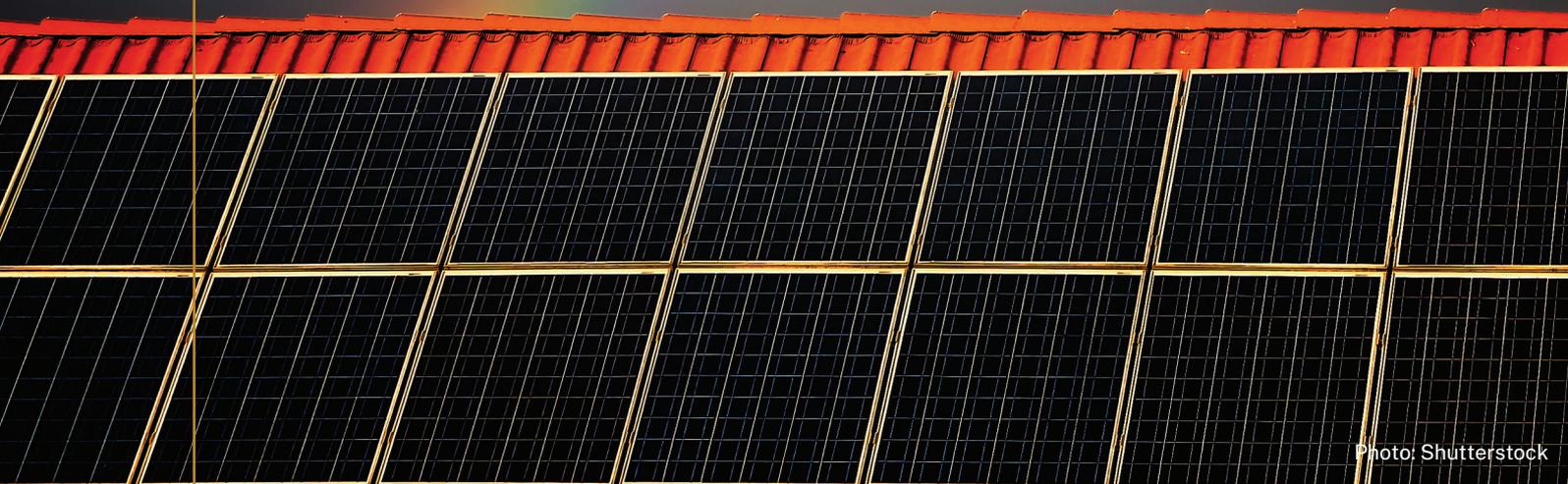




Australian  
National  
University

# Climate, Energy & Disaster Solutions Highlights 2021

Advancing solutions to  
climate change, the energy  
transition and disasters



## 2021 was a year of many milestones.

Extreme weather events exacerbated by climate change have caught governments off-guard and caused devastation and extraordinary loss of life and damage to property and ecosystems. July was the world's hottest month on record, the Arctic recorded its highest ever temperature at 38 degrees Celsius, Australia experienced its wettest November, while New Zealand recorded its warmest.

Other milestones have carried a more positive tone, signalling emerging opportunities. Global clean energy generation reached another record high. For the second time, the entire United Kingdom ran for over 18 days on zero-carbon energy. In Europe, electric and hybrid vehicles outsold diesel vehicles, and on multiple occasions this year South Australian electricity demand was completely met by renewable sources.

It is against this backdrop that the Australian National University's Institute for Climate, Energy and Disaster Solutions (ICEDS) was launched in January. Consolidating the former Climate Change, Energy Change and Disaster Risk Science Institutes, ICEDS was established to support and harness the depth of expertise of ANU researchers working in these fields.

Facilitating collaboration across disciplines, we provide a framework under which solutions to the inter-linked challenges of climate change, the energy transition and disasters can be holistically approached, and resulting opportunities maximised.

Our membership has grown to over 500 researchers. Programs including the Grand Challenge – Zero-Carbon Energy for the Asia-Pacific (ZCEAP), the Resilience Initiative for Food and Agriculture (RIFA), and the ANU Bushfire Initiative, including the ANU-Optus Bushfire Research Centre of Excellence are just a few examples of the solutions-focused work being facilitated by ICEDS and our members. They help create knowledge and build adaptive regional communities and industries, enhancing their options, capacity and networks.

Our engagement on major global matters, particularly the release of the IPCC's Sixth Assessment climate science report and United Nation's COP 26 Climate Summit in Glasgow, resulted in significant media and policy attention, cementing ANU as a go-to source for climate, energy and disaster expertise.

While the COVID-19 pandemic restricted some in-person offerings, our events continued to be a prominent and timely platform for exploring solutions between experts and the broader community. 2021 topics included preparing for future heatwaves and other disasters, trade implications in a net-zero world and our signature Climate and Energy Update events.

Demand for executive education on climate and energy has increased significantly, with ICEDS running multiple professional short courses across Australia, Asia and the Pacific. As well, ANU researchers have continued to provide both formal and informal briefings to policymakers, industry and communities throughout the year on a wide range of climate, energy and disaster related matters.

For the ANU Below Zero Initiative, it was a year of capacity building and forward planning, setting the foundations for reaching the University's below zero emissions goal. This included drafting principles around emissions removal, developing new guidelines to reduce greenhouse gas emissions from travel and starting the transition away from gas, and a community engagement project, all of which will be launched in 2022.

What follows are just some of the highlights of the work undertaken by ICEDS and our members throughout the year. This is expanded further on our website ([iceds.anu.edu.au](https://iceds.anu.edu.au)). We look forward to engaging with you on climate, energy and disaster solutions related matters and ANU Below Zero in 2022.

Prof Mark Howden,  
Director and Head of Climate

Prof Frank Jotzo,  
Head of Energy

Dr Roslyn Prinsley,  
Head of Disaster Solutions

ANU Institute for Climate, Energy and Disaster Solutions (ICEDS)

# Building a community of climate, energy and disaster risk researchers and teachers

Over  
**500**  
members

  
**7**  
out of 7  
ANU colleges

  
**25**  
out of 27 ANU  
schools

## Research Clusters

ANU research on climate, energy and disaster solutions includes a wide range of themes that are relevant to understand the challenges and find solutions, across many disciplines in natural sciences, technology and engineering, and social sciences.

In 2021, ICEDS engaged members to support collaboration through research clusters, building communities of practice across these research areas.

These are the ICEDS Research Clusters

Earth systems **BIODIVERSITY** Security **HEALTH**  
 Agriculture, Food and Nutritional Security Extreme events and future scenarios  
 Energy Economics and Policy **Low Carbon and Resilient Cities** **Climate**  
**HYDROGEN ECONOMY** Industrial decarbonisation **Economics and Policy** **SMART GRID**  
 Carbon dioxide removal **RENEWABLE FUELS** Risk, Vulnerability and Resilience Fusion Power  
 Energy Storage and Recovery **Sustainable Transport** Corporate Engagement and Action Solar Thermal Solar PV  
 Adaptation, Livelihoods and Development in Asia and the Pacific **Psychology, Communication and the Arts** Indigenous Peoples, Culture and Knowledge



Prof Brian Schmidt addresses ICEDS members.  
Photo: ICEDS

## Launching the Institute to ICEDS members

On Tuesday 22 June, the Institute held its first face-face members' meeting. We were delighted to be able to facilitate this gathering of over 100 ICEDS members, providing a platform for further networks between climate, energy and disaster risk researchers across the University. ANU Vice Chancellor Prof Brian Schmidt shared his thoughts on the role of ANU at this critical juncture.

## Policy Submissions Workshop – How To Maximise Impact

Held in November, the workshop was designed specifically to help ANU researchers develop policy submissions covering solutions to climate change, energy transition and disasters. With speakers from the Federal Government and ANU, the workshop provided an opportunity for researchers to learn from experts how to develop and improve their skills.

## ICEDS Member Profile

# Dr Sarah Milne



Dr Sarah Milne, Crawford School of Public Policy.  
Photo: Nicole Hasham

“With Australia’s commitment to achieve net zero emissions by 2050, we are going to see a large uptick in demand for carbon offsets,” said Sarah, highlighting that in the last year Australian carbon credit prices surged by 180 per cent.

From mechanical engineering to political ecology. It might seem like a leap for some, but for Dr Sarah Milne from the Crawford School of Public Policy, it was a natural progression.

“I originally trained as an engineer, but I soon moved into more applied environmental and community development work,” said Sarah, who completed a PhD in Geography at the University of Cambridge.

“Geographers study the relationships between society and nature, and my field is political ecology – a wonderful way to explore environmental struggles of all kinds,” she said.

Before joining ANU full-time in 2016, Sarah spent over a decade working on forest conservation and community-based natural resource management.

As a part of this work, Sarah was involved in implementing and researching forest carbon projects. In 2021, she applied this experience in her work on the ANU Below Zero initiative, looking at the best ways to offset the University’s residual emissions.

“Markets need to be regulated to ensure that they do not generate perverse outcomes for people and nature. Carbon markets are the same – and this is a key domain for future research and action,” she said.

Sarah hopes her work on the Below Zero Initiative will lead to articulating best practice in carbon removal, for both practical and scholarly purposes.

“This is especially important for land-based carbon projects, which -if done well -can drive ecological restoration and honour Indigenous custodianship of the land,” she said.

As a member of the ANU Institute for Climate, Energy and Disaster Solutions (ICEDS), Sarah has found a strong network of people working to navigate the climate crisis.

“This is the challenge of our time, and I cannot imagine finding a better group of people with whom to tackle this,” she said.

“ICEDS has helped me to broaden my perspective on climate change responses, given that its membership works on a wide range of issues, from technological innovation to socially just energy transitions,” she concluded.

[Read more >  
bit.ly/3zzRNsp](https://bit.ly/3zzRNsp)

# Research highlights

In the following pages you will read a small sample of research, publications and projects undertaken by ICEDS members in 2021. For more highlights, visit [bit.ly/3lr9v54](https://bit.ly/3lr9v54)

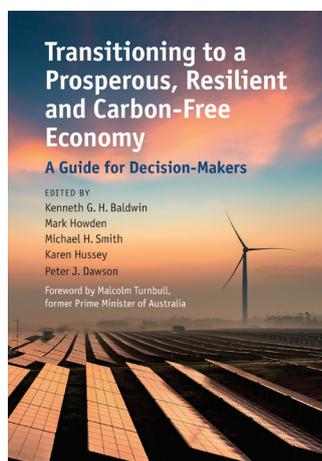
## New book: Transitioning to a Prosperous, Resilient and Carbon-Free Economy

Released in December, this book is a comprehensive manual for policy-makers addressing the issues around human-caused climate change. Edited and in good part written by ANU researchers and affiliates, it looks at both the mitigation of greenhouse gas emissions and global warming, and adaptation to change.

The book takes a sector-by-sector approach, starting with energy, and includes cities, industry, natural resources and agriculture, enabling practitioners to focus on actions relevant to their field. It uses case studies across a range of countries, and various industries, to illustrate the opportunities available.

Blending technological insights with economics and energy policy, the book presents the tools that decision-makers need to achieve rapid decarbonisation, whilst unlocking and maintaining productivity, profit and growth.

The book was launched at an event at ANU in December.



New research is investigating innovative options to combat and prevent catastrophic bushfires using drones. Photo: Shutterstock

## Can drones help prevent catastrophic bushfires?

Australia is experiencing unprecedented, extreme bushfire conditions all around the country, linked to prolonged drought, soaring temperatures and strong winds. The results have been catastrophic, resulting in loss of life and massive ecological, economic, health and social costs.

We need to change the way we fight bushfires. ANU has developed a novel approach that harnesses modern technologies and that is successful in reducing the risk of large-scale bushfires under extreme conditions.

In December 2021, the ANU-Optus Bushfire Research Centre of Excellence in collaboration with the ACT Rural Fire Service (RFS), launched a partnership with drone manufacturer, Carbonix.

The project targets the development of drone technology to provide early validation of lightning strike ignitions in deep bushland, which are responsible for the majority of catastrophic bushfires.

The Australian-owned company will provide ANU and ACT RFS with autonomous scout drones to assist with research into effective methods of early detection of bushfire ignitions.

Carbonix drones are renowned for their long endurance capability, with the most advanced drones capable of flying for up to 10 hours at a time.

[Read more >  
bit.ly/3zxjZwp](https://bit.ly/3zxjZwp)

## ANU drives zero carbon energy for the Asia-Pacific

With a list of annual achievements that includes securing more than \$10 million in funding and setting a world record, it's fair to say that 2021 was a good year for the Zero-Carbon Energy for the Asia-Pacific (ZCEAP) initiative.

Professor Ken Baldwin, founding director of ZCEAP, calls 2021 “a year of significant progression” for the Grand Challenge.

“The team secured a co-operative research centre partnership with Adelaide University in Heavy Industry Low-carbon Technology ([HILT CRC](#)), which will bring \$10 million in research funding to ANU,” said Prof Baldwin.

Prof Baldwin also reports [research](#) by Grand Challenge team members achieved an unprecedented efficiency in the direct solar hydrogen generation, setting a new world record in the process.

Incoming ZCEAP Director, Prof Frank Jotzo, who took over from Prof Baldwin at the start of 2022, points out that the initiative is in a strong position to have impact.

“The Grand Challenge has a strong group of researchers working on emerging topics that are directly relevant to industry and governments. We will build on this foundation, taking our research-based insights to our networks for maximum positive impact,” he said.

Associate Director for Research, Dr Emma Aisbett, highlighted that ZCEAP's work on governance frameworks to support net-zero trade and investment expanded rapidly in 2021.

“Leveraging publications in top field journals in both energy and international law, the team undertook impactful consulting work, presented at numerous high-profile events, drafted policy briefs and submissions, and secured external funding,” said Dr Aisbett.

“This is part of a broad and deep portfolio of research in the Grand Challenge that spans natural science, engineering, economics and social science. Collaborations across disciplines are at the heart of the ZCEAP's mission,” she concluded.

[Read more >](#)  
[bit.ly/3t5Srx4](https://bit.ly/3t5Srx4)

Photo: Shutterstock



## Helping improve food security in Asia and the Pacific

The world is facing an increasingly disrupted food future due to significant global challenges such as climate change and the COVID-19 pandemic. In the Asia Pacific, governments struggle to alleviate hunger for hundreds of millions in the region, as recent shocks such as emerging pests and disease have exacerbated disruptions to the region's food systems.

In the wake of this emerging crisis, ANU, CSIRO, and the Department of Foreign Affairs and Trade (DFAT) launched the Resilience Initiative for Food and Agriculture (RIFA) in 2020.

RIFA aims to build resilience capacity in Asia-Pacific agri-food systems by acting as an “ideas incubator” for food security solutions, delivering research, development, teaching, information-sharing and investment to the region.

The project also aims to build a pipeline of talent and support a new generation of agri-food leaders in academia, government and the private sector through postdoctoral research fellowships, short courses, internships, project partnerships and other activities.

A first step for RIFA was to conduct a scoping study which looked specifically at development projects and research studies that dealt with resilience in some aspect of the food system, including food security.

A second research project initiated by RIFA in 2021 was the Rapid Response and Situational Analysis Dashboard. Data from the project will allow governments to target resources to ensure recovery from stress events, according to Dr Steven Crimp who is a Research Fellow at ICEDS and the ANU Initiative Co-ordinator for RIFA. Ongoing real-time collection of information from a range of sources will also allow the effectiveness of interventions to be measured.

Several international aid agencies have shown significant interest in the Dashboard project, as a tool to support the development of response strategies to food stress events.

For more information and important updates, visit the [RIFA website](#).

[Read more >  
bit.ly/3q2IT43](#)

## ANU at core of steeling industry for a cleaner future

ANU researchers are at the core of a national program to transition Australia's industrial sector to producing resources such as steel and other heavy metals via zero net carbon emissions hydrogen technology.

The Heavy Industry Low-carbon Transition Cooperative Research Centre (HILT CRC) is doing the heavy lifting on maximising carbon-neutral technologies.

“We're looking at processes for making green steel using renewable energy like solar and wind, which, if implemented, could eliminate up to nine per cent of global CO<sub>2</sub> emissions,” said Assoc Prof John Pye from the ANU College of Engineering and Computer Science.

The transition to carbon-neutral technology is a key focus at ANU. The University's Below Zero Initiative was launched in May and the ANU Grand Challenge Zero Carbon Energy for the Asia-Pacific program began in 2018.

“This CRC will build upon strengths at ANU, including the momentum and diverse team that we've built up during our Zero Carbon Energy for the Asia-Pacific,” Associate Professor Pye said.

The CRC partners will work together to reduce heavy industry's CO<sub>2</sub> emissions which account for some 20 per cent of Australia's total output. The industrial sector globally accounts for 32 per cent of all CO<sub>2</sub> emissions, of which approximately half are from the heavy industrial sector.

[Read more >  
bit.ly/3HG2LzN](#)

## The Global Value of Coastal Wetlands for Storm Protection

Climate change is aggravating the threat that many coastal communities face from tropical cyclones, due to rising sea levels and larger, more frequent storm events.

While some communities have opted to construct expensive seawalls in an attempt to keep the bad weather at bay, research led by Professor Robert Costanza has shown that coastal wetlands are both a successful and cost-effective method of preventing storm damages.

In what was the first global estimate of the value of coastal wetlands in avoiding storm damages, the research showed that coastal wetlands worldwide save over 4,600 lives and almost US\$450 billion a year in storm damage costs.

“Coastal wetlands lessen the damage caused by tropical cyclones on coastal communities by absorbing storm energy, in ways that are much more effective than solid land or open water,” said Professor Costanza.

According to Professor Costanza, coastal wetlands also provide a variety of other valuable ecosystem services that seawalls don't.

“They provide habitat for marine species, sequester carbon, offer recreational opportunities, and manage sediment and nutrient run-off, among many others,” he said.

“In a world facing increasing frequency and intensity of tropical cyclones due to climate change, they are the best line of defence to protect coastal communities,” he concluded.

[Read more >  
bit.ly/3zCeqgm](https://bit.ly/3zCeqgm)



“Coastal wetlands offer storm protection to coastal communities that is both cheaper and more environmentally friendly than other options, such as seawalls,” said Professor Costanza. Photo: Shutterstock

## Protecting Australians against the health impacts of climate change

A new national research network will work to help protect Australians from the health impacts of climate change.

Led by ANU with partners from across Australia, the Healthy Environments And Lives (HEAL) network brings together Aboriginal and Torres Strait Islander knowledge, sustainable development, environmental epidemiology, and data science and communication to address climate change and its impacts on health.

HEAL has received \$10million in funding through the National Health and Medical Research Council (NHMRC) Special Initiative in Human Health and Environmental Change.

As part of HEAL, researchers, practitioners, communities and policymakers will work together on urban health, bushfires, air, soil and water pollution, food security, heatwaves and other extreme events, and biosecurity.

“This is a historic investment in our future. This coordinated group of experts and practitioners will substantially expand the boundaries of Australia's environmental, climate change and health research community,” HEAL's Director, Professor Sotiris Vardoulakis from ANU said.

HEAL comprises 100 researchers set to create a national risk assessment of current and future health burdens driven by environmental change in Australia.

“Climate change is having a profound impact on our environment, our lives and our health,” ANU Vice-Chancellor Professor Brian Schmidt said.

“That's why this new network is so vital. As climate change impacts our health and environment more and more, we will need sound solutions and the best thinking to address these negative impacts and keep ourselves and our environment as healthy as possible.”

“We are proud to lead this truly national network and enterprise that will deliver benefits for all Australians.”

[Read more >  
bit.ly/3zww58U](https://bit.ly/3zww58U)

## Evaluating clean hydrogen production options

Hydrogen can be an important part of a global clean energy system, and Australia has the chance to become a major producer of hydrogen, for export and for use in domestic energy intensive industries.

Technologies for producing hydrogen can either be zero emissions, or they can produce emissions even after carbon capture and storage. ANU research has provided new insights into the relative costs and remaining emissions of different hydrogen production technologies. The research, published in the leading journal *Applied Energy*, has found extensive interest both in expert circles and in the public debate, and has been described in the national and international media.

“Australia’s clean hydrogen strategy doesn’t make a distinction between green and blue hydrogen,” said Dr Thomas Longden, from the ANU Crawford School of Public Policy, who co-authored new research in 2021.

Green hydrogen refers to hydrogen made by renewable energy-driven electrolysis, while blue hydrogen is made from natural gas with carbon capture and storage (CCS) technologies.

“The risk is that we could create a hydrogen industry that locks in substantial emissions,” Dr Longden said.

“Mature CCS technologies could avoid between 50 and 90 per cent of the emissions, but they are expensive, and become more expensive as the capture rate increases.”

“The opportunity on the other hand is to build a hydrogen industry on the basis of electrolysis that is zero emissions and thus future proofed, using Australia’s advantage in renewable energy supply and the hydrogen technologies of the future,” study co-author Dr Fiona Beck, from the ANU School of Engineering, said.

More than 100 countries have signed up to the Global Methane Pledge to cut methane emissions by 30 per cent on 2020 levels by 2030, a plan outlined at COP26. Australia is not one of them.

“Fugitive emissions are the second largest source of methane pollution and rates are rising due to the expansion of unconventional natural gas production that uses fracking,” said Dr Beck.

“The alternative is truly clean, the costs of the existing technologies are rapidly falling and new technologies are on the horizon –including through our own research here at ANU.”

According to Dr Bec Colvin, the degree of support for climate action varies across political divides. Photo: Pixabay.



## Strong support for climate action among voters but views are divided along political lines

The vast majority of Australian voters support climate action, but their degree of support varies significantly across political divides, a new study shows.

The survey examined the views of more than 2,000 Australian voters.

More than 80 per cent of those surveyed said they think it’s important for Australia to reduce greenhouse gas emissions.

This includes close to 70 per cent of conservative voters (those voting for Coalition parties).

According to lead author Dr Bec Colvin, stark differences emerge when you delve into just how important voters think it is.

“For example, 73 per cent of those voting for the ALP or the Greens see Australian action to reduce emissions as extremely important, while only one quarter, 26 per cent, of conservative voters think it’s extremely important,” she said.

The study also found a majority of voters - 72 per cent - would be willing to incur some personal cost in return for emission reductions.

But while 26 per cent of progressive voters are willing to incur a significant personal cost, only 5 per cent of conservative voters feel similarly.

[Read more >  
bit.ly/3AsH2ZS](https://bit.ly/3AsH2ZS)

For more 2021 ICEDS research highlights, visit [bit.ly/3lr9v54](https://bit.ly/3lr9v54)

# Education highlights



Over

# 140

climate, energy and disaster courses across ANU



# 10

professional short courses



# 4.5

rating out of 5 by professional short course participants

The University's Master of Climate Change and Master of Energy Change programs continue to produce graduates who are ready to tackle some of the most important and complex challenges facing our world.

## Working towards Climate Justice with the Master of Climate Change Program

With several years' experience working for environmental and sustainable development NGO's in her native Vietnam, Quynh Trinh is very aware of her home country's exposure and vulnerability to the impacts of climate change.

*"That's why I decided to study climate change -to support my communities, businesses, and the vulnerable in their mitigation and adaptation efforts," she said.*

With her Master's program now completed, Quynh is dedicated to using her newly acquired knowledge to make a positive impact.

*"I want to be an active professional and advocate for pro-climate policies. I enjoy interacting with different stakeholders, so I am keen to be a bridging actor between communities, the private sector and the public sector to collaboratively find solutions to climate challenges."*

[Read more >  
bit.ly/3JQowik](https://bit.ly/3JQowik)



Quynh Trinh will use her Master of Climate Change to make a positive impact.  
Photo: Quynh Trinh

## Preparing for the global energy transition with the Master of Energy Change

After completing a bachelor degree in Energy and Power Engineering, Jiayi Ding was keen to continue her energy studies from a broader perspective. Once she discovered the Master of Energy Change at ANU, she realised the program would fit her needs perfectly, providing her with the opportunity to delve into new academic territory.

“The program is very attractive because it is interdisciplinary,” said Jiayi. “I’ve never studied policy or economics before. It’s exciting to be able to take courses on how energy economics works, or how policies could incentivise the development of technology.”

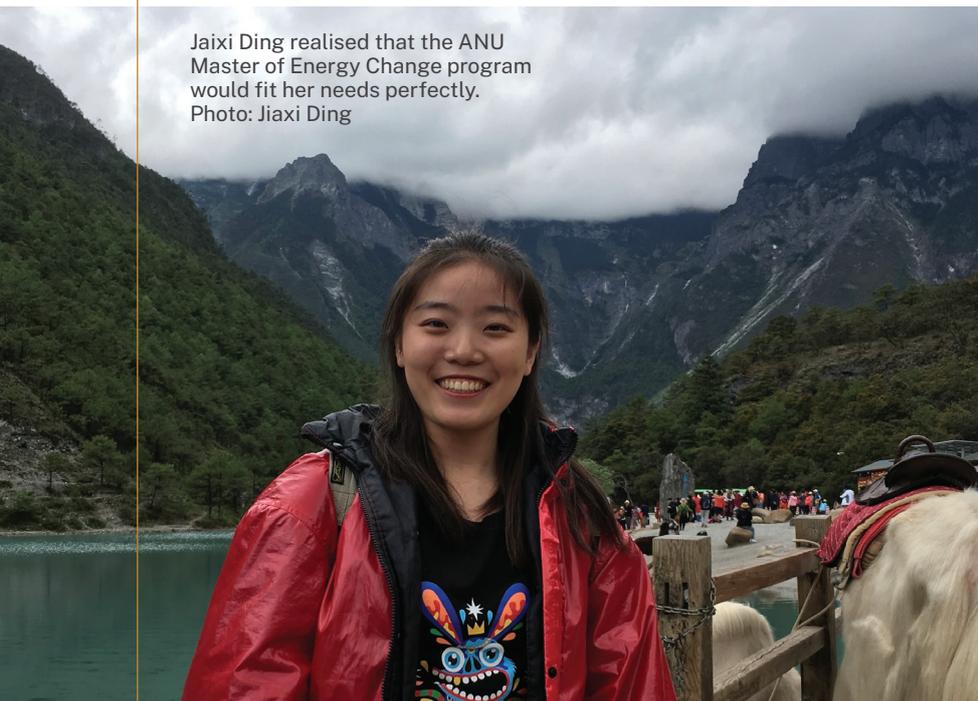
As part of the Master program, Jiayi has completed projects that are very similar to what a practicing engineer would face in a real-world scenario, and she has found this practical element highly beneficial.

The program has also helped Jiayi understand potential career pathways after graduation.

“The courses are delivered by staff from the university, as well as by practicing engineers from energy companies, so you learn about the broad range of career opportunities available after graduation,” she said.

[Read more >  
bit.ly/3t5dBLY](https://bit.ly/3t5dBLY)

Jiayi Ding realised that the ANU Master of Energy Change program would fit her needs perfectly.  
Photo: Jiayi Ding



## Can adopting a minimalist lifestyle help address climate change?

In February 2021, Rebecca Blackburn commenced her PhD at ANU and was announced as the recipient of the ANU ICEDS Game Change Scholarship, supported by the generous donors of the [Game Change Fund](#).

The Fund supports research into climate change through scholarships for PhD scholars. The objective of the Game Change Scholarship is to encourage an integrative approach to climate change solutions which crosses disciplinary and college boundaries.

Broadly, Rebecca’s research will focus on driving behaviour change to reduce consumption and its associated impacts. In particular, Rebecca will examine whether living a minimalist life actually leads to better climate and environmental outcomes.

“The impacts of minimalism are often self-reported, but with little focus on measurement. So that’s what I want to do - actually measure the ecological footprint of a minimalist lifestyle,” said Rebecca.

[Read more >  
bit.ly/31BiFMy](https://bit.ly/31BiFMy)

# Executive education

## Climate and Energy Essentials

In 2021, ICEDS ran 10 short courses, providing professionals with insights into and context around the latest developments around climate change and energy. We look forward to continuing the growth of these courses in 2022, including the addition of disaster solutions related short course offerings.

### What people said

- *I have been recommending the course to everyone with an interest in climate change where it may interact with their profession.*
- *This course was incredibly well organised, with well prepared and engaging speakers with activities and discussions to allow for ample interaction.*
- *This is my first external development course in the professional sphere, it has set a very high standard and has made me want to engage more with the climate change mitigation and adaptation space.*

## Educating professionals across Australia, Asia and the Pacific

In 2021, ICEDS also ran a series of short courses targeting professionals employed in government, NGOs and the private sector both in Australia, and Asia-Pacific countries. Funded by DFAT, the courses focussed on Climate Adaptation and Grid Integration, fostering improved understanding of the nature of climate change and the energy transition.

Climate Change Adaptation Opportunities in Development short course (November). Photo: Melanie Pill/ANU.

### What people said

- *Smoothly managed, conducted in a respectful manner and full of wisdom. I applaud both the lecturers during this program and thank DFAT for their generosity in hosting us, Pacific participants. THANK YOU!*
- *As an implementer in the power and energy industry, most of my experience in large scale projects was limited to thermal power plant development. The course has given me insights of renewable power integration and was an eye opener.*



# ANU Below Zero

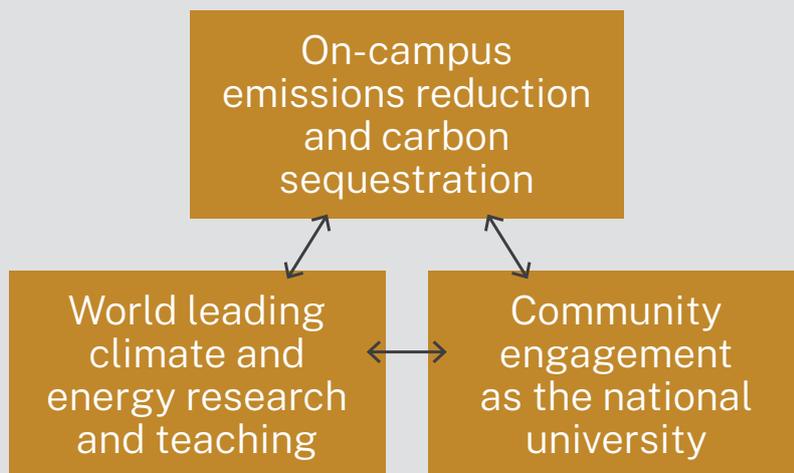
## Working towards a below zero emissions target

Transformational change is required to limit climate change to 1.5°C above pre-industrial levels, including rapid reductions in greenhouse gas (GHGs) emissions and the implementation of technologies that remove and sequester GHGs from the atmosphere.

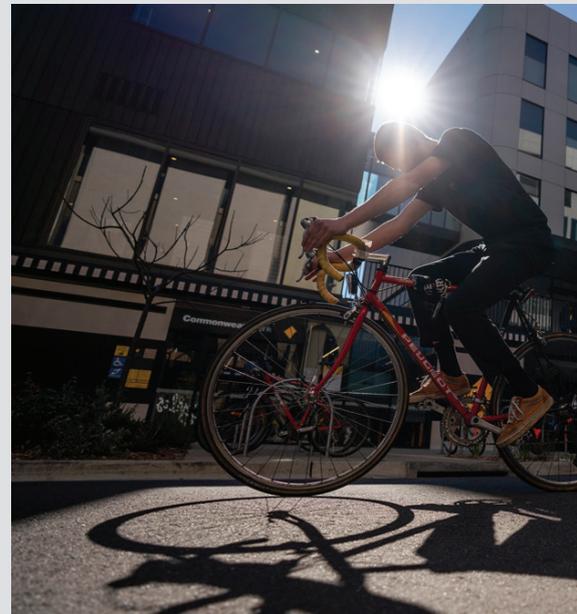
In early 2021, the ANU Council committed the University to the following greenhouse gas reduction targets:

- By 2025: Net-zero emissions for direct on-campus activities, energy, business travel and waste. The focus will be on practical emissions reductions first and foremost, only using high-quality Australian-purchased carbon offsets as a back-up.
- By 2030: Below-zero emissions (for the scope outlined above) drawing down emissions on ANU land or using carbon offsets that integrate ANU research and teaching activities.
- Beyond 2030: Progressively draw down emissions accumulated earlier, starting with those accumulated over the lifetime of the Below Zero Initiative.

All other indirect emissions arising from procurement of goods and services and commuter travel: ANU will work to reduce these emissions as rapidly as possible, based on international best practices for scope 3 emissions reduction for the university sector.



In adopting these targets, ANU seeks to take a leadership position in addressing climate change, using our influence as the national university to encourage others to take more action.



The goal of ANU Below Zero is for the university to achieve below zero emissions by 2030 for energy, waste, work travel and direct on-campus greenhouse gas emissions. Photo: ANU.

2021 has seen the ANU Below Zero Initiative focus on capacity building and strategic planning, including:

- The ANU Battery Storage and Grid Integration and Facilities & Service teams are to develop strategies for decarbonising ANU campuses.
- Extensive engagement with researchers, educators and students throughout the year to integrate Below Zero into the ANU curriculum.
- Development of recommendations around how to effectively inform travel related decision-making and reduce emissions associated with University travel, including a voluntary pilot program asking individuals to consider GHGs while making travel plans.
- Development of Draft ANU principles for carbon removal.
- Groundwork for community engagement programs around emissions reductions

## Getting involved

### ANU student intern helps develops guidelines to reduce emissions from events

Working with the ANU Corporate Communications and Engagement team, Simon developed draft ANU Net-Zero Emissions Event Guidelines, designed to support organisers in reducing the emissions associated with various types of events.

**“The focus of the guidelines is to provide practical advice that helps mitigate the most emissions intensive components of events, thereby reducing emissions overall.”** said Simon.

“The Guiding Principles provide a broad framework which can be applied at all stages of the event lifecycle, to assist event managers organise a sustainable and environmentally friendly event. The Actions section contains several practical suggestions that event managers can adopt to reduce the environmental and carbon footprint of their event.”

The guidelines have been designed in a way that makes them applicable to all events across the University of any size or format, from conferences and exhibitions to social and sporting events.

Juliet Meyer, Below Zero Engagement Manager, said that the event guidelines could set a benchmark for event organisers. “Given the ambitious emission-reduction goals of the University, these guidelines will help us reach our goal. We hope they will also inspire other institutions to reduce their event-related emissions,” said Juliet.

Simon said that being exposed to the inner workings of the Below Zero Initiative has also reaffirmed his aspiration to work on the consulting side of climate change.

“Bridging the gap between climate science and business practices is a crucial step in reaching the University’s and the world’s greenhouse gas reduction objectives. Seeing first-hand the projects that are currently in development is super inspiring and something I would love to be a part of once I finish my studies.”

The ANU Net-Zero Emissions Event Guidelines will be embedded into ANU systems and processes in early 2022.



Simon Bourke is a third year Bachelor of Commerce student (majoring in Marketing and Corporate Sustainability). Simon completed a for-credit internship with ANU Below Zero. Photo: Simon Bourke

[Read more >  
bit.ly/3qSPyNj](https://bit.ly/3qSPyNj)

# Events



30

lectures, seminars,  
roundtable discussions  
and workshops



9,979

audience  
members



81%

of those surveyed  
will talk to others  
about the event

Below is just a small sample of the wide range of events covering climate, energy and disaster-related matters, hosted by ICEDS in 2021. For more event highlights and videos, visit: [bit.ly/3GNtucX](https://bit.ly/3GNtucX)

Despite some limitations resulting from the pandemic, ICEDS ran an extensive events program, engaging audiences with a wide variety of events across in-person, online and hybrid formats.

## Workshops on the Royal Commission into National Natural Disaster Arrangements

Following the Australian Black Summer bushfires, The Royal Commission into National Natural Disaster Arrangements was formed to examine how prepared Australia is to respond to bushfires and other natural disasters.

In May and June 2021, ICEDS facilitated a series of four targeted online workshops to discuss how government, industry and society can go about the challenge of implementing the Bushfire Royal Commission's wide-ranging recommendations.

The workshops were well-attended by stakeholders from a variety of fields, resulting in rich and engaging discussions.

[Read more and watch the event videos >](#)  
[bit.ly/3nOuGWK](https://bit.ly/3nOuGWK)

## Energy Conversations: Renewable Hydrogen

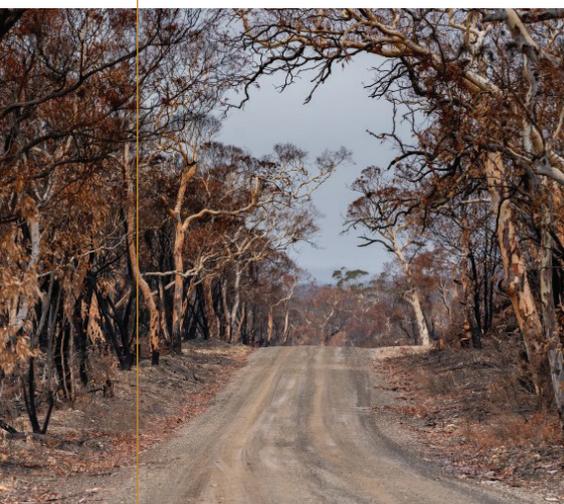
Renewable hydrogen has been making headlines globally this year, as it becomes an increasingly viable replacement for fossil fuels, and offers Australia a potential new export industry.

Researchers at ANU have been making headway in both the production of renewable hydrogen, and the safe storage and transport of it in large quantities.

How close are we to large-scale use of renewable hydrogen? What will this look like, and what are the implications for Australia?

At this Energy Conversations event, energy researchers and industry representatives gave their perspectives on the prospects for renewable hydrogen.

[Read more and watch the event video >](#)  
[bit.ly/3fOGq7i](https://bit.ly/3fOGq7i)



The Black Summer bushfire season was unprecedented due to its length, intensity, and areas impacted.  
Photo: Jamie Kidston/ANU

## North America's Heatwave - what happened, and how can we better prepare in future?

Between June and July 2021, western Canada and the north-western United States of America experienced a heatwave that broke previous heat records multiple times over. It resulted in hundreds of deaths, power failures and infrastructure meltdowns such as buckling roads.

Can this heatwave be attributed to climate change, and can we expect more of these events in future? Are heat events such as this likely to occur in Australia? And how can we better prepare ourselves and our homes, cities and energy systems for such intense heatwaves?

Climate, energy, and health specialists from Australia and North America discussed these questions and more at this event.

Read more and watch the video >  
[bit.ly/3hmW2QW](https://bit.ly/3hmW2QW)

For more 2021 ICEDS event highlights and videos, visit: [bit.ly/3GNtucX](https://bit.ly/3GNtucX)



Photo: National Museum of Australia

# Public policy engagement and outreach

Below is just a small sample of the public policy engagement and outreach undertaken by ICEDS and our members in 2021. For more highlights, visit [bit.ly/3lr9v54](https://bit.ly/3lr9v54)

Over the past 12 months, ICEDS Executive, staff and members have been engaged in various elements of public policy development, engagement and outreach. This includes numerous briefing sessions with governments at all levels, advisory roles, workshops, and presentations, to name a few.

## Making the findings of the Intergovernmental Panel on Climate Change (IPCC) accessible to Pacific decision-makers

Island nations and territories across the Pacific are increasingly vulnerable to the growing impacts of climate change. However, the most recent and comprehensive global synthesis of climate change information, the IPCC's Report on the Physical Science, is extremely technical and contains some information that is of less direct relevance to the Pacific.

ICEDS has been working on a project to help make the IPCC's findings more readily accessible to Pacific audience and close a knowledge gap in the Pacific.

"Enhancing awareness and understanding of IPCC reports – and climate change more broadly – amongst key stakeholders in the Pacific is critical to ensuring effective action is taken in the region to mitigate and adapt to climate change impacts", said ICEDS Director Prof Mark Howden.

[Read more >  
bit.ly/3FLjJvn](https://bit.ly/3FLjJvn)



Prof Abram is the only Australian-based member of a new international scientific body, the Climate Crisis Advisory Group (CCAG).  
Photo: ANU

## Reducing carbon emissions not enough

We are now beyond the point of simply needing to reduce carbon emissions to prevent catastrophic climate change, according to Professor Nerilie Abram, of the newly formed Climate Crisis Advisory Group (CCAG).

"People and ecosystems are already suffering from the impacts of climate change across the world, and these impacts will worsen unless we move quickly to radically reduce global greenhouse gas emissions," Professor Abram said.

"But we've let this problem get to the point where rapid emission reductions alone won't be enough - we also need to develop ways to remove large amounts of carbon dioxide from the atmosphere and to preserve critical parts of the Earth system while we still can."

CCAG is calling on international decision makers to collaborate and take action in three key areas:

**Reduce:** Current targets for greenhouse gas emissions reduction are not enough. Nations need to triple their emissions-cutting pledges to limit the effects of the climate crisis.

**Remove:** We need large-scale investment to develop and scale techniques to remove greenhouse gases from the atmosphere.

**Repair:** Deep research is needed to explore and investigate safe methods and technologies to repair parts of our damaged climate systems.

[Read more >  
bit.ly/3t5UmBM](https://bit.ly/3t5UmBM)

## Engaging with Australia’s emergency service agencies

ANU researchers were well represented at the country’s foremost emergency management and disaster policy forum, the 2021 Australasian Fire and Emergency Authorities Council (AFAC) conference, held virtually for the first time in October and attracting nearly 3000 participants.

Dr Marta Yebra presented on the ANU Bushfire Initiative, while Emeritus Professor Steve Dovers and Fenner School PhD graduate Dr Nadeem Samnakay presented a paper analysing the strength of Australia’s disaster policies and the threat of populist politics to coherent policy.

Dr Michael Eburn explored legal and social expectations versus realities in his presentation, and Fenner School PhD alumni Dr Susan Hunt and Dr Adam Leavesley delivered papers on, respectively, local government efforts to build community resilience, and the impact of fuel management in the ACT 2020 bushfires.

The conference was a great platform to profile ANU research and continue to strengthen relationships with research users including emergency services agencies.

## ANU collaboration working to integrate distributed energy generation and storage into the Australian grid

Australia is leading the world in rooftop solar per capita with one in four homes across the country having adopted residential photovoltaics (PV). As a consequence, we are also on track to have the most decentralised electricity network in the world in coming years. This rapid uptake of solar PV, as well as a range of other renewable energy technologies, referred to as Distributed energy resources, requires a nation-wide approach to the development of technical standards to ensure that these technologies can be integrated into the energy system for the benefit of all energy users.

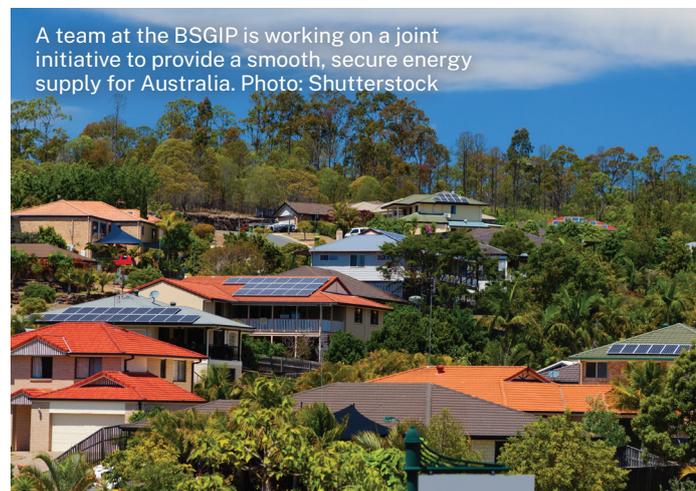
A team at the ANU Battery Storage and Grid Integration Program (BSGIP), led by Prof Lachlan Blackhall, are working on a joint initiative to support this integration and support the energy transition in Australia.

The Distributed Energy Integration Program (DEIP) is a collaboration of government agencies, market authorities, industry and consumer associations, working together to maximise the value of “behind the meter” renewable energy technologies.

In particular, technical standards and common protocols are required to harness the ability of these new DER technologies to integrate with network and market systems, to ensure a reliable, secure and resilient energy supply. In August, DEIP facilitated the release of *The Common Smart Inverter Profile (CSIP) – Australia* - an implementation guide that enables technology systems, devices and software to “talk to each other”.

“CSIP is the culmination of over two years of work facilitated through the DEIP, which has seen major players in the energy sector come together and agree on a common set of standards and protocols for integrating DER”, said Prof Blackhall.

CSIP is one of the key enablers for supporting the reforms outlined in the Energy Security Board’s Post 2025 Market Design Final Advice to Ministers.



A team at the BSGIP is working on a joint initiative to provide a smooth, secure energy supply for Australia. Photo: Shutterstock

For more 2021 ICEDS Public Policy Engagement and Outreach activities, visit [bit.ly/3lr9v54](https://bit.ly/3lr9v54)

# In the Media



20.5k

media articles/  
programs



154  
million

audience  
reach



4,834

media outlets

2021 saw unprecedented media interest in ANU researchers working in climate change, energy and disaster solutions, with a total audience of up to 154 million people for the 12-month period.



Photo: ANU

## Not drowning, fighting

3 June, Inside Story

Featuring Associate Prof  
Katerina Teiwa.

[Read more > bit.ly/3uyspTI](https://bit.ly/3uyspTI)



Photo: Pixabay

## We need more female leaders in the fight against climate change

12 November, The Guardian

Authored by Dr Maria Tanyag.

[Read more > bit.ly/3grUxQ9](https://bit.ly/3grUxQ9)



Photo:  
Shutterstock

## Could the World's Largest Green Energy Hub Redefine How Companies Work With Indigenous People?

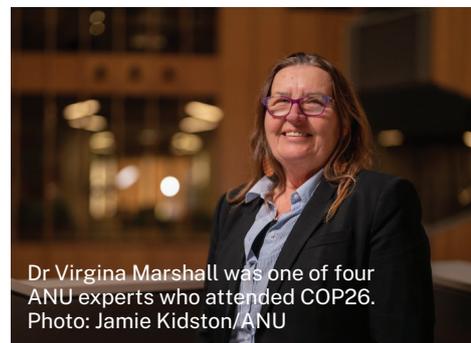
16 July, TIME

Featuring research from  
Australian National University.

[Read more > bit.ly/3gtUBii](https://bit.ly/3gtUBii)

## United Nations COP26 Climate Summit

ANU Media commentary  
on COP26 generated  
over 500 media items  
across print, online  
and radio. These  
items reached a total  
potential audience of up  
to 27 million people.



Dr Virginia Marshall was one of four  
ANU experts who attended COP26.  
Photo: Jamie Kidston/ANU



Photo:  
Shutterstock

## NSW government's assessment of raising Warragamba dam wall 'totally inadequate', critics say

29 September, The Guardian

Featuring Prof Jamie Pittock.

[Read more > bit.ly/334loig](https://bit.ly/334loig)

ANU Media distributed a release with  
comments from ANU Experts attending  
COP26, namely Dr Siobhan McDonnell, Dr Ian  
Fry, Salā Dr George Carter and Dr Virginia  
Marshall. The article calls for a greater focus  
at COP26, on the issues facing Pacific nations.

A number of ICEDS members also contributed  
their comments to the [ANU Experts list on  
COP26](https://bit.ly/3Lg3H0s), speaking to matters relating to the  
conference. The extensive commentary shows  
the depth of expertise in climate, energy and  
disaster research at ANU.



Photo:  
Shutterstock/  
Greg Stonham

## Did we underestimate the health effects of the Black Summer bushfires?

14 October, COSMOS Magazine

Featuring Prof Iain Walker.

[Read more > bit.ly/35GDc3N](https://bit.ly/35GDc3N)

For more 2021 ICEDS media highlights,  
visit [bit.ly/3Lg3H0s](https://bit.ly/3Lg3H0s)

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