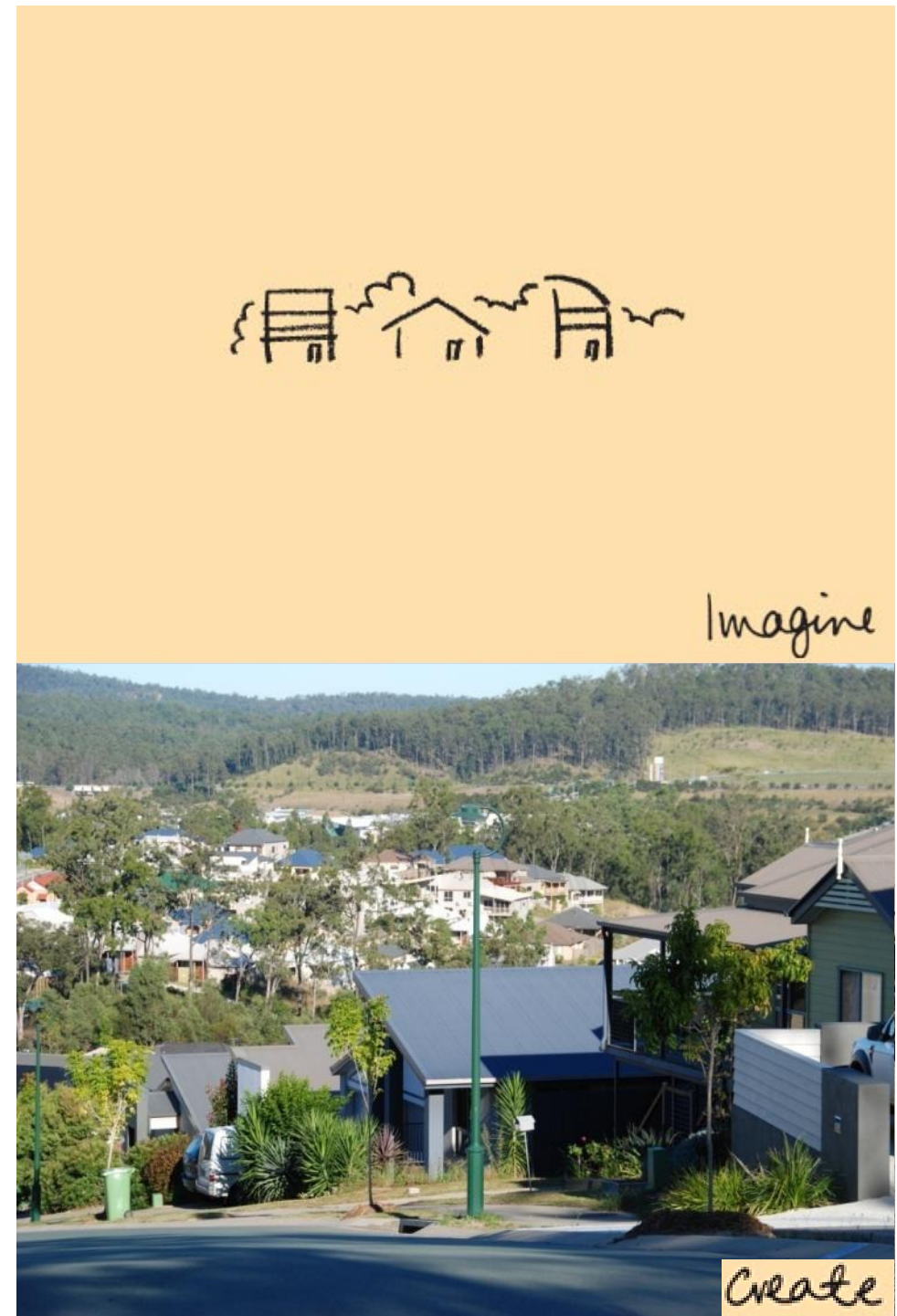


Sustainable Building & Design

Timber - part of the solution
in managing and solving
the challenges going forward

Michael Chapman
Delfin Lend Lease
30 July 2010



Trends, Challenges and Solutions



Timber - part of the solution in managing and solving the challenges going forward

Trends, Challenges and Solutions

Trends

- Thermal Efficiency & Star rating increases
- Rating Greenhouse Gas Emissions
- Move to Carbon targets for Communities
- Move to Carbon Neutral Homes
- Move to Embodied Carbon measurement



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- Different approaches heating and cooling
- Availability of flat land
- Changing household and house size
- Density requirements
- Availability of on site trades



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Solutions

- A better Carbon solution
- Response to Slope Issues
- Ability to work with all other parts of the solution
- Ease of sealing and opening



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Clay Street Eco Haus











└ AusZEH Demonstration House @ Laurimar

8-STAR SMART DESIGN

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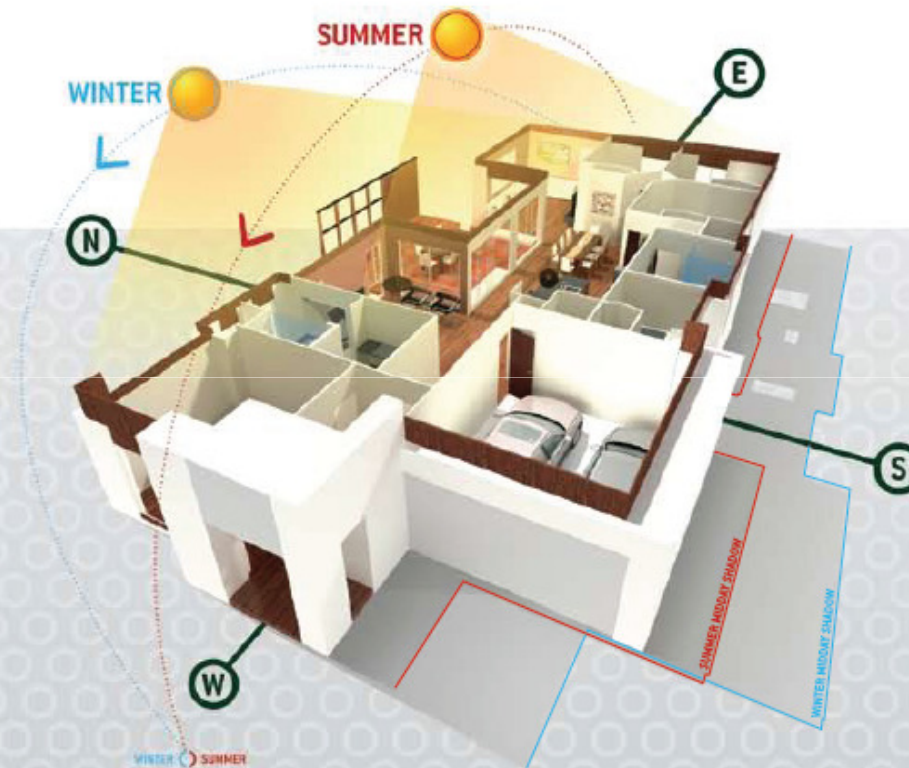
The AusZEH, designed by Henley Property Group in consultation with CSIRO and Delfin Land Lease, has achieved an 8-star energy rating using the 'Accurate' assessment tool.

A house energy rating is an index of a building's thermal performance (i.e. heating and cooling requirements) for residential homes in Australia.

Developed by the CSIRO, the 'Accurate' software has been designed to simulate the heating and cooling energy efficiency of residential buildings.

When you walk into the AusZEH, it may look like any other new home. The difference, however, lies within – its thermal performance. With an 8-star energy rating, the AusZEH relies on the combination of the following features:

- northern orientation and retractable shading options
- brick construction and higher levels of insulation to the wall and the ceiling
- double glazing to all windows and sliding doors
- insulated waffle pod concrete slab (foundation)



AUSZEH PERFECTLY IN ITS ENVIRONMENT

ORIENTATION AND SHADING OF THE AUSZEH

7

Good orientation works on the basis of designing a home which takes advantage of its climatic and regional conditions. Good orientation increases the energy efficiency of a home by reducing the need of additional heating and cooling, resulting in decreased GHG and lower energy bills.

The AusZEH is located in a climate that requires more heating than cooling to keep the home at a comfortable temperature. The AusZEH uses the sun as a natural source of free heating during the winter (a.k.a. passive heating). The smart design therefore makes the most of the sun's warmth to heat the home with the living rooms' windows facing north. The windows transfer winter solar energy when the sun sits low in the sky and excludes summer sun when it's sitting directly above the house.

The northern windows are also shaded from the hot summer sun using an extendable awning and exterior blinds by Helioscreen. The exterior blinds are made from a fabric that reduces the sun's heat by up to 90 per cent.







9
harmony



DATA SHEET

MIRVAC

Mirvac is a leading integrated real estate group, listed on the Australian Securities Exchange (ASX) with activities across the investment and development spectrum.

Established in 1972, Mirvac has more than 37 years of experience in the real estate industry and has an unrivalled reputation for delivering quality products across all of its businesses.

Mirvac has produced some of Australia's most renowned residential projects including Magnolia Shores on the Central Coast, NSW, White Bay in Sydney, NSW, Ighiteam Island on the Gold Coast, QLD, Yasa's Edge, VIC, and The Peninsula at Barrowfield in Perth, WA. As an integrated real estate group, Mirvac is able to exercise total control over the entire development process, from concept to completion. Mirvac Design specialises in architecture, urban design, interior design, landscape architecture and graphic design.

Mirvac strives to be a symbol for responsible and sustainable development and continues to deliver outstanding examples of sustainability in action. Mirvac's corporate responsibility and sustainability program focuses on six priority areas - Governance, Mirvac People, Stakeholders, Health Safety Environment, Resource Use and Sustainable Development and Climate Change Action.

harmony⁹

INTRODUCTION

Harmony 9 is a prototype home designed and built by Mirvac at its Waverley Park integrated housing project in Melbourne, Victoria.

The house is designed to be 'low carbon' in operation (i.e. the estimated amount of energy required to run the house is met by renewable energy generated on-site) and a 9.2 NatHERS Star rating. The design also incorporates water saving and re-use systems, low toxicity and recycled materials, flexible living planning and user behaviour changing technologies.

As part of Mirvac's ongoing commitment to sustainability, the Harmony 9 prototype house was created as a research and development platform to foster sustainable design initiatives into future homes.

The Harmony 9 design is based on the following principles:

- > The model is a four bedroom two storey family home - a model that has commercial acceptance at Waverley Park;
- > It forms part of an established integrated housing development;
- > It uses standard domestic construction materials and techniques;

- > It uses products and materials that are sourced from our current suppliers and are currently available in the Victorian domestic construction market;

- > It maximises the possible NatHERS rating;

- > It collects water to allow a high quality and usable landscaped garden;

- > Whenever commercially available it uses recycled materials;

- > It maintains a common sense approach to embodied energy in construction.

To achieve the 9.2 Star NatHERS rating the design process used "Accurate" NatHERS software to inform design decisions.

Third Sins Sustainability Consulting in Design worked with Mirvac Design to set the broader strategy beyond the NatHERS rating.

The design of Harmony 9 was completed in August 2008. Construction was completed in November 2009.

Harmony 9 is a prototype home and as such is not one of the standard Mirvac homes available for sale. The ideas and technologies in Harmony 9 inform the Harmony range of homes currently for sale at Waverley Park and for future Mirvac integrated housing projects.

Harmony 9 - NatHERS rating

Stars 9.2 Stars
Heating 10.5 MJ/m² per annum
Cooling (combined) 2.9 MJ/m² per annum,
(Net) 0.8 MJ/m² per annum
Total 21.9 MJ/m² per annum

Harmony 9 - Initiatives

BUILDING

Structure Concrete waffle-pod slab on ground / Timber structural walls and internal walls / Timber framed first floor and roof trusses / Steel roof.

Shading All windows are shaded to maximise the potential passive design, such as allowing full sunlight penetration from 26 May to 19 July and no sunlight penetration 17 October to 26 February.

Reverse Veneer External walls place the masonry wall leaf inside the insulation barrier to increase the internal thermal mass to regulate the internal temperature and store winter passive solar gains.

Windows Stegbar western red cedar timber frames with high performance argon filled double glazing units.

Insulation External walls R5.0 Roof R8.0 Glass wool - First Floor R8.0 Internal Walls R2.5 Glass wool.

1st Floor Timber Flooring Australian Forestry Standard (AFS) Certified.

WATER

Recycled water Nulbin Class "A" recycled water system treats grey water from the showers, basins and the bath.

Carpet No carpet has been used to minimise VOC emissions.
External Cladding James Hardie factory pre-finished / pre-cut fibre cement sheet minimising on site uncontrolled finishing, disposal, spills and clean up.

Clear Finishing Timber cladding/window frames use a natural oil to seal.

RENEWABLE POWER

Solar Cells 3.6kw system, located on the roof and the legside as sun shading devices.

ENERGY USE

Hot water Services Rheem Solar Hot Water system 80% efficient, gas boosted.

Internal Lighting All internal lights are Light Emitting Diodes (LED) or Compact Fluorescent, low energy fittings.

Daylight Appropriately shaded skylights provide natural daylight to all living areas.

RECYCLED

Slab Boral Envocrete™, a unique recycled concrete slab floor incorporating 100% recycled aggregates and 60% cement substitutes.

Timber Recycled timbers of various species for the external cladding, pergolas and sun screens. Mixed species timbers for the cladding is a result of using the off cuts and 'left overs' from the supply.

Bricks Recycled bricks are used for all internal reverse veneer walls, exposed in the family room illustrating:

- > Visual example of reverse veneer;
- > Visual example of recycled brick;
- > Artistic composition in detail.

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Jade 909 – 9 Star, Carbon Neutral Display Home



Ausbuild throws down welcome mat at new display homes

PROMINENT bayside-based property development and home building company, Ausbuild has opened the front doors to its two newest display homes – both located at its ultra-leafy Eprapah residential community at Victoria Point.

The two new homes – one of which leads the industry with an Eight Star Energy Efficiency rating – are from Ausbuild's outstanding Urban Traditional range developed for homesites with street frontages of around 18 metres.

Both of the company's latest displays feature a Kidzone – Ausbuild's design strategy of providing three bedrooms radiating around an area flexible enough to be used for everything from studying to Playstations, from a "time out" zone to indoor games.

Ausbuild partnered building materials manufacturer, Austral Bricks to develop the Eight Star Energy Efficiency rating for the Everton which is one of the two display homes.

The Everton, which covers around 220sq m, has a

centrally located gourmet kitchen and with a "squarer" floor plan, offers tremendous flexibility to people wanting a home that has to accommodate constraints such as a services easement or generous clearance from a retaining wall.

The Montego is a larger home of around 243sq m while simultaneously having the capacity to be sited on narrower allotments.

Both homes also feature almost seamless access to the alfresco area by having sliding doors that meet in a borderless corner towards the rear of the home.

The Montego also follows Ausbuild's commitment to energy efficient designs by achieving a Six Star Energy Efficiency rating.

Ausbuild's energy efficiency achievements have drawn on a six-year research program undertaken by the University of Newcastle, the Australian Research Council and brick industry body, Think Brick Australia that looked at the thermal performance of homes and optimum designs for



AUSBUILD'S Everton with an Eight Star Energy Efficiency rating is now open as a display home at the Eprapah estate at Victoria Point.

Brisbane's climate.

The energy ratings system is a design schedule for new homes independently regulated by the board of the Building Code of Australia on behalf of the Federal Government as well as all state and territory governments.

The higher energy efficiency designs for

and cooler in summer, but also in markedly reduced energy bills.

Eprapah's greenery has been a major drawcard for purchasers of the land, house and land packages and fully completed homes being offered for sale.

Ausbuild, in conjunction with its development partner, is planting 350 trees and well as around 1000 covers and

undertaking bank stabilisation work beside the creek and ornamental pond.

In addition to planting hundreds of eucalypts including tallowwood, scribbly gum and hybrid species sought out by koalas, Ausbuild is creating a parkland of four hectares tracking beside Eprapah Creek.

Eprapah also is a Telstra Smart Community with the telco providing a \$1500

credit on Telstra services for each homesite.

The new display homes are in Estuary Avenue, off Bunker Road at Victoria Point. The sales and information centre at Eprapah can be contacted on 3890 8601 or 3890 7539.

Ausbuild has won the Housing Industry Association's national Professional Major Builder of the Year award as well as having won the state title three times.



The Code for Sustainable Homes
Setting the standard in sustainability for new homes

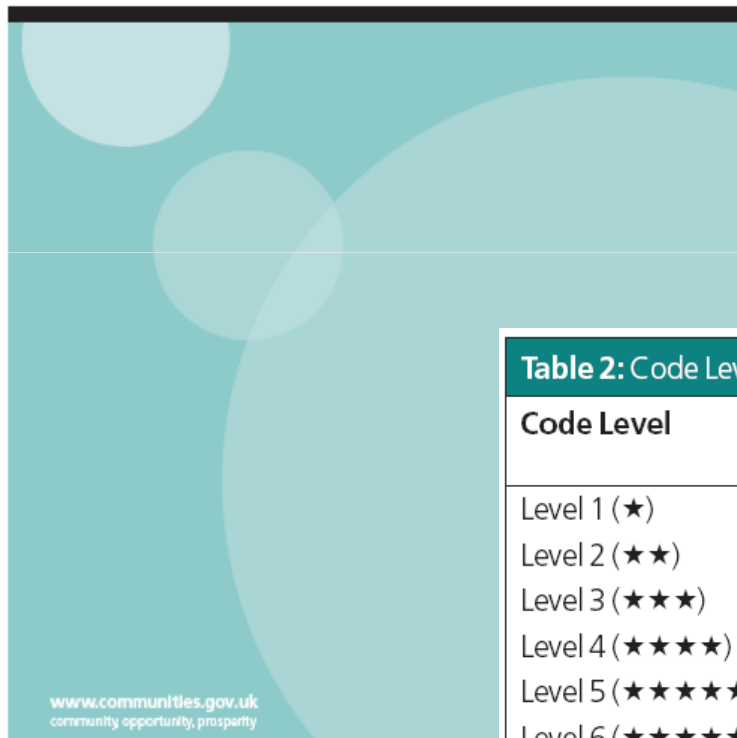


Table 2: Code Levels for Mandatory Minimum Standards in CO₂ Emissions	
Code Level	Minimum Percentage reduction in Dwelling Emission Rate Over Target Emission Rate
Level 1 (★)	10
Level 2 (★★)	18
Level 3 (★★★)	25
Level 4 (★★★★)	44
Level 5 (★★★★★)	100
Level 6 (★★★★★★)	'Zero Carbon' Home



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