ANNUAL REPORT

2025 - 2026

UNIVERSITY OF NEWCASTLE AUSTRALIA

nier
SOLUTIONS FOR GLOBAL CHALLENGES
ENERGY RESOURCES FOOD WATER

NEWCASTLE INSTITUTE FOR ENERGY AND RESOURCES

OUR VISION

To meet the resource challenges of a changing world.

OUR MISSION

We work with industry to drive research-based innovation and skills development needed to secure the energy, minerals and metals, food and water resources for a more sustainable and resilient future.

OUR RESEARCH THEMES

POWERING THE FUTURE

NEXT GENERATION RESOURCES

ENVIRONMENTAL SUSTAINABILITY AND SECURITY

NIER gratefully acknowledges the support of our many funding organisations and partners. These are specifically referenced throughout this report.

NIER hosts the Trailblazer for Recycling and Clean Energy (TRaCE), a partnership between the University of Newcastle, UNSW Sydney, and supported by the Australian Government. Due to the number of TRaCE related projects within this report, we specifically acknowledge this program here.

Trailblazer Recycling & Clean Energy

UNSW SYDNEY

Australian Government Department of Education

The University of Newcastle supports the United Nations Sustainable Development Goals (SDGs)

SUSTAINABLE DEVELOPMENT GOALS

NIER's research and activities align with these SDGs;

The University of Newcastle acknowledges the traditional custodians of the lands on which our research is conducted: Awabakal, Sarkinjung, Biripai, Worimi, Wonnarua, Gomeroi, and Eora Nations. We pay respect to the wisdom of our Elders past and present. We extend our acknowledgement and respect to all Aboriginal and Torres Strait Islander Nations from which our students, staff, and community are drawn.

A MESSAGE FROM OUR EXECUTIVE DIRECTOR

The 2025–26 year has been one of momentum and change for NIER.

The world itself is in a period of rapid change - new political agendas, greater focus on economic resiliency, security, and sovereign capability, and changes brought about by technology all continues to disrupt. At the forefront of this disruption is Artificial Intelligence (AI).

This demands new ways of working, but it also presents significant opportunities. NIER is reinforcing its role as an innovator, building on the strengths that distinguish us and helping to unlock the full value of research.

The criticality of our work is evident in the pages of this report, which focus on our researchers and their incredible work over the last 12 months. From renewable fuels, critical minerals and sustainable steelmaking to water security, environmental resilience, AI and circular economy initiatives, our researchers are tackling some of the most significant challenges facing industry and communities today.

Our partnerships and collaborations are central to what we do and who we are. Together with industry, government, and community we stay responsive to emerging challenges, prioritising the needs of our regions and taking our innovations to the world.

In March of this year, after 16 outstanding years building a precinct and model for industry engaged research at NIER, Professor Alan Broadfoot commenced a new role overseeing strategic Research and Innovation projects within the University. As part of this role, Alan will complete capital works for the Next Generation Resources Park, located alongside NIER where building has already commenced.

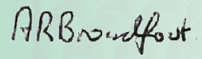
These investments will create an expanded ecosystem where industry challenges, research, and skills development come together to drive industrial innovation and growth for the industries of the future.

I thank Alan for his vision, courage and leadership over those 16 years. In receiving the reins as Executive Director of NIER, I am eager to not lose momentum, but to build on the vision and foundation, to expand and grow the value of research, and to help our partners meet the challenges of a changing world.

Low-emissions steel from Australian iron ore. Recovering silver from end-of-life solar panels. Producing fuels from waste. Turning environmental challenges into economic opportunities. These are the kinds of solutions that strengthen value chains, embed circularity and build more resilient supply chains. They are being developed right now in NIER laboratories and workshops, and their stories are captured in this annual report.

We proudly bring you NIER's 2025/26 Annual Report.

Dr Paul Ebert
Executive Director, NIER



Professor Alan Broadfoot
Interim Pro-Vice Chancellor, Industry and Engagement

NIER BY NUMBERS

(As at 30 June, 2026)

290
Industry partners

24
International partners

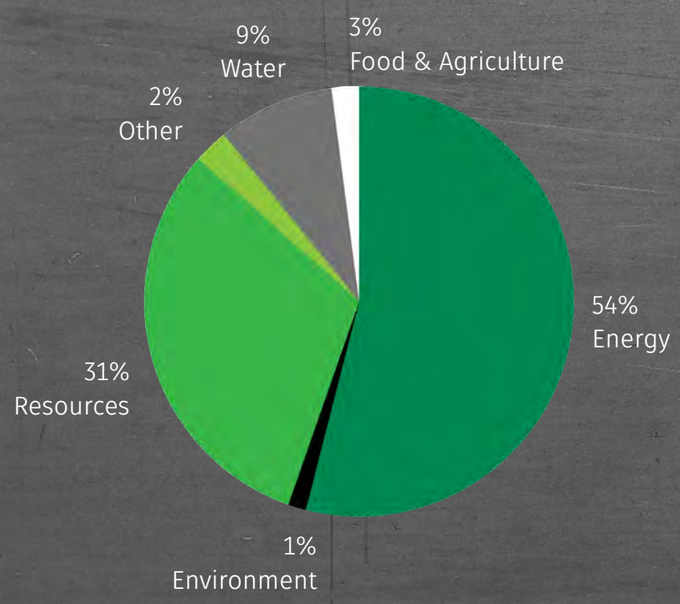
35%
Repeat partners

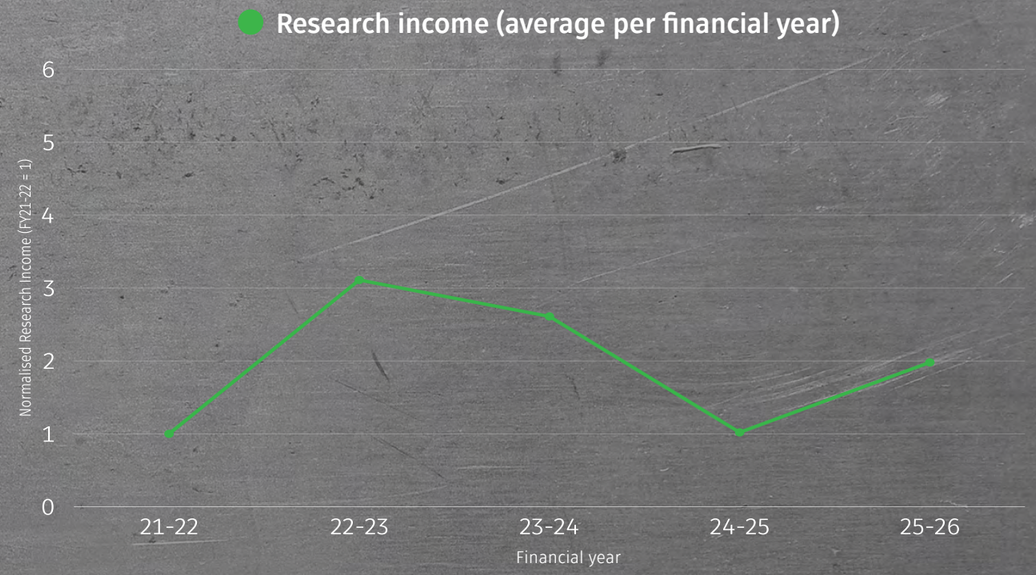
204
Active PhD students

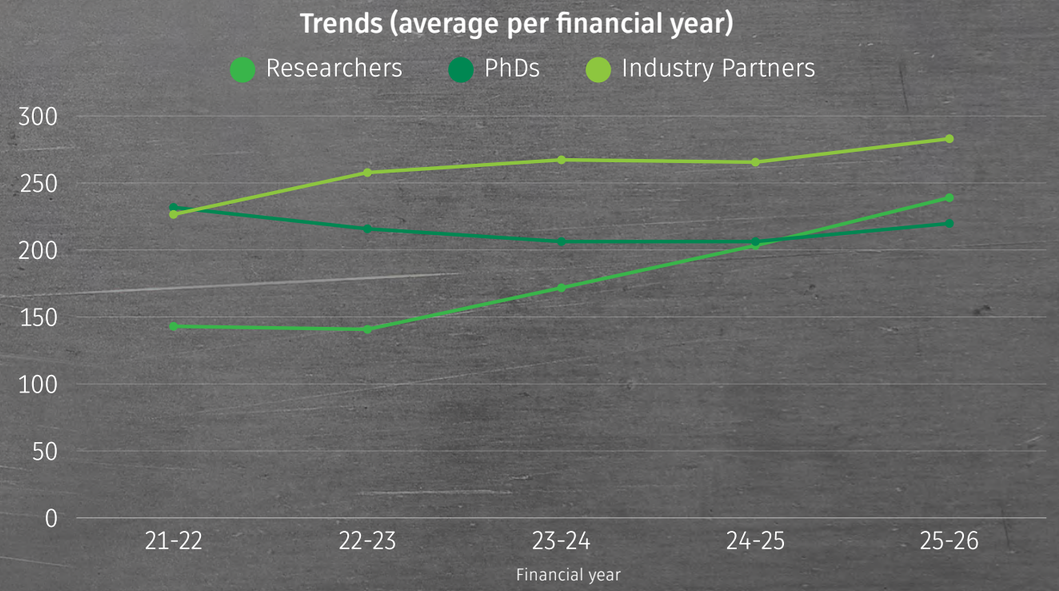
219
Engaged University researchers

21
Research centres and groups

Grants by sector







Data presented includes all NIER affiliated research centres and groups:

- ARC Centre of Excellence for Enabling Eco-Efficient Beneficiation of Minerals
- Australian National Fabrication Facility Newcastle Hub
- BHP Centre for Sustainable Steelmaking Research
- Centre for Bulk Solids and Particulate Technologies
- Centre for Critical Minerals and Urban Mining
- Centre for Geotechnical Science and Engineering
- Centre for Innovative Energy Technologies
- Centre for Organic Electronics
- Global Centre for Environmental Remediation
- Global Innovative Centre for Advanced Nanomaterials
- Centre for Integrated Resilience: Coasts, Water and Climate
- Plant Science Research Group
- Sustainable Food Innovation Research Group
- Circular Economy and Sustainable Construction Research Group
- Critical Infrastructure Performance and Reliability Group
- Artificial Materials Lab
- HESTIA Lab (Human Ecologies for Sustainability and Transition in Anthropology)
- Electrochemical Engineering Laboratory
- Artificial Intelligence and Optimisation Research Group
- Water-Climate-Land Research Group
- Applied Electrochemistry Group

POWERING THE FUTURE

Unlocking new energy solutions, new economies and a net zero future through innovative technologies, materials, and fuels.

SUSTAINABLE FUELS

As the world pursues net zero emissions and seeks greater economic resiliency, renewable fuels like green hydrogen, ammonia and methanol are becoming more important.

Such fuels, and the downstream products created from them are only just emerging as economic options and need significant innovation and research to become thriving industries of the future.

This year, the Australian Research Council (ARC) awarded funding for the establishment of an ARC Centre of Excellence for Renewable Fuels. Hosted by the University of Wollongong in partnership with seven universities, including Newcastle, it is backed by global industry partners in hydrogen, ammonia, energy, gas, manufacturing, shipping, aviation, infrastructure, steel, and policy. Newcastle's Dr Jessica Allen joins as a Deputy Director, leading Education and Outreach for the Centre. Along with Laureate Professor Behdad Moghtaderi they will work to advance the centre's ambitious research program.

The Centre will focus on developing sovereign capacity in renewable fuels, supporting domestic fuel security and substitution of CO_2 intensive fossil fuel exports with green fuels and their products.

PFAS HARVESTER

PROJECT - PFAS removal & hydrogen generation
Led by Laureate Professor Behdad Moghtaderi, Dr Jamie Dickinson
Partner - EVOCRA, supported by TRaCE

98 per cent of Australians aged over 12 years have detectable levels of PFOS in their bloodstreams. This is perfluorooctanesulfonic acid and belongs to the PFAS "forever chemicals" group.

This technology integrates regenerative chemical looping, to transform PFAS into valuable calcium fluoride for metallurgy and critical technology applications while producing hydrogen-enriched synthesis gas for sustainable fuels.

IMPACT GOAL - 60 per cent reduction in energy footprint compared to conventional incinerators, aligning with government priorities for low emissions technologies.

"We want to generate the hydrogen because we want to reduce the energy footprint for this project. My hope is that our research will lead to a cost effective and sustainable approach to PFAS destruction and remediation."
- PFAS Harvester team, 2025 NIER Research Collaboration Award Winners

SUSTAINABLE AVIATION FUELS

PROJECT - From Eucalyptus Oil to Sustainable Aviation Fuels (SAF)
Led by Dr Cui Ying Toe and Laureate Professor Behdad Moghtaderi
Partners - CO2 Australia, supported by TRaCE

SAF breakthroughs are needed to reduce aviation emissions and while maintaining vital air connectivity.

Plants naturally produce terpenes, the compounds behind their distinctive scents, flavours, and colours. The terpenes present in Eucalyptus leaves have emerged as promising candidates for SAF feedstocks.

This project explores the conversion pathways of eucalyptus leaves to SAF to determine which offers the greatest potential in terms of efficiency, cost effectiveness, and scalability.

IMPACT GOAL - Alternative fuel derived from a sustainable, abundant source.

"Australia is home to vast eucalyptus trees, and it is exciting to explore how they could play a role in achieving our net-zero goals."
- Dr Cui Ying Toe

AMMONIA SAFETY

PROJECT - Pilot-scale detonation tube for ammonia safety
Led by Laureate Professor Behdad Moghtaderi, Dr Jafar Zanganeh
Partners - A*STAR, Singaporean Government, funded by the National Research Foundation of Singapore

Ammonia is one of the most practical ways to store and move hydrogen for clean energy use.

Ammonia safety is vital to Singapore's clean energy future as it enables the country to safely and economically import and use hydrogen as part of its energy transition.

NIER researchers are working with Singapore's A*STAR Institute of Sustainability for Chemicals, Energy and Environment to help mitigate risks of large-scale ammonia storage, and inform safety buffers for new facilities.

IMPACT GOAL - A pilot-scale detonation tube to test explosion characteristics of ammonia

"This is building capabilities for the safe and economical import and use of hydrogen to support Singapore's clean energy transition."
- Laureate Professor Behdad Moghtaderi

HYDROGEN FROM SALT WATER

PROJECT - SeaH2: Turning seawater into clean hydrogen fuel using solar energy
Led by Laureate Professor Ajayan Vinu, Dr Jae-Hun Yang, Dr Mohammed Fawaz, Dr Nithinraj Panangattu

Producing clean hydrogen at scale without placing additional pressure on scarce freshwater resources remains a major challenge. Seawater offers an abundant alternative, but can generate harmful chlorine byproducts, degrade catalysts and operate inefficiently.

SeaH2 has developed a low-cost, metal-free nano photocatalyst that uses sunlight and seawater to produce hydrogen.

IMPACT - The technology generates up to 20 times more hydrogen than leading photocatalysts and five times more hydrogen in seawater than freshwater, without producing chlorine. This can help decarbonise industries including mining, steel, alumina and fertiliser production

"Australia's coastline and solar resources provide a unique opportunity to produce clean hydrogen from seawater. Our goal is to make renewable hydrogen more affordable, scalable and practical for real-world applications."
- Laureate Professor Ajayan Vinu

OPTIMISED RAIL NETWORK

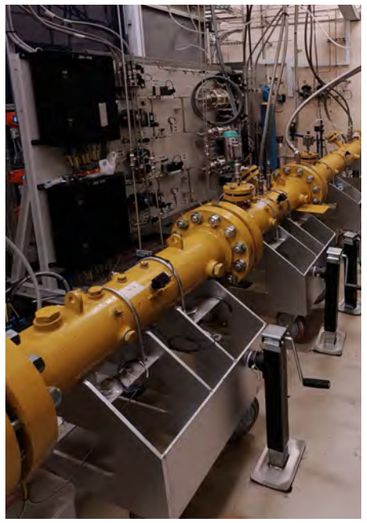
PROJECT - Decentralised AI for the Hunter Valley Coal Chain
Led by Dr Alexandre Mendes and Professor Stephan Chalup
Partner - Hunter Valley Coal Chain Coordinator (HVCCC)

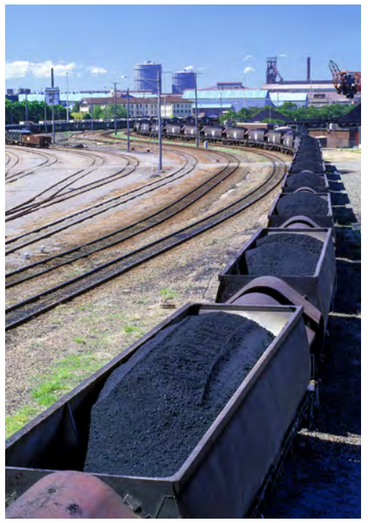
The HVCCC coordinates the world's largest coal-export operation. Delays to one train in the network affects operations and throughput. Traditional scheduling methods are centralised and often take a cautious approach to manage these disruptions.

Researchers developed an AI system that treats trains, loading points and terminals as decentralised agents. Using reinforcement learning, the agents learned how to work together and optimise dispatching decisions in real time for simulated scenarios.

IMPACT - 33 per cent lower dwell time, up to 81 per cent best case gain on key scenarios, and throughput gains on an $18.5 bn/yr export chain without additional tracks or other infrastructure.

"The decentralised design can scale across large and complex networks, and the AI agents learned to solve traffic bottlenecks and deadlocks that are difficult for human dispatchers to manage."
- Dr Alexandre Mendes





An estimated 60,000 tonnes of wind turbine material is expected to reach end-of-life nationally by 2035. While many of the components are valuable material for reuse, others are harder to recycle.

Dubbo Council, EnergyCo, Acciona Energía, NSW EPA, TRaCE and NIER are looking at ways to turn this future waste stream into a circular opportunity.

Photo: ACCIONA Energía

UNLOCKING THE REZ

The state's fleet of ageing coal fired power stations are in the process of retirement, and must be replaced by alternatives.

To maintain reliable, affordable and clean energy, the NSW Government has declared five Renewable Energy Zones (REZs) - with abundant sun and wind resources, and economical access to transmission.

With investment and resources going into the development of these REZs, there are also new industrial challenges to solve.

PROJECT - At the frontline: Local councils and the renewable energy transition
Led by - Associate Professor Hedda Askland
Partners - Dubbo, Mid-Western, Uralla and Tamworth Councils (across two REZs), supported by TRaCE

Explores how regional NSW councils are managing the rapid rollout of REZs and will produce practical tools for councils with the aim of improving how the transition is governed – making it fairer, more effective, and more trusted in regional communities.

WATER SECURITY

PROJECT - Dubbo water treatment plant
Led by Dr Craig Evans
Partners - Dubbo Regional Council and Squadron Energy

Secure, recycled water supplies are critical for the REZ, helping support renewable energy growth while reducing pressure on local water resources.

Past droughts have reinforced the need for diversified water infrastructure, capable of providing reliable supplies during periods of water scarcity - and the water needs of REZ-related developments.

An advanced wastewater treatment facility that can treat up to 1400 megalitres of water annually may be a solution for Dubbo, creating an additional source of recycled water primarily for non-potable use at the regional zoo and for irrigation of local sporting fields.

IMPACT GOAL - Evidence to gain regulatory approval for recycled water use in these applications.

RENEWABLE RECYCLING

PROJECT - Wind turbine recycling
Led by Associate Professor Igor Chaves

While cost-effective recycling pathways already exist for the steel and concrete components of wind turbines, composite blade materials remain difficult to recover and reuse.

After an award-winning concept addressing this challenge was recognised in The University of Newcastle's 2025 Circular Economy Grand Challenge, it went on to attract interest from key parties including Dubbo Regional Council, EnergyCo, Acciona Energia and the NSW Environment Protection Authority (EPA).

Supported by TRaCE, the group has proposed a project to investigate opportunities to recover and recycle decommissioned wind turbine blades into reusable materials.

POTENTIAL IMPACT GOAL: A NSW-first model for wind turbine blade recovery, processing and potential reuse, supporting a circular approach to renewable energy infrastructure.

GRID STABILITY

PROJECT - Vehicle-to-Grid (V2G) impact modelling
Led by Dr Kyle Robert Harrison
Partners - Found Power, supported by TRaCE

Australia's electricity grid faces increasing volatility due to high renewable penetration, seasonal demand spikes, and fault events.

Regional corridors often lack robust infrastructure, making them vulnerable during peak periods or outages.

Found Power is pioneering the electrification of campervans for adventure travel, integrating V2G technology to enable these vehicles to support grid stability along major travel corridors.

IMPACT GOAL - Improved grid stability via the electrification of existing traffic.

"The project with Found Power demonstrates how universities and industry can collaborate on practical solutions that address nationally significant challenges at the intersection of sustainability, transport, and regional tourism."
- Dr Kyle Harrison

SOLAR SAFETY

PROJECT - Solar PV contamination risk assessment
Led by Dr Jessica Allen and Professor Megh Mallavarapu
Partners - Tamworth (lead council), Singleton, Muswellbrook, Dubbo, Mid-Western and Hay Councils, supported by TRaCE

Is there a contamination risk in putting Solar PV panels on agricultural land? Councils are asking this question of science so they can make informed decisions to benefit both the REZ infrastructure rollout and local communities.

IMPACT GOAL - Science-based information to help educate local communities, earn social license and inform safe, sound decision-making.

"Academics can be trusted voices within communities. In an area where misinformation can spread, rigorous analysis from scientific experts can give councils and communities better tools to understand how technology and the environment interact."
- Dr Jessica Allen

IRRIGATION EFFICIENCY

PROJECT - Soil moisture sensing for agricultural water management
Led by Associate Professor Mehdi Khaki
Partners - University of Canterbury (New Zealand), Monash University, Soil CRC

Agriculture is facing increasing pressure from water scarcity, climate variability and more frequent droughts.

The University of Newcastle is a key Australian partner in the development of the ANZ Soil Moisture Data Assimilation System (ANZ-SMDAS), an innovative AI-powered platform designed to improve water management across agriculture.

IMPACT GOAL - Regular, accurate, field-scale soil moisture estimates, enabling farmers to make better-informed irrigation decisions.

"Farmers often rely on products that do not provide sufficiently detailed or timely information for irrigation decisions. This supports sustainable and resilient agriculture while reducing unnecessary water use."
- Associate Professor Mehdi Khaki

NEXT GENERATION RESOURCES

Meeting the resource needs of the future through sustainable innovations that support our minerals, metals, food, and water sectors.

CRITICAL MINERALS

Global demand for critical minerals (and metals) is rapidly increasing. These resources are essential ingredients in the manufacturing of advanced technologies for important industries such as low emissions, digital, medical and defense.

To meet rising demand, industry must maximise mineral recovery from the ore and urban waste streams, while minimising costs, water use and loss.

FROM RAW MATERIALS TO SOVEREIGN CAPABILITY

Our continent holds significant reserves of many critical minerals, and the Hunter is establishing itself as a key centre for the research, processing, innovation, and skills needed to extract and transform them.

More efficient, environmentally sustainable processing technologies are not just better for the planet – they are essential for establishing viable domestic refining operations.

NIER'S STRATEGIC POSITION

- Home to the Australian Research Council (ARC) Centre of Excellence for Enabling Eco-Efficient Beneficiation of Minerals (COEMinerals) - novel methods to extract critical minerals and strategic metals more efficiently from both primary deposits and from previously overlooked sources like mining tailings and urban waste.
- Supporting the Centre for Critical Minerals and Urban Mining (CRITIUM) to find better ways to recover important and valuable metals from ores and electronic waste
- An integrated approach between the University, industry, and government.
- Infrastructure to aid the scale up and validation of new technologies.
- Capability building and education experiences designed to enable, upskill, and empower future professionals who will lead the future minerals sector.
- Professor Alan Broadfoot serves on the Critical Minerals Ministerial Advisory Committee, helping implement the NSW Government's Critical Minerals and High-Tech Metals Strategy.

PROJECT - Single stage production of ultra-high grade minerals
Led by Distinguished Laureate Professor Kevin Galvin
Partner - FLS

The design and manufacture of a full-scale prototype of a slow-moving rake – a mechanical device for use on mine sites to separate fine minerals. This project will enhance the recovery and concentration of critical minerals, focusing in the first instance on tin and manganese.

INDEPENDENT IMPACT ASSESSMENT
South32 is a globally diversified mining and metals company. They conducted robust testing of the REFLUX Classifier (RC™). Results showed:

9% Absolute improvement in manganese recovery (from tailings at the Groote Eylandt Mining Company).

25% This correlates to twenty-five per cent relative productivity improvement in manganese beneficiation.

47 Ag Silver

Global silver demand increased from approximately 30,900 tonnes in 2016 to around 35,150 tonnes in 2025.

Over the same period, supply did not keep pace and remained slightly below its 2016 level, contributing to persistent market deficits.

This widening imbalance between supply and demand highlights the strategic importance of improving silver circularity, particularly given the growing role of silver in photovoltaics, electrification and the broader transition towards sustainable energy systems.

By 2050 Australia will have more than one million tonnes of solar panel waste, containing 300-500 tonnes of silver.

"At the moment, recycling often costs more than landfill. But if recyclers can efficiently recover and sell the silver contained within solar panels, that changes the economics completely."
~ Associate Professor Mahshid Firouzi

By combining innovative processing techniques with environmental stewardship, Australia can demonstrate how responsible resource acquisition and conservation work hand in hand.

PROJECT - Silver recovery from discarded solar panels
Led by Associate Professor Mahshid Firouzi, PhD student Hamidreza Saffarian, and co-PhD supervisor Laureate Professor Kevin Galvin.

Continuous flotation unlocks full recovery of silver from end-of-life solar cells. This is a breakthrough acid-free method to recover high grade silver from solar panels, achieving 100 per cent silver recovery in just minutes.

The team's preliminary economic assessment suggests the flotation-based process could be three to five times less expensive than conventional acid-leaching approaches.

IMPACT - Breakthrough flotation-based technology achieves 100 per cent silver recovery with no acid at ambient temperature, demonstrated at continuous large scale (TRL 5). For a plant processing roughly 3,000 t of panels per year, this equates to approximately 0.9-1.5 tonnes of contained silver annually, representing an indicative gross silver value of around A$2.7-4.5 million per year at current silver prices.

29 Cu Copper

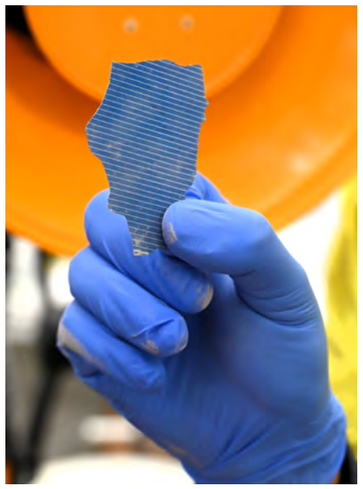
PROJECT - VIPER 2.0 pilot plant for vibration assisted recovery of critical minerals
Led by Professor Craig Wheeler and Dr Peter Robinson
Partner - JORD International, supported by TRaCE

Maximising critical mineral recovery must be balanced with reducing water use and managing mine tailings, all while keeping costs down.

With their enhanced VIPER technology, Jord International provides a practical solution to the challenge of dewatering mining tailings - the residual waste left over after ore processing. Using compression and vibration, the VIPER technology has the ability to improve critical mineral recovery and maximise water reuse within processing streams, leading to efficiency gains in downstream handling and safer disposal of waste.

IMPACT GOALS - Increase critical mineral recovery by 5 per cent. Reduce water usage by up to 10 per cent. Lower energy consumption of the entire process.

"This project aims to translate the significant benefits of the VIPER Dewatering Technology to the recovery of critical minerals and handling of mining waste products."
- Dr Peter Robinson



Australia is the world's largest producer of iron ore, accounting for approximately 38 per cent of global iron ore production. Australia is also the world's largest holder of iron ore economic resources and the largest exporter of iron ore, making it a critical supplier to global steelmakers. (2024; Geoscience Australia)

SUSTAINABLE STEELMAKING

PROJECT - Modified Blast Furnace
Led by Professor Tom Honeyands and Associate Professor Arash Tahmasebi
Partner - BHP
Funded by BHP and TRaCE

The Blast Furnace (BF) process represents 70% of current global iron and steel production, and generates approximately 2 tonnes of CO_2 per tonne of steel. It is a clear decarbonisation target.

In the coming decades while suitable alternative processes are being developed and commercialised, the BF will remain a key technology for iron and steel production. Reducing emissions is imperative.

Modified BF practices being explored;

- The injection of a proportion of green hydrogen,
- Replacement of fossil carbon with a proportion of biogenic carbon,
- Development of an oxygen BF with top gas recycling, and
- Carbon recycling BF processes.

IMPACT GOAL - Supporting some of the world's top steel producers to unlock processes to decarbonise the steelmaking industry, while utilising Australian ores.

PROJECT - Electric Smelting of Australian Hematite-Goethite Hydrogen DRI
Led by Professor Tom Honeyands and Associate Professor Arash Tahmasebi
Partner - BHP, funded by ARENA

IMPACT GOAL - Identify whether hydrogen reduction followed by electric smelting can efficiently produce low-emission iron with medium grade Australian ore.

PROJECT - Prevention of sticking in H_2 fluidised bed Direct Reduced Iron production
Led by Professor Tom Honeyands and Dr Rou Wang
Partner - HILT CRC, POSCO

IMPACT GOAL - Discover whether Australian iron ore fines can be reliably converted into hydrogen-based DRI in a fluidised bed reactor - economically and at scale.

PROJECT - Partial replacement of steelmaking coal with renewable biomass
Led by Professor Tom Honeyands and Associate Professor Arash Tahmasebi
Partners and funding from BHP and ACARP

IMPACT GOAL - Expanded knowledge on the use of biomass as a coal replacement in steelmaking.

GREEN IRON SOLUTIONS

PROJECT - Molten salt electrolysis for green iron production
Led by Dr Jessica Allen, Professor Tom Honeyands and Dr Simin Moradmand
Partner - BHP, funded by ARC Linkage Grant

Replacing carbon with electricity presents a promising pathway to decarbonise ironmaking, particularly when the electricity is derived from renewable sources.

Producing iron using molten salts allows iron and oxygen to be separated from common types of iron ore in a single step.

IMPACT GOAL - Supporting the shift away from fossil fuels with a new process to make high-purity iron without greenhouse gas emissions.

"Here we are looking at how iron forms in molten salt, how to control the process and how materials perform under extreme conditions."
- Dr Jessica Allen

CIRCULAR SHIFT FOR MATERIALS

PROJECT - Turning surplus into sustainability
Led by Dr Josephine Vaughan
Partner - Superyard, supported by TRaCE

Australia's construction and infrastructure sectors generate vast volumes of surplus materials, many of which go unused and ultimately end up in landfill.

IMPACT GOAL - A scalable digital platform to support the reuse of construction materials, reducing waste and energy demand while delivering environmental and community benefits.

"Industry leaders who are future-focused want to understand the impacts of building materials on the natural environment and human health, but there are very few ways to find and share this information. Superyard realised the benefit of providing this information to their SuperGroup partners."
– Dr Josephine Vaughan

REUSING BUILDING WASTE

PROJECT - Removable brick mortar
Led by Dr Josephine Vaughan
Partner - Biocarbon, RMIT and Brickworks

The construction industry is undergoing a major shift toward advanced techniques that improve efficiency, sustainability, and affordability.

Bricks have been identified as a building material that could be reused in new builds, but typically end up in landfill because cement mortar is too difficult and expensive to remove.

IMPACT GOAL - Removable mortar that makes it possible to recover and reuse bricks many times over, reducing the environmental impact of building material.

"A brick should last about a thousand years. With this removable mortar, the bricks can be reused at their sustainable best."
– Dr Josephine Vaughan

HOUSING SOLUTIONS

PROJECT - Fast Slow prototype build
Led by Dr Sarah Breen Lovett with Dr Hugo Moline, System Architect
Partner - Mudtec, funded by NSW Dept of Enterprise, Investment and Trade

Current housing construction methods contribute significantly to environmental impacts while struggling to meet growing housing demands.

By harnessing the benefits of prefabrication, natural materials and DIY building, the Fast Slow project is seeking to make sustainable homes more accessible to everyone.

IMPACT GOAL - Enable a low-carbon, regenerative housing future by advancing prefabricated, bio-based building systems that make sustainable homes faster, cheaper, and more accessible to deliver.

"The structural frame is made from eco-ply, a sustainably sourced plywood that's strong, lightweight, and ideal for computer numerical control prefabrication. It's a material that supports precision, modularity, and ease of transport – perfect for DIY assembly."
- Dr Sarah Breen Lovett

WASTE TO RESOURCE

PROJECT - Brine reuse at Belmont desalination plant
Led by Professor Scott Donne
Partners - Hunter Water, John Holland

Hunter Water is delivering the Belmont Desalination Plant as a long term solution to secure a climate independent source of drinking water for the region.

Desalination is energy intensive and produces concentrated by-products, including brine.

This feasibility project explores technologies that use waste brine, improve energy efficiency and reduce emissions during desalination.

IMPACT - Four viable topics were presented for further study; Brine Electrolysis, Capacitive Deionisation, Energy Storage Devices and Energy Scavenging.

"It is recommended that further development be carried out in the areas of brine electrolysis, capacitive deionisation, and the hybrid energy storage system since they have the ability to impact on energy sustainability, waste minimisation and cost reduction within the desalination plant."
- Professor Scott Donne

GEOLOGICAL HAZARDS

PROJECT - Geohazard forecasting
Led by Professor Anna Giacomini
Funded by - European Commission's Marie Skłodowska-Curie Actions programme

Rock avalanches, landslides, and debris flows can have devastating impacts on communities and ecosystems. They are becoming more frequent and severe due to human activities like urbanisation, infrastructure development, and mining. Understanding more about the triggers can potentially reduce hazards.

Data on these events is usually restricted by borders, but this research is uniting geotechnical experts from 13 countries to develop advanced computational models that simulate how these geohazards start, move, and interact with the landscape.

IMPACT GOAL - A forecast model for geohazards.

"The project unites leading international expertise to improve understanding of geohazard initiation, run-out, and deposition processes, while developing high-fidelity numerical tools for hazard prediction. It also strengthens collaboration and provides valuable training to enhance our ability to detect, monitor, predict, and mitigate geohazard risks."
- Professor Anna Giacomini

HYDRO HARVESTER TRIAL

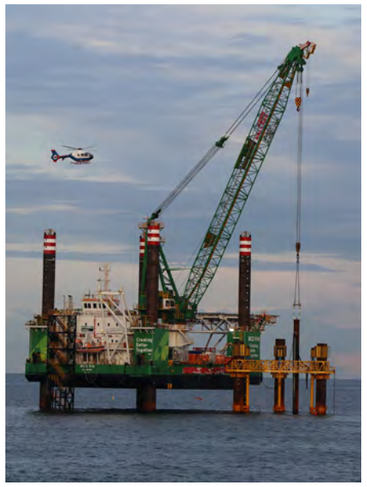
PROJECT - Water from air at scale
Led by Laureate Professor Behdad Moghtaderi and Chief Investigator Dr Priscilla Tremain
Funded by - the Australian Government's Future Drought Fund, Drought Resilience Innovation Challenges Pilot Program.

For regional communities, access to clean, reliable water can be an ongoing challenge.

The Hydro Harvester atmospheric water generation technology - which captures moisture from the air to generate up to 1,000 litres of water per day - is moving to a trial on location at an Indigenous-owned and operated farm in Western Australia.

IMPACT GOAL - Proven technology to secure water supplies in remote areas and improve climate and drought resilience.

"At this capacity, the Hydro Harvester could produce enough drinking water to sustain a small rural community."
- Dr Priscilla Tremain



AI MEETS MINERAL PROCESSING

PROJECT - Deep learning augmented intelligent grinding mill simulation and design project
Led by Professor Craig Wheeler, Professor Stephan Chalup, Emeritus Professor Mark Jones, Professor Gabriel Lodewijks and Dr Michael Carr.
Partner - ARC Linkage Projects Scheme in collaboration with Bradken, a wholly owned subsidiary of Hitachi.

Large grinding mills are the heavy rotating mills used to crush ore in mineral processing. Designing these mills means balancing several competing goals across many operating conditions. Each candidate design is slow and expensive to test using physics-based simulation. Using deep learning in the design process matches or outperforms established techniques with clear benefits for industry.

IMPACT - Enabling faster, lower-cost design of more efficient and longer-lasting grinding mills, improving the productivity and sustainability of mineral processing operations

"Grinding mills are subject to continuous wear from abrasion and impact, meaning even small improvements can result in significant process and maintenance benefits."
- Professor Craig Wheeler

WINDROW SAFETY

PROJECT - Improving haul road safety
Led by Associate Professor Klaus Thoeni
Partners - ACARP and NZ Quarry industry

In quarry and mining operations, windrows are a critical safety feature designed to physically restrain heavy vehicles like dump trucks if they drift, lose control, or misjudge the road. This project highlights how research can directly inform and improve operational safety and design practices in the field.

Higher, more effective windrows are now standard practice in New Zealand quarries with evidence showing traditional designs were often too low to prevent vehicles leaving haul roads and contributing to serious incidents.

IMPACT - Improved operational safety and design practices, with higher, safer windrows now standard practice in New Zealand.

"This research used advanced numerical modelling combined with real-world physical testing to identify how factors like truck speed, size and material affect windrow performance. The outcomes are practical, science-based guidelines to improve safety."
- Associate Professor Klaus Thoeni

BIOFERTILISERS

PROJECT - Analyses of CForge biofertiliser for pasture enrichment
Led by Dr Karl Hassan
Partner - CForge, funded by TRaCE

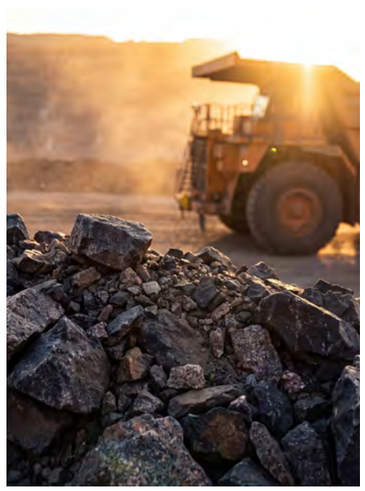
Modern farming can deplete soil nutrients, leading to reliance on chemical fertilisers and pesticides. While these products can help boost short-term productivity, their use also contributes to soil degradation, water pollution, and broader environmental harm.

CForge has developed an on-farm bio-conversion process that converts produce that cannot be sold, manure, and other farm waste into organic fertiliser, biogas and renewable energy.

This microbial study will identify which microbes are affecting the quantity and quality of the biofertilisers, as well as identifying any that are harmful.

IMPACT GOAL - Quality control and nutrient assessment of sustainable CForge biofertilisers.

"Different microbes are expected to play important roles at different stages of bioprocessing. Characterising these microbes will help in process monitoring and in delivering consistent end products."
- Dr Karl Hassan



ENVIRONMENTAL SUSTAINABILITY AND SECURITY

Balancing environmental, economic and social priorities to protect regional resilience, sustainability, and prosperity.

SUSTAINABLE FOOD CROPS

PROJECT - Salt tolerant crop solutions from wild plants
Led by Dr Vanessa Melino
Funded by - ARC Discovery Project 2026

Rising soil salinity is a costly problem for global agricultural crops, threatening nearly a third of the world's agricultural land.

This research explores how wild plants like Salicornia (Samphire) thrive in salty conditions, where most other species cannot survive. By uncovering the species unique mechanisms, the team aims to bioengineer salt tolerance into crops.

IMPACT GOAL - Enable sustainable farming on degraded lands, allow irrigation with saline water, and provide high-value crop options for farmers.

"Sustainable food crops aren't just about using fewer resources; they're about redesigning what a crop can tolerate in the first place. My work focuses on domesticating and improving crops that can be cultivated using saline water, so we can grow food sustainably in places and conditions that were previously written off. That's how we build a food system in the face of water scarcity."
- Dr Vanessa Melino

CLIMATE CHANGE MANAGEMENT

PHD PROJECT - Beyond the Global Framework for climate services - An analysis of the climate services value chain in the Pacific for a fishy future
Led by PhD Candidate, Patricia Mallam
Supervised by Dr Lara Daley & Associate Professor Meg Sherval
Partner - Secretariat of the Pacific Regional Environmental Programme (SPREP)

Fisheries are a critical component of Pacific survival, and because climate is a key-factor affecting productivity and breeding cycles, accurate and accessible climate information is crucial for planning and decision making.

The Global Framework for Climate Services (GFCS) was delivered after the 2009 Geneva World Climate Conference to strengthen the production, availability, delivery and application of science-based climate monitoring and prediction services.

IMPACT GOAL - Understand how the GFCS is operationalised in the Pacific, to help inform the design of future plans for development, management and investment.

PACIFIC FOOD SECURITY

PARTNER VISIT - Samoan agricultural opportunities
Led by Dr Taiwo Akanbi
Partner - The Scientific Research Organisation of Samoa (SROS)

External pressures including supply chain disruptions and climate-related impacts are driving Pacific Island communities like Samoa to focus on more sustainable and resilient food security options.

SROS, a partner of NIER since 2016, is exploring sustainable, industry-focused opportunities to support Samoa's growing agricultural and food manufacturing sectors. During a recent visit, the group engaged in a product development workshop focused on transforming flour made from breadfruit (a staple crop in Samoa) into a variety of gluten-free products, ranging from pasta to scones.

IMPACT - Food solutions that could be replicated at the Food Innovation Centre in Samoa using the culturally significant and abundant breadfruit.

SAFE DRINKING WATER

PROJECT - Advanced nanomaterials-based portable water filtration bags
Led by Laureate Professor Ajayan Vinu, Dr Gurwinder Singh, Dr Kavitha Ramadass, Mr Euiho Hwang
Partners - Clean Drinking Water Solutions PTY LTD, Romar

Access to safe drinking water remains a major global challenge, particularly in remote, disaster-affected communities and where reliable water treatment infrastructure and electricity are unavailable.

This solution is a sunlight-activated portable water filtration bag that combines advanced nanomaterials with a two-stage purification process to produce safe drinking water without the need for electricity or chemicals. This technology first breaks down organic pollutants, such as dyes and pesticides, and then, a specialised cartridge absorbs toxic heavy metals and other contaminants.

IMPACT – Comprehensive water purification using only sunlight in a three-litre portable device.

"By strengthening water security and improving public health, this has the potential to support more resilient communities worldwide."
- Laureate Professor Ajayan Vinu

WATER & ECOSYSTEM HEALTH

PROJECT - Ocean outfall water quality and benthic process monitoring program
Led by Professor Troy Gaston
Partner - Central Coast Council

An ocean outfall water quality and benthic process monitoring program is important because it helps demonstrate that treated effluent discharges are being managed safely and that any effects on the surrounding marine environment are understood over time.

The ongoing assessment of water quality and ecosystem health is a regulatory requirement for councils to effectively monitor the environment and identify emerging environmental risks. The program is underway and will provide a comprehensive understanding of environmental conditions, supporting evidence-based decision-making and informed long-term planning for Central Coast Council.

IMPACT – Data to inform Council operations, protect public health and the environment.

"'Benthic' refers to the plants, animals and processes that occur on the seafloor. Studying benthic environments helps scientists understand how marine ecosystems function and how they respond to changes in their environment."
- Central Coast Council

URBAN WATER SECURITY

PROJECT - Assessing urban water security
Led by Associate Professor Anthony Kiem
Partners - WaterNSW, Hydrology and Risk Consulting (HARC)

WaterNSW uses a water supply simulation model called WATHNET to calculate the amount of water available for use in the Greater Sydney region and to help inform regulation and investment decisions made by the NSW Government to ensure water security.

An independent review of the Greater Sydney WATHNET model is required to ensure alignment with best practice and the latest science. This research is delivering advice on improving the WATHNET model, generating and including stochastic hydroclimate inputs, and assessing the impacts of climate variability and change on water security for the Greater Sydney region.

IMPACT – Modelling and technical advice to ensure current and future water security for the Greater Sydney region.

"Our main role in this project was to ensure the Greater Sydney WATHNET model incorporated the latest science on modelling and managing the impacts of climate variability and change so that the resulting water security assessment was evidence-based and as realistic as possible."
- Associate Professor Anthony Kiem

ADVANCING CONSERVATION

PROJECT - Acoustic Biodiversity Monitoring
Led by Associate Professor Andrea Griffin, Dr Alex Callen, Professor Matt Hayward, Dr Ysobel Sims, Professor Stephan Chalup, Dr Khaled Saleh, Dr Darren Southwell, Dr Kaya Klop-Toker, Dr Oliver Kelly and UON alumni SAPHI Engineering.
Funded by – Origin Energy's Eraring Community Investment Fund and the NSW Environmental Trust

AI technology is being deployed to help protect the threatened species in the ecosystem. An existing monitoring system, BioMon, can identify common bird and frog species through specialised detection technology, allowing real-time alerts for verification and monitoring. Researchers are now using an enhanced AI approach to expand the capabilities of this biodiversity acoustic monitoring system.

IMPACT GOAL - Technology that can listen and recognise the calls of threatened or significant species in the area, improving monitoring and conservation activities for rare and hard-to-detect wildlife.

"We're training BioMon to detect the green and golden bell frog which is a threatened species whose last known population in the Lake Macquarie Local Government Area."
- Dr Alex Callen

COASTAL SAFETY

PROJECT - Safeguarding coastal cliffs
Led by Professor Anna Giacomini, Associate Professor Klaus Thoeni, Dr Davide Guccione, Abigail Watman PhD Candidate
Partner - Newcastle City Council

Coastal erosion is increasing with climate change.

Recent impacts on infrastructure, properties and public safety along Australia's densely populated coasts has resulted in substantial economic costs.

This project integrates advanced slope monitoring and geostructural analyses to advance understanding of coastal cliff processes, and forecast retreat rates under climate change.

IMPACT GOAL - Enable practitioners and governments to enhance community safety by proactively informing mitigation and control designs.

"Rock walls, including the coastal cliffs in Newcastle, contain pre-existing fractures and discontinuities that control their stability. Understanding these features, combined with detailed monitoring and rock cliff change detection programs, allows us to assess the likelihood of rock block failure and predict potential rockfall events."
- Professor Anna Giacomini

LONG TERM COASTAL RESILIENCE

PROJECT - Coastal landscape resilience
Led by Dr Chris Owers, Dr Gabriel Rau, Dr Brady Flinchum, Dr Tanya Mason (NSW DCCEEW) and Dr Jeff Kelleway (UOW)
Partner - Lake Macquarie City Council, NSW Dept. Climate Change, Energy, the Environment and Water, funded by Lake Macquarie Environmental Research Grant

Coastal vegetated ecosystems such as mangroves, saltmarsh, seagrass and supratidal forests are unique landscapes that provide benefits to Lake Macquarie communities. With changes in the environment and climate, there is concern for the long term resilience of these places.

This research team has established two sites of interest for long-term monitoring of vegetation change and biophysical processes to help inform local council's adaptation efforts and improve resilience for areas prone to inundation in low-lying coastal regions.

IMPACT - Two monitoring sites in Lake Macquarie that will provide detailed baseline information on coastal vegetation condition and associated biophysical processes.

"Repeat measures of this baseline information in the future will highlight changes and drivers of change."
- Dr Chris Owers

HEATWAVE RISK ASSESSMENT

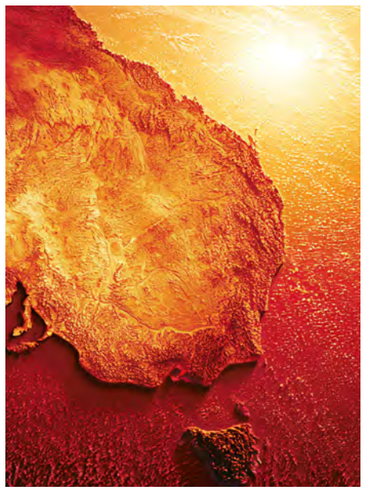
PROJECT - Heatwave preparedness
Led by Associate Professor Danielle Verdon-Kidd
Funded by - Australian Government's Disaster Ready Fund

More frequent and intense heat events are challenging the resilience of NSW communities, ecosystems, and infrastructure.

Researchers in collaboration with local governments in heatwave-prone regions of NSW developed a statewide heatwave risk assessment, ranking NSW Local Government Areas by current and future heatwave exposure and vulnerability.

IMPACT - The analysis identified heatwave hotspots across regional NSW, Western Greater Sydney, the Central Coast, and Lake Macquarie, helping councils target preparedness and resilience planning where it is needed most.

"This research provides councils with the evidence needed to better prepare communities for the growing impacts of extreme heat."
- Associate Professor Danielle Verdon-Kidd



SHORELINE ECOLOGY

PHD PROJECT - Ecological effects of foreshore stabilisation on estuarine communities
Led by PhD Candidate Hayden Swift, supervised by Professor Troy Gaston and Associate Professor Megan Huggett
Partner - Salients Pty Ltd (coastal engineering)

The impacts of climate-change-driven erosion and sea level rise in coastal areas have led to an increase in foreshore stabilisation works. These shoreline protection structures can be designed to improve conservation of estuarine ecosystems.

Rock size and structural complexity influences fish diversity, abundance, and the distribution of juvenile and adult fish.

IMPACT - Science-based recommendations to better integrate conservation into future foreshore stabilisation projects, helping to protect native fish populations while maintaining resilient coastlines.

"We found that where engineered structures are needed, incorporating designs that retain natural shoreline features may reduce impacts to native sand and seagrass fish communities and help maintain habitat function."
- *Hayden Swift*

MINE REHABILITATION

PROJECT - Welcome to the Void: Community voices in post-mining landscapes
Led by Associate Professor Hedda Askland, Associate Professor Meg Sherval, research assistant and artist Emma Clifton, and PhD candidate Sophie Nichols
Funded by - Australian Research Council Discovery project

A mining void is the open pit or landform left after a mine closes. The Hunter Valley is expected to have 25 voids, as 17 mines prepare to close over the next two decades. Some extend well below the natural groundwater level and will slowly fill to become long-term bodies of water.

As sites close, a range of economic, environmental and safety considerations need to be assessed. This project examines how communities in the Hunter might embrace and connect to mining voids to move forward.

IMPACT - Community inclusion and representation for the post-mining transition and restoration.

"These voids will be a lasting part of the mining legacy and we need community voices to help imagine a future based on restoration."
- Associate Professor Hedda Askland

PHD PATHWAYS

"It's not necessarily for industry or science to come up with the answer on their own, but more effectively together."

~ Brody Brooks, PhD Student

PACIFIC PHD GRADUATES

The Pacific Initiative is a partnership between the University of Newcastle and the Secretariat of the Pacific Regional Environment Programme (SPREP) in Apia, Samoa. The central goal is building local research capacity through targeted scholarships awarded to Pacific Island nationals, ensuring that research directly benefits their communities while developing the region's own expertise in addressing environmental challenges.

Dr William Young's PhD, "Understanding the Human-Invasive Species Relationships for Climate Resilient Communities," explored the complex relationship between Pacific Island communities and invasive species.

Dr Young's work provides valuable insights that extend beyond Samoa, offering a framework for future conservation efforts and, if successful, could significantly reduce damage to food supplies and infrastructure while boosting native bird populations.

Dr Carrol Chan, a PhD candidate from Fiji, has developed innovative approaches to invasive species monitoring through her research "Investigating Invasive Species Distributive Threat Post-Cyclone Impact in Samoa".

By mapping the distribution of three invasive weeds – the African Tulip, Merremia Vine and Devils Ivy – and examining how cyclones influence their spread, Dr Chan has developed critical tools for monitoring and managing threats to Pacific biodiversity and ecosystem resilience.

PHD FOR MINERAL RECOVERY

Tin is recognised by the Australian government as a strategic material due to, in part, its importance in enabling the global transition to net zero.

Margaret Amosah, who completed her PhD in Chemical Engineering in June 2026, researched methods to significantly enhance tin-recovery rates from mining (tailings) waste, which added new knowledge to inform processes for sustainable resource management.

Margaret's PhD supervisor Laureate Professor Kevin Galvin shares: "The outcomes of this work are very significant and highly relevant to extraction of critical minerals from tailings".

Related research continues, supported by an Australian Economic Accelerator (AEA) Innovation grant and being delivered in collaboration with industry partner FLSmidth. The project aims to develop world-leading technology for separating fine minerals based on differences in particle densities, improving the recovery and concentration of critical minerals, focusing in the first instance on tin and manganese.

"The PhD is not the destination; it has been a preparation for the next chapter."

- Margaret Ekua Amosah

FORMER PHD NOW WORKING IN INDUSTRY

Just over two years ago, Dr Samantha Clark-Welling was finishing her PhD, with the value-add of being a candidate of NIER's Doctoral Training Centres (DTCs).

Today, as a Process Engineer for MGA Thermal, she's developing long-duration energy storage technology for grid and industrial use.

Samantha's thesis focused on optimising the multiple hearth furnace, a processing unit used across industrial applications including thermal treatment of ores, wastewater treatment, and the regeneration of activated carbon.

Working with Jord International and their network of partners, with the supervision of Dr Jessica Allen, Samantha was able to access specialised facilities like plants with operational hearths to use for her testing.

"DTC support enabled me unique research opportunities and a growth mindset so that when I went into the startup environment at MGA Thermal, where I have to wear many hats across R&D, engineering, operations, and training, I felt skilled and confident."

- Dr Samantha Clark-Welling

DTC OPPORTUNITIES

Two lucky students from NIER's DTCs were awarded tickets to attend the Hunter New Energy Symposium in May.

For both Haley Redfern and Muhammad Sadeghzadeh, the symposium provided an inspiring and insightful opportunity to connect with industry leaders, explore emerging trends, and gain valuable perspectives to support their PhD research work in this rapidly evolving sector.

"As a PhD student working on part of an important project on decarbonising iron production, I feel that I am at the beginning of a very important journey and I hope this will contribute something valuable to society in the future.

Attending the Symposium provided a valuable opportunity to view these developments from different perspectives, including their implications for society, the economy, and even Australia's position in global geopolitics."

- Muhammad Sadeghzadeh

DTCS REACH TO DATE

NIER coordinates three themed DTCs: Energy, Food and Agribusiness, and Resources.

53 current Higher Degree by Research (HDR) candidates supported by NIER's DTC programs.

11 current candidates are from the Pacific Islands, addressing regional challenges.

27 engaged industry partners

28 DTC candidates have successfully graduated

10 professional development opportunities provided to candidates in 2025-26

"Being part of the DTC has benefited my studies through [helping] me network and make connections for post-studies. I would definitely recommend other candidates to join the DTC for extra training, support, and guidance."

~ Sophie Nichols, PhD Student

Find out more about NIER's DTCs

FACILITIES

NEXT GENERATION RESOURCES PARK

Bridging research, industry and education. The Next Generation Resources Park (NextGen Park) is currently under construction, due to be completed in 2027. New state-of-the-art facilities build on existing strategic assets to form a premier University based Industrial Park, providing the region access to an integrated ecosystem accelerating industrial innovation and critical skills.

FUTURE INDUSTRIES FACILITY

In development - A purpose-built co-location facility enabling industry, research experts and end-users to collaborate on pre-commercial trials and testing.

NEW ENERGY SKILLS HUB

Construction has commenced – State-of-the-art infrastructure alongside a collaborative education model geared to build capacity, strengthen capability, train, accredit and diversify the region's new energy workforce.

The Skills Hub will host specialised plant equipment across five core functional areas:

- Clean energy technologies
- Electrochemical systems
- Sustainable fuels
- Smart grid and power engineering
- Materials science

MANUFACTURING FACILITIES

ADVANCED PROTOTYPING FACILITY (APF)

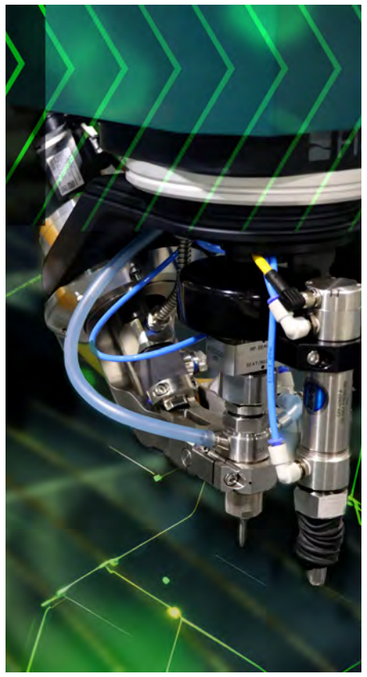
Central Hub to support next generation manufacturing through access to dedicated equipment and tools for high-end prototyping. The APF brings together machinery, multi-use facilities and expert technical support to design, develop and manufacture new parts and technologies.

AUSTRALIAN NATIONAL FABRICATION FACILITY (ANFF)

ANFF offers specialist equipment and expertise in the design, development and fabrication of nanostructured electronic materials and devices. The only facility of its kind in Australia, the ANFF Hub offers extensive and unique capabilities in functional printing, rapid prototyping and surface characterisation.

MODERN MANUFACTURING WORKSHOP (MMW)

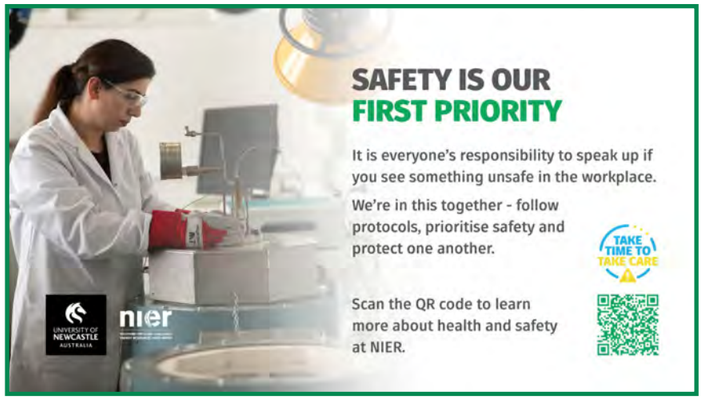
Specialised fabrication and manufacturing machinery with dedicated research and engineering expertise to develop and/or scale up the manufacturing of prototypes, from the incorporation of new technology in commercial designs, to pilot-scale manufacture and full commercial deployment.



In July 2025, the Modern Manufacturing Workshop and Advanced Prototyping Facility were opened.

Supported by TRaCE, these facilities provide equipment for prototyping, fabricating and manufacturing to help advance the recycling and clean energy industry.

See more @ trace.org.au



HEALTH AND SAFETY

At NIER, safety is our first priority. The NIER Precinct is unique in that it combines large-scale infrastructure, industrial research workshops, and laboratories.

Due to the complex nature of the research activity that is undertaken at the Precinct, a detailed NIER HSE Management System has been developed in line with the University's practices to ensure the safety of all occupants, tenants, guests and visitors.

- NIER has a unique HSE Management System that prescribes the minimum level of health and safety standards, policies and procedures applicable at the Precinct, additional to University HSE policies
- Due to the complex nature and size of the site, NIER has a unique Emergency Evacuation process that is supported by nominated emergency wardens
- The NIER HSE Steering Committee meets quarterly to promote HSE communication and oversee the implementation and ongoing maintenance of site-specific safety management systems
- There are multiple levels of inductions NIER occupants are required to complete
- Specific research projects require additional approval and adherence to relevant University safety requirements
- Anyone bringing hazardous or dangerous goods onsite must inform NIER and the University and complete the risk assessment and safety review

2025 HSE AWARD WINNERS

INDIVIDUAL EXCELLENCE IN HSE PRACTICE

Justin Houghton has strengthened laboratory safety by developing and managing an iLab system that embeds essential requirements such as inductions, training, and correct sample handling, ensuring users meet NIER safety standards. His leadership as an Area Responsible Person and contributor to the chemical radiation and technical committee further enhances safe practices and reinforces a strong safety culture across the University.

INDIVIDUAL EXCELLENCE IN HSE LEADERSHIP AND CULTURE

Dr Sam Chen has demonstrated outstanding leadership by establishing safe and compliant operations in the G-Block facility, including developing a site-specific induction and improving hazardous materials management. His collaborative approach and support for researchers across multiple schools have advanced both local laboratory safety and the broader HSE culture at NIER.

GOVERNANCE

One of NIER's defining strengths is our partnerships with industry. Through our Advisory Board, NIER draws on the diverse expertise of leaders from across the energy, resources, food, water, manufacturing, investment and technology sectors. This ensures the Institute remains aligned with emerging industry priorities, and positioned to deliver meaningful impact.

As industries look to the future with new ways of navigating the complex challenges of decarbonisation, energy transition, resource stewardship, food security and water sustainability, the perspectives provided by the Advisory Board are increasingly valuable. Board members bring diverse experience from executive leadership, research, government and industry, enabling NIER to maintain a forward-looking approach that responds to evolving economic, technological and societal needs.

This breadth of expertise helps ensure the Institute's research agenda remains focused on delivering outcomes that support regional, national and global priorities.

2025/26

This reporting period marked a significant transition for NIER's Advisory Board.

After eight years of dedicated service, Dr Mirjana Prica completed her tenure as Chair. As one of the inaugural board members since establishment in 2018, Dr Prica led with passion and perception, and we would like to extend our sincere gratitude for the depth of knowledge and steadfast commitment Dr Prica has brought to the Board and to NIER's continued growth.

Ms Emma Berry, Executive Manager (Strategy and Engagement) at Hunter Water, has been appointed as the new Chair. With more than 25 years of experience in the water industry, Ms Berry leads a team that proactively addresses challenges such as securing water supplies for the Lower Hunter region, responding to climate change, and managing wastewater to create a positive environmental legacy. We look forward to the leadership and perspective she will bring to the Board.

We also offer a heartfelt thank you to Louise Cordina, Rod Naylor and Darren Cleary who have also concluded their tenure as board members, after years of dedicated service. On behalf of NIER, we acknowledge and appreciate their commitment, generosity and advocacy.

We are excited to welcome the following new members, who will build on the strong legacy established by their predecessors:

- Ian Kay, Investment Advisor, Net Zero Economy Authority
- Jane Macey, Chief Operating Officer, Arafura Rare Earths Limited
- Anne-Marie Mooney, Chief Executive Officer, Cordina Group
- Liz Perrone, General Manager Energy Hubs, Energy Markets & Development, AGL
- Peter Dennis, Managing Director, HunterH2O
- Brett Lewis, Managing Director and CEO, The Bloomfield Group

NIER ADVISORY BOARD (INDUSTRY MEMBERS)

EMMA BERRY (Chair)
Executive Manager (Strategy and Engagement), Hunter Water

DR MIRJANA PRICA
Managing Director, Food Innovation Australia

CLARE LARKIN-SYKES
Managing Director, Forelight Advisory

JOHN RICHARDS
Chairman, Bloomfield Group

ROB COOPER
Senior Manager Corporate Affairs, AGL

LIZ SCOTT-IRVING
Vice President, NSW Energy Coal, BHP

FRANK SAMMUT
Executive Director, Central Coast Industry Connect Ltd

ADRIAN BEER
CEO,
Mets Ignited

KARA FREDERICK
Founder and Managing Partner, Tiger Financial Group

DR PETER MAYFIELD
Executive Director, Environment, Energy and Water, CSIRO

NEW INDUSTRY MEMBERS SINCE 1 JULY 2026

IAN KAY
Investment Advisor, Net Zero Economy Authority

JANE MACEY
Chief Operating Officer, Arafura Rare Earths Limited

ANNE-MARIE MOONEY
Chief Executive Officer, Cordina Group

LIZ PERRONE
General Manager Energy Hubs, Energy Markets & Development, AGL

PETER DENNIS
Managing Director, Hunter H20 BECA

BRETT LEWIS
Managing Director and CEO, The Bloomfield Group

LINK TO TECHNICAL PROSPECTUS

For detailed technical information on NIER's research capabilities

SUBSCRIBE TO NIER'S NEWSLETTER

A quarterly e-newsletter with industry and research insights

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