

# sustainability requires radical housing designs

abstract of talk by tone wheeler, principal architect, environa studio.  
presented 8 March 2007 @ AFR housing congress, melbourne.

There is no doubt that sustainability is the issue of our age. Recently we have seen

- The Al Gore film, An Inconvenient Truth,
- The Stern Report on the economics of climate change,
- The UN Intergovernmental Panel on Climate Change
- The impact of the widespread drought in Australia.

50% of all greenhouse gasses are produced by the urban and architectural design of our cities. So city design, and in particular housing, is the critical issue.

Australian cities are very poorly designed for sustainability:

- more than 70% of houses being detached has multiple impacts on energy and water use:
- current detached houses are highly inefficient, with a high surface area to the contained volume requiring high levels of insulation and good envelope design. None of this has ever been a hallmark of the the construction of our houses
- the spacing of the houses at densities less than 10 dwellings per hectare has critical impacts on the transport costs
- the costs for infrastructure over such a wide area are enormous, such that any change to that infrastructure, such as a third pipe for recycled water, underground power, or an alternative energy system have huge cost impacts.
- the houses have trended to larger designs over the last 50 years, as we build a form of monoculture: the large "Fediterranean" McMansion on an ever-decreasing site.
- this leads to a lack of diversity within the housing, in particular the provision of smaller, more sustainable homes.

A change to the structural organization of Australian cities is very difficult to achieve. Because of Australia's 3 tiers of political governance, no one tier is focussed on the urban design of our cities, nor on it's housing.

None of the three tiers have had a focus on urban and housing issues for the last 50 years:

- |                |  |
|----------------|--|
| Federal        | Tax policy has been the only policy, other than for two brief periods under the labor party, when urban and housing issues were well considered.                       |
| State          | The State governments are based in, and have a focus on, the major cities but do not have the legislative framework to organise and plan for those cities.             |
| Local Councils | With the exception of Brisbane, Australian cities are governed by a very large number of very small councils that are locally focussed and do not grasp a master plan. |

So what are the changes in design, planning and governance that are required to make our cities more sustainable?

1. At the micro-scale of the individual homes, a radical redesign of the house to reduce its size, reduce its footprint, and dramatically alter its envelope to improve its performance is required. In addition, every home should become more sustainable for electricity supply through the use of photovoltaics and every home should contribute to water savings by having water tanks and a water supply for all or part of the water needs.
2. We need to change the dominant typology of the type of house that is being built. Inevitably, detached houses will continue, but an emphasis on townhouse, in particular terrace and courtyard houses that provide access to the ground for the occupants, but are smaller, tighter in organisational pattern and therefore energy performance, and more efficient in their envelope, are required.

3. Urban infill projects, using townhouses, courtyard housing and walk-up apartments are required to massively change the density of the housing within the suburbs, without altering the scale of those suburbs. The houses should provide direct access to the ground for use of a garden or be no more than three storeys from it. Many older interwar suburbs have tree canopies that are now taller than this type of building, but the increase in density that could be achieved is between 3 to 6 fold, which radically changes the transportation and the energy and water performance of the buildings themselves and more importantly has dramatic increases in the performance of transport, making public transport far more viable.
4. A new type of low rise, medium density apartment that uses public space in the form of European cities would be desirable in the inner ring former industrial suburbs of the major cities. These apartments can achieve densities at 10-15 times the suburban experience, but can also provide an urban form for cross ventilated apartments with good ground view and access with a sensible arrangement for car parking under providing a minimum footprint for maximum outcome.
5. The high-rise apartment buildings that have been resisted up till now will have to be encouraged, but are far better when placed in clusters rather than as stand alone towers. The sun access and overshadowing issues are the primary urban considerations for the development of these towers. The energy performance of individual apartments is not dependant on direct access to sun all day, as it is for smaller houses, and thus a more dense pattern similar to New York has great advantages in terms of energy and transport performance. A major issue here is the collection of water for self-sustainability of these towers.

In order to achieve the changes for urban design and built form that are required for these houses, it is necessary to change the planning of our cities. The state and local councils would need far more coordination to produce a master plan for each city. Plans need to take account of the possibilities of greater densities without the loss of the "Australian Lifestyle" so that the cities can continue to maintain social equity and quality of life, whilst dramatically improving the performance in regard to household energy use, water use and transportation.

The merging of the state and local council planning departments, based on urban ecological areas is a desirable outcome that would seem a step too far in the current Australian climate. In ecological planning terms it would make far more sense for cities to be seen as a single organism, planned on that basis, rather than on the traditional hierarchy of suburban subdivisions.