

Published in: *Australian Planner*^{*}, 2008, 45(1), pp. 38-47

Planned Household Risk: Mortgage and Oil Vulnerability in Australian Cities

Jago Dodson* and Neil Sipe**

*The Urban Research Program, Griffith University.

** Griffith School of Environment, Griffith University.

Introduction

One of the most discussed economic phenomena since early 2005 has been the marked increase in the global price of oil. Given the heavy dependence of Australia's urban transport systems on inexpensive fuel (Newman and Kenworthy 1999), the rising global oil price raises questions about the impact this will have on urban households. The sustained high price of oil has begun to influence other sectors and the Reserve Bank of Australia has responded by raising interest rates. There has been little reported research on how the impacts of rising fuel and mortgage interest costs will be distributed across Australian cities and the implications this may hold for urban policy making.

While planners have no influence over fuel prices and mortgage interest rates, they do have substantial control over the way that Australian cities develop and the spatial patterns and practices on which they are based. Planning therefore plays a critical role in determining how vulnerability from rising fuel and mortgage interest costs will be distributed across Australian cities. Metropolitan plans are the highest order planning instruments and we need to understand how these schemes can either exacerbate or reduce urban oil and mortgage vulnerability.

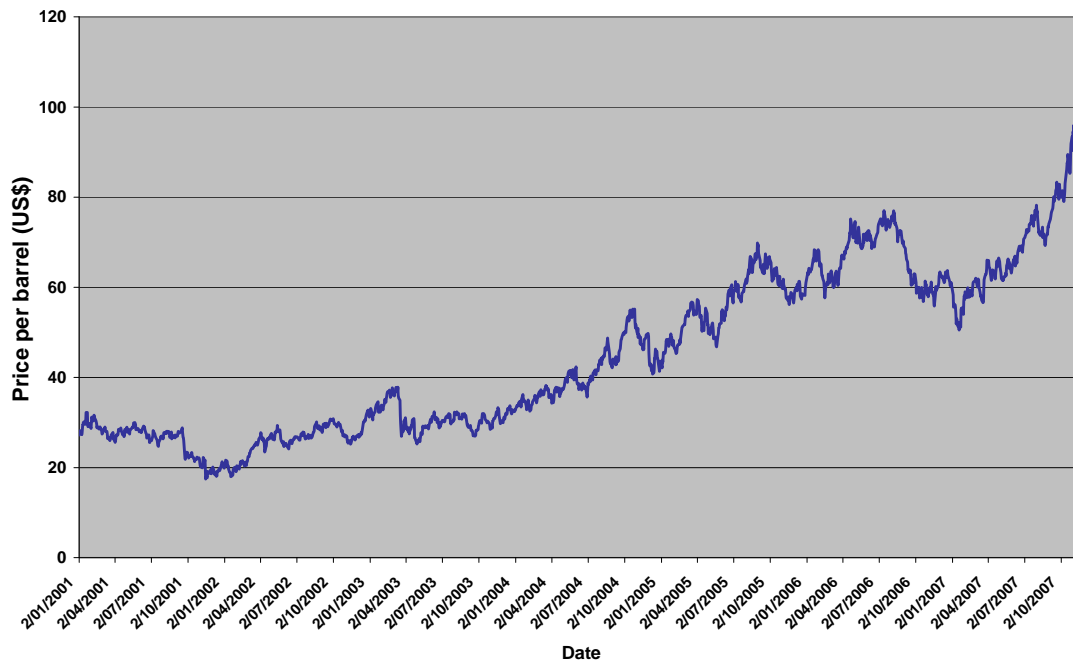
This study undertakes a locational 'vulnerability assessment for mortgage, petrol and inflation risks and expenses' (VAMPIRE) to assess how potential adverse impacts from rising fuel costs and mortgage interest rates would likely be distributed across Brisbane, Melbourne and Sydney. The study uses Australian Bureau of Statistics (ABS) census data to create a vulnerability index that can identify areas of greatest risk, and conversely, those areas where there is lesser risk.

Using the VAMPIRE results the paper then considers recent metropolitan plans in each of these cities. The discussion seeks to identify how the patterns of vulnerability identified by VAMPIRE are addressed by these plans and how likely they are to succeed. The paper argues that a substantial reassessment of priorities and implementation methods is necessary if current metropolitan plans are to significantly reduce the inequity of distribution of current and future oil and mortgage impacts. The paper concludes by outlining a number of policy measures that should be introduced by planning authorities.

Oil prices bite

The price of oil has increased markedly in the past year (figure 1). The cost of petrol in Australia has risen approximately 40 per cent to around \$1.37/L between mid-2005 and mid-2006 (Motormouth 2006). Similar patterns are found in other cities.

* Peer-reviewed paper section



Source: Energy Information Administration (2007, Contract 1).

Figure 1 Price of NYMEX Light Sweet Crude Oil, 1997-2006

Many media stories have reported the adverse effects of rising fuel and mortgage interest costs on household finances (Brown 2006; Gordon and Smith 2006; McMahon 2006) (Fishman 2006; Gittens 2006; Smith 2006). Rising fuel prices are now perceived to be altering household financial and consumption patterns. Less fuel consumption and fewer car trips combined with reductions in discretionary spending such as 'going out' and entertainment appear to be the main behavioural responses (AC Nielsen 2006; Commonwealth Bank Research 2006; Sensis 2005; Sensis 2006).

Rising fuel costs have also contributed to growth in the prices for goods and services. Inflation is recent rose to 4.0 per cent (RBA 2006) with petrol prices comprising much of this figure (RBA 2006, p.3). In August 2006 the RBA Board increased the official interest rate by 0.23 per cent, the second increase since March 2006.

Political leaders and policy makers are becoming increasingly attentive to the impact of fuel and mortgage costs on Australian households. The 2006 federal government budget cuts to personal taxation were partly inspired by the desire to provide financial relief for rising household fuel costs (Tingle 2006). The Prime Minister has said that petrol prices are now his greatest political fear. The Senate is currently inquiring into the security of Australia's petroleum security and future supply (Rural and Regional Affairs and Transport Committee 2006) while both the Queensland Government and Brisbane City Council have established taskforces to enquire into risks and challenges of oil vulnerability .

How the combined impacts of these fuel price rises will be distributed across Australian cities is heavily dependent on the distribution of oil and mortgage vulnerability within metropolitan areas. Given that land-use and transport planning play a significant role in shaping these patterns we need to begin understanding how

these processes will impact on cities. This in turn requires an understanding of urban transport systems and housing markets.

Car dependence in Australian cities

Australian cities are, by international standards, highly car dependent with the private car being used for most trips (Newman and Kenworthy 1999). Levels of car use vary markedly within Australian cities, and typically increase as the distance from the CBD increases. Sydney provides a clear example of this phenomenon (Table 1).

Table 1 Selected travel data for Sydney statistical division.

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, p.2)

The average daily vehicle kilometres travelled (VKT) for residents of eastern Sydney was 10.1 km in 2003, compared to 14.1 km for those in middle west areas and 33.3 km for those in the city's outer west. The trends in VKT growth are also uneven. Daily per capita VKT declined almost 10 per cent for residents of inner and eastern Sydney areas during the period 1991-2001 but increased by approximately 23.6 per cent and 22.8 per cent for those in Sydney's south and outer west, respectively (DIPNR 2003, p.2). The spatial divisions in car dependence are widening in Sydney over time and appear to be related to the distance from the CBD. Other Australian cities exhibit similar patterns (e.g. Morris, Wang and Berry 2002; Newman, Kenworthy and Lyons 1985). These patterns suggest that the effects of increasing fuel prices will be unevenly distributed throughout Australian cities and that those in outer and fringe areas are most exposed.

The converse of car dependence is the ability to choose and use other modes of transport for urban travel, especially public transport. Households in inner parts of Australian cities, where public transport coverage is dense and frequent, tend to use this mode more than those in middle and outer areas. In inner Sydney, for example, motor vehicles are used for only 49.2 per cent of work journeys, while the levels for south and outer west Sydney are 75.6 and 77.5 per cent, respectively (DIPNR 2003). Comparable patterns exist in other Australian cities (Morris, Wang and Berry 2002).

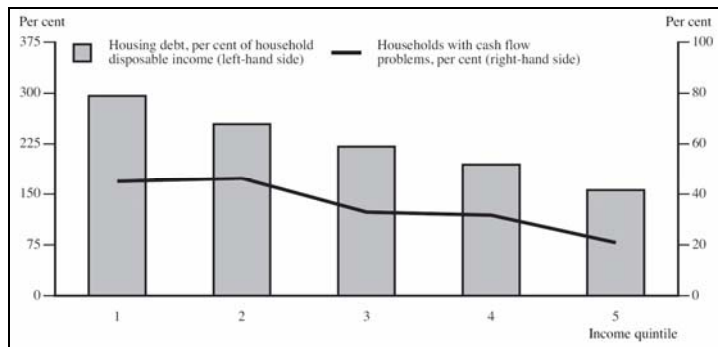
Public transport provision in Australian cities tends to be of highest quality in terms of spatial and temporal coverage, frequency and connectivity in inner urban locations compared to those on the fringe (Cheal 2003). This difference is the major factor behind the divergent levels of car dependence between these areas (Mees 2000b). These patterns are the result of many decades of governments failure to extend high quality public transport to new suburbs in favour of major road developments (Mees 2000b). By deliberately not investing and extending public transport networks in outer suburban areas, Australia's urban managers have effectively created the oil vulnerability that is now increasingly apparent. This socio-economic transport geography has substantial implications for households given the recent and potential increases in global oil prices. Those with constrained financial circumstance and high levels of household debt would likely be heavily affected. But the distribution of housing debt and income status is also socio-spatially patterned.

Home purchase and housing debt in Australian cities

House prices for Australian suburbs follow a reasonably consistent spatial 'price decay gradient' whereby house prices decline as distance from the CBD increases (Burnley 1980). Badcock (1994) has argued that household income generally determines spatial housing opportunities. A greater supply of relatively cheaper housing in outer urban and fringe localities has made these areas more affordable for many households purchasing housing, particularly those on modest or low incomes. In Melbourne 49 per cent of first home buyers purchase homes in outer or fringe areas while in Sydney the figure is 47 percent (Productivity Commission 2004, p.255). This pattern is accelerating Melbourne where the proportion of first home owner households locating in outer and fringe areas increased by almost ten per cent between 1991 and 2003 (Productivity Commission 2004, p.244 figure B.6).

The availability of residential land in fringe areas has historically not been consistently matched by the extensive or comprehensive planning of employment and public services. The result can be 'locational disadvantage' whereby modest income households seeking home ownership experience a lower quality of access to employment and services, due to their financial constraints and locational opportunities, than the metropolitan residents generally. Poor public transport services are a key factor in locational disadvantage (Maher, Whitelaw, McAllister *et al* 1992; National Housing Strategy 1992).

Household mortgage debt is another factor that intersects with the structure of Australian cities and transport systems to distribute household socio-economic vulnerability. Household housing debt data is not well resolved spatially. However the available data suggests that while home purchasers constitute a minor proportion of households overall they may nonetheless comprise a higher proportion of households in certain urban sub-regions, such as on the fringe where incomes are typically lower than the overall metropolitan level.



Source: La Cava and Simon (2005, p.45).

Figure 2 Housing debt as a proportion of household income for debtor households, 2001.

Lower income households who are purchasing owner occupied housing tend to have higher levels of debt as a proportion of their income than higher income households (Figure 3) and are also more likely to have financial difficulties than those on higher incomes (Figure 3). Such households are also more likely to purchase housing in outer and fringe areas. Given recent house price inflation and credit growth the trend is probably towards greater levels of household debt and thus greater levels of exposure to mortgage and oil risks.

Rising fuel costs are now driving inflation which in turn has led the RBA to raise interest rates, with more increases anticipated. Interest rate growth potentially poses greater risk for heavily indebted households on modest incomes. Land-use and transport arrangements have a key role in determining household mortgage and oil vulnerability. We need to understand how planning can reduce mortgage and oil vulnerability and the current capacity of urban strategies to address this issue.

In a previous study (Dodson and Sipe 2007) we sought to identify the areas of Australian cities that would be socio-economically most affected by rising fuel prices and general price inflation through the use of an oil vulnerability index based on Census data. This paper undertakes a similar analytical index, focusing on housing debt, which we refer to as the 'vulnerability assessment for mortgage, petrol and inflation risks and expenditure' (VAMPIRE). We do not want to enter into substantial detail on the construction of the VAMPIRE here. Peer-review of the VAMPIRE methodology has confirmed that it is appropriate for use at this level of analysis (Dodson and Sipe, forthcoming 2008).

The vulnerability assessment for mortgage, petrol and inflation risks and expenditure

The VAMPIRE index is constructed from four indicator variables obtained from the 2001 ABS Census that are combined to provide a composite mortgage vulnerability index that can be mapped at the geographic level of the collection district (CD). The VAMPIRE therefore assesses the average vulnerability of households within the CD rather than indicating the specific vulnerability of particular households. The variables used are:

Car dependence:

- Proportion of those working who undertook a journey to work (JTW) by car (either as a driver or passenger)
- Proportion of households with 2 or more cars

Income level:

- Median weekly household income

Mortgages:

- Proportion of dwelling units that are being purchased (either through a mortgage or a rent/buy scheme)

The VAMPIRE index combines these variables by assigning an index score (see Table 2) and weighting (see Table 3) according to the percentile. High levels of car ownership, JTW by car and mortgage tenure receive high index values while low levels of household incomes receive lower scores. Thus a CD with high levels of car ownership, JTW by car, income and mortgages would receive a score of 15 (5+5+0+5), as shown in Table 2.

The four variables we have selected are not equal in their contribution to VAMPIRE. The variables have been weighted according to their proportional contribution to the overall VAMPIRE score. Thus of a maximum possible VAMPIRE score of 30, five points are provided by each of the car ownership and JTW variables while ten points each are provided by the income and mortgage scores.

Table 2: Value assignment relative to Census District percentile for VAMPIRE.

Percentile	Value Assigned			
	<i>Car own ≥ 2</i>	<i>JTW by car</i>	<i>Income</i>	<i>Mortgage</i>
100	5	5	0	5
90	4	4	1	4
75	3	3	2	3
50	2	2	3	2
25	1	1	4	1
10	0	0	5	0

Table 3: Variable weighting for VAMPIRE

Indicator	Proportion of households with ≥ two cars	Proportion of work trips by car	Income level	Proportion of households with a mortgage
Potential points:	5	5	10	10
Weighting:	33.3%		33.3%	33.3%

Thematic maps were then created for the three largest Australian cities based on the ABS definition of the urban area and thematically shaded. The results of the mapping are discussed below. We are only able to present a limited discussion of the spatial patterns in mortgage and oil vulnerability in this paper. Further elaboration of the patterns is provided in Dodson and Sipe (2006, pp. 23-26).

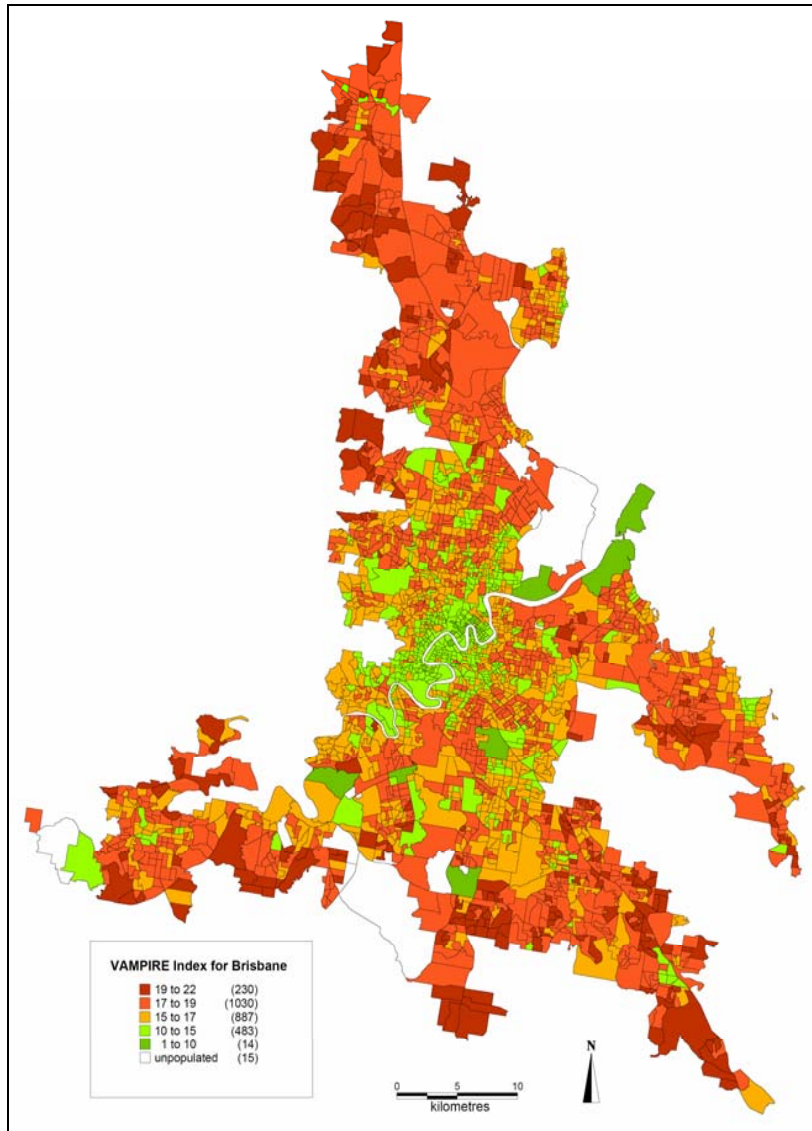


Figure 4: Mortgage and oil vulnerability in Brisbane

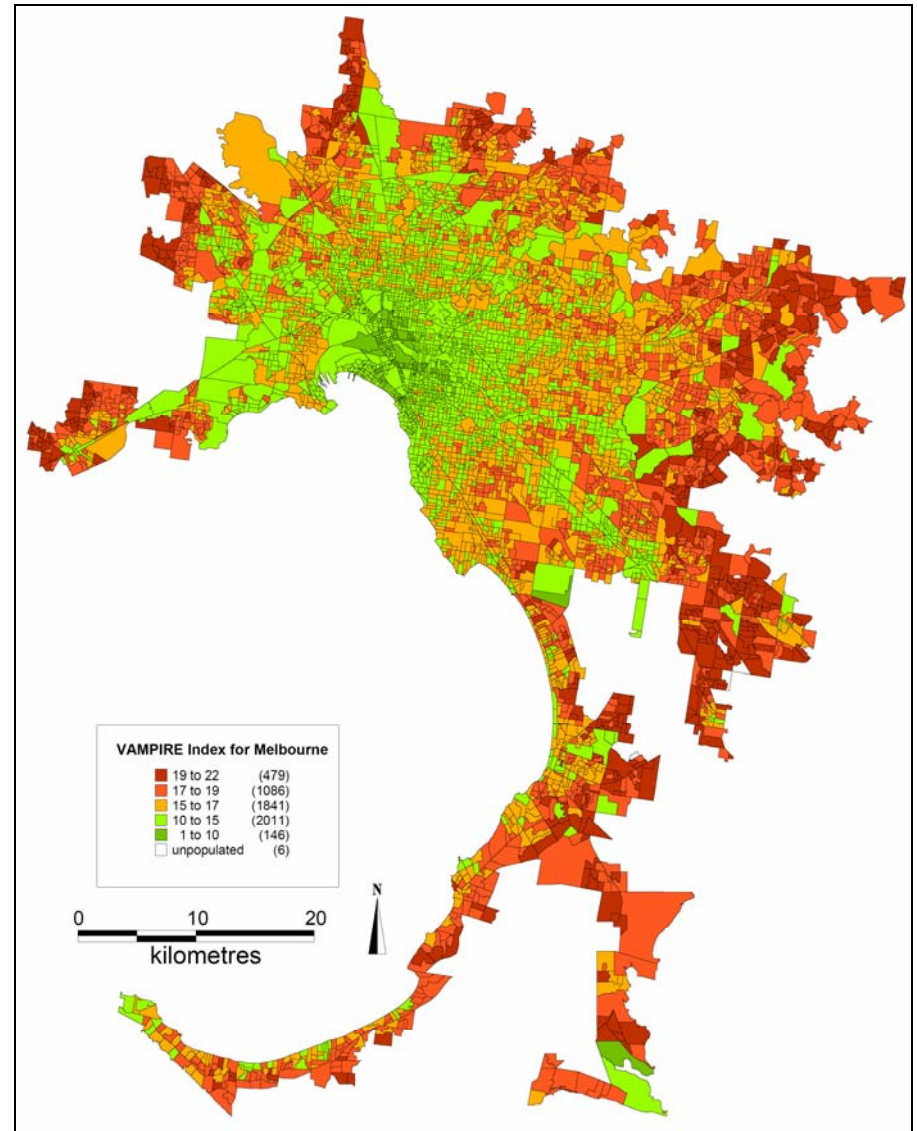


Figure 5: Mortgage and oil vulnerability in Melbourne

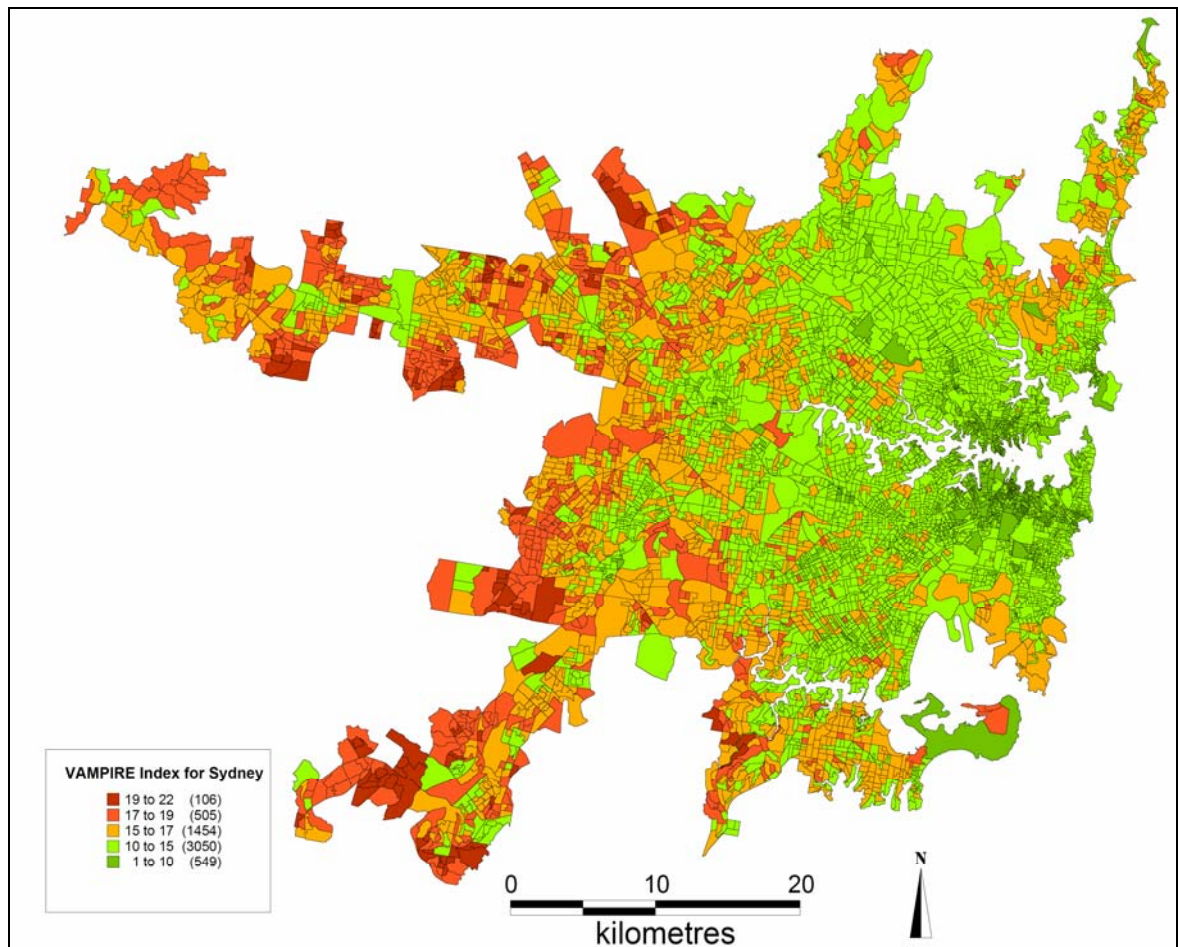


Figure 6: Mortgage and oil vulnerability in Sydney

The VAMPIRE's bite: Patterns of mortgage and oil vulnerability

Brisbane

Mortgage and oil vulnerability in Brisbane is clearly spatially differentiated. The urban growth corridors that extend to the north, southwest, east and southeast from the centre of Brisbane contain high proportions of households with high levels of car dependence and mortgage debt. Localities beyond twenty kilometres from the Brisbane CBD appear particularly vulnerable.

Oil and mortgage vulnerability is clearly related to distance from the Brisbane CBD. In general public transport quality declines with distance from the CBD and appears to be contributing to higher vulnerabilities in these distant areas. Despite some noticeable sub-regional variation the presence of recent residential developments in these outer growth corridors that contain high proportions of modest income households with mortgages makes these areas more vulnerable to oil and mortgage shocks than middle and central locations.

Melbourne

Comparable spatial patterns to those observed in Brisbane are found in Melbourne. High mortgage and oil vulnerability is distributed in a wide, if uneven band around

Melbourne's outer suburban perimeter particularly in the growth corridors of Pakenham/Cardinia, Lilydale, Hume, Melton East and Werribee. By comparison, areas with lower levels of vulnerability are more likely to be found in middle and inner areas of Melbourne.

There is strong evidence that public transport is contributing to lower levels of mortgage and oil vulnerability in some areas. For example, small tracts of low outer suburban vulnerability are associated with the Dandenong, Werribee, Glen Waverly and Sydenham rail corridors, and to some extent also the Lilydale corridor. Clearly public transport is assisting to reduce vulnerability in these areas.

Sydney

Sydney also exhibits wide variation in mortgage and oil vulnerability. There appears to be a clear east-west divide in Sydney between areas with areas east of Parramatta exhibiting relatively lower oil and mortgage vulnerability. Particularly high levels of mortgage and oil vulnerability are apparent along the urban edge of the northwest and southwest Sydney growth corridors.

Public transport again appears to be playing a role in reducing mortgage and oil vulnerability in Sydney. Mees (2000a) has previously noted Sydney's divide between the government operated bus network in eastern Sydney and the private services in Sydney's west. This divide appears to be contributing to higher levels of oil and mortgage vulnerability in the west. The rail network however appears to offer some localised protection from oil and mortgage cost pressures within the outer corridor locations, such as at Penrith, St Mary's and Blacktown in the northwest and near Campbelltown in the southwest.

Metropolitan Strategies: Compounding or alleviating oil vulnerability?

There are clear spatial differences in the distribution of mortgage and oil vulnerability in Australian cities. Given that planners exert control over patterns of urbanisation, urban structure and transport systems, it is worth contemplating whether current metropolitan plans offer measures to overcome or alleviate the present spatial inequities in distribution of mortgage and oil vulnerability. Three issues are pertinent. The first is whether oil vulnerability is a matter of concern to metropolitan planners. The second is the extent to which metropolitan plans seek to reduce oil vulnerability by reducing dependence on the private motor car in middle and outer urban areas through support for alternative modes. The third issue is whether such metropolitan strategies will promote less inequitable spatial housing markets by encouraging the supply of affordable stock for home ownership that is well-located in terms of public transport provision and access to employment and services.

The remainder of this paper examines three recent Australian metropolitan plans to test the extent to which their policies and implementation measures will reduce mortgage and oil vulnerability as identified by the VAMPIRE analysis. We have selected the *South East Queensland Regional Plan (SEQRP)*, the *Melbourne 2030 Metropolitan Strategy (MMS)*, and the *City of Cities Sydney Metropolitan Strategy (SMS)* for analysis as these comprise the three largest Australian cities. Both SEQRP and Melbourne 2030 are accompanied by implementation plans relating to transport or infrastructure. For simplicity this paper treats these accompanying documents as components of the overall strategy. Our focus is empirical such that we give greater weight to specific planning measures than to rhetorical commitments and intentions. A decision to provide a specific bus route at a particular service level is a more

convincing response to oil vulnerability than a generally expressed desire to locate new dwellings near to public transport. In the following discussion we have placed greater emphasis on the transport elements rather than the housing components of the plans, largely because the timeframe for modifying the form of the built environment is quite long, whereas the rollout of a new bus service is much shorter.

The South East Queensland Regional Plan

The 2005 *South East Queensland Regional Plan* (OUM 2005b) marked a new engagement with planning by the Queensland government in a context of rising concern about the implications of limited coordination of dispersed urban development within the region. The SEQRP covers not only Brisbane City, but the urban and urbanising areas of the Sunshine Coast, Gold Coast and Ipswich-Toowoomba. The SEQRP was accompanied by a *Regional Infrastructure Plan and Program* (SEQIP) (OUM 2005a) which sets out infrastructure to be developed to 2026. The SEQIP is a notable document in the Australian urban planning context because it specifies in detail the infrastructure elements that are to be developed over the subsequent twenty years with costs and timeframes.

The SEQRP does not directly address oil vulnerability as a planning issue. However the plan does seek to reduce travel demand and energy usage via a more compact urban form (OUM 2005b, p. 8). Indeed the 'characteristics of a sustainable community' articulated by the plan include a number of activity centres planned around efficient and well-utilised public transport (OUM 2005b, p.23). Low energy consumption is also identified as a sustainability characteristic in a general rather than transport specific sense.

The urban development components of the SEQRP contain strong commitments to urban containment, through an 'urban footprint' which delineates the outer limits of urban expansion and through population targeting at the local government level by dwelling type. Hence of the 145,000 dwellings intended for Brisbane City to 2026, 115,000 (79 per cent) are anticipated to be developed on infill sites with higher densities around public transport nodes and activity centres (OUM 2005b, p. 66). This includes eight 'transit oriented development' sites in Brisbane (OUM 2005b, p. 75).

The integrated land use and transport section of the SEQRP contains a number of commitments to the location of land uses in locations served by public transport and the expansion of public transport to support new land uses (OUM 2005b, p. 75). However the SEQRP provisions do not indicate the level of service quality to be provided by these new services. The provisions for Local Growth Management Strategies which will assist to achieve the dwelling targets under the plan include no mention of public transport services beyond identifying opportunities for transit oriented communities. The structure plan provisions which govern growth at the individual development level contain limited transport elements. While there is an intention that structure plans will ensure new developments provide for and support public transport, walking and cycling there is no specification as to how this is to be achieved and what minimum service might be expected nor the extent or means of ensuring integration with regional services.

The integrated transport section of the SEQRP (OUM 2005b, pp. 106-119) contains a number of objectives relating to public transport such as supporting transit communities and ensuring development supports walking, cycling and public transport. But there is little detail in this element of the plan and much of the task of outlining specific mechanisms for achieving the various transport objectives is

deferred to other documents, such as the 1997 *Integrated Regional Transport Plan* (Queensland Transport 1997) and the *Smart Travel Choices* green paper (Queensland Transport 2005). At the time of writing, almost two years after the release of the SEQRP, the IRTP was in the early stages of its ten-yearly review while the conversion of the *Smart Travel Choices* policy to a white paper was stalled within the policy agencies. Neither document provides an indication of how their policies might assist in minimising the transport risk of highly oil vulnerable areas of Brisbane.

The plan does refer to a requirement for local governments to prepare *Integrated Local Transport Plans* (ITLP) under the SEQRP, but these are not accompanied by any further detail and there are no requirements to consider oil vulnerability. Thus their capacity to ameliorate oil vulnerability remains untested. Current *Integrated Local Transport Plans* seem timid in their ambitions for sustainable transport modes. The current ITLP for Redlands Shire Council in Brisbane's eastern growth area seeks to achieve just a 1 per cent increase (from 7 to 8 percent) in mode share for public transport during the period from 2005-2011.

The SEQ *Regional Infrastructure Plan* provides a high level of certainty about the infrastructure that is to be developed and rolled out during the twenty-year timeframe of the SEQRP. The majority of the transport funding under the SEQIP is for major roads. Public transport, walking and cycling receive only 27 per cent of the Greater Brisbane transport funding. (OUM 2005a, p. 15). The SEQIP gives very limited attention to transport services that do not involve large infrastructure projects, such as local bus services and bus stops. From an oil vulnerability perspective, the SEQIP is relatively weak because it focuses on large regional scale transport infrastructure projects with most funds going to roads.

One opportunity to address oil vulnerability beyond the SEQRP and the SEQIP is contained in the *Translink Network Plan* (Translink 2005) operated by the region's Translink public transport authority, which the SEQRP describes as a three-yearly rolling public transport improvement plan. The main emphasis of the *Translink Network Plan* is on trunk radial rail/bus routes and major infrastructure items. Hence the main items of expenditure in the Translink plan are rail triplications, duplications and carriage upgrades and busway construction, station upgrades and park-and-ride facilities. Outer suburban local public transport networks receive little attention in the *Translink* plan.

While the content of the SEQRP offers some potential to reduce the transport risks of oil vulnerability the material actions to be undertaken as part of the plan remain weak especially in existing dispersed outer suburban areas. The continuing reliance on major road investment and the lack of close integration between the rail and bus services in Brisbane continue to raise questions about the capacity of households in highly oil vulnerable areas to absorb additional increases in oil prices.

Melbourne 2030

The *Melbourne 2030* metropolitan strategy (DOI 2002c) seeks to regulate urban development to achieve a number of sustainability and liveability outcomes. The MMS is accompanied by relevant housing, growth area and transport implementation plans. Further transport plans *Linking Melbourne* (DOI 2004), and *Meeting our Transport Challenges* (DOI 2006) have been released since the publication of *Melbourne 2030* in 2002.

In the discussion of issues motivating the preparation of *Melbourne 2030* (DOI 2002c, pp. 8-29) there is little discussion of transport energy use or the implications

that growing transport energy use may have for future sustainability. Nor is there much discussion of the problems of future petroleum supply or how it might affect heavily car dependent outer suburbs. The Integrated Transport Plan accompanying *Melbourne 2030* (DOI 2002a) refers to 'over-reliance' on the private car for travel (p. 3) and recognises that providing greater road capacity is neither a medium term (p. 7) or long term (p. 3) solution to transport problems. But the main planning issues identified in the Integrated Transport Plan are the coordination with land-use planning, access to opportunities, congestion and greenhouse emissions.

The *Melbourne 2030* transport plan specifies a number of weakly defined actions. Action 1 intends the upgrading of the principal public transport network via general improvements to trunk and local bus services, although no minimum service standards are specified (DOI 2002a, pp.16-17). Similar intentions for service frequency improvements are signalled for the tram and train systems but again no minimum standards are identified.

Action 3 of the *Melbourne 2030* transport plan seeks to provide for the transport needs of growth areas (p. 20). Again however few actions are described beyond vague intentions to undertake further planning to meet the needs of growth areas. No minimum access or service standards are identified nor is there any description of what residents of new growth areas in Melbourne may expect from their local transport system.

Melbourne 2030 also contains major contradictions between provision for private motor vehicle travel and public transport. The largest single transport project included in *Melbourne 2030* was the \$2.5 billion Scoresby Freeway (Department of Infrastructure 2002c, p.154, fig. 43). The Scoresby Freeway was announced during the preparation of *Melbourne 2030* (see Dodson 2003) and was assessed outside the *Melbourne 2030* process, yet is included as an element of the plan. How Scoresby contributes to sustainability objectives is not discussed in *Melbourne 2030* nor is the potential contradiction between the expansion of road capacity represented by this freeway and the recognition elsewhere that such expansion is neither a medium- or long-term solution to transport problems. The oil vulnerability implications of expanding road capacity which has elsewhere been shown to increase motor vehicle use, often at the expense of public transport patronage (Zeibots 2005) thus remain unaddressed by *Melbourne 2030*.

In transport therefore, the overall assessment of *Melbourne 2030* and its Integrated Transport Plan is one of almost complete avoidance of issues relating to oil vulnerability and at best vague commitments to improving public transport. There is very little in the transport components of the plan that could be described as material rather than rhetorical commitments. Most critically from an oil vulnerability perspective there is almost no outline of how public transport services might be expanded in poorly served outer-suburban localities and little attempt to assess transport need in such a way that the value of redressing inadequacies of outer-suburban public transport services could be assessed relative to, for example, tram priority measures, or increased train frequencies or, perhaps most importantly, road capacity expansion.

The housing implementation plan (DOI 2002b) of *Melbourne 2030* also deserves attention from an oil vulnerability perspective because the linking of housing to employment and services via public transport, walking and cycling will be a key element of any response to increasing oil vulnerability. Oil vulnerability is not identified as an objective of housing plans. The Local Housing Strategies anticipated by the *Melbourne 2030* Housing plan are expected to influence the spatial distribution

of new housing in terms of the allocation of new dwellings to metropolitan sub-regions. The Housing Plan provides little specific direction to local governments to address oil vulnerability or even car dependence issues in these strategies. While 24 per cent of new housing will be of a 'more intensive' form and located close to activity centres or public transport under the Local Housing Strategies (DOI 2002b, p.15) conventional, often dispersed, housing, which makes up 76 per cent of new housing under Melbourne 2030 (DOI 2002b, p.15), it seems, will continue to develop in oil vulnerable areas, away from employment, services and public transport.

Overall *Melbourne 2030* provides little confidence that the Victorian Government is capable of addressing issues of oil vulnerability within metropolitan Melbourne. While the planning documents provide rhetorical commitments to improved public transport and less car-dependent growth area planning these remain weak and the material steps that are to be undertaken remain unclear.

Perhaps to emphasise the inadequacies of the *Melbourne 2030* Integrated Transport Plan, two further metropolitan transport plans have been produced by the Victorian government since the release of the original strategy. The first document, titled *Linking Melbourne*, was intended to re-iterate the transport elements within *Melbourne 2030* (DOI 2004, p. ii). But again, the public transport elements within this plan remained weak. The main public transport item in the plan was an orbital network of so-called 'Smart Buses' planned for Melbourne's middle and outer suburban arterial roads, planning for which had already been announced in 2002. At the time of writing only three Smart Bus lines were operating at modest frequencies along limited orbital routes, none of which intersected with the highly oil vulnerable outer suburban growth areas identified by our VAMPIRE analysis. .

The second document, *Meeting Our Transport Challenges* (DOI 2006), was released in 2006 by the Victorian government in response to increasing patronage growth pressures on Melbourne's public transport network. This document made reference to petrol prices as a driver of public transport patronage growth and acknowledged that 2 million Melbourne's residents lived beyond walking distance from the tram and rail networks. However little reference was made to current spatial patterns of public transport access. The plan reiterated the Smart Bus program and again mentioned the intent to improve local middle and outer suburban bus services yet provided little detail about the process, timing, design, service quality or cost of these purported improvements. It seems that three years of rising oil prices and growing concern about oil vulnerability has had little impact on the quality of metropolitan plan making in Melbourne.

Sydney Metropolitan Plan

The *Sydney City of Cities Metropolitan Strategy* was released in December 2005 when global oil prices had reached high levels. It might have been expected that petroleum security issues would have received significant attention from the city's planners. Petroleum security was not discussed extensively in the Sydney plan however the issue of transport fuel costs was noted as an issue the strategy must take into account (Department of Planning 2005, p.22). The discussion also noted the rising transport fuel cost burden on households and calculated that household petrol bills had risen 31 per cent between 1999 and 2004 (p. 30). Given that fuel prices had only risen slightly by 2004 these petrol costs were likely to be due to rising VKTs as much as rising global oil prices (Table 1).

If shifting energy insecurity was barely noted by Sydney's planners, then the oil vulnerability of the city's suburban areas was almost completely ignored. There is no attention given to either energy security or oil vulnerability. The Sydney plan is easier to assess in terms of its likely impact on urban oil vulnerability than the Brisbane or Melbourne plans, partly because it provides some projected outcomes of policies at a high level of detail. For example, projections of residential development relative to public transport show that while 74 per cent of total new dwellings between 2005 and 2013 will be produced in existing urban areas of Sydney (p. 133) only 66 per cent of those new dwellings will be situated near high quality public transport (p. 131). Thus more than a third of Sydney's new residential growth to 2013 may be vulnerable to rising fuel prices because it is not well served by public transport. The transit orientation of post-2013 growth in Sydney is also uncertain and potentially problematic, given that the proportion of greenfield development will increase to 37 per cent.

The *City of Cities* Strategy provides relatively limited description of the way transport services will be integrated at the local level, with much of the focus on connections between regional centres and bus-rail integration. Like the Brisbane and Melbourne plans the Sydney strategy identifies a set of 35 urban centres to which growth will be directed, the majority of which are situated on the heavy rail network (pp. 93, 95). These centres are to be connected by a network of 43 'strategic bus corridors' (p. 169) operating at relatively high frequencies, which are largely derived from a prior review bus services undertaken by the New South Wales government (Unsworth 2004, p. xxxi, map 3). Only limited explanation is provided for the network design either in the *City of Cities* strategy or in the original 2004 review².

The Sydney Metropolitan Strategy is weak in describing the local bus services that are to be provided in response to the plan. The detail of local services is to be left to negotiations between bus operators and the Ministry of Transport in line with the Unsworth Review which recommended local services planning be delegated to bus operators beyond a minimum level of service standard. Route planning outside the strategic bus corridors is thus largely left to the private sector. Given that transport planning literature strongly recommends centralised network planning to achieve integration (Mees 2000; Vuchic 1998) leaving the planning of local services to private operators seems unlikely to achieve the integrated service goals espoused by the Sydney Metropolitan Strategy.

This problem is likely to be greatest in the outer western areas of Sydney where car dependence is currently high and where private operators dominate the bus services. Mees (2000) has previously described the divide in service quality and integration between the state-run buses of Sydney's east and the privately operated buses in the city's western suburbs. It is predominantly these western areas that the Sydney VAMPIRE index has identified as the most oil vulnerable yet planning for local bus services in these zones remains feeble. As with the Brisbane and Melbourne plans, linking local buses to employment, services and trunk transport routes remains the weak link in Australian suburban transport planning.

² The Unsworth Review's strategic bus routes were inspired by a Warren Centre plan for a 'grid' of bus routes and services across Sydney that would produce a virtuous 'network effect' to generate greater patronage. The Warren Centre's plan was itself based on the work of Mees Mees, P. (2000b). *A Very Public Solution: Transport in the Dispersed City*. Melbourne, Melbourne University Press. Unsworth rejected the Warren Centre scheme, and used transport models developed by external consultants to design a set of bus routes connecting Sydney's centres. The Unsworth scheme however weakened the 'network effect' and reduced opportunities for the close integration of bus and rail advocated by Mees.

The emphasis on metropolitan scale infrastructure and cross regional transport connections at the expense of local accessibility and connectivity planning in Sydney is replicated in the most recent State government policy on the city's transport. The *Urban Transport Statement* released in November 2006 retains much of the focus on corridors and the strategic bus network linking various centres which was found in the Unsworth (2004) review and the *City of Cities Strategy*. Again, local services planning in Sydney is not discussed, in favour of CBD light rail and consideration of a 'metro' underground rail system.

While its strategic planning documents lack extensive guidance on local transport planning the NSW government does operate a set of 'service planning guidelines' for Sydney's bus contract regions. These guidelines include, *inter alia*, minimum service frequencies for regional, district and local buses. The minimum frequencies are surprisingly low. District buses must operate just once per hour while local buses may operate services at half this frequency. The Ministry of Transport (2006, p.19) intends that a minimum 90 per cent of Sydney's population should be within 400 metres of a rail line or regional bus. But with local services operating once every hour it is unlikely that a sufficient 'network effect' could be generated to enable a household in an existing highly oil vulnerable western Sydney suburb to substitute public transport for substantial levels of motor vehicle travel.

A summary of the assessment for Brisbane, Melbourne and Sydney is provided in Table 4 shown below.

Table 4. Assessment of Metropolitan Plans in dealing with Oil and Mortgage Vulnerability

	Brisbane	Melbourne	Sydney
Basis of assessment -- Documents Examined	SEQRP, SEQIP, Translink Network Plan	Melbourne 2030, Linking Melbourne, Meeting our Transport Challenges	City of Cities Metro Strategy, Urban Transport Statement
Recognition of oil vulnerability as a planning problem	limited discussion	very little discussion	mention of oil prices only
Percent of new population growth served by public transport	79% (Brisbane City only)	24%	66%
Overall assessment	Weak	Weak	Weak

Conclusions – Glossing over oil vulnerability?

This paper has considered the extent to which Australian metropolitan strategies are capable of dealing with oil vulnerability and energy security through both rhetorical commitments and, more importantly, through planning actions. First we examined patterns of oil vulnerability in Brisbane, Sydney and Melbourne and used these findings as a lens through which to interpret those cities' recent metropolitan strategies. The overall conclusion arising from this exercise is that despite recent fuel price rises and a growing body of commentary and evidence attesting to the risks threatening future petroleum supplies, Australia's recent metropolitan strategies have paid almost no attention to this issue.

Two major observations give rise to concern over this policy failure. The first is that recognition of a policy problem and discussion of potential solutions is typically an

essential precursor to eventual solutions. Even immature policy discussions may produce policy steps which generate sufficient momentum in addressing strategic challenges that they facilitate and support successively improved responses. The almost complete lack of attention to issues of petroleum security and its implications for the oil vulnerability of Australian cities in recent strategic plans raises significant doubts about the capacity to Australian metropolitan strategies to adequately respond to future energy challenges. Even an acknowledgement of energy security questions accompanied by a rejection of the need for policy adjustment might be a more satisfactory response than either ignorance or avoidance of the problem.

The second observation is perhaps more concerning. It is clear that the metropolitan plans discussed above have made rhetorical commitments to reducing the reliance on private motor vehicles, which in turn would potentially reduce the oil vulnerability of outer suburban areas. Yet even these commitments are being pursued with only modest vigour and often inappropriate policy responses. Despite four years of planning Melbourne's orbital Smart Buses are presently operating across only one third of their expected future routes and will not be completed until 2012. Sydney's new regional bus services may not commence operating until 2012 (Ministry of Transport 2006). If current metropolitan plans are not capable of responding to problems that have already been identified as pressing then there is little reason to believe that such patterns will shift markedly in future.

The assessment we have undertaken suggests that there is a great deal of work to be done to advance knowledge of oil vulnerability in Australian cities and to identify means of integrating research-based analysis into metropolitan plans. A particular challenge is to identify the balance of infrastructure and service investment between modes and at varying scales necessary to respond to oil vulnerability under different supply scenarios. The analysis we have undertaken suggests that local-scale suburban public transport improvements linked to improved regional networks, combined with walking and cycling measures, are the best general response to oil vulnerability. However further work needs to be done to evaluate whether this is the best approach and whether existing infrastructure investment plans will assist in addressing oil vulnerability. Particular attention must be given to leveraging the maximum capacity from existing public transport infrastructure. Each of the three cities surveyed have extensive rail networks but a growing body of literature suggests that these are poorly articulated at the local scale, especially in middle and outer suburban zones. Expansion and integration of local bus services, especially within existing areas would ensure that existing parts of Australia's cities are re-fitted for oil vulnerability and that attention is not solely dedicated to new growth and fringe zones.

Further questions apply to the capacity of urban consolidation policies to produce positive effects on the distribution of oil vulnerability. Despite two decades of policies to increase urban densities in Australian cities, urban housing affordability appears to be in decline. The capacity of consolidation policies to reduce oil vulnerability, given the very long development horizons and the localised nature of transit oriented development schemes suggests that approaches to reducing oil vulnerability need to include more than just denser activity nodes on existing high-capacity networks. Addressing the oil vulnerability of existing suburban areas will be as important as ensuring that high levels of oil vulnerability are not generated through new development.

Whether the recent oil price rises signal what some petroleum commentators have described as an 'energy descent' or whether they merely reflect an irregular episode of supply constraint within a sustainable oil production trajectory remains uncertain.

A reading of the broader petroleum supply literature suggests cautious pessimism may be the most appropriate point from which to engage the issue rather than a cursory deflection or deliberate avoidance. The Australian Senate Inquiry (Australian Senate 2007) report has recommended that Australia should begin planning for declining petroleum security. It is now up to Australia's metropolitan planners to begin the task of including oil vulnerability as a primary future constraint in metropolitan land use and infrastructure planning and to begin adjusting their strategic frames to address the problem.

References

- AC Nielsen (2006). *AC Nielsen Fuel Price Survey Results for Australia - November 2005*. Sydney, AC Nielsen.
- Australian Senate (2007). *Inquiry into Australia's future oil supply and alternative transport fuels: Final Report*. Canberra, Australian Parliament House.
- Badcock, B. (1994). 'Stressed-out' Communities: 'Out-of-sight, out-of-mind'? *Urban Policy and Research* 12(3): 191-197.
- Brown, B. (2006). Petrol price should rule out rate rise. *The Australian*. Sydney. 19 April: 29
- Burnley, I. (1980). *The Australian Urban System: Growth, change and differentiation*. Melbourne, Longman Cheshire.
- Cheal, C. (2003). *Transit Rich or Transit Poor: Is public transport policy in Melbourne exacerbating social disadvantage?* Faculty of Architecture, Building and Planning. Melbourne, University of Melbourne.
- Commonwealth Bank Research (2006). *Petrol Prices: Learning to live with a higher level of pain*. Commonwealth Research Economic Issues. Sydney, Commonwealth Bank of Australia.
- Department of Infrastructure (2002a). *Implementation Plan 6: Integrated Transport*. Melbourne Department of Infrastructure.
- Department of Infrastructure (2002b). *Melbourne 2030 Implementation Plan 3: Housing*. Melbourne, Victorian Government.
- Department of Infrastructure (2002c). *Melbourne 2030: Planning for Sustainable Growth*. Melbourne, Department of Infrastructure.
- Department of Infrastructure (2004). *Linking Melbourne: Metropolitan Transport Plan*. Melbourne, Department of Infrastructure.
- Department of Infrastructure (2006). *Meeting our Transport Challenges: Connecting Victorian Communities*. Melbourne, Department of Infrastructure.
- Department of Infrastructure Planning and Natural Resources (DIPNR) (2003). *Regional Transport Indicators for Sydney*. Sydney, Transport and Population Data Centre, NSW Government.
- Department of Planning (2005). *City of Cities: A Plan for Sydney's Future: Metropolitan Strategy*. Sydney, New South Wales Government.
- Dodson, J. (2003). Visions for 2030: Housing and Transport Planning in Labor's Metropolitan Strategy. *Visions for Victoria: Proposals to achieve public sector renewal in Australia*. Hayward, D. and Ewer, P. Melbourne.
- Dodson, J. and Sipe, N. (2006). *Shocking the Suburbs: Urban location, housing debt and oil vulnerability in the Australian city*. Urban Research Program Research Paper 8. Brisbane, Griffith University.

Dodson, J. and Sipe, N. (2007). Oil Vulnerability in the Australian City. Assessing socio-economic risks from higher urban fuel prices. *Urban Studies*, 44 (1), pp. 37-62.

Dodson, J. and Sipe, N. (forthcoming May 2008). Shocking the Suburbs: Urban location, housing debt and oil vulnerability in the Australian city. *Housing Studies* 23(3).

Energy Information Administration. (2007). NYMEX Light Sweet Crude Oil Futures Prices (Contract 1). Retrieved 15 May, from <http://www.eia.doe.gov/emeu/international/crude2.html>.

Fishman, E. (2006). Petrol's painful formula. *Herald Sun*. Melbourne. 3 May: 18

Gittens, R. (2006). Smile, pain at the pump has pay-offs. *Sydney Morning Herald*. Sydney: 13

Gordon, J. and Smith, B. (2006). Interest, fuel cost begin to bite. *The Age*. Melbourne. 5 May: 3

La Cava, G. and Simon, J. (2005). Household Debt and Financial Constraints in Australia. *The Australian Economic Review* 38(1): 40-60.

Maher, C., Whitelaw, J., McAllister, A., Francis, R., Palmer, J., Chee, E. and Taylor, P. (1992). *Mobility and Locational Disadvantage within Australian Cities*. Canberra, Department of Prime Minister and Cabinet Social Justice Research Program into Locational Disadvantage.

McMahon, S. (2006). Shoppers think twice as petrol price and rate rises bite. *The Age*. Melbourne. 9 May: 3

Mees, P. (2000a). *Rethinking Public Transport in Sydney; UFP Issues Paper 5*. Urban Frontiers Program Issues Papers. Sydney, Urban Frontiers Program, University of Western Sydney.

Mees, P. (2000b). *A Very Public Solution: Transport in the Dispersed City*. Melbourne, Melbourne University Press.

Ministry of Transport (2006). *Service Planning Guidelines: Sydney Contract Regions*. Sydney, New South Wales Government.

Morris, J., Wang, F. and Berry, M. (2002). Planning for Public Transport in the Future: Challenges of a Changing Metropolitan Melbourne. Australasian Transport Research Forum, Canberra, 2-4 October, Australian Bureau of Transport and Regional Economics.

National Housing Strategy (1992). *Housing Location and Access to Services: Issues Paper 5*. Canberra, National Housing Strategy.

Newman, P. and Kenworthy, J. (1999). *Sustainability and Cities: Overcoming Automobile Dependence*. Washington, Island Press.

Newman, P., Kenworthy, J. and Lyons, T. J. (1985). Transport energy use in the Perth metropolitan region: Some urban policy implications. *Urban Policy and Research* 3 (2): 4-15.

Office of Urban Management (2005a). *South East Queensland Infrastructure Plan and Program 2005-2006*. Brisbane, Office of Urban Management, Queensland Government.

Office of Urban Management (2005b). *South East Queensland Regional Plan 2005-2006*. Brisbane, Office of Urban Management, Queensland Government.

Productivity Commission (2004). *First Home Ownership: Productivity Commission Inquiry Report*. Canberra, Productivity Commission.

Queensland Transport (1997). *Integrated Regional Transport Plan for South East Queensland*. Brisbane, Queensland Transport.

Queensland Transport (2005). *Smart Travel Choices: A Transport Green Paper*. Brisbane, Queensland Transport.

Reserve Bank of Australia (RBA) (2006). *Statement on Monetary Policy, 5 May*. Canberra,, Reserve Bank of Australia.

Rural and Regional Affairs and Transport Committee (2006). *Australia's future oil supply and alternative transport fuels*. Canberra, Australian Senate.

Sensis (2005). *Consumer Report - December*. Melbourne, Sensis.

Sensis (2006). *Consumer Report - June*. Melbourne, Sensis.

Smith, B. (2006). RACV expects motorist resistance to petrol at \$1.35. *The Age*. Melbourne. 7 April: 2

Tingle, L. (2006). Put a tax cut in your tank. *Australian Financial Review*. Melbourne. 11 May: 1

Translink (2005). *Draft Translink Network Plan: South East Queensland*. Brisbane, Queensland Transport.

Unsworth, B. (2004). *Review of Bus Services in New South Wales: Final Report*. Sydney, New South Wales Government.

Zeibots, M. (2005). The relationship between increases in motorway capacity and declines in urban rail passenger journeys: a case study of Sydney's M4 Motorway and Western Sydney Rail Lines. Transporting the future: Transport in a changing environment - 28th Australasian Transport Research Forum, Sydney, NSW, Transport and Population Data Centre, NSW Department of Planning.