959	8
Local Train	86436	6	6092	7	13000	3	2746	6	26830	5
Chartered Bus	82843	7	0	19.5	4454	6	0	17	40094	4
Three-Wheeler	60442	8	17880	3	5289	5	7263	5	15598	6
Circular Rail	55823	9	0	19.5	0	19.5	0	17	7974	10
Two-Wheeler	44629	10	761	12	92	14	2723	7	6285	11
Mini Bus	25591	11	5027	8	352	10.5	454	11	14080	7
Ferry	18720	12	152	16	0	19.5	0	17	0	21
Private Car	15639	13	2232	10	278	12	1361	8.5	4870	13
Hired Car	11130	14	0	19.5	2633	7	454	11	788	15.5
Shared Taxi	8530	15	152	16	18	17	0	17	112	18.5
Regular State Bus	7057	16	304	14	74	15	0	17	2184	14
Taxi	6032	17	2935	9	2428	9	454	11	9155	9
Special State Bus	5687	18	1066	11	55	16	0	17	212	17
School Bus	4265	19	0	19.5	0	19.5	1361	8.5	112	18.5
Tram	1421	20	457	13	241	13	0	17	788	15.5
Executive State Bus	0	21	152	16	0	19.5	0	17	40	20
Total	2477723		349412		227565		190177		840052	

	Rank Correlation Coefficient	Ordinary Correlation Coefficient
Work and Friends	0.63	0.97
Friends and Health	0.70	0.40
Children's School and Shopping	0.49	0.73

Source: Primary Survey

Table 10: Average Trip Length and Total Distance Covered by Sample Individuals in a Year for Each Mode

Mode	Average Trip Length		Total Distance	
	Kilometres	Rank	Kilometres	Rank
Rail	11.30	1	393028.70	4
Buses	9.45	2	1943775.40	2
Metro	8.89	3	487363.10	3
Car/Taxi/Hired Car	7.46	4	137607.10	8
Two-Wheeler	4.51	5	91257.60	9
Tram	3.49	6	8133.80	11
Ferry	3.36	7	20846.80	10
Three-Wheeler	2.37	8	201695.00	6
Rickshaw	2.14	9	224955.80	5
Bicycle	1.78	10	176286.60	7
Walking	0.47	11	3118565.00	1
Rank Correlation Coefficient: 0.07				
Ordinary Correlation Coefficient: 0.03				

Source: Primary Survey

Table 11: Average Frequency of Use and Total Distance Covered by Sample Individuals for Each Mode

Mode	Average Frequency /Year		Total Distance	
	Number	Rank	Kilometres	Rank
Walking	704.37	1	3118565.0	1
Ordinary Private Bus	166.31	2	1602869.0	2
Three-Wheeler	37.78	3	201695.0	6
Rickshaw	32.83	4	224955.8	5
Bicycle	25.78	5	176286.6	8
Metro	23.51	6	487363.1	3
Local Train	21.52	7	313280.7	4
Mini Bus	14.37	8	85585.3	10
Two-Wheeler	9.70	9	91257.6	9
Chartered Bus	8.12	10	197665.7	7
Taxi	7.84	11	64622.9	12
Private Car	5.91	12	31096.6	14
School Bus	3.07	13	25233.0	15
Hired Car	2.62	14	31451.0	13
Circular Rail	2.01	15	79748.0	11
Ferry	1.85	16	20846.8	16
Tram	1.32	17	8133.8	20
Special State Bus	1.25	18	12728.4	18
Regular State Bus	1.23	19	15864.8	17
Shared Taxi	0.71	20	10436.6	19
Executive State Bus	0.19	21	3829.2	21
Total	1072.29		6803514.9	
Rank Correlation Coefficient: 0.94				
Ordinary Correlation Coefficient: 0.96				

Table 12: Incentives that Would Prevent the Purchase of a Personal (Motorised) Vehicle

Incentive	Number of Persons
Travel comfort as at least one factor	8
Less travel time as at least one factor	6
Only travel comfort	4
Only less travel time	3
Less wait time as one of the factors	2
Cost[#] as one of the factors	2
Access as one of the factors	2
Safe travel as one of the factors	1

Greater relative cost of the personal vehicle

Source: Primary Survey

Table 13: Modes to which Shifts are desired from less polluting modes in sample, corresponding distances, percentage increase and factors that would prevent these Shifts

Desired Shift Modes	Corresponding Increase in Distance (Kms.)	Percentage of Total Distance Currently being Covered in Sample	Factors to Prevent Shift*	Rank
Taxi	43478	67	27a, 63b, 42c, 63e, 4f, 5g, 45h	1
Shared Taxi	3390	33	2b, 3c, 2e, 4h	2
Private Car	6392	21	2a, 2b, 3e, 1g, 2h	3
Three-Wheeler	33822	17	13a, 33b, 23c, 23e, 1g, 21h	4
Hired Car	3150	10	1e	5
Two-Wheeler	6410	7	3b, 1c, 2e, 2h	6
Chartered Bus	13198	7	3e, 1f, 1g	7
Mini Bus	855	1	2a, 2b, 1g, 1h	8
Ordinary Private Bus	3588	0.2	1a, 6b, 2c, 1d, 4e, 1g, 4h	9
Total	114283		45a, 111b, 71c, 1d, 101e, 5f, 10g, 79h	

* The numbers denote the number of times a particular modal feature has come up and the accompanying letter denotes the feature being referred to (a: mode transfer, b: waiting time, c: travel time, d: waiting comfort, e: travel comfort, f: safety, g: access, h: cost, i.e. cost structure change favouring less polluting mode i: fringe parking, j: parking restrictions), e.g., 27a means that less mode transfers have come up 27 times as an incentive that would prevent shifts to taxis from less polluting modes.

Source: Primary Survey

Table 14: Modes from which Shifts are Desired to More Polluting Modes, Corresponding Distances, Percentage Decline and Modal Features that would prevent these Shifts

Modes from which Shift is Desired	Corresponding Decrease in Distance (Kms.)	Percentage of Total Distance Currently being Covered in Sample	Factors to Prevent Shift*	Rank
School Bus	12028	48	1c, 2e, 1g, 2h	1
Regular State Bus	4991	32	2a, 4b, 1c, 1g	2
Special State Bus	3085	24	1a, 2b, 1c, 2e, 2h	3
Mini Bus	17255	20	3a, 16b, 11c, 12e, 2g, 7h	4
Tram	732	9	1b, 1e, 1h	5
Ordinary Private Bus	61361	4	33a, 74b, 49c, 72e, 5f, 2g, 53h	6
Local Train	11985	4	2a, 5b, 4c, 3e, 2h	6
Hired Car	552	2	1c, 2e, 1g, 4h	8
Taxi	867	1	1a, 4b, 1c, 2e, 1g, 6h	9
Rickshaw	1178	0.5	1b, 1c, 1d, 2e, 1h	10
Metro	151	0.03	2a, 3b, 2g, 1h	11
Bicycle	48	0.03	2e	11
Chartered Bus	50	0.02	1a, 1b, 1c, 1e	13
Total	114283		45a, 111b, 71c, 1d, 101e, 5f, 10g, 79h	

***** The numbers denote the number of times a particular modal feature has come up and the accompanying letter denotes the feature being referred to (a: mode transfer, b: waiting time, c: travel time, d: waiting comfort, e: travel comfort, f: safety, g: access, h: cost, i.e. cost structure change favouring less polluting mode, i: fringe parking, j: parking restrictions), e.g., 1c means less travel time has come up once as a factor that will prevent shifts from the school bus.

Source: Primary Survey

Table 15: Shiftable and Non-Shiftable (Currently Covered) Distances for the Six Most Polluting Modes

Mode	Total Distance Travelled by Sample	Shiftable Distance (Kms.)	Percent Shiftable	Non-Shiftable Distance (Kms.)	Percent Non-Shiftable	Rank by Shiftability
Two-Wheeler	91258	42480	47	48778	53	6
Three-Wheeler	201695	164886	82	36809	18	4
Taxi	64616	60804	94	3812	6	2
Hired Car	31451	30570	97	881	3	1
Shared Taxi	10437	9758	94	679	6	2
Private Car	31096	21985	71	9111	29	5
Total	430553	330483	77	100070	23	

Source: Primary Survey

Table 16: Five Modes to which the Six Most Polluting Modes Can Be Shifted, Distance of Possible Shift to Each and Percentages of Total Distance

Mode	Total Distance Covered	Possible Shifts to Five Low Pollution Modes, Distances and Percent of Current Distance									
		Bus		Metro		Local Train		Circular Rail		Ferry	
		Km	%	Km	%	Km	%	Km	%	Km	%
Two-Wheeler	91257	5088	6	27175	30	17380	19	12705	14	3362	4
Three-Wheeler	201695	81563	40	136075	67	95286	47	58378	29	30256	15
Taxi	64616	26065	40	55075	85	32356	50	39185	61	15443	24
Hired Car	31451	2513	8	27977	89	13288	42	14561	46	2006	6
Shared Taxi	10437	4889	47	9064	87	4591	44	4207	40	2530	24
Private Car	31097	2436	8	7029	23	1654	5	2587	8	2157	7
Total	**430553**	**122554**	**28**	**262395**	**61**	**164555**	**38**	**131623**	**31**	**55754**	**13**

Source: Primary Survey

Table 17: Number of Responses for Each Incentive, Corresponding to Shift to Each of Five Modes

Incentives	Responses Corresponding to Each Shift Mode						
	Bus	Metro	Local Train	Circular Rail	Ferry	Total	Rank
Better Access	131	4360	2461	3136	1314	11402	1
Cost#	530	3901	2150	2043	670	9294	2
Less Mode Transfer	768	2818	2448	1714	650	8398	3
Less Travel Time	916	2135	1188	873	627	5739	4
Less Waiting Time	857	1388	1498	1280	245	5268	5
More Travel Comfort	719	1593	541	383	304	3540	6
More Safety	389	996	527	208	97	2217	7
More Waiting Comfort	20	75	27	34	9	165	8
More Fringe Parking	0	0	5	4	0	9	9
More Parking Restrictions	0	0	2	0	0	2	10

lower cost of shift mode or higher cost of shiftable mode or both

Source: Primary Survey

Table 18: Three Major Incentives of Shift for Each of the Five Shift Modes, Shift Achieved for Each and for Combinations

Shift Mode & Shift Distance (Kms.)	Distance Shifted for Three Most Important Incentives and their Combinations, and Percent of Total Shift to that Mode													
	Less Travel Time		Less Wait Time		Less Mode Transfer		Less Travel & Wait		Less Travel & Mode Transfer		Less Wait & Mode Transfer		Less Travel, Wait & Mode Transfer	
Bus (122554)	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%
	13969	**11**	7741	**6**	9532	**8**	17969	**15**	1957	**2**	2221	**2**	51136	**42**
	Better Access		Cost		Less Mode Transfer		Better Access & Cost		Better Access & Less Mode Transfer		Cost & Less Mode Transfer		Better Access, Cost & Less Mode Transfer	
Metro (262395)	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%
	22461	**9**	31263	**12**	28195	**11**	43784	**17**	25940	**10**	17496	**7**	13038	**5**
	Better Access		Cost		Less Mode Transfer		Better Access & Cost		Better Access & Less Mode Transfer		Cost & Less Mode Transfer		Better Access, Cost & Less Mode Transfer	
Local Train (164555)	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%
	15307	**9**	5508	**3**	15472	**9**	20691	**13**	24489	**15**	19198	**12**	5093	**3**
	Better Access		Cost		Less Mode Transfer		Better Access & Cost		Better Access & Less Mode Transfer		Cost & Less Mode transfer		Better Access, Cost & Less Mode Transfer	
Circular Rail (131623)	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%
	17314	**13**	15197	**12**	14327	**11**	11649	**9**	17195	**13**	13240	**10**	2512	**2**
	Better Access		Cost		Less Mode Transfer		Better Access & Cost		Better Access & Less Mode Transfer		Cost & Less Mode Transfer		Better Access, Cost & Less Mode Transfer	
Ferry (55754)	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%	Km.	%
	16527	**30**	9139	**16**	6851	**12**	1973	**4**	2312	**4**	1667	**3**	898	**2**

Note: By 'cost' as an incentive we mean a change in the cost structure in favour of the shift mode

Source: Primary Survey

Table 19: Shift Achieved with the Provision of Three Most Major Incentives and Percent of Total Shift

Mode	Total Shift (kms.)	Shift with Three Major Incentives (kms.)	Percent of Total Shift
Bus	122554	104525	85
Metro	262395	182177	69
Local Train	164554	105758	64
Circular Rail	131623	91434	69
Ferry	55754	39097	70

Source: Primary Survey

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Public transport policy in Australia: a density delusion?

Paul Mees argues that urban planning is focussed on the wrong issues.

Global warming, volatile petrol prices and the health effects of sedentary lifestyles are all serious public policy challenges for Australia. The issue that links them is transport, particularly our strong and growing dependence on cars.

This trend began decades ago with adults, most of whom use cars for nearly all travel, and has now spread to children. As early as 1994, the Australian Bureau of Statistics reported that 55 per cent of Victorian students travelled by car: current figures are more like 70 per cent. Governments have responded with marketing campaigns designed to encourage children to walk to school, but this misses the point. If parents drive everywhere, so will their children.

Similar trends have been observed in countries like the United States and Britain, so it is tempting to conclude that the dominance of the car is an inevitable result of rising incomes and western cultures. But the trends are not universal. Zurich is the wealthiest city in the world, but only 2 per cent of students travelled by car at the last census, in 2000. In the surrounding suburbs – which house most residents of the Canton, or State, of Zurich – the share was 3 per cent, down from 4 per cent at the 1990 census. Around two-thirds of students in Canton Zurich walk or cycle, the remaining third use public transport. And while car use by workers is higher than the figures for students, it is now below 50 per cent on a canton-wide basis.

What is so different about Zurich and other European regions with successful public transport? The most common responses to this question in Australia are bigger budgets and higher urban densities. If we spend more on public transport and start living in flats instead of houses, we too can have European-style transport systems.

These ideas have been unquestioned for so long that it seems almost churlish to ask whether there is evidence to support them. But there is evidence available, and it points to quite different conclusions. Although these conclusions challenge the conventional wisdom, they also suggest that the public transport problem in Australia may be easier to solve than has generally been believed.

When money is not enough

It's been a long time between drinks for Australian advocates of public transport funding. For years, the Federal government lavishly funded roads, but offered little for rail schemes, and nothing at all for those in urban areas. Last year's budget finally changed all that, with $4.3 billion allocated for urban rail projects over the next four years.

The last big Federal urban rail project was the electrification of Brisbane's rail system in the 1970s and 1980s, and a large backlog has accumulated since then. New lines are needed to serve growth areas in all the major cities; Adelaide's diesel-powered network requires electrification; tortuous lines to centres like Wollongong, Newcastle and Toowoomba need to be straightened.

Perth's new Mandurah railway shows what can be achieved with adequate funding and planning. The 72-kilometre link, incorporating a tunnel under the Central Business District, cost $1.2 billion and carries 60,000 passengers per day. As well as fast, clean, reliable trains, the Mandurah line also offers something that is unusual in Australia: full integration with a network of feeder bus services. At busy stations, the majority of passengers arrive by bus, transferring at purpose-built interchanges that bring buses to the door of the station.

But the current Federal largesse is not going to projects like the Mandurah line. Instead, three-quarters of the budget has been allocated to build a non-electrified railway through empty paddocks on Melbourne's western outskirts. The 'regional rail link' will cost over $4 billion, three times the cost of the Mandurah line, with 75 per cent coming from the federal government. It will serve Geelong, 72 kilometres from Melbourne, but via a circuitous route that adds 10 km to the trip along the existing, 150-year-old line.

The largest national investment in urban rail in decades is about to be spent mainly on a project that may not be needed, that will not serve any communities that are currently without rail, and that will not make anyone's journey faster. Meanwhile, the largest employer in the same region of Melbourne has no regular public transport service at all. The Toyota plant in Grieve Parade North Altona opened in 1994, but 16 years later its 4500 employees are still forced to drive, because there is no bus route along Grieve Parade, and no plans to provide one.

Public transport planning in Melbourne is a mess, and things are no better in most of Australia. For a long time it was thought that the problem with public transport in Australian cities was simply lack of funds; it now looks as if there are deeper issues. The Senate Rural and Regional Affairs and Transport Committee released a report on public transport in August last year. The cross-party committee unanimously endorsed the view that 'Simply investing in more capacity is not the only requirement to improve public transport in Australia. Public transport is not administered and managed in Australian cities as well as in many cities overseas'.

These problems of administration and management are illustrated by the case of the Melbourne regional rail link. It is being built because the three organisations which run trains in the city won't talk to one another.

Currently, trains from Geelong, Ballarat and Bendigo share tracks with suburban trains in the Melbourne metropolitan area – just as trains from Wollongong and the Gold Coast do in Sydney and Brisbane.

This is a normal feature of rail operations in most big cities, and requires integrated timetabling to ensure efficient utilisation of tracks.

For example, the main line from Zurich to the city of Winterthur, some 30 km away, carries 100,000 suburban passengers a day on a mixture of express and stopping services. But the line also accommodates long-distance passenger trains to other regions of Switzerland, international services and freight trains. These services all run reliably, thanks to skilful planning and management by the Swiss Federal Railways.

But in Melbourne, V/Line, which runs the regional trains, doesn't talk to Metro, the private firm running suburban trains. The two organisations decide on their needs separately; then the suburban operator attempts to find gaps in its timetable to accommodate V/Line services. The result is a schemozzle, in which suburban and country trains delay one another unnecessarily, creating a 'capacity crisis' where there needn't be one.

V/Line would prefer to run its country trains on separate lines, free of interference from suburban services, something its counterparts in Sydney, Brisbane or Zurich can only dream about. Two years ago, a scheme emerged to do this by building a new link through paddocks on Melbourne's outskirts, bringing Geelong trains into Southern Cross (Spencer Street) station via an indirect route through Sunshine and a tunnel under Footscray.

There is no need for this new link, as V/Line trains can already run into Southern Cross on separate tracks from suburban services. In the 1920s, the Victorian Railways built an 'independent goods line' to separate slow, steam-hauled freight trains from fast electric services. The bypass line includes a separate, double-track bridge over the Maribyrnong River leading to a tunnel under Footscray and two reserved tracks as far as Sunshine. From here, reserved tracks connect south to the Geelong line and north to the main line to Sydney. This route has been used continuously since the 1920s, and since the early 1960s has carried standard gauge interstate services as well as Victorian freight trains. To enable passenger trains to use the line, a double-track flyover was built connecting it to the passenger platforms at Spencer Street/Southern Cross station.

So why not use the existing route, which could be upgraded to accommodate V/Line passenger trains for a fraction of the regional rail link's $4 billion price-tag? The answer is not congestion, since the existing bypass line carries around a dozen trains a day on each of its two tracks, largely outside the morning and evening commuter peaks. I stood at Footscray Station for half an hour in the middle of the peak and didn't see a single train enter or leave the tunnel.

Well, the bypass route is now leased to the Australian Rail Track Corporation, and they don't talk to V/Line either. When the regional rail link was first proposed, those preparing it were told not to look at the bypass route because it was 'owned' by National Rail. Yet,

national tracks are used by suburban and regional passenger services in Sydney and Brisbane, not to mention cities like Zurich: why should it be too hard in Melbourne?

Nobody asked this question in 2008, when the Victorian government's East-West Transport Needs Study, conducted by Sir Rod Eddington, enthusiastically endorsed the regional rail link. But after Eddington's report, the Victorian government sought a review from Ed Dotson, a former Victorian transport official who worked for the World Bank for the last two decades. Dotson expressed his conclusions in restrained language, but they are devastating.

No serious investigation of the practicalities of the proposal, or alternatives, had been carried out: the project was only at a 'pre-feasibility study stage'. Before it could proceed, there needed to be serious investigation of cheaper alternatives, including use of the existing tunnel under Footscray, and providing extra tracks on the current route to Geelong.

The recommended additional work was not carried out or, if it was, the results were not released. Instead, the Victorian government adopted the Eddington regional rail link proposal and forwarded it directly to the federal advisory body Infrastructure Australia, chaired by none other than Sir Rod Eddington.

Eddington has attracted attention recently for his role as a director of the failed Allco finance company. Critics argue that he didn't question Allco's investment strategies, being content to rubber-stamp them. I don't know if these criticisms are correct or not, but Eddington's assessment of the Melbourne regional rail link seems to fit this pattern. And so the federal government has rewarded Victoria with $3 billion for establishing an administrative regime so dysfunctional that its train operators would rather spend billions of dollars on new tracks than talk to one another about timetabling.

Why don't things change?

The same dysfunctional administrative arrangements help explain why Melbourne can't organise a functioning public transport ticketing system, or provide bus services to major employment centres that have been there for years. And other cities have similar problems, as the Pythonesque sagas of Sydney's proposed Metro and 'smart card' ticketing show. The Senate inquiry singled out Melbourne's privatised administrative arrangements for criticism, but noted that Sydney does not have a public transport authority either. It cited Zurich and Perth as models of good practice, recommending that:

> Australian Government funding for transport initiatives should be conditional on reforms to state and territory transport and planning departments to create central coordinating agencies along the model of the Public Transport Authority of Western Australia.

A regional public transport agency is a necessary condition for successful public transport, but it is not sufficient. The agency needs the expertise, dynamism

and independence from political 'spin' to do its job. In Melbourne and Sydney, in particular, this would mean new staff selected from outside the existing ministries, with their long histories of apologising for, rather than tackling, poor performance. In Melbourne, the authority would also need the freedom to scrap the dysfunctional franchising system, under which private rail firms focus on maximising subsidies and minimising their obligations.

The task of establishing new public transport agencies may not be as difficult as it sounds at first glance, because it actually takes fewer staff to run public transport well than it does to run it badly. Transperth has only 57 staff, while Zurich's cantonal public transport agency, the *Zurcher Verkehrsverbund* (ZVV), carries more passengers than Melbourne's operators but has only 36 employees. In Melbourne, the Transport Ticketing Authority, whose only job is to select and monitor the private consortium responsible for the dysfunctional Myki system, had 104 staff as at 30 June 2009. The total number of bureaucrats Melbourne employs to do the job of Transperth's 57 staff and the ZVV's 36 can only be guessed, as the information is not public, but it is likely to be in excess of 400.

Changes to public transport planning and administration are practical, as well as necessary. So why aren't they happening?

The first reason is the relentless ideological commitment of state and national governments and bureaucracies to privatisation and public-private partnerships, a problem with which readers of *Dissent* are only too familiar. Just as in other areas like water policy, this ideology maximises public outlays, but minimises benefits. Even in states with publicly-owned agencies, like New South Wales, privatisation ideology prevents reform of dysfunctional administrative arrangements, since the only solution critics seem able to suggest is to privatise the existing under-performing agencies. Melbourne's experience with privatisation shows that this is most unlikely to address the problems of cities like Sydney and Brisbane.

The other main factor behind the failure to reform public transport planning and management is the fact that most environmentalists, urban planners and other supporters of sustainable transport are ignoring the real problems entirely. They have been convinced that the real cause of dysfunctional public transport is not bad planning, but suburban back yards.

Blaming the back yard

Around five years ago, a Canadian documentary appeared called *The End of Suburbia: Peak Oil and the Collapse of the American Dream*. The film played well to Australian audiences of environmentalists and urban planners, because it argued that the exhaustion of cheap oil supplies will force suburbanites to abandon not just their cars, but also their separate houses and backyards. Activists and professionals enjoyed being told that their job was not just to change transport policy, but to remake the lives of suburban residents. Hardly

surprisingly, the documentary was not screened in suburban cinemas.

A good example of current thinking among planners is the 'Transforming Australian Cities' report released last year by the Victorian Department of Transport and the City of Melbourne. The report has been showered with praise and awards by the planning fraternity, which has virtually adopted it as its prescription for Melbourne's future.

The report argues that urban sustainability problems stem from the Garden City movement, which 'promised us the dream that we could live in the countryside and work in the city'. Combined with the car, this 'mindset' gave us 'the current form of our cities – namely, low density, widely spread, activity zoned cities where the motor car dominates our public realm and public transport has been largely marginalised'. The idea that the Department of Transport or the City of Melbourne might have contributed to these problems is, of course, not mentioned. In order to achieve 'liveability and sustainability', the report propounds 'six key ingredients of existing successful cities', all of which are urban-design related. Again, the quality of the institutions, planning and administration underlying public transport is apparently irrelevant. What's more, of the six ingredients, 'the question of city density is arguably the most important'. The solution turns out to be to line the city's major streets with 5 to 8 storey apartment blocks.

The report justifies this conclusion with airy references to places like Barcelona and the Brazilian city of Curitiba, but provides no supporting data. But data on the relationship between urban density and transport patterns is readily available from census agencies – particularly for cities in Australia, Canada and the United States, whose census agencies use comparable methodologies for defining urban areas, densities and the share of travel by different modes.

The following table gives the census figures for density and the share of work trips made by 'sustainable' modes (public transport, walking and cycling) from the most recent census in each country (2006 for Australia and Canada; 2000 for the United States). The figures are taken from a larger 'league table' showing the 50 leading urban regions in the three countries, arranged in order from most to least dense (the number at the left is the city's rank in the table of 50).

City		Density (per ha)	Sustainable transport share (%)
1.	Los Angeles	27.3	8.0
2.	Toronto	27.2	28.0
3.	San Francisco	27.0	14.2
4.	San Jose	22.8	n/a
5.	New York	20.5	30.8
6.	Sydney	20.4	26.8
7.	Montreal	19.8	28.7
8.	New Orleans	19.7	8.7
9.	Las Vegas	17.7	7.0
10.	Ottawa	17.2	31.0
11.	Vancouver	17.2	24.5
12.	Miami	17.0	6.2
13.	Melbourne	15.7	18.8
14.	Denver	15.4	7.6
15.	Chicago	15.1	15.0
18.	Calgary	14.0	22.3
20.	Adelaide	13.8	14.6
23.	Portland	12.9	9.9
25.	Perth	12.1	14.3
26.	Detroit	11.9	3.7
30.	Victoria (BC)	11.1	26.1
34.	Canberra	10.8	15.3
37.	Hobart	10.3	15.1
44.	Brisbane	9.2	18.6
46.	Boston	8.9	13.6

These results cast serious doubt on the density solution to the transport problems of Australian cities. It turns out that the densest urban region across the three countries is actually greater Los Angeles, traditionally regarded as the archetype of urban sprawl. Portland, Oregon, cited as the way of the future in *The End of Suburbia*, has less than half the density of the City of the Angels, and while sustainable transport usage there is higher than in LA, it is much lower than in any Australian capital. LA is also denser than New York, which may come as a surprise. The reason is that high-rise city cores have little impact on overall density figures, which are mainly influenced by the suburbs, where most residents live. So while the 8 million residents of New York City live at higher densities than their Los Angeles counterparts, the 11 million residents of New York's suburbs live in much more spacious surrounds than their counterparts in LA.

Not only are the density figures different from what might be expected, but they also have little relationship to the usage of sustainable transport. Los Angeles might have the highest density, but use of sustainable modes is low. By contrast,

Ottawa has the highest sustainable transport share, but a relatively modest density. Similarly, while Brisbane and Boston have substantially lower densities than Detroit and Las Vegas, they have much higher use rates for public transport, walking and cycling.

So drastic measures like those advocated in *The End of Suburbia* and *Transforming Australian Cities* report might, after decades, make Sydney as dense as Los Angeles is now, or make Brisbane as dense as Miami. It is hard to see how this would make any difference at all to the quality of public transport or the sustainability of overall transport patterns.

The good news

The differing performance of the cities in the table above seems much more closely related to transport policy than to urban density. This should be good news for urban policy-makers, because transport policy is easier to change than the urban form of a large city. And providing first-rate public transport is likely to be more politically popular than lining main roads with multi-storey apartments, even if developers could be persuaded to build these apartments, and residents induced to live in them.

Happily, European experience supports the lessons from Australia and North America. While first-rate public transport used to be confined to dense inner cities, it is now being extended to suburban and even semi-rural areas through the work of dynamic, efficient regional authorities like Zurich's. Integrated, region-wide services, fares and timetables mean that even rural residents can travel for work, school and recreation without needing cars. And all this has been achieved without any appreciable change to urban densities, and – in Zurich and many other cities – with lower subsidy levels than in Australian cities.

Naturally, these effective regional agencies are public bodies, but most use private sub-contractors for some services, particularly bus lines in remote regions. The ZVV also employs public agencies, including the Swiss Federal Railways and municipal transit operators, leaving the central body to focus on the critical tasks of service and financial planning.

Even in rural regions of Switzerland, nobody thinks densities are too low to allow the provision of effective, high-quality public transport. And although the 'free enterprise system' is actually listed as a national founding principal in the country's constitution, nobody thinks it should be applied to public transport.

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How WA got public transport right

John Stone compares successful and unsuccessful campaigns for reform.

Ask almost any urban dweller about the public transport in their city and you are likely to get a spray about incompetence and service failures. Experience gives residents in Melbourne and Sydney little confidence in the possibilities of change. Their dissatisfaction is rooted in years of failed promises of reform.

But there is one city in Australia where public transport has been a growth industry for nearly two decades. That city, surprisingly, is Perth.

In the late 1980s, the ALP used public transport investments in the northern suburbs of Perth to snatch an unlikely victory after the 'WA Inc.' scandals. Thirty years later, the southern line to Mandurah was built with bipartisan support.

Perth hasn't always been a pro-public transport town. Like most of the world in the 1960s, it backed the freeway as the way of the future: as one planner remembers, 'it seemed almost automatic that the railways would die'.

Instead, although Perth remains a car-dominated city, per capita public transport use grew by 32 per cent between 1992 and 2005, while the big east coast cities stagnated. Perth has restructured many of its bus routes so they act as efficient feeders to the new rail lines; and the structure of its public transport agencies closely matches the institutions that operated public transport in 'pin up' cities like Vancouver and Zurich.

Around the world, success in public transport reform begins with organised community opposition to an unpopular proposal. Then, political 'entrepreneurs' take up the issue and obtain a strong electoral mandate for new directions. From this point, the outcome is in the balance – success depends on how effectively community groups and politicians work together to enact the new mandate against entrenched opposition in the bureaucracy, the media and elsewhere.

How has WA achieved its modest but significant public transport revolution? What can we learn from Perth's history of community action for better public transport?

In the 1970s and 1980s, citizens groups across the world were organising to stop freeways that threatened to gut their neighbourhoods or to protect their local public transport services from closure. We can trace the political influence of local transport reformers in Australian cities during this period, and through some startlingly differences in their behaviour during various 'windows of opportunity', we can see how Perth achieved much that is now envied by long-suffering public transport users in the eastern states.

The first politicisation of transport policy: opposition to freeway plans

In Sydney, the ALP gained power under Neville Wran while the strength of freeway opposition could still influence government policy. His government took a strong pro-rail stance in the late 1970s and early 1980s and the opening of the Eastern Suburbs line to Bondi, other extensions of electrified services and general modernisation works stemmed the decline in rail patronage and even lifted its mode share.

This reform has faltered and progress in Sydney is now hampered by more than just a dysfunctional government. First, there is continued emphasis on motorway construction, which provides incentives for more passengers to abandon rail. Second, there is an entrenched culture of poor public transport management, which continues to take a fragmented and narrow approach to service planning. The processes of regulation are labyrinthine.

In Melbourne from 1969, there was intense community opposition, in the suburbs and the inner city, to a massive plan for new freeways. For some years, a myriad of residents' groups maintained unity through a platform of 'no freeways anywhere'. In 1973, Liberal Premier Rupert Hamer split this consensus through his decision to cancel some of the inner city freeways. The ALP took up the anti-freeway push, but the moderate Hamer was able to keep the Liberals in power. Road proponents learned important political lessons. Each section of new road is now justified in terms of its local congestion relief, sidestepping larger questions of overall transport policy and avoiding the mass opposition triggered by the overarching 1969 Plan.

By contrast, the first freeways in Perth, built during the 1960s without the need to bulldoze inner city communities, were the result of an almost unanimous consensus that the car was the future – 'your car is as welcome as you are' was a Perth City Council slogan of the time. The road lobby never needed to be as politically active as its counterparts 'over east'.

Community opposition to public transport cuts helps elect reform governments

The politicisation of the transport system in Perth came a decade or more later when the government of Charles Court announced a 'trial' closure of the 15 km Fremantle line. Coming on the heels of the first international oil shocks, the plan triggered extensive community protests. Within four months, the Friends of the Railway (FOTR) had collected over 99,000 signatures on a petition – Perth's population at the time was only 900,000. The leaders of FOTR included a young Peter Newman, who later became an internationally famous transport researcher. The group had strong links to rail management through the participation of retired engineers and had a strong cadre of 'grassroots' organisers, mostly women. From this base, they built up support among parent groups in local schools, in the football league and in other Perth institutions. But, even with opinion polls running at 82 per cent in favour of retaining the train, the Liberals

closed the line as planned in September 1979.

Although the Liberals won an election in early 1980, there were some signs of hope. An FOTR activist, standing in a safe Liberal seat, took the ALP vote from 35 per cent to 44 per cent. The lesson was not lost on ALP power brokers: public transport could be a vote winner. When the 1983 election took Brian Burke and the ALP to power the Fremantle line was not a prominent issue. Even so, the new Premier visited Fremantle on the day after the election and assured campaigners that public transport reform was on his agenda, and he told his ministers privately that he expected significant changes.

In Melbourne, a campaign against plans to close tram and train services was also influential in the watershed election of a reformist ALP government, when John Cain's victory in 1982 ended 27 years of conservative government in Victoria.

This campaign began when, in response to a burgeoning public transport deficit, the rail authority moved to cut services and sack staff. Road proponents wanted to grab these savings to revive their freeway program that was stagnating in the face of a global recession. A government inquiry proposed closure of eight urban train lines, seven tram routes and several rural passenger services.

Unlike the 'grassroots' campaign in Perth, public transport unions were at the centre of opposition to the cuts. They adopted new tactics like 'no fares' days to strengthen public support and forced a halt to implementation of any of the cuts as the 1982 election approached. The ALP wrote into its platform much of the union reform agenda, which emphasised the need for new trains and trams, and extensions to existing suburban lines. Also on the party's election manifesto were policies of opposition to further freeway construction adopted during the early 1970s.

Dealing with the business of reform

Perth

In Perth, the ALP's new transport minister was Julian Grill. Despite his later notoriety, Grill is still seen positively in transport circles as a dealmaker who could accumulate the forces needed to make things happen, and a very good listener to his backbench and his bureaucrats.

His main interest in his new portfolio was finding cost savings for mining and agriculture: that meant job cuts in rail freight. The rail unions resisted and there was a period of tense negotiations, but eventually Grill found some union leaders who could see that the writing was on the wall. The final deal involved an inventive translocation and redundancy package for workers and an agreement from the minister to support public transport improvements in Perth.

The bureaucracy underwent major changes after the election. The head of policy, a hard-headed road advocate, retired. FOTR, through Peter Newman, sat on the committee overseeing a study into rail electrification: the group's key reform agenda. In 1985 this study concluded that electrification was a cheaper option than continued operation

of the old diesel system. On the strength of this, FOTR mounted an intense lobbying effort to stop ALP back-sliding. When it came to Cabinet, Grill's commitment to the unions carried the day and the ALP went to the 1986 election promising to implement the electrification plan.

The next stage of the FOTR agenda – extension of the rail system into the northern suburbs – also required long and consistent political effort. Public opinion and the politicians favoured rail, but there was a drawn out struggle inside the bureaucracy about the comparative costs and benefits of rail versus busways. In the end, rail advocates prevailed and support for this decision from the media and voters in the northern suburbs 'mortgage belt' helped the ALP to scramble over the line in early 1989 in the first election after Burke's resignation in the wake of the WA Inc. scandals.

Peter Newman is rightly given much of the public credit for this series of political successes, but the decisions to fund new rail projects would not have been made without an increased acceptance among senior transport professionals of the importance of rail to the future of the city. The key figure in this was Stuart Hicks.

During the 1970s, Hicks had been an active member of the 'roads consensus'. But, in what he calls the 'heady atmosphere' of the early years of Burke's reform government, intellectual sparring with both Newman and his sceptical but argumentative Minister led Hicks to re-assess his position on the place of rail in the future of the city. In late 1984, Grill offered Hicks the job of running public transport operations in Perth. From this point, Hicks saw that his main task was to get 'enough people to suspend disbelief and back you to make something happen'.

Hicks established Transperth as the marketing name for unified management of buses and trains. He oversaw the design of common logos for all buses and trains, and one set of timetables for all services. Even before rail electrification in 1991, these changes helped to slow the decline in per capita transit use. By 1988, he had assembled a board that could 'help run the strategic discussions' so that his agency could 'stand up and be counted in the community debate' over the future of the city if it continued to rely on the car.

Hicks managed the construction of the northern suburbs railway. Not the least of his achievements in this role was to bring high-profile critics into the planning process, deal with their objections constructively and so build a stronger consensus for the project. Completed on time and on budget, and with rapid success in meeting patronage targets after its opening in 1993, the new rail project helped create a climate of support for rail among the Liberals who came to power in the same year.

The Liberals were keen to pursue their neoliberal economic agenda, but Hicks was able to offer a model of privatisation that, unlike that pursued in Melbourne, he felt 'did not sacrifice the single, seamless system for public transport'. Planning continued for the southern rail

line to Mandurah. In 2001, with the ALP again in government, Hicks and the new Planning Minister, Alannah McTiernan, were central to resolving conflict over the route by which the new line would enter central Perth. The final decision to take the most direct path is a symbolic and practical indication of the change that has been achieved in transport policy in Perth.

Melbourne

The ALP's 1982 election victory was a watershed in Victorian politics. The new government and its supporters were eager for change. Steve Crabb, the first ALP transport minister, had some understanding of the changes required to build a modern public transport system: multimodal ticketing, regular timetabling and simplified bus routes. But, these priorities were not share by others in influential positions: union officials, managers from the old competing train and tram agencies, and road engineers who had little knowledge or interest in public transport operations.

Crabb brought community advocates onto the board of his new public transport agency. But, faced with the 'defeatism' of rail managers, they saw few opportunities for progress on big reforms. For his part, Crabb was disappointed with what he saw as their inability to rise above tactical point scoring.

Crabb and his successors became mired in managing union and community backlash against cuts to services. The escalating conflict with transport unions culminated in 1990 in a dramatic strike by tram drivers and conductors.

In the other main issue in the transport portfolio, Crabb, like most of the people from whom he took advice, supported the continuation of the freeway-building program, and so was at odds with the policy platform his party had taken to the 1982 election. Only a few weeks after the election, he told an amazed group of road engineers to ignore the ALP policy and continue work on their current freeway project. While there were several groups inside and outside the bureaucracy continued to challenge the freeway agenda, they had nowhere from which to build a power base.

The window of opportunity for policy change effectively closed after 1985 as political leaders and the public lost confidence in the ability of managers to rebuild the public transport system, leaving freeway proponents to dominate policy debates.

By 1992, the crumbling credibility of the system helped to create the conditions under which the Kennett Liberals were able to reorganise public transport management according to the dictates of their neoliberal ideology. However, this revolution disguises the fact that there has been little change in public transport services. Privatisation, on the Melbourne model, has largely entrenched the existing fragmented approach to public transport operations. With no large-scale organised community protests, transport policy directions remained constant after the return of the ALP to government in

1999. Expansion of the freeway network remains at the heart of transport planning, and Melbourne's public transport managers continue to respond ineffectively to demands for improved services as more people look for alternatives to the car.

The future?

Big changes in public transport in Perth were set in motion by grassroots activism.

Climate change, peak oil and the social divide growing between inner urban 'haves' and outer suburban 'have nots' make action on public transport more urgent by the day. How can we re-invent those old-fashioned organising skills to re-ignite the demands for real change in Melbourne and Sydney?

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