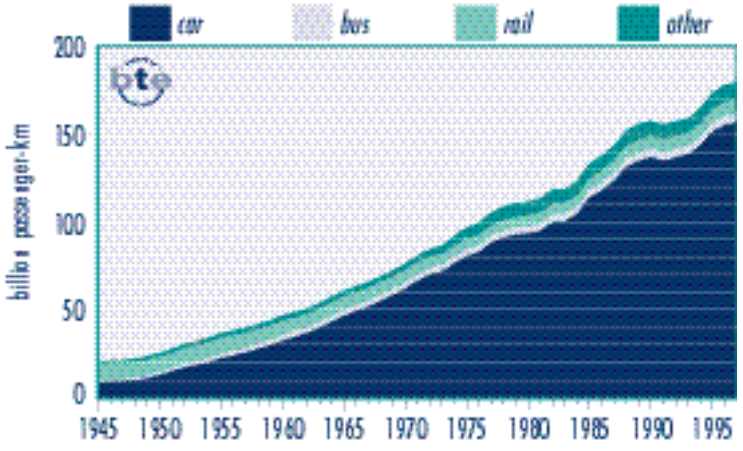
Urban Transport–Looking Ahead

In the fifty years since the end of the Second World War, Australian cities have been transformed from fairly tightly knit core-and-spoke configurations, to sprawling suburban low-density configurations.

This transformation of urban land use has been accompanied and made possible by a rapid improvement and spread of the road system, and an even more rapid expansion in per person car ownership.

As shown in figure 1, total travel in the urban areas of Australia has grown remarkably–almost nine-fold over 50 years. Almost all of that growth came from cars and 'other' road vehicles (mostly light commercial vehicles used for private purposes, and motorcycles). As of 1995, private road vehicles

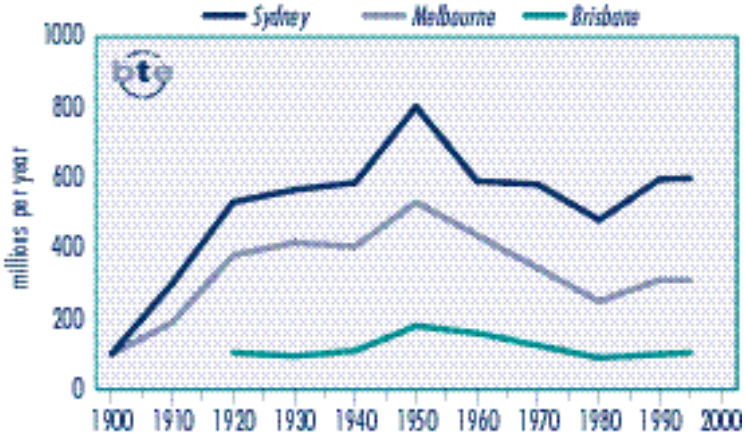
FIGURE 1 URBAN PASSENGER TRANSPORT TASK



Source Working Paper 38, BTE (1998)

(roughly 'cars' plus 'other' in the graph) represent about 93 per cent of city passenger transport. Urban public transport is just the icing on the cake of city transport. As shown in figure 2, urban public transport was once the growth area of city transport. However, after the war the growth shifted to car

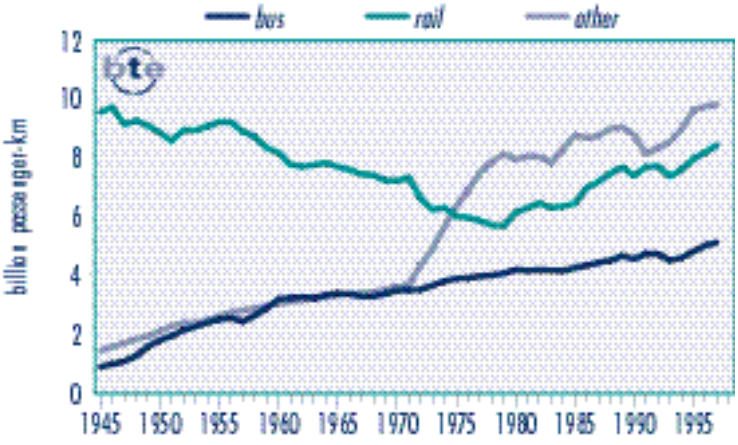
FIGURE 2 URBAN PUBLIC TRANSPORT PASSENGERS: SYDNEY, MELBOURNE AND BRISBANE, 1900–1995



Source Gargett (1990), BTE estimates

ownership, and urban public transport declined until the early 1980s. As shown in figure 3, this decline was due to declines in rail patronage (bus transport having expanded slowly over the period). By 1995, rail was moving fewer passengers than the 'other' category of urban passenger transport (mostly light commercial vehicles used for private travel, as well as motorcycles), but was once again growing in absolute terms (if not in mode share).

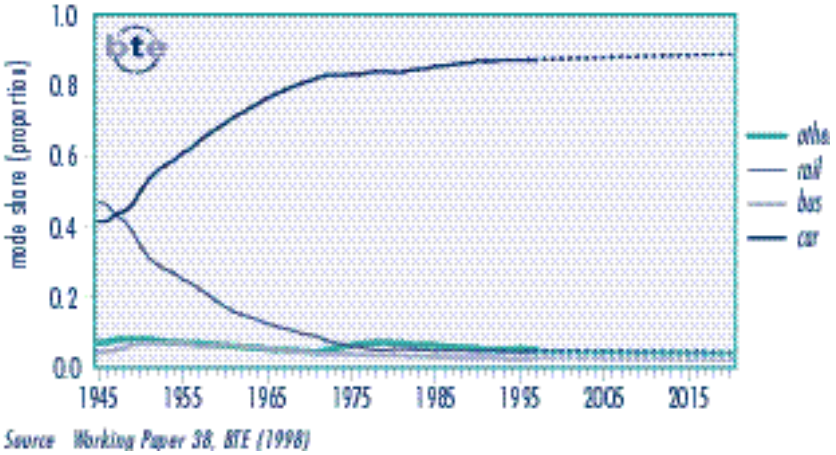
FIGURE 3 URBAN PASSENGER TRANSPORT TASK: RAIL, BUS AND OTHER



Source Working Paper 38, BTE (1998)

As shown in figure 4, the rail share has declined from a high of over 40 per cent to close to 4 per cent today. Under current trends the rail share will continue to decline slowly to the year 2020.

FIGURE 4 MODAL SHARE OF URBAN PASSENGER TRANSPORT TASK



Source Working Paper 38, BTE (1998)

These trends have clear implications for policy regarding city transport. Even if the share of the urban public transport system were doubled, private road vehicles would still constitute 86 per cent of the task. In other words, to be effective in addressing congestion and the environmental impacts from traffic, policies designed to affect city transport must target road travel directly.

1. Road system supply policies–for example: turning lanes, overpasses, freeways, tunnels, kerbside parking restrictions, additional lanes;
2. road system demand policies–for example: road pricing, travel blending, fuel excise, policies to encourage higher car occupancy, CBD parking restrictions;
3. traffic management policies–for example: intelligent transport systems, road rule enforcement, black spot amelioration;
4. vehicle performance policies–for example: new car fuel efficiency and emission standards, safety and emissions testing;

5. policies and technologies to target the 'worst offending vehicles' in the areas of noise, emissions, speed and (for trucks) overloading. For example, it has been shown that perceptions of traffic noise are most highly related to the noise of the loudest three vehicles passing in any hour, and that about 20 per cent of vehicles are responsible for more than 50 per cent of pollutant emissions; and

6. land planning policies to affect the long-term 'car intensity' of the cities–for example, encouraging linear development along rail lines, lot size restrictions, medium and heavy density development.

To an extent, policies that increase the supply and efficiency of urban public transport are natural complements to direct road travel policies–but they can only be very partial substitutes for them if the aim is to make city travel easier and cleaner.

And the problems are likely to get much worse by 2015.

Table 1 shows the results of calculations of the projected increase in congestion costs in Australia's major cities. The comparison is of growth between 1995 (the last year of data on vehicle usage) and 2015. There is projected to be a slow increase in cars per person over that period, which, when combined with population growth, could result in growth in car traffic on the existing networks of roughly 20 to 40 per cent. Although trucks are a small part of the traffic flows, truck traffic growth is likely to be much greater still–between 60 and 80 per cent to 2015, with perhaps nine tenths of this on the existing networks. Total traffic is therefore projected on past trends to grow by something like 30 to 45 per cent over the period. Should this occur, the resulting increases in the volume to capacity ratios on our roads (even allowing for a five per cent increase in network capacity), could see future costs of congestion rise to between 1.5 and 3.5 times the current levels, a cost to the Australian economy of around $30 billion per year by 2015. These projections do not take account of any measures that might be taken to avert these kinds of results, or of any major road developments since 1995.

Of course, increasing levels of congestion can act as a brake on further traffic growth, but there are many cities around the world where current congestion levels are worse than those projected here for 2015. The main point is that congestion will not be an acceptable answer to its own problem. Hence policies that directly affect road travel in our cities will become increasingly important in the years ahead.

References

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* *The BTE was formerly known as the Bureau of Transport and Communications Economics (BTCE), which also carried out research on policy issues in the Communications and Arts portfolio.*

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Table 1 Congestion projection calculations for Australia's main cities

Row		Units[a]	Source	Sydney	Melbourne	Brisbane	Adelaide	Perth	Canberra
1995									
6	Cars per person	no./person	all-Australia, BTE WP 38 (1998),p10	0.475	0.475	0.475	0.475	0.475	0.475
7	Population	M	ABS in BTCE RPT 94 (1996), p339	3.754	3.21	1.469	1.08	1.251	0.303
8	Distance per car	km	ABS SMVU 1995	15000	15000	15000	15000	15000	15000
9	City adjustment	M pcu-km	BTE1998,table 2.1,p13	-3149.4	-1258.2	-542.8	-161.4	181.3	-166.7
10	Total car vkt (and pcu-km)	B pcu-km	(.968*(**6***7*8)+**9**)/1000	22.7	20.9	9.6	7.3	8.8	1.9
11	LCV vkt (and pcu-km)	B pcu-km	12/100***16**	3.3	3.0	1.4	1.1	1.3	0.3
12	Rigid vkt	B vkt	4/100***16**	1.1	1.0	0.5	0.4	0.4	0.1
13	Rigid pcu-km	B pcu-km	**12***2	2.2	2.0	0.9	0.7	0.8	0.2
14	Artic vkt	B vkt	1/100***16**	0.3	0.3	0.1	0.1	0.1	0.0
15	Artic pcu-km	B pcu-km	**14***3	0.8	0.8	0.3	0.3	0.3	0.1
16	Total vehicle vkt	B vkt	100/(100-12-4-1)***10**	27.4	25.1	11.6	8.8	10.6	2.3
17	Total vehicle pcu-km	B pcu-km	**10+11+13+15**	29.0	26.7	12.2	9.3	11.3	2.5
18	1995 congestion cost rate	$/pcu-km	BTCE1996,p481,line 0	0.208	0.103	0.214	0.086	0.049	0.022
19	1995 congestion cost estimate	$b	**18*17**	6.0	2.7	2.6	0.8	0.6	0.05
2015									
21	Cars per person	no./person	all-Australia,BTE1998,p10	0.509	0.509	0.509	0.509	0.509	0.509
22	Population	M	ABS in Rpt 94,BTCE1996, p339	4.449	3.843	2.025	1.212	1.778	0.405
23	Distance per car	km	ABS SMVU 1995	15000	15000	15000	15000	15000	15000
24	City adjustment	M pcu-km	BTE1998,table 2.1,p13	-3149.4	-1258.2	-542.8	-161.4	181.3	-166.7
25	Total car pcu-km (incl new areas)	B pcu-km	(.968*(**21***22***23**)+**24**)/1000	29.7	27.1	14.4	8.8	13.3	2.8
26	Fractional growth (incl new areas)	fraction	(**25-10**)/**10**	0.307	0.300	0.504	0.207	0.512	0.470
27	Fractional growth existing area	fraction	**26***0.75	0.231	0.225	0.378	0.155	0.384	0.352
28	Total car pcu-km existing areas	B pcu-km	(1.0+**27**)***10**	27.9	25.5	13.2	8.4	12.2	2.6
29	LCV vkt (and pcu-km)	B pcu-km	1.8*0.9***11**	5.3	4.9	2.2	1.7	2.1	0.4
30	Rigid vkt	B vkt	1.6*0.9***12**	1.6	1.4	0.7	0.5	0.6	0.1
31	Rigid pcu-km	B pcu-km	**30***2	3.2	2.9	1.3	1.0	1.2	0.3
32	Artic vkt	B vkt	1.8*0.9***14**	0.4	0.4	0.2	0.1	0.2	0.0
33	Artic pcu-km	B pcu-km	**32***3	1.3	1.2	0.6	0.4	0.5	0.1
34	Total vehicle vkt	B vkt	**28+29+30+32**	35.3	32.3	16.3	10.8	15.0	3.2
35	Total vehicle pcu-km	B pcu-km	**28+29+31+33**	37.8	34.6	17.4	11.6	16.0	3.4
36	Increase in volume/capacity ratio	%	(**35-17**)/**17***100-5.0	25	25	37	19	37	35
37	2015 congestion cost rate	$/pcu-km	BTCE1996,p481,line (as in row **36**)	0.232	0.231	0.535	0.127	0.118	0.059
38	2015 congestion cost estimate	$b	**37*35**	8.8	8.0	9.3	1.5	1.9	0.2
39	2015 congestion cost ratio	times	**38/19**	1.5	2.9	3.5	1.8	3.4	3.7

ABS Australian Bureau of Statistics BTCE Bureau of Transport and Communications Economics BTE Bureau of Transport Economics SMVU Survey of Motor Vehicle Use RPT Report WP Working Paper*

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a. M=millions, km=kilometres, pcu=passenger car equivalent (1 car = 1pcu, 1 light commercial vehicle = 1pcu, 1 rigid truck = 2pcu 1 articulated truck = 3pcu), pcu-km=passenger car equivalent kilometres (1 pcu driven 1 km), B=billions, vkt=vehicle kilometres travelled (1 vehicle driven 1 kilometre). Calculations explained in words on pages 13 and 14 of BTE Working Paper 38.

Sources BTE 1998, *Forecasting Light Vehicle Traffic* Working Paper 38, Canberra; BTCE* 1996, *Transport and Greenhouse: Costs and Options for Reducing Emissions*, Report 94, AGPS, Canberra; ABS 1996, *Survey of Motor Vehicle Use, September 1995, Australia, Preliminary*, ABS, Cat.No. 9202.0, Canberra.