

Urban form and urban efficiency

Author:

Associate Professor Michael Buxton, RMIT University

Citation:

Buxton M 2006, 'Urban form and urban efficiency' paper prepared for the 2006 Australian State of the Environment Committee, Department of the Environment and Heritage, Canberra, <<http://www.deh.gov.au/soe/2006/emerging/urban-form/index.html>>.

Background

Many Australian State governments recently have developed land use policies which attempt to alter urban form to gain greater urban efficiency. All these strategic plans share the same commitment to more compact cities through higher density, mixed use, transit oriented development in activity centres, improved public transport and limits on outer urban growth. All share similar implementation problems, in particular, a reluctance to require compliance with clear compact city policies.

The Victorian government strategy, *Melbourne 2030*, seeks to concentrate almost 70 per cent of planned new dwellings by 2030 within existing urban boundaries, increasing the proportion of dwellings in about 100 mixed use activity centres from 24–41 per cent of new development, raise the proportion of public transport trips from 9–20 per cent and control outer urban growth through a legislated urban growth boundary. The Queensland government's *South East Queensland Regional Plan* seeks to accommodate 40–50 per cent of the planned 575 000 new dwellings by 2026 through infill or in a hierarchy of nominated activity centres and to limit outer urban development to nominated corridors. The Western Australian *Network city* strategy aims to locate 60 per cent of the planned 370 000 new dwellings by 2031 within existing urban areas in nominated activity centres and brownfield sites linked by public transport, and 40 per cent in higher density new outer urban areas. Integrating land use and transport planning is essential for a successful compact city policy, but public transport remains underfunded in most Australian cities. Extensions, however, have almost doubled the length of the Perth rail system, and patronage rose from six to 30 million passengers a year by 1992 with an expected further doubling through the southern rail extension. Some mandated codes will begin to affect the efficiency of new housing, particularly the NSW BASIX code and Victorian 5 Star housing requirement. Voluntary codes include residential energy performance assessment guides, such as FirstRate and NatHERS, the WA Liveable Neighbourhoods code, and commercial building greenhouse and energy codes.

Many Australian researchers have predicted that Australians would never accept urban intensification (McLoughlin 1991), and that urban consolidation detracted from qualities which make Australian cities liveable (Lewis 1999). However, widespread multi-unit construction is occurring in every Australian city and regional centre. Multi-unit dwellings in Melbourne increased by over 600 per cent in the ten years from 1991, accounting for 40 per cent of all residential development between 1996–2001 (Buxton and Tieman 2004). Sydney is Australia's most compact city. The NSW government planned for an increase in multi-unit housing in Sydney as a proportion of new dwellings from 42 per cent in 1995 to 65 per cent by 2001 (Holliday and Norton 1995), a figure which was achieved (Newman 2006).

Urban efficiency is usually defined in terms of travel patterns, infrastructure and energy use, and social and environmental costs including water use, congestion costs and the costs of sprawl. Societies which consume less land for urban purposes use roads less, infrastructure more efficiently and can transfer more investment to productive sources. Better urban design reduces social costs by increasing social cohesion. Cities function less efficiently as they expand and reduce their average population density. The post war spread of Australian cities exceeded one million hectares and cost \$4.2 billion to \$5 billion annually compared to the \$3 billion to \$5 billion invested annually in new manufacturing plant and equipment (Australian Urban and Regional Development Review 1994).

Changing components of urban form, such as density, can improve the efficient functioning of cities and their environmental performance, although the interaction among variables is complex and caution is needed in drawing detailed causal conclusions. McGlynn et al. (1991) showed that three compact city models reduced growth in energy consumption and saved between \$2.1 billion to \$4.2 billion in non transport infrastructure compared with a policy of urban expansion on city fringes. As dwelling density increases, transport energy use (Owens 1986, Royal Commission 1994), transport emissions (ECOTEC Research and Consulting Ltd et al. 1993), and travel distance (Rickaby 1987, Giuliano and Narayan 2003) falls. Mixed use centres contain environmental, travel and cost efficiencies particularly through their impacts on trip frequency and mode choice (Banister 1992, Loder and Bayly et al. 1995, Ewing and Cervero 2001).

Key issues

Key issues for the efficiency of Australian cities include the following:

Without increased government intervention, urban energy use is projected to grow significantly in Australia. Urban residential and commercial greenhouse gas emissions comprised 20 per cent, and domestic transport 14.5 per cent of Australia's total in 2003 (National Greenhouse Gas Inventory Committee 2003), with road transport comprising almost 80 per cent of Australia's transport-related greenhouse gas emissions (Alan Pears pers. com. 2006, calculations from

ABARE data). Transport emissions alone are projected to increase by 42 per cent over the 1990 level (Australian Greenhouse Office 2004). The opportunities arising from multi-unit mixed use development are generally being wasted by energy inefficient, often car dependent housing and office construction.

Almost half of Australia's total greenhouse gas emissions and two thirds of emissions from energy are generated in urban areas, or through energy conversion for urban use (Pears 1995). The pace and scale of redevelopment and outward expansion in many Australian cities provides opportunities for changing urban form to increase urban efficiency. For example, 100 000 new dwellings, including over 30 000 attached dwellings, were approved in Melbourne between 2000–2003.

Governments generally have not understood the need to integrate residential development, employment location and transport systems across capital cities. They are creating two city types: service rich, higher income inner and middle suburbs; and service poor, lower income outer urban areas. Governments seek to transfer a proportion of outer urban development into established areas. However, no state government has limited land supply in outer urban areas or required increased average residential densities there. The type and location of sprawling suburbs will inevitably lead to increased car use, particularly cross town car use. In recent years, about \$10 billion has been spent on freeway construction in both Sydney (Newman 2006) and Melbourne, and almost nothing on public transport infrastructure, particularly to connect new outer suburbs. This approach will inevitably cause strategic city plans to fail.

The Commonwealth government has not developed a cities policy although non-spatial policies such as taxation significantly affect city development. The House of Representatives Inquiry into sustainable cities, however, provided information on a wide list of urban sustainability issues including a national approach to policy development and governance. Greater government intervention through land use planning processes will be required to achieve increased urban efficiency otherwise housing companies and road planning agencies will continue to determine the form and functioning of Australian cities.

References

Australian Greenhouse Office 2004, *Tracking to the Kyoto Target*, Commonwealth of Australia, Canberra.

Australian Urban and Regional Development Review 1994, *Australian Cities and Regions: A National Approach*, Commonwealth of Australia, Canberra.

Banister D 1992, 'Energy Use, Transport and Settlement Patterns', in *Sustainable Development and Urban Form* (ed. M Breheny), Pion, London.

- Buxton M and Tieman G 2004, *Urban Consolidation in Melbourne 1988–2003: Policy and Practice*, RMIT Publishing, Melbourne.
- ECOTEC Research and Consulting Ltd, in association with Transportation Planning Associates 1993, *Reducing Transport Emissions through Planning*, HMSO, London.
- Ewing R and Cervero R 2001, Travel and the built environment: a synthesis, *Transportation Research Record*, 1466:44–52.
- Guiliano G and Narayan D 2003, Another Look at Travel Patterns and Urban Form: The US and Great Britain, *Urban Studies*, 40(11):2295–2312.
- Holliday S and Norton R 1995, Sydney's future: Quo vadis?, *Urban Futures*, 17:13–19.
- Lewis M 1999, *Suburban Backlash: The Battle for the World's Most Liveable City*, Blooming Books, Hawthorn, Victoria.
- Loder and Bayly, RJ Nairn, Sustainable Solutions and PPK Consultants 1993, *Greenhouse Neighbourhood Project, The Low Energy Suburb. Summary and Technical Reports*, Government of Victoria, Melbourne.
- McGlynn G, Newman P and Kenworthy J 1991, *Towards Better Cities: Reorganization and Transport Energy Scenarios*, Report prepared for Australia's Commission for the Future.
- McLoughlin J 1991, Urban Consolidation and Urban Sprawl: A Question of Density?, *Urban Policy and Research*, 9(3).
- National Greenhouse Gas Inventory Committee 2003, *National Greenhouse Gas Inventory 1988 to 1994*, Canberra.
- Newman P 2006, *Keynote Address- Sydney Futures Forum*, 19 May.
- Newton P (lead author), Baum S, Bhatia K, Brown SK, Cameron S, Foran B, Grant T, Mak SL, Memmott P, Mitchell VG, Neate K, Smith NC, Stimson R, Pears A, Tucker S and Yencken D 2001, *Australia State of the Environment 2001: Human Settlements Theme Report*, CSIRO on behalf of the Department of the Environment and Heritage, Canberra.
- Pears A 1995, *Non-Transport Energy Issues for Urban Villages. A Report for the Urban Villages Project*, Government of Victoria Urban Villages Project, Melbourne.
- Rickaby P 1987, Six Settlement Patterns Compared. *Environment and Planning B*, 14:193–223.