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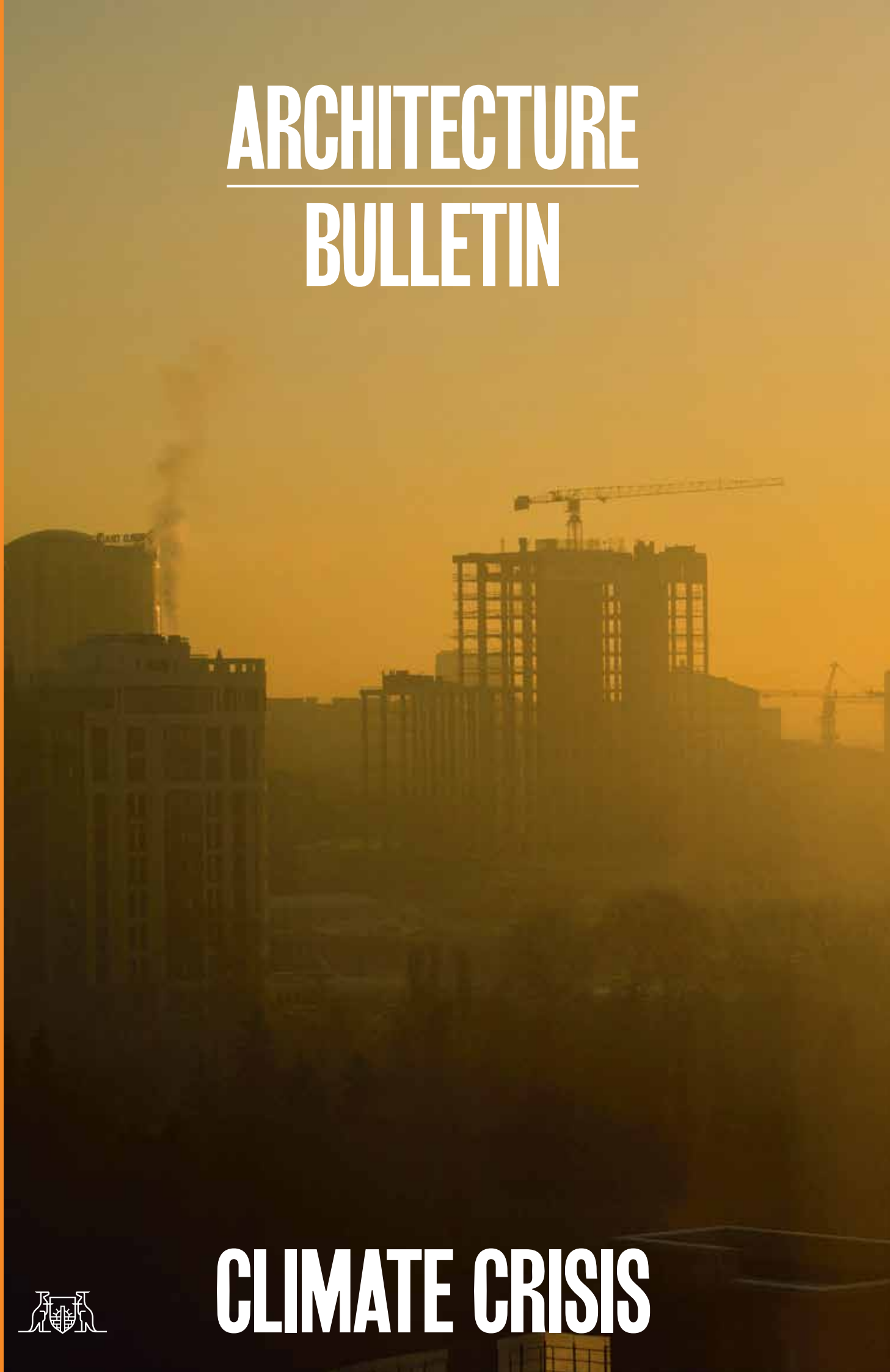
ARCHITECTURE BULLETIN



CLIMATE CRISIS

CLIMATE CRISIS – EMERGENCY? WHAT EMERGENCY?

ARCHITECTURE BULLETIN

Official journal of the NSW Chapter of the Australian Institute of Architects since 1944

EDITORIAL

EDITOR & DESIGNER
Ricardo Felipe

EDITORIAL COMMITTEE
Melika Aljukic
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Elise Honeyman
Sarah Lawlor
David Tickle
David Welsh

MANAGING EDITOR
Kate Concannon

PUBLISHING

Published by the NSW Chapter of the Australian Institute of Architects

3 Manning St
Potts Point NSW 2011
Sydney
+61 2 9246 4055
nsw@architecture.com.au

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INVITATION TO CONTRIBUTE

LIFE LESSONS (BACK TO SCHOOL) ISSUE

The Life lessons (back to school) issue of *Architecture Bulletin* aims to explore architectural education by reflecting on past student projects as a way of showing similarities and differences in learning and teaching practice over the years. The issue will give the profession insight into student projects of the past with their educational and practical value. It will also inspire current educators to reflect on their own teaching methods. Would you be willing to share your experience?

We are inviting contributors to reveal and describe a significant architecture student project of your own. We encourage you not to select your best or final year project, but more the project that continues to teach you something now.

If you are willing to participate, please send:

1. Up to 1–3 high-res images of the original concept drawing(s) – preferably hand drawn – or model. High quality iPhone snapshots using daylight is fine.
2. Up to 100–200 words max: as a reflection of what the particular project recalls for you about architectural education and its consequences in practice and/or informs you as an educator (if applicable) in NSW. Include subject name and year of project.
3. Plus at end: your name / degree name / institution name / graduation year / present title and credentials

Please email your contribution to bulletin@architecture.com.au (with 'Life lessons / Back to school contribution' in the subject line) by 12 January 2020.

CONSTRUCTION ISSUE

Since the release of the Shergold Wier Report in early 2018, issues surrounding construction have become commonplace in our social and political and media landscape. Opal and Mascot Towers, the Lacrosse Court Decision and the appointment of a NSW Building Commissioner all exemplify the need for us to reconsider the way we construct buildings, not just in this state, but across the country.

As architects, we find ourselves at the centre of this swirling discussion. *Architecture Bulletin* is asking contributors to offer insight, opinion and possible solutions to the issues surrounding construction in our state, no matter what the scale or typology.

Please send your proposed article outline to bulletin@architecture.com.au (with 'Construction issue article proposal' in the subject line) by 26 January 2020.

PROVOKE AUTHOR FOR VOLUME 77

Provoke is an opinion series written by a different guest writer each year (see p. 43). To express interest in being the Provoke author for four issues in 2020, please send your first suggested topic to bulletin@architecture.com.au with 'Provoke author proposal' in the subject line by 26 January 2020.

WRITE TO US
Send your feedback to bulletin@architecture.com.au. We also invite members to contribute articles and reviews to our Chapter section. We reserve the right to edit responses and contributions.

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FRONT COVER: Семен Саливанчук / stock.adobe.com

We could talk about carbon emissions rising again, about political inertia and community impact. But we are out of time. The climate crisis is upon us. This issue of *Architecture Bulletin* is devoted to the best of proactive sustainable architecture and design.

Here we take a look at exemplars of carbon-conquering efforts from here and around the world. What do we need to do to replicate them? We can all talk about it, but how can we *practice* active climate action.

Statements are important. A stand has been taken. At the time of publication over 650 architects have signed on the Australian Architects Declare website (au.architectsdeclare.com). Many of us have marched at the global climate strikes.

Now we need to follow up with actions – the stuff that we as architects can contribute. This is the stuff that needs to happen *right now*.

CLIMATE CRISIS

What does your building give?

Mary Casey

Rendering of Burwood Brickworks, the 6 Star Green Star rated shopping centre designed by NH Architecture. Located 19 kilometres outside of Melbourne, it opened in December 2019. Image courtesy Frasers Property

Architects have an important role in determining how a building authentically makes meaning through connection to its place. If we take connection seriously, there is both give and take in that relationship. Currently, this relationship is not well-balanced.

Most buildings are bricks-and-mortar infants. Incapable of supplying its own needs, a typical building requires that its essentials are brought to it and its waste taken away. This result is predictable from the language of our expectations. Here are some typical measures of building performance:

– Energy consumption
– Water consumption
– Maximum acceptable level of toxicity to humans
– Maximum acceptable level of toxicity to surrounds
– Waste generation
– Traffic generation.

This generates/perpetuates a mindset with two key aspects:

Scarcity: 'There is a limited supply of stuff. The best I can do is take less.'

Fixed: 'I'll define current performance based on past performance because it has always been and will always be this way.'

With such a mindset, we discuss 'how to be less bad'. It is a conversation that isn't very inspiring, and certainly does not fit with the idea of architect as space-sculptor, beauty-maker, society-shaper. So, I'd imagine it's an avoided or rationalised conversation – and that is why it persists. What if we asked: 'What can buildings contribute?' From a mindset of abundance and growth, how would we express that expectation?

Janine Benyus, co-founder of the Biomimicry Institute, has led the movement to point out a benchmark that uses this question as its fundamental design principle: Nature. After nature's billions of years of R&D, what surrounds us is the secret to survival: *To be successful, you must operate in alignment with nature's overarching system design requirement, which is to create conditions conducive to life.* How can a building support life in all its various forms?

A tree serves as a good biomimetic mentor for a building. Trees developed leaves to maximise their solar absorption capability for photosynthesis, absorbing carbon dioxide and releasing oxygen. In alignment with the principle of creating conditions conducive to life, they provide to the system: habitat, shade, soil stability and air filtering.

To learn how buildings might begin to balance their give and take equation, we might start with what buildings and trees have in common. For one, they both have a large amount of surface area. Could buildings use that in service to the ecosystem of the city?

The Palazzo Italia in Milan uses light to eat smog and generate electricity. Biodynamic concrete panels capture air pollution when the envelope material comes into contact with light, which it then transforms into inert salts, reducing smog levels in the environment. But that's not all – through extensive use of photovoltaic glass and photocatalytic concrete cladding, the building is capable of covering its energy needs autonomously from the sun.

What if this surface was used to harvest its own water? The leaves of sacred figs channel water off their surface via their unique shape, called drip tips. The Hawaii Preparatory Academy Energy Lab was conceived as a building devoted to the study of alternative energy. Like drip tips, its roof faces the upward slope of the hill so that it can capture morning dew and collect the condensate in a tray along the bottom edge.

Becoming more self-sufficient would be a move in the direction of balance. A more advanced pattern to learn from trees is collaboration. In forest systems, trees warn each other

of insects, protect each other in strong winds, share water and other resources through networks in the soil to nourish each other and keep the whole system healthy. According to the Nature Conservancy, a typical 10 sq km patch of rainforest contains as many as 1,500 flowering plants, 750 species of trees, 400 species of birds and 150 species of butterflies – this diversity is intentional because the sophistication of the interdependency improves the resilience of the whole. To survive in this system, you must become integral and indispensable to the others.

If buildings were to think like trees in a rainforest, what could they make possible? Taking tall buildings as an example, they could learn from emergent canopy trees which collect sun from great heights to feed these nutrients down to ground level for the benefit of the younger trees below. Tall buildings also collect wind from very high up and through the canyons of the city; if they responded to this opportunity, they could gather even more emissions-free energy.

These resources could then be given to a shared network. Giant networks of fungi underneath the forest floor connect the trees. Each tree brings its nutrients and water to the ground plane and the network portions it out, moving these resources around to ensure that all trees are fed. Using this as a power supply model with a diverse ecosystem of building uses above, could we meet our power supply needs (or at least a large percentage of them) from within the city limits, without the substantial transmission losses that come with our current system? And without emissions?

If we thought about our buildings and cities in this way, buildings could be a significant contributor in preventing irreversible climate change. The American Institute of Architects tracks the impact of the building sector on emissions and progress against the 2030 target of zero emissions. If we get to zero by 2050, climate change is still reversible. To do that, the building industry needs *all new development* to be zero emissions by 2030.

Talk about being indispensable. This is our potential. To make this kind of contribution, we need new metrics.

The International Living Future Institute has developed a standard for building performance which thinks in these terms: the Living Building Challenge (LBC). Established in 2009, there are currently 455 buildings around the world pursuing certification. This framework can help develop your vision of a building that supports life. Using nature as the ultimate measuring stick of performance, these projects establish a living relationship with place. They are beneficial, with a regenerative, restorative effect.

The LBC's metrics acknowledge that buildings are part of our society, so it measures:

Place: restore a healthy relationship with nature
Water: operate within the water balance of the place
Energy: rely only on current solar income
Health and happiness: optimise physical/psychological health and wellbeing
Materials: endorse products that are safe for all species for all time
Equity: support a just, equitable world
Beauty: celebrate design that uplifts the human spirit.

Using the LBC encourages *system thinking* by:

Being based in biomimicry: our fundamental need to be connected to our ecosystem as a matter of survival
Embedding biophilia: that this connection is also a condition of our mental health and wellbeing
Encouraging scale jumping: sometimes the best solution is only possible at a scale larger than your building; look outside your site for opportunities
Offering the Living Community Challenge: there is an additional framework for projects at a district, community or city scale, based on the same principles. Two buildings that have taken up the challenge include:

Omega Centre for Sustainable Living in New York

Rather than hiding this sewerage plant 'away' and creating the need for higher embodied and operational energy to move the waste off site, the Omega Institute for Holistic Studies chose to integrate this building within the campus. It is a celebration of one of nature's most amazing capabilities – transforming raw sewerage into clean water. Using a series of tanks with different combinations of living things, the interior is so pleasant that people do yoga in it. Extraordinary answers like this happen when you ask: How can I become indispensable to this place by creating conditions conducive to life?

Burwood Brickworks in Melbourne

This is Frasers Property's project to create the most sustainable retail centre in the world, powered by solar and using its roof area as an urban farm. Seeking to be a net positive development, this project will change expectations of what the contribution of a retail centre can be in a community and in an ecosystem – from something which simply takes to something offering genuine connection with its place.

These are but two of hundreds of projects around the world that are part of a hopeful vision of the future, where we have reconnected with the ecosystems we inhabit in a way so healthy and robust we not only survive, we thrive.

Often architecture is seen as an act of ego – proof of our cleverness in defiance of gravity and the laws of nature. Let's use our cleverness to design contributing members of this society: buildings that think like trees, that become indispensable to their urban ecosystem; and human-made environments that work together to serve us as well, as resiliently, generously, flexibly and beautifully as a rainforest.

Mary Casey has over 20 years of experience in Australia and internationally, and currently leads HKA's project delivery social infrastructure team. She helps people break through barriers, both internal and external, helping her clients do more than they thought was possible. In 2014, the International Living Future Institute named her a *living building hero*.

REFERENCES

The **Living Future Institute of Australia** is dedicated to establishing a powerful network of informed, influential and active global citizens who are committed to redefining humanity's relationships with the ecosystems we inhabit. Get involved at: **living-future.org.au**

For more information on the **Living Building Challenge**, including a database of certified projects, go to: **living-future.org/lbc4**

The **Biomimicry Institute** empowers people to create nature-inspired solutions for a healthy planet. Its purpose is to naturalise biomimicry in the culture by promoting the transfer of ideas, designs and strategies from biology to sustainable human systems design. For more information and numerous resources visit: **biomimicry.org**. Contact biomimicry experts in Australia via: **biomimicryaustralia.org**

For a database of biomimetic mentors (including examples of how nature solves particular problems) visit: **asknature.org**

Ethical and scientifically sound architectural solutions to the climate crisis

Mat Santamouris

THE RESEARCH QUESTION

Can architecture and construction science influence the regional and global climate crisis and provide credible, scientifically sound and ethical solutions? Is it possible through the appropriate design of buildings, urban structures and other infrastructures to limit the emissions of greenhouse gases, decrease the temperature of cities, reduce the frequency and amplitude of extreme events, and protect the health and wellbeing of citizens? Based on solid scientific knowledge and evidence from thousands of large scale applications, the answer is a resounding yes!

THE PROBLEM

Architecture, construction and climate change are strongly interrelated. Higher ambient temperatures and extreme climatic events increase the cooling energy used in buildings disproportionally to the corresponding decrease of the heating energy, while raising the concentration of harmful pollutants and negatively impacting indoor environmental quality and human health. Buildings are a significant contributor to global and local climate change. According to UNEP, the sector is liable for about 38% of total greenhouses gas emissions. In addition, buildings play a huge role in the creation of the urban heat island (UHI) phenomenon increasing the temperature of cities. The UHI effect is caused because of the inappropriate use of absorbing materials like black asphalt and dark exterior roofing materials, the high density of buildings reducing wind penetration, generated anthropogenic heat, a lack of greenery and water, and excessive use of impervious surfaces that store solar heat then re-emit this back into the air. Urban overheating has a significant impact on energy usage and the environmental quality of urban space, increasing the ecological footprint of cities and raising the risk of heat related mortality and morbidity. It also seriously affects the quality of life of vulnerable and low-income households, increasing substantially indoor temperatures during extreme events and placing people's health and life under threat.

Scientific studies estimate that because of regional and global climate change, the energy consumption of buildings by 2050 may double, and the temperature of cities may increase up to 4–5°C.[1] Subsequently, the concentration of harmful pollutants like ground based ozone may increase up to 50%, while heat related mortality and morbidity may raise up to 100% including the expected physiological and technological adaptation.[2] In addition, heat related vulnerability and the exposure of low-income populations to dangerous climatic conditions may rise tremendously, putting lives under threat.[3]

'Architects are also responsible for mitigating the urban heat island effect. Using additional greenery in cities – be it integrated into buildings or the city infrastructure – along with using reflective and other advanced materials in open spaces and the exterior envelope of buildings can all reduce the peak ambient temperature of cities by up to 3°C.'

THE ROLE OF ARCHITECTURE

Properly designed buildings benefit from low energy consumption for heating and cooling along with a superior IEQ or indoor environmental quality. Solar and heat protection of the envelope, amortisation of heat using thermal mass, dissipation of excess heat to natural sinks, appropriate natural ventilation rates, penetration of daylight, use of healthy and low-carbon materials, and green microclimates around the building can decrease energy needs by up to 80% compared to a conventional design. At the same time, such moves also improve thermal and visual comfort while decreasing the concentration of harmful indoor pollutants by 90%. A high standard of environmental performance in buildings is the responsibility of the architect and should be achieved through proper design and not by using additional engineering devices. The higher the size of the installed engineering systems to satisfy energy and comfort needs, the lower the success of the architectural design.

Architects are also responsible for mitigating the UHI effect. Using additional greenery in cities – be it integrated into buildings or the city infrastructure – along with using reflective and other advanced materials in open spaces and the exterior envelope of buildings, water sources, solar control and shading of the open urban spaces, can all reduce the peak ambient temperature of cities by up to 3°C.[4] Mitigation measures result in an impressive improvement of the outdoor thermal comfort levels, a reduction of up to 40% of the cooling energy consumption of buildings and, most importantly, a decrease of heat related mortality and morbidity by up to 35%.[1] Revitalising the thermal environment of cities results in a substantial economic and social upgrade of urban spaces, generates wealth, promotes resilience and sustainability, and creates employment. Regenerating urban space in deprived areas in this way helps to eradicate urban poverty and vulnerability, promote social equity and diminish economic disparities and discriminations.

While the technical potential to face the problems of global and mainly regional climate change seems to be very high, the economic, financial and social obstacles, as well as the lack of adequate policies, substantially reduces the global capacity of the architectural world to tackle the problem in a radical way. It is evident that the actual and future targets of architectural design should go beyond common practice and the simple satisfaction of national building energy codes. Instead, it should be driven by ethical issues, aiming to protect the health, comfort and wellbeing of dwellers and citizens while defending the local and global environment. The adoption of these objectives requires planning and the need to follow an innovative scientific and political agenda full of technological breakthroughs, as well as implementing advanced technologies and policies. Architectural interventions should be part of a proactive, rather than a reactive, agenda. Such a future plan will require substantial investment in the global building sector, including in cities and individual buildings, which will create widespread economic, scientific and social opportunities for the future and will certainly create major medium- and long-term benefits for society. In parallel, it will help to alleviate the intensity and the consequences of the problems faced by low income and vulnerable citizens.

The climate crisis offers a tremendous new challenge for the architectural profession – to increase the added value of technological, economic and social interventions in the built environment and succeed in translating the climate challenge into a future opportunity.

Mat Santamouris is scientia professor, Anita Lawrence chair high performance architecture at UNSW Built Environment.

NOTES

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Sustainable Buildings Research Centre post-occupancy musings

Paul Cooper interview by Adam Russell

The Sustainable Buildings Research Centre (SBRC) at the University of Wollongong (UOW) is a multidisciplinary facility that hosts expansive research and industry collaborations to address the challenges of making buildings sustainable. The centre combines event spaces, research offices, laboratory spaces and a large high-bay facility in what they call 'a living laboratory (that) thrives on collaboration with industry.'

The SBRC could be the pinnacle response to our climate emergency from the built environment industry in Australia. The project commenced in 2010 with a $25.1m capital works grant from the federal government, awarded on the premise of delivering a potent tool for advocacy and a place for deep experimentation in best practice sustainability. In 2015 the completed SBRC won the Milo Dunphy Award for Sustainable Architecture.

In preparation for this interview, I had the good fortune of a site visit to the SBRC under the guidance of research facilities manager Dr Craig McLauchlan. This followed a chat in Sydney with Cox director Joe Agius, who led the design for the centre. Armed with the architect's viewpoint and my own experience of the building, I then sat down for a thought-provoking conversation with Professor Paul Cooper, senior professor and centre director at SBRC. My discussion with Paul was premised on a reflection or post-occupancy musing on the SBRC through its envisioning, procurement process and performance since commissioning.

– Adam Russell

Postscript: at the time of printing, it was announced that the SBRC received full Living Building Challenge certification – the 24th building in the world and the first in Australia.

I am grateful for individuals around the world like Paul Cooper and Stephen Choi who, through sheer determination and an unwavering vision for a regenerative future, achieved a Living Building at the Sustainable Building Research Centre at the University of Wollongong in Australia. #livingbuildingchallenge

– Amanda Sturgeon, CEO, International Living Future Institute

Adam Russell: Describe how the SBRC came into being.
Paul Cooper: The SBRC was borne out of a federal government funding grant awarded to UOW to cover building retrofits and bricks-and-mortar projects. The total funding pool of $25.1m was split between the construction of a new, net-zero energy building for NSW TAFE (now a sister building to the SBRC) and construction of the SBRC itself.

How was the building performance agenda set from the outset?
The initial funding application committed to achieving a 6-star Green Building Council rated building. More stringent energy performance-oriented rating frameworks such as passive house were also considered, but none were ideally suited to the university's vision of creating a building that went significantly beyond the overall sustainability performance benchmarks of the time.

The team became aware of the Living Building Challenge by attending a small conference in Sydney and quickly realised that it offered an extremely challenging, forward-looking and holistic framework – ideal for the immediate and emerging ambitions for the SBRC.

What role did the architect play in setting and meeting specific targets?
While the architects [Cox Architecture, who won the SBRC design competition] did not set the ambitious targets for the building themselves, they drove the implementation agenda with the consultant team, with the aim of eventually achieving certification under the rigorous Living Building Challenge.

What ratings or targets has the building met so far?
6 Star Education Design v1 Green Star Rating (GBCA).

What was the biggest challenge to date?
Definitely the commissioning of the building! The main challenges revolved around the commissioning and tuning of the overall building management system and the automated operation of the windows in natural ventilation.

UOW's Sustainable Buildings Research Centre by Cox Architecture after completion in 2015. Joe Agius was the design/project director and Michael Bradburn was the project architect Photo: John Gollings Photography

What have we learnt from the building?
This was a unique learning opportunity as the university was not only the client but my SBRC colleagues. We also participated in the design process and then eventually became the users of the buildings. The SBRC team 'shadowed' the subconsultant team in some of their specification and performance modelling, particularly the ESD and energy-performance modelling. The SBRC were able to test the consultant's assumptions and modelling, and in some cases helped in refining the aspects of the design. For example, where a proposed air-tempering labyrinth was eliminated after in-depth thermal performance analysis.

Further, by participating in the challenges of designing and delivering a building that significantly outperforms current benchmarks – value-engineering and balancing performance, quality and cost in the usual messy and iterative fashion – the SBRC research team developed deep insights into how the materials and systems that they now research and test are deployed within the construction industry. These insights will help future-proof projects ahead.

What is working even better than imagined?
The things that are hard to quantitatively assess. The aesthetics and 'feeling' of being in the building have well exceeded the SBRC team's expectations. I guess you could call it the 'spirit' of the building, attributed to a delicate combination of biophilic elements, natural light and materials, and integrated living systems.

What would you change or do differently?
Again, the building system commissioning process would be the one area worth doing a lot better if we had our time again. Changing the contractual structure to be explicit about expectations in this area, who delivers what when and who is accountable for reaching compliance. For example, we really wanted the building air leakage pressure test to be built into the process as a measure of quality and performance standards. Somehow, we just didn't get that into the contractual framework.

Does SBRC perform to the standard that ought to be required of all buildings to achieve the world's Paris Agreement targets?
Yes, but this is not a straightforward question. How do we lift the bar more broadly, incentivising positive change on lower budget buildings or buildings with less ambitious clients?

Are such buildings enough, or do we all need to do more?
We need to do more. Net zero is a good interim target but we need to also look beyond that horizon towards restorative or regenerative buildings that give back more than they take.

How far do existing standards fall short?
As net-zero energy buildings become the mainstream, the focus inevitably will move toward reducing the *embodied* energy and other impacts of our buildings. Overall lifecycle environmental impacts are not yet enshrined in our building codes and this needs to be rectified very soon. Although there are exceptions, such as the Living Building Challenge that requires carbon offsets to be purchased/generated to redress the embodied carbon in each development.

Can you see a role that built environments can play in shaping more sustainable habits in their users?
Time and time again we see the transformative impact that the SBRC building has on people. People come and are inspired. Buildings can positively and significantly shape the habits of their users … and uplift their spirit!

Professor Paul Cooper is senior professor and centre director at the Sustainable Buildings Research Centre at the University of Wollongong.

Adam Russell is an architect and partner at Saltbush Projects. He is also an ambassador for the Living Building Challenge, an assessor for Liveable Housing Australia and is Think Resilience certified at the Post Carbon Institute.

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living-future.org.au

Find Professor Cooper's UOW Big Ideas Festival presentation on Living Buildings and the SBRC on YouTube. See also a Cox Architecture project video at vimeo.com/147560006

Cal-Australia dreamin'

Addressing the realities of climate change through aspirational policy

Nermine Zahran and Anthony Brower

Dis-conditioning spaces by moving stairs outside relieves the need for heating and cooling them thus reducing operational energy. This move also creates a positive experience for building occupants by giving individual front doors for tenants occupying upper floors of office buildings. Photo courtesy Gensler

Our world is changing in a divergence of speeds. Globally, changes in our climate are swelling like a great unstoppable tidal wave as we watch open-mouthed and helpless waiting to be overtaken. Locally the population continues to flock to metropolitan centres adding strain to existing cities. Individuals respond with a groundswell of innovation while organised governments, both global and local, are slow to adapt. New technologies are emerging faster than cities can create laws and infrastructure to accommodate them. People cry out for climate resilience and survival of the human race in the absence of policy which cannot shift fast enough to slow the tide.

The time to act is now. But unfortunately, the timeline continues to widen between the pledges and actual measures countries are implementing to limit global warming.

Following three years of stabilisation, the past two years have seen global energy and industry CO2 emissions on the rise again, according to the Global Carbon Project Report. Preliminary estimates by the UNFCCC indicate that Australia's net greenhouse gas emissions in 2018 were on the rise from last year at 537 million tonnes of carbon dioxide equivalent.

Domestic policies are the critical path to transforming ambition into action and bridge the 2030 emissions gap to ensure long-term decarbonisation consistent with the Paris Agreement goals. Some say that policy is ineffective as it only fosters incremental movement. But when you need to make a significant impact, bringing up the bottom for all buildings creates more change than huge reductions for the top 1% of visionary development.

New South Wales and California (CA) are both coastal states with similar climates, to the degree that Australian locals living in California call it a home away from home. That being said, the area of NSW is about double that of California, while California's population is almost five times the population of NSW.

So, it's clear that the state of California is far more dense than NSW in terms of population. This must mean that CO2 emissions are probably higher in California, right? Wrong. The figures show that California's CO2 emissions per capita is half that of NSW.

There are numerous reasons for the increase in NSW carbon emissions, but for the sake of this article, let's focus on the construction industry. Globally, the creation, operation and alteration of the built environment is responsible for 40% of global greenhouse gas emission. This means the design industry has a huge responsibility to lead the change. There are challenges ahead, but also ample opportunities to make an impact, and while changes to the built environment are far from a silver bullet solution, *every* area of influence needs to contribute if we are going to succeed.

When it comes to green design, California's Building Energy Efficiency Standards, commonly known as CALGreen or Title-24, is a mandatory green building standard. The key word being *mandatory*. In 2008, California became the first state in the United States to include mandatory green building, performance-driven requirements in its building code. This groundbreaking step meant that every structure built in the state – whether a home, school, commercial

building or other structure – would have to meet guidelines for energy efficiency, water reduction, atmosphere positive air quality, carbon reductive building materials and more. These requirements have since expanded beyond new structures to major renovations and interior alterations. Most recently California's new Zero Net Energy (ZNE) ambitions were also amended to push boundaries even further.

Over the last decade, CALGreen has continued to raise the bar in keeping with California's commitment to reducing greenhouse gas emissions and promoting building health. The latest updates to the code will become mandatory in January 2020.

California's Energy Code, which CALGreen defers to in regard to building efficiency standards, is the strictest code of its kind. It was announced that when the current revisions become mandatory in January 2020, all new low-rise residential construction, as well as half of all new government buildings, will be required to meet ZNE requirements. The 2019 updates address this efficiency goal, which will drive the creation of perhaps the greatest concentration of energy efficient buildings on the planet.

The National Construction Code (NCC) in Australia has been recently updated, yet there is no specific reference to climate change adaptation. This is the only similarity between the NCC and CALGreen, which also excludes language specifically considered as climate actions. California has moved beyond fancy terms often heard in a call to action in favour of real and actionable measures. As the NCC provides the minimum standard for the construction and liveability of new buildings, our hope lies within the opportunity to make similar actionable provisions mandatory in the next iteration of the NCC.

LIGHTING EFFICIENCY

A comparison of lighting power density models between CA and NSW reveals that the two standards are generally similar, with each standard having more stringent lighting reduction targets in specific space types. California makes the achievement of these goals easier by restricting the use of incandescent fixtures completely in favour of compact fluorescent (CFL) and light emitting diode (LED) based fixtures.

SMART BUILDINGS

Keeping with the lighting theme, California additionally integrates operational requirements into the design of systems to encourage real-time conservation: strategies like half-off automation in irregularly used spaces and daylight responsive controls in all side-lit volumes which includes demand dimming progression. These requirements are not only in place for new work but also for alterations with a clear definition of 10% fixture or lamping replacement alterations that trigger these requirements.

FUTURE PROOFING

If this wasn't enough, municipalities go further down the trench of ingrained resilience by preparing for future code iterations. A strategy identified as load disaggregation has a current day intent to set up a process for the separation of building loads across lighting, equipment and systems. While this equates into larger electrical rooms with more panels today, future use of this segregation is to allow the city the power to turn off 15% of a commercial building's lighting in the event of impending brown-outs during high use seasons. While this seems invasive, several of our clients have implemented this in a manner that connects decorative lighting to this 'switch' so business operations remain uninterrupted. On-site renewable energy will also be a requirement in future codes as the current version of CALGreen requires wiring for future solar and dedicated rooftop space allocation.

These represent just a few of the resilience strategies baked into California building codes, and other US municipalities are looking to California as a model to follow. New groups have started to emerge like the Sustainable Development Code (SDC) whose outreach-based mission is to help 'local governments build more resilient, environmentally conscious, economically secure, and socially equitable communities'. Similar to designers, policymakers look to success stories in different municipalities to adopt and improve upon. SDC brings these various success stories together in a manner that celebrates why each strategy is imperative to support positive climate action, while delivering examples on how to do it.

So can NSW avoid planning for a future climate dystopia? The answer is an emphatic yes, but only if we start taking action now. Firstly, we need new and stronger mandatory legislative requirements for a building code that applies to *all* new buildings, major renovations and alterations. Net-positive efforts will have to be coupled with resilient design that addresses climate change outcomes, such as severe coastal flooding, more frequent and fierce storms, increasingly brutal wildfires and extreme inland drought. In other words, we're talking about design that imagines the worst-case climate disaster scenarios, in order to start enacting regulations that will set us down an alternate path that places climate resilience front and centre as our shared driving purpose.

Nermine Zahran is an architect and sustainable design leader at Gensler in Sydney. Beyond her aim to positively influence materials selection, construction methods and ongoing energy-efficient operations strategies, she also seeks to ensure that the buildings and spaces we create are human-centred and improve human health and wellbeing.

Anthony Brower is a LEED Fellow focused on Gensler's sustainable design practice, where he champions the craft of high performance and net zero energy building solutions across all of Gensler's market expertise. Anthony is a co-author of Gensler's *Impact by Design* publication, content editor of *Green Building & Design* magazine, and sits on the board of the Los Angeles Chapter's committee on the environment for the American Institute of Architects.

'So can NSW avoid planning for a future climate dystopia? The answer is an emphatic yes, but only if we start taking action now. Firstly, we need new and stronger mandatory legislative requirements for a building code that applies to all *new buildings, major renovations and alterations.'*

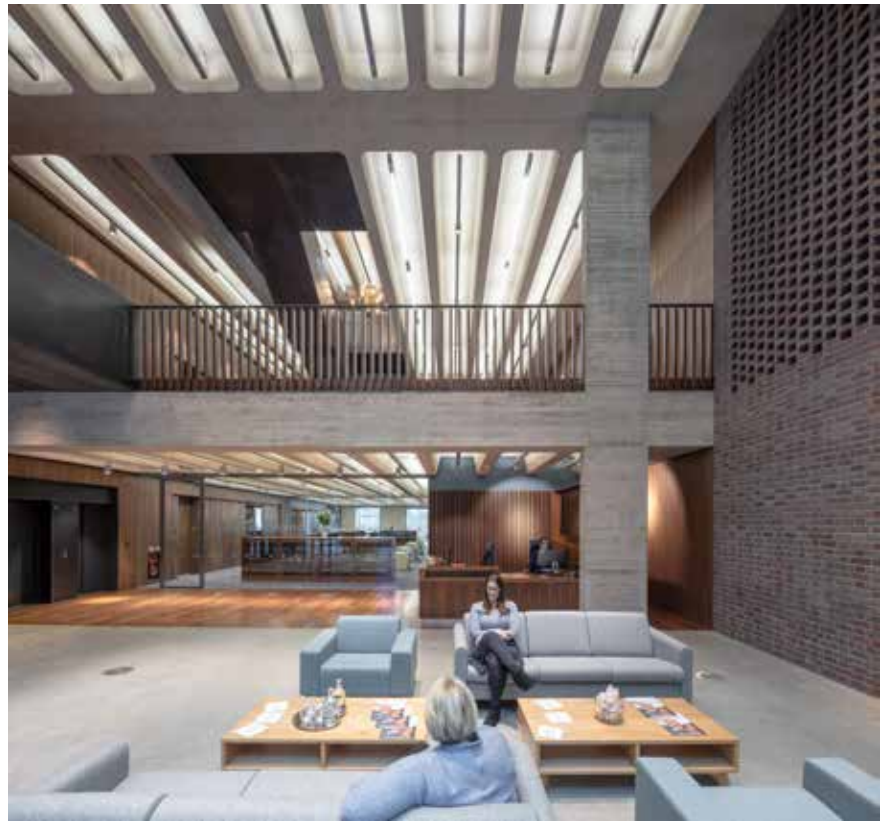
Sustainable architecture in practice

a UK perspective

Peter Fisher

The Royal College of Pathologists is an example of a new generation of 'knowledge buildings' which are helping shape the future of some of the UK's leading institutions. The new London HQ is a hybrid building reflecting the educational, social, workplace and residential uses typical of a Royal College

Photo courtesy Bennetts Associates



Environmental efficiency plays a key role in the design of Royal College of Pathologists building with exposed coffered concrete slabs used throughout the building to form part of the passive cooling strategy. By increasing the surface area of thermally active concrete, Bennetts Associates significantly improved the environmental efficiency of the building

Photo courtesy Bennetts Associates

Facebook's new London HQ will be a BREEAM 'Outstanding' office with a populated roofscape and gardens. The environmentally groundbreaking office block creates a new urban crescent and offers an expansive and highly landscaped accessible roofscape Photo courtesy Bennetts Associates

Over the last several months the Extinction Rebellion protests, the Greta (Thunberg) Effect and the BBC finally getting off the climate change fence have all combined to have a profound impact on public opinion in the UK.

Bennetts Associates has been at the vanguard of UK sustainable practice for three decades. We co-founded the UK Green Building Council and this year became the first architects in the world to have approved Science Based Targets – led by the UN, these help organisations to set meaningful and evidence based net zero carbon trajectories.

Far from sustainability being a restriction on good architecture, we think quite the opposite: sustainable architecture and good architecture are synonymous. Buildings that relate to their ambient climate and readily available resources are rooted in their locality in a profound way that isn't simply a sentimental vernacular. A concern with how local climate is tempered by a building's passive form has been central to the task of architecture for most of history. As a rule, the more complex a building's mechanical systems and associated controls are, the more energy it will use. Viewing sustainability as largely a technological issue reduces it to being something that is applied to architecture rather than something that is at the core of what architecture is. If the passive form of a building is rooted in human comfort within the prevailing ambient climate, then we are less likely to use mechanical systems.

Through a series of pioneering office projects in the late 1990s and early 2000s we developed an approach to passive design that is still pertinent. Exposing the thermal mass of the structure rather than hiding it behind suspended ceilings enabled the use of natural or low energy ventilation. Importantly the higher perceived ceiling heights, the opening windows, the thermal mass, gentle acoustics and reflected lighting resulted not only in the frugal use of energy, but also a more engaging and delightful human environment.

In additional to thermal mass, a key is keeping the sun out of buildings. Yes, even in the UK the sun can be problematic for non-domestic buildings! As a profession we still seem largely impervious to overwhelming evidence that large areas of glazing are bad.

Our recent projects have built on those early ones. Five Pancras Square at Kings Cross (which had the highest BREEAM rating in the world on completion) and the Royal College of Pathologists both use exposed thermal mass to shape the interior and deep facades to provide shade, which enable the use of passive ventilation strategies, based on fully natural or displacement techniques.

Embodied energy is becoming ever more significant as operational energy improves. Importantly, carbon emissions are avoided now rather than in the future. It is, however, a complex balance. Although concrete has a high embodied content, its impact in a building like the Royal College of Pathologists, can be offset within ten years because it enables a passive ventilation. This is through a combination of reduced operational energy and embodied energy in the services equipment. After the structure, the facade and services are roughly equal in their embodied impact.

Our recently completed project for Jaguar Land Rover has explored hybrid structures that are lighter and manufactured off site, speeding up construction and significantly reducing waste, but retaining the benefit of thermal mass by combining the use of steel, concrete and timber. Facebook's new HQ at Kings Cross explores embodied energy and biodiversity in much more depth.

Recently we have started work on a major commercial project that is using Science Based Targets to explore what net zero carbon for both operational and embodied impacts will mean. Among many things, it will involve sensible glazing ratios, a lighter-weight hybrid structure and off-site construction, as well as exemplary wellbeing, biodiversity and public realm.

Designing for sustainability continues to oblige the architect to pursue complete integration of space, structure, fabric and services. Not only do such buildings have more integrity and lower environmental footprints, but – importantly – we think it simply makes for better architecture.

Peter Fisher is a director of Bennetts Associates Architects in London and a design fellow at the Department of Architecture in Cambridge; he also sits on RIBA's Sustainable Futures Group. In addition to a series of seminal environmental buildings, he has taught, lectured and written widely on the subject of architecture and sustainability.

Thank you to Duncan Sanby for his assistance.

Rotterdam resilience

Elise Wood

Rotterdam's Benthemplein Water Plaza by De Urbanisten is the world's first large scale water square. The sunken recreation spaces also serve as a water storage facility. Since this photo, the surrounding planting has been established
Photo: Pallesh + Azarfane / courtesy De Urbanisten

Rotterdam is a city that logically shouldn't exist. Like most places in the western half of the Netherlands, the majority of Rotterdam lies below sea level. Acting as an important trade passageway between the Rhine River and the North Sea, Rotterdam rises above the elements thanks to an elaborate system of dykes, dams and floodgates. While the battle between the Dutch and water is age old, climate change is posing new challenges for the waterlogged country, forcing planners and architects to get creative in how they safeguard their city.

Rotterdammers are seemingly surrounded by water and vulnerable to a range of risks. Rising sea levels from the coast and increased river discharges from the Rhine threaten the effectiveness of the city's established system of water management. Furthermore, a changing climate is seeing more intense and prolonged periods of rainfall, increasing the frequency of urban flooding events. Conversely, the region is also experiencing longer periods of drought and soaring temperatures during summer. The challenge for planners is no longer to simply get rid of the water in Rotterdam. Today, the city must act to embed water within the urban fabric so that it may be stored and discharged efficiently, and utilised as a defence to heat stress.

Since 2008, the city government of Rotterdam has led an ambitious climate-proof program focused on adaptation to address these challenges. At the core of the city's approach has been a commitment to add value to urban life, beginning with what it calls 'no regret' measures. These measures take advantage of urban development, renewal and maintenance activities, incorporating adaptation actions while providing a public good. A stunning example is Rotterdam's Benthemplein Water Plaza – the world's first large scale water square.

Previously a concrete block, Benthemplein has been transformed into a multifunctional recreation space with a combined water storage facility. When the weather is dry, students at the adjacent college, as well as the general public, can make use of landscaped basins designed for basketball, skating and passive play. During heavy rainfall, these basins retain stormwater from the square and surrounding rooftops, providing essential drainage infrastructure.

Benthemplein Water Plaza is but one facet of a larger vision by urban research and architecture firm De Urbanisten to co-create Rotterdam's first climate-proof district. Situated in the district of Zomerhofkwartier – ZOHO for short – the architects have partnered with the city government, residents and businesses, as well as other design firms to retrofit one of Rotterdam's heat and flooding hotspots. To date hard surfaced public spaces, parking spots and roofs have been turned into raingardens, contributing to the project goal of 11,500 m^2 of newly planted green infrastructure. Over 100 water barrels lie

Bobbing Forest (architect Mothership, Jeroen Everaert) and the Floating Pavilion (Deltasync / Public Domain Architecten) in downtown Rotterdam Photo: Elise Wood

camouflaged throughout the district, including within ZOHO's iconic namesake sculpture. Rotterdam has even managed to create its own 'highline', making use of a former goods railway for a public park, events space and garden.

Projects like ZOHO not only demonstrate adaptation concepts, but also show the co-benefits of climate action to the public and build support for more daring projects. Currently, Rotterdam is experimenting with prototypes of floating architecture to take advantage of 'waterfront development' opportunities. Along with a floating pavilion and forest downtown, a floating dairy farm is in operation on the city's harbour.

With established expertise in hydraulic engineering and demonstrated ability to marry technical solutions and improved public outcomes, many cities now call upon Rotterdam to assist with their own adaptation solutions. In fact, climate adaptation services are becoming an important export sector for Rotterdam. As outlined in *Rotterdam Resilience Strategy*: '[the city's] watersquares, underground carparks with huge rain retention basins, multifunctional dykes and floating constructions are often profiled in international press and in the aftermath of Hurricane Katrina in New Orleans and Hurricane Sandy in New York, this experience has attracted millions of dollars of revenue for Rotterdam based companies.' The city is active in supporting these opportunities, setting up the Rotterdam Centre for Resilient Delta Cities in partnership with local businesses, and hosting the C40's first Adaptation Academy.

There are many lessons to be learnt in Rotterdam's approach to climate adaptation and success in scaling up urban resilience activities. It can be difficult to gain support for adaptation measures owing to the long timeframes of climate change impacts. The likes of rising sea levels and temperatures seem remote, pushing adaptation investment down the priority list. However, the case of Rotterdam illustrates the essential ingredients for sustained action: a deep understanding of the challenges that lie ahead and an opportunistic approach to intervention that provides improved public amenity in the short term and delivers urban resilience in the long term.

Elise Wood is an urban policy and planning adviser. Her research was supported by the Westpac Scholars Trust.

Should we lose hope? Optimistic Dutch ideas for a post-fossil fuel landscape

Jamileh Jahangiri

A modern sustainable neighbourhood in Almere, The Netherlands

Photo: Pavlo Glazkov / stock.adobe.com

Earlier this year, New South Wales welcomed Dutch landscape architect and planner Dirk Sijmons from H+N+S Landscape Architects. Addressing an audience of Sydney-based landscape architects and designers, the author of *Landscape and Energy, Designing Transition* presented works including design options and choices for the post-fossil fuel landscape. In doing so, Sijmons demonstrated how far-reaching the energy transition from fossil fuels – such as oil, coal and gas – to an energy supply largely fed by renewable energy sources could be. Researchers from H+N+S have successfully identified the sustainability proposal from the largest to the smallest areas of the Netherlands. Many of their research-based projects are visible, tangible and ecologically and economically convincing. One such project is *Climate measures for a liveable landscape*.

H+N+S alongside five other major Dutch parties (industry, built environment, mobility, electricity and agriculture and land-use) reported a vision for the 3.5 mt reduction of CO2 emissions from the agriculture and land-use sector for 2030. The report emphasised that energy measures should envision the cut of 1 mt from the greenhouse horticulture and fuels (for the tractors and power tools) and 2.5 mt from non-energy related measures (such as smarter land-use, anti-methane emissions livestock farming and forest expansion).

After identifying how the proposed measures will visibly change the landscape, the H+N+S team instruct where it is most beneficial and effective to place the measures in four typical Dutch landscapes: sand, clay, peat and urban. This area-oriented approach also provides an opportunity to map the climate issue with other social objectives. Climate measures in land-use can act as a lever to facilitate other spatial processes, and by coupling with other processes it can also make climate measures more flexible and cheaper. The proposal reviews the relationship between land-use and climate in global scale, European scale and a national scale to get a feel for the scope of the issue, to position the highly productive Dutch agriculture and to investigate the spatial impact of the measures respectively.

Through major studies, the report demonstrates the role of agriculture and land-use at a global level in the production of greenhouse gases. Using detailed diagrams, they showcased the enormous role of land-use changes such as deforestation, dewatering peat and other reclamations. It highlights the human appropriation of net primary production of our biosphere (land and ocean) that is appropriated by humanity. In summary, 95% of the weight of all land mammals consists of humans and their domesticated animals and only 5% remains for the wild mammals such as elephants, lions, tigers, rats, mice, giraffes and wolves. This emphasises why the switch to more vegetable protein is critical.

On a national level, by using an area perspective through the system sections of the four typical Dutch landscapes, H+N+S distinguished the main pillars of climate agreement yielded by the Netherlands working group between two measures. These include generic measures (such as a frontrunner's scheme for greenhouse horticulture, or reducing food waste from limiting methane emissions in manure storage) and site-specific measures (such as adjusting crop rotations in arable lands, phasing out of the climate adaptation of the Natuurnetwerk Nederland or adjusting summer levels in peat meadow areas). Once implemented, they can give a welcome boost to other, sometimes difficult, area processes by linking it with other interests.

Their report states that although assigning the technical generic measures are feasible, a 95% reduction in 2050 cannot be achieved without more emphasis on place-specific measures, often complicated because multiple interests and parties are affected or served. This should be done through processes that can provide tailormade solutions for each type of landscape and a beckoning perspective for local parties to get started. This perspective must bridge climate measures to other tasks and revenue models for involved parties.

Australia relies heavily on traditional energy sources including coal and natural gas; the transition from fossil fuels to renewable energy is not simple. According to Adopt NSW, 13% of all NSW carbon emissions in 2013/14 were from agricultural emissions. The H+N+S design team suggests that land-use and agriculture have a direct relationship with the climate problem through both energy transition and the literal inhalation and exhalation of the cultural landscape and the metabolic processes of human domesticated animals. The peat drainage and its oxidation is a well-known example.

We shouldn't lose hope as these carbon-conquering efforts can be achieved here in Australia and especially in NSW. What is needed to make this feasible is to follow the whole process of Dutch landscape architects like H+N+S, in their collaboration and connection with the spatial experts from different sectors. They believe this will further reduce the emission of greenhouse gases and make optimal use of the potential for capturing carbon in soils, plants and forests. The importance of sustainability in regional and city planning is a universal and cultural challenge that affects everyone. As architects, landscape designers and planners, we need to stay optimistic and must rethink sustainability at local levels with the help of cross disciplines. The Dutch are replicating these research ideas. Why not us?

Jamileh Jahangiri is a registered architect and sessional academic, and works at Cox Architecture (predominantly in public architecture). In 2018 she received the NSW Chapter's David Lindner Research Prize to explore the passive security around schools.

The author used text descriptions from the H+N+S 'Climate measures for a liveable landscape' project webpage: hnsland.nl/en/projects/climate-measures-liveable-landscape

'95% of the weight of all land mammals consists of humans and their domesticated animals and only 5% remains for the wild mammals such as elephants, lions, tigers, rats, mice, giraffes and wolves. This emphasises why the switch to more vegetable protein is critical.'

The fundamental issue of sustainable school design

Jayne Harrison

Ysgol Trimsaran (a school in Wales designed by Architype) used a locally sourced timber frame construction. It is Passivhaus certified and the first year of post-occupancy monitoring showed Ysgol Trimsaran to be using less than half of the primary energy of a comparison school designed to meet building regulations only Photo: Phil Boorman for Architype

The current NSW government's commitment to rebuilding and refurbishing schools across the state presents an extraordinary opportunity to improve how and where our children learn. While the $6bn investment is great news for New South Wales, who is paying attention to the impact of this massive infrastructure rollout on our environment?

In 2018, the Government Architect NSW published the *Environmental Design in Schools* manual emphasising the critical importance of good environmental design. This design manual aims to 'provide school principals and school communities with a holistic understanding of environmental design. It presents strategies for passive design as opportunities for making positive, sustainable change in the building or running of a school.' While this initiative is successful in shining a spotlight on sustainability in schools, it focuses primarily on the universal principles of environmental design and gives pointers for reducing direct emissions from buildings once built.

It is easy to convince ourselves that we are doing a good job when sustainable design principles and practices are visible in our new and existing school buildings. We can see and measure the impact of solar panels, thermal efficiency and rainwater tanks. But are these more obvious solutions fooling us into thinking we are really making a difference, and is it blinding us to the real issues and the real impact of infrastructure roll out?

It is an underestimated fact that the highest percentage of emissions is created in the construction of buildings, *not* in running them. The built environment in Australia accounts for 25% of our country's CO2 emissions; emissions during construction are responsible for anywhere between 10% and 97% of the whole of building lifecycle.

TACKLING THE ISSUE HEAD ON

The benefits of refocusing our attention on reducing embodied emissions when building and refurbishing schools are twofold. Firstly, tackling embodied emissions is not dependent on ongoing building user behaviour; in schools it is dependent on the overloaded teaching and leadership team.

Secondly, savings made during the design and construction stage are delivered today, and so this is more impactful. Data shows that a kilogram of CO2 saved over the next five years has a far greater environmental value than a kilogram saved in 10 or more years' time.

BUSTING THE DOLLAR MYTH

How often do we hear that building sustainably is expensive? Or worse, that sustainable design measures included in a project are the first to be abandoned under the guise of 'value engineering'. In the UK, the government and construction industry have joined forces with the aim to not only halve emissions in the built environment over the next eight years, but also to *reduce the cost of construction* by one third by 2025. This flagship deal will see the government invest £170m (A$324m) over three years, with £250m (A$476m) coming from industry, to commercialise technologies capable of building energy-efficient, cost-effective public buildings and infrastructure. This forward-thinking approach and real commitment to industry-wide creativity has led to real gains in the reduction of emissions and also to new business opportunities for further reducing impact and cost, and for creating differentiation.

SCHOOLS AS EXEMPLAR SUSTAINABLE BUILDINGS

A school building is arguably the largest and most visible physical artifact of school sustainability, and as such serves as a measure of our commitment to protecting the environment for our children. It is for all of us – whether we are architects, policy makers, project or delivery managers – to *pay* more than just lip service in creating sustainable school environments for our children. Systems and professionals need to start promoting, actioning and delivering sustainable design in a way that those paying for school building projects understand its value.

SO WHAT CAN ARCHITECTS DO?

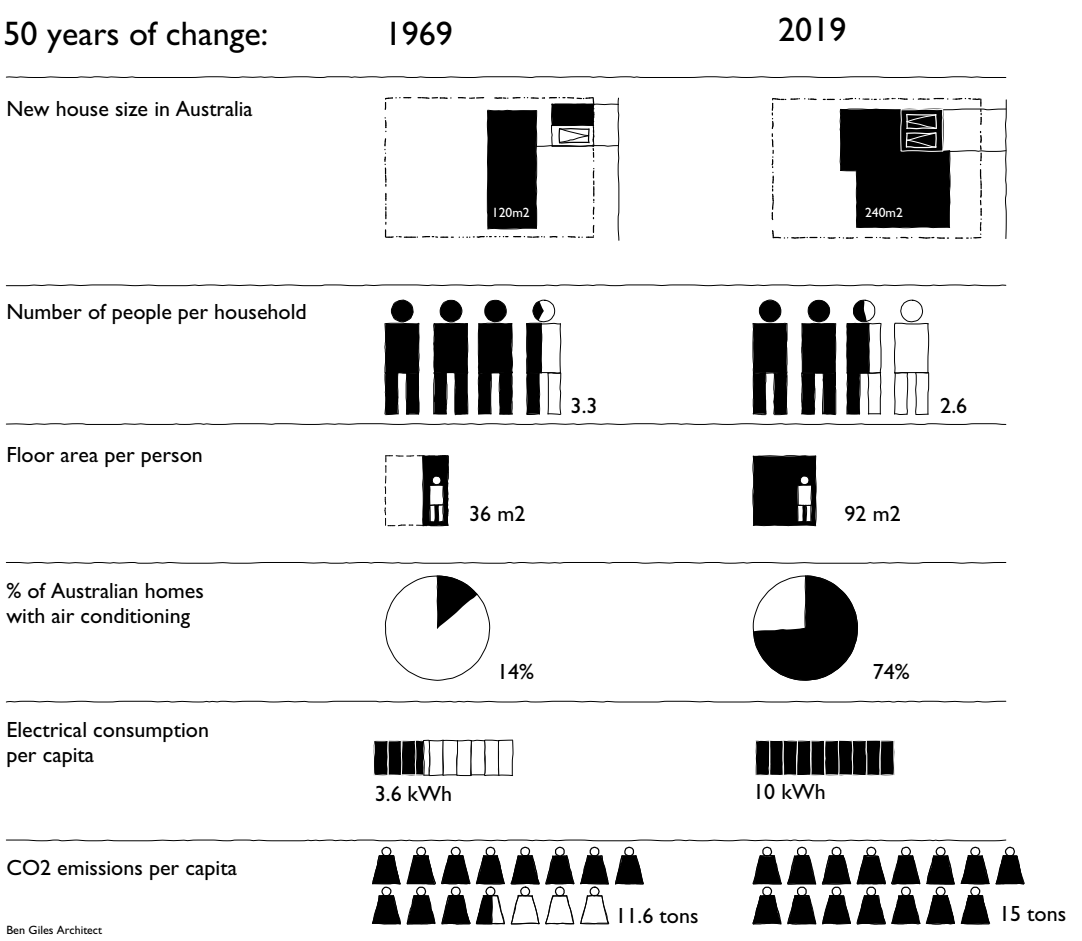
As a profession architects must be frontrunners in driving change. Good cost effective and environmentally sound design can be the catalyst that inspires change. We need to demonstrate the business case for reducing embodied carbon and the cost advantage as well as the benefit to the environment. Architects, the Institute, publications and architecture schools should all promote exemplar projects that quash the perception that considering embodied carbon adds cost and complexity to a project.

Finally, we need to promote better education and knowledge sharing, and engage with government and industry to action ideas that drive innovative outcomes for protecting the environment we seek to leave for our children. Winston Churchill once said, 'We shape our buildings; thereafter they shape us'. But he also said, 'It is no use saying, "We are doing our best". You have to succeed in doing what is necessary.' The protection of the environment – with the importance of school buildings leading the way – is all our responsibility.

Jayne Harrison is the principal and founder of JDH Architects, the award-winning Sydney based practice that creates innovative contemporary learning environments. She has over two decades' experience of designing 150+ educational projects.

Advocating for smaller homes

Ben Giles



Changes in Australian homes in the last 50 years Diagram: Ben Giles

'And we need lots of storage. For all our stuff.' Typically concluding the shopping list of rooms of the residential architect's brief, cupboards and storerooms are the go-to feature. The result is a contributing factor to new Australian houses being, notoriously, the world's largest. Yay, us!

While architects bemoan the low-density undesigned sprawl of outer suburbia, the inner-ring suburbs, which remain the residential architect's bread and butter, are where we must take responsibility. It is here in the archiporn world of home magazines and Instagram likes, that our large and pretty houses are championed. All too often these houses are the result of architects pandering to aspirational clients with inflated and uninformed briefs. And so our suburbs are loaded with blinged-up trophy homes with single-use spaces like rumpus rooms and home theatres, and ensuites for everyone. Notwithstanding that they may have a rainwater tank and a few solar panels on the roof. We have – and continue to design – houses with a huge amount of embodied energy in materials. Houses with high heating and cooling energy loads. And houses with heavy maintenance requirements demanding to be filled with stuff.

Thoreau asked, 'How much house do you really need?' And the answer for new houses in Australia seems to be 240 m^2. With an ever-diminishing average of 2.6 people per dwelling, this gives each of us 90 m^2 of personal space to wallow in.

It's time for a bit of body shaming because it doesn't have to be this way and can't continue if architects are to play our role in reducing carbon emissions. As a profession we have the knowledge and skills to transform briefs and design innovative solutions that create more with less. Our role as leaders in the built environment is to push back on these fat houses and show a leaner, better way via smaller, compact and well-arranged flexible spaces.

At the regulatory level, NSW has seen a number of positive moves over the last decade with the introduction of the Affordable Rental Housing SEPP, enabling secondary dwellings on residential lots. More recently, and despite NIMBY opposition, the introduction of the Low Rise Medium Density Housing Code will shortly see our suburbs densify further with a fast track process for terrace houses, dual occupancies and manor homes. This continuing diversity of the state's housing stock will be a positive move for affordability and sustainability. But there is work to be done. The NSW Housing Code currently permits enormous maximum house (GFA) sizes. For example, a house on a 600 m^2 block can have a floor area of 335 m^2 (big enough for you?) approved via a Complying Development Certificate. While the streamlining of the approval process has been welcome, perhaps these maximum house sizes – catering to the volume home market – can be further reviewed downwards in the interest of reduction.

At an organic level, garages are being affordably converted to granny flats as cars are relegated to – dare we say it – driveways and even to the street. From within the profession, advocates such as Rory Hyde speculate on what Robin Boyd and his *Small Homes Services* might do in these times. Hyde suggests a revised *Small Homes Adaptability Service* that puts architects front and centre in the adaptation of existing suburban housing stock to encourage diversity and flexibility. Elsewhere, the Other Architects office and others propose hypothetical suburban housing models, while the Nightingale model innovates procurement methods for the design and development of apartment buildings.

Then there's the Tiny House movement, which has taken the small dwelling to an extreme and then to a fetish. It has provided a useful point to examine the basic requirements for a house, albeit for tree-changers. The showcased examples are often located in remote rural locations requiring car access and therefore their relevance to wider acceptance in metropolitan areas is questionable. The much-published smaller houses of Japan and Europe may offer better models for our consideration.

The game has changed and the challenge for architects is to embrace and lead. It is not good enough to design oversized, carbon-emitting houses in pursuit of chunky fees and shallow awards. If we continue to do so, are we any better than those supporting coalmines for jobs in regional communities?

Ben Giles is an architect and writer. In 2019 he was admitted as a Fellow to the Australian Institute of Architects.

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Drumkerin – it's not just about the house

Mahalath Halperin

Drumkerin is an eco house project by Mahalath Halperin Architects. It won the Single Dwelling (New) Award at the 2018 Architecture & Design Sustainability Awards

There was a time when solar hot water and PVs on the roof deemed a home innovative and very green. Passive solar design and double glazing were considered leading edge and good examples were hard to find. We have now moved far beyond that in our knowledge and capacity for designing passive solar, energy efficient and environmentally friendly houses. As architects we have the ability (and responsibility) to design better. With rising emissions and a changing climate, it is essential that proactive sustainable architecture becomes the norm as a contribution to reducing our carbon footprint.

But it's not just about the house. Examples of responsible building need to be much more than that to have a significant impact on our collective carbon footprint. It's not just about good design or the right materials and systems. It's also about living, behaviour, locality, community inclusiveness.

We recently designed and completed Drumkerin, our home-office in Armidale, with many of the above elements. Yes, it faces true north and has good zoning, lots of insulation, thermal mass and double glazing. But it also has a large component of recycled and upcycled content. It incorporates innovative materials such as PCM (phase change materials) and low tech solutions such as nil-energy evaporative cooling.

But again, it's not just about the house. It aimed to be an example of low carbon, minimal footprint, community-embracing living in a regional city. During the design process, a holistic approach to all decision-making influenced the choices throughout the project (as architect and client), balancing each eco-initiative against a set of criteria:

1. practical – would it be possible, would it work, would it last?
2. sensible – was it worth the effort, does it balance with other ideas or negate other benefits?
3. aesthetic – does it look good, does it complement the rest of the house?
4. financial – is it affordable, is it cost effective, what is its payback and would its benefits last?

The answers to these questions have proved true in the completed project with a significant reduction in our carbon footprint, while being an exemplar for others.

The house sits on a subdivided block near the centre of the city, retaining the 1920s house at the front, with sympathetic and appropriate development behind – and maximising already existing urban infrastructure. As part of infill development, a precedent was fought for – and agreed to with the local council – to retain all stormwater and roofwater on site. To have connected to the council's drainage system 100 metres away would have been cost prohibitive and halted the project. Instead, we created a total storage capacity of 50 kL, allowing us to water the extensive permaculture-based garden despite level 5 water restrictions (ironically not even on the agenda at the time). But the tank design was, like most decisions in this project, multifaceted. We wanted to keep as much water as possible for the garden. The house straddles an old tennis court, so is partly at ground level, then continues over the tennis court with 38 kL water tank storage beneath. On hot days, with only a high clerestory window

open, cool air is pulled across the tank from screened openings on the south-east corner though a vent in the tank/hallway junction – evaporative cooling by default.

So as well as achieving this for this specific project, future infill development might also be able to proceed on a similar basis. This project has added to the overall development opportunities of the city in a practical way.

The house itself, while only rated as 6.2 by NatHERS, is performing well beyond the predictions, despite increasingly hot summers. The challenge is to design for future weather changes, even if it means a less efficient house in the short term. Monitoring of energy and temperature shows that for up to nine months of the year, the house is in fact 10-star performance – with no energy required to heat or cool, even with constant low-to-mid 30s in summer. For the shorter winter months (with sub-zero temperatures) figures indicate up to 9.5-star performance. Through the use of CatchPower software, we know exactly how much energy is being used to heat the home. Designed to divert excess PV power to hot water systems rather than the grid, this was a first-time use to divert the energy to a heatbank instead – effectively storing excess energy as heat. But even adding this energy into the calculations, the house is still well below predicted energy usage.

Part of the reason may be the software's inability to recognise innovative materials such as the PCM, which provides a diurnal cycle of heat gain and release much faster than the lag times of conventional thermal mass. Or the inclusion of an attached glasshouse which directs warmed air into the house on sunny winter days. And, of course, behaviour (air locks and double glazing are only effective if closed in cold weather or opened for warm weather).

During construction, there was a conscious choice to prioritise local trades and materials to support the local community. Although it doesn't always reduce the mileage on transport – as many materials and items still need to come from elsewhere – the support then spreads to regional, state and national, ahead of global. It's all part of the bigger picture.

A high component of sustainable, recycled and upcycled material was essential to improve the embodied energy of the building. While there are now many off-the-shelf products available, they won't necessarily be used unless architects specify the right product to ensure the right content. Knauf plasterboard and insulation, Urbanline decking (wheelie-bin offcuts and sawdust), recycled fly-ash, Weathertex cladding, secondhand bricks – these are the easy ones.

Furthermore, we incorporated reconfigured bookcases and extensive use of timber offcuts; hardwood parquetry seconds for benchtops; a hoop pine ceiling removed from the demolished garage reinvented in the bedroom; old gas brackets rewired for wall lighting; and even the toilet door from a demolished garage was made larger as a new front door. We've used secondhand cupboard handles, doors, a basin, glazing and other items that look good as new. Non-standard processes used included Arcpanel self-supporting roofing and installing thermal breaks between slabs and supporting walls, and to external slabs.

More inventive materials also included the use of four 1860s ironbark columns found in a secondhand store; metal screens (left over after machinery is punched out) to create the glasshouse wall and a front screen door; secondhand balustrade glazing for the glasshouse roof and the kitchen splashback; used pallet racking as the bones of the walk-in-robe, with Ikea seconds for doors and drawers; and a sulky wheel converted into a light fitting.

This all adds to reducing the embodied energy and depletion of resources required for the build. But again, is that enough for a well-designed, energy efficient, low demand, sustainable house? Even the most efficient machine can still be operated badly – and the most sustainable building can still be occupied 'badly'. Appropriate behaviour is essential to the success in reducing the building's impact during occupation post construction. By providing well-designed comfort, ample natural light and fresh air, energy demand is reduced, but it still relies on good behaviour to maximise the benefits.

Many aspects of how the house was built and its location and use take its sustainability a step further. Staying close to the city, we can still walk to most places rather than use a car. Instead of including a third (and hardly-used) bedroom, there is a gate in the fence to the nearby motel. The vegetable garden and food forest feed us; reduce our food miles; provide excess for the farmers' market or to swap; and bring over 40 different birds to the garden.

Despite generating excess power with the PVs, the decision to stay connected to the grid is in anticipation of future peer-to-peer trading and a possible community grid. Involvement in house and garden tours also enables us to share the ideas with the broader community.

It's not hard to design, build and live in responsible housing, and at no more cost than much of what's being built. But it's the bigger picture that's making this project more than just a good house. As a winner of the 2018 Architecture & Design Sustainability Awards (for a new single dwelling), the judges commented:

> 'Ticking all the boxes in a sustainable building is – thankfully – increasingly common. Buildings that are restorative, contributing to restoring a functioning environment, are rarer. Really uncommon are restorative buildings that are both funky, biophilic and very human. Drumkerin is all those things.'

As an eco architect, I aspire to set a good example. As well as being a pleasure to live and work in, Drumkerin has also achieved this for myself and my practice. The intent was to downsize, but in so doing we have provided Armidale with an example of a better solution to current building trends. While there's no silver bullet – every client, site, house is different – it provides an array of ideas and options for creating a successful eco home.

Mahalath Halperin is an environmental architect who provides a sustainable and holistic approach to her services in Armidale. In the past she has been the chair of the Australian Solar Energy Society, vice president of the International Solar Energy Society and chair of NSW Chapter's Country Division; Mahlath is currently the director of the Australian Building Sustainability Association.

Natural building materials for carbon-conscious design

Bec Evans

Constructing the exterior straw bale walls of house in California Photo: Edward Caldwell / courtesy Arkin Tilt

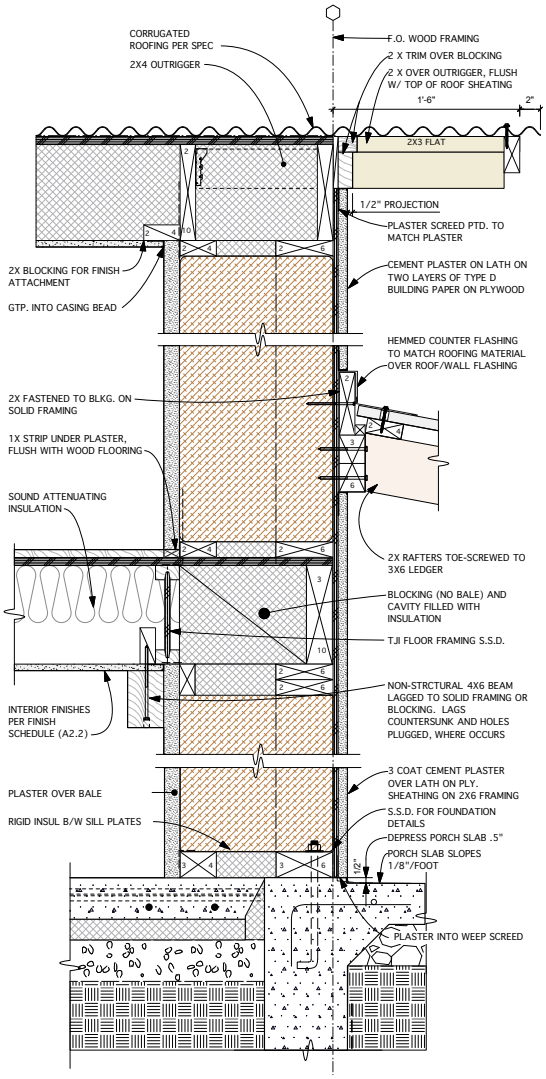
Northern California has a historic place in the counterculture movement, and with this a widespread culture of sustainably minded alternative living communities. This has made the use of natural building techniques more common in the region and helped drive their contemporary push as a strategy to mitigate the carbon footprint of construction. I am currently living in Berkeley, California, where I work at Arkin Tilt Architects, but grew up in NSW where I studied and worked in Newcastle and Sydney.

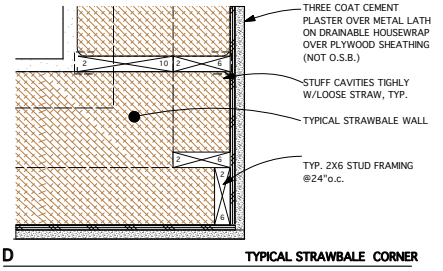
Through Anni Tilt and David Arkin, principals of Arkin Tilt, I was introduced to groups like the California Straw Building Association (CASBA) and became more aware of the work numerous architects, engineers and builders are doing to enable the use of natural building methods within the mainstream sector. The work includes writing books and drafting building codes for methods like straw bale, natural plaster, hempcrete, light straw clay, cob, wood, earthbag, earthen floor, compressed earth block and rammed earth. This has been spurred by a growing understanding that a number of these methods have a carbon storing potential, particularly the plant-based systems when grown with regenerative land management practices.

Most of the buildings I have worked on at Arkin Tilt use a straw bale wall system to take advantage of the environmental benefits; it is the byproduct of a food crop and able to sequester carbon in the straw, the soil and lime plaster. The choice is also driven by architectural intent and the numerous possibilities afforded by the various natural building systems – the expressive nature of rammed earth being more commonly known. Straw bale offers the spatial opportunities of a deep wall, with the ability to inhabit this depth and consider how light might interact across it and through openings. The different types of natural plasters (lime and clay) offer a range of colours and rich textures. This combination of straw and plaster provides an insulated wall lined with thermal mass to assist passive thermal strategies. Proper detailing of this wall, including good overhangs, a permeable lining, well-detailed openings and a reasonable distance above grade, will give it a long life.

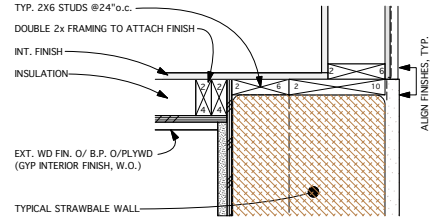
A reduction in the carbon impacts of the architecture industry requires reducing the life cycle impacts of material systems and their production. Despite getting better at reducing the operational energy and emissions of a building, we are still generally not accounting for the global warming potential of the materials themselves. Over the next 10 years, the emissions from the manufacturing of materials and construction of a new building are going to be much higher than those from its use. We need to move towards designing energy-efficient buildings from low carbon emitting or carbon sequestering materials to effectively confront climate change.

Working to enable accessibility of natural building systems and using them in projects are ways to assist with

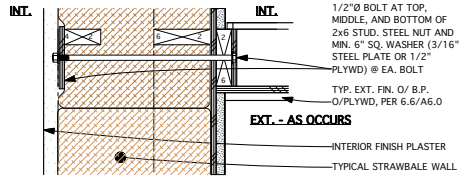




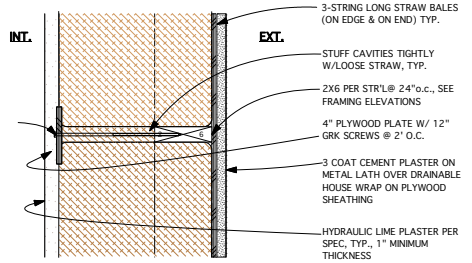
D **TYPICAL STRAWBALE CORNER**



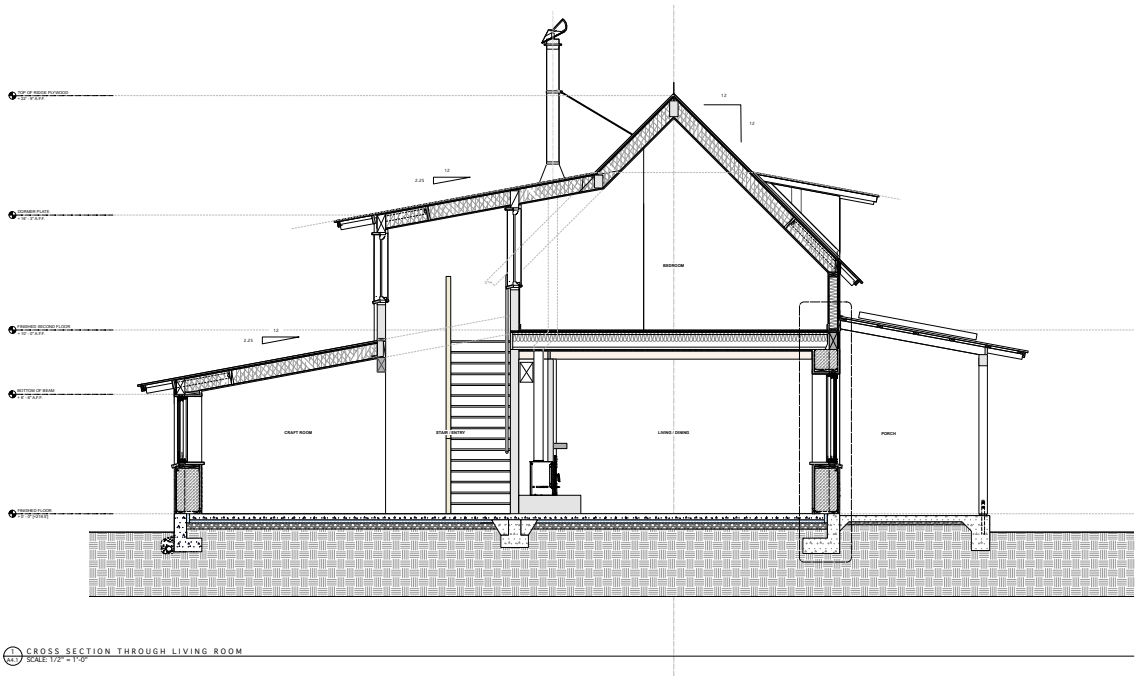
C **2X WALL TO STRAWBALE WALL IN PLAN**



B **2X WALL TO STRAWBALE WALL W/O TJI**



A **TYP. STRAWBALE WALL - PLAN**



1 CROSS SECTION THROUGH LIVING ROOM
SCALE: 1/2" = 1'-0"

Construction section and details for a straw bale house in Martinez, California. It has an exterior straw bale wall within a typical Californian stud frame, designed to be more intuitive to conventional builders. Compared to NSW, the details show additional plywood and mechanical connections to account for significant seismic loads Courtesy Arkin Tilt

this shift, and the changes starting to happen in California demonstrate a pathway. One strategy is to integrate alternative methods within the building systems that practices, consultants, governing agencies and builders are already used to working with. There are numerous technical publications available on the various systems to help with this switch, the CASBA *Straw Bale Building Details* being a great start for straw bale. Although California-centric, it covers broad strategies and detailing principles to successfully design with straw bale in a climate with many parallels.

The project illustrated on the previous page is a hybrid system. It has an exterior straw bale wall within a reasonably typical Californian stud frame, designed to be more intuitive to conventional builders. Compared to NSW, the details show additional plywood and mechanical connections to account for significant seismic loads. In this system, plaster protects the bales from moisture, fire and wear, but there are other systems where the plaster is installed over a mesh and this is capable of transferring the shear loads. Installing the bales into the framing can be time consuming, but it's low skilled and low risk work. After the framing and roof were up, the owners of this house had a bale-raising work party where we assisted their friends and family to place the bales on a Sunday. Giving people the opportunity to work on their own buildings and understand what they're made from is a generous benefit to a number of these systems.

One of the main hurdles to mainstream adoption is demonstrating compliance with building codes and government bodies. Generally these systems don't have the financial backing that other products have to navigate this process. For natural building materials in California, this leadership tends to have been done by volunteer-led collectives of engineers, architects and builders, in partnership with university research facilities.

In the US, the work of CASBA has successfully made building with straw bales relatively straightforward. There's an appendix in the International Residential Code, which is the foundation of most US state/county building codes. This was derived from various regional codes in the 1990s and required further fire, structural and thermal testing, as well as the drafting and defense of the code at the IRC code hearings. It carried the intention of legitimising straw bale building and enabling other natural building methods to follow suit.

Anthony Dente, an engineer with whom Arkin Tilt share an office, is part of the Cob Research Institute who have partnered with Santa Clara University and are following this path of testing and code drafting for the building system of Cob. In the US, building materials that are not explicitly included in the codes have a pathway to approval, but this relies on more academic engineering principles and each individual project negotiating with its respective governing agency. This puts an expensive and sometimes prohibitive burden on individual projects. The goal is for professionals to be able to design with any quality system. It's widely believed that many of the natural building systems are capable of meeting code requirements, but the work to prove this and determine safety guidelines needs to occur.

The primary relevance of this work to NSW is recognition of the value that natural building methods have in mitigating the carbon emissions that derive from architecture. It's evident that architects can work with others already in the natural building industry, helping as advocates to identify and overcome the legislative hurdles to more widespread use. Architects can also work to incorporate these materials, where appropriate, demonstrating their potential to others while supporting to build capacity in the building industry.

Bec Evans is a project manager at Arkin Tilt and graduated with a MArch from the University of Newcastle. She worked with Jeffrey Broadfield and Peter Cummings on Richard Leplastrier's Salbinda house before moving to California to attend the College of the Redwood's fine woodworking program.

The interior of a finished straw bale house Photo: Edward Caldwell / courtesy Arkin Tilt

Built heritage and the impacts of climate change

Jennifer Preston

In the past decade or so, there has been significant research undertaken both in Australia and overseas on climate change in relation to built heritage. In Australia, 2007 saw a symposium and public forum on climate change and cultural heritage together with the Australia ICOMOS conference in Cairns and a subsequent issue of *Historic Environment* (Vol 21, 2008) was devoted to the topic. In 2009, the Australian government undertook a preliminary assessment of the *Implications of Climate Change for Australia's World Heritage Properties*. In 2010, the NSW Office of Environment and Heritage published the report *Observed Changes in New South Wales Climate*, which presented research from peer-reviewed scientific papers and sources such as CSIRO and the Bureau of Meteorology.

Elsewhere, an international workshop entitled *World Heritage and Climate Change* was held in Germany in 2017 and an ICOMOS working group on climate change and heritage was established. So, a substantial body of research has been done and is all available online with a simple search. We now need to move to real world practical measures to protect our built heritage from the impacts of climate change.

The NSW Office of Environment and Heritage noted that the state's average temperatures have been rising since the 1960s, with the decade from 2008 to 2017 being the hottest. Its 2010 report, referred to above, summarised the observed effects on climate changes: annual increases in extreme fire danger days, prolonged and more severe droughts, changes in wildlife behaviour, decreases in mid-spring alpine snow depth, rising sea levels and increases in surface temperature and acidity.

Note that these are observed changes; they have already happened and are continuing to do so. While some of the changes such as those in wildlife behaviour or reduced spring snow depths may have minimal effect on our built heritage, other changes – increased risk of bushfire, rising sea levels, storm surges, flooding, hail storms and severe winds – can potentially have a severe impact.

Sea level rises and storm surges cause erosion and inundation resulting in damage or even destruction of coastal heritage sites. Places with a direct relationship to the sea and those along rivers and other inland water courses are particularly vulnerable, but even inland areas can be effected.

Extreme weather events may also cause increased storm intensity, flash flooding and hailstorms to which poorly maintained heritage buildings – those with unprotected glazing or with fragile roof cladding – will be vulnerable. Increased rainfall combined with higher temperatures exacerbates the effects of biological attack by fungi and mildew on timber structures.

Periods of hotter and drier conditions lead to a heightened bushfire risk with the associated danger of loss of heritage sites. Increasing extremes in temperature are already leading to air conditioning and other climate mitigation measures being introduced to heritage fabric. Although it is undoubtedly also related to current society's expectations and the extra heat output of our technology, we are seeing buildings that have been climatically acceptable for 180 years now requiring air conditioning. So how can we mitigate the effects of climate change on our heritage buildings?

A good first step would be to include an assessment of the likely impacts of climate change on individual buildings and sites when undertaking a conservation management plan, assessing them for risks of bushfire, rising sea levels, storm surge, flooding and hail or wind damage.

For areas that are predicted to become affected by increased sea levels and the effects of storm surges, water-tight barriers and breakwaters may need to be considered. This is not new technology; several companies in Australia manufacture a variety of flood barriers – including fixed, demountable and retractable – and are now being used by several councils to provide river access while maintaining the security of towns from flood waters.

For highly valued built heritage located within bushfire prone areas, the current practices of hazard reduction may not be sufficient and the creation of external sprinkler systems that drench the outside of the building when a fire threat is present should be considered.

In managing any change to protect a heritage asset from the impacts of climate change, it is also necessary to consider how much adaption and what sort of adaptive measures are acceptable before loss of heritage value occurs and concepts of authenticity and integrity are affected.

Despite the identification of heritage at risk and adaptation and mitigation measures being put in place for some sites, it is likely that we will lose some of our built cultural heritage as a result of climate change. If we cannot prevent loss, despite our best efforts, how can we mitigate the impacts of the loss? The first place to start must be the accurate recording of heritage structures, particularly those at high risk. Digital 3D recording, virtual reality simulations and video recording are all worth investigating.

Of course there is no one-size-fits-all answer but with a suite of solutions available to us, we can put measures in place to help protect our built heritage from the impacts of climate change, so that the buildings from the past that we value today can be passed on to future generations.

Dr Jennifer Preston is the chair of the NSW Chapter heritage committee.

Functionally graded ‘non-standard architecture’

Melika Aljukic

The gift of différance is technological.
– Bernard Stiegler, *Technics and Time*

Rethinking the tool in architecture, developments in ‘non-standard architecture’ have currently focused on the integration of geometry, structural efficiency and optimisation to produce non-standard forms using computational and robotic mechanisms, notably in the innovation of structurally optimised functionally graded concrete. Functional grading of materials is a technique where a continuous variability is implemented in one or several of their parameters, including hardness, density, porosity or chemical composition, over a defined length in at least one spatial direction. The method involves the arrangement of high-performance concrete in stressed zones and highly porous concrete in regions with low stress, to achieve fully stressed components with minimum weight, in three spatial dimensions. The use of gradient materials in architecture has a sustainable perspective and is an opportunity for an architectural discipline to re-examine and implement new construction methods. Current research has achieved optimised concrete linear elements in functionally graded concrete. One distinct area to which my current research is related includes the application of functionally graded concrete to the non-standard parametric forms.

There are foundational limits to the manner in which the non-standard has been conceptualised in architecture, from figurative into formal, specifically in its relationship to modernism. On the one hand, there are evident parallels between classical, baroque, modernist and non-standard modes of codification and their implications to architectural design, production and manufacture. On the other, the foundational conception of space used in non-standard discourse has remained Euclidean and orthogonal that is modernist across these different historical phases. This means that the non-standard must encounter a critical limit preventing it from achieving its objective of critiquing and challenging geometric production within modern architecture.

Non-standard architecture design process devised with a programming protocol integrates computational ‘form-finding’ methods for optimisation that rely on increasingly sophisticated digital design tools and programming techniques. The earlier manifestation of form-finding methodology in the form of a soap film machine, developed in 1963 by the Institute of Lightweight Structures and Conceptual Design (ILEK) in Stuttgart, integrated geometrical registration and measurement of the models. The physical analogue models developed were design and working models in a wide range of materials for the architectural design process and tension distribution in the membrane. This generation of autonomous formation design is found in the work of Frei Otto. The new digital design capacities integrated method into the advanced digital tools, capable of performing optimisation on meshes and modelling minimal surfaces virtually. The contemporary design thinking and processes involve the use of automated command and programs as a means for not just designing the project, but also, for evolving a non-standard design. Programmatic modelling applications and manufacturing processes have led to a renewed interest in evolutionary techniques in the form of evolutionary algorithms and software that can run now within these domains. Topological description of form fundamentally relates matter and information.

Steel fibre reinforced ultra-high performance concrete lattice. Non-standard prototype by Melika Aljukic. From *Mixed Matters: Concrete* by Melika Aljukic, Architectural Association, ILEK, str.ucture GmbH Stuttgart, 2016. Collection of the Institute for Lightweight Structures and Conceptual Design (ILEK), University of Stuttgart

Controlled segregation of a non-standard concrete element at ILEK. Source: ILEK

The research devised on the non-standard architectural components in ultra-high performance concrete and functionally graded concrete shows minimised component weight with performance, topology and shape optimisation. High compressive strength and improved durability of concrete achieved, result in light, durable and sustainable structures. The development of functionally graded concrete undertaken by ILEK under the direction of Werner Sobek aims to minimise material consumption within structural integrity. Research project on the design optimisation of functionally graded precast floors by ILEK shows a reduction of component weight 42%, compared to a normal concrete floor slab with a 5m span. In addition, permitting greater deformation and using a textile carbon-fibre reinforcement, grading enables an element mass reduction of about 60%, while providing the same load-bearing capacity as the solid floor slab. Correspondingly, the method is associated with lower CO2 emissions. In addition, thermal insulation properties can be controlled with porosity over the height of the component section. Gradation of concrete that integrates high-strength concrete aggregate increases the structural strength, while porous aggregate increases thermal insulation properties and decreases thermal conductivity. Resulting insulated lightweight aggregate used in the non-standard architectural element is the minimal surface that meets both structural and heat insulation specifications and is a highly recyclable component.

The recent development of automated manufacturing processes for graded concrete includes controlled segregation, layered casting and graded spraying. Controlled segregation involves the controlled separation of the concrete mixture through the introduction of the centrifugal force. Layered casting involves pouring into formwork concrete mixes in a layer by layer sequence. Graded spraying method involves concrete mix gradation established in the spray head robot end-effector by adding compressed air. The practical experiments undertaken show that within automated production processes for functionally graded concrete, spray end-effector method is the most efficient fabrication method for non-standard concrete geometry. One of the advantages is the integration of different strengths of concrete into the spray method optimisation process for non-standard geometry fabrication. Similarly, to natural bone optimisation, the spray robot method allows flexible allocation of material over the optimised element using automated production for efficient functional grading. The distribution of concrete results in fabrication, reducing the bulk of the material, energy, water and waste. The significance of the new integrative computational and fabrication method presented here lies in the evolution of non-standard architectural codification and production processes that extend the capacity of existing skills and technologies to achieve formal result and innovation. The second degree of significance is concerned with environmental sustainability where non-standard construction component weight is minimised with performance, topology and shape optimisation.

Melika Aljukic is the principal of architecture and urban design practice Melika Aljukic Architects. Melika graduated from the UNSW with Bachelor of Architecture First Class Honours and holds a Master in Architecture (Architecture and Urbanism) from the Architectural Association. She is currently a PhD (Architecture) candidate at the University of Sydney.

Reconsider, reconfigure, reimagine

Joynton Avenue Creative Centre by Peter Stutchbury Architecture Photo: Hugo Chan

A sustainable lesson from adaptive reuse

Hugo Chan

5 Martin Place by Johnson Pilton Walker Photo: Hugo Chan

Much of the conversation surrounding sustainable architecture in the face of imminent climate change devastation is concerned with newness. Every day, we see new buildings constructed with ever greater material efficiency, new structures withstanding ever worsening weather conditions, and new technologies operating at ever higher standards of performance. And yet, this position of newness remains firmly embedded within the cycle of cradle to grave, where the old is necessarily deficient and discarded, replaced by the fresh and the exciting. This begs the question: is our quest for sustainability unconditionally clenched within the hands of the new?

In 2014, American architect Carl Elefante declared that 'the greenest building is the one already built'. Similarly, with her experience in adapting historic structures in the United States, Elizabeth Leber (partner at New York firm BBB) argued that to demolish 'and start over again is a misuse of [the embodied] energy' inherent in all our buildings. Meanwhile, in Australia, the CSIRO demonstrated that the energy accrued during the construction of housing is equivalent to 15 years of normal operational energy consumption, with the multiple of initial embodied energy for commercial and office buildings sitting at thirty. Finally, with the 2019 release of the ICOMOS document *The Future of Our Pasts: Engaging Cultural Heritage in Climate Action*, pressure is mounting on architects to accept that working with the past is just as relevant and equally important in our battle towards a climate resilient future.

With this future in mind, it is time for us to realise that adaptive reuse should no longer be concerned merely with breathing new life into our old institutions. Rather, it should be seen through the lens of sustainability as a means of managing our existing urban fabric more innovatively. The adaptive architecture paradigm replaces the *tabula rasa* mentality with a call for architects to take up the mantle of change and to view existing structures as hotbeds of challenges, where the opportunity to reconfigure can apply indiscriminately: to the prosaic and the poetic, the classical and the modern, the beloved and the detested.

Extending adaptive thinking more thoroughly into the design process has been the philosophy of Richard Johnson at JPW in Sydney for many decades. He considers adaptive reuse as 'the starting point for any project in the city', which is not to suggest a haphazard policy of rampant heritage protectionism, but an encouragement to reflect on the design premise of the *tabula rasa* before calling in the wrecking ball. His practice's involvement in refurbishing rather than rebuilding Sydney's Hilton Hotel on George Street in 2005 was based on a frank appraisal which showed that 'with a new hotel [we would] put the tower in roughly the same position … there seemed no point for us to demolish all of that'. The tectonic skin and the interior finishes may have been invigorated, but the internal, structurally-sound framework still stands, proudly living a second life.

Almost 20 years on, the second life of another Sydney building is taking shape on the corner of Bathurst and Pitt Streets. The new Greenland Centre, a collaborative effort by Woods Bagot and BVN, is tipped to be an innovative response accomplished by stripping an original 20-storey office tower down to its steel frame and reusing this skeleton as a new, reinforced structural base for the new 60-storey tower. Both projects stand as testaments that adaptive architecture is not consigned merely to the field of heritage conservation.

Beyond considering how we can approach existing civic fabric, adaptive architectural thinking also provides a key lesson for new projects. In 2018, Norman Foster defined adaptive architecture as the ultimate sustainable building and one that you can recycle. He states that 'instead of demolishing the building … to do buildings which encourage change, which respond to change, and to have technologies and techniques which enable buildings to improve their performance'. Similarly, John McElgunn (partner at RSH+P) argues that adaptive reuse 'has a lot to do with designing new buildings, designing them in a way that they are not entirely tailored for the brief of today. Because we know that the brief of today will have morphed during the evolution of the project, let alone when it is finished.' Both views recognise the complex layering of systems which make up contemporary practice and that architects must consider the inevitable deterioration of different services, with a core structure lasting the full term of a building's life cycle while anticipating the inevitable need for compartmentalised renewal.

The success of our sustainable future is not predicated upon only one modus operandi within the architectural profession. Rather, it requires a multitude of ideas and processes, addressing historic, current and future architectural needs. Adaptive reuse as a mode of thinking, asks us as architects to critically reassess valuable pre-existing site assets: conserving the historically valuable, retaining the structurally sound and building to anticipate the inevitability of change. Through this, adaptive architecture reduces the damage of wholesale demolition and reconstruction and instead, demands us to look at how structures can be reconfigured, reimagined and reused, aiding in our pursuit of a sustainable built environment and a climate resilient future.

Hugo Chan is architect and associate, practice management at Cracknell & Lonergan Architects, having completed a Byera Hadley Travelling Scholarship in 2018/19 entitled *Alternative realities: approaches to adaptive reuse in architecture*. Interviews from this article are part of a podcast series which can be viewed online: studiohc.org/arpodcast

Building more responsibly

Dean Ipaviz and Matt Baker interview by Tiffany Liew

Dean Ipaviz and Matt Baker from Verdecon

Based in the eastern suburbs of Sydney and Northern Rivers of NSW, Verdecon are an emerging team of builders that are continually searching for ways to build more responsibly with the environment in mind. They claim to be one of two carbon-neutral builders in Australia. Tiffany Liew chats with Dean Ipaviz and Matt Baker about how they developed their carbon-neutral business and how the construction industry might work towards more sustainable building practices.

A carbon-neutral building site of Verdecon

Tiffany Liew: What motivated you to start Verdecon?
Dean Ipaviz and Matt Baker: The archaic practices of the building industry as we know it was the driving force for us for us to dip our feet in the water and to start Verdecon. We're both surfers and funnily enough grew up in coastal areas on either side of the country. When you have a love of the ocean you instinctively have an appreciation for the environment that surrounds it. We both fell into our apprenticeships because school wasn't for us and we liked working with our hands. When you start to realise the job you're going to do for the rest of your life is going to have such a negative impact on the environment, you really start to question your role within that industry. We saw a real opportunity to explore something our own way and write the rule book as no one else seemed to be pushing the environmental wagon like we wanted.

Can you describe some of the practical strategies that make your building processes more responsible?
For us it starts with waste management. If everything you throw out from one job all goes to landfill or into the one skip, you're doing it wrong. My biggest tip is not to leave this separation solely to the transfer station your demo crew or skip company uses. Understanding what's recyclable and why has saved us quite a bit of money along the journey and has made us some money as well. Waste management then filters into our supply chains and understanding where our materials come from has been another journey in itself. Although I'm sure they're trying, Bunnings doesn't have an FSC plantation behind each store (not that that's where we get our timber from). Realising and understanding the embedded energy of any material you use is a good way to start looking at your own consumption and ordering on site. There's nothing wrong with asking the question of your local supplier or timber yard to understand where their material is sourced; it might actually help them in the long run. The flow on for us has been that we've actually opened accounts with numerous suppliers around Sydney and the Northern Rivers. We do our best to use the ones closest to our sites and we try to keep our sites in the eastern suburbs and inner west. Knowing we

have the flexibility of using a different supplier means we choose to pick up materials on the journey or have it delivered from a location closer to site. The goal of keeping our sites closer together means less travel time for our staff, less traffic on the road and less emissions in the atmosphere. This is small on the scale of our company's footprint but if you multiply this with local trades and the number of building sites across NSW/Australia at any one time, you start to see that this will add up.

What can we do as architects or clients to help minimise environmental impact?

We're far from architects, so this is only what we'd love to start seeing and I hope this doesn't offend anyone. One of the biggest things that architects can do from the first meeting is to work within the bounds they are already afforded by Mother Nature. Rather than design an odd-shaped rectangular box, look to increase the amount of natural light in all areas in lieu of artificial. Utilise that light, and the materials below and around it as thermal mass (masonry and recycled concrete where possible). Back in the facts and statistics on insulation and performance glass, and utilise cross ventilation for cooling instead of installing an AC unit in every room.

Another big item we've noticed is specifying rooms sizes, heights and cabinetry in the incremental sizes we procure our materials (300 mm). A basic example would be an 800 mm joinery cupboard; the offcut from the 800 mm panel will become waste and you will need three or four sheets for one cupboard. But if you step the cupboard size down to 600 mm you can build the whole cupboard from only two sheets.

From the client side, it's about understanding the investment you're about to undertake and really looking at the big picture. If you choose to invest in air con, increased artificial light, a poorly insulated and leaky house that's going to cost you $5–10k per annum for the duration of its life to heat, cool and cook with, surely this is not as beneficial in the long run? That $150k over the lifespan of your investment would be far better spent on a solar and battery system, reducing grid dependance and your family's long-term energy costs. It would be great to see architects taking ownership of this shared responsibilty and steering clients from concept stage toward a minimum standard in renewables, no matter what the budget is or finding a way to pro rata budgets to ensure a minimum standard is adhered to.

We need improvements to the code and education at the lowest level (apprenticeships) to inform people on why the above leaky house just isn't practical. Architects and builders alike need to identify early on that our homes need to perform well in all climates, be cost-effective to run and still look good. It would be great to see this topic at the forefront of all concept and planning meetings.

I still hear people talking about solar with negative connotations but with the improvements in induction cooking and the adoption of heat pumps (in Australia) over the last 10 years, I can't see how the code is not calling up mandatory solar on any new build or renovation of $300k. Instead, we're upgrading our homes, increasing the demand on the grid and wondering why we're having rolling blackouts.

In this day and age, and for less than the above-mentioned costs, you can confidently achieve grid neutrality from an electricity point and remove gas altogether with the aim of recouping these costs over the life of your home. If you decide to sell, then it's certainly going to increase the sale price for the vendor as well. Don't get me wrong – I understand that not everyone can absorb this upfront cost but surely the solution lies somewhere in the middle of artificial everything (long-term cost, short-term gain) and passive something (short-term cost, long-term gain).

It is impressive to hear that your business is carbon neutral. How does your business offset inevitable carbon impacts that may be incurred by client or architect decisions?

Thanks – it's an accreditation we don't take lightly. Funnily enough, we offset annually through a company called Carbon Neutral (CN). It's a time-consuming process but well worth it in our eyes. It involves a review of the previous year's emissions (via our accounting software) where we quantify our footprint: travel, materials, labour, flights, fuel, etc. We then add that data into a spreadsheet supplied to us by Carbon Neutral; the subsequent data is then verified by them to determine its validity. Once verified, we are then required to purchase carbon offsets that will sequester the carbon our business has produced for that year. This is done via the reforestation of degraded farmland in the Yarra Yarra where CN are reintroducing a biodiversity corridor for the native wildlife in that area.

So in actual fact, answering your question is far less straight forward, as these inevitable emissions that occur from impending jobs or actual changes in scope are costs that Verdecon will have to absorb in the long run – call it our carbon tax if you like. Finding a solution to mitigate and decrease large inevitable emissions depends on our ability as knowledgeable builders to workshop and bring functional solutions that are going to be the best for the client for longevity and cost; best for the architect for aesthetics; and best for us and the planet for the resultant footprint. We also see real value in relationships with other builders and sharing knowledge. We're always learning when building so it's handy having these relationships to reach out for help when we need or to bounce ideas.

We believe carbon offsetting is going to become more and more normalised in the next decade, when it starts to impact on your business's ability to trade. I see carbon scores being introduced and I'm glad we're at the pointy end of that from a building perspective. We see this sense of social responsibility as being something that will set us apart in the near future.

Dean Ipaviz and Matt Baker are carpenter/builder/project managers at Verdecon.

Tiffany Liew is an architect and sessional academic at the University of Sydney and UTS.

REFERENCES

Carbon Neutral helps organisations minimise their impact on the environment by working with them to measure, reduce and offset greenhouse gas emissions: **carbonneutral.com.au**

Watch 'Diversifying the Yarra Yarra' – the impacts of a region with large-scale reforestation on YouTube: **https://youtu.be/qO_klSP7h9Y**

The time is now: Architects Declare Australia

Caroline Pidcock

How times are a changing... When I first undertook my Byera Hadley Travelling Scholarship in 2009–2010 on 'The architecture of (net) zero emissions housing', there were not that many people in our profession actively pursuing or interested in such a topic. It's now 10 years on, and in 2019 for the first time ever, architects have banded together globally to take a leadership position on sustainability. With much more than just a focus on zero emissions, Architects Declare is an international call to action to acknowledge the twin crises of climate breakdown and biodiversity loss as the most serious threats of our time. Within one month of its launch in Australia, almost 500 architects – including 12 Australian Institute of Architects' gold medallists and Australia's only Pritzker Architecture Prize winner – had pledged to take action through Architects Declare Australia. Now there are 679.*

It's not just the die-hard environmentalists of our profession, but the widest possible range of architects who have realised they can – and must – be part of the solution to these crises. All signatories to the declaration commit to raising awareness of the climate and biodiversity emergencies and the urgent need for action among clients and supply chains. They also advocate for faster change in the industry towards regenerative design practices and a higher governmental funding priority to support this.

The first declaration was made on 30 May 2019 by the 17 Stirling Medal winning architects in the UK. Soon after, a group of Australian architects and associated professionals approached the group to replicate the Declaration in Australia, where it was launched on 25 July 2019, the third country in the world to do so. The Declaration has since expanded to other countries including Norway, Italy, New Zealand, Iceland, South Africa, Sweden, Denmark, Ireland, Canada and Germany. Similar declarations have now been made by engineers, landscape architects, students, educators and other consultants throughout the world.

For everyone working in the construction industry, meeting the needs of our society without breaching the earth's ecological boundaries will demand a paradigm shift in our behaviour. Together with our clients, we will need to commission and design buildings, cities and infrastructures as indivisible components of a larger, constantly regenerating and self-sustaining system.

The research and technology exist for us to begin that transformation now, but what has been lacking to date is collective will. Architects Declare Australia harnesses, nurtures and builds collective will to advance the demand for knowledge and to catalyse it into action. Architects Declare Australia brings architects together to find ways to raise awareness, advocate, establish principles and new initiatives, and share knowledge and research.

Each signatory to Architects Declare Australia has agreed to consider what this means for their practice, staff and their work, now and in the future. The declaration asks signatories to focus on how they will:

1. Raise awareness of these issues
2. Advocate for faster change
3. Establish mitigation principles as key measures for the industry
4. Share knowledge and research
5. Evaluate all projects against these principles
6. Upgrade existing buildings
7. Include life cycle costing, whole life carbon modelling and post-occupancy evaluation in basic services
8. Adopt more regenerative design principles
9. Collaborate with everyone to reduce construction waste
10. Accelerate the shift to low embodied carbon materials
11. Minimise the wasteful use of resources at all scales of our profession. The declaration adds:

In Australia, we as architects are aware that Aboriginal and Torres Strait Islander peoples have long espoused the cultural, social, economic and environmental benefits embedded in the holistic relationship of caring for Country.

The Declare movement is spontaneous, decentralised and non-hierarchical, and is by its very nature disruptive. Instead of relying on governing bodies or associations to take the lead, it urges every architect to take responsibility for actioning these principles in their own lives and practices. By inverting the traditional method of advocacy and policy deployment, the movement fosters a bottom-up approach to community-led change-making.

As chair of 1 Million Women, a group that is all about helping women to build a lifestyle revolution to fight the climate crisis through daily actions, I understand how empowering it is to just start and act. As actions succeed, we are energised to do more. It's in this way that architects can find their individual and collective power to make architecture that is better for our clients and the planet.

It is the hope of Architects Declare Australia that architectural practice will be forever changed by the energy and momentum of this global movement. Now is the right time.

Caroline Pidcock is the spokesperson for Architects Declare Australia. She was awarded the 2019 NSW President's Prize for her substantial contribution to the architecture profession.

The author acknowledges significant input from Verity Campbell and Ran Boydell.
* At the time of printing in November 2019.

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CHAPTER

Architects Declare Australia spokesperson Caroline Pidcock (in red) with other architect supporters at the global climate strike in Sydney on 20 September Photo: Kat Han

This issue of the *Bulletin* is timely as architects and others worldwide grapple with how we can make a difference and address this real and dangerous predicament we see ahead.

The UN secretary-general Antonio Guterres remarked in September 2018: 'If we do not change course by 2020, we risk missing the point where we can avoid runaway climate change, with disastrous consequences for people and all the natural systems that sustain us.'

The 400 hundered parts per million CO2 level has long been considered the critical point. Yet in July 2019 we surpassed 411 parts per million and the concentrations continue to rise. This is the highest CO2 concentration in three million years.

RIBA were the first to declare a state of climate emergency on 30 May 2019 and committed to a five-year plan of action for climate change. RIBA also pledge to support the UK government's drive to make the country carbon neutral by 2050.

The American Institute of Architects were next on board on 13 June 2019 when they adopted the 'Resolution for urgent and sustained climate action', which they will continue until zero-net carbon practice is the accepted standard of its members. The American Institute of Architects prioritise and support urgent climate action as a health, safety and welfare issue to exponentially accelerate the 'decarbonisation' of buildings, the building sector and the built environment.

Architects Declare Australia sees the climate and biodiversity emergencies as a twin challenge and the most serious issues of our time. This initiative was launched this year on 25 July by a group of seven architects including NSW past president Caroline Pidcock.

So as architects will we continue to argue about past shortfalls in design to address climate change, or do we make a stand and improve the Earth's last chance to survive from this point forward? It's your choice. Do you want to make a difference?

Kathlyn Loseby
NSW Chapter President

Common to all the articles in this issue of *Architecture Bulletin* is an inherent recognition that we cannot continue as we are and expect to see a different result – that is any future other than one characterised by further intensification of our twin crises of climate breakdown and biodiversity loss.

Without wishing at all to diminish the scale and consequence of this catastrophe, there is an analogy that arises as I reflect on these global circumstances within the walls of the NSW Chapter office. Without critical and committed change, we likewise cannot expect a different result from our work (that of staff and members alike) at the Institute.

At recent national strategy meetings in Brisbane bringing together the Board, National Council and senior National and Chapter staff, the facts of our reality spoke firm truths: change is imperative if we are to survive as an organisation and thrive as a profession.

As I see it, there are two fundamental motivations for change within the Institute. Firstly, a desire to bring a more acute focus to our work so that we are doing both more effectively and for greater member benefit those things that properly sit within the core remit of the profession's peak body. And secondly, a recognition that our operational status quo is simply not sustainable – financially, environmentally and personally. We would be well served to take inspiration from the principles of regenerative design embraced by Architects Declare so that we might carve out a healthy future for this much beloved but much beleaguered organisation.

Our Institute at its best is the synergistic culmination of the tremendous investment of intellect, passion and generosity gifted by hundreds of members for nearly 90 years. At its most vulnerable, it is an establishment wedded to existing and historic ways for the sake of tradition and comfort at the cost of current relevance and a valuable, viable future. The classic cartoon 'Who wants change? Who wants to change?' captures the present challenge. It will take a critical mass of us to realise the task of regeneration and I urge you to come on board. Sea levels are rising and more than ever do we need a worthy vessel.

Happy festive season and brave new year to all!

Kate Concannon
NSW State Manager

Advocacy supports momentum in reform

When NSW premier Gladys Berejiklian and planning and public spaces minister Rob Stokes faced the media on 27 November to launch 'major planning reform to drive jobs and investment', it was a culmination of efforts to bring reform to planning and development. It is reform that will have far reaching impact on us all. The Institute has been active in responding to the government's agenda, advocating for the best outcomes for our industry and the wider community. These outcomes include design and building quality to underpin wellbeing and consumer confidence, as well as fair conditions for and appropriate recognition of the expertise and contribution of the profession.

NSW Chapter President Kathlyn Loseby has focused the Institute's activity around three key avenues for reform:

1. Addressing defects in the construction industry, particularly in new apartments
2. Contributing to the development of the draft Design and Building Practitioners Bill 2019
3. Making a submission to the NSW Productivity Commission discussion paper (27 Nov)

In a three-part series, the ABC's *7.30* shone the light on Australia's building industry in the aftermath of significant defects that emerged dramatically in high rise buildings, including the Opal and Mascot Tower complexes in Sydney. The series explored how these incidents have focused attention on the lack of protection for owners when things go wrong and the impact of the building boom on quality.

In an interview with ABC *7.30*, Kathlyn Loseby presented the Institute's position that: 'the most important thing is that we put the consumer at the forefront of all consideration and discussion. That will help drive better building outcomes and better accountability.' The program was also a trigger to promote the Institute's recommendations to address the issues raised by *7.30*:

1. Quality outcomes will not occur nor will the consumer be protected if time and cost continue to be the prime drivers in the construction industry.
2. There must be increased accountability across the whole development process and, accordingly, the Institute wants to see a nationwide requirement for the registration of all building practitioners, just as architects must be registered.
3. For large projects we need independent eyes on site the whole way through and to this end the Institute is calling for the reinstatement of a clerk of works.
4. We also need to ensure these projects are supported by more complete documentation and procurement models that deliver better outcomes for consumers in terms of their physical and financial security.
5. We have seen positive steps towards the implementation of these solutions in various jurisdictions around the country, but more reform is needed faster.

In the lead up to the Design and Building Practitioners Bill 2019, the Institute acknowledged the bill as a positive first step towards rectifying issues around the quality and safety of complex buildings. Never before has there been such a groundswell of both popular and industry support for better regulation and we urged the NSW government to maximise this unique opportunity to drive lasting change.

In reviewing the draft bill, the Institute raised concerns that practitioners covered by the bill are not treated equally nor with the same level of obligation. In addition, the application of the Civil Liabilities Act 2002 allows for contracting out of proportionate liability, which undermines fairness and accountability for all practitioners, lessens availability of professional indemnity insurance and ultimately impacts consumer protection. With the enacted bill and recommended amendments, we considered the consumer will have a robust system, managed by appropriately qualified and regulated building practitioners, giving confidence that the finished building meets the Building Code of Australia and relevant standards. We will continue to work closely with our industry stakeholder group and government to see the draft bill and regulations progressed through in 2020.

Finally, the Institute responded to the NSW Productivity Commission discussion paper *Kickstarting the productivity conversation – planning for the housing we want and the jobs we need*. The Institute's response recognised that governments and industry in Australia must deliver places for communities that are built and connected in a way that enhances liveability, wellbeing, sustainability and productivity. Our cities are increasingly the generators of our national wealth, and rural and regional communities must be well-connected to urban centres and their services. This requires the integration of planning, transport, design and implementation.

The Institute strongly believes that good design supports productivity and to achieve the best outcomes will require more focus on reform and design policy change. Better alignment between both policies and connections across all levels of government is required to address urban development which is currently highly inefficient. While the discussion paper addresses each issue, these are typically treated by governments in isolation whereas an integrated, coordinated approach is required for effective outcomes.

Design policy for design and building regulation should also recognise that the provision of appropriate, affordable, safe, secure, sustainable and well-located housing is a critical issue both now and into the future. Design policy and regulation plays an integral role in ensuring such housing is delivered. Poorly designed and built housing not only forgoes the wide-ranging economic benefits that appropriate housing delivers; it has an adverse impact on the physical and mental health of communities, resulting in increased economic costs associated with poorer health, social, educational and productivity outcomes.

Coming full circle to the government's announcement it was pleasing to hear the premier mirror similar language to the Institute. It is clear that both the Institute and NSW government believe that the sooner the reform agenda can be finalised and bedded down, the better for the NSW economy, construction industry and most importantly consumers.

Wilma Walsh is the NSW Chapter's communication officer.

AJ+C promotions

AJ+C are pleased to announce the following promotions: Nadia Zhao and Xion Lin to associates; and Brendan Whelan, Giselle Moore, Indi Beard and Sarah Slattery to senior consultants (pictured above). These promotions recognise their dedication to achieving design that is creative, sustainable and innovative in artistic, conceptual, technical and economic terms.

Sutherland Entertainment Centre: sustainable design by NBRS Architecture + Chrofi

Re-energising the existing to create a state-of-the-art performance space is the sustainable life cycle design approach. As a counterpoint to the existing fabric the new glazed foyer of the Sutherland Entertainment Centre (pictured above) features the warmth of a glulam timber structure. The NBRS/Chrofi design was awarded silver in the WAN Awards 2019 future projects category.

Iconic site on the rise: a Crone collab with Tzannes and Make

Construction of the Opera Residences development at Bennelong Point (pictured above) is well underway, with the structure expected to reach ground level by end of 2019 and project completion by early 2021. All 104 luxury residences sold and retail spaces leased, including an award-winning Japanese restaurant. As executive architect, Crone has been collaborating with Tzannes (design architect) and Make (interior designer). Visit crone.com.au to learn more.

BKA delivers world-class cricket training facility in Sydney's south

BKA's recently completed O'Neill Cricket Training Facility marks the first stage of a three-phase masterplan to transform Penshurst Park into a regional sporting hub and public space. The second stage of works, also designed by BKA, will begin in early 2020.

TKD Architects are a founding signatory of Architects Declare Australia

Tanner Kibble Denton Architects are proud to be one of the 30 founding signatories of the Australian Architects Declare Climate and Biodiversity Emergency. TKD has formed a new internal taskforce, led by Chloe Rayfield and Robin Sampson, to develop a set of climate, biodiversity and sustainability principles that will articulate the business' commitments and provide practice benchmarks to inspire clients and industry partners. The first clear demonstration of TKD's commitment to this issue was the strong attendance of the global climate strike rally in Sydney on 20 September.

#climatestrike #schoolstrikeforclimate
@architectsdeclare_au

Pathway to net-positive energy buildings

Rear and front views of My Ideal House by Mirvac Design with Madeleine Blanchfield. It won a 2019 NSW Architecture Award for Sustainable Architecture

Mirvac responded to the climate emergency many years ago, implementing its 2014 sustainability strategy 'This changes everything' with clear goals and real targets. Far from a simple one-step fix, we have set an ambitious goal to implement net-positive energy buildings by 2030. And with the release of 'Planet positive', our plan to reach net-positive carbon by developing all-electric buildings powered by 100% renewable energy, we are well on the way to delivering that goal.

While we can lead, we need others to join us – governments, suppliers, our competitors and most importantly the people who live in our apartments and homes.

In Australia the built environment contributes to 25% of total carbon emissions. Within Mirvac Design we proactively work to make a positive contribution by examining every element of our design and the materials used in construction. But it doesn't stop at design and construction. The human factor is equally important and through design we need to make it easier for future occupants to live a more sustainable lifestyle – as we are learning from our industry-first research project called the House With No Bills in Melbourne. After six months the pilot project has shown energy bill savings of around $2300, 72% of household energy is off grid and the home is energy positive for 40% of the time, producing more energy than it consumes.

Innovation is essential to making advances in sustainability, but to achieve consumer acceptance it must also be functional and affordable. Collaboration between our architects and interior designers, sales and marketing teams, as well as development and construction, will see all Mirvac masterplanned communities feature solar power from this year onwards.

The change in people's attitudes to embrace renewable energy has been welcomed – after all, it is 20 years since we delivered Newington, the largest solar-powered suburb in the southern hemisphere adapted from the 2000 Sydney Olympic Games Athletes Village.

Education and providing proof of the benefits of sustainable design and living is ongoing. Projects such as My Ideal House, which won a 2019 NSW Architecture Award for Sustainable Architecture, exemplify our determination to engage with external architects to educate and influence.

Born from a competition to design a sustainable, flexible and liveable family home, My Ideal House focused on the merits of good design over size. Judges noted that Mirvac Design's collaboration with the winning architect demonstrated 'how sustainability and regenerative challenges in the built environment can be addressed in a scalable market'.

There are many other examples such as the 'living labs' established at Brighton Lakes in Moorebank, Sydney. There we have combined passive design principles with photovoltaic solar panels, batteries and smart technology, to make it easy and attractive to live more sustainably. The living labs solar and battery systems on average produce enough clean energy to provide 84% of household energy use with an average annual saving of $1449 in energy bills.

Renewable energy in residential towers is more challenging given the limitation of roof space, however we have succeeded in tapping solar energy for common areas in new projects. Harold Park, in inner-city Sydney (launched in 2011 and completed last year) set a sustainability benchmark with the seven residential buildings incorporating 1300 apartments and terrace homes, exceeding the Building Sustainability Index energy and water targets by 25%.

At Tullamore in Melbourne, people living in Folia prestige apartments will have access to a shared solar energy system called Allume, enabling the dynamic delivery of solar energy to individual apartments reducing their running costs. This is a significant leap forward in making apartment living more sustainable through an innovative energy distribution strategy.

People will ultimately determine the progress towards reducing carbon emissions. While solar panels and passive design might not be attention-grabbing strategies, our cumulative efforts are making a difference.

Each year Mirvac settles around 3000 lots, giving us a huge opportunity to make an impact. Through greater awareness of human-induced climate change and the financial reality of soaring energy costs, people are not just responding to but demanding sustainable design. And that is when real change can begin to occur.

Diana Sarcasmo is Mirvac's general manager of design.

Daniel Wahl's Designing Regenerative Cultures

Designing Regenerative Cultures
by Daniel Christian Wahl
Triarchy Press with International Futures Forum
2016

'Wahl sees design as "the discipline where theory meets practice", and squarely positions designers as the actors with the greatest agency to imagine or precondition for change.'

Have you ever felt that you know what it takes to make the world a better, more sustainable place as a citizen and designer but that the transformative moment remains just out of reach? Do you feel like the mechanisms of society won't let you shift your habits far enough in the direction you know they need to go? Nor empower you to steer the complexity of bringing a building into being to a positive and regenerative outcome that is future-friendly?

If you're nodding your head then reading Daniel Wahl's opus, *Designing Regenerative Cultures* might just be the epiphanic hit you need – indeed what the planet needs. It is worth noting this is not a book by an architect, about architects or written for architects. *Designing Regenerative Cultures* will take you out of your comfort zone and allow you to see the profession through a fresh, optimistic and invigorating lens.

The book brings together current and emerging best practice in transformative innovation, biologically inspired design, health and resilience, and living systems thinking. It is a deeply researched and well referenced book with the capacity to seed broader interests and new lines of enquiry in the reader.

The primary arguments of the book coalesce into a reimagined worldview, where thinking is done reiteratively through systems (or 'nested ecologies') and feedback loops, rather than in isolated silos – where humans evolve to be broadly responsive and less tightly controlling. Over seven chapters Wahl draws together a bricolage of new philosophies, theories, businesses, social movements and science – views into what he observes as catalysts for an emergent and transformative new human culture.

Along the way the author muses through rhetorical observations, such as: 'We will have to decide not just how we make ourselves sustainable, but why we should be sustained.' He cleverly argues for a qualifiable future, irrefutably observing that 'you cannot make an economic argument for human survival – you have to make a spiritual argument for human survival.' In a world of ever-mounting standards, codes and contracts, it takes a while for the gravity of this observation to sink in.

The book is full of insightful moments. Wahl observers that Darwin's species-centric 'survival of the fittest' theory has driven not only our sense of nature but also our social and economic interactions, forming a worldview of exponential growth and individualised competition. He elegantly articulates a requisite shift from quantitative growth to qualitative growth as essential to human persistence – a re-understanding of evolution as 'a cooperative dance, in which creativity and constant emergence of novelty are the driving forces'.

Wahl sees design as 'the discipline where theory meets practice', and squarely positions designers as the actors with the greatest agency to imagine or precondition for change. The converging climate, extinction, resource depletion and population emergencies he cites invite more than just an incremental change. While not signaling the architectural discipline explicitly, it is inferred between the lines.

'Everything changes if we change the way we think,' Wahl says. He believes a fundamental redesign of culture is exactly what is needed to transform the impending breakdown into an exciting opportunity for breakthrough. Through an emergent regenerative culture – 'a culture that aims to leave a richer, more vibrant and more ecologically productive planet to each subsequent generation' – Wahl envisions a more beautiful world than the current one we are failing to sustain with much sacrifice.

So who is this book for? If you are obsessing over how two materials come together in detail, then *Designing Regenerative Cultures* is not for you. However, if you are in a mid-career crisis and looking for a way to reinvent yourself with a deeper sense of purpose, then you may find some new direction inside. Lastly, if you are feeling overwhelmed by the collective task of turning spaceship Earth around, then Wahl's book will give you hope.

Adam Russell is an architect and partner at Saltbush Projects.

Always was, always will be

Overlooking the Lune de Sang site in an area known as the Big Scrub, west of Byron Bay, showing homesteads and sheds by Chrofi Architects Photo: John Choi

Reflections on the 2019 Country Division Regional Conference

Byron Bay, 8–10 October 2019

'Always was, always will be' was a conference about what a shared future might look like: a shared future with our First Peoples as leaders of how we work with and on Country; of how we work with the land and not against it; of our responsibility to bring people along with us on the journey towards a shared future.

Starting a conference in quiet reflection and walking on Country was the most sublime way to get the mind and body in the appropriate place to begin our understanding. Danièle Hromek asked us to learn to always connect with Country by listening and attempting to make sense of what we feel Country is telling us.

Through Aboriginal art we can learn about Indigenous culture and society, from sophisticated kinships of matrilineal and patrilineal lines to how this connects different clan groups. Dr Fabri Blacklock challenged delegates to live by the Aboriginal principles of respect, patience, observation and responsibility. Imagine how our work on Country would be if we did this.

Chels Marshall shocked the conference into an environmental reality. Not only through the degradation and destruction of our environment, but of whitewashing millennia-old knowledge with popular new names like forest bathing and biophilic design. Chels' world view: the earth doesn't belong to us, but we belong to it; humans are equal to (not above) everything; and every element of our world can be considered as the environment.

Imagine living in a town like Alice – with one foot permanently pointing to the exit sign and knowing a deeper anxiety is pervasive in the town. That was Sue Dugdale's brutally honest reflection of Alice Springs and her place in it. Who can forget quotes such as whitefellas like 'reasonable architecture to be solid citizens', and blackfellas' observations that 'whitefellas don't tend to die here [in the Alice]'. Sue saw her work through three prisms of whitefella work, blackfella work and work for both. Her work is beautiful, critically acclaimed and so anchored in place and client.

Rarely does anyone witness great oratorial performance, especially in Australia. Noel Pearson, billed as the headline speaker, exceeded expectations. He spoke like Obama does or like Luther King did: in rhythms and syncopations, in power and control. Of the many important things Noel said, two stick hard. Firstly, that we should always pitch our significant cultural changes to the 4 o'clock. So if noon was middle Australia, 8 o'clock was left, then 4 o'clock was the right of the nation's mind. Only the right, he believed, could make cultural change – like Aboriginal recognition in our constitution – and make it stick. The other was his 'Declaration of Australia and the Australian People'.*

Tim Horton was reminded of Indy Johar's challenge of 'The necessity for a boring revolution'. Change is made through the pathways of legal precedent interacting with contemporary life. Tim offered glimpses of legal decisions that point toward ways for Indigenous recognition and the law's deeper understanding of Country (eg the Rocky Hill Mine case). He left us with the proposition: as we sleepwalk towards a 4–6 degree warming, it is important to remember the last ice age was only 4–6 degrees cooler.

Dillon Kombumerri, principal architect at the Government Architect NSW, makes sense of complex concepts by using story to transfer knowledge that lasts in memory and is born again in others. His diagram of European culture versus Aboriginal culture explains so much; not only about Country and how we approach it, but how we can make sense of the past as we plot a path towards our shared future. We also learnt that Aboriginal culture was gender balanced: women and men had roles and responsibility for Country and kinship structurally interwoven within their social and cultural fabric. Clearly a socially balanced and advanced culture.

Who's Country is it anyway? Siân and Michael Hromek, Aboriginal designers based in Sydney and Byron, gave delegates insight into their creative process of working with Country and Indigenous communities by using Aboriginal design and planning principles. Their presentation was a useful guide for developing a personal first principles process. Their statement of 'take only what you need' – heard several times during the conference – was a one of intent as much as belief.

The first two days of the conference ended with a panel by Callantha Brigham and Michael Mossman. Their work was to inform the conference of the Institute's work on their Reconciliation Action Plan and to seek feedback. But the connection was made when a power outage in all of the Northern Rivers led to conference participation. Like a choir conductor, Michael Mossman asked neighbours to engage with each other as a way of finding common ground. The metaphor was not lost.

Byron Bay and its hinterland were part of the fecund Big Scrub – a lowlands rainforest that ran from Lismore to Byron. Impressive rare and ancient trees stood sentinel across the forest, looked after by the local Aboriginal people. The ravaging of this place into forgotten dairy farms, monocultures of macadamia and blue gum plantations and far too many wedding venues leaves a hole in your heart. Dierdre and Andy Plummer's personal journey aims to reverse this process, as we discovered on a bus tour on the final day of the conference. On their 113-hectare property called Lune de Sang, they are rebuilding these ancient forests with native trees such as red cedar, white booyong, silver ash, teak, rosewood and quandong. To support this, they have invested in quality architecture from Chrofi who have created eight homesteads and sheds on the site over almost a decade. Andy and Dierdre have sound economic reasons behind their motivation, which for us was perhaps a bit like pitching the idea to the 4 o'clock. It is important to note that Andy and Deirdre's process wasn't born from an Indigenous path or acknowledgement, but so evidently a response from what they felt Country was telling them. A clear demonstration of how things can be done differently.

At the conference end, we were all left buzzing with ideas, a heart for reconciliation and to work with our First Peoples. Put simply, we all left inspired. But as we sat in the cool contemplation of a cold drink and relief, an old saying came to mind: 'a Country grows great when old (wo)men plant trees in whose shade they shall never sit'. That is Aboriginal culture in a nutshell.

Shaun Carter was the conference creative co-director with Sarah Aldridge.

* Read Noel Pearson's 'Declaration of Australia and the Australian People' at https://bit.ly/2CiI2DG

NSW Architecture Awards and Prizes 2019

2019 NSW Student Architecture Awards

NSW Graduate Medal
No 'us' and 'them' by Joshua Sleight, The University of New South Wales
NSW Graduate Medal – Commendation
The Brickworks by Nathan Dawes, The University of Newcastle
NSW Undergraduate Medal
Little Bay Retreat by Yishun Tang, The University of New South Wales
NSW Undergraduate Medal – Commendation
Urban Studio by Shuyang Liang, The University of New South Wales
NSW Undergraduate Medal – Commendation
Domain Arts by Sasha Tatham, The University of Sydney
NSW Architectural Communication Award
Type 15: work live in Chandigarh by Sahibajot Kaur, The University of Newcastle
NSW Architectural Technologies Award
The Filament Factory by Jazmin Gavin, The University of Newcastle

NSW UNIVERSITY PRIZES
The University of New South Wales
Hayden Co'Burn – Graduate of the Year (Master's program)
Louisa Hartley – Graduate of the Year (Bachelor's program)
Luke Walker – History & Theory Prize
Matthew Burnett – Construction & Practice Prize
The University of Technology Sydney
Joel Glynn – Graduate of the Year (Master's program)
Oscar Read– Graduate of the Year (Bachelor's program)
Madison Randall – History & Theory Prize
Alexander Lewis – Construction & Practice Prize
The University of Newcastle
Sahibajot Kaur – Graduate of the Year (Master's Program)
Kate Glanville – Graduate of the Year (Bachelor's Program)
Claudia Smith – History & Theory Prize
Nathan Dawes – Construction & Practice Prize
The University of Sydney
Sarah Mae – Siew Yap – Graduate of the Year (Master's program)
Chris Koustoubardis – Graduate of the Year (Bachelor's program)
Mitchell Tran – History & Theory Prize
Nicolas Buci & Jong – Oh Won – Construction & Practice Prize

2019 Newcastle Architecture Awards

Newcastle Jury Prize
Maitland Riverlink by Chrofi Architects with McGregor Coxall
Educational Architecture
Award – St Pius X High School Library by SHAC
Public Architecture
Award – Maitland Riverlink by Chrofi Architects with McGregor Coxall
Residential Architecture – Houses (New)
Award – Greenacres by Austin Maynard Architects
Commendation – Macmasters Beach Courtyard House by Matt Thitchener Architect
Commendation – Twenty One Flowerdale by SDA
Residential Architecture – Houses (Multiple Housing)
Award – The Edge by CKDS Architecture
Heritage
Award – The Newcastle Signal Box by EJE Architecture
Award – The Station, Newcastle by EJE Architecture
Interior Architecture
Award – Ginger Megs X by Derive Architecture & Design
Commendation – Regis Elermore Vale by Jackson Teece
Urban Design
Award – Maitland Riverlink by Chrofi Architects with McGregor Coxall
Sustainable Architecture
Award – Graham Whiteing Residence by True North Architects
COLORBOND® Award for Steel Architecture
Award – St Pius X High School Library by SHAC

2019 NSW Architecture Awards

NSW Architecture Medallion
Maitland Riverlink by Chrofi with McGregor Coxall
Public Architecture
SULMAN MEDAL FOR PUBLIC ARCHITECTURE
Maitland Riverlink by Chrofi with McGregor Coxall
ARCHITECTURE AWARDS
Cabarita Park Conservatory by Sam Crawford Architects
Green Square Library and Plaza by Studio Hollenstein in association with Stewart Architecture
Shellharbour Civic Centre by DesignInc in association with Lacoste+Stevenson
COMMENDATION
State Library of New South Wales by Hassell

Educational Architecture
WILLIAM E KEMP AWARD FOR EDUCATIONAL ARCHITECTURE
University of Sydney F23 Administration Building by Grimshaw Architects
ARCHITECTURE AWARDS
Our Lady of the Assumption Catholic Primary School by BVN
St Pius X High School, Library by SHAC
Taronga Institute of Science and Learning by NBRS Architecture
COMMENDATION
The University of Sydney Life, Earth & Environmental Services Building by HDR
Residential Architecture – Houses (New)
WILKINSON AWARD
GB House by Renato D'Ettorre Architects
ARCHITECTURE AWARDS
Merewether by Savio Parsons
Sunrise House by MCK Architects
COMMENDATIONS
Bay Guarella by Peter Stutchbury Architecture
Castle Cove House by Terroir
Residential Architecture – Houses (Alterations and Additions)
HUGH AND EVA BUHRICH AWARD
Five Gardens House by David Boyle Architect
ARCHITECTURE AWARDS
Redfern Warehouse by Ian Moore Architects
COMMENDATION
Moreton Manor by CO-AP (Architects)
Residential Architecture – Multiple Housing
AARON BOLOT AWARD
North Rocks by Candalepas Associates
ARCHITECTURE AWARDS
Iglu Redfern by Bates Smart
Imperial by Stanisic Architects
OneA by Breakspear Architects and Kannfinch
COMMENDATIONS
Arlington Grove by Smart Design Studio
Mezzo by Chrofi and Kannfinch
Commercial Architecture
SIR ARTHUR G. STEPHENSON AWARD
Dangrove by Tzannes
ARCHITECTURE AWARD
Paramount House Hotel by Breathe Architecture
COMMENDATIONS
2 Bligh Street by Bates Smart
Barrack Place by Architectus
Rail Operation Centre by Jacobs with Smart Design Studio

Heritage
GREENWAY AWARD
House in Darlinghurst by Tribe Studio
ARCHITECTURE AWARDS
Paramount House Hotel by Breathe Architecture
State Library of New South Wales by Hassell
Tayim by Welsh + Major Architects
COMMENDATIONS
Balmain Rock by Benn + Penna Architecture
The Burcham by Allen Jack+Cottier
St John's College Library by Hector Abrahams Architects

Interior Architecture
JOHN VERGE AWARD
Green Square Library and Plaza by Studio Hollenstein in association with Stewart Architecture
ARCHITECTURE AWARDS
Castle Cove House by Terroir in collaboration with Pascale Gomes – McNabb Design
Dangrove by Tzannes
COMMENDATIONS
Caroma On Collins by Archier
Redfern Warehouse by Ian Moore Architects

Urban Design
LLOYD REES AWARD
Harold Park by Mirvac Design, Government Architect NSW (GANSW), City of Sydney and Hassell
ARCHITECTURE AWARDS
Green Square Library and Plaza by Studio Hollenstein in association with Stewart Architecture and Hassell
Maitland Riverlink by Chrofi with McGregor Coxall
COMMENDATION
Elizabeth Bay Marina by lahznimmo architects

Small Project Architecture
ROBERT WOODWARD AWARD
Bungarribee Parklands Shelters by Stanic Harding Architects with Paramatta Park & Western Sydney Parklands Trusts
ARCHITECTURE AWARD
Renewal of the Opera House's Joan Sutherland Theatre by Scott Carver
COMMENDATION
Punch Park Amenities by Carter Williamson Architects

Sustainable Architecture
MILO DUNPHY AWARD
Our Lady of the Assumption Catholic Primary School by BVN
ARCHITECTURE AWARDS
My Ideal House by Mirvac by Mirvac Design with Madeleine Blanchfield
UNSW Roundhouse by Tonkin Zulaikha Greer

COLORBOND® Award for Steel Architecture (NSW)
St Pius X High School, Library by SHAC

2019 NSW Premier's Prize
Green Square Library and Plaza by Studio Hollenstein in association with Stewart Architecture and Hassell
NSW Premier Gladys Berejiklian

2019 City of Sydney Lord Mayor's Prize
Barrack Place by Architectus
Harold Park by Mirvac Design, Government Architect NSW (GANSW), City of Sydney and Hassell
Lord Mayor of City of Sydney Clover Moore

Blacket Prize
Maitland Riverlink by Chrofi with McGregor Coxall

Enduring Architecture
350 George Street by Edward Raht

Emerging Architect
Cameron Anderson, Cameron Anderson Architects

2019 NSW Country Architecture Awards

James Barnet Award
Award – Cloud Cottage (Bowral) by Takt Studio

Public Architecture
Award – Tuncurry Resource Recovery Centre (Tuncurry) by Ian Sercombe Architect

Residential Architecture – Houses (New)
Award – Blade House (Coredale Illawarra Coast) by Takt Studio
Award – Cloud Cottage (Bowral) by Takt Studio
Commendation – Eyrie House (Kangaroo Valley) by Local Architect South Coast

Residential Architecture – Houses (Alterations and Additions)
Award – March House (Orange) Source Architects
Commendation – Exoskeleton House (Thirroul) by Takt Studio

Residential Architecture – Affordable Housing (under $400,000)
Commendation – Charlotte Shack (Charlotte Bay) by Ian Sercombe Architect

Heritage Architecture
Award – Kingscliff Community Hall and Amenities (Kingscliff) by Aspect Architecture
Commendation – March House (Orange) by Source Architects

Commercial Architecture Award
Commendation – Spicers Sangoma Retreat (Bowen Mountain) by Barbara Tarnawski Architects

Interior Architecture
Award – March House (Orange) by Source Architects

Small Projects
Commendation – Fingal Oasis (Fingal) by Aspect Architecture

Termimesh Timber Award
Award – Cloud Cottage (Bowral) by Takt Studio

People's Choice Award
Award – Echo Beach House (Casuarina Beach) by Create Architecture

Sustainable Architecture
Commendation – Tuncurry Resource Recovery Centre (Tuncurry) by Ian Sercombe Architect

Vision Award
Commendation – PLAN RAND (Rand) by Regional Design Service

2019 NSW Chapter Prizes recognising individuals and practices

The following prizes were announced at the inaugural end-of-year prize night and celebration on 22 November 2019.

Adrian Ashton Prize for architectural culture and literature:
Catherine Hunter and Bruce Inglis, *Glenn Murcutt: Spirit of Place*

Best in Practice Prize recognises excellence in practice:
BVN
Commendation – MHNDU
Commendation – SJB

Christopher Procter Prize provides an emerging architect with the opportunity for research-based travel or study:
Hannah Slater, 'Altogether Now: Seeking an integrated approach for urban renewal'

David Lindner Prize inspires graduates and emerging architects to engage in important and challenging design issues involving the public realm:
Hannah Slater, 'Alone Together: Addressing urban isolation in Australian cities'

Marion Mahony Griffin Prize acknowledges a distinctive body of work by a female architect:
Abbie Galvin FRAIA, Government Architect NSW

The Reconciliation Prize recognises architecture and professional practice in NSW which advances the rights of Aboriginal and Torres Strait people:
University of Sydney, 'Wingara Mura- Bunga Barrabugu – A Thinking Path to Make Tomorrow'
Commendation – Kaunitz Yeung Architecture
Commendation – Kamay Botany Bay National Park Masterplan, Kurnell by Neeson Murcutt + Neille with Sue Barnsley Design and Freeman Ryan Design

NSW President's Prize to recognise an individual who has made a substantial contribution to the profession of architecture:
Caroline Pidcock LFRAIA

Charles Jencks 1939–2019

It is ironic that in the same year of the Bauhaus centenary, Charles Jencks should pass away. Jencks was a principal protagonist of the postmodern movement which challenged the legitimacy and singularity of mainstream modernism, as defined by Siegfried Giedion in *Space, Time and Architecture*.

In recent years he was best known for his work as trustee and co-founder of Maggie's Centres, an institution supporting cancer sufferers by providing secondary therapies alongside primary care institutions. These centres grew out of Charles Jencks and second wife Maggie Keswick's experience with cancer, the disease which claimed her life in 1995 and, finally, his own in London on 13 October this year.

Maggie's Centres were an opportunity for Jencks to provide patronage for contemporary architecture and offer a caring, supportive environment for sufferers, family and friends. Jencks established the centres predominantly in the United Kingdom and completed twenty centres in twenty years. He invited many architects and friends to design individual centres including Frank Gehry, Zaha Hadid, Rem Koolhaas, Richard Rogers, Kisho Kurokawa and Benedetta Tagliabue.

Charles Jencks at Maggie's Centre at Charing Cross Hospital, London (architect: Rogers Stirk Harbour + Partners)

But it was his work as cultural and architectural theorist and historian which most strongly defined his position in the architectural milieu of his time. He was a protagonist, definer and high-profile promoter of postmodernism, a reactionary movement which emerged most significantly in the USA in the 1970s. The movement responded to the global proliferation of modernism which, by then, was referred to as late modernism. In fact, he has been referred to as the godfather of postmodernism – a title he would no doubt have greatly appreciated.

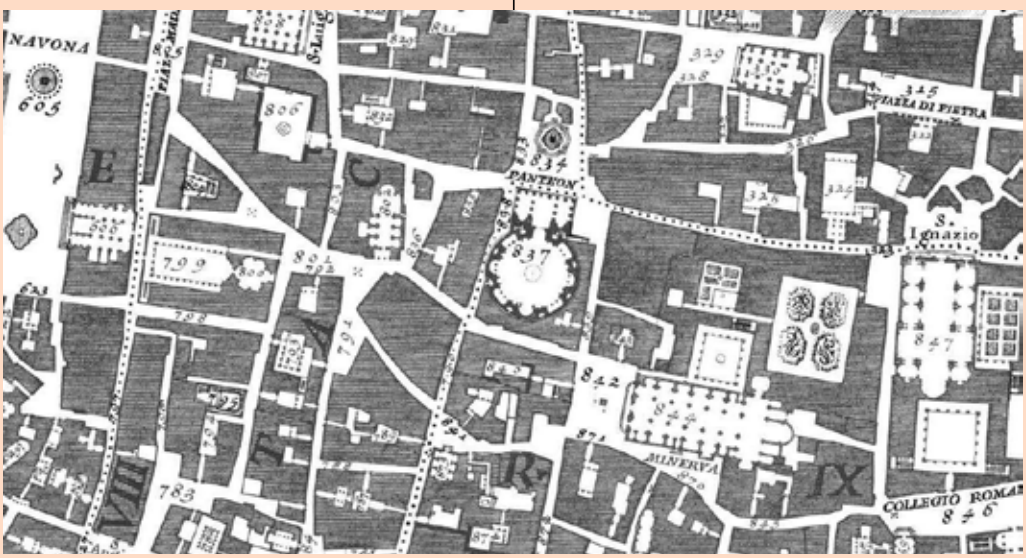
Having studied under Reyner Banham, Jencks acquired and relished the art of discussion and disagreement. He appeared in many television programs in Britain and the USA and wrote two films, one on Le Corbusier, the other on Frank Lloyd Wright and Michael Graves – strange bedfellows to say the least. Jencks was a prolific writer who contributed to many professional journals including *Architectural Forum*, *Architectural Review*, *Architectural Design*, *Domus*, *A&U*, *AD* and a host of other populist publications. But it was his two seminal books *Meaning in Architecture* in 1969 and *The Language of Post-Modern Architecture* in 1977 that gave expression to his architectural theory and historical narrative.

In the controversial social and intellectual polemic which raged in the free world in the 70s and 80s, the importance of discourse was the hallmark of evolutionary change and Jencks was at the centre of it. Postmodernism challenged the central tenets of modernism – a rejection of 19th-century historicism and a blind obedience to functionalism, which was often pursued at the expense of the more visceral aspects of human experience. Predictably, postmodernism did not prevail and nor did the International Style. Instead, Kenneth Frampton's concept of critical regionalism heralded the next generation of meaningful and authentic global architecture related to an architecture of its place and time.

By the 21st century, Jencks' stardom had passed but not before his forays into an esoteric brand of cosmogenic art, landscape architecture, architectural teaching and practice had reached its zenith. In 2015, Charles Jencks received the Sir John Soane's Museum Foundation honour in New York, the last major professional accolade of his career. The London terrace house he created with collaborators Terry Farrell, Piers Gough and others was a container for a collection of artefacts, furniture and artworks; the house was Grade 1 listed by Historic England last year. Plans are now underway for its conversion to an architectural museum called the Cosmic Home. Such is the legacy of Charles Jencks.

Ed Lippmann is the founder and principal of Lippmann Partnership.

Why nothing matters



Nolli Map of Rome, 1748

Earlier this year I was teaching a UNSW design studio alongside some formidable colleagues: Anita Panov, Andrew Scott, Mitchell Thompson and David Ostinga. Our studio brief was based on the premise that 'nothing matters', examining how the voids we leave behind in cities – our public spaces – are vitally important to civic life.

Our students were in third year, at that wonderful point in their education where their eyes are being prised wide open. Together, we have observed Nolli's Rome, noting how public spaces are carved from city form. We've rallied with Jane Jacobs and sat back with Jan Gehl to watch urban life unfurl. Alongside Rem Koolhaas we've been thrust into the metropolis, a place of pace and erasure, cynicism and change.

This study of nothing has also reminded me of the distinctive links between architecture and culture: in particular, the politics of public space within a contemporary, capitalist democracy. Public spaces have always been places where both nothing, and anything, can happen. Yet, increasingly, the nothing of our cities is being privatised and commodified, governed and surveyed. This is changing the way we act as a society and transforming how we relate to one another.

Public spaces have always been dormant, the sites of potential rights (or rites) and wrongs. Yet, our parks and plazas, seats and streets are increasingly depicted as places where bad things might happen. In a time-pressured society, loitering is now viewed with scepticism – after all, don't we have somewhere better to be? Yet the synonyms of this verb – to loiter – are some of our most beautiful: to amble, to linger, to potter, to stroll. To go slowly, to take pause. To do nothing, to no end, with no purpose.

Our civic spaces are among our most important. This is largely because they demand nothing of us – no payment, for one – while simultaneously reminding us to come together and be citizens, and to take part in a collective life. As Rebecca Solnit writes: 'We talk about people coming together, but we sometimes forget that's a spatial, geographical business … Democracy was always a bodily experience, claimed and fought for and celebrated in actual places.'

In the city, our beautiful Sydney, I've done many things: I've lived, worked, bought dresses and browsed for books. I've dined on sushi and stopped for coffees, pausing to catch up with friends. As an actor, and a spectator, I've inhabited public space. I've waited nervously for first dates on the steps at Town Hall and hosted picnics in our many gardens and parks. But most importantly, I've also taken part in democratic life. I've watched important broadcasts, joined protests and danced in the streets. These vital activities rely on nothing: on the voids left behind by a building's absence.

One of my favourite studios Lundgaard and Tranberg used to have this opening statement on their website: 'A building should be generous. It should give more than it takes. It should take part in the life of the city and give something away for free.' Or, as the artist Wolfgang Tillmans puts it: 'I love it when people are together in communal activity that is not governed by the goal of economic gain … Material and media culture constantly drives us apart; it's beautiful when we realise we can be together for free.' This question – of what is free and what our freedom looks like – is inextricably linked to what we do as architects.

The semester's teaching reminded me that the core of our society – our politics and our humanity – is facilitated by public space. That nothing, it sustains us. That nothing, it matters.

Jennifer McMaster is the founder and principal of Trias.

Provoke is an opinion series written by a different guest writer each year. To express interest in being the Provoke author for four issues in 2020, please send your first suggested topic to bulletin@architecture.com.au with 'Provoke author proposal' in the subject line by 26 January 2020.

Image source: *Mapping Cultural Space Across Eurasia*, http://dighist.fas.harvard.edu/projects/eurasia/items/show/206

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