

## Housing

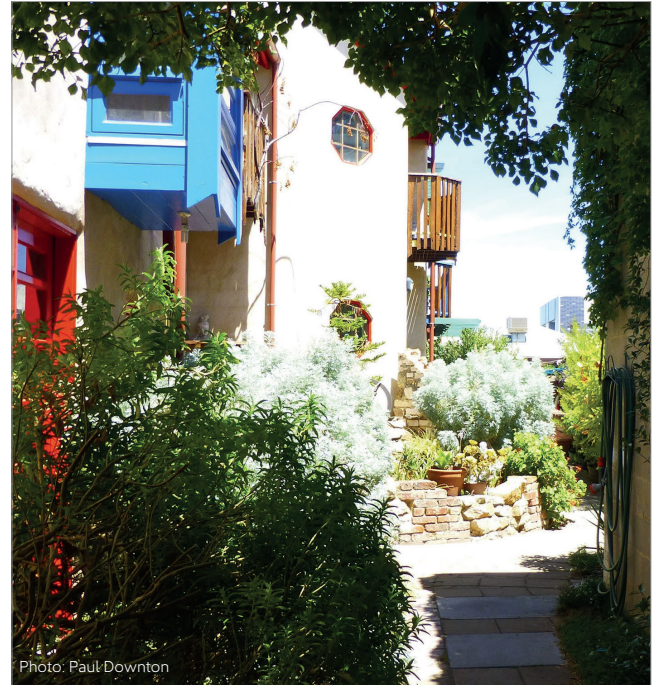
**Housing of the future will be judged by very different standards to the housing of today. As a starting point, it will need to respect ecological limits and suit significantly changed demographic patterns and lifestyles. These principles are embedded in the concept of ‘positive development’ – development that has a net positive ecological and social impact.**

This might seem like an ambitious goal, but progressive parts of the housing industry are already working towards positive development. It will need to be the norm in any scenario for a sustainable future. Frameworks such as the international ‘Living Building Challenge’ set benchmarks and guidance for achieving positive development, and the not-for-profit ‘Living Future Institute Australia’ has been set up specifically to promote this objective.

Many of the homes we build today will still be in use in 50 or even 100 years’ time when climate change, population growth and resource depletion will have created a very different environment. The structure of households will also be different, with a significant shift towards smaller (single person or couple only) households and an ageing population. These demographic shifts have begun but will be more pronounced in the future. In 2050, an estimated 23% of Australians will be aged 65 years or more, compared to 13.3% in 2006 (The Treasury 2010).

Housing of the future will be flexible, adaptable and resilient, helping us to respond to both predicted and unexpected change. As resources will be scarcer and most likely more expensive, housing will need to be capable of meeting its own energy and water needs, producing food and recovering precious nutrients and materials from waste streams. It will be space-efficient in response to ecological limits and the increasing number of single person households, reversing Australian housing stock’s current status as the largest (by floor area) in the world (James 2009).

Housing of the future is more likely to be clustered in ‘urban villages’ located close to local amenities and public transport to minimise transport energy demands. It will also cater for different living and working patterns and for the needs of an ageing population. A likely trend will be towards the division of large family homes into smaller ones, as well as new forms of housing that allow some level of cooperative living among different households and engender a sense of community.



### Adapting to climate change

Our homes keep us comfortable, protect us from weather and provide a refuge from climatic extremes. With indications that we are already experiencing the early effects of climate change, we must design our homes to cope with it.

Mitigation strategies can minimise the extent of climate change; however, the opportunity to avoid altogether the impacts of climate change has passed. Impacts across Australia will vary regionally but in general include increased temperatures, changes in rainfall patterns, longer periods of drought, increased fire danger, and increased risk and intensity of severe weather events.

*Adapting to climate change* shows how to find out about climate change impacts for your locality and advises on catering for these impacts in the design or renovation of your home. The overview of adaptive strategies and potential design solutions applies to a range of climate change variables including heat waves, low rainfall, bushfire, cyclones, flooding, sea level rise and storm surge.

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## Carbon zero, carbon positive

A carbon zero house is one that has no net annual carbon emissions from electricity use or direct fuel combustion (e.g. burning natural gas). A carbon positive house makes 'positive' contributions by producing more renewable energy on site than the house requires and feeding it back to the grid. A house can thus produce enough renewable energy to offset the carbon emissions embodied in its building fabric, as well as the carbon emitted to produce the food, goods and services consumed by the household.

*A carbon positive house produces more renewable energy on site than the house requires and feeds it back to the grid.*

Carbon zero housing is considered to be today's benchmark of best practice; carbon positive housing will play an increasingly important role in limiting global warming and contributing to 'positive development', which sets the broader goal of a net positive ecological and social impact.

This article shows how you can create a carbon neutral or carbon positive home in the most affordable manner. The variables that reduce household emissions include reduced house size, passive design, appliance efficiency and attention to occupants' habits and behaviour, and there are options for on-site renewable energy generation and carbon offsetting. The process of setting

targets, monitoring progress and planning future carbon reductions as technologies improve is also outlined.



## The livable and adaptable house

A livable and adaptable house is one that is able to respond effectively to changing household needs without requiring costly or substantial alterations.

When building a new house many people anticipate spending a number of years, if not decades, living in their home; others may conceive of a shorter stay. Whatever the intention, any new home will likely have to accommodate changing needs over its lifetime. Australian





demographics are changing rapidly, with average households becoming both smaller and older, and an increasing number of people living independently in their later years. An adaptable home might be a large family home designed to be easily divided into two smaller homes. The balance between home and work life also places altering demands on our houses as many people choose to work from home offices. A single space may act at different times as a home office, a teenage retreat, a family study or a bedroom for an elderly relative.

The overview of the principles of livable and adaptable housing is complemented by key design considerations for the different parts of a home.



Photo: Paul Downton

## Affordability

Housing affordability is a growing issue in most Australian cities. The cost of sustainability improvements to housing has typically been seen as a barrier to affordability; however, recent and predicted rises in water and energy costs have forced a rethink of this short-term approach.

Some sustainability features or upgrades may add to the capital cost of a home. However, they may significantly improve life cycle affordability and even be cost beneficial from day one when amortised over the period of a typical mortgage, when resultant savings on energy or water bills offset or exceed the interest repayments incurred by any additional capital costs. Affordability should therefore be considered over the life span of the home.

This life cycle costing (LCC) approach typically focuses on economic cost, but the benefits of increased comfort, health and amenity should also be taken into account.

This article explains LCC in more detail and explores strategies to reduce both upfront and life cycle housing costs, drawing on recent Australian research into housing costs and benefits.

### References and additional reading

The Treasury. 2010. Australia to 2050: future challenges. The 2010 intergenerational report. Commonwealth of Australia, Canberra.

James, C. 2009. Australian homes are the biggest in the world. CommSec economic insights, 30/11/09. Commonwealth Bank of Australia, Sydney.

### Author

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