

Sanctuary

MODERN GREEN HOMES

ISSUE
56

SUSTAINABLE HOUSE
DAY SPECIAL

DEEP DIVES: Building & design | Retrofitting
Building materials | Climate resilient design

Best and fairest
Australia's eco homes on show



PUBLISHED BY **renew.**
SPRING 2021 • AU/NZ \$12.95
SANCTUARY.RENEW.ORG.AU

ISSN 1833-1416



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PLUS

Flood-resilient design genius
Tiles from recycled glass and fabric
Targeted retrofits for comfort
Urban homesteading trailblazers



**An Earthworker-Reclaim heat pump
hot water system worth \$5,000
from the Earthworker Energy
Manufacturing Cooperative**

Offer open to Australian residents. Details page 80



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PRODUCTS

These products are independently selected by our editorial team. If you have recommendations for products you think would be of interest we'd love to hear from you. Email: sanctuary@renew.org.au



Flooring made from whole bamboo

Bamboo is a great alternative to timber for some building applications, as it's fast-growing and durable; it also releases more oxygen than trees do while growing. Dasso Ecosolid bamboo flooring is produced using the whole bamboo stem, including the strongest outer piece called the rind, which adds to the durability of the product for high-traffic areas. The bamboo stem is flattened and set with a biodegradable resin, with the finished product able to be sanded and stained like timber, though it's simplest to leave it untouched. The product comes in different widths and pricing is available on request.

www.dassogroup.com

Off-the-ground balcony planters

Apartment residents find all sorts of ways to grow their own produce, be it in community gardens or at home on balconies or near sunny windows. Balcony space can be tight though, so anything that gets planters off the ground and into the vertical space is ideal. The Mini Rail planter box from Glow Pear attaches to railings to make use of underutilised balustrades, fences and handrails. Like other Glow Pear planters it features an integrated self-watering system with a water level indicator. Units can be attached to each other to create a modular system, and are made to be long-lasting with UV-resistant and recyclable plastic. The planters offer a good vegetable-growing soil depth of 225mm, hold 4.5 litres of water in the reservoir and can be attached to rails of 15mm to 100mm width. The Mini Rail costs \$139.

www.glowpear.com.au



Strong, lightweight roofing system

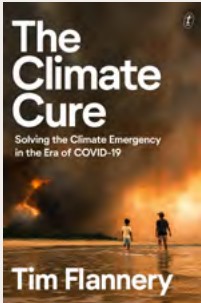
Roofs in bushfire-prone or cyclone risk areas need a strong structure to withstand intensifying climate extremes. The Gerard roofing system is made from individual pressed steel panels that together form a single structural unit, making it more able to resist the high winds encountered during storms and fires – it's rated for wind speeds of up to 350 kilometres per hour. The lightweight roof panels have a high strength-to-weight ratio, reducing risk associated with heavier roofing systems in weather extremes. The interlocking system is weathertight, helps eliminate gaps where embers can enter in a bushfire, and is approved for use in the highest-risk bushfire zones, those rated BAL-FZ. While steel production is energy-intensive, the product is 100 per cent recyclable. Pricing depends on project.

www.gerardroofs.com.au

REVIEWS

If you have recommendations for films, books, smartphone apps, podcasts, websites or anything else, email: sanctuary@renew.org.au

BOOKS



The Climate Cure

Tim Flannery

Text Publishing, 2020

\$25

Review by Lori Dalton

It's a welcome relief to be presented with a book about solutions when global problems loom so starkly over us. Renowned climate scientist Tim Flannery's latest book *The Climate Cure: Solving the Climate Emergency in the Era of Covid-19* presents an achievable action plan for tackling the climate emergency.

But we must wait patiently until the second half of the book for the cure. With headings such as 'The Great Australian Tragedy', 'A History of Folly' and 'It's Worse Than You Think', Part 1 sends a strong message: Australia needs to act fast, just as we have done with the coronavirus pandemic. Flannery says that while it is now too late for early intervention, the climate emergency is still within our control.

In Part 2, he proposes a climate cure that he likens to a virus-related lockdown, starting with a fast but fair transition away from fossil fuels. His recipe for a climate 'vaccine' includes a heavy dose of renewables, electric vehicles and hydrogen, administered with leadership and cooperation, and finished off with carbon drawdown from the atmosphere and a sprinkle of e-fuels.

Tim Flannery is known for his straightforward, accessible writing style, and *The Climate Cure* is no exception: a keen reader could easily digest it over a weekend. The book is a good snapshot of the current climate outlook and a clear call for a new approach based on the nation's response to Covid-19.



The Book of Australian Trees

Inga Simpson

Lothian Children's Books, 2021

\$27

Review by Ajay Hooda

With its beautiful illustrations and vivid descriptions of 15 iconic Australian native trees, this book aims to encourage children to be more aware of and appreciate the relationship humans, birds, insects and animals have with trees, indirectly introducing one of the most important topics of our times: climate change and its danger to our entire ecosystem.

From the red ironbark to the grey gum, the Moreton Bay fig to the Queensland bottle tree, author Inga Simpson has done a great job in connecting the millions of years of evolutionary history of these trees with the climatic conditions of today in child-appropriate language. She includes the trees' common and scientific names, appearance and characteristics, survival strategies, the wildlife for whom they are either homes or food, the areas in Australia where they can be found and many more impressive facts and figures. The information encourages a sense of connection and empathy with the trees in the face of threats like increasing bushfires and logging.

This book is a great read for kids, especially as they can be such effective teachers and motivators for their parents, families and communities. As the book says, "We all depend on trees, but their future is in our hands".

PODCAST

Another Architecture Podcast

www.anotherarchitecturepodcast.com

Review by Madeleine De Gabriele

Another Architecture Podcast takes the jargon out of house design. Each episode, host George Bradley interviews someone who has built a unique house somewhere around the world, delving into why and how without getting bogged down in technicalities (though if that's your thing, project details are often available on the podcast's website). Bradley's enthusiasm is infectious and makes his interviews engaging and easy to follow.

Close to home, episode three explores a Brisbane bungalow-turned-terrarium and is an interesting discussion on how to mesh a family home with an inside-out aesthetic. In episode 29 Bradley looks at the Lune De Sang Pavilion, built on a former dairy farm in New South Wales that the owners are re-wilding. New instalments are released every fortnight, and the archives cover projects ranging from a prefabricated zero-carbon prototype house in Costa Rica to an off-grid island cabin in a Finnish archipelago, with all kinds of innovative urban design in between.

This is a great listen if you're thinking about renovating or building, or simply want to daydream about beautiful houses around the world.

RETROFITTING

Rather than building from scratch, renovating or retrofitting can be the most eco-friendly way to achieve a comfortable sustainable home and live a lower-impact lifestyle.

Week 2 of the Sustainable House Day program will focus on providing resources and expert presentations on retrofitting to make the most of an existing house. Our webinar on Tuesday 28 September will look at getting off fossil fuels and going all-electric. Then on Thursday 30 September we'll be joined by experts to dig into the nitty-gritty of insulation and energy efficiency in existing homes.

**Sustainable
House Day**

See the full program at
sustainablehouseday.com



Proof positive

LOCATION Mittagong, NSW • WORDS Kellie Flanagan • PHOTOGRAPHY Ben Wrigley

Veteran of an owner-built, deep green backyard flat project in Mittagong, NSW, Andy Lemann applied his learning to the main house, retrofitting it for much improved energy efficiency.

At Sustainable House Day this year the New South Wales Southern Highlands town of Mittagong will be in the spotlight, as designer-builder and local resident Andy Lemann unveils his recent comprehensive energy efficiency retrofit of a modest fibro cottage.

Readers of our sister magazine, *Renew*, may remember the story of Andy's previous project, the Greeny Flat, a small-scale dwelling he designed and built in the backyard of the cottage owned by his mother. "After the first year in the Greeny Flat, we were able to confirm that it was net positive for energy," says Andy. "In fact, we had exported about two and a half times as much electricity as we'd imported, and our running costs for the year were less than \$300."

A couple of years later he turned his mind to the cottage itself, aware that it represented an opportunity to apply the energy positive concept to an existing house. Being able to upgrade existing

homes to a high standard is incredibly important, he says. "Even if we made every new home energy positive, we still wouldn't be dealing with the bulk of our residential carbon emissions – that comes from existing homes."

The family's decisions for the retrofit and remodel were largely driven by practicalities. "To me, the aesthetics of a solution are definitely a secondary consideration to the practical function," laughs Andy, who spent many years living and working in the USA and was a member of the Building Performance Institute, which provides training on how to ensure that buildings are "safe, healthy, comfortable, durable, and energy efficient". The solution had to be cost effective, low maintenance, energy efficient and also elderly-friendly, as it's likely that Andy's parents will move in one day. The house's existing layout lent itself well to a passive solar retrofit: "The living space was already on the north side of the building, with the bedrooms on the south," says Andy. "We've taken out a couple of walls and moved the kitchen so that it's incorporated into the newly open-plan living space." There was also an appropriately sized eave already in place to provide summer shading.

Although the cottage's fibre cement



At a glance

- Comprehensive, low-budget retrofit for energy efficiency
- Asbestos fibre cement cladding replaced with galvanised steel
- Net positive for operational energy
- Mini Trombe wall and solar air heater

Opening for Sustainable House Day 2021. For more:

sustainablehouseday.com/fibro-cottage

BUILDING MATERIALS

As we aim to reduce our impact on the earth, the materials we use to build our homes are as important as our designs. The wrong material can not only contribute to pollution or deforestation, it can also undermine your home's performance.

Week 3 of the Sustainable House Day program is all about building materials. First, on Tuesday 5 October we'll look at natural materials like hempcrete, strawbale and rammed earth that can make your home healthy, highly functional and sustainable. Then, on Thursday 7 October, our experts will dig into the details of how the right windows can increase your home's efficiency and thermal comfort.

**Sustainable
House Day**

See the full program at
sustainablehouseday.com



PUTTING WASTE TO WORK:

‘Green ceramic’ building products from recycled glass and textiles

WORDS Jodie Lea Martire



←↑

At the Pavilions apartment, ‘green ceramics’ made from recycled glass and textiles have been used in a wide range of applications including floor and wall tiles, lights, tables and artwork.

Repurposing waste materials into new building products makes sense on several environmental levels, and one research and industry collaboration is pulling it off to great effect with a range of tiles, fixtures and even artworks made from ‘green ceramics’.

It’s a rarity in the construction industry to find recycled glass throughout the kitchen, repurposed fabric scraps in the floor, and wall art made from a slick combination of the two. But that’s exactly what you’ll find in this display apartment by a major developer – and it’s just what makes it a worthy winner of the Architecture and Construction category of the

Circle Awards, which recognise advances towards a circular economy.

The two-bedroom Pavilions apartment at Sydney Olympic Park is the result of a multi-year collaboration between urban property group Mirvac and the Centre for Sustainable Materials Research and Technology (or SMaRT Centre) at the University of New South Wales (UNSW). Unveiled in March this year, the apartment showcases an industry-first use of waste glass and textiles, converted by the SMaRT Centre into a material called ‘green ceramics’ and featured in a variety of applications. The floor tiles come from cullet (ground-up glass waste) combined with scraps from old beanies, which give them black speckles. Other tiles with different glass/textile blends have been used in the kitchen splashback



↑

Rather than seeking to keep floodwaters out, James's approach to flood-resilient design is to ensure water that enters the house won't damage the materials and can be flushed out quickly to allow the structure to dry out and the family to move back in. "By 'building better before' a flood event rather than rectifying damage once a house has been flooded, we can significantly reduce the waste materials sent to landfill," he says.

Daniel and Marion were accustomed to living in small homes in Brisbane and Europe and despite having three boys by the time they renovated, they increased the footprint by just 20 square metres. The upstairs was reconfigured only slightly, with the new living room pushing out toward the backyard to capture northern sun. Wide folding doors open onto a metre-wide balcony, efficiently converting the living room into an outdoor living space. Downstairs features bedrooms, bathroom, laundry, rumpus and a home office.

Demolition was minimal, with as much as possible recycled. Kitchen cabinets were reused for wardrobe and laundry storage and the appliances reinstated in the new kitchen. Demolished timbers and the original tin roof were converted into a characterful garden

shed ("The only new thing is the roofing screws," says Daniel) and other garden structures. The fall of the land was reworked to manage overland flow, with additional drainage and paved areas in salvaged and new bluestone paving, a lower embodied energy solution than concrete pavers.

Daniel and Marion were "committed to pushing the boundaries," says James, experimenting with innovative sustainable materials and construction methods and thus contributing to JDA Co.'s industry-leading expertise in this area which will help others build back better in the future. Daniel lobbied local concrete suppliers Wagners for seven years to enable the use of a geopolymers concrete polished slab for the first time on a residential project, avoiding the high carbon emissions of

standard Portland cement concrete. "It is made with a cementitious fly ash waste from coal-fired power and iron ore slag – also a waste product – mixed with a binder and aggregate to make a slab," he explains. His email to the builder Tom Yabsley accepting all risk gave some reassurance and the concrete grinders learned on the job.

To achieve satisfactory energy ratings downstairs while still meeting the brief for flood resilience, James and Tom developed an insulated external wall free of cavities where water could become trapped. Exposed hardwood studs were used, with clear-finished hardwood shiplap cladding (set vertically to drain better) with sealed joints and 30-millimetre-thick closed-cell extruded polystyrene insulation behind. Internal walls are of waterproofed Hebel

block, and sills are flush with the floor to allow easy hosing out after a flood. All walls downstairs are lined internally with fibre cement to give the appearance of familiar plasterboard, with hardwood trims. The goal with all of JDA Co.'s 'flood houses' is to encourage broad community uptake by ensuring they look no different to a normal home, and Marion and Daniel's is no exception. "You have to put the architectural ego aside," says James. "It's well built, it looks great. Nobody would know it's doing a different job."

Daniel and Marion didn't want air conditioning so design for cross ventilation, aided by ceiling fans on muggy days, makes the house comfortable. "When you go downstairs in summer, it's lovely and cool," says Marion. The house is powered by grid-connected solar with a 10 kilowatt-hour battery

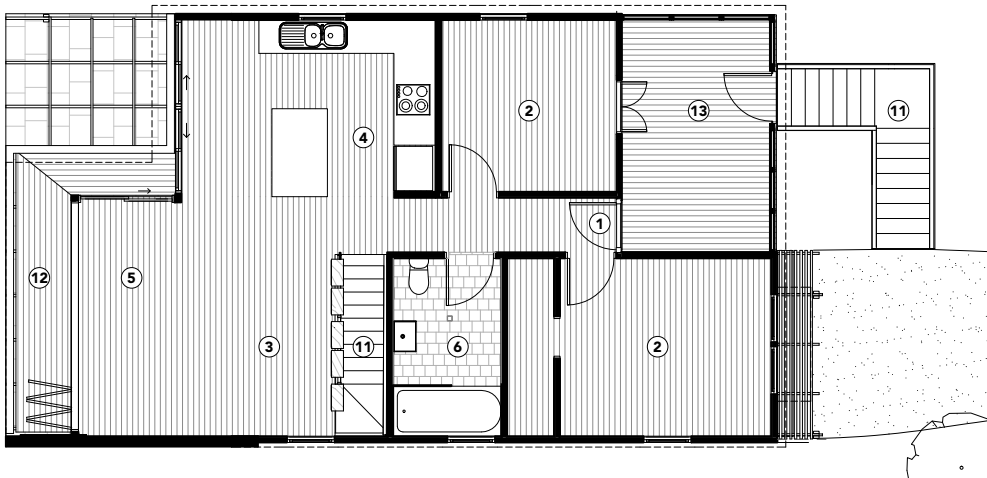
sufficient to supply essential lights and the fridge in grid outages; as part of the flood resilience, upstairs and downstairs run on separate circuits so if downstairs becomes inundated the electricity can be shut off there and continue running upstairs.

The outcome of Daniel and Marion's project is a reflection of the happy shared experience with builder and architect, with the family revelling in their reimagined, elegant, light-filled home. "It's not all about utility," says James, despite all the technical details and decisions. The home respects its heritage with old and new clearly expressed, and the interiors reflect Marion's impeccable sense of style. The couple didn't notice any significant extra cost for the flood-resilient design, which brings the added benefits of peace of mind and a 40 per cent reduction in their insurance premium. 🏡

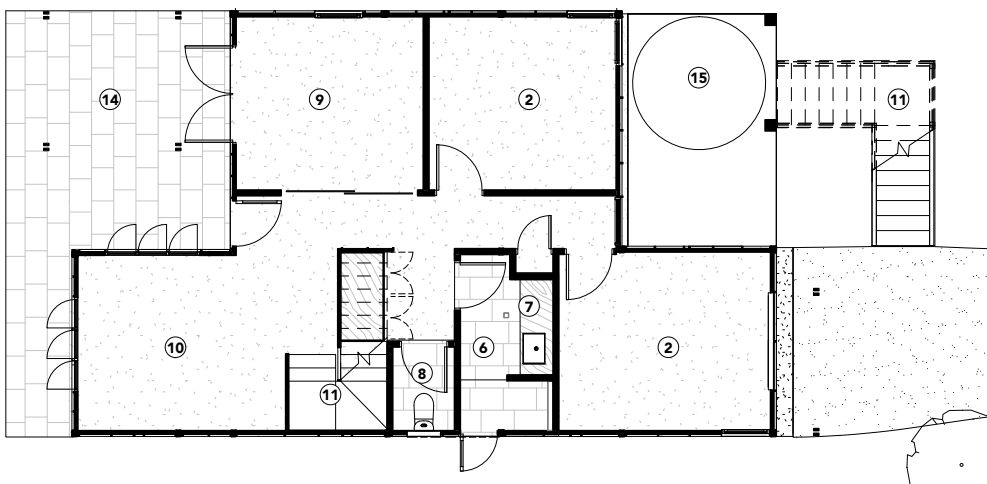


↑ The external walls downstairs have been designed to eliminate cavities within where water could accumulate, using hardwood framing and cladding with extruded polystyrene insulation.

FIRST FLOOR PLAN



GROUND FLOOR PLAN



LEGEND

- ① Entry
- ② Bedroom
- ③ Living
- ④ Kitchen
- ⑤ Dining
- ⑥ Bathroom
- ⑦ Laundry
- ⑧ Toilet
- ⑨ Study
- ⑩ Rumpus room
- ⑪ Stairs
- ⑫ Balcony
- ⑬ Verandah
- ⑭ Terrace
- ⑮ Water tank



Strait views

LOCATION Cape Paterson, VIC • WORDS Jacinta Cleary • PHOTOGRAPHY Marnie Hawson

Designed to fit the slope of its block, this snug split-level house incorporates ribbon windows to maximise both views and thermal efficiency.

Opening for Sustainable House Day 2021. For more:

sustainablehouseday.com/straithouse

Richard and Kate Keech are no strangers to high-performing homes, having recorded a 75 per cent reduction in gross energy and water consumption when they renovated their Melbourne period home. Their block at The Cape has the highest elevation of any site within the Stage 2 land release, and magnificent views to the south across Bass Strait. “The orientation is not ideal for passive solar design, but for us, a high-performance house that maintained the views was non-negotiable,” says Kate.

Richard, an engineer and expert consultant on energy efficiency, says they

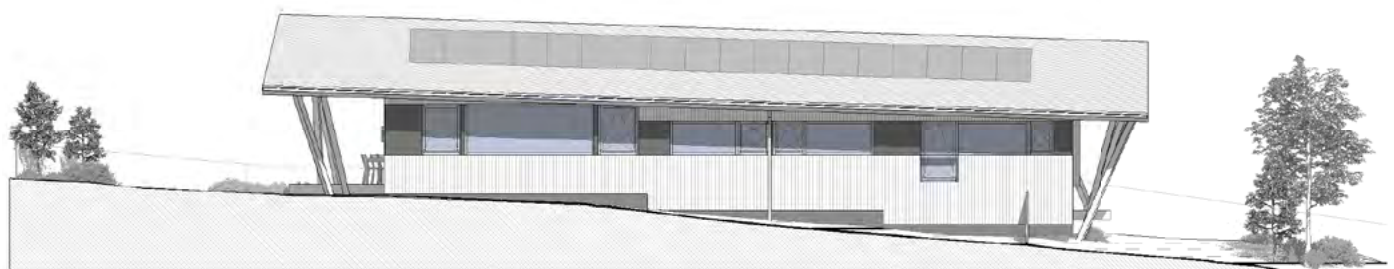
took their time to research their options, investigating the collection of designs The Cape makes freely available while the Stage 2 paddocks were being turned into a residential site. “There was quite a long wait before we could start construction. This slowed us down, but ultimately worked in our favour,” he says.

They eventually decided to get a house designed especially for the sloping block, and engaged EME Design after meeting director Luke Middleton while touring his Melbourne home on Sustainable House Day. The warmth and “softness” of the house appealed to them, and “Luke’s



↔↑↓

Designer Luke Middleton designed Kate and Richard's house specifically to fit its high, exposed site, sizing and placing the windows to make the most of the sea views without compromising the thermal performance. Triple-glazed windows, high levels of insulation and attention to airtight design and construction mean almost no active heating or cooling is required, and Passive House Plus certification is pending.



Urban homesteads

How to live a more sustainable lifestyle in the city

WORDS Rebecca Gross

Urban homesteading is a growing movement in which city dwellers are cultivating their own organic produce, connecting with nature and their community and living lower-impact lifestyles. In this extract from her new book on the subject, sustainability advocate and author Rebecca Gross introduces some of those paving the way, and offers tips and advice to inspire your first (or next) step in planting the seeds of change.

A homestead in the traditional sense refers to a farmhouse and its surrounding land, with the rural location entailing a greater connection to nature and the local community as well as substantial self-sufficiency. An urban homestead transplants this idea to city and suburban settings, where people live by some or all of the philosophies associated with homesteading. Varying in size and amenity, the urban homesteads I profiled for my book include a Berlin balcony, a London rooftop and a New York terrace, along with backyards in Australia, the Netherlands and the United States.

Growing fresh produce is at the core

of urban homesteading. It's what humans have done for thousands of years, but today there is a notion that growing food at home is 'innovative'. Depending on your age, your grandparents and great-grandparents mostly grew food. For many, however, it has skipped one or two generations due to the rise of mass production, processed food and more urban living. Growing fruit, vegetables, herbs and fish and collecting eggs and honey alleviates our disconnect from food sources and promotes consumption of local, seasonal food, which is good for the environment and for our wellbeing.

Many of the book's contributors share the opinion that a productive garden is also a productive use of time. Gardening has changed their lives and outlooks, as they grow crops, raise chickens, tend beehives and attract pollinators and wildlife to their backyards or other urban pockets. For many it has become an integral part of their lifestyle and identity, and for some a passion they have translated into businesses helping other community members establish their own gardens.

By transforming urban spaces into productive gardens, these homesteaders are working in harmony with the natural ecosystem, consciously connected to soil, plants, wildlife, animals, seasons and weather. Creating a green network helps bring bees, birds and insects back into

cities, as well as reducing the heat island effect. And optimising soil health and saving seeds aid food security and the resilience of the urban ecosystem.

On top of that, the produce tastes better and reduces food miles and reliance on supermarkets. Plus, there is great reward in working in the garden, spending time in nature and knowing your food goes from plot to plate.

There is certainly privilege in having the space, money and time to establish a garden or integrate more advanced sustainability measures. But a lack of land needn't hinder your urban homesteading dreams, as rooftops, balconies and terraces can be transformed into productive gardens, and there are even ingenious portable gardening methods that can be used for rental properties.

Sharing is caring in the urban homesteading world, and many practitioners are passionate about sharing ideas, knowledge, advice and time, wanting others to experience the joys and benefits of living a more sustainable life. So let me introduce you to a collection of urban homesteaders who have transformed their backyards or balconies into productive gardens and actively encourage and help others to do the same. Their key advice is to start small: make a first step, learn from your mistakes and successes, and soon you too will have dinner on your doorstep.

**A SERIOUSLY PRODUCTIVE
PERMACULTURE PLOT
Melbourne, VIC**

Kat Lavers is a passionate gardener and sustainable food systems advocate. Her food garden, The Plummy, is on Wurundjeri land in suburban Melbourne, and is designed on permaculture principles to get the most out of the site. It includes a food forest with fruit trees, raised beds for vegetables and herbs, and an aviary for quails.

Kat has developed a highly detailed planting plan that optimises the productivity of the garden while minimising excess, and she weighs all the produce to demonstrate the productivity of her urban permaculture system. In 2020, The Plummy produced 450 kilograms of herbs, vegetables, fruit and eggs from a 100-square-metre growing

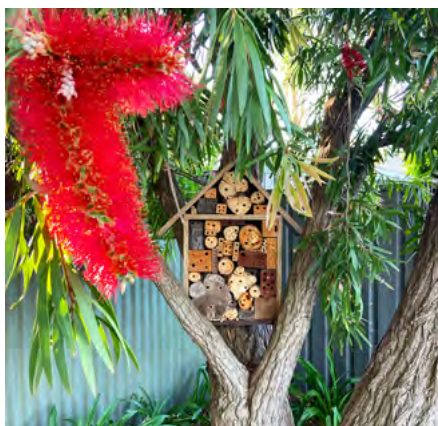
area. “There is little data about what these systems are capable of, so it is important to bust the myth that it’s a nice thing to do but it doesn’t really produce a lot of food,” Kat says.

While she produces 95 per cent of the fresh eggs, fruit and vegetables her household eats, Kat is not aiming to be entirely self-sufficient. “We are aiming for community interdependence – to have most of our diet come from this garden or within our immediate bioregion,” she says.

Kat teaches permaculture and organic gardening, running a popular council program that supports people to improve the productivity of their garden. She also runs private tours of The Plummy. [Ed note: read more about Kat’s urban homesteading in *Renew 144*: “The farmer next door.”]



Images: Amy Plesse Photography



Images: Monique Collins

**GREEN HOBBY TO THRIVING BUSINESS
Adelaide, SA**

Monique Collins’ passion for gardening began in 2015 when she started growing flowers in her Adelaide backyard, and it evolved into growing produce when her son was born three years later. She wanted

to supply food for her family and for her son to know where his food came from. Gardening also provides an enjoyable daily activity. “Becoming a parent inspired me to grow more, and it is so much fun playing in the backyard with a toddler. First thing in the morning, he runs outside and wants snow peas,” she says.



Gardening is now not only a hobby and a passion, but a business for Monique. She founded the Edible Garden Co. to help other people install and establish their own gardens and develop healthy soil, and to educate them about the importance of seasonal produce. “One of the biggest questions I get is, ‘What’s in season?’” she says. Eating seasonal, locally grown food reduces food miles and waste as well as the need for cold storage, packaging and handling. It also means greater variety in your diet. “If everyone could get to know what’s in season, and grow food or consume more consciously, it’s one small action that can make a huge difference for the environment,” says Monique.

EXPERTS EXPLORE:

Uta Green on using her new studio as a testing ground

WORDS Uta Green



Sustainable design is a complex beast, involving a progression from high-level decisions on form and function down to fine-tuning design details and material choices. Uta Green of Green Design Architects explains the design process for her practice's new studio in Hobart, including using iterative energy ratings to optimise the small building's performance.

As architects, when we design our own place, we get to play. We can test ideas outside the box, and we can take the time to do research that will be useful for future projects. At Green Design Architects we currently have the opportunity to build ourselves a new office, and we are looking forward to making it the most sustainable building possible, including designing to Passive House standards.

OUR NEW OFFICE

We live on the edge of Hobart, in the bush under kunanyi/ Mt Wellington. Life is so good here that we don't want to leave the place for work, so for the past few years we have

made space for the office in our home. But with more staff joining Green Design, it is time for a dedicated office, and we have space in the paddock behind the house. The site is in a perfect position at a bus stop and on a cycle route, but has a few constraints: the lowest bushfire attack level (BAL) part of the block is squeezed between a drainage easement and a thoroughfare, which results in an unusual triangular shape.

REDUCING THE FOOTPRINT

For most small building projects, three interlinked parameters determine what is achievable: cost, quality and size. We are never willing to compromise on quality, by which we do not mean gold-plated taps or marble benchtops; what is important is thermal comfort, detailing, longevity, accessibility and good design as well as a clean environmental conscience. Environmental sustainability usually costs more than standard solutions. As my partner David likes to put it, "Do you wish to save the world or your hip pocket?" If you want to do both, you have to reduce the size. This is also the best way of minimising the embodied energy.

So the footprint of our new studio is minimal at 42 square metres, but big enough for its purpose. It consists of a single

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an Earthworker-Reclaim
heat pump hot water
system worth \$5000, from
the Earthworker Energy
Manufacturing Cooperative

renew.org.au/prize



Subscribe to *Sanctuary* or join Renew by 5pm AEDT on Friday, 29 Oct 2021 and go into the draw to win a Earthworker-Reclaim heat pump hot water system worth \$5000, from the Earthworker Energy Manufacturing Cooperative. Open to Australian residents. Terms and conditions apply.

This prize comes from Australia's first community-owned clean-energy manufacturer. Located in the heart of Victoria's Latrobe Valley, the Earthworker Energy Manufacturing Cooperative is part of ensuring a just transition for communities affected by the move from fossil fuels to renewable sources of energy.



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