

MODERN GREEN HOMES

Sanctuary

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PREFAB + MODULAR
SPECIAL

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OFFSITE**
and beautiful

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PLUS

Prefab studios for at-risk youth
Changing the conversation with Parlour

Roadmap to Zero Carbon Homes
Gardening on the wild side



Fast and flood-resilient

Offsite prefabrication was the perfect approach for the rebuilding of Empire Vale Public School, right on the Richmond River near Ballina in New South Wales. The school was one of six in the area devastated by floods in 2022.

“The damage caused by the floods displaced a lot of people,” explains Jan Gyrn of Modscape + Modbotics, the prefab manufacturer behind the rebuilding of all six schools. “There was a huge lack of resources – both materials and workforce – in the area. And yet the school is a crucial asset for the Empire Vale community and it was important to get it up and running again as quickly as possible.”

Teaming up with Pedavoli Architects, engineering firm DDEG and ADCO

Constructions, Modscape + Modbotics was able to deliver a new Empire Vale school building for School Infrastructure NSW much faster than via traditional construction methods. Jan explains that it only required around 12 to 14 weeks to manufacture the school’s 27 modules and seven roof cassettes, followed by two days for transport and installation. Six weeks of works onsite, and the school was ready to welcome its teachers and students back. “Usually, building a new school would take at least a couple of years,” he says.

The new school is designed to withstand future floods, with the learning spaces, library, canteen, staff offices and a covered outdoor learning area raised three metres above the ground – clear of the predicted extreme flood level. “Enclosed

Above and facing page The new school building is raised above the predicted extreme flood level, and features a sheltered, shaded play space beneath.





CLIENT

School Infrastructure NSW

DESIGNER

Pedavoli Architects

PREFAB MANUFACTURER

Modscape + Modbotics

BUILDER

ADCO Constructions

ENGINEERING

DDEG

PREFAB TYPE

Volumetric

LOCATION

Empire Vale, NSW
(Bundjalung Country)

SIZE

1,060m²

WORDS

Anna Cumming

PHOTOGRAPHY

Ben Guthrie

building areas below the flood level are built with water-resilient materials like breeze blocks, and designed to let floodwater flow through without doing damage,” Jan says.

One of the most successful outcomes is the undercroft. “What began as a design consideration is now heavily utilised as an active play space as it’s shaded and out of the rain,” says Jan.

The modules that make up the school building each have a structural steel frame that was fitted with prefabricated floor, wall and roof components at Modscape + Modbotics’ factory. Once the modules were trucked and craned into position onsite, batten cladding was added to the

exterior, and external floor areas were poured with concrete to comply with educational facility guidelines.

Far more than the 150-year-old building lost to the flood, the new Empire Vale school incorporates passive solar design, including shading and natural ventilation. It also boasts rainwater harvesting and a solar PV system.

Getting schools operational again is an important step in returning a community to normal after a disaster, and Empire Vale’s climate-responsive, resilient, prefabricated design is a great way to do it quickly and effectively. And best of all, locals can be reassured that if disaster strikes again, things will be different. **S**





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Doing it for the kids

For the last 25 years, Victorian charity Kids Under Cover and prefab home manufacturer Ortech Industries have been teaming up and quietly making a difference to young people at risk of homelessness.

“It all started in the early 2000s, after we sent some flat-packed homes to Lombok to help communities there rebuild in the wake of the Boxing Day tsunami,” Ortech Industries’ general manager Ainslee Haslemore says. “Kids Under Cover got in touch with us when they saw that story.” Since then, the partnership has seen over 600 purpose-built, prefabricated studios installed in backyards around Victoria – and more recently in South Australia – to help families and carers in need of more space to accommodate the young people in their care.

The one- and two-bedroom studios with bathrooms are designed to provide a safe and stable space away from the often overcrowded main house, offering breathing space and independence and reducing the risk of young people being forced to leave home prematurely. In an intentional design choice, the studios don’t include kitchens, encouraging the occupants to connect with their families and carers at key moments like mealtimes.

Designed as a modular flat-packed ‘kit of parts’ with standardised dimensions and manufactured offsite, the studios can be erected easily in just a couple of weeks in almost any backyard – even in rental properties. Once they are no longer needed, they can be dismantled and moved to a new location up to four or five times.

The studios are designed to be

Facing page Kids Under Cover’s latest project, Village 21, groups several studios together to form a shared living environment for young people aged 18–21.



comfortable, sustainable, energy-efficient and durable. Steel frames are lined with Ortech Industries' proprietary panelling product, Durra Panel, made from wheat straw waste and offering excellent acoustic and thermal properties. "Durra Panel is great for this application, as it's so durable and low maintenance," says Ainslee. "It keeps costs down, and its low thermal conductivity helps to even out the day/night internal temperature in the studios. It makes for a nice healthy living environment." The studios also feature plenty of insulation, double-glazed windows, and shading.

Kids Under Cover's most recent impact study shows that having access to a backyard studio improves at-risk young people's wellbeing, independent living skills, and school attendance and performance, while dramatically reducing

overcrowding, family conflict, and risk-taking behaviours. The organisation has taken the concept further with Village 21, a shared living environment for young people aged 18-21 in which several studios are grouped together, with a communal kitchen and hangout space and live-in mentors. Designed to support residents in the transition from living at home to living independently, the pilot Village 21 has been very successful and three more are in development.

As for Ortech Industries, they will be continuing their collaboration with Kids Under Cover, as well as offering Durra Panel modular homes to the general public under their Place It brand. "We have a range of pre-designed options, and we can also do custom designs," says Ainslee. **S**

PREFAB MANUFACTURER
Ortech Industries

BUILDER
Harris HMC

PREFAB TYPE
Kit of parts

SIZE
20-30m²

WORDS
Anna Cumming



From classroom to classy dwelling

What happens to modular buildings like relocatable school classrooms when they reach the end of their service life? A collaboration between Modularity by Rendine, the University of Melbourne and peak industry body prefabAUS, supported by Sustainability Victoria, has shown that with a bit of design creativity, they can be repurposed into new, functional living spaces.

“By salvaging the steel frame from a 40-year-old school building and combining it with carefully selected sustainable materials, we developed a prototype modular home that embodies the principles of the circular economy,” explains Professor Tuan Ngo, Research Program Leader of the Building 4.0

Collaborative Research Centre at the university.

The team aimed to break the ‘throwaway’ cycle in construction by keeping valuable materials in use for longer. At the same time, they were eager to demonstrate a replicable methodology for reusing and upgrading redundant steel frames into safe, code-compliant housing, and showcase the integration of sustainable materials and flexible design as an example of how prefabrication can deliver both low-carbon and adaptable accommodation solutions.

“We also aimed to cut carbon emissions, saving around 2.9 tonnes of carbon dioxide per prototype just through the reuse of structural steel, and to inspire

Above and facing page An old school classroom module (pictured bottom right) was stripped back to its steel frame (bottom left) to form the structure of the prototype modular home.

the industry and wider community by providing a tangible demonstration model,” says Tuan.

He explains that material choices were guided by rigorous testing and circularity assessment. “The salvaged steel frame formed the backbone of the prototype, verified for structural integrity and corrosion-treated for long life. For interiors and cladding, we selected bio-based straw panels, recycled packaging waste wall boards, solid timber panels, and other materials with high circularity scores. uPVC double-glazed windows were chosen for energy efficiency and low embodied carbon, while vinyl and linoleum flooring products were used for their recyclability and low emissions. Each choice balanced durability, local availability, end-of-life recyclability, and carbon footprint.”

The prototype pod is a 30-square-metre, one-bedroom dwelling, but the modular layout is adaptable and the

system could expand into two- or even three-bedroom configurations. The design extends the life of a 40-year-old steel structure by another 40 or 50 years. Construction details were developed for ease of disassembly, so components can be replaced or repurposed again in future. Thermal efficiency was improved with insulated wall and ceiling panels, high-performance glazing, and cladding systems that reduce heating and cooling demands.

“The key message of the project is that prefabricated homes can be designed for circularity, not just convenience,” Tuan says. “For homeowners, this means you can now look for products and suppliers who prioritise reuseable structures, recycled content, and low-carbon materials. Prefab systems also offer flexibility – whether it’s a backyard studio, a secondary dwelling, or even larger housing – without locking you into wasteful end-of-life outcomes.” 

PROJECT TEAM

Modularity by Rendine,
University of Melbourne
& prefabAUS

PREFAB TYPE

Modular building
salvage and reuse

SIZE

30m²

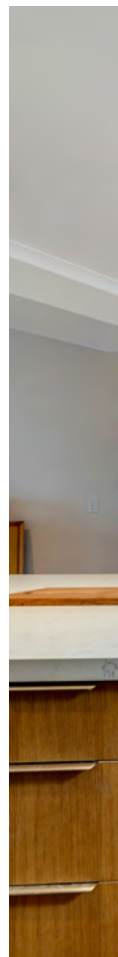
WORDS

Anna Cumming

PHOTOGRAPHY

John Baxter





Towards high-performance houses at scale

Founded back in 2013, Melbourne-based CarbonLite is a longstanding player in the prefabricated construction industry in Australia, and a pioneer of the rigorous Passive House standard in the country too. Co-founder Burkhard Hansen has always sought to push the boundaries, and together with partner builders, CarbonLite has delivered some of the country's most energy-efficient homes.

"These homes usually come at a premium though – often around \$6,000 per square metre – putting them out of reach for most Australians," says Tom Davies, CarbonLite's Transformation and Partnerships Director. "While this demonstrates what's possible, it won't by itself achieve the scale of change we need in the industry. With homes responsible for around 21 per cent of Australia's carbon emissions across their life cycle,

the residential sector has to transform as a critical, inevitable part of the climate solution."

Looking for opportunities to deliver high-performing houses at scale, thus driving down costs and putting them within the financial reach of more people, the CarbonLite team has recently collaborated with long-established sustainable design practice Envirotecure to develop RubikHaus.

"RubikHaus is a set of house designs that have been optimised for energy efficiency and performance using Passive House principles," explains Tom. "Each design can be precision fabricated in CarbonLite's factory using a Passive House-certified panelised construction system, before being assembled onsite by a team of trained installers."

The first two RubikHaus projects were

recently completed, both in Gisborne in the Macedon Ranges, 50 kilometres north-west of Melbourne: "perfect territory for Passive Houses, with its seasonal temperature extremes," says Tom. Cambio is a two-storey, four-bedroom home that achieved an 8.5-Star energy rating. It was manufactured in just five weeks for a cost of around \$3,500 per square metre. While it's yet to be certified, a blower door test done before the plaster layer was added showed an airtightness of 0.81 air changes per hour, keeping it on track to meet the Passive House Low Energy standard.

Just down the road, Tempus is a single-storey RubikHaus that also rated 8.5 Stars and was delivered for around the same price per square metre. The house is currently tenanted, and in the April-June quarter this year the occupants received a \$42 credit on their electricity bill, while



DESIGNER
Enviroecture

**PREFAB MANUFACTURER
& BUILDER**
CarbonLite

PREFAB TYPE
Passive House–certified
panelised

LOCATION
Gisborne, VIC
(Wurundjeri Country)

SIZE
Cambio 237m²
Tempus 180m²
(RubikHaus designs
range from 150m² to
250m²)

WORDS
Anna Cumming

PHOTOGRAPHY
RT Edgar Macedon
Ranges

living in comfort with their new baby.

“There’s no reason why we can’t deliver homes that are net positive for energy across the year – the only real barrier is cost,” Tom says. “To address that, we must achieve volume, to make the additional cost of materials and energy-efficient appliances comparable with a conventional home.”

He goes on to emphasise the importance of innovative finance mechanisms. “The Australian home market is ripe for transformation; land and build costs no longer stack up, and volume homes are typically value-engineered to achieve the minimum required performance standard at least cost. A way to address this is to change the system so that for high-performing (net positive and resilient) homes, operational costs including mortgage finance, energy

bills and insurance costs are reduced, enabling greater financial accessibility for homeowners – this effectively incentivises building better homes.” He notes that some financial institutions now have offerings targeted at higher-performing homes and those built using advanced methods of construction, and build-to-rent schemes – a good model for housing security and greater affordability – are also starting to mature in Australia.

“RubikHaus is CarbonLite and Enviroecture’s contribution to a broader initiative to transform the housing sector and business in general to become climate and nature positive,” Tom says. “Having spent three years perfecting the product, we’re now focusing on scaling initiatives. That’s the next chapter.” **S**

Above Cambio, a recently completed RubikHaus project, is an 8.5-Star family home built using a prefabricated panelised construction system for speed and high performance.