Australian National University

Climate, Energy & Disaster Solutions Highlights 2024

Advancing solutions to climate change, the energy transition and disasters

Photo: Launch of the Relocating Communities at Risk Issues Paper, Exhibition and Website. Photo: Brenton McGeachie

The world saw rapid and profound changes in 2024. The election of President Trump for a second term in the US, multiple conflicts and disappointing international climate negotiations cast a shadow over mitigation efforts. In Australia, new fossil fuel developments and lack of rapid progress on emissions reductions outside of the electricity supply sector continue to put our climate ambitions at risk - though development of net zero sector plans and strategies, and ambitions for green energy and commodity exports are pointing in the right direction.

Meanwhile, the world's window for action is narrowing. The record for the hottest year was beaten again, with global mean surface air temperature consistently over 1.5 degrees of warming above pre-industrial temperatures. Heatwaves in Spain disrupted global olive oil supplies, while floods in Dubai produced surreal images of deserts turned into lakes. However, 2024 also saw some encouraging developments. Electric vehicle sales surged both in Australia and globally, while renewable energy supply continues its rapid growth, and new industrial decarbonisation opportunities are coming into reach, along with further climate finance progress and development of a global green economy.

At ICEDS, we continued advancing innovative solutions to climate change, the energy transition and disaster risk reduction. Our interdisciplinary approach brings together experts across The Australian National University (ANU) to deliver research, teaching, outreach and engagement. Some 2024 research highlights include our work developing a climate adaptation AI tool that, unlike generic AI tools, only uses peer-reviewed articles as source material. Another was collaborating with ANU School of Art and Design for interdisciplinary approaches to relocating communities in disaster-prone areas. In energy, researchers collaborated on projects to understand how Australia can realise its potential to become a major green energy and commodity exporter, including through green iron. ANU is a Heavy Industry Low-Carbon Transition Cooperative Research Centre core partner with longer term research projects supported by external partners underway.

We continued our engagement with policymakers, journalists, academics and the broader public. During 2024 we hosted 27 events attracting more than 3,000 attendees. We held the Will Steffen Lecture, honouring the life and work of the internationally esteemed expert in climate change research and founding director of the ANU Climate Change Institute. We addressed difficult climate disaster financing questions in the 2024 Disaster Update *Who pays for disasters and how?* Our 2024 Energy Update, opened by **Climate Change Authority Chair the Hon Matt Kean**, addressed the net zero transition in industry and in regional areas, questions at the forefront of both academics' and policymakers' minds. ICEDS staff and members authored nine submissions to government or other inquiries alongside an increase from 20,500 media mentions to over 25,000.

ICEDS continued delivering highly regarded professional short courses with the latest climate, energy and disaster research being shared directly with hundreds of decision makers. This included longer format courses with specialised content for Indian Ocean Rim Association regional representatives, an ACT pilot of our Climate Essentials for Educators, and development of a Pacific Climate Security short course for rollout in 2025.

This year marks the end of the first phase of ICEDS since it formed from a merger of the Climate Change Institute, the Energy Change Institute and the Disaster Risk Science Institute in 2021. The intervening four years have seen the Institute emerge as a leading Australian centre taking an integrated approach to the triple challenge of addressing climate change, the energy transition and disaster solutions. The Institute will continue evolving in 2025 under new leadership, as **Director and Head of Climate Professor Mark Howden**, **Head of Disaster Solutions Associate Professor Roslyn Prinsley**, and **Head of Energy Professor Frank Jotzo** step down. We are proud to share a selection of the University's world-leading work. On behalf of the Institute, we thank you for your support in 2024 and encourage your continued engagement with ANU on this vital work.

Professor Mark Howden,
Director & Head of Climate

Professor Frank Jotzo,
Head of Energy

Associate Professor Roslyn Prinsley,
Head of Disaster Solutions

Dr Steven Crimp,
Deputy Head of Climate

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

ICEDS community

Strengthening capacity and capability in climate, energy and disaster research, teaching, outreach and engagement

600+
members

7
out of 7
ANU colleges

26
out of 27
ANU schools

Throughout 2024 we continued to build communities of practice on climate, energy and disaster solutions across the University. Our growing membership from various disciplines provides opportunities for collaboration and capacity-building to generate solutions-driven initiatives. Members have been engaged in extensive research, teaching, public policy engagement and outreach activities throughout the year.

Within our 26 research clusters, we launched a model of cluster leadership in which senior academics partner with early-to-mid career researchers (EMCRs), giving the senior academics more support while providing leadership and mentoring opportunities to EMCRs.

Members at a networking morning tea
Photo: Christian Gómez Carrasco/ANU

In March 2024, ANU launched *ANU Policy Brief,* a digital platform designed for time-poor policy-makers, with ICEDS experts among the first to publish on the platform. In June, ICEDS hosted a member event at which Associate Director, ANU Media and Communications **James Giggacher**, Editor, ANU Policy Brief **Amy Capuano** and ICEDS Director **Professor Mark Howden** discussed the connections between policy briefs and media releases, and how to use each of these platforms to share ANU research. Following on from this event, member and PhD candidate **Tanja Russell** developed a Policy Brief *Climate change is taking an emotional toll, but better education could help* as a summary of her current work.

"It was great to have the assistance of the policy brief team to produce this, as it's something I can point to when talking with people who may not want to read an academic paper but want to understand what the research was about," said Tanja.

ICEDS also held members morning tea in May to facilitate networking.

Dr Hina Aslam

Towards a global green economy

Dr Hina Aslam is the Hoffmann Senior Fellow on Circular Economy Policy at the ANU College of Law and the World Economic Forum
Photo: supplied

Dr Hina Aslam researches energy and climate policies, industrial decarbonisation and circular economic policy. She is currently research lead for the Heavy Industry Low-carbon Transition Cooperative Research Centre (HILT CRC) project, conducting research on embedded emissions accounting frameworks (EEFs) for four industrial products; iron, steel, aluminium and cement. The work will serve as a guiding framework for the expansion of the Australian Government's guarantee of origin scheme for industrial products in the future.

'Embedded emissions' refers to greenhouse gas emissions resulting from processes required to create a product. Twenty-two per cent of global emissions are embedded in internationally traded products, making it an important area for carbon reductions. Verification and certification of embedded emissions are driving climate and trade policies and regulations across the world, such as the European Union's Carbon Border Adjustment Mechanism (CBAM), passed in 2023. Many other nations are working towards developing their own CBAMs, including Australia. However, this endeavour relies on having ways to accurately measure and account for the embedded emissions of the products being exported/imported, which is far from simple.

Various frameworks and methodologies for such accounting have proliferated globally, and they are not always comparable as they use varied approaches.

"For instance, there are over 100 different frameworks and certification schemes for iron and steel products – which measure and certify these products – and they all differ in the accounting methodologies they're using," Hina said.

This rapid growth in the number of schemes can lead to confusion among users and create administrative burden for industry, as they need to comply with multiple schemes.

"On the other hand, it can also raise concerns about greenwashing in industry."

Her team is working on public embedded emissions accounting frameworks that can allow industries to demonstrate their low carbon products credentials. This will help them to support their efforts towards climate change mitigation and meet the needs of trade related climate policies, ensuring they remain competitive internationally and can comply with cross-border carbon regulations.

Read more

Research highlights

Forest regeneration projects failing to offset carbon emissions

Forest regeneration projects that have received tens of millions of carbon credits and dominate Australia's carbon offset scheme have had negligible impact on woody vegetation cover and carbon sequestration, research from ANU has found.

The research was undertaken in collaboration with Haizea Analytics, University of New South Wales and the University of Queensland, and analysed 182 human-induced regeneration (HIR) projects.

HIR projects are the world's fifth largest nature-based offset type by credit issuances, and the largest when projects involving avoided emissions are excluded.

The analysed projects are mostly located in dry outback areas in Queensland, New South Wales and Western Australia, and are being credited for regenerating native forests in areas that are largely uncleared.

The projects do not involve any tree planting. They are mainly claiming to regenerate native forests from soil seed stock, and suppressed seedlings, by reducing livestock and feral animal numbers.

The researchers say the projects have been controversial because decades of scientific research in Australia's rangelands suggests grazing by livestock and feral animals generally does not have a material negative impact on woody vegetation cover.

Read more

A key problem with HIR projects is that sequestration is modelled, not directly measured Photo: Stuart Watt/Wikimedia Commons

Sustainable agro-forestry can be an option where old growth forests are already gone Photo: Nakau.Org

Cool coffee - exploring climate smart agriculture and carbon in PNG

As part of a research collaboration between ANU, Sustineo and Nakau, a technical team have investigated if smallholder coffee farmers in Papua New Guinea can continue to strengthen the climate resilience of their coffee farms while exploring opportunities to diversify their income — including through carbon.

Nakau's **Alex McClean** and **Michael Dyer** travelled to Simbu Province to meet coffee farmers and better understand the context of highland-grown coffee systems in Papua New Guinea.

"In any project, we first need to understand the baseline scenario, which in this context is smallholder traditional coffee farming with sub-optimal levels of shade," explained Alex.

"The specific activity we want to investigate is increasing the shade tree density, and for coffee farmers this would mean planting more shade trees among coffee trees."

Investigations will continue in 2025.

Read more

Flooding in Queensland. Photo: Shutterstock

Innovative proton battery project aims to redefine the future of energy

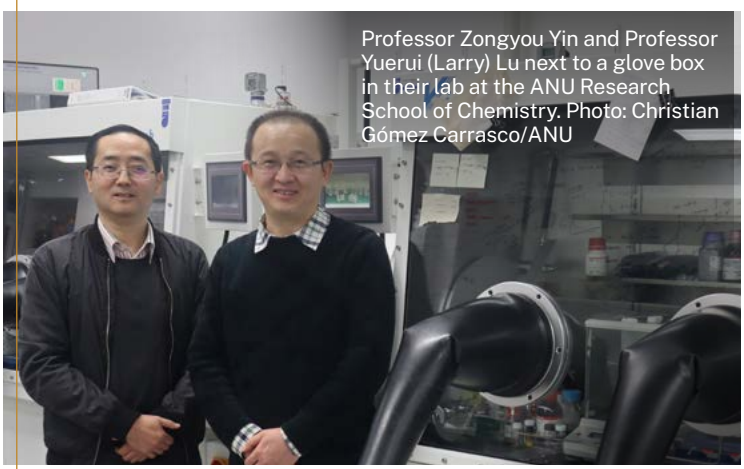
With industry and government support, researchers from ANU are closer to revolutionising the energy storage sector by creating a novel rechargeable proton battery that focuses on sustainability and efficiency.

The project's core aim is the creation of superior materials and a functional prototype of a new rechargeable battery that utilises protons instead of lithium. This proton battery has the potential to store and release energy at an unprecedented speed, positioning it as a formidable contender for future energy needs.

ICEDS assisted **Professor Zongyou Yin**, **Associate Professor Alexey Glushenkov** from the ANU Research School of Chemistry and **Professor Yuerui Lu (Larry)** from the School of Engineering in setting up the collaborative project and obtaining industry support.

"This project represents a significant step towards more sustainable and efficient energy storage solutions. By developing proton batteries, we are exploring new frontiers in renewable energy that could profoundly impact our future," said Zongyou.

Read more


Professor Zongyou Yin and Professor Yuerui (Larry) Lu next to a glove box in their lab at the ANU Research School of Chemistry. Photo: Christian Gómez Carrasco/ANU

A National Relocation Strategy for Communities at Risk

ICEDS has led a team of researchers pioneering innovative approaches to community relocation. Many Australians live in areas increasingly exposed to climate change and associated extreme weather such as floods, fires, coastal erosion, cyclones and extreme heat. If no action is taken in advance, hundreds of thousands of people could be forced to flee.

The devastating 2022 floods in northern New South Wales demonstrated the dangers of failing to move communities out of harm's way. Nearly three years after the disaster, the city of Lismore is still recovering. Many people remain in temporary housing and cannot return home, re-open businesses or access funds to move elsewhere.

But there is an alternative. The interdisciplinary team at the ANU has explored the relocation of vulnerable communities from a variety of perspectives, including the design of future communities. They stressed the need to identify areas most at risk and permanently relocate communities before disaster strikes. Their Issues Paper outlines the pressing need for such a strategy and offers guidance on how to do it.

They also called for the establishment of a National Relocation Authority to spearhead the strategy. While the prospect of relocation can be unsettling and traumatic for residents, it offers new opportunities and long-term benefits. But acting now is crucial.

Read more

Professor David Lindenmayer cautions against large, remote and infrequent burns
Photo: Tracey Nearmy/ANU

Climate adaptation AI

Much has been written on the topic of climate change adaptation resulting in a huge body of literature from many sources accumulated over decades. With so many papers, reports and datasets produced, it can be a complex and daunting task to scan these sources to formulate answers to simple (or not-so-simple) research questions.

Climate adapt AI is a cutting-edge AI search and synthesis tool that operates as a personalised document-based artificial intelligence tailored for climate change adaptation research. The tool uses a database of carefully curated research documents as source material to search and synthesize information, ensuring users receive the most relevant and reliable answers to their questions.

An ICEDS team of researchers and experts led by **Charlie O'Neill**, a 2025 John Monash Scholar, developed an innovative custom tool applying the latest generative AI techniques to climate adaptation which aims to revolutionise the approach to research synthesis in this domain. More information to come in 2025.

Charlie O'Neill has been developing the large-language model
Photo: Jerry Cashman/ANU

Prescribed burning could be making forests more flammable

Disturbing natural forests with activities such as logging and prescribed burning can make them more flammable, landmark research from ANU and Curtin University has found.

To be better prepared for future bushfire seasons, the research calls for a greater connection between forestry and fire science to understand how fire prevention strategies affect the natural environment.

"We've understood for a long time now that logging can make bushfires worse, but it's only in the last few years that evidence is showing that prescribed burning could be doing the same thing," said lead researcher Professor David Lindenmayer.

Prescribed burns are a fire mitigation tool used with the aim of reducing fuel load to minimise the intensity and severity of fires.

However, while prescribed burns can sometimes decrease flammability in the short term, the way they disrupt forest ecosystems can create longer periods of additional flammability.

Read more

Dr Bjorn Sturmberg
Photo: Crystal Li/ANU

Preparing food systems for climate change in the Pacific

ANU researchers have collaborated with CSIRO to develop a tool that will support Samoan leaders in fine-tuning their response to climate change.

Launched in November 2024, the Agrifood Systems Climate Explorer (ASCE) gives local decision makers an accessible tool that provides fine-grained detail on precisely which climate impacts their food systems will face.

The tool presents climate risk data in an interactive visualisation overlayed over a map of Samoa, showing data at the district level. It also displays data relevant to the risk profile of each area, such as the types of crops grown in the area. With much of planning and decision-making happening at the district level, it allows for local leaders to plan how they will minimise risk and maximise protective factors based on the unique features of their district.

Read more


Members of the ASCE project team
Photo: supplied

Electric vehicles fed power into Australian grid during blackout

During a major storm event that eventually cut power to tens of thousands of homes, a fleet of electric vehicles (EVs) were able to feed power back into Australia's electricity grid, according to a report from ANU.

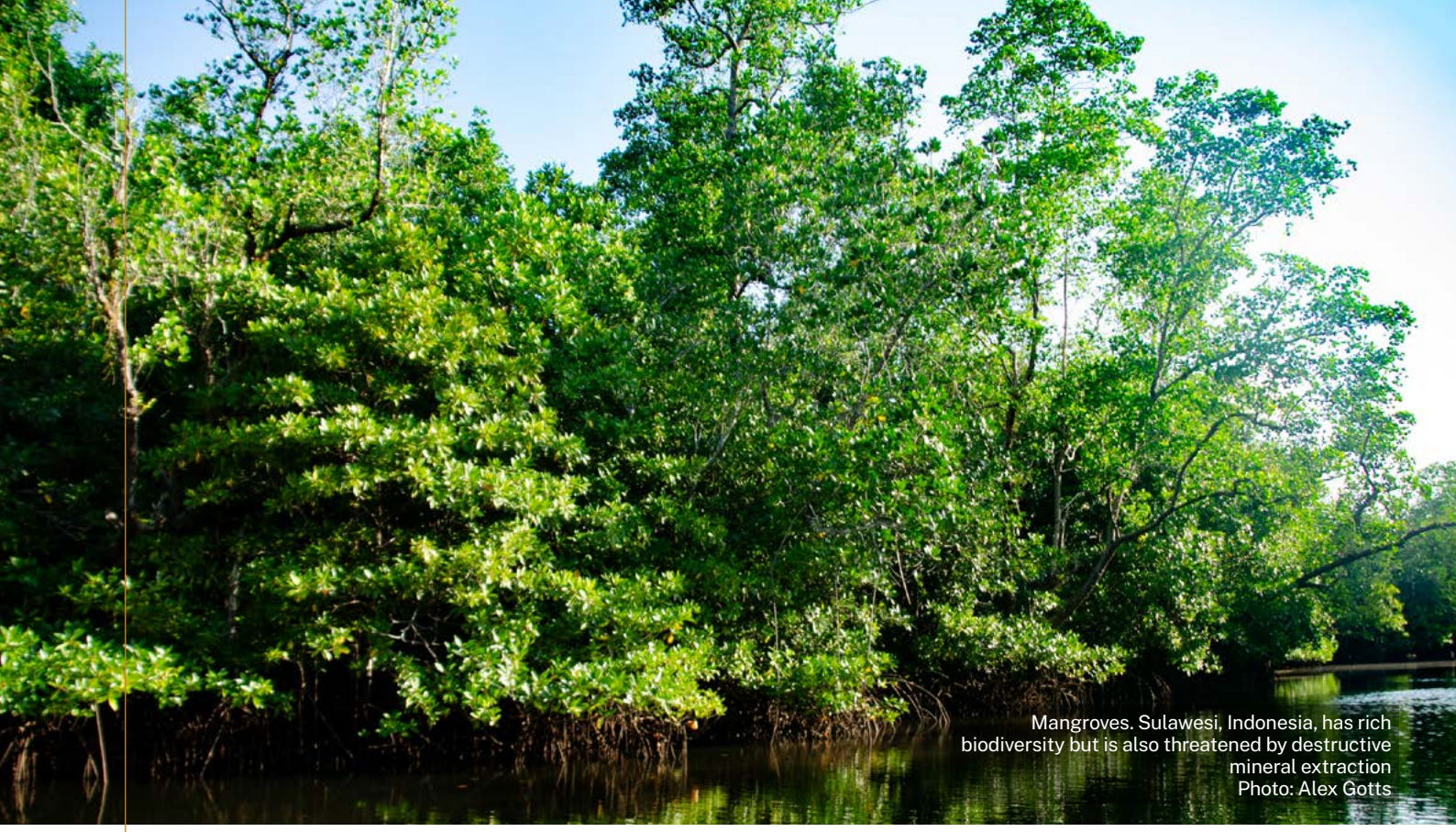
According to lead author of the study, **Senior Research Fellow Dr Bjorn Sturmberg**, it's the first time in the world this type of vehicle-to-grid response to an emergency has been demonstrated.

"It shows electric vehicles can provide the backup we need in an emergency like this."

"We have a fleet of 51 EVs across Canberra that monitor the grid whenever they're plugged in and can quickly inject short bursts of power to rebalance the system if the national grid rapidly loses power. They're essentially big batteries on wheels.

"The event in February [2024] — caused by storms in Victoria — was the first real-world test of our vehicles and chargers. We now know a vehicle-to-grid system can work," said Bjorn.

Read more



Mangroves. Sulawesi, Indonesia, has rich biodiversity but is also threatened by destructive mineral extraction
Photo: Alex Gotts

Building interdisciplinary research into climate, energy and disasters

The successful projects from the second ICEDS Seed Funding Grant round have progressed over the course of 2024. These grants have become launch pads for more extensive research programs.

Sacrifice zones: ICEDS member explores less destructive path through the energy transition

Dr Rini Astuti's project looks at how we address socio-environmental justice issues in the energy transition, particularly in the complex world of critical minerals.

The nickel industry in Indonesia is a good example of the difficult issues her team is addressing. The energy transition has turbo-charged global demand for nickel as it is used in a number of low carbon technologies, such as solar panels, batteries and wind turbines. This has seen a flood of workers and rapid industrialisation in the nickel producing regions in Indonesia like Sulawesi. This has brought environmental problems like deforestation, mudslides, pollution and disruption to fisheries. Rini says that while there are adequate environmental laws in place, these aren't effectively enforced.

"Many of these mining companies often disregard the environmental and social safeguards."

Globally, regions affected by rapid critical mineral development are known as 'sacrifice zones.'

The seed funding from ICEDS helped their research team to host the ANU forum on critical minerals and just energy transitions in November 2024. This event brought together stakeholders ranging from the Indonesian Ambassador, HE Siswo Pramono, the Minerals Council of Australia and even a small Australian mining company that wants to conduct mining differently, through co-design with First Nations communities.

This forum was just the beginning of the team's research program. The next step is a literature review on the concept of justice in critical minerals.

"We want to look deeper into how change can actually be implemented by different actors and stakeholders and what the best practice is in regard to environmental and social justice in the mining sector, and for First Nations communities."

Read more

McMichael Award supports researchers tackling impacts of climate change on health

The 2024 Awardee is **Dr Yen Le**, a Lecturer at School of Culture, History and Language, College of Asia Pacific, ANU. Yen is a medical anthropologist with research interest in chronic diseases, food, the environment and health, and stigmatised conditions. She has conducted research on living with leprosy in Vietnam, perceptions of food safety, environmental pollution and health impacts, as well as the rise of alternative diets and self-care movement in Vietnam.

"I am very excited by the reach, relevance and inclusivity of the McMichael Awards Program for Early and Mid-career academics. The success of the Awards is reflected in the strong interest and broad appeal with applications and enquiries from all the academic colleges at ANU, with the number of applications tripling in three years. As Chair of the selection panel, I feel confident to say that the quality was fabulous, and the ideas brilliant across all the applications. It is such a privilege to see the McMichael Awards inspire future science by fostering networks, collaborations, and innovative partnerships," said **Associate Professor Aparana Lal**.

Pioneering zero-carbon energy for the Asia Pacific

The ANU Zero Carbon Energy for Asia-Pacific Initiative (ZCEAP) continued its research and engagement with industry and governments, focused on the opportunity for future renewable energy based industrial production and exports from Australia. Relevant research covers technical, policy, economic, legal and social aspects of future industries such as green iron and hydrogen and their energy supply chains. Following ANU start-up support for ZCEAP as a 'grand challenge' initiative, ICEDS has continued to support coordination and outreach. Research activities are supported by a range of industry, government and philanthropic partners.

"How Australia can help decarbonise Asia's economies through zero-emissions exports remains a tremendously important question. Our transdisciplinary research approach has helped shed light on opportunities and how to deal with barriers. Deep engagement with industry and policymakers has been a crucial part of our program," said Professor Frank Jotzo, Director of ZCEAP.

Read more

Dr Zoe Leviston, Associate Professor Aparna Lal, Dr Yen Le, Associate Professor Amy Dawel and Dr Annabel Dulhunty
Photo: Calo Huang

Education highlights

From the Pacific to the world

Loloma Kakala Homasi dreamt of advancing her career on an international level before moving to Canberra. She came to ANU with a background in climate change, with a postgraduate diploma in Climate Change from the University of the South Pacific in Fiji and having worked at Department of Climate Change in Tuvalu, a nation that is extremely vulnerable to the effects of climate change like coastal inundation, natural disasters and the impacts of saltwater on agriculture.

Loloma started her Master of Climate Change at the Crawford School of Public Policy to build on her knowledge of adaptation and mitigation from a more international perspective. Originally from Tonga, Loloma lived in Tuvalu for many years and had the opportunity to pursue with support from the governments of Tuvalu and Australia.

Climate change adaptation and mitigation were areas that Loloma was able to explore in depth during her studies, with disaster solutions particularly important in the Pacific.

Loloma Kakala Homasi graduated from the Master of Climate Change. Photo: supplied

"It transformed me as a person. I learnt about the Pacific, but I also got an international perspective."

For Loloma, the best part of the degree was undoubtedly the people, from the students to the lecturers. One highlight was a guest lecture from Professor Mark Howden, who was inspirational in his passion for climate change adaptation and mitigation.

"The network you gain and the information you learn from them is so valuable," said Loloma.

Read more

Master of Energy Change student Mutia Buhron's work will shape the energy transition in Indonesia Photo: Alex Gotts/ANU

ANU student at the coalface of the energy transition

Before moving to Canberra, **Mutia Buhron** managed a 22-gigawatt coal power station near Jakarta. She came to Australia after winning a scholarship from her employer, the Indonesian state electricity company, PLN, to undertake the ANU Master of Energy Change. This interdisciplinary course has given her the 'helicopter view' over the technical, policy and economic aspects of the energy transition.

Indonesia has rich coal resources and has long relied on fossil fuels. Now with a plan to reach net zero by 2060, things are changing rapidly. A disruptive flood at the power station she managed in 2013 brought home the impacts of climate change for Mutia. But at the time, she didn't yet understand why we need to transition our energy systems.

"In daily life, it's easy not to notice incremental changes in the climate. Taking this course helped me realise that we're already dealing with the effects of climate change."

Transitioning can be difficult technically and economically. With many coal power stations in Indonesia a lot younger than their counterparts in Australia, their natural retirement ages are further away. This issue of 'stranded assets' makes the transition more expensive. In efforts to stimulate the local economy, Indonesian legislation stipulates that a certain amount of the materials and products required for the transition must be sourced from within Indonesia.

Read more

Sarah Boddington spoke at the 2024 Energy Update.
Photo: Jack Fox/ANU

Energising the transition

With a background in international development and a focus on the social dimensions of energy and climate transitions, **Sarah Boddington**'s PhD research at the Crawford School of Public Policy plays a crucial role in shaping climate policy and promoting lower carbon practices in Australia.

"As a social researcher, I focus on the social dimensions of energy and climate transitions. It's an interesting time to be studying this because, following the adoption of the Net Zero target in 2022, we are now at a stage in Australia where the debate is moving from whether we should have action on climate change to what that action should look like."

Read more

Grassroots to blue skies

Amita Thapa Magar already had a distinguished background in the environmental sector when she began studying at ANU. She worked on adaptation and disaster recovery in Nepal, in grassroots projects such as the Nepal Climate Change Support Program, which delivered local adaptation projects in areas like erosion prevention and drinking water schemes. She began the Master of Climate Change to take on a more technical and managerial role.

"I felt it was time to change my perspective and add a new and international approach to my skills," Amita said.

Nepal is extremely vulnerable to climate change, facing challenges such as increased flooding, landslides, and glacial lake outburst floods due to the country's mountainous terrain. The Nepalese Government is working on adaptation and mitigation strategies to help the country build climate resilience and promote sustainable development with the Green, Resilient, and Inclusive Development (GRID) approach being a key strategy.

After winning an Australian Government scholarship, Amita chose ANU as it was highly recommended, and because Canberra's family-friendly environment, making it an ideal place for her and her family.

Read more

Amita Thapa Magar uses the Master of Climate Change in grassroots mitigation and adaptation projects in Nepal.
Photo: supplied

Professional Short Courses

16
professional short courses delivered in 2024

397
total participants

4.46
average rating out of 5 by participants

Executive education courses influence minds and careers

In 2024, ICEDS delivered 16 short courses to 397 participants with an average rating of 4.46/5 stars overall. These courses provide professionals with an overview of the latest developments from both a scientific and a policy response perspective. Reaching thought leaders in Australia and internationally, these courses translate ANU expertise directly into real-world impact.

"The course content was relevant and delivery was excellent. It was great to have time for questions and discussions which developed new knowledge and understanding," said Karen Symons, National Coordinator, National Emergency Management Agency.

ICEDS member Dr Arnagretta Hunter in discussion with teacher participants during the Climate Essentials for Educators course . Photo: ANU

Teacher participants during the Climate Essentials for Educators course
Photo: ANU

This year, the executive education team ran three six-week courses on Climate Change Adaptation and Mitigation for students from Indian Ocean Rim Association member states. Funded by DFAT with a competitive scholarship, this course supports decision-makers in our region to address the most significant environmental, social and economic challenge of our time as Indian Ocean countries face rising sea levels, cyclones, droughts, floods, heat waves and other challenges. The topics in this course, such as health, water and food security in a changing world, equip leaders in their home countries to adapt to climate change, while building Australia's reputation as a constructive regional partner.

"The course was insightful and well-structured, with a rich blend of theoretical foundations and practical applications. The discussions provided valuable regional perspectives that enhanced my understanding of climate adaptation and mitigation challenges specific to the Indian Ocean Region," said a course participant.

In 2024 ICEDS ran the second pilot of our Climate Essentials for Educators with a group of ACT educators, supported by the ACT Education Directorate. The course connected ANU climate researchers with primary and secondary school teachers to build their capacity to teach about climate change, as well as navigate conversations in the classroom and with parents. With a rise in eco-anxiety as well as misinformation from social media, the role of teachers is more critical than ever.

"The potential impact of this course is enormous. We can start to build the societal conversation around the change that needs to happen and take away some of that fear and that's got the potential to transform society," reflected Sharon Forwood, NSW Secondary Geography Teacher and Visiting Fellow at ICEDS.

Coming up in 2025, we have developed the Pacific Climate Security short course. This will be delivered in-country, beginning in the Solomon Islands.

Our latest short courses are advertised here

ANU Environmental Sustainability

(formerly Below Zero Program)

In 2024, the Below Zero team moved from ICEDS to join the environmental sustainability team in the ANU operational division (ANU Green) to consolidate our efforts in improving the University's environmental outcomes and climate action activities.

ANU Green is directed by the Dhaagun Environmental Management Plan (EMP), which provides an approach with supporting goals to improving environmental sustainability across its Acton campus and regional sites. Dhaagun is earth and environment in the local Walgalu (Ngambri) & Wiradjuri language. Read more about our strategy on our website.

To reflect the organisational and regulatory changes in 2024, Below Zero now refers to the ANU climate action ambitions. The University's long-term ambition is to be below zero emissions from our operations and value-chain (scopes 1, 2 and 3) by 2040 with an interim goal of carbon neutrality for direct on-campus and energy-related emissions (scopes 1 and 2) for part of 2025 (pilot) and from 2026 onwards.

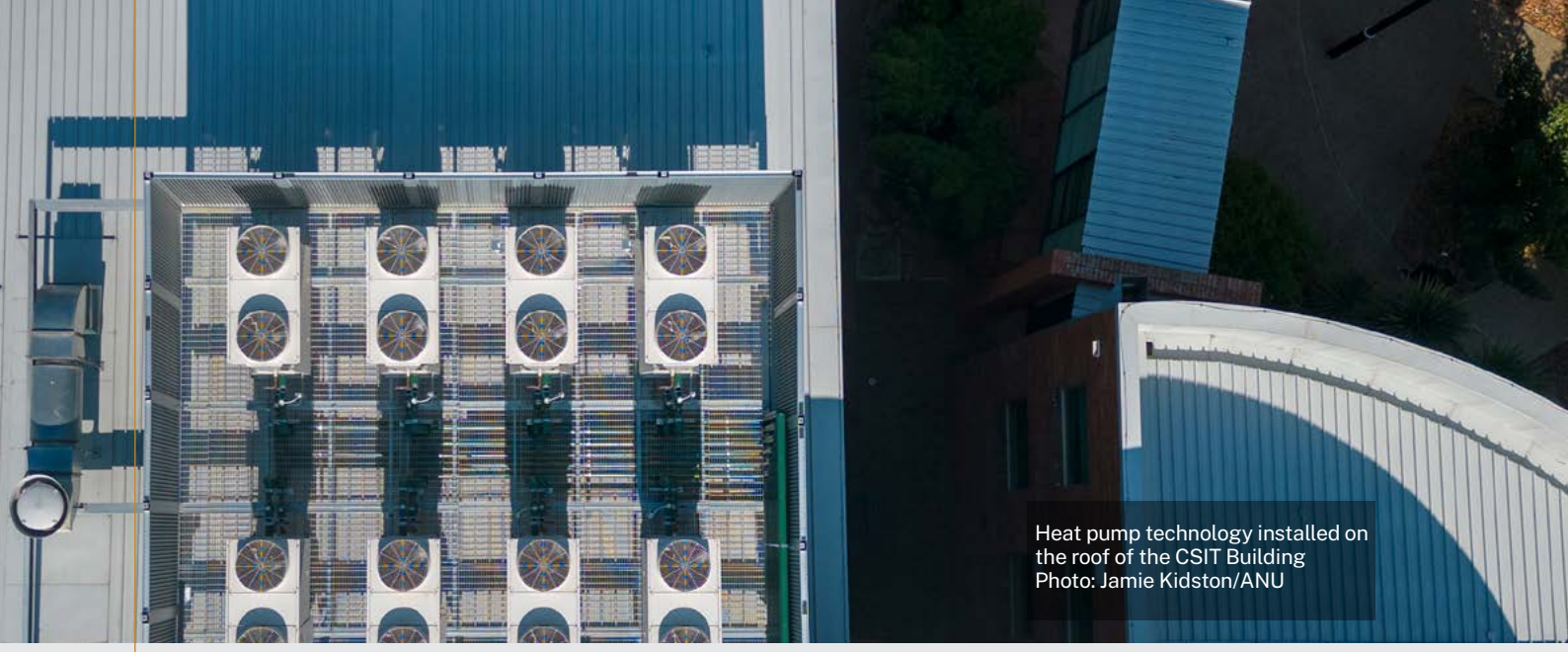
Climate risk was added as a strategic priority of the EMP to ensure the University discloses and manages climate risks, adapts to future climate impacts and meets Commonwealth Climate Disclosure requirements.

Climate scenario workshops

ANU is part of a Climate Risk Working Group with 12 other Australian universities, facilitated through the member-led organisation Australasian Campuses Towards Sustainability. In 2024, ANU hosted two workshops on climate scenario planning with experts from member universities, including sector partners in New Zealand who had done a similar process in previous years. These workshops brought together over 100 researchers, professional staff and students to address the question – How could climate change impact Australia's university sector in the 2030s, 2060s, and 2090s?

The risks posed by climate change include physical risks — such as those arising from more severe

Rooftop photovoltaic panels at ANU
Photo: Jamie Kidston/ANU



Heat pump technology installed on the roof of the CSIT Building
Photo: Jamie Kidston/ANU

weather events — and transition risks, such as those that involve policy, legal, technological, market, financial, and reputational challenges associated with reducing greenhouse gas emissions. It will also bring opportunities as governments and the private sector invest in research to address the problem. Exploring different climate scenarios using qualitative methods is the first step in identifying these risks, which can then be explored further using quantitative methods.

The Working Group will capture the outcomes of this program in a report to be published in early 2025. The report will outline four potential climate scenarios for the tertiary education sector. While directly relevant to the 12 participating universities, the findings will also serve as a resource for other institutions as they begin to disclose and address climate risks.

ANU recognised for climate action award

At the Future of Sustainability conference, ANU was recognised for its exceptional environmental initiatives in the Australasian Green Gown Awards. Two ANU programs were recognised as finalists in the climate action category: the ANU Carbon Smart Travel Program and our work to transition our campus buildings to carbon-neutral heating.

The ANU Carbon Smart Travel Program won the highly commended award for its comprehensive and impactful approach to supporting organisational change and empowering communities to reduce travel emissions. The ANU approach was recognised as distinctive for its participatory nature, which involved staff and students in co-designing measures and fostering a sense of ownership. Watch a video about this program.

By the end of 2024, ANU had transitioned nine buildings to electric heat pumps, reducing the University's carbon footprint by approximately 900 tCO_2e per annum, 6.5% of our total emissions from burning natural gas. These projects showcase that it is possible to transition existing infrastructure by retrofitting buildings, conserving resources and minimising waste. Watch a video about this program.

ANU was recognised for its exceptional environmental initiatives in the Australasian Green Gown Awards

Photo: Australasian Campuses Towards Sustainability

Events

27
Seminars, panels, roundtable discussions and workshops

3,254
Audience members

4.4
Average rating out of 5 by audience members

86%
of those surveyed would talk to others about the event

ICEDS ran an extensive events program in 2024, engaging audiences with a wide variety of topics across in-person, online and hybrid formats.

Professor Brian Walker salutes Will Steffen at ICEDS panel event. Photo: Jamie Kidston/ANU

Giant of climate science honoured at Will Steffen lecture

Emeritus Professor Will Steffen has been remembered as a giant of the scientific community at the ANU lecture held in his name.

Will, who passed away in January 2023, was one of Australia's most influential and respected climate scientists. He also leaves behind a lasting legacy at ANU, as the former Director of the Fenner School of Environment and Society and the inaugural Director of the University's Climate Change Institute.

During the 4 July address, delivered by his long-time collaborator **Professor Johan Rockström** from the University of Potsdam, Will was fondly remembered not just as a brilliant scientist, but as a selfless mentor and gifted communicator.

"I know I speak on behalf of the global sustainability and climate science community in saying that we owe so much to our dear colleague and friend Will Steffen," Johan said.

Watch the event recording.

ANU student and Duty of Care campaigner Hannah Vardy opens the second session of the ANU Climate Update
Photo: Alex Gotts/ANU

Moving from climate anxiety to action

Understanding the up-to-date science of climate change and climate impacts is essential for decision-making, however it can also be overwhelming. A focus on actions fosters hope and empowers people to respond to the challenges we face. At the 2024 ANU Climate Update, the second session featured a panel of researchers and practitioners who were focused on action in a variety of fields.

Watch the event recording.

Visiting delegation from Indonesia's Inter-University Center for Excellence on Climate Change
Photo: Jewel Cabardo/ANU

Roundtable: Indonesia's Inter-University Center for Excellence on Climate Change

In September ICEDS partnered with the ANU Indonesia Project to host leaders from five of Indonesia's leading universities for an in-depth exchange about interdisciplinary, cross-institution research and engagement on climate change and energy transition. The roundtable also discussed exciting opportunities in bilateral universities-led collaboration between Australia and Indonesia in years and decades to come.

The Hon Stephen Jones MP, Australian Assistant Treasurer and Minister for Financial Services presented the keynote address.
Photo: Christian Gómez Carrasco//ANU

Who pays for disasters and how?

As Australia faces more frequent and intense natural disasters due to climate change, disaster costs are skyrocketing, outpacing investments in resilience and recovery. A critical question emerges: who covers the growing costs of preparing for, responding to, and recovering from these events – and how? A growing percentage of the damage caused by disasters in Australia is uninsured. This problem, known as the "insurance gap," is increasing across the globe. When disasters strike, governments often must pay for rebuilding where insurance does not cover the damage.

ICEDS hosted the ANU Disaster Solutions Update and a Disaster Finance and Insurance Research Roundtable on 6 August to highlight key research areas needed to address these pressing concerns.

Read more

Public policy engagement and outreach

ANU contributions to national policy debate

In 2024, ICEDS staff and members have prepared nine submissions to government and other inquiries. These include a submission to the Inquiry into Australia's response to the priorities of Pacific countries and the Pacific region, urging rapid reduction in Australia's domestic and exported emissions to improve the relationship between Australia and Pacific countries, as well as adaptation measures that centre First Nations and Pacific Islander voices. ICEDS members gave evidence to the Inquiry in September 2024.

A submission to the Select Committee on the Impact of Climate Risk on Insurance Premiums and Availability addressed the complex, compounding and cascading nature of climate risks and how the costs of these risks can be shared across the economy. The submission encouraged better information transparency and governance as well as accurate data for complex risk to support policy and decision-making. It highlighted the uneven burden that climate risks impose on disadvantaged groups and encouraged responses following principles of justice and solidarity. Following the submission, **Associate Professors Roslyn Prinsley and Caroline Schuster** gave evidence to that Senate Select Committee in October 2024.

"The best way to reduce recovery costs and close the insurance gap is to find effective methods to minimise disaster impacts in the first place, leaving much less damage to pay for," said Roslyn.

ICEDS responded to the UNFCCC Call for Input: Expert Dialogue on Children and Climate Change. The submission noted that climate change is an issue of intergenerational justice, where current and future generations of children will shoulder the burden of a problem that was largely caused by previous generations. It explored the complex and interacting risks children face, beginning in gestation, as direct risks like natural disasters are compounded by the impact of reduced economic resources and increased pressures on caregivers. The submission outlines policy responses, such as embedding intergenerational justice in law.

Read more

Professor Frank Jotzo. Photo: ANU

ANU Professor appointed chair of new QLD Clean Economy Expert Panel

Queensland Minister for Energy and Clean Economy Jobs **Michael de Brenni** appointed **Professor Frank Jotzo** as Chair of the state's new Clean Economy Expert Panel.

The Clean Economy Expert Panel was established through Queensland's Clean Economy Jobs Act 2024, which set a new emissions reduction target of 75% below 2005 levels by 2035, as well as enshrining in legislation Queensland's commitment to net zero emissions by 2050.

The Panel will provide advice to the Minister about achieving the emissions reduction targets and ways to reduce greenhouse gas emissions in Queensland.

"A low-emissions economy will bring opportunities for lasting prosperity. Ambitious emissions targets open the gate, then comes the journey of making it happen," said Frank.

"Queensland has huge potential for investment in the clean economy of the future. Not only in energy but in industry, agriculture, transport and agriculture.

"This panel will advise the Queensland Government on the way forward, drawing on the wide range of experience of the members. It is a positive that perspectives by the university and broader research sector are prominently represented in an advisory body of this kind."

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Salā Dr George Carter attended the Pacific Island Countries Ministerial Talanoa with Australia and New Zealand in Fiji in October. From left to right: Kushla Munro, Deputy Permanent Secretary DCCEW, Dr Sally Box, Head Climate Change Negotiations, DCCEW, Salā Dr George Carter, The Hon Chris Bowen MP, Minister for Climate Change and Energy. Photo: Supplied

ANU researcher appointed to COP29 Presidency Scientific Council

Leading Pacific Islands researcher **Salā Dr George Carter**, Senior Fellow and Deputy Head of the ANU Department of Pacific Affairs, was appointed to the Scientific Council of the COP29 Presidency, joining a distinguished global team of scientists that guided climate policy discussions at the 2024 United Nations Climate talks in Azerbaijan. His appointment signals the rising prominence of Pacific voices in the global climate discourse, particularly in advocating for small island states most vulnerable to the impacts of climate change.

"It's an absolute privilege to join this prestigious council. This role is about amplifying and elevating our Pacific science and lived experiences in the COP process. It's more than just research — it's a life mission," said George.

The Scientific Council of the COP29 Presidency plays a pivotal role in ensuring that science informs climate negotiations and decision-making. With 28 experts from diverse regions and institutions, the council facilitates cross-border collaboration, strengthens access to climate science, and supports the implementation of the Paris Agreement.

Through this platform, George was determined to ensure that Pacific perspectives remain central to global climate discussions.

"We hope to bring more means of implementation — whether finance, capacity building, or technology — to Pacific, New Zealand, and Australian universities and researchers so they can influence global policy on climate change," George explained.

"Our aim is to solidify our research agency and ensure our scientists and traditional knowledge holders have a seat at the table."

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Professor Mark Howden pictured at IPCC-61 in August
Photo: IISD/ENB | Anastasia Rodopoulou

ICEDS Executive engagement

ICEDS Director and Head of Climate Change, Professor Mark Howden, has given over 150 presentations to policy, industry, academic and general audiences throughout 2024, both as Director of ICEDS and in his capacity as a Vice-Chair of the IPCC Working Group II.

Mark has continued to provide high-level input and briefings for politicians, political organisations and government departments, embassies, scientists, industry and community groups. This includes various state and federal Ministers and representatives; the Department of Foreign Affairs and Trade; the Department of Climate Change, Energy, the Environment and Water; the Climate Change Authority; several High Commissioners and the diplomatic community, and the US National Academy of Science to name a few.

Mark has been engaged in considerable media activity in 2024. This includes interviews with ABC AM and PM amongst many other ABC programs, SBS, SkyNews, CNN, BBC, Al Jazeera, the Guardian, German National Radio and CNA amongst others. Throughout the year, he was featured in 295 media items, reaching a potential audience of up to 6 million people globally. This included extensive coverage in relation to the record-breaking temperatures and other extreme events and how to better respond to these, appropriateness and progress towards emissions targets, the US elections and COP29.

Mark either chairs or is a member of a range of advisory committees. One of these is the expert advisory committee for the first National Climate Risk Assessment which was delivered in 2024. This advice also contributed to the development of the latest National Climate Adaptation Plan to be released this year. He also Chairs the ACT Climate Change Council which delivers advice to the ACT Government, advising how to build on the ACT's world-leading climate change policies.

Mark teaches into many different courses at ANU and other universities in relation to climate change and extremes, agriculture and food security, GHG emission-reduction and science-policy as well as other topics. He regularly contributes to ICEDS executive short courses on climate issues, both to international and Australian audiences.

ICEDS Head of Energy, Professor Frank Jotzo, led and contributed to research on net-zero emissions strategies, industrial decarbonisation, green steel and electricity policy, including through research projects at the Crawford School of Public Policy.

Frank continued to lead Australia's Carbon Leakage Review for the federal government, and was appointed to the new NSW Net Zero Commission as well as Chair of the new Queensland Clean Energy Expert Panel. He also served on several advisory and steering committees, including the Jobs and Skills Australia (JSA): Clean Energy Workforce Capacity Study and the Carbon Valuation Group. Professor Jotzo was also appointed to the scientific advisory board of the Potsdam Institute and the OECD green iron project advisory board.

Frank spoke at a number of significant public events and conferences, including as a keynote speaker at the HiTemp4 forum, several industry and policy conferences and at side-events at the United Nations Climate Change Conference, COP29.

Frank engaged extensively in public outreach through the media over the year, on topics such as emissions targets, domestic and international climate policy, the Inflation Reduction Act, trade and climate, and COP29. In addition to media interviews, Professor Jotzo authored op-eds and commentaries which were published among others by the Australian Financial Review, The Guardian and The Conversation.

Frank teaches on climate change policy and economics in Master courses at ANU Crawford School and regularly contributes to ICEDS executive short courses on energy issues, both to international and Australian audiences.

Professor Frank Jotzo.
Photo: ANU

ICEDS Head of Disaster Solutions, Associate Professor Roslyn Prinsley, has focused on leading and supporting robust research initiatives building on ANU expertise in Disaster Risk Reduction with a focus on transformational solutions.

In 2024 Roslyn convened and taught on two Disaster Solutions Essentials professional short courses, including one dedicated to National Emergency Management Agency (NEMA) regional staff. She led the ANU Disaster Solutions Update – where she also presented a keynote speech alongside the Minister for Financial Services and Coordinator-General of NEMA. She presented at a range of events including the Floodplain Management Australia conference, where her presentation was one of five (of 90+) ranked very highly by the Conference Evaluation Panel. She convened and chaired two major events - the Relocation Panel at the Launch of the Relocating Communities at Risk Issues Paper, Exhibition and Website - attended by senior executives from NEMA, Department of the Prime Minister and Cabinet, Queensland Reconstruction Authority, the Insurance Industry, other government agencies, Red Cross and other NGOs; as well as the ANU National Disaster Finance and Insurance Research Round Table 2024 with support from Natural Hazards Research Australia.

Roslyn delivered briefings to the of Department of Prime Minister and Cabinet, the National Emergency Management Agency, Natural Hazards Research Australia, Floodplain Management Australia. She delivered multiple presentations in her capacity as the lead for the Partnering with communities in regional Australia to increase resilience to floods project, including the Ipswich, Noosa and Moree local councils. The multi-stakeholder and interdisciplinary project, which supports regional Australian communities to mitigate future flood risk, will have as one of its main outputs the development of the first Australian Guidelines to incorporate Nature-based Solutions for flood mitigation. She was also appointed to the Expert Advisory Committee: Nature-Based Measures, NSW State Disaster Management Plan

Roslyn engaged in media activity in 2024, including interviews with ABC News, ABC Saturday Extra, Channel News Asia, Canberra Times, News.com.au, and authored articles in The Conversation, and UNDRR PreventionWeb amongst others.

Roslyn has continued mentoring students involved in research projects aimed to generate transformational solutions to disasters, including a cohort of Honours research students from the College of Engineering, Computing and Cybernetics, developing rapid aerial fire suppression technology. She also continued to lead the Disaster Solutions Research Internship program within ICEDS, an initiative that has attracted 23 high-calibre interns from the Colleges of Science and Business and Economics over the last few years.

Associate Professor Roslyn Prinsley Photo: Jamie Kidston/ANU

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18 April, CNA
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