Just Transitions to Decarbonisation in the Asia-Pacific

Just Transitions in Australia

Moving towards low carbon lives across policy, industry and practice

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About Just Transitions to Decarbonisation in the Asia-Pacific
Working in partnership with teams from the UK Science & Innovation Network, the programme examines how just transitions whilst tackling climate change and biodiversity is key to supporting inclusive economies and societies in the future. Through the programme, the Academy awarded funding to seven research projects exploring the actions required in the Asia-Pacific to tackle climate change and biodiversity loss, to identify opportunities for decarbonising economies and societies, and to recommend options and pathways for communities, workers, businesses, policymakers and the wider public. The programme was funded by the UK's Department for Business, Energy and Industrial Strategy.

Contents

Executive summary

Just Transitions in Australia reports on and documents the policy, practice, and realistic possibilities for 'Just transitions to decarbonisation' in Australia.

The research aimed to gather and collate evidence on just transitions that can be disseminated and formulated to shape policy and practice at multiple scales, from the national to the local and community. The report is the central output of the 'Just Transitions in Australia: moving towards low carbon lives across policy, industry and practice' (Oct-March 2021-22) project. The project was funded by the British Academy's Just Transitions to Decarbonisation in the Asia-Pacific programme, and involved a collaboration between research teams based at Royal Holloway University of London and Monash University.

The full report is structured into four sections: 1) the introductory section; 2) a set of key principles for just transitions; 3) possibilities for just transitions; and 4) five detailed domain reports which provide the detailed evidence produced through the research process, and from which the principles have been developed.

This executive summary focuses on the following three areas:

- The **research aims, approach and design** (Section 1).
- The **principles** (Section 2) are a starting point for any person or organisation wishing to participate in a just transition. They embody the shared values that will be needed across all sectors of society for a just transition to take place. They are explained further in section 4 (domains) of the main report. Therefore, each domain should be read in conjunction with the principles.
- The **possibilities** (Section 3) set out a series of plausible and realistic possibilities towards a just transition in Australia. In seeking a just transition we must acknowledge that we will need multiple but connected starting points, tailored to the capabilities of different individual, organisational and political actors and necessarily shaped by shared values.

1.0 The Just Transitions in Australia project

1.1 The Australian context

Australia's position over its natural resources has recently been identified as a resource or 'coal curse'.[1] Australia is characterised as a 'wealthy nation with the economic profile of a developing country'. National government is reluctant to set new targets or take seriously the challenges of a transition to decarbonisation, pinning some of its hopes on natural gas. The current government's plans have only just advanced from its Paris Climate agreement commitments, to reduce to 26-28% of 2005 levels by 2030, to a net zero position by 2050. Meanwhile the complex effects of the climate emergency are tangibly experienced in the greater frequency and unpredictability of extreme weather events, including vast bushfires, cyclones and droughts, which signal climate change biting. Yet there is growing acknowledgment of transition. Beneath the scale of federal government response, the electricity market is markedly changing with the onset of renewable electricity, and there are many green shoots of progress to transition, where 'just transitions' can be realised. Australian states have also proven to be much more active in decarbonisation. In November 2021, the Net Zero Emissions Policy Forum was formed through a collaboration of the NSW, ACT and SA state governments.

The context is complicated further by the multiplicity of definitions and approaches towards transition and highly uneven outcomes and experiences. In particular, this involves Australia's relationship to Indigenous populations. The complex political and legal questions relating to Aboriginal and Torres Strait Islander land and resources, poses challenges for equitable ownership, social investment and autonomy over low-carbon transition schemes and practices. Moreover, the reliance of Australian industry on resource exports and jobs creates a distinctive set of issues for 'just transition' to decarbonisation.

1.2 Defining Just Transitions: Key concepts and terms

Our approach towards 'just transitions' builds on approaches to 'energy' and 'sustainability transitions', concepts and principles towards mobility transitions, mobility justice, the everyday as a site of transition, and social practice.[2]

Approaches towards 'just transitions' have been influenced by labour movements in North America and Australia – through the retrenchment of jobs within heavy high-carbon industries and sectors such as the automotive industry. In engaging the concept of 'just transitions' in relation to the wider Australian context, we have

1 Brett, J. (2020). 'Resources, climate and Australia's future'. *Quarterly Essay*, (78), 1-81.

2 Markard, J., Raven, R., & Truffer, B. (2012), 'Sustainability transitions: An emerging field of research and its prospects', *Research Policy*, 41(6), pp. 955–967; Nikolaeva, A. et al. (2019) 'Commoning mobility: Towards a new politics of mobility transitions', *Transactions of the Institute of British Geographers*, 44(2), pp. 346–360. doi:10.1111/tran.12287; Adey, P., Cresswell, T., Lee, J. Y., Nikolaeva, A., Nóvoa, A., & Temenos, C. (2021). *Moving Towards Transition: Commoning Mobility for a Low-carbon Future*. Bloomsbury Publishing, London; Pink, S., Mackley, K. L., Morosanu, R., Mitchell, V., & Bhamra, T. (2017). Making homes: Ethnography and design. Taylor & Francis, London; Strengers, Y., Pink, S. & Nicholls, L. (2019). Smart energy futures and social practice imaginaries: Forecasting scenarios for pet care in Australian homes. *Energy Research & Social Science*, 48, pp. 108-115.

been careful to attend to how it will manifest both institutionally and societally. The Australian Council of Learned Academies (ACOLA), in their 2021 *Australia Energy Research Transition Plan*, suggested that 'a successful transition must also encompass the perspectives and wellbeing of people, in the context of their lives, communities, economy and employment, in a way that is fair'.[3] At the same time, we recognise that while the term 'just transitions' has travelled further than labour relations, it does not always simply translate so easily or come without baggage, especially given its history within Australia. But while other terms could be used, we recognise utility in the plurality of ways 'just transition' could be applied to the Australian context.

Our approach, informed by sociological understandings of social practice and anthropological theories of human experience and everyday anticipation, puts people, their actions, values, needs, hopes and concerns at the heart of any understanding of a just transition. Technological change undoubtedly participates in transition but just transitions must better account for what people do, and how they, and other 'multi-species' lives (animals, environments and natures), are differentially entangled in transitions to decarbonisation.[4]

Sovacool et al., ask: how might policies and practices of low-carbon transition become more 'justice aware'?[5] We respond by drawing on multiple perspectives on 'just transitions' adapted from Wang and Lo.[6] Here we see just transitions as:

- A labour concept, involving issues and challenges related to changes in work/jobs, role of trade/labour unions and movements; sites and spaces of labour (including the home);
- A policy/governance concept: issues and challenges related to the political context, policy framings, institutional arrangements, public-private partnerships, contestations; understanding policies distributionally;
- A geographical concept: issues and challenges of place, scale and space; where do just transitions take place (or not) and why there (or not there)?; issues around justice across scales and places;
- An everyday life concept: issues and challenges in relation to everyday practices, the home, the household, and especially individual and shared feelings and experiences;
- A geopolitical relation: issues and challenges of states, NGOs, social movements, and global institutions lobbying for transition, making calculations on transition in relation to other strategic goals.

We mobilise an 'integrated justice concept', to weigh transitions and these different perspectives on justice in relation to one another. Issues and challenges related to unequal distribution of costs/benefits/trade-offs of transition are examined across, the environmental, climate, the everyday, energy justice, geopolitical relations and labour definitions. At the same time, we work more broadly to understand who and

3 ACOLA. (2021). Clarke, D., Baldwin, K., Baum, F., Godfrey, B., Richardson, S., and Robin, L. *Australian Energy Transition Plan, Report for the Australian Council of Learned Academies* (ACOLA), www.acola.org, p.3.

4 Tschakert, P., Schlosberg, D., Celermajer, D., Rickards, L., Winter, C., Thaler, M., Stewart-Harawira, M. & Verlie, B. (2021). 'Multispecies justice: Climate-just futures with, for and beyond humans'. *Wiley Interdisciplinary Reviews: Climate Change,* 12(2), e699.

5 Sovacool, B. K., Burke, M., Baker, L., Kotikalapudi, C. K., & Wlokas, H. (2017), 'New frontiers and conceptual frameworks for energy justice', *Energy Policy*, 105, pp. 677-691.

6 Wang, X., & Lo, K. (2021). 'Just transition: A conceptual review', *Energy Research & Social Science*, 82, 102291.

what has agency within just transitions and their multiple and overlapping and sometimes contradictory or in-tension relations, as blue-green antagonisms, jobs vs the environment, rather than alliances.

This is not necessarily, then, about determining an idealistic 'just transition', but recognising the value in widening how just transitions could be assessed, and, more pragmatically, in advancing discussions between actors such as 'unions, environmentalists, governments, and community members on how best to balance ecological and social needs when making critical environmental policy decisions'.[7] Failure to transition in a 'just' way, threatens decarbonisation in Australia altogether.

1.3 Research approach

Against this backdrop our project recognises 5 critical domains from which 'just transitions' can be examined and evaluated in Australia:

- The Home
- Work and Industry
- Mobilities and Infrastructure
- Renewable Energy
- Technology and Data

This report is predominantly developed through collective synthesis and interpretative analysis on the basis of secondary data from across a range of sources, complemented with primary data from a limited number of interviews and submissions:

- An academic and grey literature review of the state of the art of policy and practitioner knowledge on transitions to decarbonisation in Australia.
- Semi-structured interviews were undertaken with academic project advisors at key positions within research networks, and with stakeholders in academic, public policy and community organisations.
- Drawing on the findings of existing and ongoing ethnographic, design ethnographic futures and interview-based research projects being undertaken in Australia and spanning all the domains.
- Submissions from leading academic, policy, consumer advocacy and industry stakeholders.

1.4 Research outputs

Including this Executive Summary, the project has led to the creation of a major report; 5 policy briefings focused on each 'domain' (including: home; work and industry; mobilities; renewable energy and technology, data and cyber security); 3 webinars; and a project website where the reports and other research materials, including project submissions, will be hosted.

7 Snell, D. (2018). 'Just transition'? Conceptual challenges meet stark reality in a 'transitioning' coal region in Australia. *Globalizations*, 15(4), p. 561

2.0 Principles for Just Transitions

Australia is grappling with how to transition towards decarbonisation in ways that are environmentally sustainable and socially just, whilst at the sharp edge of the impacts of climate change. This report moves beyond a common focus on decarbonisation and the impacts for coal communities and workers. While the transition away from coal is important, the research underpinning this report acknowledges the much broader range of issues and concerns that underpin just transitions to decarbonisation.

Transitions to **decarbonisation in Australia** entail two risks: **entrenching existing injustices associated with carbon-based energy systems and economic activities**; and **generating new conditions of harm and inequality as a consequence of introducing low-carbon energy systems**.

Moreover, just transitions to decarbonisation need to consider implications and trade-offs across multiple intersecting domains and geographies of contemporary life, including the domains of the home, work and industry, mobilities, renewable energy, and technology and data.

Our research has identified **a set of key Principles** that are pivotal for successfully understanding and governing just transitions in Australia. Each of these Principles offers a different entry point from which stakeholders can approach the complex question of ensuring a transition to decarbonisation is just. These are not suggested as "do this" or "do that" instructions, as if a just transition could follow a simple recipe, but rather as propositions upon which to base/reflect on future actions and decisions.

The principles presented here are organised through five key lenses: 1) places and scales; 2) timescales for transition; 3) innovation; 4) people, experiences and identity; and 5) responsibilities.

2.1 Places and scales

For just transitions, we need to attend to how transitions unfold unevenly across different places and spatial scales. This means looking at different places and their spatial, material and social complexities, their climatic, geographical and housing variabilities, and how places and regions are framed within just transitions to decarbonisation for strategic ends.

- **National policy directives for just transitions to decarbonisation must reflect the diversity and uneven population distribution of Australia**. The application of such directives will mean different things for rural, regional and urban areas. Disparities in energy infrastructure access for households in well-serviced urban centres compared with poorly resourced remote communities, compounded by climate extremes, provide a stark illustration. Accounting for diversity is necessary to avoid silencing and excluding certain voices and inhibiting community buy-in for decarbonisation initiatives.

- **In places with pre-existing carbon-intensive technologies and infrastructures, just transitions to decarbonisation should consider the spatially uneven costs and difficulties of moving away from these systems**. For instance, retrofitting or adaptive reuse of existing built environments may be cost-effective and avoid maladaptation in resource waste. Challenges to consider around issues of lock-in can also include, for example, not only the presence of roads built for the private car that is expensive to demolish, rebuild or adapt, but the legal and economic contracts they are tied up with, and the social structures dependent upon these infrastructures and the mobility they enable.

- **Just transitions require recognition that decarbonisation is unfolding on the unceded lands of First Nations peoples**. There is a tendency to see large parts of Australia as a deep well of untapped potential for green and renewable energy resources, without contemplating the cultural heritage and spiritual value of place for First Nations peoples. Transitions to decarbonisation can only be just if First Nations land rights and entitlements are upheld and strengthened, and where First Nations peoples and traditional landowners and custodians are empowered to participate and lead the transition.

- **Careful deliberation and transparency is needed around how the benefits and/or negative consequences of just transitions are understood and accurately communicated in and for localities and regions**. How places may be affected by transitions can be framed in different ways for a variety of political purposes. While understanding of impacts can be important for identifying the most disadvantaged by transitions or the best forms of distributional support, local opposition can also be unfairly side-lined or dismissed on the basis of regional, national or even global benefit.

- **The potential for scaling up production and deployment of clean technologies as part of a just transition must be considered across scales and geographies**. Hopeful ambitions for leveraging global competitive advantage and expanding international trade may be at odds with just transitions at local or regional scales. For instance, electric vehicle uptake in cities and big battery development at regional nodes can drive emissions reductions. At the same time, these interventions – alongside continued growth in energy demand – could strain mineral resources and supply chains, have other downstream impacts in terms of waste, and further entrench the lifestyles, social structures, and urban forms that depend upon the private car.

2.2 Timescales for transition

Careful attention must be paid to the timescales of just transitions and how these vary within and across domains. Appropriate timescales for implementing just transitions can only be understood in context.

- **Just transitions unfold over multiple and intersecting timescales**. For instance, workers and communities transitioning from fossil fuel industries have short-term needs for employment and income. In contrast, long-term renewable energy targets necessitate transmission infrastructure investment in the present, which may in turn be hindered by current national policy uncertainty. Energy regulators need to ensure immediate energy security by managing energy prices and deal with existing household vulnerabilities while also accommodating renewable energy uptake over time.

- **Just transitions means engaging with the implications of articulating speed, acceleration and urgency of transitions**. Short-term climate change imperatives and mid-century net zero emissions targets, as well as extreme climate impacts being experienced today, promote emergency and crisis policy responses. Nevertheless, care should be taken in how the speeds of transitions are communicated and proposed. There may be material consequences of moving too fast towards alternative practices and systems for those who get 'left behind' or who unfairly bear financial and other burdens of change.

- **Just transitions must avoid being based on vague or unrealistic ambitions**. Some responses to decarbonisation imperatives have been to defer decision making and investment in anticipation of future (technological) breakthroughs that reach far into the distance, without investigating or understanding the possible social implications and conditions associated with such breakthroughs. These approaches naively suggest that climate change can be managed without significant changes to lifestyles, built forms, and economic development. Clear long-term policy settings are also needed to establish confidence for private sector investment necessary for scaling up low carbon infrastructures such as renewable energy.

- **Just transitions require better understanding of what is being transitioned from and to, and with what implications for whom**. This means engaging critically with framings of the past and recognising alternative histories and memories. Some transitions can be resisted by nostalgic ideas about a better past in the face of an unpredictable present and worse future. And yet, such ideas can obscure the existence of past transitions, for example from one industry's predominance to another, which may have already generated injustices for localities, First Nations peoples, and environments. Historical and contemporary dispossession and marginalisation of First Nations peoples must be deliberately acknowledged.

- **How the future is (un)equally framed or imagined requires careful unpacking**. Workers and communities can easily feel 'left behind' or marginalised from future visions in which they do not appear to fit, or even to have a future. The social enactment and plurality of timescales through which transitions unfold and are framed – including past, present, and future opportunities and constraints – need to be engaged with explicitly to understand how time and transition is discussed and imagined by people and communities. This may include working with novel, more socially embedded and politically sensitive modes of exploring the timescales of just transitions such as through new techniques of futuring.

2.3 Innovation

The existing and dominant innovation paradigm in Australia follows a technological solutionist narrative, whereby technological innovation is seen as a solution to societal and environmental problems. This narrow approach to solving climate challenges has important limitations in terms of the extent to which social, ecological, and localised values and outcomes are understood and prioritised in investment and policy making. Just transitions should critically re-consider the role of technology invention, design, innovation and economic growth in decarbonisation.

- **New innovation frameworks and policies for just transitions are needed to adequately respond to intersecting social and ecological challenges**. Innovation occurs beyond technological invention through the application of new ideas, processes, and policies in organisations and institutions, governance frameworks, social practices, and economic models and paradigms. Collaborative, challenge-oriented, and grassroots models of innovation can help address the social and ecological short-comings of linear, narrow and technology-focussed models based solely on R&D, technology transfer and research commercialisation.

- **Everyday action should be considered as a driver and a conduit of innovation for just transitions, rather than simply an outcome of top-down change**. This includes the consideration of a broader range of actors as innovators beyond technology entrepreneurs or multinational corporations, such as community organisations, local governments, households, and NGOs. For instance, diverse participation in the early design phases of 'smart' systems and automated technologies is needed to avoid the unjust consequences of past interventions – such as the Australian Robodebt failure – which had disastrous consequences for the lives of people who were already severely impacted by social and economic inequalities.

- **Just transitions in settler-colonial states like Australia must advance the decolonisation of science, technology and innovation**. To do so, the value of Indigenous knowledges and the generative potential in collaboration should be recognised, and the 'where', 'how' and 'for whom' of the existing dominant innovation paradigm should be interrogated. This includes reconsidering the reliance of government and public sector organisations on private sector solutions (including taking guidance from consultancies and buying in pre-made non-specific solutions from technology companies) – especially in the handling of data.

2.4 People, experience and identities

People, experience and identity need to be at the core of transitions to decarbonisation. Technology-led approaches characterised by top-down and short-termist interventions are inherently limited because they regard people as 'recipients' of transition, seeking their 'acceptance' or 'social licence' to proceed rather than creating meaningful engagement or active participation. Ignoring the complexity of lived experiences and identities may also lead to failed transitions.

- **Just transitions must account for the complexity of everyday life to have a lasting impact**. A transition is more likely to be just if it emerges from the circumstances in which its justice will be experienced and becomes integrated into the ways communities and people *move forward in just transition*, rather than in 'nudging' behaviours towards sustainability. This requires acknowledging that people are complex, and their everyday lives are contingent on many factors. Existing initiatives tend to categorise people one-dimensionally in terms of their relationships to powerful organisations – such as the 'customers' of transport or energy companies, 'users' of technologies, or 'citizens' of states and cities – which fails to appreciate diversity and complexity.

- **Just transitions involve listening to and respecting local knowledge and everyday expertise**. This means avoiding making uninformed assumptions about or speaking on behalf of certain workforces, communities, and geographies. A wealth of existing knowledge and good practice which work towards transition to decarbonisation can be identified in everyday life, in people's own homes, communities, workplaces, and modes of transport. In order to ensure a just transition, these should be gathered, learned from, surfaced and shared.

- **A just transition is not simply an abstract process which can be modelled but is always experienced as just from the ground-up**. Experiences of transition are personal, intimate, and felt, especially in terms of loss and harms to well-being, personal and social identities. As such, just transitions should be tailored to the experiences of those affected – at home, in workplaces, in communities. Assumptions of resilience and a suppleness to change should be seriously questioned.

- **Careful, embedded, and participatory approaches to just transitions from within communities are critical**. A just transition needs to recognise cultures and identities, and to design collaborative, participatory interventions towards transitions which emerge from and move forward within them. A just transition must work with individuals and communities to create shared forward journeys that ensure strong and supportive communities and secure, fulfilled and healthy individual identities.

2.5 Responsibilities

Prospects for just transitions open up questions around the distribution of roles and responsibilities, including ensuring that the wellbeing of people, communities, non-human species, and the planet is central to decarbonisation. Financial and other costs and benefits of decarbonisation are unevenly and unequally shared in market economies without state intervention. Powerful private corporations stand to profit from expanding green markets, often subsidised by government investment. We also see communities mobilising around shared goals and collective self-organisation.

- **Consideration of democratic accountability and appropriate scales of authority and governance will underpin just transitions**. Business as usual governance frameworks position private investors as the likely beneficiaries of transitions to low-carbon systems – potentially at the expense of investment centred around the empowerment of households and localities. Just transition programs should consider which stakeholders take responsibility for management of costs, access, benefits, and individual and community wellbeing over time and space, including prospects for new governance arrangements. For example, how might energy market regulation at different levels of government facilitate greater local and household energy autonomy, or nationalisation of energy production? Localised collectives are already pushing the boundaries of incumbent systems through cooperative ownership of renewable energy assets and distribution of revenues in line with social goals.

- **Just transitions must be inclusive and participatory and will likely benefit from cross-sectoral coalitions of actors**. For example, in the domain of work and industry, industry organisations who are seeking to monetise labour at every opportunity may be unwilling to take responsibility for a just transition, while SMEs are usually unable to afford to do so. There is an urgent need for a powerful joined up strategy whereby government, industry, unions and (appropriately remunerated) workers can move forward by taking shared responsibility to design just transitions and having the adequate time to do so with the communities affected.

- **Decarbonisation objectives should seek to overcome siloed governance**. They must consider and account for interconnections between systems, underlying processes, or unintended consequences and feedback loops. Integrated policy making is needed to avoid conflicts or contradictions. Insights from the energy sector highlight the need for horizontal coordination of multiple government department activities and strategies because of the way energy

vulnerability and insecurity is an outcome of energy market conditions as well as housing and income.

- **Just transitions must attend to the potential for ongoing marginalisation of First Nations peoples in decision-making and benefit-sharing through decarbonisation**. The principles of Free, Prior and Informed Consent (FPIC) provide one framework through which decarbonisation projects with Indigenous peoples can be undertaken with mutual benefit, and where communities can fully consider, and be involved in leading decisions over, the implications of transitions on their freedoms and capabilities.

Further research, openness, and experimentation are needed if we are to understand how these principles may be realised further in practice.

3.0 Possibilities

This section sets out a series of plausible and realistic possibilities towards a just transition in Australia. In seeking a just transition we must acknowledge that we will need multiple but connected starting points, tailored to the capabilities of different individual, organisational and political actors and necessarily shaped by shared values. The possibilities we outline therefore do not pretend to constitute what would always be an artificial vision of a 'whole' transition, pursued from just one perspective. Rather, they represent the lived and practical reality of the complex, messy and inevitably imperfect transition which Australia is confronted with.

3.1 The home

Australian homes vary regionally and in relation to social and economic inequities. The Building Code of Australia specifies eight climate zones with different standards, and vernacular practices regarding heating and cooling techniques for properties.[8] Australian homes occupy some of the largest footprints in the world, while the inner suburbs of Australia's cities are characterised by high-density and high-rise apartment living. While Australia is cited as first in the world for the rate of solar and wind capacity installed per person annually, possibilities for solar uptake are unevenly distributed. New home-based technologies, routines and practices could be pivotal in supporting a just transition. However, design for this outcome requires further research and engagement, particularly considering the impact of the COVID-19 pandemic on increased homeworking, making homes intensified hubs of activity with increased energy demand to support heating and cooling and a diversification of digital and smart devices, solar generation storage and automation.

Everyday life in the home offers significant opportunities for a ground-up just transition to decarbonisation. A just transition offers the simultaneous opportunity to eliminate the existing inequalities and inequities in access to housing, renewable energy and technologies. Subsequently, the home could become a site for just transition if equitable modes of access to infrastructures, technologies, skills and human services were secured:

- A just transition is best supported by dedicated and tailored policies and initiatives for vulnerable and marginalised groups, particularly to support low-income households, those living in poor quality and/or rental housing, and people who do not have adequate digital skills or interest, or ability to access and afford emerging technologies, to participate in many of the opportunities proposed for an energy transition.

- Careful applications of emerging technologies supporting decarbonisation in homes could support a just transition. To achieve this, smart home and automated technologies and systems must be tailored and flexible to people's real needs and must enable people to feel in control of technology and its data security and privacy settings. Supporting trust in energy policy, businesses and companies involved in the transition, and in technology itself, must underpin the transition.

8 https://ncc.abcb.gov.au/editions-national-construction-code

- A just transition at the household level could be one of the key elements underpinning processes of transition from the ground up, but it will only be achieved if it is built on deliberate and committed research and design with those households, especially people typically unable to participate. Further immersive and place-based social science and futures-led design, testing and trialling of the human services and technologies required to support such a transition would facilitate this process.

- Future research must also be attentive to how property ownership and living arrangements are envisaged and hoped for in the future and accommodate these visions to plan for and co-design inclusive, just and enduring transitions that people will be able to fully participate in as we move into near and far futures.

3.2 Work and industry

In many parts of Australia work is a highly carbon intensive occupation. Remote working, by fly-in, fly-out workers (FIFO) employed in Australia's resource boom, has lured especially skilled tradespeople away from cities and regional towns, towards remote communities. They depend upon regular regional air-transportation to move backwards and forth, and for the provision of key services, even healthcare. Whilst the COVID-19 pandemic and successive urban lockdowns have led the way towards home and remote working, they are strikingly unevenly enjoyed for only certain kinds of work and worker – particularly white-collar office-based professionals, with vastly different consequences for agricultural work which has relied upon mobile migrant and tourist workforces. Agriculture, construction, manufacturing and tourism are amongst the key industries upon which just transitions to decarbonisation pivot.

Just transitions in the workplace represent a challenge of significant magnitude, involving diverse industries, workers and stakeholders. Across all sectors, important decisions must be made around 'who takes responsibility for the costs of investment? And who reaps the benefits of this investment in a transitioned future?' In the past, and in other international contexts, there has been governmental responsibility to pay costs and fund investment, whilst private industry and shareholders have reaped the benefits (often in lieu of local residents, workers, and communities experiencing the benefits they deserve).

- The evidence demonstrates that private industry alone is neither willing, nor capable, of instituting just transitions toward decarbonisation for Australian workers. However, possibilities for a just transition are most likely to come about through collaborative and cooperative initiatives between stakeholders who are given 'time' to prepare adequately.

- The question of 'who takes responsibility' is fundamental to making just transition in work and industry possible.

- The futures of Australia's diverse industries are entangled and interdependent. Acknowledging this and making the interdependencies visible creates the opportunity to account for and address the 'hidden' emissions across the sectors.

- Economic and employment vulnerabilities are also often entangled with environmental vulnerabilities.

- New possibilities towards a just transition would be created by revising the current innovation paradigm, which currently holds a just transition back because it supports socio-economic systems that lead to inequalities and modes of exclusion which impact people's working and non-working lives deeply.

- The Australian Cooperative Research Centre (CRC) model provides a fruitful possibility.[9] A CRC for Just Transitions would provide a basis for private, public and university sector partners to co-invest in just transition processes.

3.3 Mobilities

Australia's vehicles are amongst the most polluting in the world, with carbon emissions higher than in the EU or the United States and contributing to a fifth of the country's total emissions. Efficiency standards, the elimination of the internal combustion engine, and targets for net zero mobility are below international expectations. Yet mobility transitions mean more than simply moving to low-carbon technologies; they also require a shift in the meanings, routines, and practices that shape mobilities within society. They also require attention to social inequalities in order to create a just transition. For instance, in Australia only 5-10% of daily journeys are taken on foot and the accessibility of alternative mobility options like this is unevenly distributed. In some places innovations in public transport (such as electric buses or autonomous metro) and e-micromobilities (such as electric scooters) are proliferating, with some Australian cities having expansive and accessible public transport systems. However, other cities and remote regions, especially some regional and remote First Nations households, may not have access to options beyond private fossil-fueled automobility.

This unequal distribution of mobility options poses challenges when the way we move about is the lifeblood of society. Mobility helps in fulfilling social obligations and responsibilities, accessing services, participating in work, taking time off, and ensuring that commodities and goods can get from one place to another. Mobility in Australia is also highly meaningful. It is a way of accessing landscape and Country, a cultural practice of identity and status. And yet, so embroiled in everyday life – as well as complex systems and infrastructures – transitioning to decarbonisation is an integrated problem that requires an integrated solution.

- Moving beyond the technocentric view is an important process if the just aspects of a transition are to be addressed. This could involve 'commoning' mobility – a way of collectively shaping fairer and greener forms of mobility, bringing decarbonisation transitions together with mobility justice.

- Reducing car use, and expanding public transport and active travel, would both contribute to a just decarbonisation transition in the transport sector, with broader improvements to liveability and wellbeing. Achieving this requires attention to the needs and practices of diverse groups of peoples in Australia.

- Integrating mobility transitions within urban planning constraints, housing markets and density, services, and work and employment is essential given their interdependencies and the social structures that they enable – such as long-distance commuting across large metropolitan regions. Ambitious strategies at the local and state government level – and cooperation between them – are providing some possible entries to these issues.

9 https://cooperativeresearch.org.au/

- Cultures of individual and private mobility, and associations of the car with identity and status, are engrained but may be reshaped through the generation of participatory and shared processes and values, even in the transition to electric vehicles.

- Attention to how mobilities are likely to be shaped by the needs of future everyday life, in relation to homes, work and technology – and through research and design with diverse communities – will enable more effective planning for flexible pathways towards a just mobilities transition.

Electric vehicles: both transition and non-transition

Electric vehicles are frequently seen as the most immediate solution for decarbonising mobility systems in Australia, despite a lack of federal government support for the technology. In comparison to private petrol and diesel cars, they offer an attractive near-term solution that cuts emissions, cleans up city air and improves health, and could support industries associated with battery production and renewable energy.

Yet there are challenges in an electrified transition, not least of which is the lack of charging infrastructure that limits where EVs can travel and who they could work for, alongside their high cost and lack of availability. This makes EVs, where available, most suitable for those with sizable financial and space assets. There are also cultural identity factors at play that frame them as unsuitable for the Australian way of life, with the perception that they don't fit with notions of freedom that traditionally are associated with fossil-fueled trucks known as 'utes'. Issues around the source of electricity used to charge EVs also persist; energy derived from coal doesn't decarbonise transport. It merely shifts the impacts.

A just transition to EVs must therefore be attentive to the complex cultural and social factors that surround their use, with a risk that a technology-led transition attempting to force new practices on unwilling peoples risks an unjust or failed transition. A just transition would also offer benefits to those who can't afford or are unable to use an EV. Expanding the availability of other forms of mobility — particularly active travel and public transport — would usher in wider benefits, bringing mobility to more groups and also offering health, wellbeing, and productivity benefits in denser cities. More convenient and accessible forms of mobility would therefore help in a wider shift away from resource- and space-intensive private automobility.

3.4 Renewable energy

The mainstreaming of small- and large-scale renewable energy technologies presents opportunities and risks for energy justice. In the absence of coherent national energy policy aligned with the imperatives of the climate emergency, renewable energy production and access remains geographically uneven and offers varying value propositions for producers and end-users. The benefits of rooftop solar PV in meeting household energy needs and improving energy affordability are unequally accessed, highlighting the limitations of "self-management" and energy market regulation. Meanwhile, remote communities outside of energy markets and poorly serviced by private providers stand to gain from off-grid renewable energy systems if carefully co-designed in place. Large-scale (corporate) renewable energy development intersects with First Nations land rights and has uncertain outcomes for Indigenous participation in decision-making and local economic development. Grassroots movements call for more radical community empowerment and First Nations justice through self-

determination in local energy ownership and management. Tensions between corporate, public, and community-led development raise critical questions around responsibility for, and appropriate scale(s) of, essential energy services provision.

In this context, the possibilities for just transitions in the energy sector can be understood across varied configurations and scales of renewable energy infrastructure and services provision. Opportunities for realising energy justice can be identified in terms of recognition of structural inequalities and injustices, democratic participation and non-discrimination, and fair distribution of costs and benefits.

- Individuals can increasingly exercise agency through their choice of energy provider within the energy market. In contrast to commercial models, cooperatively owned and other social enterprise type energy retailers are offering consumers both green electricity supply and the opportunity to have a say in how the provider's profits can be distributed in the community according to social priorities.

- Renewable energy investment designed for distribution is more likely to achieve equitable access to renewable energy than individualised market interventions. Adequate regulation of energy markets should minimise unfair and burdensome cost transfers to consumers least able to afford them (including environmental levies and network upgrade costs). Prioritising public investment in renewable energy and energy efficiency upgrades in social housing and remote communities – alongside increased income support – can address structural energy vulnerabilities.

- Participatory and democratic modes of renewable energy development can respond to the energy needs of households and communities in ways that empower people and centre First Nations justice. For large-scale developments, negotiation of land use agreements between corporations and Traditional Landowners according to principles of Free, Prior and Informed Consent (FPIC) provide opportunities for local economic development and enhanced land management. Local, community-owned renewable energy development can enable energy transitions that reflect shared local priorities and needs and generate local wealth, including those led by First Nations peoples as a form of self-determination. The First Nations Clean Energy Network is playing a leading role in this agenda.

- These insights demonstrate the value of place-based experimentation and challenge-oriented innovation policy that foreground social and ecological objectives as part of a just transitions research and action agenda.

Bushlight community energy planning

In 2002 Bushlight was formed by the Centre for Appropriate Technology (CfAT), an Aboriginal and Torres Strait Islander controlled business based in Alice Springs, with funding from the Federal Government. Bushlight (https://cfat.org.au/bushlight-archive) worked with over 130 communities to help remote communities manage their energy use through education and training programmes, to design and build renewable energy technologies within communities, and to engage and train people to be able to install and maintain renewable energy systems within communities.

The community energy planning model employed by Bushlight aimed to deliver benefits of tailored services provision, including cost reduction, improved energy literacy, and broader development outcomes associated with access to reliable and affordable energy services through **shared decision-making**.[10] The process involved:

- Two-way exchange between residents and Bushlight team in the planning process (meetings and ongoing communication), and resident education about energy services and energy use;
- Systems designed based on current and future needs of the community, established in community mapping and energy profiles, dwelling audits, and evaluation of options and limitations, cultivating a "sense of ownership" and confidence in operating the solar system;
- Ongoing support and training for residents and service providers, with an emphasis on "image-based and hands-on resources" and activities to build technical understanding and capacity in community (including user manuals and posters); and
- Regular maintenance of renewable energy systems.

The program was also characterised as an "**innovation in demand management**" and achieved continuous energy supply (avoiding disconnection).[11] The solar and battery systems were sized according to need and configured to ensure a minimum 24-hour power supply for essential uses (usually fridges, lighting, and medical devices) separate from discretionary power uses – reflecting what was important for the community. To facilitate daily household energy budgeting, energy availability was displayed by the Energy Management Unit (EMU).

The Bushlight approach is distinguished from supplier-led approaches characterising previous deployment of solar PV systems in remote communities through the 1990s.[12] This history presented a challenge for Bushlight to effectively engage with these communities, as well as an imperative to do things differently through co-design.

10 Centre for Appropriate Technology (CfAT). (2011). *Bushlight's Community Energy Planning Model*. Available at https://static1.squarespace.com/static/5450868fe4b09b217330bb42/t/547530a6e4b08b6cd903ce41/1416966310958/Community-Energy-Planning-Model-Booklet-2011-web.pdf

11 Riley, B. (2021). 'Scaling up: Renewable energy in Aboriginal Lands in North West Australia'. Nulungu Publication Series, *Nulungu Research Paper No. 3*. Available at https://researchonline.nd.edu.au/nulungu_research/3/

12 Lloyd, B., Lowe, D., and Wilson, L. (2000). *Renewable Energy in Remote Australian Communities (A Market Survey)*. Australian CRC for Renewable Energy Ltd. Available at: https://static1.squarespace.com/static/5450868fe4b09b217330bb42/t/5475301de4b0e9b1b372c1a0/1416966173707/ACRE-CAT-RE-System-Audit-Report-2000.pdf

3.5 Technology and data

The Australian government views technological innovation through a vague but hopeful lens: that global innovations, smarter use of data, and general market forces will drive transitions to decarbonisation. There are many opportunities to innovate locally, but there are conflicts in the means by which innovation is approached in domestic policies and strategies. Green investments often coalesce around emerging technologies such as blockchain, while programs to decarbonise existing technological infrastructure remain contingent on global transitions, including, the challenges posed by e-waste and energy-intensive data centres. These serve as reminders of how digital innovations negatively impact the environment through their manufacture and maintenance. Technology can also render individual users as commercial data points, and as vectors of cybersecurity risk. In everyday life, this raises questions of data governance, privacy, and user-centric control, and the role of citizens in the transitions to decarbonised technology futures – concerns which Australia is yet to address.

There is not a particularly 'Australian' manifestation of data use, technology enterprise, or consumer behaviour for decarbonisation. Australia's position on technology investment – which prioritises cheap short-term action, a resuscitated manufacturing identity, and a longer-term stance of 'watching' overseas developments – sits in tension with a recognition of the need for local innovation. There are many opportunities, and an emerging community groundswell, for the bridging of these tensions, and to accelerate just technology transitions. The private sector drives much innovation in Australia, while government investments remain vexed: publicly stalling innovations in some areas, while also making significant investments in emerging technologies. Greater harmony is needed to achieve net-zero goals in a transparent, consultative, and *just* manner.

- Just transitions in the technology space show the importance of thinking globally and locally, as Australia relies on imported devices and systems. Developing a focus on such an approach would open up increased possibilities towards a just transition.

- There is an opportunity to enshrine green, equitable, consultative practices in all new technological design. Importantly, through avenues such as reuse and recycling, these principles can also be articulated in the present.

- Developers of energy-hungry infrastructure (i.e., cryptocurrencies) and data-driven systems should – and some are beginning to in Australia – enshrine net-zero aims and prioritise these ahead of cybersecurity and wealth generation.

- The role of people, as communities and as individual consumers, citizens, and technology users – must be considered in all future technology design and development. There are possibilities to re-think technology design and development to account for and involve people and real everyday circumstances and needs in processes of transition to decarbonisation from the outset.

Data centre management in Australia

Most everyday technologies rely on data which – contrary to terms like 'online' and 'cloud' – is actually stored in physical locations. These require land, energy, and constant cooling. There are competing views on whether increasing internet traffic is leading to increased energy consumption. It is clear however, that this is a global issue.

Historically, internet companies sought cheap land and labour when building data centres. Increasingly though, multinationals like Google and Amazon are looking to Arctic regions for cooler temperatures, access to cheaper renewable energy, and tax incentives. As Australia is a warm climate, with extreme fire risk, heat management of data centres is a significant issue. Additionally, Australia is not seen as a global technology hub, and much of the nation's online infrastructure is reliant on storage based in the Global North. Thus, keeping data stored securely onshore (protecting what is often called 'data sovereignty') will require negotiation and planning, as experts from the Australian Research Council's Centre of Excellence for Automated Decision Making and Society explain in their submission:

> The technical answers given by operators to heat management and their material implications on energy networks and resources are at the heart of most of the debates concerning data centres' environmental consequences. [It is important] to understand how companies, public agencies and civil society understand and address the environmental, economic and cultural conditions and limitations facing the establishment and management of data centres.[13]

Presently, 'cloud' metaphors remain something of a hurdle for government policy and planning. Investments in cleaner energy (such as the federally-funded Clean Energy Finance Corporation) are not linked to data management – despite some shared timelines for government digitisation and net-zero emissions. However, cybersecurity priorities may also bring more sustainable onshore data management. Australia already grants some citizen data a protected status (such as in areas of health and finance) and may need to strengthen these protections in future. The private sector is driving change in this area, proposing solar farms as a means to power green and secure blockchain and cryptocurrency industries.

13 Parker, C., Haines, F., Richardson, M., Cellard, L., and Lawrence, A. (2022) Submission to Just Transitions in Australia, the ARC Centre of Excellence for Automated Decision Making and Society (ADM+S), January. Available at: https://www.monash.edu/__data/assets/pdf_file/0011/2878769/Just-transitions-report-ADMS-submission-DRAFT-6-Jan-2022.docx-1.pdf

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