

Absolutely PREFABULOUS

Gone are the days of dreary, mass-produced prefabricated housing. Today's factory-built homes are modern, cost-effective and environment-friendly.

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This page: Modular houses by Modscape are factory-built and delivered to your home in 12 weeks. Manufactured in Victoria and delivered Australia-wide, they undertake numerous sustainable design practices including using recycled and recyclable materials where possible and ensuring waste minimisation. www.modscape.com.au

Think prefabricated homes and you may picture little boxes on the hillside, identical in look, feel and definitive lack of personality. But just because a home is constructed in a factory doesn't mean it can't stand out as a beacon of design in your neighbourhood. And what's more, choosing an off-the-shelf home can be a big winner in environmental terms.

Past to present

After World War II, factory-built homes were a popular way to construct cheap housing, fast. Used as temporary replacements for bomb-damaged homes in Europe or to cope with drastic population growth in America and Australia, drab prefab yielded economies of scale, while tapping into our penchant at the time for mass produced goods.

Fast forward half a century and the desire to individualise our purchases is never more telling than in the hunt for property. We desire a home that reflects our individuality. And after a period in the property doldrums – Australia has taken longer to embrace this type of construction than Europe and the UK – the rebirth of factory-built has shown it to be a viable option for design-savvy consumers who desire an eco-friendly building model. In 2010-11 the local industry generated revenue of about \$3,020 million.



From the ground up

There are three main types of factory-built housing that cater for a range of sites, budgets and design requirements: prefabricated (prefab), modular and kit.

"A prefab home is one that has been built to near completion inside a factory," says Melissa Sydney from Prebuilt Housing Solutions, a Victorian-based company that delivers nationally. "It will be delivered whole or in large pieces on the back of a truck rather than as a kit of parts which need assembly on-site. Modular homes are a sub-set of prefab, based around repeated modules of a set size or shape which can be combined in different ways. Modular homes are generally prefab, but prefab is not necessarily modular." >>

Kit homes are assembled on-site from flat-packed components, in much the same way as putting together a new bookcase – just with a few more tradespeople. Prefab and modular homes arrive at the site almost fully constructed, requiring only minor joining work and connection to utilities.

You can choose a prefab home for a hard-to-reach bush site, a modular apartment for your city block or kit assembly for your brand new beachhouse. And while the sea- and tree-change market continues to grow, factory-built homes are becoming increasingly popular with space-challenged urban dwellers.

"Prefab is popular in the cities, as people are opting to replace rundown, dank and under-insulated houses with something modern and new, with minimum disturbance to their neighbourhoods," Sydney says.

And it's big news overseas. Factory-built homes comprised 74 per cent of detached single houses constructed in Sweden – home of Ikea's ubiquitous BoKlok prefab housing solution – between 1990 and 2002. They currently make up about 35 per cent of the Japanese market and the US prefabricated housing industry is estimated at a whopping \$8.6 billion.

Reduced impact

For most buyers, factory-built homes have three big pluses: a set product, a set price and significantly reduced construction time. In environmental terms, this equates to far less waste, which is significant when you consider that building and renovation waste makes up 40 per cent of what gets sent to landfill.

"Rather than constructing a home on-site where there's wasted time, money and materials, you're doing it in a factory," says Robert Crawford, lecturer in construction at the University of Melbourne. "You can standardise things and better control the waste that is occurring, as you can more easily integrate it into the construction process rather than it being lost on-site and sent off to landfill."

A study of prefabricated housing in Hong Kong published in *Waste Management* found prefabrication can reduce construction waste by up to 52 per cent, while research published in the *Journal of Engineering, Design and Technology* revealed that residential buildings are the most suitable construction project type for using prefabrication to reduce waste.

A central construction zone also means there's minimal trampling of and damage to the site, and transport emissions are also reduced. "Constantly trafficking over the land can completely destroy the site's natural features," Sydney says. "We organise local suppliers and tradesmen, which cuts down fuel emissions usually prevalent in construction as people travel to and from the sites. When you think of all the hours spent on the road travelling to and from the site by all the carpenters, plumbers, electricians, engineers, project managers, designers and clients, it adds up to a lot of fuel emissions."

Prefabricated architecture can deliver high-order design and diversity within the framework of waste reduction, renewable systems integration and optimal performance, says a study published in the *BEDP Environment Design Guide*.

Energy matters

The Building Code of Australia now requires all new dwellings – prefab or otherwise – to meet the requirements of a six-star rating. The beauty of factory building is that it allows for significant savings in embodied energy (construction), which can lead to reductions in operational energy (use).

It was previously thought that the embodied energy content of a building was insignificant compared to the energy used in operating the building over its life, but CSIRO research indicates otherwise. The average household contains about 1,000 GJ of energy embodied in the materials used in its construction – equivalent to about 15 years of normal operational energy use.



This page: A HIA GreenSmart home winner, EcoLiv's modular homes are factory-built and delivered on-site and achieve a minimum 7 star thermal performance rating among their many design principles aimed to reduce impact on the environment. www.ecoliv.com.au



WARREN REED

“ PREFABRICATED ARCHITECTURE CAN DELIVER HIGH-ORDER DESIGN AND DIVERSITY WITHIN THE FRAMEWORK OF WASTE REDUCTION, RENEWABLE SYSTEMS INTEGRATION AND OPTIMAL PERFORMANCE. ”

Crawford says his research has shown the operational and embodied energy in the initial construction of a building to be about equal over the average lifecycle (50 years). "Focussing on reducing material waste and efficiencies is just as important as installing efficient heating and cooling systems, solar passive design and the like."

Architect and environmental design consultant Chris Barnett, from Third Skin Sustainability, Consulting and Design, believes factory construction of the company's modular housing components allows for greater savings in embodied and operational energy than could be achieved by on-site construction.

"We use smarter engineering, make sure we don't have wastage and offer super-high thermal fabrics with very low embodied energy," he explains. "To use our methods on-site you'd have to thicken out the walls and put in double layers of insulation batts. You can do it through traditional construction but it's expensive and complex. We're targeting a 70 to 80 per cent greenhouse reduction."

Make your choice

When it comes to choosing your home, there are oodles of options. Just like their on-site counterparts, most prefab builders offer a range of designs, including a choice of facades, colours and architectural detailing. Custom designs are also available.

"There is a myth that building prefab is a cheap way to go," Sydney says. In reality, expect to pay anything from \$170,000 to \$350,000 for a middle-of-the-road factory-built home, depending on the size and degree of customisation.

Still, it's hard to put a price on convenience. Prefab homes can be built in a matter of weeks and you can continue living in your 'knock down' until just before your new home arrives. Not to mention the absence of truckloads of tradies traipsing on your new carpet. Now that's clean and green living.



A word of caution

Factory-built homes don't always equate to sustainable living – you need to assess a prefab builder's eco-credentials just as you would those of a conventional builder.

"Many companies will look for the cheapest options, which can lead to them importing many inclusions at the expense of quality and the environment," Sydney says. "Sourcing from far away can negate the advantages of having a factory base in terms of emissions."

Look at the materials used in constructing the housing envelope and the star rating, as well as the ongoing operational energy impact. Solar passive design principles will ensure your home stays warm in winter and cool in summer with limited need for heating and cooling.

Many factory-built homes use a steel base and frame, which takes more energy to produce than the concrete base and timber frame combinations used in many on-site constructions.

However, Crawford says other efficiencies can reduce this impact, not to mention the potential for steel to be reused and recycled at the end of its life.

