

# TOWARDS ZERO

CEFC 10 YEAR ANNIVERSARY MAGAZINE • INSIGHTS ON AUSTRALIA'S NET ZERO TRANSFORMATION



CEFC marks 10 years  
as trailblazing investor



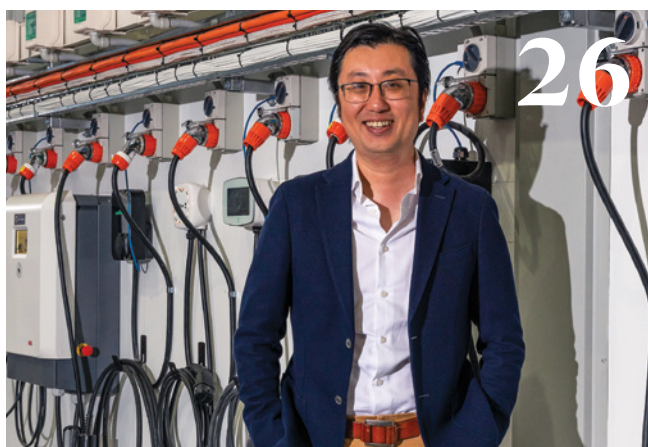




The CEFC acknowledges the Traditional Custodians of Country throughout Australia and recognises their continuing connection to land, waters and culture. We pay our respects to their Elders – past, present and emerging.

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# The history of humanity is defined by innovation, transformation, resilience.

It is these characteristics that allow us to surmount the insurmountable, to make possible the unimaginable. These same qualities must now shape our response to a defining challenge of our time – combatting climate change. To mark our first decade of investing on behalf of all Australians, we are delighted to share insights from some of the leaders who have inspired us, and whose ambition and commitment will help shape our net zero future.



# A word from the CEFC

**On behalf of everyone at the CEFC I am pleased to present *Towards Zero*, a unique collection of voices from across our economy to share their insights into our net zero future.**

We developed *Towards Zero* to mark our first 10 years investing on behalf of all Australians: a decade in which we have been privileged to work with investors, developers, innovators, regulators and governments who share our commitment to our net zero future.

The insights in this publication give us confidence and inspiration about the potential of our transformation. They show how innovation and new technologies can make net zero a reality in the way we farm, build, manufacture and travel. How our unparalleled solar, wind and critical mineral resources can power our green transformation and how our strong and stable financial system can give us vital access to the domestic and global capital needed to make this transition.

While we are only too aware of the scale of the challenges ahead, there can be no doubt about the necessity of our mission – not just in mitigating the climate effects of more intense droughts, floods and extreme weather, but in capturing the economic opportunities of a net zero economy.

As we say in our introduction, the history of humanity is defined by innovation, transformation and resilience – characteristics that allow us to surmount the insurmountable, to make possible the unimaginable. We can be confident these same qualities can shape our response to the defining challenge of climate change.

In our first decade investing as Australia's 'green bank', our investments have made an impact right across the economy. It is a track record we will draw on in the period ahead, emboldened by the addition of new capital to help deliver the 21st-century nation-building infrastructure needed to power our low emissions economy. As we have done since we began, we will continue to collaborate with investors, developers, innovators, regulators and governments whose ambitions match our own.

We trust you enjoy *Towards Zero* and find confidence and inspiration in the transformation ahead.

**Ian Learmonth**  
CEO, CEFC



# Rising to the transmissions challenge

*with Daniel Westerman, CEO, Australian Energy Market Operator*

**It is difficult to overstate the importance of Daniel Westerman's job. As the CEO of the Australian Energy Market Operator (AEMO), Westerman is responsible for nothing less than ensuring Australia's energy system delivers secure and affordable energy as it grapples with the transition to a low-carbon economy. We sat down with Westerman to talk about the future of the grid, the path to net zero, and his journey from professional petrol head to EV aficionado.**

**The transition to net zero requires a lot of change in a lot of areas, but it all starts with renewable energy. As the person responsible for operating Australia's largest gas and electricity markets, how do you feel about our position?**

There's real momentum in Australia right now to hit our 43 per cent emissions reduction target by 2030 and become a net zero economy by 2050. The continued investment in renewable energy, both in homes and throughout the grid, is key to our success.

Yes, the scale and time pressures to replace retiring coal generation are daunting. We need to install 45 GW of new supply by 2030, with around 36 GW from renewables and 9 GW from new firming capacity, such as pumped hydro, batteries, and gas generation, to unlock those renewables.

AEMO has a critical job to do in connecting this new generation, working with stakeholders such as the CEFC to navigate Australia's energy transition for the benefit of all Australians. It's an exciting time for the whole industry right now. But yes, there's a big job to do.

**Can a grid powered by renewable energy deliver the power that manufacturing needs? If so, when will we get there? What's the magic ingredient to making this work?**

That's a good question. Our 2022 Integrated System Plan, effectively co-designed with more than 1,500 stakeholders over 18 months, shows we'll need a mixture of firmed renewables with transmission to decarbonise the power system. That means manufacturers who typically need firm energy will require a combination of renewables,





*Australia's grid infrastructure will need to be transformed as coal plants retire and we move towards more variable renewable and distributed energy*

firming capacity and new transmission. It's critical that we get that firming capacity in various forms: pumped hydro, batteries of all shapes and sizes, and gas generation.

Large-scale hydrogen projects present a clear opportunity for manufacturers to embrace renewables. Hydrogen production enables the storage of low-cost renewable electricity, adds to our firming capability, and by integrating renewable energy and hydrogen production, can offer additional flexibility and resilience to our existing electricity grids. As with all of the challenges and opportunities facing Australia's energy sector, the magic ingredient is collaboration: industry, governments and communities all working together.

The grid is reaching higher peaks and average volumes of renewable energy. The current National Electricity Market (NEM) record for instantaneous renewable penetration is 64 per cent: a record broken just a few days ago, up two per cent on the previous record. In Western Australia, renewables hit over 79 per cent at one point in January, mostly due to rooftop solar. These figures are up there with any power system in the world!

**Let's think ahead to ISP 2050. According to the plan, we'll have reached net zero emissions by then. What will the grid of 2050 look like?**

That'll be a day we all celebrate for our children and our children's children. By then we'll have an interconnected grid that connects and shares the least-cost renewable energy from people's homes, along with onshore and offshore generation and storage technologies throughout Australia.

**The experts say we're moving from a one-way monolithic grid built around coal and gas. What will come in its place, and will such a disaggregated model keep the lights on?**

Prior to this year, we saw a rise in zero or negative wholesale electricity prices in the NEM due to increasing penetration of rooftop and grid-scale solar. Australians have embraced rooftop solar in world-leading numbers, and this appetite is likely to flow into electric vehicles and residential battery systems.

*“Governments, industry and consumers understand the critical role for transmission investment. But as an industry, we need to get the social licence with landowners and communities to build it.”*

The challenge is to be able to operate this grid with such a diverse portfolio of technologies. With the appropriate operating regulations, standards and markets, these devices do present an exciting opportunity for consumers to contribute to an efficient power system.

**They say you have to lead by example. Where are you on your personal grid transition?**

I began my career as an automotive engineer and now I'm a proud owner of an electric car. EVs are really easy to live with: they are simple to charge and I never worry about range. I also run mine almost entirely from my home solar system. On top of that, they're simple to service and are immune from the price of petrol. I'm starting to investigate what it would take to join a virtual power plant now, but things do seem to move a little slowly in my personal life sometimes – the perils of life as a busy CEO.

**What's really inspiring you with the country's transmission project at the moment?**

The transmission will harness the greatest value from our current and future portfolio of renewable and firming generation, often located in strategic renewable energy zones, allowing the sharing of least-cost, low emissions energy. For instance, new wind and solar farms are located where the wind and sun are strong and reliable, often in places that haven't been on the grid superhighway before.

The encouraging part of the transmission infrastructure outlined in the Integrated System Plan is the vital role these projects play in providing secure, reliable and affordable electric for all Australians. Also, it's fair to say that governments, industry and consumers understand the critical role for transmission investment. But as an industry, we need to get the social licence with landowners and communities to build it, considering environmental, social and cultural sensitivities, not just the engineering and economics.

**What's the most important thing on the horizon we have to get right in the transition?**

Well, it's people really – it's so critical we invest in people through this energy transition as much as the technology itself. The installation of new generation firming and transmission assets is likely to create thousands of highly skilled roles that will be dotted across the Australian landscape, in a pattern that will match our new generation fleet.

The energy sector presents a new era of career opportunity, whether it's in creating renewable generation, building storage, knitting it together with a new grid, operating the new grid, jobs with equipment manufacturers, in energy companies and retailers, in construction and electrical and gas trades, in banking and financing – the list of flow-on jobs from an energy sector in a renewal phase is colossal.

You can see governments' estimates in their energy policy announcements made recently. That's vitally important for regional communities who naturally want meaningful, skilled jobs for their young folk and for their present workforce to transition from other parts of the energy sector, or indeed, to transition from other sectors of the economy.

### A word from the CEFC

Transforming our electricity grid is one of the most important nation-building projects of our time, promising benefits for generations to come. It's at the heart of our work with AEMO, governments, investors, businesses and regulators – work that will substantially increase in the years ahead as attention turns to the Australian Government Rewiring the Nation plan. Our shared goals are to bring low-cost renewable energy to Australian homes and businesses via a stable, modern and interconnected 21st century electricity system. We have a strong track record of delivering grid infrastructure, large-scale energy storage and, of course, substantial new renewable energy generation – all of which are critical to powering a low emissions economy. It is this experience that will underpin our investment focus in contributing to the delivery of our Rewiring the Nation ambitions.



“The CEFC has been an important player in the growth of the renewable energy sector in Australia. Their early seed funding on two of our projects, Collinsville Solar Farm in Queensland and the Collector Wind Farm in New South Wales, meant that these projects were able to bring renewable energy into the market earlier than otherwise would have been the case, facilitating a swifter reduction in carbon dioxide emissions by the electricity generation sector of the economy. The ongoing investment support of the CEFC in new greenfields renewable energy projects will help Australia attain a substantial uplift in renewable energy generation and storage to support its transition to a low emissions economy.”

*Polagorn Kheosiplard, Chief Executive Officer, RATCH-Australia*



# Exercising our investment muscle

*with Shemara Wikramanayake, CEO, Macquarie Group*

**As the Chief Executive Officer of one of Australia's leading financial services institutions, Macquarie Group, Shemara Wikramanayake has long championed the role of investors to spur on the transition to net zero. A year after she joined climate leaders at COP26 to help chart a path forward, Wikramanayake shared her thoughts on what the economy of the future will look like, and what we need to do to build it.**

**The transition to net zero emissions is gathering momentum. What's driving this change? Can the momentum be maintained given the near-term economic headwinds facing the global economy?**

Several factors are contributing to the firming of long-term climate goals. First, climate science is unequivocal, and the consequences of continued, rapid global warming are sadly increasingly visible and costly. That in turn has created strong societal consensus and support for climate action across most of the political spectrum.

These social drivers to the transition are supported by technological progress and clear economic incentives. Surging fossil fuel prices are a significant contributor to ongoing economic headwinds, meaning that much faster clean technology deployment – especially of low-cost renewables – is needed to improve energy affordability and security, as well as sustainability. This remains a medium-term trajectory, which should happen in a measured way, having regard to energy security, technological advancements and maintaining employment opportunities and community support.

**Australia has committed to achieving net zero emissions by 2050. What are the big changes necessary to make that happen?**

Australia is fortunate to have some of the most potent clean energy resources in the world, including plentiful sunshine, available land and a network of world-class businesses working across commodities, technology and energy. Unfortunately, we're also one of the most carbon-intensive developed economies, and have fallen behind on emissions reductions relative to peers over the last decade.

*“Faster clean technology deployment – especially of low-cost renewables – is needed to improve energy affordability and security, as well as sustainability.”*

However, we now have a new set of goals and it's critical that the public and private sectors continue to work together to ensure they are delivered. Climate change is a global challenge, so we also need to keep working as part of the global community to define Australia's role, and building partnerships to advance projects and solutions across different sources of emissions.

Australia is well-positioned to catch up. We can do this by focusing on the rapid scale-up of clean electricity generation, accelerating the electrification of demand (notably in increasing the uptake of EVs), and by starting to use our large renewables potential to produce green hydrogen, which will help decarbonise our industry and create new export opportunities.

**The net zero economy of the future will be different to our economy today. From an investor point of view, what economic areas will be the most exciting? Where will we see the most significant changes?**

At Macquarie, we've had the opportunity over two decades to support some of the early-stage climate solutions that have now evolved towards frictionless scale up, such as solar and wind generation. We've typically done that by investing our own balance sheet first, to build experience and de-risk the asset class, before starting to invest third-party fiduciary capital entrusted to us to reach greater scale.

It's exciting to be involved in the transition from early stage to mature, scalable climate solutions, and we're now working to replicate this approach across more nascent but equally promising sectors including storage, hydrogen and nature-based solutions. The changes required are not restricted to solutions for cleaner energy, but also extend to reducing emissions across agriculture, transportation, industry, buildings and waste. While this creates challenges, it also creates exciting opportunities for investors.

This increased investor appetite was one of the main drivers behind our decision to transfer our Green Investment Group into our asset management business. All technologies will need to scale significantly to meet net zero by 2050 and governments are working to put in place the investment frameworks and regulations to support greater flows of capital. We think we can leverage our experience and relationships to help build and finance these assets.

**Do you have any comments about the role the CEFC has played in the net zero transition?**

Over the last decade, the CEFC has played a pivotal role in accelerating the decarbonisation of our economy, providing transitional solutions to accompany the significant long-term investment needed in technologies backed by private capital and government. This has involved catalytic help for businesses, consumers and farmers to invest in energy-efficient, low emissions and renewable energy projects, leading to the greater adoption of exciting clean energy solutions, such as electric vehicles.

Macquarie Asset Management and Macquarie Capital have worked collaboratively with the CEFC on innovative investments to reduce emissions and improve energy efficiency across agriculture, electricity generation, airports, ports, rail, water, social housing and other infrastructure sectors. In the coming years, the CEFC's enabling work alongside private capital will be critical to ensure Australia achieves the Government's emissions reduction targets. As momentum and consensus around the solutions needed to decarbonise a broad range of Australian sectors increases, the CEFC is uniquely placed to prioritise and unlock innovative opportunities to help grow Australia's low emissions economy.

### A word from the CEFC

Putting our economy onto a net zero footing is a challenge requiring collaboration between expert players with deep pockets. This is why a key part of our investment approach focuses on developing new markets and financial products, from building Australia's sustainability-linked bond market to tapping into the private equity sector, spearheading the green home loan market and delivering discounted green finance products for businesses and consumers. It's also why we work with institutional investors and fund managers to back emissions-focused investment vehicles, accelerating net zero ambitions while delivering returns. With net zero becoming the 'new normal' for investors, lenders, customers and regulators, this collaborative approach extends the reach and influence of our investment activities.



# How to feed the 21st century

*with Dr Ellen Litchfield, Community Outreach Co-ordinator,  
Farmers for Climate Action*

**In some ways, Dr Ellen Litchfield has been preparing for climate change her whole life. Growing up on the edge of the Simpson Desert, one of the driest regions on the driest continent, the weather was always on her mind. “My family and I were always acutely aware of the climate,” Litchfield remembers.**

Rain, a perennial concern for farmers all over the country, was especially scarce out on the stony downs of Wilpoorina Station, located 650 kilometres north of Adelaide. To a layperson these conditions might sound less than ideal for living off the land. But Litchfield, a third-generation farmer, maintains the experience was overwhelmingly positive. “The more limited something is, the more you understand how valuable it is,” she says. “The more you understand how much you need to work to conserve it.”

It’s this type of pragmatic conservationism that has guided Litchfield and her peers throughout their careers. Today, Litchfield is one of countless farmers working to make net zero agriculture a reality. Farmers for Climate Action, a non-partisan movement Litchfield works for in between her station duties, boasts over 7,000 farmers, with a support base of more than 35,000 everyday Australians.

The growth of the organisation is a clear signal that support for sustainable agriculture is increasing. Yet Litchfield acknowledges that going green is still a hard row to hoe. Agriculture accounts for about 15 per cent of Australia’s total greenhouse emissions. If we’re to achieve our net zero goals, farmers will have to severely lower their emissions. Yet recent models show that herd numbers are expected to rise after recovering from last decade’s draught. And as animal numbers increase, so too will our greenhouse gas emissions.

It’s a tricky challenge. But it’s one Litchfield believes Australian farmers are well-suited to meet. “We can grow food more sustainably here in comparison to a lot of other countries,” she says. “When most people think of agriculture, they think of what they see on TV: high-input, energy-intensive farming with a lot of chemicals.” But she says this reputation doesn’t always match the reality. “Most of our farms are on the rangelands, which means they have native pastures that require minimal input.”

She points to beef farming as an example. “The majority of our cattle are grass-fed. And grass-fed farming can be done really sustainably, in ways that actually put nutrients back into the soil.” It’s a fact that Litchfield realised while on an overseas trip to study arid rangeland farming across Africa and the Americas. “In Kenya, you can see cattle and sheep living with giraffes and lions. And here, we often do the same with small marsupials in our native habitats.” She stops to point out how well certain breeds of sheep thrive amongst our native grasslands. “It’s a symbiotic relationship,” she says. “It just works, if you let it.”

Which isn’t to say that everything is fine the way it is. On the contrary, Litchfield acknowledges that modern-day farming methods will have to continue to change along with the environment. Thankfully, there’s no shortage of ideas to guide us on how this could be done. Recent investments in research have shown that farmers can reduce the amount of methane produced by livestock by doing simple things like using different types of feed, or by breeding animals to have lower emissions. A methane-reducing vaccine is also in development.









**Left:** Cattle bred for harsh conditions can help limit our greenhouse emissions.

**Previous:** Litchfield and husband Blake Ward with baby Winston.

Beyond livestock, there are evolving techniques to help farmers cut down their emissions. Targeted reforestation is one; the use of sustainable land management practices to help increase carbon sequestration is another. Such moves will help nudge us towards net zero. But Litchfield says farmers don't need to be driven by environmental concerns to start changing their activities – they need to care about their own livelihoods.

"To be a farmer, you really have to be a conservationist first and a pastoralist second," she says. Often this happens as a matter of course, a case of sustainability and practicality intersecting. She points to the increased use of solar power on farms. "Studies have shown that fossil fuel use on large regional properties is a greater carbon emitter than methane production, so things like solar-powered water pumps can make a big difference." But while solar power certainly lowers emissions, it owes its success to being more economical. "Being green is really a by-product of the economic benefits," Litchfield says.

Another positive development, she says, has been the invention of meat-free protein alternatives – something laypeople might have expected a beef farmer like Litchfield to view as a threat to her livelihood.

Litchfield, who is on the record as saying the planet "needs vegans", counters that there is no reason that mock meats and other animal-product substitutes can't be good for the economy as well as the planet – especially if Australian crop farmers take the opportunity to get in at the ground floor. If we do this, she says, "Australian agriculture will be well-placed to remain a really profitable part of Australia's economy".

But our future prosperity won't just depend on our ability to feed ourselves. "We're an export nation," Litchfield reminds us. "Over 70 per cent of our product goes overseas." If the global population hits 9.7 billion by 2050,

as is predicted, that could mean a bigger export market for Australian farmers – but only if we're in the running. According to reports, Australians could soon be hit with tariffs in some international markets if we don't cut our emissions. If going green isn't its own reward, surely staying in the green is.

It's just another example of how our environmental and economic interests intersect. "We need to make sure we can feed the rest of the world," Litchfield says. "And to do it sustainably, too."

### A word from the CEFC

Australia's agriculture sector is perhaps the most exposed to the potential ravages of climate change, whether from drought, floods or temperature extremes. And with 55 per cent of our land mass committed to agricultural production, it's hard to overstate the need for action. That's why we are investing to help re-position Australia's natural capital for a regenerative and sustainable net zero future. Our investments range from providing discounted finance for smaller-scale energy efficiency and renewable energy improvements in agriculture production to large-scale investments in specialised funds, notably across the cropping and livestock sectors. Increasingly, our capital is also focusing on soil carbon opportunities and innovative regenerative farming models, tailored to Australia's diverse land use conditions and highly variable climate.



“The CEFC has had a successful first decade and is needed as much as ever for the critical decade ahead. The skilled team is excellent and is as important as its capital and purpose. Its investments have been catalytic for so many sectors, technologies and business models. I am proud to have been involved from the start as a board member for its first five years.”

*Anna Skarbek, CEO of Climateworks Centre and Founding Board Director of the CEFC*

“Australia is a global leader in the transition to renewable energy, and the CEFC has been instrumental in facilitating the enormous amount of investment and ongoing innovation in our sector. This investment will not only shape our country’s energy system but also profoundly impact communities across Australia, ultimately delivering clean, low-cost electricity, enabling jobs and a better environment.”

*Kane Thornton, Chief Executive of the Clean Energy Council*

# Believing in Australian renewables

*with Romain Desrousseaux, Deputy CEO, Neoen*



**Ten years ago, as investment in Australia's renewables industry slowed and developers set sail for safer markets, French generator Neoen saw an opportunity. As a newcomer to the energy game, Neoen knew that muscling into the booming renewable energy markets of China or the US would be difficult. So the company elected to forge its own pathway 'Down Under'.**

The Neoen solution was to play a longer game and do the hard yards on the ground, carefully examining the data and looking at the potential to build its business here. And with leadership and vision, not to mention the latest technology, they took on Australia's wide, sun-baked landmass, embracing the opportunities that come with having fewer incumbents to compete with. In the decade since, Neoen has gone on to make Australia its largest market, investing in solar and wind farms and playing a pioneering role in the deployment of grid-scale batteries.

As the company celebrates its 10th anniversary in Australia, Neoen deputy CEO Romain Desrousseaux explained why he's always seen Australia as an attractive investment destination. He admits it hasn't always been easy. "We arrived in Australia at the time when most of the industry was leaving," he says down the line from Paris, adding that the policy environment was especially tough. "It was a difficult time for our business."

Indeed, it was a difficult time for many businesses in the clean energy sector. Climate Council research shows investment in Australian renewables crashed by 88 per cent in 2014, with just one large-scale renewable project achieving finance approvals throughout the entire year. Still, Desrousseaux couldn't deny the two factors that, in his eyes, made Australia an attractive place to invest: our world-class solar resource and low population density. "Coming from Europe, Australia has quite low density and therefore an ability to find very large pieces of land with small communities where you can develop relationships and ensure your social license is well accepted."

Instead of being spooked by the exodus of more established developers, Neoen saw an opportunity to put down roots in a market brimming with potential. Desrousseaux says the strategy suited the growing business. "If you come into a place which is really booming like Australia is today, it's very hard for a new entrant to find projects, develop them, and make their way to the end, because it takes time." The patience paid off. In the years since, Neoen has overseen a transformation in the way renewables compete in the energy market, helping to establish wind, solar and

battery storage as the fastest technologies to deploy and the most cost-effective new forms of generation. The transformation is so dramatic that even without subsidies, clean energy technologies are pricing fossil fuel into premature retirement.

The company's vision for utility-scale solar has been key to its success, buoyed by Neoen bringing its European expertise to Australia's world-class solar resource. So far, there are seven active solar farms in Neoen's Australian portfolio, alongside five wind projects and a growing fleet of battery storage systems. The Australian division has already invested \$3 billion, but has ambitions to increase its rate of growth, announcing a plan in late 2021 to double its size by 2025.

A pivotal moment came when a massive storm hit South Australia in September 2016, crippling the electricity transmission network and setting off a cascading series of events that culminated in Neoen's highest-profile project. In one of the most unusual moments in Australian energy history, technology billionaire Mike Cannon-Brookes challenged Tesla CEO Elon Musk to build a world-first giant battery system to provide backup power for South Australia in the event of future unplanned outages.

Musk agreed, wagering that Tesla would complete construction of the massive 100 MW battery within 100 days of signing the contract or promise to waive the bill. His bet ultimately paid off, partnering with Neoen to deliver what was then the world's largest battery.

The new system quickly demonstrated its value when it responded to an explosion at a Queensland coal plant, injecting energy to stabilise the grid within seconds – and all at a lower cost than the coal and gas plants that dominated that segment of the market. This was an important demonstration, given that Neoen's early battery investments had been somewhat speculative. Experts had been theoretically confident that massive lithium batteries could make the electricity grid more reliable, but there had been no practical demonstrations at scale.

Desrousseaux says Neoen was confident, but still relieved when the Hornsdale battery quickly proved its worth. "Let's say it was a theory. Everyone said it should work like this but no one had tested it at a large scale. So the good news was that it was working." In its second year of operation, in 2019, the South Australian battery saved consumers \$116 million through its disruption of the frequency and ancillary control markets, accomplishing its objectives and subsequently undergoing a major expansion in 2019.





*Romain Desrousseaux (right) and a wind turbine technician check out the view.*

"These services have proven to work very well," Desrousseaux adds, "and the different governments and AEMO understood that it was a nice solution to ramp up batteries everywhere."

Which isn't to say it's all been smooth sailing. Unsurprisingly for a technological trailblazer, the company has been forced to overcome challenges, both technical and regulatory. And Desrousseaux highlights a few issues they're yet to overcome. The first is a particularly Australian challenge – moving from a highly centralised grid tailored to large fossil fuel generators, to a decentralised system with smaller renewable generators spread out across the continent, closer to population centres. Desrousseaux warns that the grid will need to evolve quickly. "It's getting hard to avoid the curtailment element or the negative prices. So there's the need for grid investment and more storage to be able to develop far more projects."

Desrousseaux also says global inflationary pressures are making it harder to deliver projects, as the cost of everything, from raw materials to transportation of goods, is rising quickly. "The key question is: will the electricity price adapt in the long run to this step change? Or are we in a difficult window for a year or two years and then the prices are going to settle, and people are going to go back again and build?" He admits he doesn't yet have the answers but is closely watching a series of upcoming tenders to see how the market responds.

Managing uncertainty has been a constant theme throughout Neoen's time in Australia. But despite the ever-changing conditions, Desrousseaux says Australia has remained an attractive place to invest. "We do not feel afraid about the investment situation in Australia," he says. If anything, they're just getting started.

## A word from the CEFC

When it comes to achieving net zero, it's a case of first things first. And when it comes to the grid, that means dramatically lifting our renewable energy output, investing in large-scale energy storage, supporting distributed energy models and modernising our electricity grid. From our earliest days, the CEFC has played a major role in nurturing the development of the large-scale renewable energy sector, crowding in substantial private sector investment and supporting the entry of new developers, contractors, suppliers and offtakers. We've also acted as a counter-cyclical investor to alleviate the challenges of market turbulence. Like all market players, we recognise there is a long way to go to get to net zero electricity. We also know we have a short period of time to get there. That's why we're increasingly active in grid-related investments, which hold the key to delivering substantial levels of new, clean energy generation to commercial, industrial and individual consumers.

“The CEFC brings a valuable level of expertise to the relationship. We meet with the CEFC every three months as a matter of course. This regular, interactive dialogue enables us to stay on top of new technologies and new ways of doing things so that we can continually enhance our operations, enhance the product, enhance returns, and make an increasingly positive impact. It’s a very good dynamic.”

*Michael Hanna, Head of Infrastructure, Australia, IFM Investors*



# Mining a monumental shift

*with Nicole Roocke, CEO, Minerals Research Institute of Western Australia*

**For generations, mining has been pivotal to Australia's prosperity: in fact, to say that mining has brought its share of benefits would be to understate its contribution to the point of absurdity. But as Australia races towards net zero, the challenges to the sector have started to compound.**

Waste needs to be mitigated, but critical processes still require energy. And all that's before you factor in public perception. While most Australians accept mining and recognise its economic contributions, reports show that most believe its environmental impact is negative.

But great challenges tend to spur great innovation, with the sector now looking to decarbonise. For Nicole Roocke, CEO of the Minerals Research Institute of Western Australia (MRIWA), the last four years have been dedicated to tackling these issues head-on. Her focus at MRIWA has been on helping Western Australian industry demonstrate genuine leadership in the field and identifying what activities will benefit the state and the nation as we head further into the 21st century.

It's a job she's proud to be doing, not least because our extractive industries will play a central role in our net zero transformation.

"Mining is going to continue to be critically important to the country," she says, especially because much of the technology required to deliver decarbonisation will depend on critical minerals. Commodities such as lithium, graphite, cobalt and nickel are in high demand in the energy transition. And with Australia amongst the world's top producers, this makes the decarbonisation of the sector all the more important.

The ingredients for mining's net zero transition, Roocke says, are all there today. *The Compelling Case for Decarbonisation*, a joint report from the CEFC and MRIWA, paints an optimistic future for low-emissions energy minerals, finding that "the decarbonisation of mining presents the greatest opportunity in a generation to diversify and grow the resources sector".

This opportunity, Roocke says, will be possible due to technology developments that reduce the impact of mining operations while bringing about their own commercial benefits. Mining operations that embrace new technologies like renewable energy generation and storage, or alternatives like green hydrogen and green ammonia, will reap the dual upsides of reducing operating costs while contributing to lower emissions.





But that's not all. When mining companies transform their operations – when they electrify their equipment, replace diesel vehicles with EVs and draw power from renewable sources – other sectors start to take these innovations more seriously. This helps change norms around sustainability best practice. But it also works to drive up demand for the same types of technologies and innovations in other sectors of the economy. “The mining sector can be the best marketing tool for mining, if they want to,” Roocke says. “Just by deploying renewable energy solutions and looking at decarbonising their own operations and demonstrating what’s possible at scale.”

To be sure, the path forward isn’t as straightforward for all mining operations; your options depend on what it is you’re mining. What works in lithium mining won’t always apply to copper, for instance, and any operation requiring significant heat in processing will face greater challenges in decarbonising, by simple dint of the fact that the more heat you need, the more energy you have to consume.

But that doesn’t mean the challenge is insurmountable. If investment and research are directed in the right areas, Roocke believes there will be cause for optimism. For that reason, MRIWA is also doing work on carbon capture and sequestration opportunities, helping to find other avenues to minimise the emissions impact of mining operations where other options aren’t suitable.

Research and investment into such technologies will be critical in delivering a mining sector that gives back as much as it takes. But while energy generation and carbon sequestration are obvious starting points, sustainability will be built into every facet of the mines of the future as well. The movement of materials will become greener as battery-powered small and mid-sized vehicles and electrified haulage systems supersede the diesel-powered internal combustion engines of today. Drilling, blasting, loading and

dewatering will benefit from implementing greater electrification and green hydrogen. And while mineral processing varies wildly depending on the commodity being mined, electrometallurgy, pyrometallurgy and physical processing are all seeing dramatic advancements in accelerating decarbonisation.

“If we can achieve precision and low-impact mining,” Roocke says, “it means we can still supply the commodities needed to enable us to lead the lifestyles that we lead. Net zero emission mining is an exciting opportunity for the sector, and it is important for us to be able to progress that conversation.” And while the conversation is layered with complexity and the challenge is great, the opportunities are too.

### A word from the CEFC

With mining-related emissions increasing at almost double the rate of the services, construction and transport sectors combined, there’s never been a more critical time to decarbonise the resources sector. That’s why our investments are supporting on-site solar generation and battery storage, the electrification of mining vehicles and equipment and opportunities to bring green hydrogen to mining operations. Having already invested in Australia’s emerging lithium mining sector, we’re also working to accelerate investment in graphite, cobalt and nickel, so Australia can capture the benefits of this once-in-a-generation demand shift to the new minerals that will deliver decarbonisation.

# Building tomorrow's cities

*with Graham Burrows, Director, Jackson Clements Burrows*

**The net zero city of the future is already here. Well, bits of it are anyway. For architect Graham Burrows, our new vision for decarbonisation starts with something old: the building stock we already have in cities and regional centres across Australia, and the embodied carbon it holds.**

"The worst thing you can do is build a building and pull it down in 20 years' time," Burrows says. "That's a terrible carbon outcome. We're going to have to be really resourceful and we're going to have to adaptively reuse a lot of our building stock."

As co-founder and co-director of Jackson Clements Burrows Architects, Burrows is a long-time champion of creative sustainability. And to hear him tell it, we're going to have to get pretty creative when it comes to retooling the structures we already have.

"Let's take a building from the '50s, for example, with really poor thermal envelope properties," Burrows suggests. "We might pull those poorly performing parts of the building off and put high-performing facades on. Those facades might have more opportunity to have openable windows and balconies, light and ventilation, screening in the form of plants and creepers."

Another example is adding on to an existing structure. "Think of a 10-storey building," he says. "To get value out of that site, we might add another five levels onto that building, but we might add that out of timber. We're adding it out of timber because timber is lightweight, timber is low-carbon, timber is inherently sustainable and renewable."

What might this look like as we stroll through future cityscapes? Fewer glass boxes. More sunlight and fresh air. More wood – sometimes visible, sometimes structural. More native greenery and connection to ecosystems. Older buildings changing shape (getting taller, opening up, becoming more innovative and playful) and new builds designed with a changing world in mind.

Strategically, these structures will have to serve multiple functions to stay relevant over time. Either that or change use completely. So, an office building converts to a hybrid hotel and apartment building. A carpark finds new life as a medical clinic. Spaces are flexible and adaptable – continually upcycled as needs change.

This also means designing now for future uses we might not even conceive yet. For Burrows, it's about imagining re-use from the start. Planning grids for an office building that could be easily converted to apartments. Being generous with ceiling heights in carparks – the dead infrastructure of the future as we move away from private vehicle commuting. "Make the structural spans as wide as possible so you can do more with it later," Burrows says. "That's going to be a smart way to think about our futures."

Challenges like these call for tailor-made solutions. No more generic copy-and-paste structures. New and old builds will be radically local, Burrows says: responding to specifics of climate, geography, energy mix, materials, ecosystems and culture.









***Above:** When complete, this 15-level commercial building in Collingwood will be Melbourne's largest mass timber office tower.*

***Left:** Graham Burrows*

***Previous:** Gillies Hall, at Monash University Peninsula Campus, is one of the country's largest cross-laminated timber buildings.*

“One of our colleagues is an Indigenous architect and she says that if you look after Country, Country will look after you. It’s about this inherently reciprocal relationship that we all have with the land. And so we should be designing with care, we should be treading lightly, we should be siting our buildings in the right way so that it takes advantage of the breezes and the orientation,” Burrows says.

Using locally produced and supplied materials – timber, clay, rocks, plantings – will help define this relationship, and cut the carbon impact of transporting products from further afield. Harnessing green energy may be a localised affair too. Solar panels capitalise on sunny weather. Rooftop wind turbines make sense in gusty areas. “We can build a richer and a more meaningful environment in the pursuit of a more sustainable environment. They can coalesce quite beautifully together.”

For Burrows, the net zero city of future holds “a hell of a lot more timber construction”. Hardwoods and softwoods. Timber beams and columns. Cross-laminated timber floor and wall panels. These are engineered products that are strong, durable and low carbon – and they go up fast.

“Certainly timber is far lower in embodied carbon than concrete or steel. And it’s also so fantastically renewable. It regrows! We’re not digging a hole in the ground to dig up iron or to make steel. We’re planting trees and then we’re harvesting them and then we’re planting more trees.”

Not all this timber will be visible in finished constructions. But when wood is exposed, there’s also a “natural biophilic benefit”, Burrows says, pointing to studies that suggest better mental and physical health outcomes for people living and working among natural elements.

While timber is out in front in terms of zero-carbon construction, Burrows notes that manufacturers and suppliers are looking at ways of reducing the carbon content of materials like steel and concrete as demand for decarbonised structures grows.

It also depends on what you do with it. A steel building made from reusable elements that can be unbolted and used elsewhere – much like a giant Meccano set – could be another low-carbon solution. “With steel, you’ve only got the embodied carbon in it once, but if you’ve used it for five different things over the course of 50 or 100 years then that’s great... Thinking about the ability to reuse, recycle and regenerate is really important.”

Interest in low and zero carbon materials and construction practices is on the rise with clients, Burrows says – teamed with the right policy frameworks, it can really help to drive the industry forward.

The future city Burrows looks to is “complex, diverse, thriving, vibrant and low carbon”, he says. “It’s less monocultural and more complex from an ecosystem and also from a functioning point of view.”

We can look forward to multi-purpose spaces and districts: “thriving pockets” dotted throughout what is now suburbia mixing commerce, community and residential needs. The ‘city’ becomes more diffuse. Neighbourhoods become more important. We’re more likely to live and work and play within walking or cycling distance. We value real-life interactions as well as digital dialogue.

And we acknowledge that these spaces are not just for us. Native plants – some animals, too – share our future city space. Greenery helps cool our environment. Rooftops and winter gardens sprout food for humans and insects. Thoughtful landscape integration revives ecologies and real biodiversity comes back to city streets. “That’s the future I want to see,” Burrows says. “How do we re-green the city? It’s a place of concrete and steel and asphalt at the moment – how do we bring green in?”

“As architects, we know how much carbon is involved in the creation of buildings and their consumption of energy. So as a profession and as a culture, we’ve got a huge responsibility to do our very best to strive for net zero carbon and to produce low carbon, highly efficient operating environments. We’re stuffed if we don’t.”

## A word from the CEFC

From our earliest investments in the property sector, diversity has been the name of the game: think energy-efficient buildings, solar panel arrays on industrial complexes, small-scale cogeneration plants, and state-of-the-art lighting. Today, our capital is transforming commercial and industrial precincts, creating green destination points. We’re also repurposing existing properties, giving yesterday’s buildings a second life as low emissions assets. For the future, diversity remains front and centre. We’re extending our reach, locking in green solutions from the earliest planning and design phases, tackling embodied carbon in early-stage construction, and backing new materials and construction methods, including high-rise timber buildings. The potential rewards are substantial: analysis suggests we could achieve close to full electrification across our residential and commercial buildings by 2040.



# Refining our net zero future

*with Kathy Danaher, Vice Chair, Ark Energy Corporation*

**There haven't been many straight lines in Kathy Danaher's long, multi-hyphenated career – but then, the path to becoming one of Australia's most esteemed industrial innovators was always going to take some interesting turns.**

Today, Danaher is leading one of Australia's most exciting industrial transformations, creating a futuristic hydrogen hub that will help position Queensland's far north at the forefront of the world's minerals supply chain. It's an ambitious project, with the potential to revolutionise the way Australia's refinery companies do business. Success will depend on the careful management of many complexly interwoven parts. But with Danaher at the helm, success is all but assured.

She has been here before. A few years ago, as CFO of Sun Metals, Danaher oversaw the development of a solar farm designed to provide 25 per cent of the energy needed to power the company's zinc refinery. It was a bold step into a new frontier.

"Back in 2016, there weren't many of these around," she remembers, "so we learnt a lot by building it. A lot of new partnerships and processes had to be set up, but we pulled it off – our Townsville solar farm is still the largest consumer-owned integrated industrial solar farm in Australia."

Born in rural Victoria, Danaher studied accounting before landing her first full time job after leaving university at one of the world's largest oil and gas supermajors. "I had no idea it was BP until I turned up for the interview," she remembers. "It gave me great business exposure to oil, gas, refining and even renewables through BP solar, which was at its infancy then."

As the world's largest producer of zinc, lead and silver, Korea Zinc plays a crucial role in global supply chains. It's the kind of work that usually comes with a big carbon footprint – metals extraction and processing accounts for one-tenth of global greenhouse gas emissions. But Danaher is proof that our extractive industries don't have to be dirty.



*These 140-tonne rated Hyzon Motors hydrogen fuel cell trucks are expected to be the first of their kind in Australia*



As she did with Sun Metals, Danaher is leading the charge to help decarbonize Korea Zinc and its subsidiaries; from the top-down, the group is committed to the RE100 goal of using 100 per cent renewable energy in its hard-to-abate operations.

The path towards RE100 is challenging, but with some hard work, a little robust investment and a lot of that famous Aussie ingenuity, it's one Danaher is making great strides on. Most recently, Ark Energy unveiled plans to build its green energy export corridor in Queensland. Under this plan, Australia will begin exporting more than one million tonnes of green ammonia to Korea in 2032. That green ammonia – a byproduct of green hydrogen – will be produced by electrolyzers powered entirely by renewable energy.

It's the realisation of a long-term goal to see Australia further develop its green hydrogen export industry. As Danaher says, the country's northern states and territories are prime candidates for the nation's move to net zero. "In Queensland, the combination of solar and wind works particularly well for us, as the sun shines in the day and the wind blows at night – enabling us to maintain more of a flat load." Other traditional industries, like cattle farming, have a role to play, too. "They tend to like the security of a regular income stream," Danaher says, "which wind farms can offer them while usually only occupying less than one per cent of their properties."

For her part, Danaher is focused on delivering tangible gains for Australia while work takes place on building Queensland's green energy corridor. Exporting to their parent company in Korea is the ultimate goal, but Danaher says Ark Energy's initial efforts will focus on building a domestic hydrogen market. "We're in the middle of building a 1 MW plant in Townsville to produce, compress and store hydrogen [that] will then be used in our logistics business to displace diesel in our ultraheavy

triple-road train trucks." Moves like these are set to help further reduce the cost of green hydrogen – which is already approaching competitiveness for heavy trucking and buses – while simultaneously reducing Australia's greenhouse emissions, a third of which are currently associated with the transport sector.

For Danaher, the sense of collaboration is the most exciting component of the project. "It's a very satisfying experience," she says, "solving problems as a collective; having different people in a room with different perspectives and ideas. Especially when you have that 'Aha!' moment, when the answer becomes clear."

### A word from the CEFC

Manufacturing and industrials are widely considered as 'hard-to-abate' sectors, meaning that achieving net zero emissions is more difficult and more costly than in other economic sectors due to the energy-intensive nature of their operations. But from a CEFC point of view, 'hard-to-abate' doesn't mean 'can't abate'. In fact, in our first 10 years, our two largest transactions in terms of forecast emissions reduction have been in manufacturing activities – one related to chemicals, the other to food. It's a model we are pursuing in other areas of the manufacturing sector, backing investments that re-tool operations to support electrification at scale and bringing the benefits of renewable energy to large-scale sites. We're also looking to back new industries such as green steel, low carbon cement and energy-efficient chemicals production.

# Getting from A to B on the way to net zero

*with Tim Washington, Founder and CEO, JET Charge*

**To look at Tim Washington now, you could be forgiven for thinking he had the whole thing mapped out; so well does he suit the role of founder and CEO of Australia's largest provider of electric vehicle charging technologies, surely this was the business plan from day one.**

As it happens, good timing, serendipitous tech advances and a little-known entrepreneur by the name of Elon Musk all played a part in the success of JET Charge. And if all goes to plan, they'll have had a role to play in Australia's net zero successes as well.

It all started in 2012 when Washington was looking for a way out of his family's fashion business. Tesla had just launched its game-changing Model S in the US, prompting the self-professed tech geek to ask himself an obvious question: how will the new generation of motorists fuel their EVs? Washington confesses that he jumped in the deep end to try and answer that question with little pre-existing knowledge of the technical challenges he was taking on.

"All I knew was that you didn't have to go to a petrol station, and if you didn't have to go to a petrol station, that had to mean something big," Washington explains from his Port Melbourne office. "My simple thesis was basically that people would want a specialist service for the installation of charging stations in their home for the Tesla."

And perhaps just as importantly, he thought maybe, just maybe, that specialist service would provide other energy benefits as well. He wasn't wrong. A decade later and JET Charge has started deploying Australia's

first consumer bi-directional charger – a revolutionary piece of kit that, once the final regulatory and technical hurdles are cleared, will allow the country's more than three million solar households to charge their EV batteries during the day and then use the stored energy to power their homes when the sun goes down.

The breakthrough promises to turn EVs into batteries on wheels, a deceptively simple trick that could help us overcome some of our thorniest net zero challenges: eradicating fuel bills and reducing home energy costs for individuals on the one hand, and slowing transport emissions – Australia's fastest-growing source of pollution – on the other.

Combine these with other advances in transport technologies, from the increased rollout of e-bikes to the use of hydrogen in long-haul trucks and shipping to the potential for biofuels in aviation, and the future is starting to look very net zero indeed. It wasn't always this way. Back when Washington started JET Charge in 2013, the budding entrepreneur encountered roadblock after roadblock. "I knew we were in for an uphill battle," he says, reflecting on the once pervasive scepticism that EVs would ever become an everyday option for 'regular' people. "And in some ways, that's a battle we continue to fight to this day. But I knew then as I know now that it's a fight we are going to win."

It's an optimistic outlook, but one anchored by some pretty solid evidence. Namely, the finances are starting to stack up. "When I first saw there was a clear trend to electric vehicles being cheaper to buy and run than traditional vehicles, I knew it was only a matter of time," Washington says.





*“Washington predicts that by 2032, about 30 per cent of Australians will be driving EVs... After 2040, things may start to get downright sci-fi.”*

The widespread increase in EV sales over the past decade would seem to confirm this hypothesis: more than 60 per cent of new cars sold in Norway last year were battery electric, and a further 22 per cent were plug-in hybrids. Meanwhile, EVs make up approximately 20 per cent of all new car sales in Europe, China and California.

Such advances give Washington hope about the future of an Australia beyond petrol. In 2021, EV sales in Australia tripled, making up two per cent of new cars sold, a 1.2 per cent increase on the previous year. And, despite the late start, he believes Australians are particularly well-positioned to make the transition quickly and efficiently. One reason for this is the availability of off-street parking in our cities. Between 60 and 70 per cent of local homes have access to a private parking space, making it far easier to install charging points in Australia than in countries that rely more heavily on public stations. As Washington says, “if you can charge from home, you can benefit from an EV”.

But while Washington recognises the challenges ahead of us – we’re a long way behind our Scandinavian counterparts – he is bullish about our chances. So bullish, he’s even happy to make a wager on the issue. Washington predicts that by 2032, about 30 per cent of Australians will be driving EVs. And he sees that number increasing to 100 per cent by 2040. At that point, Washington says, the EV industry and the car and energy industries will be one and the same, with every Australian car owner suddenly in possession of their own generator and energy storage device.

After 2040, Washington says things may start to get downright sci-fi. Delivering a webinar for the Clean Energy Council in 2021, he predicted that over the next five years, the increasing capacity of EVs to store and move energy will work to transform the country’s electricity networks, using electric vehicles to “essentially act as batteries to support the grid in times of need”.

After this, Washington predicts EVs will ultimately “become” the grid, acting as a “legitimate alternative” to traditional poles and wires, with algorithms directing the flow of energy to where it is needed.

Until then, Washington is getting on with the hard work of realising our net zero future. He reiterates the challenges. “It’s a monumental task that fills me with an innate sense of long-term urgency,” he says. But Australians have been known to do a lot with a little, and in a short amount of time. One reason for hope is the success of Australia’s rooftop solar sector. In addition to providing emissions-free, low cost electricity to fuel EVs, our world-leading installation rate shows that new technologies can help to level the playing field for consumers.

He cites the example of a worker with a long commute. “Think about the people who drive a hundred kilometres a day to get to work. They’re already at a disadvantage because they’re time-poor. Then they have to travel and pay more for petrol. With electric vehicles, bi-directional charging and rooftop solar, we can actually solve much of that inequity.”

It’s these same ‘regular’ people – the ones critics claimed EVs would leave behind – that Washington says are now lining up to enter the electric vehicle business. JET Charge often receives expressions of interest from former FIFO electricians looking to find a more stable line of employment. “So many people have joined us from the so-called ‘traditional industries,’” Washington says, a note of contentment in his voice. “To see the next generation of apprentices and project managers figuring out their role in the transition, it fills you with hope.”

“This is one of the most important transitions to happen for several generations in transport,” he says. The next few years will require careful navigation. But with the roadmap laid out carefully, the only way is forward.

## A word from the CEFC

At the beginning of the 20th century, it was the invention of the Model T Ford that set transport in a whole new direction. Or perhaps it was the switch from hot air balloons to what would eventually become commercial aircraft. In the 21st century, as we tackle transport emissions related to these innovations, it’s the battery that’s changing everything – from e-bikes to e-vehicles, e-buses to e-farming equipment and even underground mining vehicles. And then there is the potential of green hydrogen for heavy vehicle haulage, shipping and even aviation. While these technologies will make transport more efficient, they will also do so with far fewer emissions. For the CEFC, that means continued investment in infrastructure, new technologies and new modes of transport, so that in getting from A to B, we are on track for net zero.

“The CEFC was a key partner in bringing Bank Australia’s Clean Energy Home Loan to life, using its investment to back our product as well as drive forward the market for green mortgages in Australia. As we look towards our target of reaching net zero by 2035 across the homes we fund, the knowledge we’ve gained with the Clean Energy Home Loan will be instrumental in helping us get there.”

*Jane Kern, Head of Impact Management, Bank Australia*

# Coming home to a greener future

*with Susan Lloyd-Hurwitz, CEO, Mirvac*

**The past decade in real estate has been defined by a series of practical, Scandinavian-infused trends that are changing the way our homes look and feel. But one among them stands supreme: sustainability. From rooftop solar to better insulation, more of our buildings are designed to be easier on the environment. The shift is edging us along the path to net zero, and proving to be good business.**

"Ninety-nine times out of a hundred, being a leader in sustainability creates real business value," says Susan Lloyd-Hurwitz. "It creates a sense of trust, which in turn creates business opportunities. It also gives people something that enables them to have impact."

As the CEO and Managing Director of Mirvac, one of Australia's leading sustainable property developers, Lloyd-Hurwitz understands how real estate and the environment intersect. Not only was Mirvac the first Australian property company to become net positive in carbon, it managed to get there nine years ahead of schedule. The key to this over-delivery, Lloyd-Hurwitz says, was being ambitious while owning up to potential limitations. "The acknowledgement that we didn't already have all the answers was powerful," she says, because it meant success "wouldn't be a case of looking out the window and waiting for an idea to miraculously appear."

What it did mean was placing a renewed focus on learning and innovation, embedding an innovation methodology across the business with employees – from engineers to managers – expected to question things. It proved crucial to getting the company to think about sustainability at every level.

Now, Mirvac's new homes come with a rooftop solar system and battery, reducing household energy costs by up to 90 per cent. And by spending just 0.7 per cent of its construction budget on sustainable design, Mirvac saved \$337,000 in annual energy costs at its Sydney-based LIV Indigo complex, about half of which flows to residents. Lloyd-Hurwitz forecasts more change in the property sector in the coming years, from building materials made out of recycled glass and textiles to a zero-waste philosophy. "It's taken a bit of courage to lead the way," she says. But fortune does tend to favour the brave.

## A word from the CEFC

Home is where the 'green heart' is – or at least it will be as we look to a more sustainable solution for one of our most basic human needs. It's now a truism that a greener approach to residential development can deliver immediate and substantial benefits, from lower emissions and operating costs to a more comfortable living environment. That's why we're delivering sustainability-focused capital to landmark green housing developments, community and social housing, the emerging build-to-rent sector, student and aged care accommodation. It's also why we've led the development of Australia's green home loan market, helping home buyers bring a greener approach to their day-to-day lives.



*Above: The Mirvac LIV Indigo project brings clean energy benefits to the rental market*

*Right: Susan Lloyd-Hurwitz, CEO, Mirvac*







# From food waste to feedstock

*with Olympia Yarger, Founder and CEO, Goterra*

**It's safe to say that anyone involved in insect farming has an interesting story about how they came to the job; few people grow up imagining a life tending to maggots. Even so, Olympia Yarger's is about as unexpected as they come. After leaving the family farm, the Canberra native decided to return to agriculture as an adult.**

"I looked at a bunch of farming systems I could be part of, but the cost of feed kept preventing them from being viable," she remembers. Eventually, she stumbled on the idea of using insects as a cheap way to make her own feed. "And once I started doing it, I realised that it was farming in its own right."

Flash forward to 2022 and Yarger is the founder and CEO of Goterra, a high-tech waste management company that uses black soldier fly larvae to convert food waste into protein. And while insect farming is nothing new – humans have been doing it as far back as Ancient Greece – what Yarger offers is a more sustainable way to do it. "Goterra is a robotic insect farm," she explains, referring to the bright blue remote-controlled modular containers she invented that mash up food waste then convey it to waiting insects at feed time. "Insects need a place to live and be fed," she says. "If we can do this autonomously, we take away a lot of the cost of managing the insects."

But Yarger has her sights set on something much more ambitious than lowering the cost of insect farming. Food waste accounts for eight per cent of global carbon emissions. Put another way, if food waste was a country, it would be the third highest emitter after the US and China. Composting food waste is often discussed as a solution. But even greater gains could be made if that food

waste was eaten by insects – especially if those insects were then used to feed our stock animals and pets. It's a highly sustainable process with virtually no agricultural input, water or pesticides required. And it's a model that's whetting appetites across Australia.

Goterra deployed its first robot in 2020; in just two years the number has increased to six. "We have plans for there to be many, many more," Yarger says, adding that it isn't only agribusinesses that have come knocking. "Our clients are from all sectors: government, waste management, multi-asset managers." But while the business outlook is good, she stresses that Goterra has a higher calling. "For us it's all about creating a circular economy, whether in metropolitan, regional or rural Australia."

## A word from the CEFC

Sometimes the best idea really is the one that hasn't yet been tried. Of course, it takes imagination and confidence to bring those ideas to reality – and the right capital. In our first 10 years, we have worked with more than 100 innovative companies doing just that, backing new ideas, technologies, markets and models, all with a shared goal of cutting emissions. Because when it comes to using cleantech innovation to deliver net zero, we see opportunities across all areas of our economy. It's why we're proud to be Australia's largest specialist cleantech venture capital investor, and to be leading the creation of a dedicated new cleantech fund manager, Virescent Ventures.



## A message from The Hon Chris Bowen MP

*Minister for Climate Change and Energy*

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It is my great privilege to mark the 10th anniversary of Australia's Clean Energy Finance Corporation, the world's largest and most successful green bank. The CEFC is the proud legacy of Labor in government, and over the last decade, it has played an integral role in the nation's clean energy transformation. It has made \$10.76 billion in investment commitments, driving total transaction value of around \$37 billion in 265 large-scale and more than 36,750 smaller-scale projects.

But that is nothing compared to the work the CEFC will be called on to do over the next 10 years as we decarbonise our industries, transition to a clean energy economy and meet our commitment of net zero emissions by 2050. We need to upgrade our electricity grid and boost the uptake of renewable energy generation while abating millions more tonnes of emissions. This will be the largest transformation in our nation's history, and the CEFC, and its sister agency ARENA, will be vital to its success.

I congratulate the CEFC on your leadership in this transformation so far, and for all the work still to come.



The CEFC is a specialist investor at the centre of efforts to help deliver on Australia's ambitions for a thriving, low emissions future. With a strong investment track record, we are committed to accelerating our transition to net zero emissions by 2050. In addressing some of our toughest emissions challenges, we are filling market gaps and collaborating with investors, innovators and industry leaders to spur substantial new investment where it will have the greatest impact. The CEFC invests on behalf of the Australian Government, with a strong commitment to deliver a positive return for taxpayers across our portfolio.

[cefc.com.au](https://cefc.com.au)



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