

MONASH
NET ZERO
INITIATIVE





Leading the way to a **100% renewable energy future**

Energy and the technology it powers has become fundamental to our ever increasing quality of life. But if we keep doing things the way we've always done, we're going to cause irreversible damage to our environment. It's not sustainable, and it's not fair to future generations.

As Australia's largest university, with more than 70,000 student enrolments and over 150 buildings spread across four domestic campuses, we're a significant consumer of energy.

That's why we're taking ambitious action to **completely transform how we use energy** at Monash.

The goal? Net zero carbon emissions from our Australian campuses by 2030.

This is the **most ambitious project** of its kind undertaken **by an Australian university**.

We're putting theory into practice and **creating meaningful change for our world**.

It starts with revolutionising our infrastructure and the way we do things.

Through applied research and industry partnerships, a scalable clean energy network will be developed that can be tested here and deployed around the world.

We'll become the premier destination for future leaders to research, collaborate and learn how to power a sustainable world.

We're proud to be leading the way to a **100% renewable energy future**.

Net zero carbon emissions by 2030

We have **a game-changing strategy to transform the way that we use energy**. This will significantly improve the impact that our University has on our environment.

It starts with **generating as much energy from our large-scale on-site solar arrays as possible, and sourcing the rest from off-site renewable energy sources**.

In the next 13 years, we'll **eliminate our dependence on coal-fired energy sources**. All of our buildings and appliances will be converted to electric, ensuring we only use clean, renewable energy.

Over time, we'll **reduce our overall energy consumption** with energy efficient technologies such as heat pumps, high-performing building facades and more efficient lighting and appliances.

We'll start by building an on-site microgrid at our Clayton campus. We'll be able to control when and how we use our power, making energy more reliable, efficient and affordable.

We'll work closely with research organisations, industry and government to lead the way to **global energy sustainability** in the future.

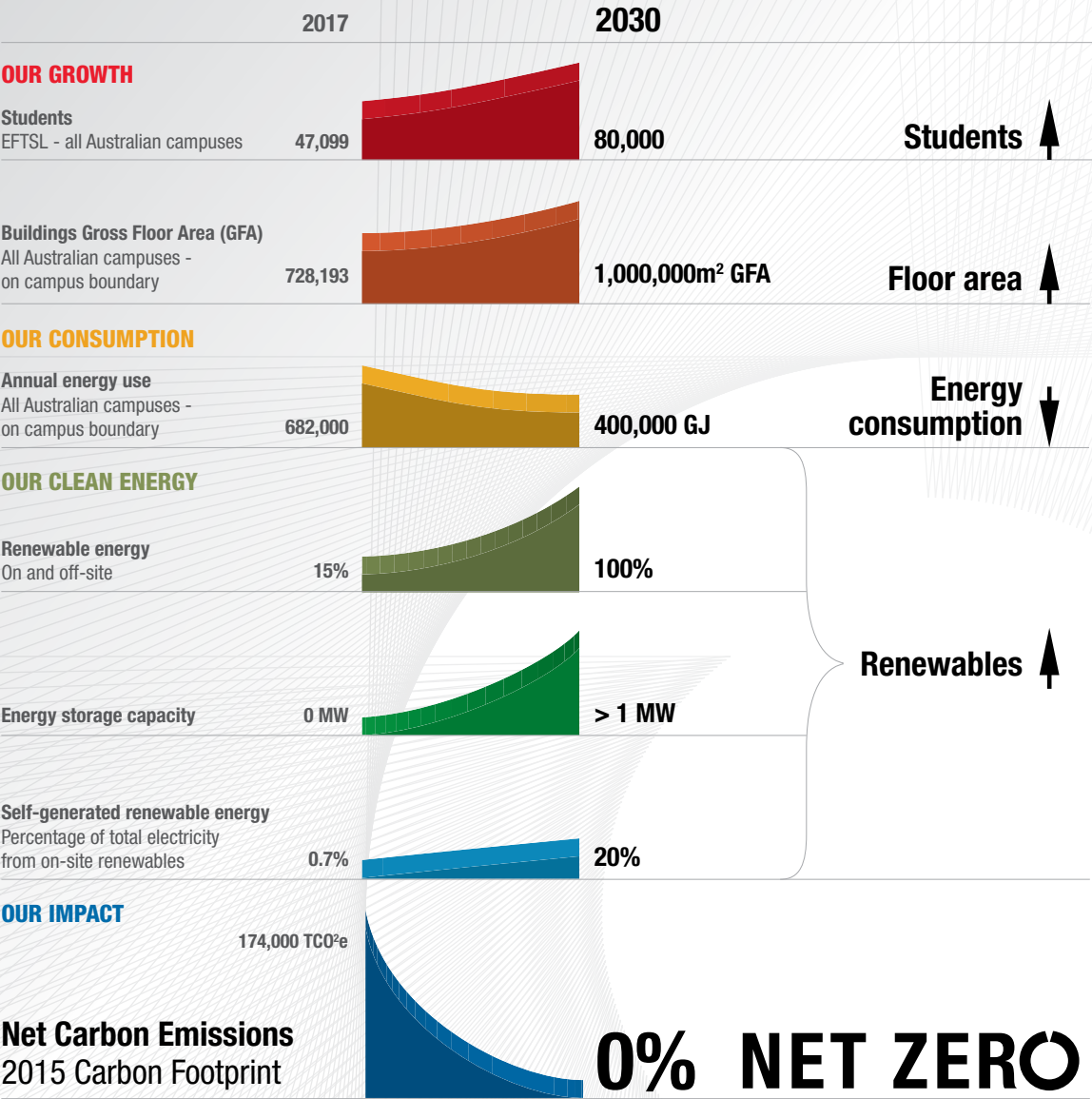
And we'll do it all by 2030.

"Monash supports and promotes the principles of the Sustainable Development Goals through our world-leading research, innovation and education. We will strive to ensure our campuses and major programs are environmentally sustainable and socially inclusive, which will include reporting on our activities in support of the goals."

Monash University President and Vice-Chancellor Professor Margaret Gardner AO



Our commitment



Source: ClimateWorks Net Zero Emissions Strategy Report (March 2017)

Environmental sustainability begins on campus

We're committed to making an impact on a global scale, and it starts in our own backyard.

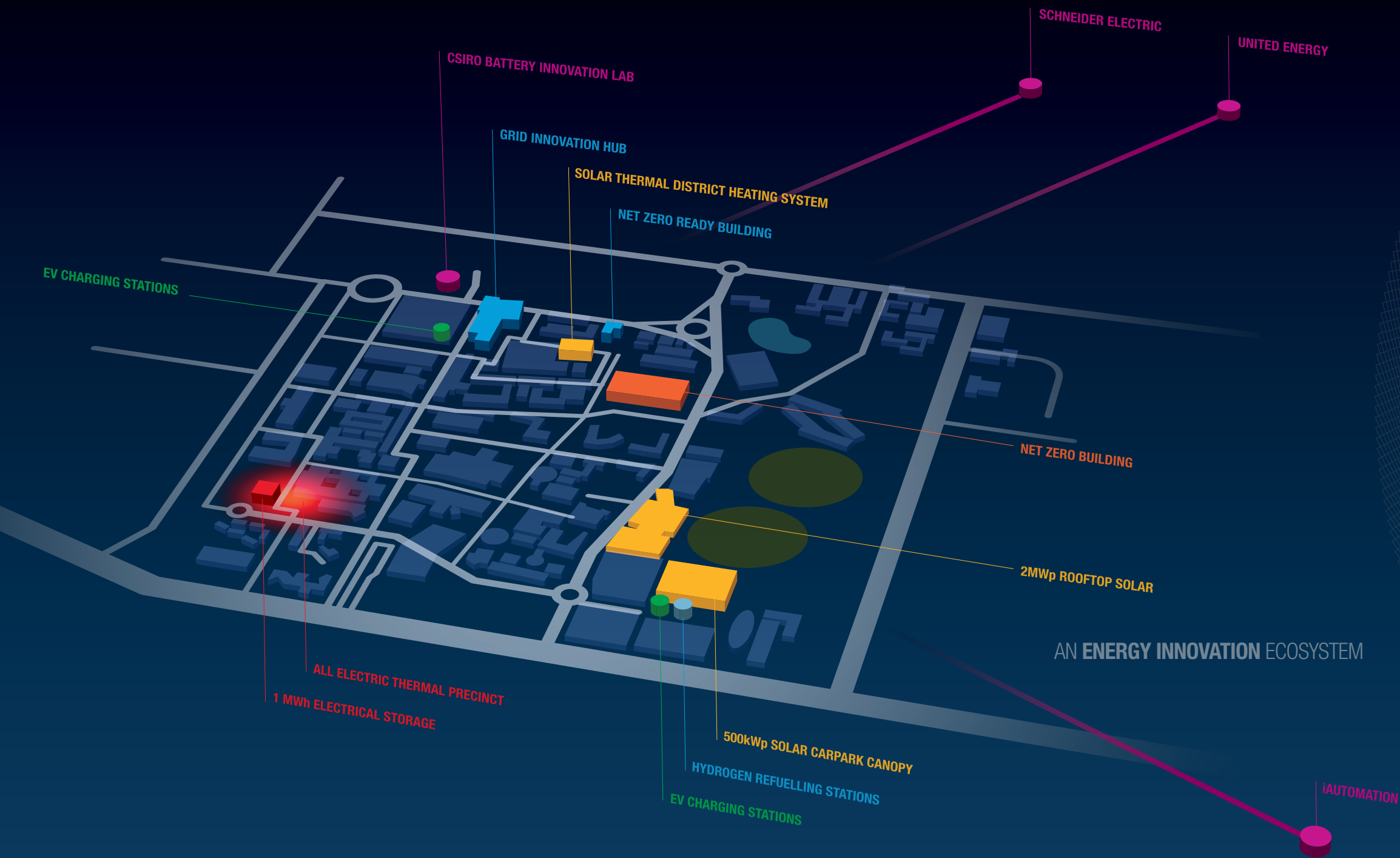
Over the past decade, **our campuses have become thriving community centres**. Changing student expectations has meant that our libraries, amenities, and public spaces now remain open and accessible for longer than ever before.

Putting it into perspective, we have 2,800 students who live on our campuses all year round and numerous libraries that are open seven days a week – that's a lot of energy consumption just there. With our energy bills currently pushing \$12 million per annum, and expected to nearly double in the next two years due to rising energy prices, it's also a significant cost that we can put to far better use.

In 2015, **76% of the University's total carbon emissions resulted from heating, cooling and operating our buildings**.

We know that to be environmentally sustainable, we need to reduce our impact as we continue to grow.





Driving local innovation and game-changing energy technology

Monash University's Clayton campus sits at the heart of a vibrant and expanding Clayton Innovation Precinct. This precinct is home to CSIRO and a host of innovative manufacturing enterprises.

The precinct also plays host to an emerging energy ecosystem which houses some of the world's most progressive energy brands. Currently more than 15 leading energy brands operate within 3 km of Monash's Clayton campus.

This environment provides the critical elements for ground-breaking industry partnerships, research collaborations, and the development of technology prototypes that can be locally tested.

Our Net Zero Initiative will enhance our research and learning opportunities. Our future engineers and leaders will learn how to power a sustainable world. Together, we'll role-model global energy best practice.

Putting world-leading research to work

Our Net Zero Initiative **puts our leading research institutes into action** – not in a lab or a small test environment – but in a living, breathing energy-hungry campus environment. We're committed to playing a fundamental role in achieving the United Nations Sustainable Development Goals by **ensuring our campuses and major programs are environmentally sustainable and socially inclusive.**

Drawing on research from ClimateWorks' 2014 report, 'Pathways to Deep Decarbonisation in 2050: How Australia can prosper in a low carbon world', our Net Zero Initiative will focus on:

- > Reducing our energy consumption
- > Electrifying our campuses so we don't need to use natural gas
- > Generating and buying renewable energy
- > Innovating how we store and use renewable energy
- > Engaging our communities to help us create a clean future

Our world-leading research contributors

ClimateWorks Australia

ClimateWorks Australia is an expert, independent adviser, acting as a bridge between research and action to enable new approaches and solutions that accelerate Australia's transition to net zero emissions by 2050. It was co-founded in 2009 by The Myer Foundation and Monash University and works within the Monash Sustainable Development Institute.

Monash Energy Materials and Systems Institute (MEMSI)

MEMSI is a multidisciplinary research environment that interfaces academic energy research and industry. It brings together researchers from across Monash University in partnership with industry to develop solutions to global energy problems.

Monash Sustainable Development Institute (MSDI)

The Monash Sustainable Development Institute is one of the leading interdisciplinary research and education institutes for sustainable development around the globe. MSDI is driven to find real solutions to some of the most significant challenges facing our world today.



Our path to Net Zero

Monash was the first Australian university to commit to an energy reduction target and we're proud to be a leader in taking action on climate change.

Since then, we have been actively reducing our carbon impact and laying the foundations for the Net Zero Initiative.

2005

We began measuring and reporting on performance in Energy and Emissions, Water, Waste and Recycling, Transport and Engagement

We set an energy reduction target of 20%

2009

We installed solar panels on each of our campuses and started generating renewable energy

2016

We formally committed to achieving the 17 Sustainable Development Goals

We generated more than 650,000 kWh of renewable energy from our Australian campuses – enough to power 130 Victorian homes for 1 year

2020

Build an on-site microgrid at our Clayton campus

Create an energy innovation ecosystem within the Clayton Innovation Precinct

Build Australia's largest net zero energy building

40% reduction in campus carbon emissions

10% reduction in non-renewable energy consumption

55% of electricity purchased from renewable sources

Develop more than 25 energy-relevant research programs through our Monash Energy Materials and Systems Institute (MEMSI)

Fund 10 foundation PhD scholarships dedicated to energy research and advancement of sustainable technology research with industry partners

Contribute energy (ancillary services) back to the Victorian energy grid to improve stability and resilience

Increase our on-site solar energy generation capacity to 7% of overall energy usage

2030 NET ZERO

Replace all of our appliances so they only use electricity

Convert all light fittings across our campuses to LED

Purchase 100% of our energy from renewable sources

Achieve Passive House certification for all new buildings

Change all heating and hot water plants from gas to electric heat pumps

Increase our on-site solar energy generation capacity to 5.5 million kilowatts (20% of usage)

Control how and when we use energy to reduce demand and strain on the network

Build Australia's largest urban solar farm, turning every practical rooftop and carpark on our campuses into a solar power generator

Net Zero in action

We're clear on our goal — net zero carbon emissions. By 2030, our buildings and operations will only be powered by renewable energy sources.

This is how we will do it.

Reducing our energy consumption

- > Convert more than 68,000 light fittings across our campuses to LED
- > Improve insulation and sealing of our buildings
- > Upgrade more than 150 boilers and chillers to electric super-efficient heat pumps
- > Achieve Passive House certification for all new buildings

Electrifying our campuses so we don't need to use natural gas

- > Change all heating and hot water plants from gas to electric heat pumps
- > Replace all of our appliances so they only use electricity

Generating and buying renewable energy

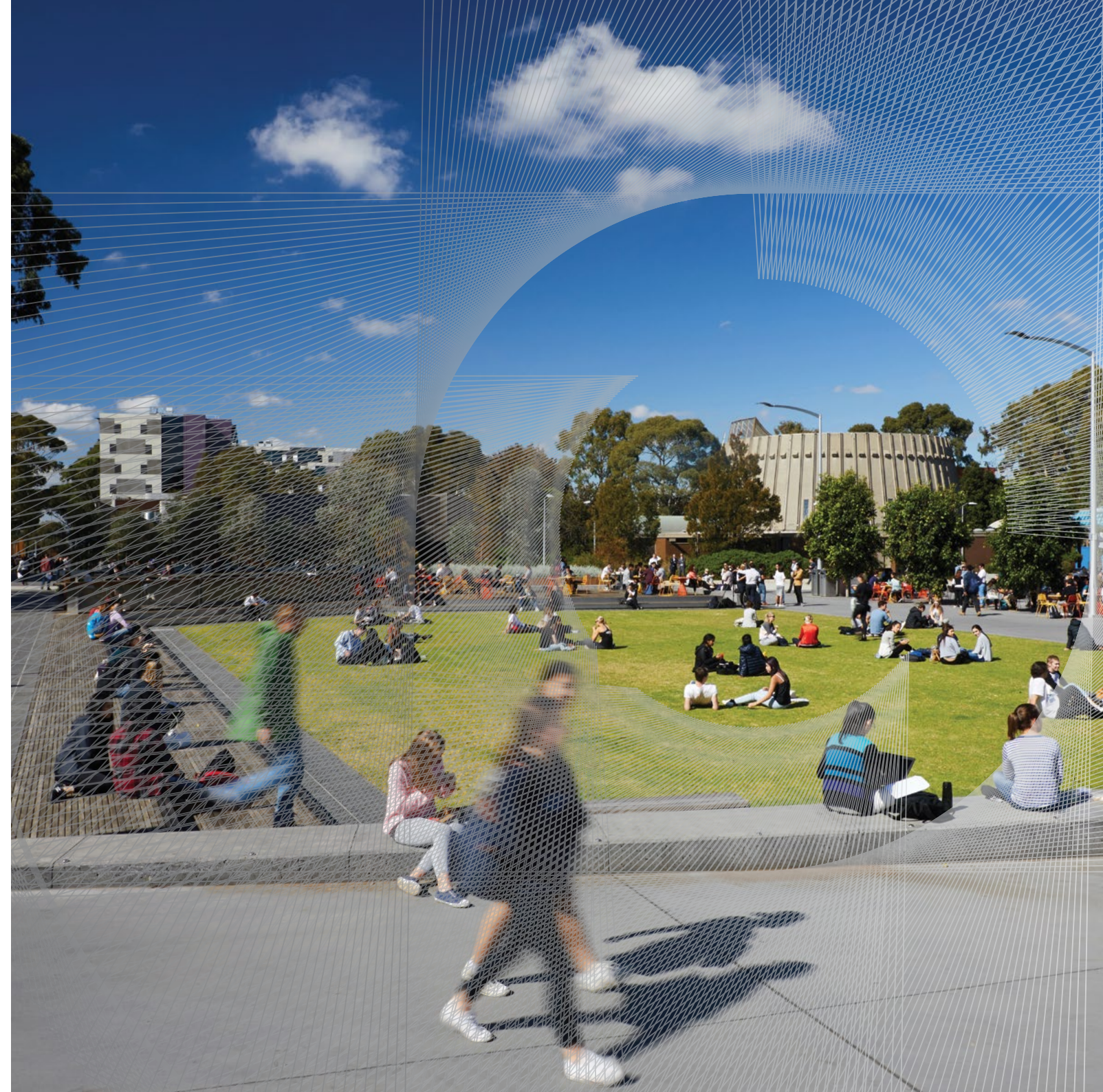
- > Build Australia's largest urban solar farm, turning every practical rooftop and carpark on our campuses into a solar power generator
- > Increase our on-site solar energy generation capacity to 5.5 megawatts, enough to power 1300 Victorian homes for 1 year
- > Purchase 100% of our energy from renewable sources

Innovating how we store and use renewable energy

- > Build an on-site microgrid at our Clayton campus
- > Power our campuses with renewable energy
- > Control how and when we use energy to reduce demand and strain on the network
- > Contribute energy back to the Victorian energy grid to improve stability and resilience
- > Create an energy innovation ecosystem within the Clayton Innovation Precinct

Engaging the communities in which we operate

- > Engage our University community to drive energy awareness and action
- > Fund foundation PhD scholarships dedicated to energy research and advancement of sustainable technology research with industry partners
- > Develop more than 25 energy-relevant research programs through our Monash Energy Materials and Systems Institute (MEMSI)
- > Seek long-term industry partners to help us build the future of energy



Net Zero Initiative

Monash's Buildings and Property Division construct, operate and maintain Monash's infrastructure to ensure usability, durability and longevity to benefit the University now and in the future. As stewards of the University, the Division is committed to incorporating environmental sustainability into all facets of Monash's operations.

monash.edu/net-zero-initiative

Research opportunities

The Monash Energy Materials and Systems Institute (MEMSI) is a multidisciplinary research environment that interfaces academic energy research and industry. MEMSI brings together researchers from across the University in partnership with industry to develop solutions to global energy problems.

memsi.monash.edu