THE UNIVERSITY of ADELAIDE

FAME Strategy

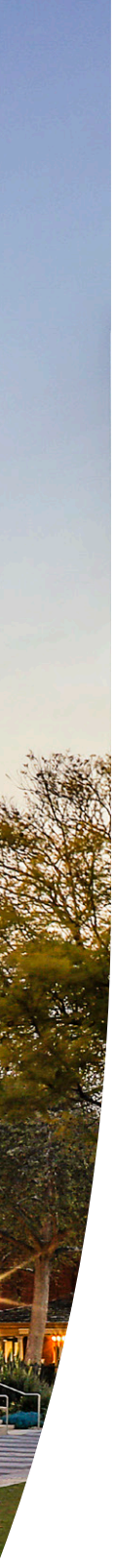
Sustainability

Developing and accelerating solutions that deliver sustainability, equity and prosperity for the planet and its people.

GROUP OF EIGHT AUSTRALIA

make history.

We acknowledge and pay our respects to the Kaurna people, the traditional custodians whose ancestral lands we gather on. We acknowledge the deep feelings of attachment and relationship of the Kaurna people to country and we respect and value their past, present and ongoing connection to the land and cultural beliefs.



A defining moment for the planet and the University

The world is facing the greatest challenges of our time.

Nature is declining globally at rates unprecedented in human history. This environmental degradation is threatening our human systems, exacerbating poverty, inequality, and fuelling disruption to global peace and justice. Deep and lasting transformation of our social, ecological, industrial and cultural systems is required to address these problems and ensure the sustainability of life on Earth. This is an enormous challenge that requires changes in practices, values, education and governance across communities, industries and government.

As a signatory of the UNs' Sustainable Development Goals (SDGs) since 2016, the University of Adelaide is committed to sophisticated solutions leading to the transformative change needed for a more sustainable future. The University acknowledges its critical role in helping the world achieve the SDGs through its research, teaching, operations and community leadership.

Our FAME Strategies provide a platform that enables us to help attract the best researchers and partners and deliver positive impacts for our State and Nation through research excellence and its translation. As this FAME Strategy: Sustainability highlights, the University's world-class researchers are supporting industries, governments and communities transition to a more sustainable future.

Complementing this FAME Strategy, the release of the University's *Sustainability Strategy 2030 - Here for good* also highlights how we are responding to the accelerating environmental, social, economic and technological change across the globe, and how we can help create a better, more sustainable future.

We understand that leadership starts at home. That is why the University is proud to lead by example and be bold in our commitment to generating the solutions to the challenges of today and tomorrow.

For more information on the SDGs visit: un.org/sustainabledevelopment

For more information on 'Here for good', the University's Sustainability Strategy visit: adelaide.edu.au/sustainability/hereforgood

The University of Adelaide prioritises its research at scale within FAME (Foci and Magnets for Excellence) Strategies. They provide a platform that enables us to attract the best researchers and partners and deliver positive impacts for our State and Nation through research excellence and its translation.

Vision

Developing and accelerating solutions that deliver sustainability, equity and prosperity for the planet and its people, underpinned by breakthrough research.

Mission

To lead globally-transformative research that overcomes complexity, drives change, and creates value for a more sustainable future.

Enabling a sustainable future for all

Sustainability challenges are complex, dynamic and interconnected.

Global environmental issues are inextricably linked to extreme poverty, entrenched inequality, and declining economic prosperity globally. As these issues become more pressing, the scale and speed of our response must advance.

Achieving sustainability demands deep and lasting transformation of our systems, knowledge and values. Major efforts are needed to advance our collective knowledge and understanding, with the urgency to find solutions to these problems driving a wave of research to enable society to build a more sustainable future.

The pursuit of the sustainability agenda requires complex decision making, meaningful cooperation and new knowledge to help manage the conflicts that result from our needs, interests, goals and the boundaries of our natural systems.

With these profound challenges also comes enormous opportunity. As well as addressing some of today's biggest challenges, investment into sustainability research will also see future opportunities unlocked. This includes a focus on helping existing industries face the future, as well as supporting the creation and growth of emerging industries.

We must work together towards a sustainable society for the preservation of humanity and the environment in which we live.

Ambitious and transformative research that drives change

Sustainability has been firmly ingrained into the global agenda. The world has come together to build global partnerships that seek to meet the greatest challenges of our time, but also to build a more equitable and prosperous future for all.

The University of Adelaide is committed to supporting and investing in world-leading research to drive breakthroughs that will develop and accelerate a global transformation to a sustainable future.

Discovery and development of breakthrough sustainability solutions is core to our research strategy, as is educating the next generation of research and industry leaders with the skills to navigate the complex decisions and governance challenges to deliver true sustainability.

Our research across the University's Faculties and Research Institutes has the capability to drive this agenda.

Definitions used in the document for 'Net Zero' and 'Carbon Neutral' can be found in 'Here for good', the University's Sustainability Strategy (adelaide.edu.au/sustainability/hereforgood).

Guiding principles

- **Excellence in research and research training** is fundamental to the generation of disruptive and transformative innovation and research which is aimed at building more sustainable communities, governments and industries.
- **Responsible innovation** ensures that social, ethical, and cultural contexts and implications sit at the heart of our research.
- **Collaboration and partnering** with national and international stakeholders who will provide new research and translational opportunities and pathways to market, as well as opportunities for integration of disruptive technologies and processes.
- **Listen to, connect with, and learn** from our Indigenous partners and all Indigenous Australians who play an important role in the preservation and sustainability of our environment.
- **Global, National and State priorities** will align the FAME: Sustainability Strategy with the needs of society, industry and government.
- **Leverage South Australia's competitive advantage** in clean energy and industries to highlight the opportunities through partnering with the State's businesses, communities and researchers.
- **Leadership and ambition** will be at the heart of the research we conduct and the impact that our research generates. We will ensure our research impacts are fit-for-purpose and end-user focussed.
- **Recruiting and retaining talent** will build a reputation that attracts outstanding individuals from across Australia and around the world to join the University of Adelaide.

Aims

The University will:

- Accelerate the development of a sustainable future through research excellence and translation in the areas of resilient and equitable communities, sustainable resource production and consumption, biodiversity and ecosystem services, clean and green technology, and sustainable governance and decision-making.
- Lead and develop transformative and disruptive research and knowledge that will generate positive impacts for environmental, societal and economic benefit.
- Partner with industry, government and other external stakeholders to strive towards achieving a sustainable, equitable and resilient future for Australia.
- Align priorities with those of our strategic partners to support the Nation and State to maximise the opportunities and outputs of our research in pursuit of a sustainable and resilient world.
- Actively seek relevant and emerging research and development funds to support research leadership, research excellence, and translation and commercialisation activities as a value-add to the South Australian and broader Australian economies.
- Educate the next generation of research, business and community leaders through research and industry-linked training.

Research Missions for sustainable transformation

The FAME Strategy: Sustainability will drive a sustainable future through the delivery of ground-breaking research. The Strategy encompasses five research missions (RMs) which focus on urgent and important cross-cutting thematic areas.

RM 1 seeks to reduce global inequality and cultivate an inclusive transformation to a sustainable future. This includes exploring human rights-based approaches, improving access to justice, promoting inclusivity and participation, championing Indigenous voice and traditional knowledge, developing resilient infrastructure and planning, disaster risk reduction, and enhancing the wellbeing of vulnerable populations through improved health systems.

RM 2 explores innovative systems and solutions required to improve production and consumption. From the extraction of critical minerals through to the systems required to optimise food production and water use, and new knowledge that supports circular economies and supply chains, RM 2 investigates how we can do more with less to ensure the sustainable and efficient use of natural resources.

RM 5 encourages and enables sustainable governance. This includes research into reimagining governance structures, responsive policy and regulatory design, mobilising green and climate finance, capacity development and behavioural change, and enhanced decision-making tools. It will also examine the co-benefits, trade-offs and tough choices required to navigate sustainability issues.

RM 3 focuses on planetary health, including the restoration and resilience of biodiversity and ecosystems. This includes pioneering new knowledge into planetary health, biodiversity restoration solutions, nature-based climate adaptation, and the true valuation of ecosystem services. It will also champion Indigenous and traditional knowledge to strengthen ecological research.

RM 4 will accelerate the technology, innovation and skills required to transform to a sustainable economy. This includes developing low/zero emissions future fuels (including hydrogen) and low emissions technology, as well as reducing inequality through transferable, affordable and accessible technology.

Hydrogen: fuel of the future

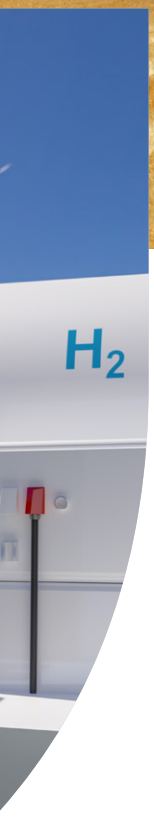
Hydrogen development is an exemplar of a global challenge that sits at the heart of this FAME Strategy.

South Australia is a world leader in the transition to become carbon neutral, and in the development of future fuels. The State Government is committed to creating a new multi-million-dollar hydrogen production and capability, bolstering the State's status in this area.

Hydrogen – specifically green hydrogen – is a clean and reliable energy source that will accelerate the carbon neutral transition. Momentum behind hydrogen has accelerated with strong political and business support and rapid development of global policies and projects. Hydrogen is a fuel that will play a key role in decarbonisation and enable the development and export of high-value green products.

New knowledge is required to realise scalability and understand the impact of hydrogen on industries, regions and the economy. Our group of 'green hydrogen' researchers is focussed on supporting the scaling up of the emerging Australian sector, providing much needed research to accelerate and de-risk the developing industry and related projects.

The University of Adelaide has strength and ambition in delivering research breakthroughs. This includes the development of the fuels needed to transition our economy to become carbon neutral and new technology that will transform the world's heavy industry through production of 'green steel' and 'green copper'. Our research is aligned with State and National priorities, and we are working strategically with industry and government partners to maximise the impact of our



research to realise decarbonisation goals, develop value-adding green products and transform to a better, more sustainable future. Realising the full potential of hydrogen is core to the delivery of all five of our Research Missions. Resilient, healthy and equitable communities (RM 1) will require access to affordable, reliable and clean energy. As we de-couple economic productivity from fossil fuels, clean energy will be critical for responsible resource production and consumption (RM 2). Hydrogen development at scale will accelerate improved planetary health and biodiversity restoration (RM 3) by curbing our reliance on fossil fuels. Investment in hydrogen research and development now will be critical to ensure accelerated access to clean and green technology (RM 4). Finally, it is crucial that, as hydrogen production scales and markets mature, there is effective sustainability governance and decision-making (RM 5) to support industry, government and community.

The University is ready to play a world-leading role in scaling hydrogen production in Australia through partnerships that drive innovation and a focus on empowering our national hydrogen skills to deliver a more sustainable future.

We have been recognised by CSIRO for our world-class capability in hydrogen-related research and development and were recently ranked second (only to CSIRO) for research 'intensity' across the complete hydrogen value chain. Our research into the cross-cutting uses and utilisation of hydrogen was determined to be significantly ahead of higher education peers. For more information, please visit: research.csiro.au/hyresearch/c/

Research mission 1

Resilient , healthy and equitable communities

RM 1 seeks to reduce global inequality and cultivate an inclusive transformation to a sustainable future. This includes exploring human rights-based approaches, improving access to justice, promoting inclusivity and participation, championing Indigenous voice and traditional knowledge, developing resilient infrastructure and planning, disaster risk reduction, and enhancing the wellbeing of vulnerable populations through improved health systems.

Ensuring a just and equitable transformation to a carbon neutral society and economy is critical. Globally, economic growth has been deeply unequal, and now the impacts of environmental issues are compounding risks for vulnerable populations. The interconnected nature of sustainable development and equity poses serious challenges, but also presents opportunities to build a better future for all. Through increased efforts to build equality in our communities, we can also support more resilient communities.

The University of Adelaide understands that social justice and equity sit at the heart of sustainable development. Tackling the world's most pressing environmental issues will require major economic and societal shifts. Ensuring that no-one gets left behind in that transition requires robust planning and meaningful consultation with communities. Whether it is improving access to a clean and healthy environment or building community resilience to the worsening impacts of climate change, reducing inequalities is integral to achieving the United Nations' SDGs.

We have a proud history of leadership across many research initiatives which focus on building resilient, healthy and equitable communities. As part of RM 1, the University will continue to partner with communities to deliver appropriate and effective sustainability responses.

The University has many examples of meaningful and impactful community engagement, especially as it relates to solving environmental issues and adapting to climate change. For example, our researchers are currently delivering 'Old ways for new days', a project which works in partnership with the Girrigun Aboriginal Corporation to develop stronger understandings of Indigenous perspectives about climate change, and how Indigenous communities are building adaptation responses together.

Law and policy will be a critical enabler of sustainable transformations, and RM 1 will leverage our expertise to ensure that regulatory development is inclusive and equitable. Our researchers provide independent perspectives on law and policy issues relating to the environment, land use planning, heritage protection, human rights, sustainability, climate change and energy and natural resources, supporting decision-makers and communities.

Importantly, RM 1 will leverage the University's world-class health research networks to ensure that the health and wellbeing of communities is maximised.

Over the past century, extreme heat has killed many Australians. Our Extreme Heat and Health Adaptation Team has developed with colleagues around the country a heat-and-health warning system that utilises excess heat factors as a scale for public information. The research team's new system, 15 years in the making, was adopted as Australia's national emergency warning mechanism [for heat-and-health].

Australians are all too familiar with the impacts of natural disaster. Our researchers are helping to quantify the economic and social impacts of drought in rural Australia. The aim of this project is to use innovative techniques to analyse national datasets to determine the economic and social impacts of droughts and floods in rural and regional Australia and better understand farmers' drought adaptation responses to carbon-credit market signals. The outcomes of this innovation are expected to be a major step in developing and implementing cost-effective drought policies and services to minimise its complex impacts, strengthen rural and regional community resilience, and enhance sustainable agriculture in Australia.

Furthermore, our Environment and Health Research Group continues to have a strong, collaborative relationship with government organisations including SA Health, SA SES, SafeWork Australia, Bureau of Meteorology and the Australian Institute of Health and Welfare.

Climate change will have a major impact on all Australian communities, but particularly vulnerable and remote communities. Once housing is constructed, its sustainability depends on the efficacy of property maintenance. In remote Indigenous communities in Australia, responsive or reactive approaches to property maintenance dominate over planned and preventative attention, leaving housing in various states of disrepair. Our researchers are helping to understand those impacts and are exploring how housing stock in rural Indigenous communities can be maintained at high levels over time while considering the impacts of climate change and ensuring positive health and wellbeing outcomes for householders. This work is helping to build the resilience of remote and Indigenous housing to improve housing outcomes for communities.

The University is deeply committed to the Indigenous voice and meaningful engagement with Aboriginal and Torres Strait Islander communities. Traditional knowledge is a critical part of community health, resilience and sustainability in Australia, including strengthening the nexus between Indigenous knowledge and research.

We proudly support and participate in Indigenous research networks, such as the National Indigenous Research and Knowledges Network (NIRAKN) and the Australian Institute of Aboriginal and Torres Strait Islander Studies (AITSIS). Through RM 1, the University will continue to strengthen Indigenous relationships and champion Indigenous voices in research. Planning and designing buildings that better address urban heat is another necessary step to achieve green urban cities. We are currently investigating the role of smarter site planning, green space and building design to reduce cooling energy needs as well as improve the comfort, health and wellbeing of the occupants.

This research has discovered a significant correlation between temperatures and the perceived health and wellbeing of older people in South Australia, and is providing important building design and policy guidance for decision-makers and industry.

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RM1 links to the following SDGs

- 1 No poverty
- 3 Good health and well-being
- 4 Quality education
- 5 Gender equality
- 10 Reduced inequality
- 11 Sustainable cities and communities
- 16 Peace, justice and strong institutions

Research mission 2

Responsible resource production and consumption

RM 2 explores innovative systems and solutions required to improve the sustainability of production and consumption. From the extraction of critical minerals through to the systems required to optimise food production and water use, and new knowledge that supports circular economies and supply chains, RM 2 investigates how we can do more with less to ensure the sustainable and efficient use of natural resources.

The availability of key resources, such as water, food and minerals, is critical to ensure that we equitably meet the needs of the global population. There is an urgent need to manage how natural resources are extracted and produced, and how any resulting waste is managed. We recognise the intrinsic link between resource production and consumption and long-term global sustainability and resilience. The link between mining and renewable energy is critical to the world's carbon neutral future. South Australia is central to global electrification with its copper and mineral deposits; its ability and renewable energy to produce 'green' hydrogen, steel, cement, copper and other critical metals; and our know-how to apply our expertise in energy and water, artificial intelligence & machine learning, sensing, renewable energy systems and energy- and mining business, law and economics to make mining and other heavy- and hard to abate industries operate in a manner that allows it to achieve its ESG goals while meeting the demand needed to meet future decarbonisation commitments.

From the critical minerals buried deep underground through to our precious water resources, we understand that minimising environmental and social harm through enhanced extraction, processing and use of resources is crucial in the transition to a sustainable future. Deep collaboration is required to progress thinking and develop new solutions for resource extraction and use. We are leading collaborative efforts across these vital areas and RM2 will accelerate delivery of these and other innovations, such as new catalysts that will, for example, enable us to produce hydrogen directly from solar panels or from seawater, or enable us to mine the mineral, rather than mine ore.

Our research has directly benefitted many of Australia's and other countries largest companies and organisations to accelerate intelligent solutions to complex issues, and create future opportunities that will continue to shape strategic growth across industries for years to come.

As the global economy strives to decouple from fossil fuels, the need for complex and critical minerals has increased exponentially. The University has nation-leading capabilities in the discovery, mineralogy and processing of mineral resources considered critical to modern energy and electronics technology. We are supporting the transition to a low-carbon future through pioneering research which unlocks greater understanding of critical minerals across the whole value chain from the resource in the ground, right through mining and processing. This research will enable systemic optimisation of the mining industry nationally and globally.

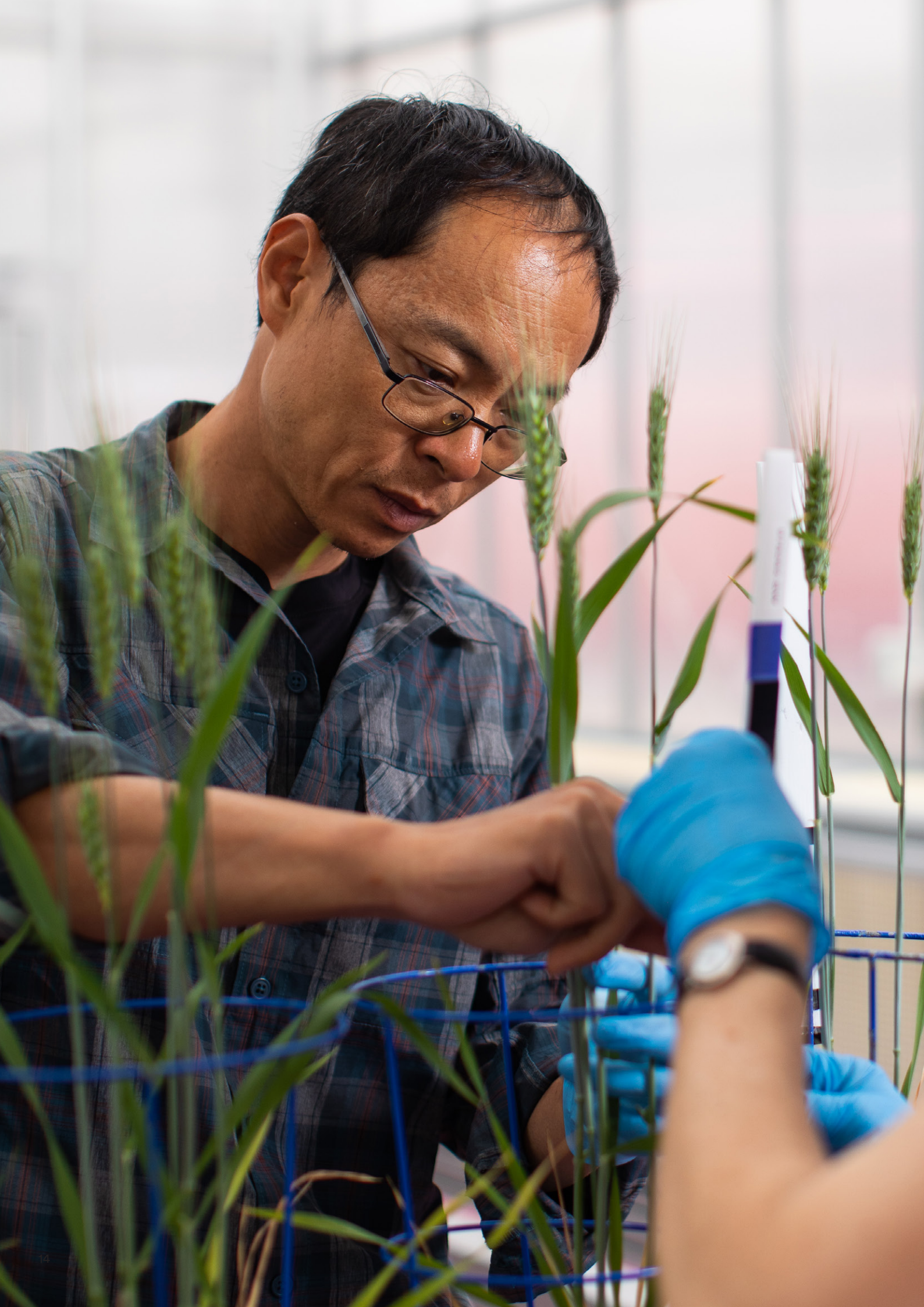
The University is leading cutting-edge research into technologies that deliver improved environmental remediation. Our researchers are delivering ground-breaking research into new, advanced oxidative processes (AOPs) which are developed utilising novel metal nanocrystals, metal-free nanocarbons for activating versatile superoxides toward adsorption, aqueous oxidation of toxic contaminants and control of air pollution. This research has the potential to improve environmental remediation practices globally, delivering outcomes for the planet and its people.

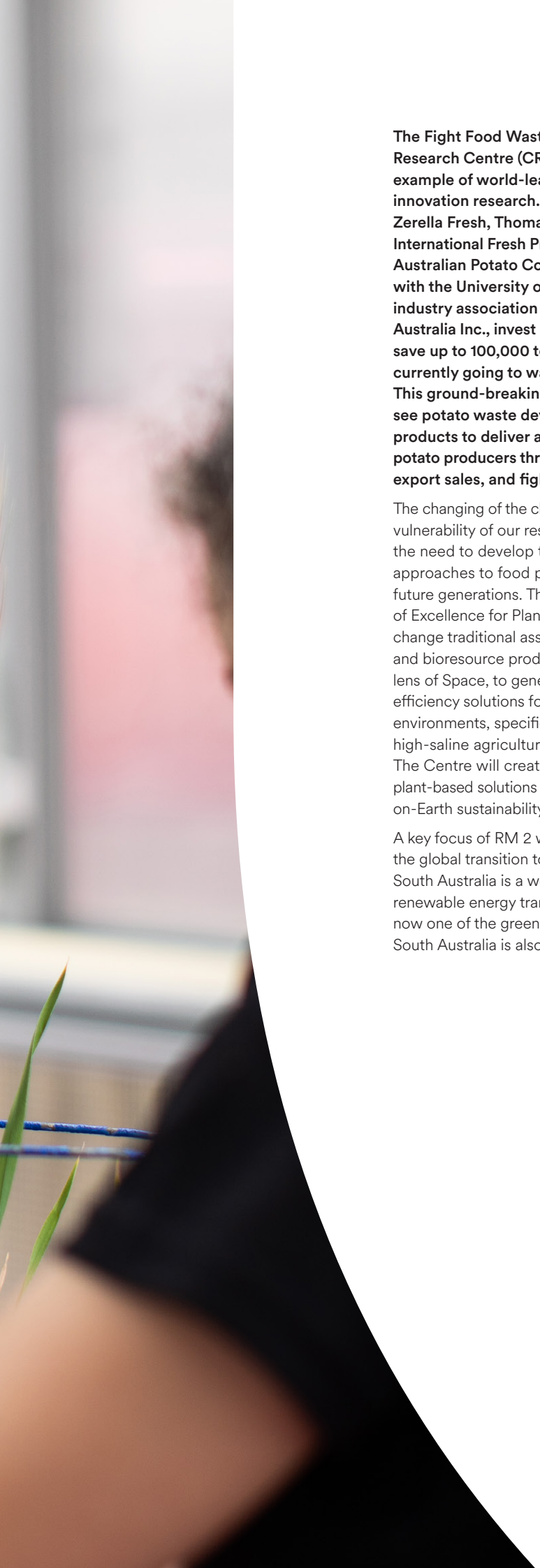
Our researchers are leading the collaborative efforts with industry to meet the world's increasing need for copper and to facilitate the global transition to renewable energy. This includes pioneering the cutting-edge technology required to mine lower-grade, complex ores using less energy and water and producing less waste. This ground-breaking research is set to provide a step change in both the economics and sustainability of copper production globally. We have the capability together with stakeholders to assist SA in becoming the world's largest producer of 'Green Copper'.

Secure and sustainable water is an important goal of many countries, including Australia. It is especially important for South Australia. Water is key to minerals processing, agriculture and the wine industry, and to our future green hydrogen production. Our researchers at the Water Research Centre are bringing together disciplines and capabilities to collaboratively enable solutions for improved water governance and use.

The University is leading cutting-edge research into technologies that deliver improved environmental remediation. The Water Research Centre has built a team of experts with a strong track record in achieving water security and sustainability outcomes for all types of water resources. Their work is providing essential operational and policy decision support to ensure the availability of our most precious resource into the future.

When it comes to primary food production, the University of Adelaide has an eminent, 130-year legacy of research and teaching in food, wine and agriculture, and world-class expertise in improved production and product development practices.





The Fight Food Waste Cooperative Research Centre (CRC) is a great example of world-leading food innovation research. Mitolo Group, Zerella Fresh, Thomas Foods International Fresh Produce, the South Australian Potato Company, together with the University of Adelaide and industry association Potatoes South Australia Inc., invest nearly $1 million to save up to 100,000 tonnes of potatoes currently going to waste every year. This ground-breaking research will see potato waste developed into new products to deliver additional profit to potato producers through domestic and export sales, and fight food waste.

The changing of the climate and increased vulnerability of our resources highlight the need to develop transformative approaches to food production for future generations. The ARC Centre of Excellence for Plants for Space will change traditional assumptions of plant and bioresource production through the lens of Space, to generate new plant efficiency solutions for challenging Earth environments, specifically in low-water, high-saline agriculture environments. The Centre will create the flexible plant-based solutions needed to improve on-Earth sustainability.

A key focus of RM 2 will be to support the global transition to a circular economy. South Australia is a world leader in the renewable energy transition; our grid is now one of the greenest in the world. South Australia is also leading as a model for the circular economy with 83% of material diverted from landfill and $270m in recovered, recycled and reused items in 2019-20 .

Together, we are exploring new ways to engineer construction and other high-value materials from recycled household, commercial and industrial waste to develop innovative solutions to reduce waste. For example, the Australian Research Council-funded Industrial Transformation Research Hub 'Transformation of Reclaimed Waste Resources to Engineered Materials and Solutions for a Circular Economy' (of which the University is a partner) is investigating changing behaviours, smart designs to minimise waste, optimum processing of waste and converting waste to energy, developing novel materials using recycling and upcycling technologies, and metrics and tools to encourage uptake of new materials (such as bamboo and green concrete).

Our multi-million-dollar program, in collaboration with Petronas Research, has successfully developed a novel 'self-heal' epoxy technology with highly robust and reliable performance. This revolutionary research is improving the integrity of materials by healing in situ damage during operations, which will lead to a longer service life of materials, and decreased maintenance and inspection costs.

1. greenindustries.sa.gov.au/sarecycling

RM2 links to the following SDGs

- 12 Responsible consumption and production
- 6 Clean water and sanitation
- 2 Zero Hunger
- 11 Sustainable cities and communities
- 9 Industry, innovation and infrastructure
- 4 Quality education

Research mission 3

Planetary health and biodiversity restoration

RM 3 focuses on planetary health, including the restoration and resilience of biodiversity and ecosystems. This includes pioneering new knowledge into planetary health, biodiversity restoration solutions, nature-based climate adaptation, and the true valuation of ecosystem services. It will also champion Indigenous and traditional knowledge to strengthen ecological research.

The diversity of species on land and in oceans plays a key role in ecosystems and the services they provide. Ensuring the long-term health of ecosystems is essential to a functioning biosphere, and to human life on Earth. In an unpredictable future, our leading researchers are making a change in ecological and climate change research.

Earth is on a path to devastating climate change that will transform biodiversity and disrupt services which ecosystems provide to nature and people. We understand that our global stewardship of natural ecosystems must fundamentally improve, and we are committed to developing strong local and international collaborations and engagement to address complex future environmental problems, and to become carbon neutral.

The University's Environment Institute will play a critical role in RM 3 as a world-leader in environmental change research that delivers relevant, innovative and actionable outcomes to complex global environmental challenges. The Environment Institute provides new knowledge and develops novel tools for better monitoring of climate change impacts, biodiversity, invasive species and ecosystem health – past, present and future.

Our research is transforming the way we think about, plan for, and adapt to a changing climate. As part of the Environment Institute, Climate Futures is a transdisciplinary team of researchers who have united to provide the context, tools and policy guidance needed to help mitigate future biodiversity losses and maintain resilient ecosystems in the face of shifting climates.

South Australia's coastline is teeming with life, and it is critical that this biodiversity is protected and restored. The University has expertise in the restoration of marine environments, and researchers in the Environment Institute have delivered ground-breaking restoration research that has been integral to the early success of South Australia's restored shellfish reefs.

Researchers from the Environment Institute have delivered ground-breaking restoration research that has been integral to the early success of South Australia's restored shellfish reefs. Shellfish reef restoration is the beginning of a new era for large-scale marine restoration in Australia. Our researchers are undertaking pioneering research to understand better how shellfish ecosystems, particularly oysters, enhance the resilience and function of coastal ecosystems.

This restoration project aims to pull our native mud oyster back from the brink of extinction in the wild and restore a forgotten ecosystem that once teemed with marine life.

South Australia hosts some of the world's most spectacular natural heritage, and the State Government provides national leadership in terrestrial and marine biodiversity restoration. RM 3 will explore the policy and regulatory frameworks which will guide improved biodiversity restoration and resilience. For example, our researchers were integral in delivering research that supported the development of the Blue Carbon Strategy for South Australia, which was launched in 2019 to accelerate action to protect and restore coastal ecosystems.

The University of Adelaide was awarded funding from the Australian Government Department of Agriculture, Water and the Environment's Blue Carbon Ecosystem Restoration Grants program. The program will support the important function of marine ecosystems, with 20 hectares of seagrass to be restored in the Gulf St Vincent off Port Gawler, north of Adelaide, in partnership with South Australian Research and Development Institute (SARDI), the research division of the Department of Primary Industries and Regions (PIRSA).

Once established, the project will examine how effectively the restored patches operate as habitats for fauna, and in accumulating blue carbon, to ensure that seagrass rehabilitation not only restores the actual seagrass, but the functions that the habitat provides in the environment.

Here in Adelaide, our researchers have contributed to evidence-based planning, policy development, restoration decision-making, and biodiversity and conservation monitoring by government agencies, statutory authorities and land managers. Our recommendations have been adopted by the Adelaide & Mount Lofty Natural Resource Management Board to support habitat restoration.

We have also led the revision of seed sourcing and restoration practices on national and international scales and provided the evidence-base for water management planning and strategies, including the adoption of 7,400 ha of land set aside for critical habitat restoration, resulting in significantly increased environmental water flows in the Murray Darling Basin.

In 2022, the University received funding from the Federal Government's Soil Science Challenge program to understand ecological processes and its critical role in agricultural and environmental sustainability. Working in partnership with the SARDI, the research division of the PIRSA, researchers will examine soil DNA samples collected over the past 20 years to improve productivity, profitability and resilience for Australia's agricultural sector. The "Past, present and future drivers of soil change" project will include research that enhances the capacity of plants to acquire nutrients via plant-microbe interactions and manage plant-based systems to mitigate and adapt to environmental change (including soil carbon sequestration).

As with other RMs, Indigenous knowledge is critical to understanding and guiding environmental protection and restoration, both here in Australia and abroad. Research undertaken by the Environment Institute is exploring how different communities can adapt to climate change. This has included developing adaptation strategies with and for Indigenous peoples, looking at how urban areas can be 'greened' and the ways in which fisheries can be made more resilient and responsive to climate threats. We will continue to ensure our research understands and supports the convergence of traditional knowledge and natural resource management, and will continue to partner and engage meaningfully with Indigenous Australians.

By harnessing the power of our world-leading research in environmental management and climate change, we will continue to work with partners to deliver solutions for maintaining and enhancing planetary health and biodiversity.

RM3 links to the following SDGs

- 13 Climate action
- 15 Life on land
- 14 Life below water
- 3 Good health and well-being
- 12 Responsible consumption and production
- 4 Quality education

Research mission 4

Accelerated access to clean and green technologies

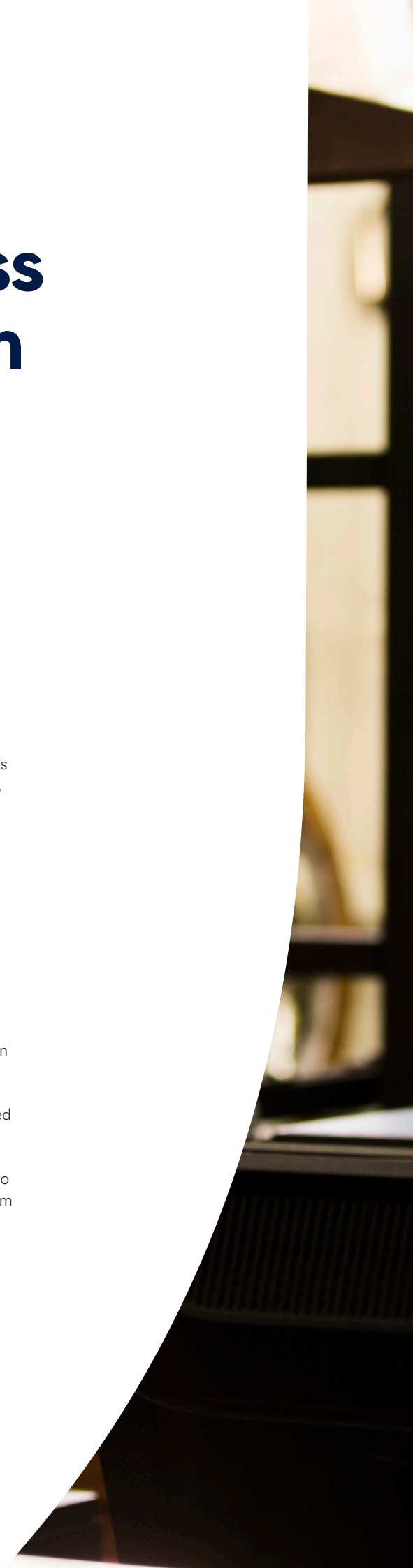
RM 4 will accelerate the technology, innovation and skills required to transform to a sustainable economy. This includes developing low/zero emissions future fuels (including hydrogen) and low emissions technology, as well as reducing inequality through transferable, affordable and accessible technology.

Significant advancements in technology and science are required to ensure global sustainability targets are realised and advanced. The transition to a carbon neutral future is well underway. However, increased global efforts are required to develop future technologies that are safe, secure and intelligent.

South Australia is a recognised world-leader in renewable energy technology. As the State's premier university, we have helped shape the technology that has driven this clean energy revolution. To ensure that this much-needed clean and green technology is accelerated and implemented at scale requires pioneering research into smart grid design, energy stability and energy storage, as well as investigation into future business models and the policy and governance structure required to support the energy transition.

RM 4 will further support the University's research in energy generation, catalysis, and energy storage and distribution (including 'smart grid' planning). Our research capability spans from fundamental scientific discovery to laboratory prototyping to operational environments and commercialisation.

New fuels are the future of energy. World-leading research delivered by the Future Fuels Cooperative Research Centre (CRC) is tackling the future of energy and is focussed on industry partnership to enable the decarbonisation of Australia's energy networks. This includes the exploration of the technology, systems and markets required to support hydrogen delivery, including the development of a global hydrogen roadmap which was submitted in 2021 to the Australian Government to help inform its National Hydrogen Strategy.



Researcher leaders across the "University are exploring how CO2 can be recycled and utilised via the simulation of nanocarbons and metal-organic framework (MOF) materials. This research will support the development of CO2, CH4 adsorption, storage, and hydrocarbon conversions via photocatalysis and electrochemistry. These are all areas that are critical in the national push to decarbonise and deliver a renewable energy revolution.

The University of Adelaide has an outstanding research track record in energy storage innovation which attracts significant global interest. Our researchers are delivering innovative solutions for the development of the circular economy of batteries, and the University provides an ideal environment for industry-focussed research and development. For example, we have designed and patented technology to develop high-energy, high-power-density batteries that aim to be safe, cheap, and more reliable than any other battery on the market.

The application of this technology will have a transformative impact on the world's progress towards a more sustainable future, lowering emissions and providing reliable power to millions.

Three of our most Highly-Cited Researchers and two ARC Australian Laureate Fellows are leading international battery development, with our metal-sulphur batteries now a major candidate for a next-generation energy storage device with low-cost and high-energy density. These batteries can be charged and discharged at least 10,000 times providing good cycling durability. This work opens the path to a new generation of metal-sulphur batteries that could potentially store at least twice as much energy by weight than the current generation of lithium-ion batteries.

We understand that energy needs to be effectively and efficiently delivered, which is why RM 4 will support the University's significant, proven capability in optimal grid planning, including energy storage and demand management systems, wholesale and local energy market design, and network development.

The University of Adelaide has worked in partnership with the energy industry for over two decades, undertaking technically challenging projects to help ensure power system security and reliability. Our R&D expertise has directly benefited companies and organisations such as the Australian Energy Market Operator (AEMO), South Australia Power Networks, Powerlink Queensland, TransGrid, VENCorp, Transend Networks, Hydro Tasmania and ElectraNet.

Our researchers are also currently exploring the development of technologies to support 'ultra-green' hydrogen through a venture with Sparc Hydrogen Pty Ltd and Fortescue Future Industries. The project is seeking to deliver cutting-edge technology to produce commercially-viable green hydrogen via photocatalysis. This technology can potentially be adopted remotely and for onsite use, reducing the reliance on long-distance hydrogen transportation or electricity transmission.

This research will accelerate hydrogen R&D nationally and is evidence of our commitment to partnering with industry to support the transfer and development of new technologies.

Our researchers are leading the development of a technology for producing copper powders using a thermochemical wasteless method. This is an exciting project delivered in partnership with a European Research Consortium. The results suggest that the potential applicability of the studied method for the mass production of high-quality copper powders with zero environmental impact and are now being investigated for nickel.

RM4 links to the following SDGs

- 7 Affordable and clean energy
- 9 Industry, innovation and infrastructure
- 8 Decent work and economic growth
- 11 Sustainable cities and communities
- 12 Responsible consumption and production
- 3 Quality education
- 17 Partnerships for the goals

Transforming heavy industry for the future: HILT CRC

RM 4 is exemplified by the current research and industry engagement being led by the Heavy Industry Low-carbon Transition Cooperative Research Centre (HILT CRC).

While heavy industry in Australia has begun to reduce its greenhouse gas emissions, these emissions are very difficult to abate. New, carbon-neutral technologies are needed to convert Australian ores to high-value, low-carbon products at globally competitive prices.

Many of Australia's leading companies in the heavy industrial sector have embarked on a program through the HILT CRC that will enable a step-change in the rate at which they transition toward zero net-carbon emissions.

HILT CRC is leading Australia's collaboration in transforming heavy industry for the low-carbon economy. It will demonstrate the technologies needed to grow Australia's economy, unlocking potential value of $48.7 billion in annual revenue and $92 billion in investments, while mitigating CO2 emissions. This includes pioneering new knowledge on materials such as 'green' iron, alumina, cement and other processed minerals.

HILT CRC's focus is on developing technologies and methods that overcome barriers to the low-carbon transition, including the unacceptable risks of untested innovations.

HILT CRC brings together many of Australia's leading researchers in this field, drawn from the University of Adelaide, which led the bid, together with the Australian National University, CSIRO, Curtin University, University of Newcastle, Swinburne University, Queensland University of Technology and international partners Arizona State University, German Aerospace and the University of Canterbury.

The University is proud to be a core partner of HILT CRC as it continues to play an important role in Australia's transition to a low-carbon future through collaboration and knowledge sharing.

For more information visit hiltcrc.com.au

Research mission 5

Effective sustainability governance and decision-making

RM 5 encourages and enables sustainable governance. This includes research into reimagining governance structures, responsive policy and regulatory design, mobilising green and climate finance, capacity development and behavioural change, and enhanced decision-making tools. It will also examine the co-benefits, trade-offs and tough choices required to navigate sustainability issues.

Sustainability challenges require improved knowledge, governance, regulation and collaboration, and depends upon people working together. Organisations require support to navigate sustainability through research and capacity development that supports robust decision-making and transformative governance.

Improved leadership, skills and decision-making are required to develop and deliver on sustainability initiatives, all the while navigating a regulatory landscape that is in flux. We will continue to facilitate the growth of proactive and innovative leaders who can make a positive difference within their organisation, company or community and contribute to the global effort to make our society and economy carbon neutral.

A well-articulated sustainability strategy and corresponding governance framework has become a prerequisite for attracting talent, raising funds, and procuring finance and government approvals.

The global standardisation of Environmental, Social and Governance (ESG) reporting and metrics will go some way to deliver transparency and progress, but improved capability and capacity development will be required to deliver long-term adaptive transformation. Our researchers are delivering influential research and providing strategic advice to national clients on emergent sustainability issues for business and government.

Inclusive and culturally sensitive resource management is critical to enable better sustainability governance. An exciting new government-funded project on 'Hydrosocial Adaptations to Water Risk in Australian Agriculture' is delivering critical insights on the behavioural patterns that impact environmental change and policy, while illuminating how people contest hierarchies of access and control when it comes to resource allocation decisions. This work includes discussion of the role that anthropologists can play in fostering participatory, policy-relevant research; a critical component of strong sustainability governance.

RM 5 will deliver on providing decision-ready evidence to corporates' and governments' strategic navigation of sustainability challenges and opportunities. For example, work conducted by leading researchers across the University is exploring the adoption of solar photovoltaics across Australia, with analysis on the differences in uptake between hardship and non-hardship customers. This research will provide important evidence for improved national energy policy and planning.

The University is committed to enhanced collaboration with communities to realise sustainability outcomes. The Spencer Gulf Ecosystem and Development Initiative (SGEDI) is one such example, where researchers from the Environment Institute are facilitating change to maintain the integrity of Spencer Gulf. This research involves developing the science and understanding for world-class decision making that supports a thriving Gulf region with progressive developments, community opportunity, while the unique ecosystem is protected and enhanced – through effective consideration of cumulative, chronic and long-term environmental stresses.

While there is evidence that transition to a sustainable and equitable path is feasible, charting an effective and viable course through a climate crisis involves complex decision-making, and occasionally trade-offs. Ensuring that laws and the policy framework that support the transition are robust is also a critical component of RM 5.

RM 5 will also explore the role of social enterprise in enabling equality and sustainability. The Yunus Centre for Social Enterprise at the University of Adelaide (a joint initiative of the University and Yunus Centre) promotes and sustains enterprise as a deliberate vehicle for social good. The Centre provides connection, empowerment, expertise, exploration and initiative.

RM5 links to the following SDGs

- 16 Peace, justice and strong institutions
- 17 Partnerships for the goals
- 13 Climate action
- 4 Quality education
- 10 Reduced inequality.

Research excellence with global impact

A strong commitment to research has defined the University of Adelaide's history. Our research has supported societal, economic, and health advancements with an institutional focus on generating research excellence with impact.

As South Australia's sole member of the Group of Eight, the University of Adelaide is driving innovation and prosperity through the translation of research and new knowledge. We have long been central to the creation and dissemination of knowledge locally, nationally, and internationally for the socio-economic advancement of South Australia and Australia.

Our FAME Strategies are a critical element of our strategic aspirations, highlighting how our world-class research is driving impactful, positive outcomes across the world. As a core element of the Research that Shapes the Future pillar of the University's Strategic Plan, Future Making, we are strengthening our multidisciplinary research collaboration and funding opportunities through our Industry Engagement Priorities (IEPs), and identifying key areas of research and industry focus through strategic research documents.

Future Making aligns the University's global connectivity, research, and innovation with the social, intellectual, and economic needs of all people, South Australia, and the nation.

For more information on the University's internationally-recognised research and innovation go to: adelaide.edu.au/research

The University was ranked equal 36th globally in the QS World University Rankings: Sustainability 2023 (*topuniversities.com/university-rankings/sustainability-rankings/2023*) This ranking is focused on social and environmental sustainability performance in higher education institutions.

Institute for Sustainability, Energy and Resources: Leadership for a better future

The University of Adelaide is dedicated to conducting world-class research.

Our Institute for Sustainability, Energy and Resources (ISER) leads globally transformative research that overcomes complexity, drives change, and creates value for a more sustainable future. ISER provides a platform for research innovation, leadership, and partnership from our experts across all Faculties and Institutes.

ISER co-ordinates this FAME Strategy: Sustainability and will lead the any further development and implementation of it.

ISER is a conduit to the University's full spectrum of sustainability, mining, subsurface resources, and energy-related expertise.

The capabilities within ISER focus on delivering the vision and mission of this Strategy.

With a strong commitment to impact, ISER's capability and experience equip us to take on collaborative projects of any scale or complexity.

For more information on ISER visit:
adelaide.edu.au/iser

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Kaurna acknowledgement
We acknowledge and pay our respects to the Kaurna people, the original custodians of the Adelaide Plains and the land on which the University of Adelaide's campuses at North Terrace, Waite, and Roseworthy are built. We acknowledge the deep feelings of attachment and relationship of the Kaurna people to country and we respect and value their past, present and ongoing connection to the land and cultural beliefs. The University continues to develop respectful and reciprocal relationships with all Indigenous peoples in Australia, and with other Indigenous peoples throughout the world.