

MITIGATION ADAPTATION AND EQUITY:

*Do we have the planning capacity to fairly manage our urban climate change response?**

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Summary

This submission focuses on the capacity of current Australian urban transport and planning policies to reduce transport energy demand in order to reduce transport greenhouse gas emissions. The submission argues that current planning policies have limited potential to produce significant transport emissions reduction. Such policies also risk generating socially inequitable distributional outcomes. The submission calls for a rethink of current metropolitan transport and urban planning involving limiting of new road capacity expansion and substantial investment in new public transport infrastructure, services and governance in middle and outer suburban areas of Australian cities.

Spatial Travel Demand

Demand for travel in Australian cities is growing rapidly. In South East Queensland – Australia's fastest growing urban region – travel demand is expected to increase by 50 per cent by 2026. Given that cars are used for 80 per cent of current travel in SEQ this growth implies a similar increase in transport emissions. Similar patterns are found in other Australian cities – the recent Eddington Report into Melbourne's transport predicts 80 per cent growth in travel demand by 2030.

The Garnaut Review has already signalled that transport emissions will be targeted in any greenhouse emissions abatement regime. The recently released issues paper indicates that greenhouse gas emissions abatement will likely proceed via an emissions trading scheme involving competitive auctioning of deliberately constrained emissions permits. This will inevitably involve increases to the cost of carbon emissions, including those from transport. In the case of transport this will most likely be transmitted through higher fuel prices.

Levels of car use, and in turn levels of fuel demand for urban travel are presently highly differentiated in Australian cities. In general there is a distinction between inner, middle and outer suburban zones with the inner being typified by relatively modest rates of car use and relatively high levels of public transport use, walking and cycling. By comparison outer suburban zones are highly car dependent and public transport, walking and cycling are used for only a small proportion of trips.

* This submission is a written version of the presentation given by the author to the Garnaut Review Forum on Transport and the Built Environment, State Library, Perth, 18 February, 2008.

These spatial transport patterns are demonstrated by Sydney household travel survey data (Table 1). Thus for example, inner eastern Sydney residents use cars for a lower proportion of trips and travel shorter distances than those in the middle suburbs. Residents of outer suburban areas travel further and use cars for a higher proportion of trips than those in middle and outer suburban zones. The result is a wide discrepancy in the likely distribution of effects from higher fuel prices – those in the highly car dependent outer suburbs would face a greater relative impact than those in more central zones.

Part of the reason for these differences is the historical discrepancy in the quality of public transport services in outer suburban zones. Public transport services are generally of modest to good quality in inner and middle suburban areas, especially those developed prior to WWII. Governments were reluctant to supply public transport infrastructure to the dispersed suburban areas that expanded rapidly after WWII with the result that the automobile became the dominant travel mode. Despite a shift in planning rhetoric over recent years public transport services in the outer suburbs remain poor. The result is effectively a spatial market failure in the supply of non-automobile transport modes.

Table 1: Household travel indicators by sub-region, Sydney, 1991-2001.

Travel Indicator	Area								Total Syd. SD
	Inner/ East	North East	South East	Inner/ Central West	North West	South West	Outer West	Central Coast	
Average number of trips per person	3.85	4.01	3.81	3.42	3.36	3.31	3.99	4.16	3.74
Private vehicle mode share (all trips) (%)	48.7	67.9	72.3	64.6	80.1	78.7	79.7	77.3	70.0
Private vehicle mode share JTW (%)	49.2	65.2	69.0	64.4	76.8	75.6	77.5	77.3	67.6
Average trip length (km)	5.7	8.2	8.4	8.0	11.8	11.9	13.7	12.8	9.5
Daily VKT per person (km)	10.1	17.9	17.6	14.1	23.2	24.0	33.3	30.1	20.0
Change in VKT per person (%) 1991-2001	-9.9	0.3	9.1	6.0	4.7	23.6	22.8	19.0	11.6

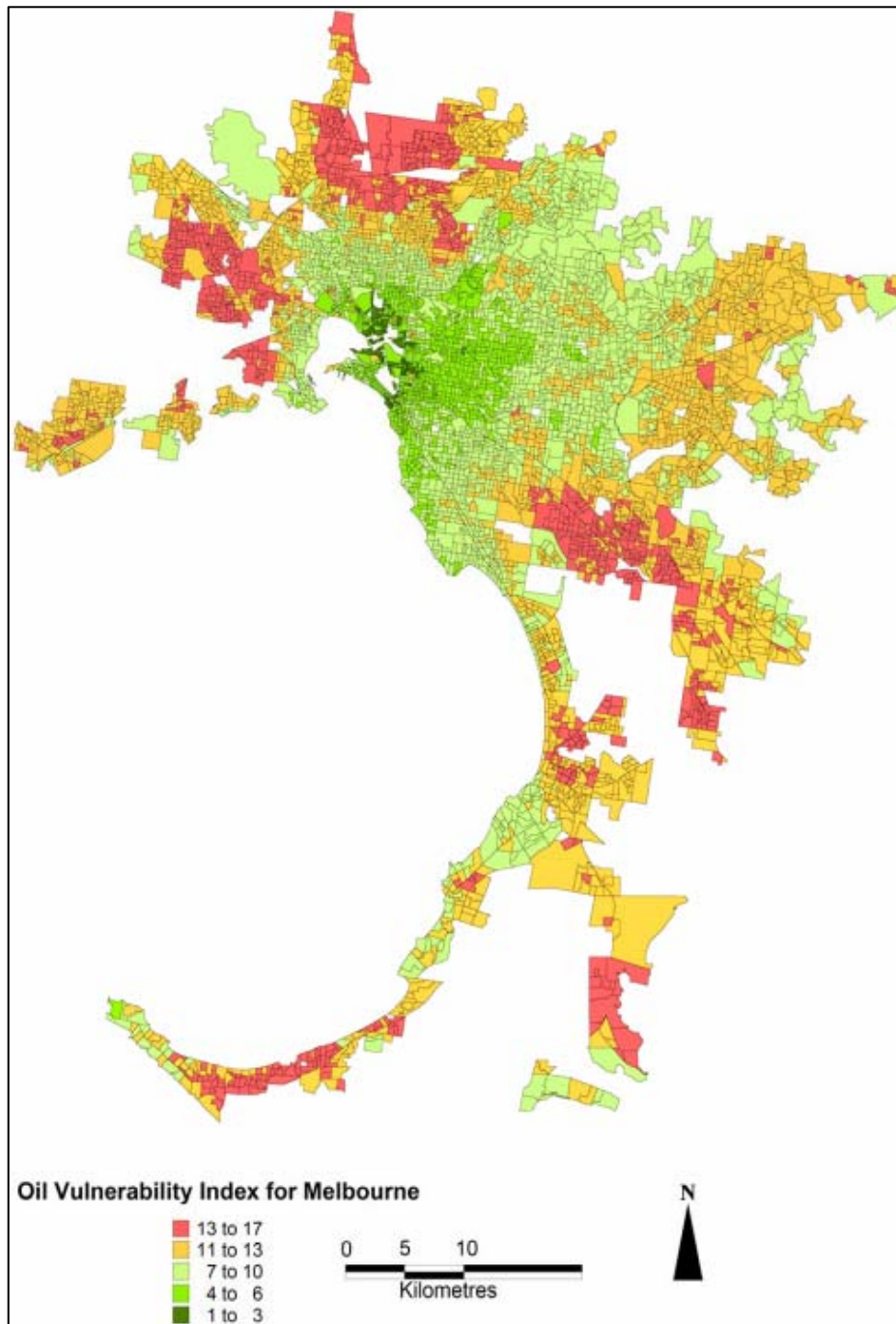
(Source: DIPNR (2003))

This spatial market failure in public transport provision coincides with marked patterns of urban socio-spatial distribution in Australian cities. In general, outer suburban zones tend to be populated by lower socio-economic status groups compared to middle and central areas. High levels of car dependence, and the costs associated with ownership and operation of motor vehicles has long been recognised by social scientists as contributing to relative disadvantage among outer suburban residents. This pattern has been described most clearly in Dodson and Sipe's (2005) work on the socio-economic vulnerability of households to rising fuel prices in Australian cities (Figure 2; higher index scores indicate higher vulnerability).

This oil vulnerability work suggests that increasing the cost of carbon will have socially regressive effects if it is not accompanied by appropriate policies to reduce the socio-economic impacts of higher transport fuel costs. In this context it is worth noting Lenzen et al's (2004) work on total household carbon emissions

which include transport, embodied and operational energy. This work demonstrates that by far the greatest carbon emitters are households in central and inner areas of Australian cities whose higher general consumption patterns contribute to higher levels of carbon release.

What policies might be needed to overcome any socially regressive impacts of a higher carbon price on the cost of urban transport for lower socio-economic status middle and outer-suburban residents?



(Source: Dodson and Sipe (2005, p. 21)).

Figure 1: Distribution of household socio-economic exposure to adverse impacts of rising transport fuel prices, Melbourne.

Current Policies

The main approach to reducing urban transport emissions that has been pursued in Australian urban plans over the past three decades has been urban consolidation. For almost three decades Australia's urban planners have sought to relax planning regulation to permit higher density development within urban areas. Reducing transport energy demand from urban transport by increasing urban densities has been one of the main objectives of urban consolidation policy. The assumption is that higher urban density will serve to concentrate presently dispersed demand for public transport thus making this mode more economically viable. This view has proven highly contentious in the Australian context and scientific opinion remains divided on this question. For example, Newman and Kenworthy (1999) have argued in favour of higher urban densities to reduce automobile dependence. Mees (2000) by comparison has demonstrated that that density is less important in determining public transport use than the quality of public transport supply.

Two phases in urban consolidation since the 1970s can be observed. The first phase, from the mid-1970s to the late-1990s involved simple relaxation of planning regulation of the location of multi-unit development and more permissive regulation of building heights and bulk. Such policies 'wasted' much of the presumed effect of consolidation by failing to ensure that development was focused at public transport nodes. Since the early-2000s consolidation policies have shifted to focus on concentrating higher density development around public transport nodes with the objective of generating higher levels of travel by public transport. This approach will likely also fail to achieve its objectives because it fails to accurately understand the historical patterns that have influenced the structure and form of the Australian city. This risk of failure has significant implications for the achievement of lower levels of transport carbon emissions.

Two influences are particularly important. The first influence is the distribution of demand for public transport relative to private motor vehicles and the role of transport infrastructure and services in shaping this demand. The second influence is role of housing markets in directing investment into higher density residential development. Together these two influences limit the capacity of urban consolidation policies to achieve significant reductions in urban transport greenhouse emissions. A new approach to urban transport and housing is needed.

Housing Markets and Consolidation Failure

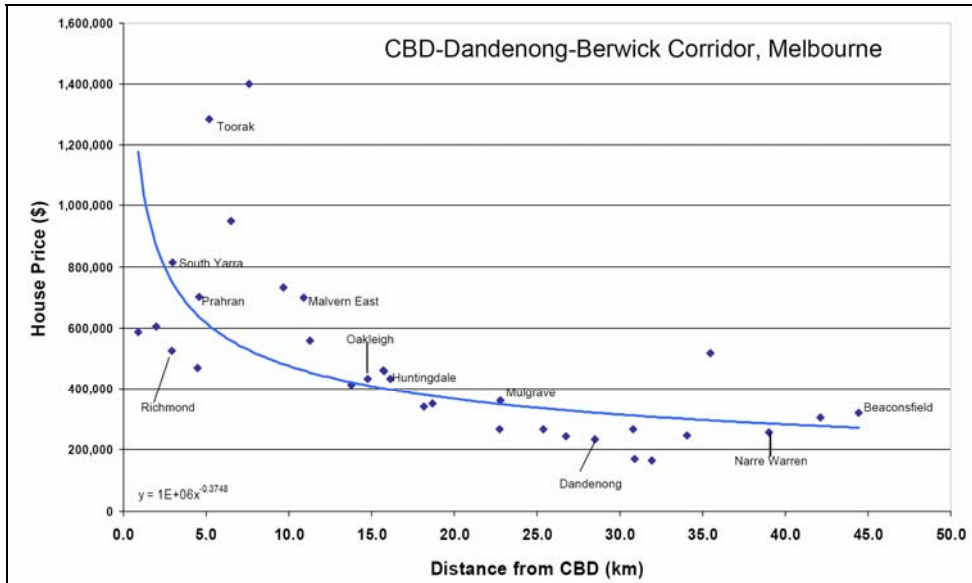
Private motor vehicles account for approximately 75 per cent of travel in Australian cities. Dependence on automobiles for urban travel is highly spatially differentiated within Australian cities, as the case of Sydney attests (Table 1). Even consolidation proponents, such as Newman (2006), have acknowledged a robust relationship between household access to good quality public transport and the balance of car and public transport travel in Australian urban sub-regions. Areas with poor quality public transport exhibit high levels of car use; areas with historically good quality public transport show lower levels of car use.

Recent consolidation policies have shifted from a blanket relaxation of regulations controlling urban density to an approach which seeks to focus higher density development around public transport nodes. Such an approach is exemplified by the 'activity centres' and 'transit oriented development' found in recent Australian metropolitan plans. Although such schemes rarely refer to such measures as directly intended to reduce greenhouse gas emissions, such expectation is implicit in the plans.

But can contemporary urban consolidation policy realise the objective of reducing urban transport greenhouse emissions by reducing automobile travel? More importantly, can urban consolidation reduce automobile travel in those areas where it is currently high – the middle and outer suburban areas of Australian cities? This submission is sceptical of that possibility because the processes used to achieve urban consolidation – namely reliance on private housing markets. It appears that the structure of Australian urban land markets reduces the potency of urban consolidation in reducing demand for higher density development in outer areas. In turn this reduces the capacity of urban consolidation to limit automobile use in these areas.

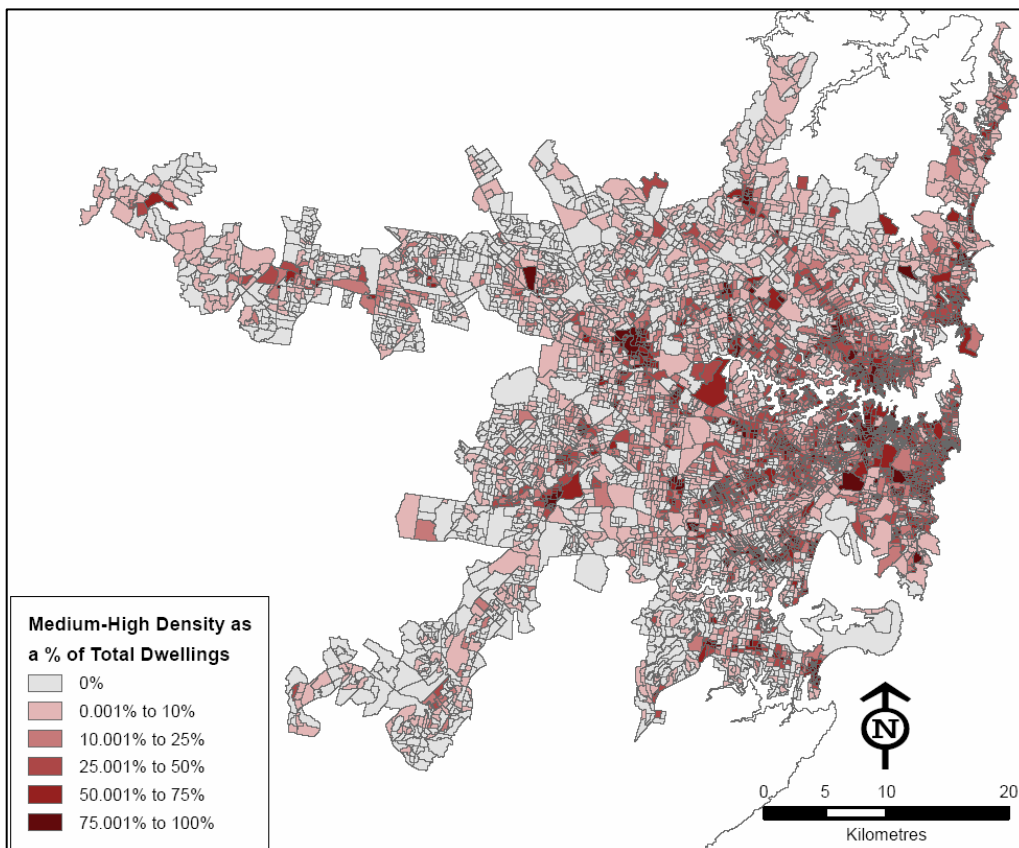
Housing markets are particularly critical to consolidation programs because price signals transmitted through housing markets indicate where private investors should undertake new housing development. Land and housing markets in Australia's major cities display marked distance-decay gradients such that land prices are high in central and inner city zones and decline with increasing distance from the city centre. Thus, for example, in Melbourne's CBD-Dandenong-Berwick corridor high prices in central areas such as Prahran and Toorak give way to relatively modest values in middle and outer zones such as Dandenong and Beaconsfield (Figure 2).

Development of higher density housing makes economic sense in central and inner zones because the elevated land prices signal greater demand for housing in these areas which in turn justifies the additional expense and risk of constructing multi-unit dwellings. But because of the land price distance-decay gradient the economic rationale for higher density development is much weaker in middle and outer suburban zones. In these areas the limited higher density development that does occur tends to concentrate tightly around specific nodes, such as individual retail centres or rail nodes. Hence in Sydney Liverpool and Fairfield exhibit historic concentrations of higher density housing around their rail nodes in contrast to the dispersed car-dependent suburbs of the immediately surrounding sub-region (Figure 3).



(Source: Victorian Valuer General Data, 2007)

Figure 2: Urban house price gradient in the CBD-Dandenong-Berwick corridor, Melbourne.



(Source: ABS Census data 2006)

Figure 3: Distribution of multi-unit dwellings in Sydney, 2006.

Most middle and outer suburban zones in Australian cities lack significant nodal concentration like that seen in Sydney. Consolidation policies will have little effect on residential densities in these areas because the prices generated in such sub-regional land markets will be insufficient to motivate the investment in significantly higher density housing by private market actors. To make matters worse, housing markets are subject to periodic investment cycles in which prolonged downturns in construction can occur. The urgency of climate mitigation is too great to rely on medium and long run housing market cycles to generate the level of new nodally concentrated stock that is sufficient to produce significant emissions reduction. Such problems only exacerbate the challenge of reducing suburban transport emissions through urban consolidation. Given that these are also the areas where transport greenhouse emissions are highest current attempts to reduce transport greenhouse emissions through urban consolidation will not have significant impact on these areas. Worse, the poor supply of public transport in such zones means that households in these areas, who tend to be socio-economically less well off in general, will face greater exposure to rising transport fuel costs. Clearly a solution beyond urban consolidation is required. What might this involve?

Public Transport Supply – The missing link in urban climate mitigation?

A significant body of literature has recognised that the quality of public transport supply in urban sub-regions is a key determinant of public transport demand. For example the European Union's *Hi-Trans* guidelines (Nielsen 2005) for public transport network planning state that higher demand is generated when services operate at less than ten minute intervals because the effective cost to passengers of waiting times and informational costs, such as consulting timetables, decline. Mees (2000) has used the cases of Toronto and Zurich to demonstrate that when rolled out across a metropolitan system of integrated public transport lines such service frequencies generate a 'network' effect whereby the increasing ease of public transport use (i.e. declining cost to the user) produces rising demand for travel by public transport.

An appreciation of the 'network' character of high quality public transport appears implicit in some of the conceptual work underpinning urban consolidation. For example, Newman and Kenworthy's 'network city' schematic (Newman and Kenworthy 1999, p. 185) suggests a constellation of high density nodes linked by a web of high quality intersecting public transport lines. In Australian cities nodal intensification has so far not been accompanied by significant investment in service frequencies nor similar comprehensive investment in service coordination and integration to create a system capable of generating the 'network effect'. Continuing spatial market failures in the supply of public transport networks to middle and outer suburban zones of Australian cities are limiting growth in public transport demand because services do not satisfy the travel needs of residents. These deficits and the lack of consumer choice they present will inevitably impede attempts to reduce private motor vehicle emissions from such areas via carbon pricing. Clearly a new emphasis on public transport investment is necessary to support alternative travel behaviour in the outer suburbs of Australian cities.

Funding New Spatial Public Transport Supply

A major investment program is needed to redress spatial market failure in suburban public transport networks in Australian cities. State governments have a poor record of such investment and display considerable reluctance to invest in public transport. This is despite large budgets being spent on transport investment generally; most current transport investment is directed towards aiding private motor vehicle travel through major roads, such as tunnels, freeways and tollways. The Federal government also expends large sums to supply new road capacity. As Issue Paper 5 has noted the Federal government programmed \$12.3 billion during 2004-2009 for major road infrastructure under the Auslink scheme including a number of urban road projects, but no funding was allocated to public transport. Auslink has never funded public transport.

State governments also prioritise road capacity expansion over public transport in their infrastructure planning. An example of this bias is the South East Queensland Regional Infrastructure Plan (Office of Urban Management 2005) in which 65 per cent of funding for Greater Brisbane is to be dedicated to major urban roads, including a number of freeways while public transport is to receive just 30 per cent of new transport investment (Table 2). The timeline for rollout of this infrastructure means that the supply of road capacity will expand earlier than public transport capacity, which occurs in the latter years of the plan. Similar biases are present in the plans of Australia's other major cities, with perhaps the exception of Perth.

Table 2: Allocation of transport funding by mode, SEQ Infrastructure Plan, 2005.

Mode	\$m	%	Timing
Roads	5,555	65	2006-2015
Rail Freight	265	3	2006-2026
Public Transport	2,554	30	2006-2026
Walking & Cycling	210	2	2006-2026
Total	8,584	100	

(Source: Office of Urban Management (2005, p. 15))

Given the imperative to begin reducing reliance on the private automobile in order to reduce greenhouse emissions Australian metropolitan infrastructure plans need to change their transport budget allocations to favour less energy and emissions intensive modes. Effectively this means directing the majority of new transport infrastructure supply to public transport by re-prioritising public transport projects and services within existing transport budgets. This investment should be used to redress the historic spatial market failure in public transport supply within the middle and outer suburban sub-regions of Australian cities.

An approach to climate emission mitigation in the built environment and transport area in which limits are placed on road capacity growth while public transport networks are expanded and intensified would not require further funding. Much of the new public transport infrastructure and many of the services that are needed to redress suburban public transport failure could be funded through a

reprioritisation of current projects within metropolitan infrastructure plans. Effectively this means no net cost to governments. User adoption of these services would be further motivated by carbon pricing raising fuel costs for private motor travel. Government revenues from an emissions trading program could also be allocated to supporting public transport supply in presently poorly served areas.

Such investment would also have social and economic benefits beyond the transport emissions problem – there is a growing evidence base that reducing car dependence and encouraging greater public transport use, as well as walking and cycling has multiple benefits beyond direct environmental impacts. These include improved health outcomes, reduced social exclusion and increased social capital formation, improved economic efficiency and higher regional GDP growth.

Conclusions

Current approaches to reducing the level of greenhouse gas emissions from urban transport emphasise the intensification of the built environment through urban consolidation. This submission has demonstrated that the areas where transport greenhouse emissions are greatest are also the areas where urban consolidation is least likely to be viable due to housing market processes. This means that current planning policies are woefully inadequate in meeting the challenge of reducing urban greenhouse emissions from transport. The submission has also demonstrated that there is significant market failure in the supply of public transport in many middle and outer sub-regions of Australian cities. This spatial market failure coincides with zones of high relative social disadvantage. If climate mitigation policies are to avoid socially inequitable effects through higher carbon prices they must be accompanied by an extensive program of investment in public transport infrastructure and services, including comprehensive network planning along European *Hi-Trans* principles. This can efficiently be achieved without significant additional expense to governments by re-allocating funds within existing Federal and State urban transport budgets to emphasise investment in public transport infrastructure and services over roads. Given the current deficits in public transport network planning in Australian cities any service and infrastructure improvements would need to be accompanied by extensive capacity building within the sector to ensure that our institutions are able to effectively plan for the climate-safe and adequate public transport Australian cities need.

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