UNSW Estate Management

June 2023

Environmental Sustainability Report 2022

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Acknowledgement of Country

UNSW Sydney acknowledges the Bedegal people (Kensington Campus), Gadigal people (Sydney CBD and Art & Design campuses) and Ngunnawal people (UNSW Canberra – ADFA) as the traditional custodians of the lands on which each UNSW campus is located.

For tens of thousands of years, Aboriginal and Torres Strait Islander people managed the land sustainably using practices adapted to its unique climate, geography and ecology. We honour their relationships with the land and their rich contribution to society.

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A message from the Vice-Chancellor and President

I am pleased to introduce the Environmental Sustainability Report 2022, the first progress report of the Environmental Sustainability Plan 2022-24, which deepens UNSW's commitment to environmental sustainability and builds on our significant achievements to date.

UNSW has a strong heritage of expertise in climate science and sustainability. As a public service university, we have a responsibility to use our rich source of knowledge and capability to deliver solutions to the climate crisis and secure a more liveable world.

Our planet is at a critical point. The UN Intergovernmental Panel on Climate Change (IPCC) AR6 Synthesis Report: Climate Change 2023 states climate change is a threat to human wellbeing and planetary health. It reiterates the urgent need for the world to cut emissions and adapt to the new climate realities. Momentum is building for change: at the UN Biodiversity Conference (COP15), held in Montreal at the end of 2022, a historic deal was struck to halt biodiversity loss by 2030 including the protection of 30 per cent of the planet's land and seas.

UNSW's Environmental Sustainability Plan 2022-24 guides the University's strategic planning and contribution to the United Nations Sustainable Development Goals (SDGs). The Plan identifies three themes: *Climate action, Living campuses and Resource efficiency.* New goals include achieving a net gain in biodiversity value at Kensington campus – at least 80% of campus retailers achieving Plastic-Free Dining gold status, as well as increasing targets for energy and water efficiency, waste reduction and onsite solar photovoltaic (PV) capacity.

This report highlights our actions and progress against the first year of the Plan.

Having switched to 100 per cent renewable electricity in 2020, our focus is now on electrifying campus infrastructure and tackling 'scope 3' emissions: those from our suppliers, travel and investment activities. In 2022, the University developed an Electrification Strategy, which will guide the phasing out of gas and other fossil fuels and electrifying our campuses to meet the University's energy needs.

Our progress towards net zero emissions was recognised at the Bankisia Foundation 2022 NSW Sustainability Awards, with UNSW winning the 'Net Zero Action' category. With the installation of the Paddington campus' first solar PV system, UNSW now has a total of 1.37MW installed solar PV capacity, placing us on track to achieving our target of 1.5MW by 2025.

In 2022, we expanded the Laboratory Efficiency Assessment Framework, an initiative that drives sustainable practices in laboratories, following a successful pilot in 2021. Twenty-two laboratory groups have joined the program, achieving significant decreases in single-use plastics and carbon emissions.

We took further steps to improve waste management with new food and compostable packaging bins introduced in staff kitchen areas across the Kensington campus in 2022. This builds on our existing programs, including Plastic Free Dining, which aim to eliminate single-use plastics and and divert waste from landfill.

In 2022, UNSW made the Nature Positive Pledge – a commitment to determine a baseline of our impact on nature and set specific, measurable targets for biodiversity. Supporting this commitment, UNSW is restoring the Fowlers Gap Arid Zone Research Station in outback New South Wales into a dedicated site for conservation after more than 150 years of agricultural land use.

These impressive achievements reflect our ambition to be a catalyst for an environmentally sustainable future through collaborative research, partnership and innovation. UNSW made great progress towards our environmental sustainability goals in 2022, and the Environmental Sustainability Plan 2022-24 will continue to drive our efforts.

I am proud to lead a university with such a strong sense of responsibility and commitment to environmental sustainability. Thank you to everyone in the UNSW community who is advancing these initiatives to build a more sustainable world, and ultimately improve the lives of people in Australia and around the world.

Professor Attila Brungs
Vice-Chancellor and President
UNSW Sydney

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2022 highlights

> Won a Banksia 2022 NSW Sustainability Award in the 'Net Zero Action' category.

> Completed the Electrification Strategy and Paddington solar PV project to continue our transition towards clean renewable electricity.

> Implemented low-emissions and fossil-free investment strategies.

Living campuses

> Introduced the Plastic Free Dining Awards to recognise campus retailers.

> Expanded food waste collection to office kitchens and introduced a soft plastics collection system.

> Furniture reuse program diverted 84% of surplus UNSW furniture from landfill to beneficial reuse.

> UNSW ranked joint fifth in the world and joint first in Australia in the inaugural QS World University Sustainability Rankings for its contribution to tackling global environmental, social and governance challenges.

> UNSW jumped 41 places to 55th in the world out of 1,406 institutions in the Times Higher Education Impact Rankings, which measure research, outreach and stewardship against the SDGs.

Climate action

Living campuses

> Expanded the Laboratory Efficiency Framework (LEAF) program, with 22 laboratory teams participating and 18 now accredited University-wide.

> Began restoration of Fowlers Gap Arid Zone Research Station into a dedicated site for conservation and research.

> Village Green project was completed, incorporating sustainable design features.

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Environmental sustainability at UNSW

UNSW Sydney is an education and research-intensive university, which delivers outstanding teaching alongside cutting-edge research. Established in 1949 and with campuses in Sydney and Canberra, UNSW is principally focused on the scientific, technological and professional disciplines. Environmental sustainability is a key element of our updated 2025 Strategy.

Many of our students and staff are actively engaged in environmental and social issues. We recognise that we are uniquely positioned to contribute to solving global environmental challenges through teaching, research, thought leadership and demonstrating leading practices on our campuses.

UNSW's environmental sustainability program is led and coordinated by the Sustainability unit within Estate Management, in collaboration with students and staff across academic faculties and divisions.

Our Environmental Sustainability Plan 2022-24 supports the 2025 Strategy, in particular:

Theme 03 – Sustainable Development:

Objective 2 – Reduce our environmental footprint by using natural resources more efficiently, reducing waste and ensuring investments are consistent with the UN SDGs.

Enabler 04 – Enhance our Campuses:

Objective 2 – Position our campuses and the activities they support as leaders in sustainability practices. We can do this by minimising our environmental footprint and improving Resource efficiency.

UNSW and the global goals

The 2030 Agenda for Sustainable Development, adopted by all UN Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 SDGs, which aim to tackle the world's most pressing challenges by 2030 – including ending poverty, delivering more equitable prosperity and protecting the planet.

Universities have a critical role to play in the achievement of the SDGs. The Environmental Sustainability Plan supports UNSW's contribution to the following seven SDGs and their associated targets.

Climate action

> 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.

> 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

> 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development.

Living campuses

> 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

> 12.2 By 2030, achieve the sustainable management and efficient use of natural resources.

> 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

> 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

Resource efficiency

> 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

> 7.3 By 2030, double the global rate of improvement in energy efficiency.

> 12.2 By 2030, achieve the sustainable management and efficient use of natural resources.

> 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

> 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

> 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

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The Environmental Sustainability Plan 2022-24 at a glance

UNSW's Environmental Sustainability Policy is the foundation of our Environmental Sustainability Plan. The three themes that support this foundation – *Climate action, Living campuses* and *Resource efficiency* – guide our strategic planning and contribution to the Sustainable Development Goals (SDGs).To deliver on these ambitious themes, we have identified seven focus areas, which are supported by targets and key initiatives.

Climate action

Take urgent action to achieve net zero emissions across our operations and value chain.

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Living campuses

Create healthy, resilient places for learning and research where people and nature thrive.

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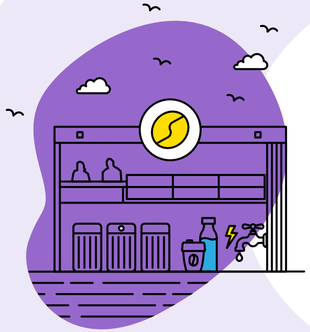

Resource efficiency

Conserve resources by reducing consumption, prioritising reuse and responsibly managing waste.

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Focus area	Targets[1]	Key initiatives
Operational emissions	– Maintain net zero operational (scope 1 and 2) emissions – Increase onsite solar PV capacity to 1.5MWp	– Implement Stage 1 of the Electrification Strategy – Procure 100% renewable electricity
Partnering for net zero	– Reduce total (scope 1, 2 and 3) emissions by 30% by 2025, 50% by 2030 and to net zero by 2050[2] – Divest investments in fossil fuel companies[3]	– Complete a climate risk assessment – Complete and implement the Net Zero Strategy – Maintain the Responsible Investment Framework – Maintain the Sustainable Procurement Framework
Buildings and campuses	– Capital projects achieve our minimum sustainability requirements – Kensington campus achieves a net gain in biodiversity value	– Establish a biodiversity value metric and baseline – Establish Fowlers Gap Arid Zone Research Station as a dedicated conservation site – Maintain the Capital Projects Sustainability Framework – Maintain the Strategic Asset Management Plan
Engagement and integration	– Increase student and staff awareness of environmental sustainability issues	– Implement the Laboratory Efficiency Assessment Framework – Maintain and promote the SDG Toolkit and Modules
Travel and transport	– At least 85% of students and staff travel to campus by sustainable travel modes	– Develop and implement an active travel masterplan
Energy and water	– Reduce energy intensity by 5% – Reduce water intensity by 5%	– Maintain and implement the Energy and Water Action Plan
Waste and recycling	– Divert at least 85% of general waste[4] from landfill – Reduce general waste by 20% – At least 80% of retailers achieve Plastic Free Dining gold award status	– Maintain and implement the Waste Management Plan – Maintain and implement Plastic Free Dining

1 Target year is 2025 (i.e., will be measured based on full year 2024 performance) unless stated otherwise. Target scope and baseline details are shown in Appendix 1.
2 Emission reduction target will be periodically reviewed, and updates recommended so that it continues to align with best practice and reflects maximum effort towards limiting temperature increase to 1.5°C.
3 Includes direct ownership and commingled funds that include public equities and corporate bonds of companies who derive over 20% of their revenue from ownership and exploitation of fossil fuel reserves.
4 General waste includes waste from internal areas (burgundy, red, yellow and blue bins) and external areas (burgundy, white and red bins).

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How we measure progress

Our Environmental Sustainability Plan 2022-24 addresses our key operational activities and environmental issues. Our approach in each area is structured as follows:

> Targets: Specific, measurable outcomes that we measure our progress against.

> Key initiatives: The main strategies that enable the realisation of our targets.

The Environmental Sustainability Plan 2022-24 contains 13 targets. Progress towards our targets is reported in its respective sections using the following categorisation:

Status	Symbol	Description	Count
On track	○	Targeted outcome is on track for achievement by the end of the reporting period	9
Not on track	△	Targeted outcome is not on track for achievement by the end of the reporting period	3
No data	△	Data enabling progress to be measured is not available	1

Our performance is reported in the sections that follow, and progress towards all targets is summarised on page 20.

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Taking urgent action to achieve net zero emissions across our operations and value chain.

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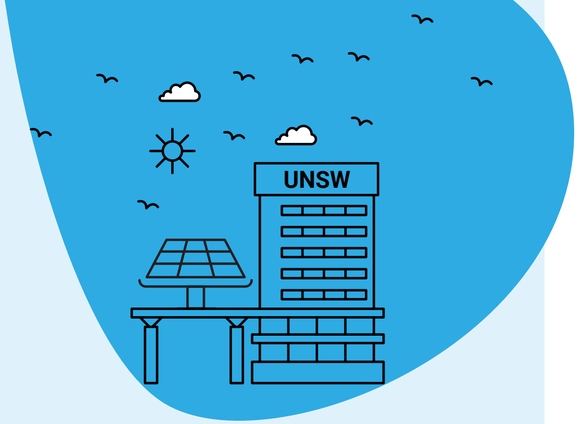

Highlights

> Won a Banksia 2022 NSW Sustainability Award in the 'Net Zero Action' category.

> Completed the Electrification Strategy and Paddington solar PV project to continue our transition towards clean renewable electricity.

> Implemented low-emissions and fossil-free investment strategies.

Sustainable Development Goal(s)

Our activities in this area contribute to the following SDGs: 7 and 13

And are especially focused on these targets under SDGs 7 and 13:

> 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.

> 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

Goal: Take urgent action to achieve net zero emissions across our operations and value chain.

Why this matters

Climate change is an existential threat and tackling it is a top priority for our students, staff and communities, as well as a key UNSW research and teaching focus. Our *Climate action* theme includes measures to reduce operational (scope 1 and 2) emissions such as switching to renewable energy and electrifying our campuses, as well as tackling value chain (scope 3) emissions by engaging with our key suppliers and divesting from fossil fuel investment holdings.

How we are responding

Our approach is underpinned by a comprehensive annual inventory of our greenhouse gas (GHG) emissions undertaken since 2018, and our target to reduce total (scope 1, 2 and 3) emissions in line with efforts to limit temperature increase to 1.5°C, the goal of the Paris Agreement. We will continue to monitor our performance and review our target to ensure it reflects best practice and maximum effort towards – or beyond a fair share of – the necessary 50 per cent global emission reduction by 2030 identified in the IPCC Special Report on Global Warming of 1.5°C.

Value chain emissions result from activities such as construction, procurement, travel and investment activities, some of which organisations can influence but not directly control. Tracking and reducing these emissions is highly complex. We are actively engaging with UNSW suppliers and other stakeholders to reduce value chain emissions.

Energy sourcing and onsite solar energy projects are managed by Estate Management, while measuring and reducing our total GHG footprint involves staff in facilities management, construction, procurement, merchandising, travel and investment services; as well as suppliers and academic experts.

Targets	Status	Comment
Maintain net zero operational (scope 1 and 2) emissions	On track	Target has been achieved since 2020, when UNSW switched to 100 per cent renewable electricity, in addition to onsite solar PV, efficiency initiatives and carbon offset purchases.
Expand onsite solar PV capacity to 1.5MWp	On track	Installed capacity increased to 1.37MWp with the completion of a new 131kWp solar PV system at UNSW Paddington campus in early 2023.
Reduce total (scope 1, 2 and 3) emissions by 30 per cent by 2025, 50 per cent by 2030 and to net zero by 2050	On track	2022 calendar year emissions were 46 per cent lower than the baseline. Emissions reductions have been driven by reductions in travel and purchasing activity, switching to renewable electricity and implementing low carbon investment strategies.
Divest investments in fossil fuel companies	On track	Progress was made in 2022 as detailed below, and UNSW on is track with its fossil fuel divestment target. Comparable data is not available for 2022 but will be reported in future years.

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2022 progress

Progress was made towards UNSW's *Climate action* targets in 2022. Our efforts in this area saw UNSW Sydney recognised with a prestigious Banksia 2022 NSW Sustainability Award in the Net Zero Action category (see case study).

An Electrification Strategy was completed, setting out a phased pathway to tackle direct GHG emissions from fuels and refrigerant gases (see case study). Supporting the Electrification Strategy, a new 131kW solar PV system at Paddington campus was completed in early 2023.

Low emissions and fossil-free strategies continued to be implemented for UNSW investment holdings (see case study).

Finally, further progress was made to reduce our total emissions in line with our 1.5°C-aligned target of a 30 per cent reduction by 2025 and 50 per cent reduction by 2030 (see case study). Improvements were also made to our methodology for measuring emissions, particularly from investment holdings.

We're a Winner!

NSW Sustainability Awards 2022

NSW

Banksia FOUNDATION

UNSW Sydney wins prestigious sustainability award

UNSW was presented with a Banksia NSW Sustainability Award by NSW Treasurer and Energy Minister Matt Kean at a ceremony in October 2022.

The award, in the 'Net Zero Action' category, recognised UNSW's efforts to achieve net zero emissions through energy efficiency and onsite solar PV initiatives, switching to 100% renewable electricity through a landmark Power Purchase Agreement (PPA), and measuring and targeting value chain emissions from sources such as purchased goods and services, investments and travel.

"This award reflects many years of work since UNSW Estate Management began installing onsite solar PV systems and working on a solar Power Purchase Agreement," said Head of Environmental Sustainability William Syddall.

"Having switched to 100 per cent renewable electricity in 2020, our focus is now on electrifying campus infrastructure and tackling emissions from our supply chain, investments and travel. Most of these emissions are outside of our direct control and can only be reduced through engagement and partnership."

Electrification Strategy completed

Clean electrification – the process of replacing assets that use fossil fuels such as natural gas with assets that use renewable electricity – is a key component of UNSW's pathway to net zero emissions. UNSW campuses use fossil fuels for building heating, hot water, steam, vehicles and back-up electricity generation. Having studied the potential to electrify our campuses in 2021, Estate Management developed an Electrification Strategy which was approved in 2022 with funding allocated for the delivery of Stage 1 (2022-25).

The Strategy is summarised below:

1. Electrify our campuses

> Electrify existing buildings and infrastructure based on life cycle and economic efficiency
> New buildings and infrastructure to be all-electric
> Install EV charging infrastructure

2. Transition to low-GWP refrigerants and fuels

> Set low-global warming potential (GWP) standard for all new equipment
> Replace, retrofit and refurbish equipment that uses high-GWP refrigerants
> Engage equipment manufacturers and drive change
> Use low emissions fuels for assets that cannot be electrified

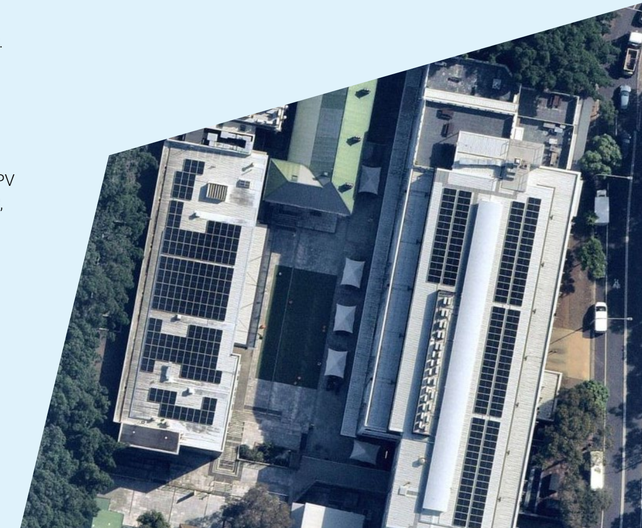
3. Increase resilience of our campuses

> Study battery storage solutions for campuses and critical infrastructure
> Maximise onsite solar PV capacity
> Increase resilience to power outage events
> Reduce peak pricing exposure in the electricity market

Further analysis is being undertaken to identify priority projects and engineering designs will be completed in 2023.

New solar PV system installed

Supporting the Electrification Strategy, a new 131kW solar PV system was installed at the Paddington campus in 2022-23, pictured below right. The new system is on the rooftops of Blocks D, F and G and is the first PV system at the campus. There are now 14 PV systems at UNSW's main Sydney campuses with installed capacity of 1.37MW.



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Tracking our pathway to net zero

UNSW has committed to reduce total emissions in accordance with a 1.5°C science-based target, which translates to:

> 30 per cent reduction by 2025.

> 50 per cent reduction by 2030.

> Net zero emissions by 2050.

UNSW's carbon reduction target was developed using the Science Based Targets initiative (SBTi) methodology and approved by UNSW Council in 2020. It includes total emissions across UNSW's operations (referred to as 'scope 1 and 2' emissions, mainly from energy use) and value chain (indirect or 'scope 3' emissions from purchased goods and services, construction, investments, travel and other sources).

The table to the right shows a detailed breakdown of UNSW's GHG footprint since the 2018 baseline year. In 2022, UNSW's total emissions increased by 18,007 tonnes (13 per cent) to 156,852 tonnes compared to 2021. The largest increases were from business travel (by 10,799 tonnes) following the reopening of international borders, and purchased goods and services (by 7,372 tonnes) due to an increase in supply chain expenditure. These increases resulted from university operations and expenditure levels returning closer to normal levels following substantial reductions during 2020 and 2021.

Emissions also increased from tenant energy use (by 2,581 tonnes), and gas and other fuels (by 1,048 tonnes), due to increased campus activity compared to 2020 and 2021. The largest reduction in emissions (by 3,810 tonnes) was from investments, following the implementation of low emissions and fossil-free investment strategies (see case study) and updates to the calculation methodology.

Overall, while total UNSW GHG emissions increased in 2022, they were 46 per cent lower than the 2018 baseline, well ahead of our 2025 target of a 30 per cent reduction and on track to meet our 2030 target of a 50 per cent reduction. UNSW's performance is therefore ahead of the 1.5°C emission reduction pathway.

Emissions scope / category	Emissions (tCO_2e)				
	2018	2019	2020	2021	2022
Scope 1: direct emissions	**8,045**	**8,860**	**8,089**	**7,445**	**8,512**
Natural gas and other fuels	7,162	8,000	7,195	6,729	7,777
Refrigerant and laboratory gases	631	608	642	467	580
Livestock emissions	252	252	252	248	155
Scope 2: indirect (electricity) emissions	**74,398**	**77,509**	**70,810**	**64,220**	**64,105**
Electricity (location-based method)[1]	74,398	77,509	70,810	64,220	64,105
Scope 3: indirect (value chain) emissions	**210,670**	**205,618**	**121,445**	**131,400**	**148,340**
Category 1: Purchased goods and services	69,941	81,796	43,838	49,629	57,001
Category 2: Capital goods	55,212	34,026	17,163	19,653	20,206
Category 3: Upstream energy-related emissions	9,292	9,753	8,926	6,779	6,570
Category 5: Waste generated in operations	1,757	3,766	2,451	2,180	1,892
Category 6: Business travel	24,841	28,311	1,492	642	11,441
Category 7: Employee commuting	11,553	9,949	5,745	4,427	4,369
Category 13: Tenant energy emissions	6,851	6,764	4,931	4,566	7,148
Category 15: Investments	31,223	31,253	36,898	43,524	39,714
Sub-total (before surrenders)	**293,113**	**291,986**	**200,343**	**203,065**	**220,957**
Scope 1 voluntary surrenders (ACCU, VCU)	0	0	8,089	7,445	8,512
Net scope 1 emissions (including offsets)	**8,045**	**8,860**	**0**	**0**	**0**
Scope 2 voluntary surrenders (LGC)[2]	0	0	70,810	64,220	64,105
Net scope 2 emissions (market-based method)	**74,398**	**77,509**	**0**	**0**	**0**
TOTAL EMISSIONS (excluding offsets)[3]	**293,113**	**291,986**	**129,533**	**138,845**	**156,852**
Net emissions (including offsets)	**293,113**	**291,986**	**121,445**	**131,400**	**148,340**

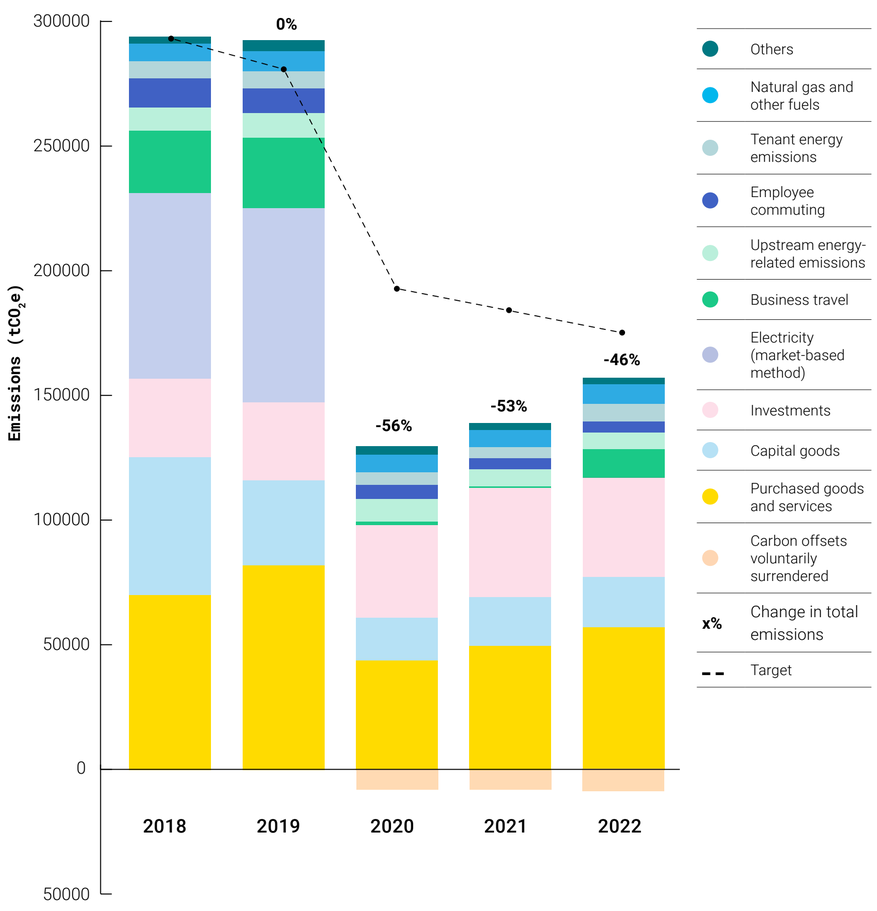
[1] Calculated using the NSW grid average electricity emission factor (i.e. excluding renewable electricity purchases).

[2] 87,806 LGCs were surrendered, equivalent to 87,806 MWh of electricity and 64,105 tCO2e of emissions when calculated using the NSW grid average electricity emission factor. Offsetting with LGCs is permissible under the market-based method for accounting for emissions from purchased electricity.

[3] Measures performance against UNSW's total emissions target under the market-based method (includes scope 2 emission reduction from the surrender of LGCs, but not the surrender of carbon offsets).

Note: The 2018-21 figures previously reported for scope 3 emission categories 1, 2, 6 and 15 have been restated following a methodology update to improve the accuracy of spend-based emission calculations.

UNSW total greenhouse gas emissions, 2018-2022



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Creating healthy, resilient places for learning and research where people and nature thrive.

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> Expanded the Laboratory Efficiency Framework (LEAF) program, with 18 laboratory teams accredited University-wide.

> Began restoration of Fowlers Gap Arid Zone Research Station into a dedicated site for conservation and research.

> Village Green project was completed, incorporating sustainable design features.

Sustainable Development Goal(s)

Our activities in this area contribute to the following SDGs: 4, 11, 12 and 15.

And are especially focused on these targets:

> 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development.

> 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

> 12.2 By 2030, achieve the sustainable management and efficient use of natural resources.

> 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

> 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services – in particular forests, wetlands, mountains and drylands – in line with obligations under international agreements.

Goal: Create healthy, resilient places for learning and research where people and nature thrive.

Why this matters

Our campuses are part of the daily lives of our students and staff, and we aim to make them vibrant places where people can connect with each other and with nature. This connection not only benefits the people at our campuses and field stations, but also the wildlife and ecosystems that call them home. Many of our students and staff are already highly engaged in environmental sustainability issues and their time at UNSW can help prepare them to contribute to a better world.

How we are responding

Living campuses includes how we design and construct buildings and infrastructure, manage green spaces, how our students and staff travel to our campuses, and how we engage students and staff in environmental sustainability issues.

The SDG Modules and SDG Toolkit resources support our educators to integrate sustainability thinking into their course content. Through the LEAF program we aim to engage laboratory users in sustainable practices to save energy, water and waste. Beyond our campuses, UNSW has committed to transforming the 39,000 hectare Fowlers Gap Arid Zone Research Station in western New South Wales from a sheep station into a dedicated site for conservation and ecological restoration.

Estate Management is focused on optimising the use of existing buildings and other assets throughout their life cycles. When new buildings and refurbishments are required, our minimum sustainability standards and Capital Projects Sustainability Framework apply.

The planning and management of our campuses is led by Estate Management in collaboration with UNSW faculties and divisions, consultants, contractors, government bodies and the wider community.

Targets	Status	Comment
Capital projects achieve our minimum sustainability requirements	On track	The majority of projects completed in 2022 met UNSW's minimum requirements, except for a small number of refurbishments that could not demonstrate achievement of waste recycling requirements. On track for 100 per cent compliance by 2024.
Kensington campus achieves a net gain in biodiversity value	No data	The biodiversity value metric has not been finalised at the time of writing, so performance cannot be compared.
Increase student and staff awareness of environmental sustainability issues	On track	This metric is measured every three years and is scored 'on track' based on the most recent survey (2021).
At least 85% of students and staff travel to campus by sustainable travel modes	Not on track	The percentage of students and staff travelling by sustainable modes declined slightly to 84 per cent, due to an increase in the number of staff driving to campus.

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2022 progress

Several initiatives were implemented or progressed in 2022 in support of *Living campuses* targets.

The LEAF program was expanded following a successful pilot in 2021 (see case study).

The new Village Green precinct opened, with a range of sustainable construction methods used to create facilities for students and staff to enjoy (see case study).

A new Environmental Sustainability website was created to support the Environmental Sustainability Plan 2022-24. The website includes practical resources and templates to help students and staff learn about and implement sustainability principles in their day-to-day activities both on and off campus.

Progress was made to further understand and enhance biodiversity. The development of a new metric to track biodiversity value at the UNSW Kensington campus is underway, with the metric and baseline being finalised in 2023 and further details shared in future reports. UNSW committed to conserving and restoring the Fowlers Gap Arid Zone Research Station (see case study), and confirmed its commitment to measuring and reversing its impact on nature by taking the Nature Positive Pledge (see case study).

A survey undertaken in 2022 provided insights into UNSW student and staff travel patterns to inform potential improvements to public transport, active travel and long-term campus planning. The survey reported a slight reduction in the percentage of students and staff travelling by sustainable travel modes, and an increase in staff travelling by private car. The shift from public transport towards private car use is likely to have been influenced by the COVID-19 pandemic, when public transport was discouraged at times.

Laboratory sustainability program expanded

Following a successful pilot of the Laboratory Efficiency Assessment Framework (LEAF) with UNSW Science in 2021, LEAF was made available to teams University-wide in 2022 to reduce the environmental impact of laboratory activities.

LEAF is an internationally recognised standard for sustainable laboratory operations developed by University College London. It requires laboratory groups to complete actions to save energy, water and waste, reduce their carbon emissions and improve research quality, supported by an online self-assessment tool. Depending on the actions implemented, lab groups can achieve a UNSW Gold, Silver or Bronze LEAF award following an internal audit process.

Twenty-two laboratory groups participated in 2022 including from Engineering, Science and Medicine & Health, as well as the Children's Cancer Institute and the RNA Institute. These groups are reducing the environmental footprint of their research through improved administration, efficient equipment and material use, and appropriate waste management.

Overall, LEAF teams achieved estimated reductions of 2,922 tonnes of CO2, 454,000 litres of water, and $154,000 in laboratory expenses, as well as a significant decrease in single-use plastics usage.

Four labs received a LEAF Silver award and 14 labs received a Bronze award, presented by UNSW Provost, Professor Anne Simmons at a ceremony in December 2022.

Professor Simmons recognised the achievements of the laboratory groups and Estate Management. "Our active involvement on the world stage is so important in showing our leadership in the area of environmental sustainability. It is through your dedication to sustainable research practices that we will continue to make a difference."

William Syddall, Head of Environmental Sustainability, highlighted the benefits of LEAF to UNSW. "Lab spaces and activities can be resource-intensive, and we thought it was important to take meaningful action in this space. LEAF teams achieved some fantastic outcomes in 2022 and we'll be looking to increase the impact of the program next year."

Silver Awards

> Burns Laboratory – School of Biotechnology and Biomolecular Sciences.
> Ferrari Laboratory – School of Biotechnology and Biomolecular Sciences.
> Lessio Laboratory – School of Chemistry.
> Microfluidics Laboratory Group – School of Mechanical and Manufacturing Engineering.

Bronze Awards

> Wich Lab – School of Chemical Engineering.
> Children's Cancer Institute – School of Clinical Medicine.
> Cornsters Laboratory – School of Biological, Earth and Environmental Sciences.
> G005 Teaching Prep Area – School of Biological, Earth and Environmental Sciences.
> Lan Laboratory – School of Biotechnology andBiomolecular Sciences.
> Synbiote – School of Biotechnology and Biomolecular Sciences.
> Beves/Peeks Laboratory – School of Chemistry.
> Field/Ball Laboratory – School of Chemistry.
> Hunter Laboratory – School of Chemistry.
> Synthetic Teaching Laboratory 262 – School of Chemistry.
> RNA Institute – School of Chemistry.
> Smart Materials and Surfaces Laboratory – School of Chemistry.
> Decision Neuroscience Laboratory – School of Psychology.
> Nanoporous Materials Laboratory – School of Materials Science and Engineering.

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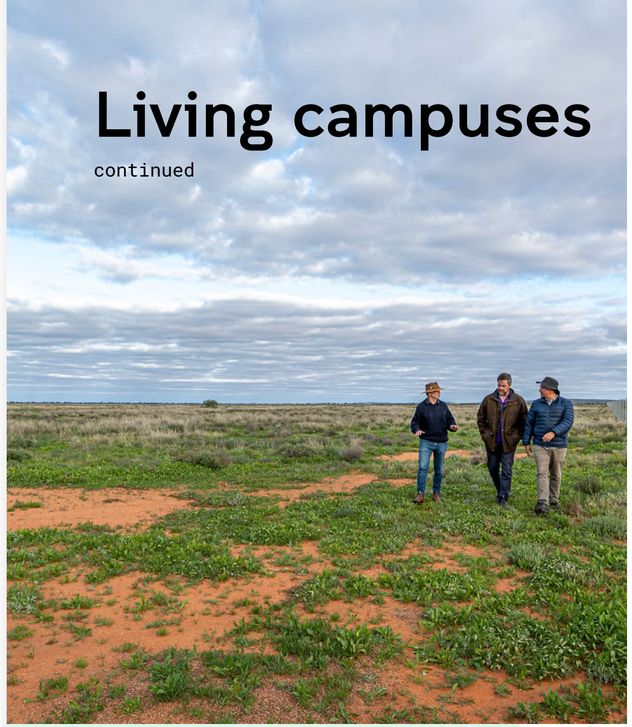

Fowlers Gap enters new era of conservation

After more than 150 years of pastoral land use, UNSW Sydney has begun restoring Fowlers Gap Arid Zone Research Station in the far west outback of New South Wales into a dedicated site for conservation and research.

The 39,000 hectare property located 1,250 kilometres from Sydney – deep in NSW's arid zone – has operated as a sheep station and research hub for half a century. UNSW holds a perpetual lease to the station, which has hosted many researchers, students and artists looking to study one of Australia's most iconic ecosystems.

"As rich and diverse as the knowledge this station has sprung in its 50 years as part farming property, we are looking forward to restoring this site's biodiversity and ecosystems," UNSW Sydney Vice-Chancellor and President, Professor Attila Brungs, said during a visit to the site, pictured above. "Our aim is to make this area a beacon for arid ecology research. We have started by removing sheep and we are now restoring the ecosystem."

Over 70 per cent of Australia falls within the semi-arid and arid zone, an area where relatively few people live and which is remote from many research institutions. Research opportunities at Fowlers Gap include restoration of arid zone ecosystems, geology, hydrology, how these systems have been changed by pastoralism, and its future environmental trajectories under the effects of climate change. The research will provide important outcomes for neighbours, visiting communities and other organisations around Australia and the world.

"Research has always been a primary focus of UNSW's endeavours at Fowlers Gap," Professor Brungs said.

"We aim to strengthen this by diversifying what we do here and involving researchers and organisations from a range of different disciplines and areas, from the sciences and engineering, to the arts."

Professor Richard Kingsford, Director of the Centre for Ecosystem Science at UNSW, said there are great opportunities to understand the functions of arid ecosystems at the research station.

"Fowlers Gap has a wonderful diversity of habitats for large-scale experiments that will improve our fundamental understanding of these arid systems," he said.

Fowlers Gap has fostered hundreds of research papers, books and theses on everything from cooperative breeding in apostlebirds and thrips, to the drought-coping strategies of babblers and zebra finches, and the rediscovery of 'extinct' native mice. More than 800 UNSW students – from science, art and more – have journeyed there in the past 10 years.

Village Green project kicks sustainability goals

The Village Green at UNSW Kensington campus reopened to the UNSW community in October 2022 following a two-year redevelopment, transforming an under utilised outdoor space into a vibrant and connected place where students, staff and the community can come together to play, exercise, socialise and relax.

The Village Green pictured above increases opportunities for social and competitive student sport and activities focused on wellbeing and sustainability, and features a new multi-purpose synthetic pitch, multi-purpose courts for netball, basketball and futsal, a 500 metre walking and running track, outdoor fitness equipment, a bouldering wall, a seated viewing grandstand and landscaped social spaces, and an urban farm. The new FIFA and World Rugby standard multi-purpose synthetic pitch can be used all year round, maximising its utility to the UNSW community.

Sustainable systems and materials underpin the design of the Village Green. The pitch surface and infill were carefully selected to minimise their contribution to urban heat island effect and risk of microplastics pollution. The innovative infill material is made from cork, which holds less heat than traditional rubber infill and is biodegradable. The synthetic pitch does not require watering, saving 18,000 kilolitres of water per annum compared to a turf pitch.

The upgraded below-ground stormwater infiltration tank captures campus stormwater and contributes to recharging the Botany Aquifer, and in doing so provides a sustainable water source on campus for non-potable uses.

Supporting UNSW's emission reduction goals, the project achieved a reduction in embodied carbon of 917 tonnes (31 per cent) compared to typical practice. This was primarily achieved by using low embodied carbon concrete for the stormwater tank and 74 per cent recycled steel for the project, including the grandstand.

The Village Green is landscaped with all-native plantings which will restore tree canopy cover levels to pre-project levels, while the urban farm provides an urban agriculture space including BBQs, wash basins, raised planters, maintenance shed, fire pit and seating for use as an outdoor classroom.

UNSW takes the Nature Positive Pledge

UNSW Sydney has committed to start a nature positive journey by reducing the impacts of our operations and supply chain, wby taking the Nature Positive Pledge.

The Nature Positive Pledge is an initiative between the United Nations Environment Programme and the University of Oxford. It is affiliated with the UN Decade on Ecosystem Restoration and was made in 2022 ahead of COP15 to the UN Convention on Biological Diversity in Montreal.

By making this pledge, UNSW became a founding member of Nature Positive Universities and committed to:

> Carry out a baseline study of our impacts on nature.

> Set specific, measurable, time-limited targets for biodiversity.

> Carry out actions for nature to meet our targets, using the conservation hierarchy.

> Report on progress towards these steps on an annual basis.

These commitments align with targets and initiatives in the UNSW Environmental Sustainability Plan 2022-24, and progress will be reported in the annual Environmental Sustainability Report from 2023.

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Conserving resources by reducing consumption, prioritising reuse and responsibly managing waste.

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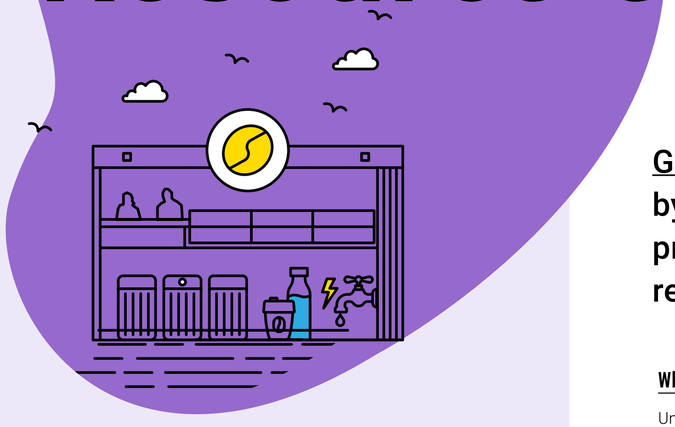

Highlights

> Introduced the Plastic Free Dining Awards to recognise campus retailers.

> Expanded food waste collection to office kitchens and introduced a soft plastics collection system.

> Furniture reuse program diverted 84% of surplus UNSW furniture from landfill to beneficial reuse.

Sustainable Development Goal(s)

Our activities in this area contribute to the following SDGs: 6,7 and 12

We are especially focused on these targets:

> 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

> 7.3 By 2030, double the global rate of improvement in energy efficiency.

> 12.2 By 2030, achieve the sustainable management and efficient use of natural resources.

> 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

> 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

> 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

Goal: Conserve resources by reducing consumption, prioritising reuse and responsibly managing waste.

Why this matters

University campuses and activities are significant consumers of energy, water and other natural resources, and generators of waste. Our *Resource efficiency* theme includes programs to optimise the energy and water efficiency of buildings, promote reuse over single-use and improve our recycling systems. By minimising waste and improving waste systems and behaviours, we aim to conserve natural resources, minimise contamination, reduce costs and support sustainable waste management practices amongst our students and staff.

How we are responding

Energy and water efficiency initiatives and waste management systems are managed by Estate Management in collaboration with contractors and the wider student and staff community. We aim to promote reuse and eliminate single-use plastics from campus through initiatives such as Plastic Free Dining and associated communication activities.

The Waste Management Plan guides improvements to our recycling systems, reuse initiatives such as the furniture reuse program, and efforts to optimise waste segregation.

Targets	Status	Comment
Reduce energy intensity by 5 per cent	Not on track	Energy intensity increased compared to 2021 due to the return of students and staff to campus and is not on target.
Reduce water intensity by 5 per cent	On track	Water intensity increased compared to 2021 due to the return of students and staff to campus but is lower than the target.
Divert at least 85 per cent of general waste from landfill	Not on track	82 per cent of general waste was diverted from landfill in 2022, slightly short of the target.
Reduce general waste by 20 per cent	On track	General waste volumes increased slightly due to the return of students and staff to campus, but are 30 per cent lower than the 2018 baseline.
At least 80 per cent of retailers achieve Plastic Free Dining Gold Award status	On track	Seven out of 26 retailers (27 per cent) achieved Gold award status, while 14 achieved Silver and three achieved Bronze. In total, 88 per cent of retailers have achieved a Plastic Free Dining Award.

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Several new initiatives were implemented in support of energy, water and waste targets during 2022.

The performance of UNSW Kensington's D26 (Biological Sciences North) and E26 (Biological Sciences South) buildings was optimised to improve efficiency and user comfort (see case study).

Several water saving measures were implemented across our campuses, including additional irrigation water meters, cooling tower metering and benchmarking, rectification works in student accommodation, and toilet flushing controls.

A new awards program was launched in early 2022 to celebrate UNSW retailers who have gone plastic-free (see case study). Food and compostable packaging bins were introduced into staff kitchen areas to increase the capture of organic waste for composting, following their introduction in external areas during 2021.

Estate Management also established a soft plastic recycling system at the Kensington campus. Soft plastics that pass the scrunch test – they can easily be squeezed into a ball in your hand – can be recycled when placed in the orange bins at 12 collection points (as of early 2023, only clear soft plastics are accepted for recycling). Three of these locations are open to UNSW community members without swipe card access:

> Biological Sciences Building (E26) – Loading dock.

> The Kensington Colleges (D17) – Parking behind Arc office.

> Chemical Sciences (F10) – Loading dock.

The return of students and staff to campus saw increases in energy and water intensity and waste generated in 2022. Additional efficiency and electrification works will be required to achieve the energy intensity target.

UNSW retailers recognised for going plastic-free

In early 2022, Estate Management introduced the Plastic Free Dining Awards to recognise and celebrate UNSW retailers for going plastic-free. Retailers can achieve a Gold, Silver or Bronze award to highlight their progress in switching to compostable packaging and supporting reuse. The awards also help students and staff to identify where they can eat plastic-free.

By the end of 2022, six retailers had achieved a Gold Award, 14 a Silver Award and three a Bronze Award. Further information about Plastic Free Dining, the scoring criteria and the award status of each retailer can be found on the UNSW Environmental Sustainability website.

Reuse program gives UNSW furniture another life

As learning and teaching requirements change each year, so do the University's furniture requirements. UNSW established a furniture reuse program in 2019 in collaboration with contractor Egans Asset Management, to encourage reuse and divert unwanted furniture from landfill. Used furniture is assessed and rated based on its condition: 'gold' rated furniture is stored for reuse, 'silver' rated furniture is made available for students and staff to purchase at a nominal price, while 'bronze' rated furniture is recycled where possible or disposed of to landfill.

In 2022, 1,146 surplus furniture items were removed at the request of faculties and divisions, with 924 items stored in the reuse store and 222 items reused at other locations on site. 257 items were relocated back to UNSW campuses from the reuse store, while an additional 325 items of refurbished office furniture were supplied to UNSW from Egans' own stock, leading to substantial resource savings when compared to buying brand new furniture.

A sale of surplus used furniture was held in July to make low cost used furniture available to UNSW students and staff. 201 furniture items were sold to the UNSW community, giving them a new life and preventing 3 tonnes of waste to landfill.

Overall, the program resulted in 84% of surplus UNSW furniture assets, comprising a total weight 49 tonnes, being diverted from landfill.

Optimising building performance for user comfort and energy efficiency

In 2022 the Estate Management Engineering Technology team completed optimisation works on Biological Sciences South (E26) building in support of UNSW energy targets. This initiative aims to ensure that buildings operate efficiently while providing comfortable teaching and learning environments.

The works included a detailed energy audit to identify potential for energy savings, including benchmarking of building control systems and heating, ventilation and cooling system performance. The energy audit also focused on the performance of the building's airflow equipment. Chilled and hot water systems were also reviewed.

Noticeable improvements in thermal comfort were reported following the tuning; and overall building energy consumption decreased.

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Research focus: UNSW waste pioneer recognised with prestigious award

Leading UNSW researcher Scientia Professor Veena Sahajwalla received the Clunies Ross Innovation Award, one of Australia's most prestigious research awards, for her globally recognised waste transformation technologies.

Prof. Sahajwalla is an internationally renowned materials scientist, engineer, and innovator who has revolutionised recycling science via the development of next-generation 'green materials' derived from waste.

Her latest breakthrough is the development of various microfactory techhnologies for transforming problematic waste materials, such as glass, textiles and plastics into value-added products such as high-grade filaments for 3D printing and green ceramics for the built environment.

As the Founder and Director of UNSW's Centre for Sustainable Materials Research and Technology (SMaRT@UNSW), Prof. Sahajwalla leads visionary research programs that foster innovation and promote collaboration with industry, research partners, non-government organisations and governments, on the development of innovative environmental solutions for the world's biggest waste challenges.

"It's an incredible honour to be awarded the 2022 Clunies Ross Innovation Award that recognises the discovery, development and adoption of technology that has significantly improved societal or industry capabilities," Prof. Sahajwalla said.

Research focus: UNSW recycling and clean energy initiative secures Trailblazer funding

A recycling and clean energy initiative led by UNSW Sydney in partnership with the University of Newcastle was awarded $50 million in government funding through the approximately $250 million Trailblazer Universities Program.

The two universities will join forces to lead research commercialisation initiatives that help Australia and the world transition to sustainable recycling and clean energy solutions and systems.

The $50 million Federal Government funding has been matched by $50 million cash and $47 million in-kind from UNSW and the University of Newcastle for the initiative. Over 20 industry partners have expressed support for the initiative and committed more than $130 million in cash and in-kind contributions.

UNSW Vice-Chancellor and President, Professor Attila Brungs, said that UNSW was proud and honoured to be leading Australia's efforts in research commercialisation to support the nation's manufacturing priorities.

"We are delighted to work with the University of Newcastle and our innovative industry partners on transformative research projects that deliver real world outcomes. The Trailblazer Program will undoubtedly strengthen university-industry collaboration to support the start-up and growth of Australian businesses. The Recycling and Clean Energy Trailblazer will create a step-change in Australian environmental sustainability transition".

In partnership with industry, the universities have secured investment and commitments for the development and commercialisation of solutions in the following priority areas:

> Electrification, Energy Systems and Storage

> Sustainable Fuels and Chemicals Manufacturing (with a special focus on Power-to-X "P2X" based production methods for hydrogen and sustainable aviation fuels)

> Next Generation Solar PV and Systems

> Recycling and microfactories

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Focus Area	Target	Unit	Performance 2018	2019	2020	2021	2022	Status
Climate action	Maintain net zero operational (scope 1 and 2) emissions	Tonnes of carbon dioxide equivalent (tCO2e)	82,443	86,368	0	0	0	On track
	Expand onsite solar PV capacity to 1.5MWp	Megawatts potential (MWp)	0.79	1.16	1.16	1.23	1.37	On track
	Reduce total (scope 1, 2 and 3) emissions by 30% by 2025, 50% by 2030 and to net zero by 2050	Tonnes of carbon dioxide equivalent (tCO2e)	293,113	291,986	129,533	138,845	156,852	On track
	Divest investments in fossil companies	% of eligible investments in fossil fuel companies	–	–	–	–	–	On track
Living campuses	New build and refurbishment projects achieve our minimum sustainability requirements	All relevant projects meeting all requirements Y/N	–	–	–	–	–	On track
	Kensington campus achieves a net gain in biodiversity value	Biodiversity value rating	–	–	–	–	–	No data
	Increase student and staff knowledge and awareness of environmental sustainability issues	Average rating from 1 (low) to 5 (high)	3.03	–	–	3.10	–	On track
	At least 85% of students and staff travel to campus by sustainable travel modes	Travel by modes other than private car (%)	–	85%	–	–	84%	Not on track
Resource efficiency	Reduce energy intensity by 5%	Kilowatt hours per square metre GFA per year	199	209	191	185	200	Not on track
	Reduce water intensity by 5%	(kWh/m2/year)	0.95	0.96	0.62	0.56	0.80	On track
	At least 85% of general waste is diverted from landfill	Kilolitres per square metre GFA per year (kl/m2/year)	94%	49%	65%	83%	82%	Not on track
	Reduce general waste by 20%	% of general waste by weight diverted from landfill	2,852	2,838	1,409	1,609	1,992	On track
	At least 80% of retailers achieve Plastic Free Dining (PFD) Gold award status	Tonnes (t) of general waste per year	0%	–	–	–	26%	On track

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Environmental data

Energy and water efficiency

(Kensington, Paddington and Randwick campuses)

Energy	Unit	2018	2019	2020	2021	2022
Consumed electricity	Kilowatt hour (kWh)	84,954,523	92,588,228	85,280,032	81,085,776	85,736,828
Electricity from onsite solar		996,974	1,152,340	1,079,664	1,057,563	1,065,861
Gas		33,841,626	37,653,273	34,102,707	33,434,650	37,876,184

Water	Unit	2018	2019	2020	2021	2022
Potable water	Kilolitre (kl)	289,103	285,834	153,380	138,593	210,094
Bore water		272,247	310,899	231,851	201,756	278,539
Total water		561,350	596,733	385,230	340,349	488,633
Bore water as a % of total	%	48%	52%	60%	59%	57%

Waste and recycling

(Kensington, Paddington and Randwick campuses)

General waste	Unit	2018	2019	2020	2021	2022
Paper/cardboard	Tonne	1,114	658	380	538	719
Mixed metals	Tonne	120	29	36	75	95
Drink containers	Tonne	84	122	188	151	88
Mixed plastics	Tonne	0	0	24	41	56
Food and organics	Tonne	278	80	0	0	0
Food waste	Tonne	228	257	51	59	48
Residual	Tonne	1,017	1692	730	745	986
Total		**2,841**	**2,838**	**1,409**	**1,609**	**1,992**
Destination						
Recycling	Tonne	1,824	1,146	679	864	1,006
Processed engineered fuel (energy recovery)	Tonne	858	244	241	477	633
Landfill	Tonne	159	1,447	490	268	353
General waste recycling rate	%	64%	40%	48%	54%	50%
General waste landfill diversion rate	%	94%	40%	65%	83%	82%

Paper and cardboard: Segregated paper, confidential paper and paper recovered from general waste at Material Recovery Facility (MRF).
Mixed metals: Reported as recovered from general waste at MRF.
Drink containers: Collected through Return and Earn reverse vending machine on Kensington campus.
Mixed plastics: Reported as recovered from general waste at MRF.
Food and organics: Reported as recovered from general waste at MRF.
Food waste: Segregated food waste collected from retailers and colleges.
Residual waste: Contaminated paper, plastic, food packaging and other non-recyclable waste destined for energy recovery and landfill.

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