Australian National University | ANU Centre for Energy Systems

AESS Research Workshop Friday 18th of September 2026 Full Program and Abstracts

Program in brief

8:30 am Arrive for 9am start

9 am Welcome and introduction (shared online)

Phillipa Watson and Heather Logie

9:15 Regional transition and publics – talks (shared online)

Facilitator: Beck Pearse

Good Neighbours: Place-sensitive principles for energy infrastructure development in urban industrial regions
Chantel Carr and Kimberley Crofts

Need for social performance index informed solar project siting framework in Australia.
Benjamin Ware, Phillipa Watson, and **Rabin Basnet**

Getting over the line – designing effective engagement for renewable energy infrastructure (***presenter online***)
Tsyon Feleke

Lines in the paddock: mapping rural-urban contestation over electricity transmission projects
Jonathan Pickering, Wendy Conway-Lamb and Lian Sinclair

10:15 Regional transition and publics – World Café (in person activity)

Facilitator: Wendy Russell

Statutorily Tiered Environmental Assessment for Renewable Energy Zones and Transmission Corridors
Hilary Bekmann

Temporal and ecological dimensions of energy justice: learning from contentious electricity transmission projects about how to co-design a just transition.
Wendy Conway-Lamb, Lian Sinclair, Jonathan Pickering

Government bailouts and the implications of energy transitions via deal-making.
Chris Gibson

Rural electricity rollout and Australia's long run regional development challenges
Beck Pearse

How do we know? Methodologies for tracking transitions on the ground
Chantel Carr

10:55 am Morning Tea (in-person)

11:20 Rethinking demand and equity – talks (shared online)

Facilitator: Pip Watson

Toward an energy communication agenda at new material frontiers.
Rini Astuti, Faranak Hardcastle, Karina Judd, Sujatha Raman, Dan Santos

Opening up energy demand reduction in socio-energy system change.
Sujatha Raman, Rini Astuti, Faranak Hardcastle, Karina Judd, **Dan Santos**

Expert insights on the real-world deployment of time-of-use tariffs.
Thomas Longden, Gina Gatarin

Households electric import patterns over a 24-hour period and the underlying characterises of household segments - An empirical analysis based on 366,439,750 days of household electricity use patterns.
Sara Dolnicar, Anna Zinn, Reza Serati, Marius Portmann, Siamak Layeghy

12:20 Urban electrification and households – World Café (in person activity)

Facilitator: Wendy Conway-Lamb

Anticipating energy vulnerability in Australian households: a futures anthropological approach.
Nedha de Silva, Fareed Kaviani, Yolande Strengers, Sarah Pink & Abby Mellick Lopes

Scenarios for future living: imagining Australia's household energy future.
Fareed Kaviani and Yolande Strengers

More Than Meters and Money: Stakeholder Perspectives on Taste, Cultural Identity and Clean Cooking in Kumasi, Ghana.
Stephen Sodoke, Dickson Boateng and Ermolin Ilya.

Making it up as we go along: an account of energy standards governance from the inside.
Laura Jones

The ethical complexities of household electrification research
Sangeetha Chandra-Shekeran

1:10 pm Lunch (in-person)

2:00 Urban electrification and households – talks (shared online)

Facilitator: Laura Jones

VPPs as Asymmetrical Boundary Objects.
Declan Kuch, Jesse Adams Stein, Cameron Tonkinwise, Chantel Carr, Abby Mellick Lopes

EV owner perspectives on V2X.
Laura Jones, Yeliz Simsek, **Rebecca Blackburn**, Phillipa Watson, Kim Blackmore, Heather Logie

Apartment decarbonisation. Risks, opportunities and lessons for emissions reductions in cities.
Wendy Russell, Phillipa Watson, Yeliz Simsek, Rebecca Blackburn, Heather Logie and Michael Thomas

*How Nuclear Power staged a comeback in the Philippines: Discourses and Discursive Opportunity Structures under a Populist Regime.
Dakila Kim Yee

3:00 pm Afternoon Tea (in-person activity)

3:15 Intermediaries and Infrastructure – talks (shared online)

Facilitator: Rebecca Blackburn

Beyond Installation: Consumer Advisory Practice in Australia's Residential Battery Workforce.
Kim Blackmore, Yeliz Simsek, Sarah Wilson

On the ground, on the road, on the roof: Solar and battery installers' labour processes and structural employment conditions. (**one presenter online**)
Jesse Adams Stein, Eugene Schofield-Georgeson, **Chantel Carr**, Declan Kuch

*Beyond Technology: Understanding the Social Dimensions of Campus Microgrids in Australia's Energy Transition. (***online***)
Maryam Azhar

The Work of Australia's Critical Electricity Infrastructure in a Changing Climate.
Merry Jean Caparas

(Close of online sharing for the day)

4:15 pm Weaving AESS threads – workshop (in person activity)

Facilitator: Wendy Russell

Reflecting on experiences & insights from the workshop.
Identifying and reflecting on threads running through the workshop.
What roles could AESS play?
How best to sustain/build the network?
Who will host the next meeting?

5:15 pm Wrap-up and close

* Note that these presentations have been swapped.

5:15 -7:00 Networking drinks and dinner Badger & Co ANU (self-funded)

Abstracts & speaker details

(Presenter/s are **bolded)**

9:15 Regional transition and publics - talks

Good Neighbours: Place-sensitive principles for energy infrastructure development in urban industrial regions

Chantel Carr and Kimberley Crofts

Most Australian research on industry-community relations in energy transitions focuses on regional contexts where infrastructure development is located in peripheral zones or dedicated corridors. The Illawarra region of NSW presents a fundamentally different geography, where major industrial infrastructure sits at the physical and social centre of a dense and diverse urban region. Bounded by the ocean and escarpment, there is no spatial buffer between industry and community. Here, co-existence is not a planning aspiration; it is a lived reality that has been shaped over a century. This paper draws on extended qualitative research with residents, workers, community organisations and institutions in Port Kembla and the wider Illawarra. It identifies six place sensitive principles for energy and industrial infrastructure development in urbanised industrial regions. These principles emerge from community experience of living with heavy industry for generations, and speak directly to a new wave of proposals that have so far remained unrealised in a community already saturated with competing promises around energy futures. We argue that urbanised industrial regions require distinct frameworks for energy transition planning, and that the knowledge communities develop through sustained co-existence with industry is an underutilised resource for getting transitions right.

Dr Chantel Carr is Senior Lecturer in Geography and Sustainability in the School of Social Sciences and the incoming Keira Chair in Energy Futures at the University of Wollongong. Her research focuses on what climate and energy transitions mean for communities and workforces. Chantel has led socio-technical and labour-focused research across all scales of the energy system, from generation and industrial decarbonisation through to building retrofit and household adaptation.

Dr Kimberley Crofts works for Energy Consumers Australia where she advocates for energy justice and improved outcomes for vulnerable energy consumers. Her PhD, completed in 2024, examined the role of public participation in energy transitions in the Hunter Valley. Prior to moving into energy policy and advocacy Kimberley worked in strategic, service, and communication design.

Need for social performance index informed solar project siting framework in Australia

Benjamin Ware, Phillipa Watson, and **Rabin Basnet**

Australia has one of the highest rates of solar deployment per capita, supported by a long history of PV technology development and favourable policy. As utility-scale deployment has increased, community resistance to solar farm developments has also increased. Resistance to wind energy and transmission infrastructure is well documented in Australia and internationally, but resistance to utility-scale solar remains under-investigated. This project identified twelve utility-scale solar proposals (≥1 MW) in Australia that were formally refused, delayed, or withdrawn primarily due to community opposition. Five of these were formally rejected following community-led protest, representing an aggregate lost generation potential of 411,207 MWh per year.

For each formally rejected project, publicly available documents expressing community opposition were collected and analysed using hybrid thematic analysis based on an energy justice framework. Recognition justice concerns were most prevalent, comprising visual and landscape impact, rural character, and place identity. This reflects a structural tension between solar siting criteria, which prioritise flat, low-complexity, high-irradiance pastoral land, and community relationships to that land as both an economic asset and a marker of cultural identity. This tension was explicit in the Yass and Mitchell's Flat cases, where residents and elected representatives identified an asymmetry between hosting solar infrastructure and receiving its benefits. Procedural justice concerns centred on inadequate developer consultation and unclear planning policy for site selection. The spatial and thematic analysis has direct implications for addressing community concerns during solar project development. Communities most likely to host utility-scale solar are also those most likely to oppose it, because optimal siting is most disruptive to the landscape values most salient to them. Policy responses that treat this as a communication problem to be managed are unlikely to be effective. Responses that instead treat it as a distributional and procedural justice problem by investing in making the socioeconomic benefits of hosting solar development visible and equitably distributed will be the better strategy.

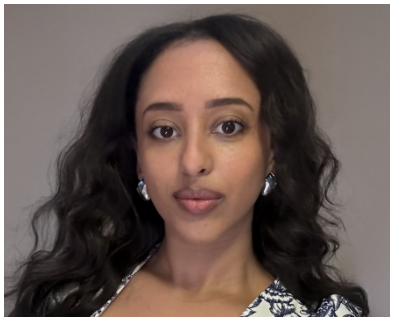
Dr Rabin Basnet is a Research Fellow at the School of Engineering, Australian National University (ANU). His research sits at the intersection of solar photovoltaic (PV) technology, sustainability, and community engagement, with a focus on solar cell technology development and commercialisation, end-of-life management, and the circular economy of solar panels. He works closely with leading industry partners on technology development, as well as with local governments and community organisations to develop practical reuse and recycling pathways and to support the deployment of utility-scale solar projects. Dr Basnet co-convenes the PV Technology course at ANU and leads the Circularity Network within the School of Engineering.

Note**:** This is a part of Benjamin’s undergraduate R&D project

Getting over the line – designing effective engagement for renewable energy infrastructure

Tsyon Feleke

This systematic review synthesises studies from Global North countries to understand how stakeholder engagement strategies influence the social acceptance of transmission infrastructure, through the relational lens of place attachment theory, communication accommodation theory and social identity theory. This framework is used to explain how emotional connections to place, communication between stakeholders and group dynamics interact to shape perceptions of social acceptance. Our approach views stakeholder engagement as a practice of social recognition and meaning, rather than an agent of procedural regulatory compliance or risk management. The review identified eleven relevant empirical studies with data extraction and thematic coding analysing the influence of this theoretical framework. The inclusion criteria considered studies published between 2015 to 2025, to examine how stakeholder engagement strategies influence acceptance outcomes. The findings show that respectful and participatory engagement strengthens trust between community members and developers, while risk management approaches often lead to the erosion of trust through increased perceptions of unfairness. Attachment to local landscapes and historical identities strongly influences community attitudes, but the recognition of these factors by developers can increase perceptions of legitimacy, leading to higher levels of acceptance. Cases in Germany, Ireland and UK identify the need for participatory stakeholder engagement models which contributes to the establishment of a Social Licence to Operate (SLO). This review provides empirical evidence to address the gap between stakeholder engagement theory and practice that aims to earn a SLO in transmission infrastructure acceptance by recognising the need for adaptive engagement frameworks that prioritise collaboration and participation. We address the lack of systematic synthesis of how engagement strategies rooted in the lived experience of stakeholders influence the acceptance of transmission infrastructure across the Global North. Additional research can explore comparative studies across alternative regions to examine these frameworks in alternative geographies to further reinforce these findings.



Tsyon Feleke is a PhD student at Curtin University, focusing on developing a novel stakeholder engagement model to enhance community acceptance of renewable energy and transmissions infrastructure for a just transition in Australia. Her presentation will be on her initial systematic review regarding the topic. Her supervisors are Professor Peta Ashworth and Professor Fran Ackermann, and the project is funded by the RTP PhD Government Research Training Program.

This research was funded by the RACE for 2030 Cooperative Research Centre in partnership with Monash University, UNSW, University of Technology Sydney, CSIRO, Ausgrid, CitiPower and Powercor, United Energy, Red Energy, NSW Department of Climate Change, Energy, the Environment and Water, Department of Energy, Environment and Climate Action.

Lines in the paddock: mapping rural-urban contestation over electricity transmission projects

Jonathan Pickering, Wendy Conway-Lamb and Lian Sinclair

A vital ingredient of Australia's transition to renewable energy is the rollout of new transmission lines, mostly in regional and rural areas, to deliver electricity from new solar, wind and battery infrastructure to large cities and industrial centres. However, plans for new electricity transmission frequently attract vocal opposition from communities living near proposed lines. While survey evidence suggests that urban-rural differences on energy and climate policy are sometimes overstated, claims by rural communities that transmission lines are being unfairly imposed on them by urban elites are a prominent theme in public opposition to these projects. The construction of new transmission also affects urban electricity consumers who will share the cost of network upgrades, although both urban and rural consumers should ultimately benefit from lower overall energy costs in a net-zero economy. A fair and publicly supported energy transition requires a nuanced understanding of the perspectives expressed by different groups and their underlying rationales and concerns. Drawing on a new framework for understanding energy justice in the transmission context, this paper employs content analysis of recent public debates over electricity transmission projects in Australia to map how proponents and opponents of new transmission lines situate the relationship between urban and rural communities. We assess the extent to which groups seek to ground their claims in evidence and/or appeals to fairness/justice, highlight areas of common ground and divergence between groups, and propose way forward to navigate remaining areas of contention.

Jonathan Pickering is an Associate Professor in the Canberra School of Government at the University of Canberra. He joined the University in 2015 a postdoctoral fellow at the Centre for Deliberative Democracy, and since 2020 has taught international relations, political theory and public policy. His research focuses on democracy and justice in environmental, climate and energy policy. His recent work explores community engagement in the rollout of largescale energy infrastructure in regional Australia. Jonathan is a Chief Investigator on the ARC-funded Discovery Project Just Transmission: Advancing Coherence in Australia's Electricity Policy (2025-28).

10:15 Regional transition and publics - World Café

Statutorily Tiered Environmental Assessment for Renewable Energy Zones and Transmission Corridors

Hilary Bekmann

Australia's energy transition sits between two competing imperatives. One is an "abundance agenda" pushing for faster, larger-scale build-out of renewable infrastructure. The other is the need for genuine community buy-in and sound environmental outcomes at the places where that infrastructure actually lands. These imperatives don't always pull in the same direction. Australia's energy transition depends on timely delivery of transmission corridors and Renewable Energy Zones (REZs). Yet delivery is increasingly threatened by failures of community engagement, social licence and planning uncertainties, not technical constraints. This presentation examines a structural gap in NSW's REZ and transmission planning architecture: the absence of statutorily tiered environmental assessment. Under this model, strategic-level decisions would have direct legal effect on the scope of project-level environmental impact assessment. Currently, REZ designation and transmission corridor selection are made without formal environmental assessment or binding community engagement. This leaves strategic questions, such as where infrastructure is sited, at what scale, and with what cumulative impact thresholds, to be contested later. By that point, approvals are largely already locked in. Drawing on sustainability-transitions literature on strategic-to-project sequencing, and on energy and environmental justice frameworks, the presentation argues that current NSW and Australian practice inverts effective sequencing. Strategic decisions close before communities can meaningfully engage. Project-level engagement only opens once the strategic frame is already set. International and Australian tiered planning experience, including Germany's Bundesfachplanung and South Africa's REDZ framework, offers mixed but instructive evidence. It speaks to whether, and under what conditions, tiering improves community, environmental and delivery outcomes. The presentation outlines a proposed PhD research design. This comprises analysis of current NSW practice, comparative analysis of Australian and international tiered-planning precedents, and a participatory Delphi-workshop process with practitioners. The aim is to develop a statutorily tiered environmental assessment framework for NSW REZs and transmission corridors, and to contribute empirical evidence to a live policy debate. As this is early-stage doctoral research framing, the topic is intended to generate discussion and gather feedback and ideas from conference attendees, rather than to present settled findings.

Hilary Bekmann is a sustainability practitioner commencing doctoral research at the UTS Institute for Sustainable Futures in 2027. She was Associate Director of Sustainability at the University of California Office of the President, where she authored systemwide policy and strategy across ten campuses and ten hospitals, and previously led sustainability at Property at Macquarie University. Her research examines statutorily tiered environmental assessment for NSW Renewable Energy Zones and transmission corridors. Hilary holds an MBA from the University of California, Davis and an MEnSc from Macquarie University.

Temporal and ecological dimensions of energy justice: learning from contentious electricity transmission projects about how to co-design a just transition

Wendy Conway-Lamb, Lian Sinclair, Jonathan Pickering

As part of Australia's transition to renewable energy, major new electricity transmission projects are needed to connect solar, wind and battery infrastructure in rural areas to large cities and industrial centres. However, proposed new high-voltage transmission lines and towers frequently attract resistance from regional communities, who often feel unfairly burdened by infrastructure that seems mainly to benefit urban populations, and by policy decisions that appear to prioritise energy over agriculture or local biodiversity. These contentious issues need to be addressed if Australia's energy transition is to be fair, effective, and publicly supported. While scholars increasingly recognise the need for a multi-dimensional approach to energy justice, and there has been a welcome recent uptick in energy justice literature focused on energy generation and storage, debates about siting of infrastructure tend to focus on spatial and socioeconomic justice for communities in the vicinity of proposed projects. Drawing on examples from transmission planning in Australia and evidence of communities' perspectives on justice and fairness, this paper identifies two additional critical dimensions that a framework for evaluating energy justice would need to incorporate: the temporal dimension, such as when short-term project delivery is prioritised over genuine community engagement and assessment of long-term cumulative impacts; and an ecological dimension, drawing on multi-species justice to incorporate ecological values and impacts on the natural world. We conclude by highlighting the importance of building procedural justice and democratic legitimacy into any evaluation of energy justice.

Dr Lian Sinclair is a Postdoctoral Research Fellow in Geography at the University of Sydney. Lian researches the political economy, geography, development and governance of energy and mining in Australia, Southeast Asia and globally. Her research focuses on how corporations, governments, community groups and NGOs contest the uneven costs and benefits of the energy transition. Lian is a Research Fellow on the ARC-funded Discovery Project Just Transmission: Advancing Coherence in Australia's Electricity Policy (2025-28).

Dr Wendy Conway-Lamb is a Postdoctoral Research Fellow at the Centre for Environmental Governance and the Centre for Deliberative Democracy, University of Canberra. Wendy's research focuses on just and democratic approaches to climate and energy governance. She has a background working on climate policy and international development with governments and civil society in the Asia-Pacific region. Wendy is a Research Fellow on the ARC-funded Discovery Project Just Transmission: Advancing Coherence in Australia's Electricity Policy (2025-28).

Government bailouts and the implications of energy transitions via deal-making

Chris Gibson

Recent government-funded bailouts of energy-intensive industrial facilities has amplified debates about industrial viability, the role of government and pace of decarbonisation, worker and community impacts, and who bears transition risk. Less prominent has been debate on what such crisis interventions reveal about the governing of industrial decarbonisation, and whose interests and futures are prioritised. Bailouts suggest that, beside the careful work of policymakers and community and just transition advocates, governance of industrial futures and accompanying energy transitions also occurs as high-level response to crises, in a distinctive technical-corporate form: as deal-making between state and private actors, under place-, time- and industry-specific constraints. Decarbonisation scenarios with industry- and community wide consequences are thus unfolding through highly technical commercial in confidence negotiations—raising ethical and social justice questions and, potentially, even risking the decarbonisation futures that best-practice policymaking is ostensibly designed to drive. As well as discussing details from specific bailout cases and canvassing social justice implications, this presentation invites participants across research and policy realms to respond to the advent of energy transitions via deal-making and the direction for industrial decarbonisation it charts.

Chris Gibson is ARC Australian Laureate Fellow and Professor of Urban and Regional Planning and Policy at the University of Sydney. His Laureate research project, 'Regional decarbonisation transitions: an inclusive, place-based approach', brings together researchers across economic, cultural and legal geography, regional planning and governance, and sustainability science, to trace where investments in renewables and clean manufacturing hit the ground, and with what effect, while uncovering overlooked regional skills and initiatives, and First Nations' perspectives.

Past and ongoing ARC-funded research includes the contributions of festivals and events to regional development; regional cultural asset mapping; planning policy for urban industrial spaces; sustainability transitions in regions; and collaboration and skill among craft, manufacturing, and critical infrastructure workers. Chris is an elected Fellow of the Academy of Social Sciences in Australia, and is currently Editor of the academic journals, *Progress in Human Geography* and *Economic Geography*.

Rural electricity rollout and Australia's long-run regional development challenges

Beck Pearse

This paper traces four recurrent and immediate challenges in the RE electricity infrastructure rollout in some parts of rural Australia: 1) the scale and concentration of rural change, 2) how benefits actually flow to landholders through existing land and labour regimes, 3) the histories unearthed by the impacts and conflicts communities raise over RE projects, and 4) what RE policy could do differently in order to come to terms with rural economic geographies. I rehearse the core findings of economic geography and rural social studies of energy transition in Australia. They add up to an argument that wind and solar projects materialise in regions already shaped by decades of rural restructuring, underinvestment, depopulation and an ageing workforce, where regional development institutions remain fragmented and under-resourced, a legacy of the post-1990s market turn. Community benefit funds and social licence mechanisms compensate hosts and fund modest local projects, but don't touch these longer-run structural conditions that form the backdrop to the 'social licence' debate over RE. Renewable energy could be leveraged toward genuine regional development, but only with industrial policy reaching well beyond electricity planning itself.

Beck Pearse works at the intersection of social theory and political economy, focussing on carbon markets, environmental movements, gender relations, and the coloniality of knowledge. Beck's current projects investigate the possibilities for rapid and just energy transition, with particular focus on land and labour relations. These include two ARC Discovery Projects: *Decarbonising Electricity* (Goodman et al. 2018-21) and *Environmental Justice and the Making of Just Food and Energy Policy* (Schlosberg, Pearse and Rickards 2020-22). Her published books include *Pricing Carbon in Australia* (Routledge/Earthscan, 2018), which explores the rise and fall of Australia's short-lived emissions trading scheme, and *The ethnography of climate movement politics,* co-authored with Stuart Rosewarne and James Goodman (Routledge, 2014).

11:20 Rethinking demand and equity - talks

Toward an energy communication agenda at new material frontiers

Rini Astuti, Faranak Hardcastle, Karina Judd, Sujatha Raman, Dan Santos

Australia's net zero agenda and the expansion of digital infrastructure have increased demand for critical minerals. These new demands create extractive pressures both in Australia and elsewhere. In Australia, Burton et al. (2024) find that 80% critical mineral projects are located where Indigenous Peoples have land rights. However, existing inequities are likely to exacerbate socio-environmental harms for Indigenous communities. As a society we must now grapple with two intertwined material challenges. The first involves new frontiers of material demand coming from energy transitions and digital infrastructure expansion. The second involves new frontiers of material supply, where mining expands further into Indigenous lands, the deep sea, and outer space. Engaging publics, governments and industry across these new challenges requires strategies centring energy communication. Endress et al. (2016) define energy communication as the symbolic practices through which people make sense of, and contest, their material experiences with energy resources, production and consumption. However, scholarship on energy communication remains preoccupied by crisis framings, and there is a need to expand this scope to grapple with new material frontiers. How are these challenges and solutions framed, and who will benefit or be burdened? How do we engage with publics about harms arising from solutions that may exacerbate current crises? These matters present new challenges for energy communication because these new issues are entrenched in "everyday energy" practices and systems. We argue that material and digital sufficiency is a promising way forward, and that this demands a systemic outlook rather than individual responsibilisation.

Dr Rini Astuti is a Senior Lecturer/Fellow at the Centre for the Public Awareness of Science (CPAS), College of Systems and Society, at the Australian National University. Her research sits at the intersection of climate and environmental governance, the social dimensions of energy transitions, and critical minerals development, drawing on human geography – particularly from political ecology, science and technology studies, and development studies frameworks and theories. Grounded empirically in Southeast Asia (particularly Indonesia) and Australia, her work examines how place-based politics, actor agencies, and justice dynamics shape the outcomes of climate, environment and energy transition policies

Faranak Hardcastle is a Research Fellow at CPAS and investigates intervening in scientific and technological developments to reduce harms and equitably distribute benefits.
Karina Judd is a Postdoctoral Research Fellow at CPAS and examines practices around inclusive science communication.
Sujatha Raman is the Director of CPAS and investigates how science, innovation, society and matters of public interest intersect.
Dan Santos is a Research Fellow at CPAS and explores alternative visions, practices and arrangements around emerging technologies.

Opening up energy demand reduction in socio-energy system change

Sujatha Raman, Rini Astuti, Faranak Hardcastle, Karina Judd, **Dan Santos**

For over 20 years, sociologists have conceptualised energy system change in terms of avenues for recognising and tackling the taken-for-granted ratcheting up of consumption in modern societies (Shove 2003; Shove et al. 2015). Much of this work has investigated how everyday social practices are ordered and embody specific norms, and identified opportunities for transformation towards demand reduction. However, the practice framework extends beyond end-use consumption to also highlight the co-creation of energy-intensive infrastructures. In this talk, we explore openings for transforming energy demand in the rise of changing infrastructures associated with energy transitions.

We identify four interconnected openings related to energy demand that warrant more sustained attention. The first is one we are living through, namely, energy supply shocks and the attendant (in)equitable social impacts. If energy demand reduction is to become a socially viable aspect of energy transitions, it will need a managed and equity-sensitive approach to infrastructural change; sociotechnical research can play a critical role. The second opening is provided by technical measurement and modelling methods (e.g. LCA; material flow accounting used by the International Resource Panel), where there is scope to examine underlying knowledges, assumptions and values. The third relates to cultivating new cultures of innovation, and shifting away from foregrounding breakthrough technologies towards fostering innovative pathways around reduction. The fourth revolves around unpacking normative regimes and highlighting how demand-oriented discourses, such as energy sufficiency, are articulated and instantiated in policy regimes.

Sujatha Raman is the Director of CPAS and investigates how science, innovation, society and matters of public interest intersect.

Rini Astuti is a Senior Lecturer/Fellow at CPAS and analyses how place-based, justice dynamics shape the outcomes of climate, environment and energy transitions.

Faranak Hardcastle is a Research Fellow at CPAS and investigates intervening in scientific and technological developments to reduce harms and equitably distribute benefits.

Karina Judd is a Postdoctoral Research Fellow at CPAS and examines practices around inclusive science communication.

Dan Santos is a Research Fellow at CPAS and explores alternative visions, practices and arrangements around emerging technologies.

Expert insights on the real-world deployment of time-of-use tariffs

Thomas Longden, Gina Gatarin

While there are claims that implementing time-of-use tariffs will shift the way that people use electricity, real-world deployments have shown little shifting of electricity use. Here we focus on the insights provided by 55 energy experts and their assessments of whether households would be better/worse off under time-of-use tariffs. We find that most experts believe that families with children will be less able to shift electricity use away from evening peaks and will be worse off under time varying pricing. 87% of experts believe that families made up of working parents with younger children would be much or somewhat worse off with time varying pricing. In contrast, having no children meant that 63% of experts believe these households would be somewhat or much better off. Technology also matters with 89% of experts believing that solar battery households would be better off. Those experts that were more optimistic about the benefits of time-of-use tariffs tended to work in Government departments. Those working as ombudsman, advocates or at a non-government organisation were less optimistic and tended to believe that family with children would be worse off. When providing context for these responses, experts specified that socio-technical factors shaped by work schedules, care responsibilities, housing characteristics, and energy literacy impacted the likelihood of being worse/better off. While having solar and a battery is a game changer enabling greater agency over energy use, most of the remaining households have limited flexibility and are likely to be worse off with time varying pricing.

Dr Thomas Longden is a Senior Research Fellow at the Urban Transformations Research Centre, Western Sydney University.

Dr Gina Gatarin is a sociologist currently working at the Urban Transformations Research Centre, Western Sydney University.

Households electric import patterns over a 24-hour period and the underlying characterises of household segments - An empirical analysis based on 366,439,750 days of household electricity use patterns.

Sara Dolnicar, Anna Zinn, Reza Serati, Marius Portmann, Siamak Layeghy

Australia leads the world in rooftop solar photovoltaic systems. We analyse smart-metered household electricity consumption in Queensland (Australia) to identify five distinct household electricity use patterns. We then assign 366,439,750 use days of 1,097,125 households to those patterns to derive household market segments with distinct electricity use and socio-demographic characteristics. Segment profiles show that the benefits of rooftop photovoltaics are asymmetrically leveraged by the population. Households with photovoltaic systems and daytime valley use typically live in their own house and report a high education and income level. Households without photovoltaics and consistent electricity use all day buy most electricity from the grid; they are more likely to rent, live in apartments and report lower income and education levels. Regulatory modifications can make the cost-saving benefits of solar systems available to a wider section of the community, while also contributing to carbon emissions reduction via an increase in renewable energy.

Professor Sara Dolnicar FASSA (The University of Queensland) develops and experimentally tests theory-informed practical measures that trigger pro-environmental consumer (mostly tourist) behaviour. These new practical measures are tested in real-world contexts, so their effectiveness can be established. She recently developed an interest in modifying household electricity consumption behaviour to help them reduce cost and increase network stability. Sara's research is driven by curiosity and the desire to create meaningful change. Notable acknowledgements of her contributions include. Australian Research Council Laureate Fellowship; Travel and Tourism Research Association Distinguished Researcher Award; and Slovenian Ambassador of Science – the highest honour the Republic of Slovenia bestows on expatriate Slovenian researchers in recognition of global excellence, impact, and knowledge transfer. Sara is a dedicated supervisor and mentor of early career researchers.

12:20 Urban electrification and households - World Café

Anticipating energy vulnerability in Australian households: a futures anthropological approach

Nedha de Silva, Fareed Kaviani, Yolande Strengers, Sarah Pink & Abby Mellick Lopes

Energy poverty is often broadly defined as a household's inability to meet its everyday energy needs. In this paper, we examine how experiences and conceptualisations of energy poverty are shifting in the contemporary moment, and we suggest the implications of how energy poverty and its outcomes might be defined in possible futures. Specifically with the increasing uptake of consumer energy resources such as home batteries, EVs, rooftop solar PV, changes to weather with more frequent extreme weather conditions, rising cost of living and global geo-political events and their ramifications such as the recent petrol crisis, our understandings of energy hardship not only for the present but also for the future are changing. Drawing on survey data and ethnographic research from a national wide Australian research project that explores future everyday life and its implications for energy systems planning, we highlight the need to develop a definition of energy vulnerability that focuses beyond present financial needs of people and how hardship manifests differently across diverse households in both the present and possible futures.

Nedha de Silva is an early-career researcher working in the fields of work, household energy and Net-zero transitions. Currently, she is a Research Fellow at the Emerging Technologies Research Lab, Monash University working on Scenarios for Future Living Project. Her broader research explores the social aspects of the energy transition in households, industries and visions for energy consumption and everyday life in the future.

Scenarios for future living: imagining Australia's household energy future

Fareed Kaviani and Yolande Strengers

Australia is undergoing what has been described as the biggest transformation of the National Electricity Market since its formation. Decarbonisation and the electrification of households are unfolding amid intensifying social, environmental, and technological change, creating competing expectations for how people will live, and will want to live, with energy and digital technologies in the future. At the same time, futures will be defined by disruption: supply chain insecurities, infrastructural breakdowns, more frequent and extreme weather events, geopolitical instability, growing inequality, rising costs of living, cybercrime, dis/misinformation, automation of jobs, an ageing population, climate migration, declining fertility, resource strain, emerging technologies and declining trust in institutions and between people, to name a few. In this presentation, I introduce the Scenarios for Future Living (SFL) project, a RACE (Reliable Affordable Clean Energy) for 2030 Cooperative Research Centre partnership that aims to better support Australia's energy sector planning by providing foresights into how diverse households and home businesses will interact with energy in the future. I will share findings from the project's seven interconnected work packages and how they come together in a scenario building framework designed for uncovering the uncertainties associated with disruption and trust in Australia's energy futures.

Fareed Kaviani is a Research Fellow in the Emerging Technologies Research Lab (ETLab) working on the RACE Scenarios for Future Living (SFL) project and previously contributing to the ARC Linkage Project Digital Energy Futures (DEF). His research foregrounds social science knowledge and innovative interdisciplinary methodologies to anticipate energy and technology futures and social change.

This research was funded by the RACE for 2030 Cooperative Research Centre in partnership with Monash University, UNSW, University of Technology Sydney, CSIRO, Ausgrid, CitiPower and Powercor, United Energy, Red Energy, NSW Department of Climate Change, Energy, the Environment and Water, Department of Energy, Environment and Climate Action.

More Than Meters and Money: Stakeholder Perspectives on Taste, Cultural Identity and Clean Cooking in Kumasi, Ghana

Stephen Sodoke, Dickson Boateng and Ermolin Ilya.

Energy transition programmes in sub-Saharan Africa have made limited progress on cooking energy, including in urban areas where grid connection is widespread and cleaner cooking technologies are available. Research on barriers to clean cooking has concentrated on affordability, technology uptake, and supply reliability, while the cultural embedding of cooking practice has received less analytical attention. This paper reports a Q-methodology study with 40 grid-connected stakeholders in Kumasi, Ghana, drawn from nine stakeholder groups. Participants sorted 33 statements into a forced quasi-normal distribution. Varimax rotation produced four factors explaining 46% of the study's variance, interpreted through Social Practice Theory and the Energy Cultures Framework. The four profiles are Infrastructural Distrust, Taste-Embedded Cultural Sufficiency, Lived Experience Practice Defence, and Aspirational Modernity Under Constraint. All four place the statement that dual-fuel cooking forms part of local culture on the positive side of the distribution, where it shows the smallest spread of Z-scores among positively placed items. All four also reject the proposition that biomass fuel is more reliable than cleaner alternatives. The shared commitment attaches to the cultural standing of biomass cooking on a clay or mud stove, to the taste participants associate with it, and to the embodied competences and identity claims that sustain the practice. The study extends cultural accounts of biomass fuel retention from household samples to a stakeholder design, and suggests that clean cooking interventions addressing taste, embodied skill and identity may complement measures aimed at affordability and reliability.

Stephen Sodoke is a doctoral candidate in the School of Arts and Social Sciences at the University of Sydney, where his research examines just transitions and informal energy economies in sub-Saharan Africa. His doctoral work explores the livelihood, governance, and justice dimensions of biomass fuel value chains and their implications for equitable energy transitions. He holds a Master of Public Administration in Population and Development from the Higher School of Economics and an MPhil in Geographic Information Systems from Kwame Nkrumah University of Science and Technology. His work on stakeholder perspectives on energy poverty and energy policy has been published in Energy Policy and Energy Research and Social Science. He also serves as Director of Research and Stakeholder Affairs at the GREAT Research Hub in Ghana. Stephen's broader research interests include energy policy, sustainability, climate justice, and development in the Global South.

Making it up as we go along: an account of energy standards governance from the inside

Laura Jones

Technical standards for distributed energy resources are increasingly central to Australia's energy transition. Yet how they are actually made - the decisions, discretions, power dynamics and interpretive work that shape their content - remains largely invisible. The formal record of a standards process does not capture who held the pen, whose tension was welcome in the room, what got let slide because someone was tired, or how a broken hyperlink in a technical specification quietly redistributed responsibility between actors. This presentation draws on an ongoing auto-ethnographic journal kept by the author while leading a testing service and resolving implementation issues for CSIP-AUS, Australia's demand flexibility communication standard. Writing from the inside of a governance process — as practitioner, technical expert, and emerging social science researcher simultaneously — surfaces six recurring themes: standards as perpetually incomplete texts reassembled at the point of application; definitions as acts that open and close possibilities; the gap between formal and actual process; energy and bandwidth as hidden governance variables; structural biases in whose interests are served; and the divergence between what a test certifies and what it appears to certify. This is exploratory work, offered in the spirit of generating discussion rather than presenting conclusions. The presentation invites reflection from the social science community on what this kind of insider inquiry can and cannot see, and what frameworks might best illuminate the social life of technical energy governance.

Laura Jones is an Energy Systems Specialist at the ANU Battery Storage and Grid Integration Program. Trained as an electrical engineer, her career spanning network utilities and applied research has increasingly drawn her into questions that engineering alone cannot answer — about power, equity, governance, and whose interests technical systems serve. She is not a social scientist by training, but has found social science frameworks indispensable for making sense of her own practice. This presentation reflects that ongoing, sometimes uncomfortable, crossing of disciplinary boundaries.

2:00 Urban electrification and households - talks

VPPs as Asymmetrical Boundary Objects

Declan Kuch, Jesse Adams Stein, Cameron Tonkinwise, Chantel Carr, Abby Mellick Lopes

The Cheaper Home Batteries Program requires every subsidised battery to be 'capable' of joining a virtual power plant. Households are not joining. Roughly 5% of batteries rebated in New South Wales proceed to enrolment, despite widespread interest: 69% of non-member battery owners say they are interested. The VPP works as a boundary object insofar as regulators, market operators, retailers and households each read the term differently, and that plasticity allows a broad coalition to coordinate without agreeing. Revisiting Star and Griesemer's found case study, we find an asymmetry between amateur and professional labour stabilised through standardised methodologies that informs our reading of VPPs. While three of the four readings in our case can stay general indefinitely, the household must convert the category into consent over its own battery, and what gets standardised is not visible as a contribution but rather a surrendering of the asset itself. Contracts fix battery reserve, control and exit while leaving dispatch decisions, payment formulas and the practical steps to leave comparatively flexible for VPP operators to change. In other words, this 'market' standardises one side and withholds the judgment devices the other would need. Our analysis draws on three national survey waves, provider offer documents, and a corpus of social media posts. Households report a knowledge deficit at the same rate whether or not they want to join, which locates the deficit in the 'market' rather than in motivation. Participants engage with one-off rebates because they are the only figures they can reliably calculate. Exit from VPP arrangements remains problematic for some. Each of these observations suggest remedies to fulfill the market creation imagined by the energy industry; in essence, equipping households with more sophisticated devices to navigate the market and to (reinforce) rights to act confidently within it.

Declan Kuch is Net Zero Research Principal at the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW). His current research work focuses on energy standards for rental housing, urban renewable energy, virtual power plants and the social dimensions of industrial decarbonisation. He holds a PhD in Environmental Policy from UNSW and an Adjunct Research Fellowship at the Institute for Culture and Society, Western Sydney University. Declan is the author of The Rise and Fall of Carbon Emissions Trading (Palgrave), and author of recent articles in Science, Technology & Human Values and Social Studies of Science. He has advised the Australian Council of Learned Academies (ACOLA) on energy and technology policy and currently lives on Darug and Gundungurra country with his wife and daughter.

Australian National University | ANU Centre for Energy Systems

EV owner perspectives on V2X

Laura Jones, Yeliz Simsek, **Rebecca Blackburn**, Phillipa Watson, Kim Blackmore, Heather Logie

This study involved a qualitative exploration of 15 Australian electric vehicle (EV) owners and their perspectives on bidirectional charging. Bidirectional charging allows an EV battery to draw electricity to and from a home or the grid, potentially supporting the grid to reduce peak demand. We found focus group participants were interested in bidirectional charging, especially vehicle-to-load (V2L), and vehicle-to-home (V2H), with vehicle-to-grid (V2G) generating the greatest caution. Participants acknowledged several benefits of bidirectional charging including using the battery investment, saving money by using cheap green energy, environmental benefits, and stabilising the grid. A recurring theme was that V2G would need to be a commercial proposition. Participants were concerned with financial returns and payback periods. Many indicated that environmental or community benefits would not be sufficient to justify participation. There was broad agreement that benefits received should reflect the value provided and any associated costs, risks or inconvenience. Participants were concerned with lack of warranty for batteries used for V2G, damage to the battery due to additional charging cycles, and the high upfront cost of a bidirectional charger. The importance of retaining control over vehicle use and battery charge was raised. Moreover, participants questioned whether V2G was in fact the best way to stabilise the grid. Perspectives on emergency use of vehicle batteries was mixed. Some participants prioritised retaining battery capacity for their household during outages, while others expressed willingness to support neighbours or broader community needs during emergencies. Overall, there was interest in bidirectional charging especially V2L and V2H.

Rebecca Blackburn is a social scientist and Postdoctoral Fellow at the ANU Centre for Energy Systems. Her work focuses on social aspects of the energy transition including apartment electrification and adoption of electric vehicles. Rebcca's PhD thesis explored the environmental and wellbeing benefits of a minimalist lifestyle. Her research is informed by an interdisciplinary background including 15 plus years' experience working as an environment manager and consultant for government and not for profits in Australia and the Pacific.

Apartment decarbonisation. Risks, opportunities and lessons for emissions reductions in cities.

Wendy Russell, Phillipa Watson, Yeliz Simsek, Rebecca Blackburn, Heather Logie and Michael Thomas

Residential apartments are a critical challenge for decarbonisation of cities in Australia and across the world, particularly in relation to gas network de-commissioning. This is due to the challenges of electrifying these large, complex buildings, and of joint decision-making within diverse apartment communities. This is raising questions about responsibility and the role of government in this aspect of transition. The apartment sector provides an opportunity for decarbonisation of multiple households, including those on low incomes, but current consumer-led approaches are complicated by the collective decision context. The other side of this coin is that apartments provide a context of collective infrastructure decisions and systems that could allow exploration of collective energy solutions relevant to other contexts.

We present findings here of a project on apartment decarbonisation based on case studies in the ACT that integrated social research and energy system modelling. Our findings indicate that latent willingness to decarbonise is stymied by technical, financial and administrative constraints. Contributing to these are disparity in government support, which favours detached houses, and electricity regulations, which limit options for shared systems. We discuss apartments as a risk and an opportunity for city decarbonisation. We are also interested in apartments as an example of how infrastructure constructs collectives, and what the re-configuration of infrastructure can mean for re-configuring collective decisions and actions.

Dr Wendy Russell is a research fellow in the Australian National University Centre for Energy Systems (ACES). She was recently project lead on an Apartment Decarbonisation project funded by the ACT Government's Energy Innovation Fund. Her research focuses on social dimensions of energy system change, and on the integration of social, technical and economic dimensions in energy research. She has worked on microgrids, neighbourhood batteries and electric vehicle policy. Wendy is also a practitioner of dialogue, deliberation and public engagement, and has worked in government and as a consultant. She is interested in the intersections of technological development and democracy.

How Nuclear Power staged a comeback in the Philippines: Discourses and Discursive Opportunity Structures under a Populist Regime

Dakila Kim Yee

The Philippines hosts the only nuclear power plant in Southeast Asia, yet it has never operated it. For most of the past 40 years, speaking of nuclear power was a taboo due to various meanings attached to it: nuclear power's safety risk but also the local experience of the country with regards to nuclear power strategy, one that has been tainted with political legacies of authoritarianism. Yet, in the past 10 years, starting during the populist regime of Rodrigo Duterte (2016-2022) up to the present administration of Ferdinand Marcos Jr., nuclear power has staged a comeback and has been envisioned as one of the centerpieces in the Philippines' energy plan. Using qualitative data gathered from key informant interviews and documentary analysis of news reports and policy documents, discourses centering on energy security, cheap electricity and nuclear as clean energy as key discourses that have put nuclear power back into the policy agenda. I argue that discursive opportunity structure provided by a shift to a populist regime in the Philippines in 2016 enabled the promotion of discourses that has played a key role in promoting nuclear power to the public. This paper highlights how the interaction of discourses and a shifting discursive opportunity structure under a populist government can facilitate a shift in a policy position on nuclear power.

Dakila Kim Yee is currently a PhD student at the Centre for Deliberative, Faculty of Business Government and Law at the University of Canberra, Australia. He is also assistant professor at the University of the Philippines Tacloban (on leave). He has a decade of teaching and research experience in the Philippines.

His previous research explored various themes such as the urban political ecology of disaster reconstruction in the Philippines. His research has been published in the following journals: Philippine Studies: Historical and Ethnographic Viewpoints, Journal of Sociology, Critical Asian Studies and Peace Review.

3:15 Intermediaries and Infrastructure talks

Beyond Installation: Consumer Advisory Practice in Australia's Residential Battery Workforce

Kim Blackmore, Yeliz Simsek, Sarah Wilson

As residential battery systems become increasingly common within Australia's energy transition, attention has largely focused on technology performance, safety, market design, consumer acceptance, and workforce supply. Comparatively less attention has been given to the role of frontline workers who support households to understand, select, and use these technologies. This presentation draws on interviews, industry consultation, and stakeholder workshops conducted as part of a workforce development project examining consumer advisory practice in the residential battery sector. The research explores how advice is currently provided across the residential battery ecosystem and considers the implications for consumers, workforce development, and energy transition outcomes. Participants described installers as playing an important role in helping consumers navigate issues such as system sizing, safety, backup expectations, virtual power plant participation, electricity tariffs, and battery monitoring. The findings also suggest that responsibility for consumer advice is distributed across multiple actors, including retailers, manufacturers, consumer advocates, and installers. The presentation considers these findings in the context of a residential battery sector that is becoming increasingly established, supported by evolving standards, accreditation arrangements, and market structures. Drawing on socio-technical systems and street-level bureaucracy perspectives, it explores whether changing industry conditions may also be changing expectations of installer roles, from technology intermediaries supporting an emerging market towards frontline practitioners who exercise discretion in how technical information, risks, and opportunities are communicated to consumers. The presentation aims to stimulate discussion about the social dimensions of residential battery deployment and the evolving relationship between consumers, technologies, institutions, and frontline energy workers.

Associate Professor Kim Blackmore is a Senior Fellow in the School of Engineering at the Australian National University. Her research focuses on workforce development, engineering education, systems thinking, and the human dimensions of complex technology transitions. She leads applied research examining how education, training and capability-building can support emerging industries and critical infrastructure sectors. Kim has held senior leadership roles at ANU and the University of Canberra, including Director of the ANU Centre for Learning and Teaching. She currently leads a national project developing consumer advisory training for battery installers and works with industry, government and education partners on workforce capability for the energy transition.

On the ground, on the road, on the roof: Solar and battery installers' labour processes and structural employment conditions

Jesse Adams Stein, Eugene Schofield-Georgeson**, Chantel Carr**, Declan Kuch

Installers of Distributed Energy Resources (DER) are central to Australia's rapidly expanding solar PV and small-scale battery storage sector, and are increasingly counted on as intermediaries able to guide consumers in the energy transition. Yet numerous reports find a substantial proportion of inspected installations breach work health and safety and electrical safety regulations. Regulatory responses, such as 'naming and shaming' non-compliant installers, treat poor quality work and safety violations as individual conduct rather than structural conditions. Research on intermediaries and middle actors has identified the significance of trades in energy transitions, but has attended less to the economic imperatives governing their labour. Analogous empirical work in the HVAC sector shows that lowest-cost contracting leaves installer-tradespeople little scope to address transition outcomes. Read alongside Nicholas Beuret's concept of the "installation economy", this suggests renewable energy transitions risk being built on precarious and unsafe labour, while relying on capacities that labour is not resourced for.

There is little empirical research specifically examining DER installers' labour. Bringing together social scientific, legal and design perspectives, and informed by ongoing sector engagement, we set out a research agenda for investigating how economic constraints and employment conditions shape DER installers' labour processes, including identifying installer employment typologies. We discuss the need for empirical investigation into how DER installers' practices may be shaped by business models built on individual subcontracting in solar/battery supply chains, alongside regulator and rebate-driven work pressures, and potential sham contracting. This paper scopes an emerging research agenda that connects renewable energy labour processes with structural conditions.

Associate Professor Jesse Adams Stein (UTS School of Design), is an interdisciplinary design researcher whose work investigates what happens to skill, labour processes and technical knowledge when industries are in transition, particularly local manufacturing, industrial craft and vocational trades. Stein works across historical and contemporary contexts, bringing historical depth to live policy challenges, including energy transitions, skills shortages and the right-to-repair. Jesse.stein@uts.edu.au

Dr Eugene Schofield-Georgeson is a Senior Lecturer in the Faculty of Law at the University of Technology Sydney (UTS), where he teaches and researches the regulation of work and industrial relations in Australia. He is the author of two academic books including, Contract, Labour Law and The Realities of Working Life (Routledge, London, 2025), and his work on wage enforcement and labour standards has been instrumental in creating legal change. He maintains an ongoing research interest in environmental labour studies and has published widely and consulted with government in this field.

Beyond Technology: Understanding the Social Dimensions of Campus Microgrids in Australia's Energy Transition

Maryam Azhar

Microgrids are increasingly promoted as a key enabler of energy transition, offering enhanced reliability, renewable energy integration, emissions reduction, and greater local energy autonomy. While existing research has largely focused on the technical and economic performance of microgrids, less attention has been paid to the social and governance factors that shape their successful adoption and long-term sustainability. This presentation examines microgrids through a socio-technical lens, drawing on research undertaken across Australian university campuses as living laboratories for energy transition. The workshop theme emphasises the social dimensions of energy systems and equitable transitions.

Using a multi-criteria decision analysis (MCDA) framework, the research evaluates campus microgrid pathways against not only technical and economic criteria, but also social dimensions including stakeholder engagement, governance readiness, energy equity, institutional capacity, and community participation. Findings demonstrate that successful energy transition outcomes depend on more than technology deployment alone. Universities with strong governance structures, cross-sector collaboration, and stakeholder involvement achieve more robust and socially acceptable transition pathways than those relying solely on technological solutions.

The presentation argues that microgrids should be understood as social as well as technical infrastructures. Their effectiveness is influenced by organisational culture, decision-making processes, policy alignment, and the distribution of costs and benefits among stakeholders. By highlighting these often-overlooked social dimensions, the study contributes to discussions on equitable and resilient energy transitions and offers practical insights for policymakers, universities, and community energy initiatives seeking to accelerate decarbonisation while maintaining public trust and participation.

Maryam Azhar is a researcher and educator specialising in sustainable energy systems, energy transitions, and the integration of social, technical, and policy perspectives in complex infrastructure challenges. She holds a PhD in Chemical Engineering from the University of Sydney and has taught across several Australian universities, including the University of Sydney, UTS, and Macquarie University. Her research focuses on renewable energy integration, campus microgrids, decarbonisation pathways, and AI-enabled decision support tools. Using transdisciplinary approaches, she examines how governance, stakeholder engagement, and institutional capacity influence energy transition outcomes, with a particular interest in equitable and resilient energy futures.

The Work of Australia's Critical Electricity Infrastructure in a Changing Climate

Merry Jean Caparas

Electricity infrastructure is often portrayed as seamless and dependable; its reliability is attributed to extensive regimes of standards that coordinate technologies, actors, and practices. This paper argues that such stability is continuously produced within more-than-human assemblage in which human and non-human agencies negotiate to sustain infrastructural flow. These negotiations ordinarily remain hidden but become visible during rupture, moments when infrastructures fail to perform as expected and underlying fragilities surface.

Emergency power outages caused by extreme-weather events exemplify these ruptures. Under routine conditions, weather interacts with the grid in ways partially stabilised through standards built on historical climatic assumptions. During extreme events, however, weather asserts its agency unpredictably, exceeding design parameters and disrupting established relations. Such disruptions expose the limits of standardised risk and emergency management practices. When these limits materialise as cascading outages in highly networked electricity systems, they reverberate across social, economic, and political life. Sustaining electricity under these conditions requires multiple forms of work: anticipatory risk management to contain disruption, intensive real-time operational work during emergencies, and post-event processes of restandardisation to recalibrate standards as effective guides for governing electricity infrastructure in a changing climate.

Drawing on documentary analysis of the 2016 South Australia Black System Event and the 2024 Victoria Power Outage, and interviews with electricity network participants, the paper examines how Australia’s electricity risk and emergency management standards are being challenged and are evolving as forms of climate adaptation.

Merry Jean Caparas is a third-year PhD researcher in the joint PhD program of La Trobe University’s Climate Adaptation Lab and Sheffield Hallam University in the UK. Her PhD research is on Work in Critical Electricity Infrastructure Security and Resilience, examining how standardisation of electricity risks and emergency management are being challenged and changing under climate change in Australia and the UK.