

RESEARCH IMPACT

TO BUILD RESILIENT COMMUNITIES



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SOLUTIONS FOR GLOBAL CHALLENGES
ENERGY RESOURCES FOOD WATER

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RESOURCES, ENERGY AND INDUSTRY INNOVATION FORUM | AUGUST 2024

NIER PRECINCT

**3.8-hectare
industrial innovation
precinct supporting
industry-focused
applied research,
demonstration and
training.**



**INDUSTRY
ENGAGED
RESEARCH
COLLABORATION**



**SUPPORTING
SECTORS OF
NATIONAL
SIGNIFICANCE**



**INDUSTRY
EMBEDDED
DOCTORAL
TRAINING
CENTRES**



**THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA**

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SOLUTIONS FOR GLOBAL CHALLENGES
ENERGY RESOURCES FOOD WATER

SUSTAINABLE SOLUTIONS

CARBON CAPTURE & UTILISATION

LOW EMISSIONS TECHNOLOGIES

CLIMATE RESILIENCE & SUSTAINABILITY

SUSTAINABLE FUELS

LOW CARBON STEELMAKING

RENEWABLE ENERGY SYSTEMS & STORAGE

ADVANCED MATERIALS FOR INDUSTRIAL INNOVATION

SUSTAINABLE HYDROGEN PRODUCTION

SKILLED WORKERS FOR THE FUTURE

BULK MATERIALS HANDLING & TRANSPORT

FOOD & WATER SECURITY

PARTNERSHIP NETWORKS

ECO-EFFICIENT MINERALS PROCESSING

WATER CAPTURE, REUSE & RECYCLING

GEOTECHNICAL ANALYSIS

ENVIRONMENTAL REMEDIATION OF LAND & WATER

BIOFUELS & GREEN CHEMICALS

WASTE TO RESOURCES IN AGRIBUSINESS INNOVATION

COASTAL & CATCHMENT WATER MANAGEMENT

ENERGY & RESOURCES

- CLEAN ENERGY & DECARBONISATION
- NEXT GENERATION MINING SOLUTIONS
- RESOURCES OPTIMISATION

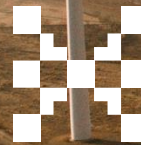
Australia's net-zero emissions targets will not be achievable without a major acceleration in clean and renewable energy technologies.

The clean energy transition is underpinned by critical mineral components that are essential for many of these technologies.



ARC Centre of Excellence for
ENABLING ECO-EFFICIENT
BENEFICIATION OF MINERALS

**ENERGY &
RESOURCES**
KNOWLEDGE HUB

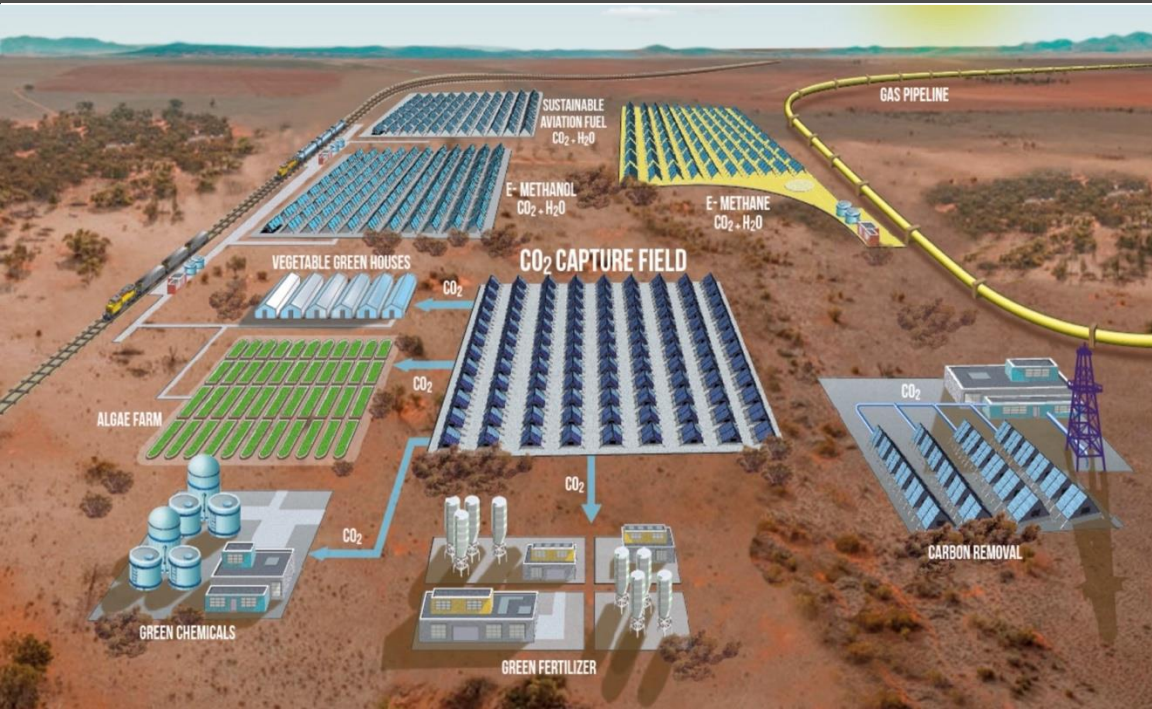


**DECARB
HUB**
New South Wales
Decarbonisation
Innovation Hub



**Trailblazer
Recycling &
Clean Energy**

SUSTAINABLE FUELS & CHEMICALS



CENTRE OF EXCELLENCE – MINERALS

2024 RESEARCH THEMES:

- **Removal of waste ore at coarse particle sizes to pre-concentrate the ore and reduce energy consumption**
- **More efficient processing of fine particles to maximise resource recovery and reduce emissions**
- **More effective solid-liquid separation to recover more water and ultimately eliminate tailings dams**



TAILINGS TO TOPSOIL

Centre for Bulk
Solids & Particulate
Technologies

- 
- Alternative solution to tailing disposal in mining operations by transforming suitable tailings into a soil additive for developing high-performance biomass production.
 - Creation of additional pathways for agribusiness on mined land, leading to greater employment opportunities and regional economic growth.

SUSTAINABLE FOOD & WATER SYSTEMS

- WATER SECURITY & CLIMATE ADAPTATION
- BIOTECHNOLOGY & YIELD IMPROVEMENT
- FOOD INNOVATION & VALUE-ADD

Climate impacts demand planning in adaptive measures and investment in improved technologies to secure vital and productive natural systems for the economic future of regions.



Future
Drought
Fund



WATER SECURITY & CLIMATE ADAPTION

Centre for Water, Climate & Land

- Climate forecasting, including scholastic modelling of climate variability and extreme weather analysis
- Rainfall and evaporation data for regional water strategies
- Groundwater resources and recharge, connection to surface water and water security.



HYDRO HARVESTER

Centre for Innovative Energy Technologies

Produces high-quality drinking water when and where it's required most, by extracting moisture from the atmosphere.

Other applications of the technology include:

- Emergency water supply for livestock to avoid complete destocking during droughts
- Emergency water supply in disaster management scenarios
- Temporary community water supply to allow for the repair/ replacement of damaged infrastructure
- Supplementary community or farm water supply to delay onset of water restrictions and reduce impacts.



HEALTHY & RESILIENT COMMUNITIES

- SOCIAL IMPACT & MENTAL HEALTH RESILIENCE
- HEALTH & SAFETY IN REGIONAL INDUSTRIES
- TRAINING FOR THE SKILLS OF TOMORROW

Maintaining the balance between community needs and critical industries is a complex challenge for regions.

Determining the impacts of new industries through social research can support the health of impacted communities through regionally inclusive solutions.



SOCIAL IMPACT, HEALTH & EDUCATION

- Enhanced models for community participation in decisions about land use change, coexistence and the sustainability of critical regional industries.
- Understanding cumulative impacts of climate and industry-induced displacement and resettlement on communities and social resources.
- Development and implementation of self-management programs and virtual health systems to reduce fatigue, alcohol and drug related problems in mining.
- Industry-informed education and training to drive skill development, enterprise and competitive advantage for regional industries.



THANK
YOU



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Our University is working with a variety of stakeholders to begin the attraction of new industries and investment, and lead research development and demonstration.

www.newcastle.edu.au/nier