



CLIMATE  
CHANGE  
AUTHORITY

# 2023 ANNUAL PROGRESS REPORT

October 2023

## 2 Climate-related wellbeing: impacts, adaptation and transition

### Key information about Chapter 2

**Wellbeing is a necessary condition for an orderly transition to a prosperous, resilient net zero economy.**



Households, businesses, communities and governments all need to adapt to changing climate and its effects, to reduce the risk and the impact of climate-related hazards, and to maintain wellbeing.



First Nation Peoples are, and wish to be, active in reducing the impacts of climate change as well as accessing and contributing to the opportunities created by the transition to a net zero economy.



Planning is necessary to support workers and regional and rural communities in the transition.



Access to simple tools that explain climate and energy concepts would help people, communities and businesses understand and respond to the risks they face.

## 2.1 Introduction

Wellbeing is a necessary condition for durable change in a democracy. It is integral to achieving Australia's economy-wide, societal-level transition to a resilient, prosperous net zero economy.

Wellbeing means 'meeting various human needs, some of which are essential, and includes the ability to pursue one's goals, to thrive and feel satisfied with their life' (OECD, 2013). When needs are met, people are more likely to have the capacity and resources to 'buy in', choose their own decarbonisation pathways and provide the 'license' for others to take action. When needs aren't met, governments and other proponents of the transition can expect communities to withhold or withdraw their support for change.

In the context of responding to climate change, the government's pursuit of Australia's wellbeing must extend beyond securing community acceptance for the net zero transition. Climate change is already causing suffering in Australia. The ongoing and increased frequency of many types of climate-related weather extremes are taking a toll on Australia's physical and mental health and, especially for First Nations communities, cultural health as well. These impacts need to be recognised and addressed.

And while rapid decarbonisation brings opportunities for new jobs and new industries, these opportunities are not evenly distributed. What constitutes a 'just transition' in these circumstances is examined below.

Wellbeing is an important lens through which governments make tough decisions about trade-offs and allocate resources equitably, in the public interest, and for the long term. In July 2023 the Australian Government released Australia's first National Wellbeing Framework – Measuring What Matters, which aims to:

- track Australia's progress to better align our economic and social goals in our communities and right across our country.
- put people and progress, fairness and opportunity at the very core of Australia's thinking about our economy and our society, now and into the future.

It identified five broad themes that are important to Australians' individual and collective wellbeing: healthy, secure, sustainable, cohesive and prosperous as well as cross-cutting dimensions of inclusion, equity and fairness. The themes of the framework are supported by 50 key indicators, to monitor and track progress, which will be updated over time. The authority looks forward to making use of and contributing to Measuring What Matters in the future.

The authority has developed a climate-related wellbeing framework to give effect to requirements set out in relevant legislation:

- The *Climate Change Authority Act 2011* requires the authority to have regard to the principle that any measures to respond to climate change should, among other things, be equitable; in the public interest; take account of the impact on households, business, workers and communities; and boost economic, employment and social benefits, including for rural and regional Australia.
- The *Climate Change Act 2022* requires the authority to advise on the social, employment and economic benefits of any new or adjusted greenhouse gas emissions reduction targets and associated policies, including for rural and regional Australia; and the physical impacts of climate change on Australia, including on rural and regional Australia.

The authority's framework considers wellbeing in the context of:

- a changing climate (physical impacts), such as heatwaves, floods and droughts.
- a changing economy (transition impacts resulting from global economic shifts and domestic policy measures), such as job losses and workforce transitions as industries decline and new opportunities arise.
- policy measures responding to physical risks (adaptation policies)
- policy measures addressing transition risks (just transition policies).

#### **BOX 2.1: What is 'adaptation'?**

Adaptation in human systems is the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, adaptation is the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects (IPCC, 2021b).

#### **BOX 2.2: What is 'just transition'?**

Although there is no universal definition of a just transition, many jurisdictions have adopted the term to refer to a process and/or outcome that is fair, distributes benefits evenly, and leaves no one behind. Having reflected on the examples set out in Table 2.1 and taking account of our purpose and principles, the authority takes just transition to mean:

**The process and the outcome in which burdens and benefits are shared equitably as Australia accelerates emissions reductions, adopts new ways of doing things, and prospers as the world transitions to net zero emissions.**

*Table 2.1: Jurisdictional approaches of a just transition*

| <b>Jurisdiction</b> | <b>Approach to just transition</b>  |
|---------------------|---|
| Collie, WA          | The purpose of a just transition is to create a strong and sustainable future for Collie as it shifts away from a dependence on coal and coal-fired energy production (WA Government, 2020a).   |
| New Zealand         | A strategy to move a region toward a low carbon future. It is about a region leading their own transition to ensure that the impacts and opportunities that may arise from the transition are more evenly distributed (Ministry of Business, Innovation & Employment, 2023).  |
| Scotland            | A just transition is both the outcome – a fairer, greener future for all – and the process that must be undertaken in partnership with those impacted by the transition to net zero. Just transition is how we get to a net zero and climate resilient economy, in a way that delivers fairness and tackles inequality and injustice (Scottish Government, n.d.).   |
| Wales               | Delivering a just transition will mean, that as we move to a cleaner, stronger, fairer Wales, we leave no-one behind. We will develop a clear understanding of the impacts of change, positive and negative, and how to make sure these are fairly distributed in society. In doing so, we have committed to learning lessons from the past and building a future for Wales that supports a wellbeing economy (Welsh Government, 2022). |
| European Union      | The European Union maintains a Just Transition Mechanism as 'a key tool to ensure that the transition towards a climate-neutral economy happens in a fair way, leaving no one behind' (European Commission, n.d.).  |



This chapter presents an assessment of physical and transition impacts on wellbeing and recent progress in policy responses to physical risks (adaptation policies) and transition risks (just transition policies). This chapter focuses on communities at higher risk, particularly First Nations communities, regional and rural Australia, and low-income earners. It is based on our recent consultation and research into the lived experiences of Australians, and is structured as follows:

- Impacts of climate change
- Strengthening adaptation action
- Supporting First Nations communities
- Supporting regions and rural communities
- Improving communication
- Improving employment outcomes.



## 2.2 Impacts of climate change

*'Human-caused climate change is already affecting many weather and climate extremes in every region across the globe. This has led to widespread adverse impacts on food and water security, human health and on economies and society and related losses and damages to nature and people. Vulnerable communities who have historically contributed the least to current climate change are disproportionately affected.'*

*Intergovernmental Panel on Climate Change (IPCC, 2023a)*

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*'Australians are on the frontline of climate change impacts. We are experiencing more severe bushfires, hotter and longer heatwaves, rising sea levels that are exacerbating hazards along our coastlines, cyclones that are projected to intensify and possibly track further southwards and an increase in rainfall intensity and associated flooding as the climate warms.'*

*Insurance Council of Australia (ICA, 2023a)*

The climate has already changed dramatically (Australian Academy of Science, 2021) (see also Chapter 1). Australia's climate has changed since the early 1900s and the pace of many climate trends, such as sea-level rise, has accelerated in recent decades (CSIRO & BoM, 2022). Even under a global mitigation scenario that limits warming to around 2°C, Australia is projected to experience further climate change which is likely to worsen many hazard characteristics (IPCC, 2022a).

Climate change risk and impacts do not only arise due to acute hazards like floods, and chronic hazards like changes in rainfall. Climate risks and impacts are a combined outcome of the interaction between hazards, exposed elements, and vulnerabilities. All Australians are exposed to climate impacts in some way (e.g. through increased food prices after hazard events). However, for any given hazard, some areas and populations are more at risk than others due to different exposure and vulnerability.

Rural, regional and remote communities, First Nations communities, and low-income earners are in particularly exposed and vulnerable situations (ACOSS, 2023; NSW Health, 2023). Other groups such as some culturally and linguistically diverse subgroups, people with disabilities or health conditions, and people of marginalised genders (including women) face their own distinct risks and impacts from climate-related hazards (Gutnik & Roth, 2018; Hansen, et al., 2013; Hazeleger, 2013). Many individuals belong to more than one of these groups, resulting in multi-dimensional and magnified risk.

*'Climate change impacts increase financial stress, can lead to loss of employment, homelessness, increase risk of domestic violence, negative physical health and worsens long-term mental health, deepening disadvantage'* Australian Council of Social Service

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*'[I am] overwhelmed by my need to continue to prepare for the next fire.'* Comment from  
*Anonymous in East Gippsland, Victoria*



Importantly, climate risk and impacts are not always linear. Feedback loops, compounding hazards and cascading risks can also amplify impacts (IPCC, 2019). For example, as climate change contributes to more frequent extreme heatwaves, demand for air conditioning is projected to increase (Sherman, Lin, & McElroy, 2022). Drawing from an electricity system dominated by fossil fuels, increased demand for air conditioning will increase greenhouse gas emissions which cause climate change and place increased pressure on the stability of the system. Compound hazard events occur when hazards occur at the same time, trigger other hazards or increase the likelihood that another hazard will occur (IPCC, 2021b).

This happened in 2019–20 where drought increased the likelihood of fires and the ‘Black Summer’ fires occurred (Kemter, et al., 2021). Cascading risk is the potential for one event to trigger another in human or natural systems, whereby the resulting impact is significantly larger than the initial impact and is often associated with vulnerability and interconnected critical infrastructure (IPCC, 2019; Pescaroli & Alexander, 2018). The Royal Commission into National Natural Disaster Arrangements identified cascading impacts from the 2019–20 fires. Road closures affected emergency response and the transportation of essential goods such as food across the country (Australian Government, 2020). Power and telecommunications outages affected ATMs and EFTPOS terminals, preventing people from buying fuel to evacuate during the event, and food and other essential goods from shops after the event (Australian Government, 2020).

Power and telecommunications outages also hampered communication with people in fire zones, leaving people unable to access fire status information, emergency operation centres unable to coordinate, and local governments unable to contact their constituents to understand the support needed (Australian Government, 2020).

In line with the IPCC (IPCC, 2018), the Australian Government’s Intergenerational Report recognises that further temperature increases, even those of less than a degree (which would take average temperatures to 1.5°C to 2°C above preindustrial levels), would result in more severe climate impacts (Treasury, 2023d). With climate-related hazards already contributing to devastating impacts for communities and businesses around Australia, the likelihood of more severe and frequent hazard events underlines the urgent need for adaptation that reduces current and future climate exposure and vulnerability and builds resilience.



### 2.2.1 Physical impacts

The Department of Home Affairs maintains a database of ‘declared natural disasters’ where households, businesses or local councils are eligible for disaster-recovery assistance (Department of Home Affairs, 2023). For the 2022–23 financial year, there were 38 disaster events declared across Australia. The most common declaration was for a flood and storm (13 events), followed by flood (8 events) and bushfire (8 events). Box 2.3 provides more detail on the Fitzroy River storm and flood disaster in Western Australia that occurred in late 2022 and early 2023.

Some hazards, such as extreme heat, drought and coastal erosion were not recorded in the Department of Home Affairs database in 2022–23 because they are not categorised as a disaster type in the database, or did not trigger disaster recovery assistance in the 2022–23 financial year. While some hazard events do not result in disasters or loss or damage, disaster databases such as the one maintained by the Department of Home Affairs are prone to common deficiencies, such as excluding some hazards, particularly slow onset or chronic hazards (hazard bias), not considering losses of all sizes (threshold bias) and not considering all types of losses (accounting bias) (Gall, Borden, & Cutter, 2009). Therefore, they should not be assumed to be a complete account of all disasters that occurred in a time and place.

Australia did experience some extreme heat events in 2022-23 (BoM, 2022b). Extreme heat can have disastrous impacts on infrastructure, human health and the natural environment (IPCC, 2022a; WHO, 2023) and is one of the key issues identified by stakeholders during the authority’s consultation process.

*‘Australia is already experiencing the impacts of climate change... Extreme heat days, longer dry spells, and harsher fire weather will become increasingly common’ -  
Environmental Defenders Office*

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*‘Australia is totally unprepared for impending climate impacts... The impacts are going to be severe. Most worrying is deadly heat’ - Australian Institute of Landscape Architects*

Coastal erosion is also a concern for Australia (Australian Government, 2021c) and has been recognised by the United Nations as having impacts on Torres Strait Islanders and their culture (Views adopted by the Committee under article 5 (4) of the Optional Protocol, concerning communication, 2022) (see Box 2.4).

The frequency and severity of coastal erosion and inundation is projected to increase due to climate change-driven sea-level rise over the coming decades (CSIRO & BoM, 2022). This is likely to increase the during- and post-disaster assistance needed by coastal communities and businesses unless significant adaptation and resilience-building activities are undertaken to reduce vulnerability and exposure before the hazards occur.



### **BOX 2.3: Ex-Tropical Cyclone Ellie, flooding, and the Fitzroy River**

From the last week in December 2022 to the first week in January 2023, exceptional amounts of rain fell over the Kimberley region in Western Australia, delivered by ex-Tropical Cyclone Ellie, resulting in widespread flooding (BoM, 2022a; BoM, 2023). The Fitzroy River at Fitzroy Crossing peaked at around 15.81 metres, exceeding the previous record of 13.95 metres set in 2002 (based on records extending back more than 50 years) (BoM, 2023). The flow rate was estimated to reach 60,000 cubic metres per second, exceeding the estimated normal full flood rate of 23,000 cubic metres per second at the Fitzroy Crossing townsite and well in excess of the estimated 8,000 cubic metres per second of water that normally flows through the river (Fears for remote WA towns as Fitzroy River records one of highest flow rates in Australia, 2023; Hastie, 2023). The quantity of water flowing through the river per day was estimated to be equivalent to Perth's water use over 20 years (Fears for remote WA towns as Fitzroy River records one of highest flow rates in Australia, 2023).

The event had widespread, long-lasting, and cascading impacts. As a limited snapshot, the Fitzroy River Bridge was severely damaged and main roads were impassible for months (Minister for Infrastructure, Transport, Regional Development and Local Government, 2023). The damage disconnected the East and West Kimberley regions by road, isolating many remote communities including First Nations communities and limiting movement to ferries and barges (Minister for Infrastructure, Transport, Regional Development and Local Government, 2023; O'Connor, ABC News, 2023). By April 3 2023, access via four-wheel drive had been established with a single-lane rock causeway (Minister for Infrastructure, Transport, Regional Development and Local Government, 2023) and on 31 May 2023, a two lane crossing was opened catering for all vehicles including road trains, five months after access was cut off (WA Government, 2023b). During this period, the cost of transport to the region ballooned with one freight company doubling its freight fees to cover the additional 4,500km required to make the return journey from Perth to the East Kimberley (O'Connor, Sinclair, S, & Mitsopoulos, ABC News, 2023). This caused stress for many business owners operating in and out of the region including local mechanics, supermarkets, and farmers (O'Connor, Sinclair, S, & Mitsopoulos, ABC News, 2023), however the Commonwealth-State Disaster Recovery Funding Arrangements were activated to assist businesses to reduce freight costs (DPIRD, 2023). Damage to roads and bridges also restricted access to schools with some staff needing to take a helicopter to travel to and from their school (Bieundurry & Williams, 2023).

Beyond transport and associated cascading impacts, many houses that were damaged in the flood were still not repaired as of July 2023 and people living in temporary housing were yet to return to their communities (Murphy & Bieundurry, 2023). Many of these people were First Nations people. One Indigenous person described the effect of her long-term relocation from her home and Country – 'When it comes to country, it's like having a vital organ taken away from you' (Murphy & Bieundurry, 2023).

### 2.2.2 Consequential impacts

Climate change is having serious impacts on the physical and mental health of Australians. Consultation reinforced that health impacts from climate change are a key concern for many.

In Australia, extreme heat is the deadliest natural hazard. (Coates, Haynes, O'Brien, McAneney, & de Oliveira, 2014; DIT, 2013). Climate change has already contributed to an increase in heatwave days and even under a 1.5°C scenario, this trend is projected to continue (Australian Academy of Science, 2021). Heat contributes to and worsens physical and mental health issues (Hughes, Hanna, & Fenwick, 2016; Hansen, et al., 2008). The impacts of extreme heat events are exacerbated by poor or overcrowded housing conditions, which have flow-on effects on physical and mental health (Buergelt, et al., 2019; Quilty, Jupurrurla, Bailie, & Gruen, 2022; Lea, et al., 2021).

One survey of houses in rural or remote areas found that several factors contributed to poor thermal performance, including (Healthabitat, n.d.):

- little to no insulation
- inadequate shading system
- lack of active cooling systems (fans and air conditioning).

In urban areas, heat is magnified by the urban heat island effect whereby temperatures may be several degrees warmer than surrounding non-urban regions due to the presence of more infrastructure that absorbs and traps heat than green (e.g. gardens or parks) or blue (e.g. rivers and lakes) surfaces (Australian Government, 2021c). Many houses in urban areas, particularly those occupied by low-income earners, are also poorly insulated, have limited shading, and do not have cooling systems (Barnett, et al., 2013; Haddad, et al., 2022). Of the limited existing dwellings (primarily in Victoria) that have been assessed under the Nationwide House and Energy Rating Scheme across urban to remote areas, the most common energy rating, which includes consideration of thermal performance, is 1 out of a possible 10 stars (CSIRO, 2023f). This means that many Australians live in houses with poor thermal performance and are at risk of impacts to their health from high temperatures.

The 2019–2020 east Australian fires caused major health issues. They resulted in 33 deaths (Parliament of Australia, 2020) and the associated smoke from the fires has been estimated to be responsible for 417 excess deaths between 1 October 2019 and 10 February 2020 (Arriagada, et al., 2020). In the Riverina region of New South Wales, where the Dunns Road fire burned at Emergency Level for many days, emergency department data shows that respiratory presentations increased by 86% compared to the same week the previous year (AIHW, 2020). Similarly, inhaler sales increased by 144% on the Mid North Coast when multiple fires were burning in the area compared to the same week the previous year (AIHW, 2020).

Health impacts may not arise during or immediately after a disaster but may emerge months later. For example, there is often a higher incidence of mosquito-borne diseases after flooding (Vardoulakis, et al., 2022). Short- and long-term health impacts can be exacerbated by damage to or evacuation of medical centres affected by disasters as well as chronic shortages of health professionals, particularly in regional, remote and very remote communities (AIHW, 2022; Australian Government, 2022b).

Disasters, and the anticipation of increasing disasters due to climate change, are also affecting mental health. After the February to March Eastern Australia floods in 2022, UNICEF Australia and Royal Far West conducted a children's Needs Assessment on children under 12 years old and identified multiple mental health concerns, including heightened anxiety, grief and loss, regression in developmental skills and sleep disturbance (Royal Far West and Australian Committee for UNICEF, 2022).



Multiple studies and reports have linked mental health concerns such as distress, anxiety, depression, and probable post-traumatic stress disorder to climate-related disasters and climate change in Australia (Gergis, Blashki, Gardner, & Bradshaw, 2023; Parliament of NSW, 2022; Matthews, et al., 2019; Fitzgerald, et al., 2020; Rodney, et al., 2021).





### 2.2.3 Economic impacts

Climate change and climate-related hazards pose high risks to the Australian economy as well as to the financial wellbeing of Australian households and businesses.

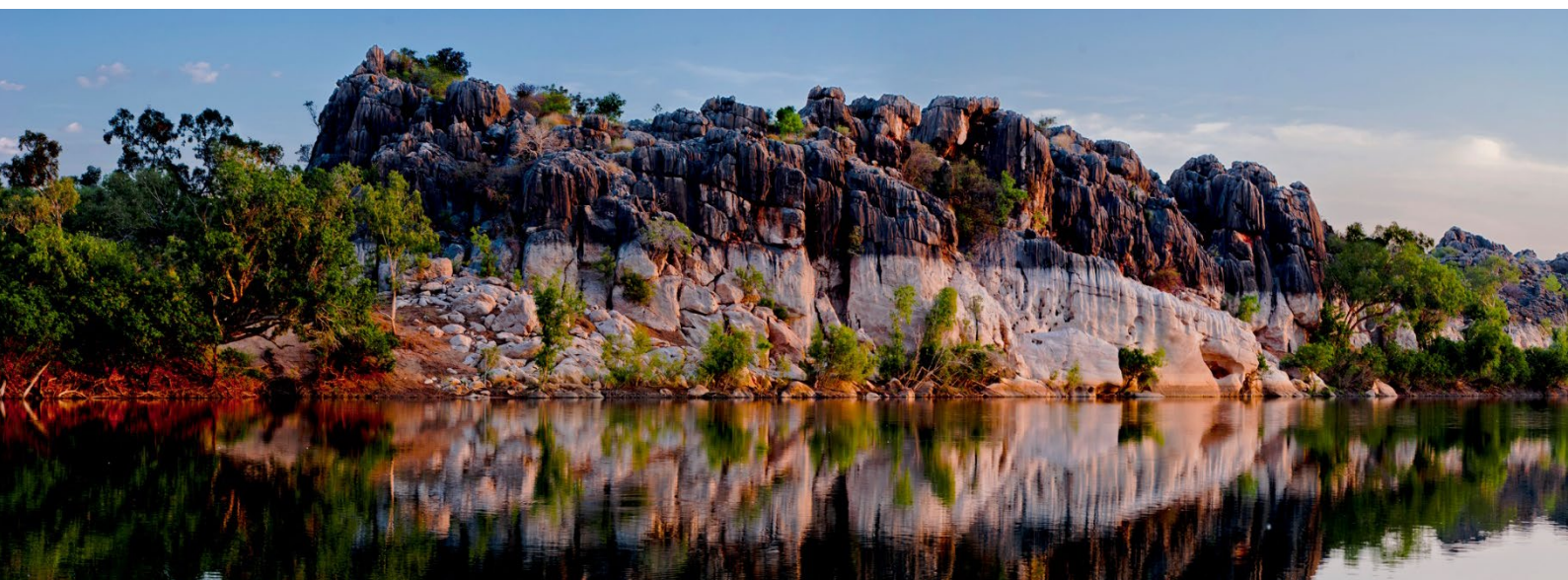
#### 2.2.3.1 Impacts on the broader economy

Multiple submissions from financial institutions highlighted the greatest risk for investors is from damage to physical assets caused by climate change (IGCC, HESTA), with the Investor Group on Climate Change stating:

*'Unless climate change is addressed in an orderly and just way, the long-term retirement savings of millions of Australians are under threat'. Investor Group on Climate Change*

Modelling for the world's central banks by the Network for Greening the Financial System (NGFS) show that 'for all [NGFS] scenarios and time scales, physical risks outweigh transition risks globally (Boele & Martens, 2022). The SOAS Centre for Sustainable Finance has mapped how climate risk transmits to sovereign risk, which is the risk a government is unable to meet its debt obligations. This mapping has shown transmission occurs through channels such as depletion of natural capital and natural services, fiscal impacts of climate-related disasters and fiscal consequences of adaptation and mitigation policies (Volz, et al., 2020). Other research has shown that Australia's credit rating is at risk under high emissions scenarios (Klusak, Agarwala, Burke, Kraemer, & Mohaddes, 2021).

In 2020, disasters (climate and geophysical) were estimated to cost the Australian economy up to \$38 billion per year and projected to rise to at least \$73 billion per year in 2060 under a low emission scenario, or \$94 billion under a high emissions scenario (Deloitte Access Economics, 2021). Increasing costs were associated with population growth, property value growth, and climate change. In a single event in late 2022, flooding in south-east Queensland was estimated to cost the state \$7.7 billion in social, financial, and economic impacts. Damage to commercial and residential buildings was the largest tangible cost at approximately \$2 billion, while the cost from mental health, disease, and social issues was estimated to reach around \$4.4 billion. Treasury's Intergenerational Report also projects that with each degree of temperature rise, expenditure through the Disaster Recovery Funding Arrangements would increase as well (Treasury, 2023d).



### *2.2.3.2 Economic impacts on households*

All Australians bear the costs of climate- and weather-related disasters, either through direct damage, cost of living and price spikes or through taxes which government use to pay for disaster relief (Lefebvre & Reinhard, 2022). Preparing for climate change can also entail cost pressures, but the savings and benefits in the longer term can be substantial, even intergenerational.

Households in vulnerable situations, such as those with low incomes, experience more severe consequences from the economic impacts of climate change and extreme weather events and are the least able to cope, adapt and recover (ACOSS, BSL, TSI, 2017).

During consultation, the authority heard about other economic costs experienced in rural and regional areas. For example, some farmers in NSW need to use small planes or helicopters to transport food and other goods during flood periods. While this cost may be planned for and absorbed without major consequences for some time, more frequent or ongoing need to access essential household goods and transport products to market via helicopter or plane would become unaffordable.

Rising insurance premiums have also been a focus for many households and insurance institutions, with research from the Actuaries Institute finding approximately one in eight households are experiencing home insurance affordability stress, driven by the exposure to climate-related natural perils, particularly cyclones and floods (Paddam, Liu, & Philip, 2023). This research also found that low-income households were particularly exposed to flood (Paddam, Liu, & Philip, 2023).

The Insurance Council of Australia (ICA) notes that '[t]he impact of extreme weather on Australian shores is increasing the global cost of reinsurance. Reinsurance costs rose to 20-year highs this year, with Australian insurers facing cost increases of up to 20 to 30 per cent.' (ICA, 2023b). The ICA goes on to state that 'when – not if – extreme weather events strike large population centres in the future we can expect them to have a greater impact and be more costly ... We can't wait until disaster strikes, we need to act now by investing more to make communities more resilient, reform land-use planning and building codes and, in some cases, move people and homes out of danger altogether' (ICA, 2023b). The ICA's report and comments highlight the need for risk mitigation and adaptation to manage the costs of climate and extreme weather impacts (ICA, 2023b).

### *2.2.3.3 Economic impacts on businesses*

Businesses are bearing substantial costs because of climate change and climate-related disasters.

The 2022 flooding in south-east Queensland was estimated to cost small businesses \$324 million in direct physical damage and disrupted operations due to road and public transport closures (Deloitte Access Economics, 2022). Sixty-two per cent of businesses that responded to the Small Business Survey by the Queensland Department of Employment, Small Business and Training had to close for a period including 23 businesses that closed permanently (Deloitte Access Economics, 2022). These permanent and temporary business closures were estimated to affect 4,145 workers.

Tourist operators are likely to be affected by climate change as well. In Queensland the viability of more than 60,000 jobs supported by marine tourism businesses may be affected due to more frequent, intensive, extensive and longer marine heatwaves in the future that cause coral bleaching (GBRMPA, 2022).

Treasury's Intergenerational Report also finds that tourism demand in Australia is projected to be negatively affected by temperature increases (Treasury, 2023d).



#### 2.2.4 Other impacts

Many other risks associated with climate change were raised during the authority's consultation. These include: the degradation of the natural environment and its impacts on flora, fauna, land and water; damage to infrastructure; damage to social cohesion; migration within Australia and to Australia; and climate impacts on Pacific neighbours. The authority considers these important issues to address in risk assessments and adaptation planning.

The effects of physical impacts of climate change on First Nations people are discussed at 2.4.





## 2.3 Strengthening adaptation action

To reduce the risk and the impact of climate-related hazards and maintain wellbeing, households, businesses, communities and governments need to adapt.

Adaptation can involve physical, tangible changes to the natural and built environment or social or economic activities and adjustments (IPCC, 2022b). Physical adaptation could include actions such as constructing desalination plants to manage low rainfall and associated water shortages or planting drought resistant crops (Howden, Schroeter, Crimp, & Hanigan, 2014). Economic adaptation could involve taking out insurance against a climate risk (Jarzabkowski, et al., 2019). Social adaptation activities could include actions such as those that improve education levels (IPCC, 2022b) or social cohesion (Carmen, et al., 2022). The Paris Agreement aims to strengthen the adaptation response of all Parties by encouraging appropriate adaptation planning and implementation to reduce impacts and foster resilience (UN, 2015).

In Australia, adaptation delivery is mostly undertaken by state, territory and local governments as well as private businesses (COAG's Select Council on Climate Change, 2012). However, the Australian Government has a role in national leadership, providing science and information, managing Commonwealth assets and programs, and maintaining a strong economy and social safety net (COAG's Select Council on Climate Change, 2012).

The Defence Strategic Review highlighted that climate change is now a national security issue and that 'state and local governments, in partnership with the Commonwealth, must have in place the necessary plans, resources and capabilities to deal with all but the most extreme domestic disaster operations' (Department of Defence, 2023). From 2005 to 2022 the Australian Government spent \$23.99 billion (at 2022 prices) on disaster relief (\$1.4 billion per year on average) compared to only \$0.51 billion on disaster resilience (Lefebvre & Reinhard, 2022). The Australian Government recently announced up to \$1 billion for the Disaster Ready Fund over 5 years from 1 July 2023 (NEMA, 2023a). However, if distributed equally over the 5 years this will be about \$200 million spent on preparedness and adaptation per year compared to the estimated \$1.4 billion spent on relief per year on average between 2005 to 2022.



### 2.3.1 Mainstreaming adaptation

Some government frameworks, strategies and programs do consider climate change, particularly regarding nature, health and disaster risk management, however this must extend to all policy areas, programs, investments and assets. National examples of where climate change is considered include:

- The National Disaster Risk Reduction Framework (Department of Home Affairs, 2018) and Second National Action Plan on implementation (NEMA, 2023b) link climate impacts and adaptation to disaster risk reduction
- The Disaster Ready Fund Guidelines (NEMA, 2023a) for the first round of funding included mandatory statements on enabling adaptation and avoiding maladaptation (defined as increased risk of adverse climate-related outcomes (IPCC, 2021b)
- The National Disaster Mental Health and Wellbeing Framework aims to provide guidance on how governments and recovery partners can consistently support mental health and wellbeing before, during and after disasters in the context of a changing environment driven by climate change (National Mental Health Commission, 2023)
- Australia's Strategy for Nature 2019–2030 incorporates consideration of climate change risk, impacts, and adaptation across 2 of its 3 goals and 3 of its 12 objectives and progress measures (Australia's Nature Hub, 2023).

Climate change is a long-term issue requiring long-term solutions. Therefore, where possible, consideration of climate change should be incorporated into legislation and regulation as well, to overcome short-term political cycles where strategies, policies, and plans can be quickly defunded or superseded, leading to uncertainty, and a lack of strategic implementation of adaptation activities.

## 3. RECOMMENDATION

Secure agreement with all levels of government on a framework to ensure that climate change risk and adaptation are factored into all policies and programs and their implementation, including but not limited to critical infrastructure, building codes, health, social services policies (such as those on public housing), transport, environmental protection, national security, and sectoral decarbonisation plans.

The Australian government is developing the Climate Risk and Opportunity Management Program (CROMP) which aims to develop the capabilities and systems needed for the Australian Public Service to identify, manage and disclose climate risks (DCCEEW, 2023j). The need to integrate climate risk considerations across all policy areas was emphasised by multiple stakeholders during consultation, particularly regarding the National Construction Code and building standards. However, the level of influence that the CROMP will have across policy areas and different levels of government is unclear. This is important to consider as most of the remit for adaptation implementation sits with sub-national governments.



### 2.3.2 Monitoring climate risk and adaptation responses

The Australian Government is undertaking a National Climate Risk Assessment and developing a new National Adaptation Plan (DCCEEW, 2023j). The risk assessment is planned to be finalised by the end of 2024 (DCCEEW, 2023p). However, the government is yet to commit to periodic reviews or updates of either document. Reviews and updates would be in line with the approaches of some international peers on risk assessments and adaptation plans including the United Kingdom (UK Government, 2008), New Zealand (NZ Government, 2019) and advice from the UNFCCC that defines the adaptation cycle as an ‘iterative approach’ of risk assessment, planning, implementation and monitoring, evaluation and learning (UNFCCC, 2023a).

Climate change risk changes depending on adaptation action, global emissions trajectories and other social and demographic factors (IPCC, 2022b). Additionally, new research and modelling capability is likely to improve understanding of climate change risk (see Chapter 1.1.4). Therefore, the National Climate Risk Assessment and the National Adaptation Plan should be revised periodically to ensure they remain up to date, relevant, and effective. These activities should be planned with sufficient time and resources to consult widely. Legislating the requirement to repeat the National Climate Risk Assessment and National Adaptation Plan process through amending the *Climate Change Act 2022* would elevate consideration of adaptation and promote a commitment to ongoing action.

Measuring the effectiveness of adaptation policy at the national level is a key question for many countries, driven in part by the Paris Agreement and the Global Goal on Adaptation (Christiansen & Martinez, 2018). Stakeholder consultation that identifies outcomes and indicators that matter to stakeholders has been recognised as an important component when developing monitoring and evaluation frameworks (Karani, 2018; Leiter, 2018; Flood, Dwyer, & Gault, 2018). The authority recommends the government establish an ongoing process to assess implementation of the National Adaptation Plan, which ensures that the effectiveness of the Plan is assessed regularly and adjustments to adaptation measures are made in a timely manner in response to the available evidence.

#### 4. RECOMMENDATION

Legislate for the National Climate Risk Assessment to be undertaken, and the National Adaptation Plan updated, a minimum of every 5 years, and for ongoing monitoring and evaluation of the Plan.





## 2.4 First Nations people in Australia

### 2.4.1 Process to develop this advice

In preparation for the 2023 Annual Progress Report, the authority sought to engage with First Nations people, organisations and representative bodies in order to listen to their needs and experiences and to understand their climate change challenges. The information we obtained is highly valuable and greatly appreciated but represents only a small sample of First Nations perspectives. The themes discussed below are the main ones identified through our consultation process for the 2023 Annual Progress Report. We hope to continue improving our First Nations engagement to inform our future advice.

### 2.4.2 First Nations people and their connection to land

Australia's First Nations people have a deep connection with land and waters, plants, animals, heritage, cultural ancestors, laws and more (Murawin, 2023). First Nations peoples are the world's first engineers, scientists and agriculturalists. They have been, and continue to be, experts at Caring for Country and navigating the changing climate for thousands of years (Australian Government, 2021c). Caring for Country is fundamental to spiritual identity, culture, economy, social and holistic health (Murawin, 2023). The authority heard how Caring for Country means looking after the health of the land because 'if you look after the country, the country will look after you' (Murawin, 2023).

*'As a proud Gureng Gureng (Aboriginal) man, my love and care for Country is what makes me who I am. Our country and environment is critical to our identity and way of life'*

*Anonymous submission*



### 2.4.3 Impacts of climate change on First Nations people

Through our engagement process, the authority heard about the substantial effect of climate change on First Nations people and communities.

First Nations people's connection to Country places them in a unique position where damage to the natural environment caused by climate change and climate-related events contributes to significant cultural harm (Murawin, 2023). Flora and fauna are being damaged or are disappearing as the climate changes (Australian Government, 2021c). Many cultural practices have had to change or cease due to the impact of climate change on Country.

*'A lot of the seasons are out of whack. For example, plants are starting to flower later, the emus are starting to lay eggs later. So that's certainly been an impact from a cultural perspective' Southwest Queensland participant (Murawin, 2023).*

Climate change is affecting some cultural practices that are supported by government policies as well, such as Savanna Burning under the Carbon Farming Initiative.

There are also concerns about the protection of cultural heritage, sacred sites and ceremonial grounds from climate-related impacts. Some participants from coastal communities noted burial sites are being exposed due to washouts and anticipate the impacts of coastal inundation and erosion to increase over the next 20–30 years (Murawin, 2023). They are thinking about how to conserve their burial grounds (Murawin, 2023).

Loss of culture is impacting the physical health and social and emotional wellbeing of communities.

*'Climate change is causing significant ecological grief for Indigenous Australians by harming our country and our connection to it. This is re-traumatising after the impacts of colonisation.' Lyrebird Dreaming*

The authority also heard in rural and remote areas climate change is affecting food and water security and housing quality. These impacts have flow-on consequences for health as well.

*'Hunting is impacted. I'm hearing my mob saying they got to chuck an extra half a tank of petrol in and drive another two hours to get kangaroo. Five years ago that wasn't the case' (Northern Territory participant (Murawin, 2023).*

The authority heard from some participants that water sources are becoming too salty to drink, with some communities forced to buy water that is more expensive than sugary drinks (Murawin, 2023). Increased salinity in the earth is affecting housing quality too, which impacts the residents' health (Murawin, 2023).



Other research and work points to the disproportionate exposure to climate-related hazards for First Nations communities. For example, one study noted that First Nations people in New South Wales were more likely to experience a high numbers of heatwave days, live in areas with moderate to high rainfall variability making them more prone to drought and flood or live in areas with higher fire risk, compared to non-First Nations people both now and in the future (Standen, et al., 2022). The impacts of coastal inundation and changing weather patterns, including increased rainfall intensity, is also affecting Torres Strait Islanders' way of life. In 2022, the United Nations Human Rights Committee found that Australia failed to uphold the International Covenant on Civil and Political Rights by inadequately protecting indigenous Torres Strait Islanders against the adverse impacts of climate change (ClientEarth, 2022; Faa, 2022) (see Box 2.4).

Scholarship on Indigenous experiences of urban climate impacts and adaptation is limited (Nurse-Bray, Parsons, & Gienger, 2022; Choy, et al., 2013; HEAL Network & CRE-STRIDE, 2021). Given most First Nations people live in urban or regional parts of Australia rather than rural and remote parts (ABS, 2022a), this is an area of research that must be expanded.





#### ***BOX 2.4: United Nations Human Rights Committee finds in favour of Torres Strait Islanders***

Globally, compensation and restitution for losses and damages resulting from climate related impacts are growing issues for litigation and diplomacy. In 2022, UNFCCC COP27 heralded a breakthrough on the issue with countries agreeing to establish dedicated funding arrangements to assist developing countries to respond to loss and damage (UN, 2022a). These funding arrangements, however, will not assist those within Australia, like the Torres Strait Islanders, in responding to climate-related impacts and other avenues for compensation and restitution are likely to be pursued.

In 2019, 14 Torres Strait Islanders submitted a petition against the Australian Government to the United Nations Human Rights Committee (UNHRC) (Human Rights Law Centre, 2022). The petition claimed that as some of ‘the most vulnerable populations to the impact[s] of climate change’, changes in weather patterns and climate have had direct harmful consequences on their livelihood and culture (Human Rights Law Centre, 2022). For example, the petition submitted that coastal inundation has destroyed family graves and increasing intensity of rainfall and storms has degraded the natural landscape and consequently reduced the amount of food available for traditional diets (Human Rights Law Centre, 2022). The petition argued that their fundamental human rights under the International Covenant on Civil and Political Rights (ICCPR) had been violated as Australia had failed to adapt to and mitigate climate change.

In 2022, the UNHRC found Australia failed to uphold the ICCPR by inadequately protecting Indigenous Torres Strait Islanders against the adverse impacts of climate change (ClientEarth, 2022; Faa, 2022). The Committee’s remedy to Australia’s non-compliance requires adequate compensation, meaningful consultation, additional actions to secure the communities’ safe existence on their respective islands, and monitoring, review and resolution of deficiencies of measures as soon as practicable (Human Rights Law Centre, 2022).

The decision is the first-time:

- an international tribunal has found a country has violated human rights law through inadequate climate policy
- a nation state has been found responsible for their greenhouse gas emissions under international human rights law
- that peoples’ right to culture has been found to be at risk from climate impacts (ClientEarth, 2022).

While the decision of the UNHRC is not legally binding, the Australian Government has an obligation to provide an effective remedy (Human Rights Law Centre, 2022). In March 2023, the Australian Government published its response to the views of the UNHRC, available on the Attorney-General’s Department website (Attorney-General’s Department, 2023).

#### 2.4.4 Many First Nation Peoples are, and wish to be, an active part of finding adaptative solutions and accessing opportunities in the carbon transition

*We need more recognition of our right to protect our water and bush tucker.' Northern Territory participant (Murawin, 2023)*

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*'It is time that everyone sits up and takes notice, (including) the carbon and energy movement, that the rightful place for Aboriginal people is managing country and receiving the economic benefits and independence that it provides' Central Australia Participant (Murawin, 2023)*

#### 2.4.5 Importance of meaningful engagement

Recognising and incorporating Indigenous knowledge and perspectives through meaningful engagement can enhance Australia's adaptive capacity, resilience and transition. In the authority's consultation process, many participants spoke of the need for more substantial and comprehensive engagement based on ongoing relationships with government (Murawin, 2023). Ongoing relationships require participatory consultation through partnerships, transparency, and communication throughout the decision-making process. The authority heard that First Nations people, including Traditional Owners, continue to feel locked out of the decision-making process and not provided with appropriate opportunities to both participate in or benefit from caring for country activities. There was also a general perception that government systems are set up to impede Indigenous and environmental interests. For example, First Nations people are grouped as clans, dialects or individual language groups and nations' boundaries are defined by waterways and landscape: they can cross multiple jurisdictions.

*'It's not an environment issue, it's a communication issue.' Canberra participant (Murawin, 2023)*

Working with First Nations people through cooperative processes where expertise and lived experience are both recognised, respected and used to inform the final products of the process may achieve greater outcomes for the environment and First Nations people. Recognising and respecting the history, wisdom and First Nation systems can help support self-determination. The Australian Government has taken steps to strengthen engagement and partnerships with Aboriginal and Torres Strait Islander communities and advocacy organisations such as the First Nations Clean Energy Network, which has partnered with the Australian Government to develop the First Nations Clean Energy Strategy (DCCEEW, 2022b).

Engagement must be built on United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) principles of free, prior, and informed consent (FPIC), which Australia endorsed in 2009 (AHRC, 2021). FPIC is the right of Indigenous peoples to give or withhold their consent for any action that would affect their lands, territories, or rights. It promotes genuine inclusion, disclosure and respect for First Nations peoples decision-making processes (AIATSIS, 2020). FPIC must form part of best practice engagement with First Nations peoples and is central the First Nations Clean Energy Network's Aboriginal and Torres Strait Islander Best Practice Principles for Clean Energy Projects (FNCEN, 2022). As at October 2023, the Australian Senate is conducting an ongoing inquiry into the application of UNDRIP in Australia (Parliament of Australia, 2022).

A lack of access to culturally safe, accessible data on matters that impact communities poses a barrier to participation in current and future economic opportunities. One participant noted that we need ‘one trusted source of information’ to go to, stating some government websites were not being updated regularly (Murawin, 2023). Indigenous organisations and people who work or live in areas impacted by the transition today are in many cases working with outdated, or incomplete datasets maintained by government.

The 2023 Commonwealth Closing the Gap Implementation Plan presents an opportunity to address these barriers, if implemented successfully. The plan includes a path forward for Priority Reform Four of the 2023 Closing the Gap Agreement: shared access to data and information at a regional level. Implementation actions, including the establishment of six community data portal sites; fully established measurement frameworks and data development timelines for socioeconomic outcomes and for Priority Reforms; and an Australian Public Service-wide Framework for Indigenous Data and Governance are all due for delivery end of 2023 or mid-2024. If successfully implemented, these actions will support the commitment under Priority Reform Four that ‘Aboriginal and Torres Strait Islander people have access to, and the capability to use, locally relevant data and information to set and monitor the implementation of efforts to close the gap, their priorities and drive their own development’ (NIAA, 2023b). The authority will monitor the progress of this reform in future reports.

## 5. RECOMMENDATION

Facilitate the development of a First Nations peoples-led framework to engage with First Nations people on decarbonisation and adaptation matters, building on the principle of free, prior and informed consent.

### 2.4.6 Supporting First Nations economies

Employment provides financial and economic security and can facilitate First Nation self-determination. While First Nations employment remains persistently lower than non-First Nations people, a target of 62% First Nations people aged between 25 and 64 employed by 2031 is on track to be met under Closing the Gap Target 8: Strong economic participation and development of people and their communities, although this is based on limited data (Productivity Commission, 2021). However, participation in the renewable energy workforce is minimal. The 2021 Census shows 29 First Nations people reported to be working in ‘other electricity generation’, which captures wind, solar and other renewable forms of generation, and 30 reporting to be working in hydro-electricity generation. First Nations employment in fossil fuel extraction and energy generation is more significant. There were 2,715 First Nations people reporting to work in coal mining, 596 in oil and gas extraction, and 142 in fossil fuel electricity generation (ABS, 2022a).

Some opportunities for First Nations employment are being realised within Australia’s carbon farming industry, land management and Caring for Country initiatives, and these have demonstrated effective social, economic, environmental and cultural outcomes (Social Ventures Australia, 2016) (Weir, Stacey, & Youngetob, 2011). In the 2022–2023 Federal Budget, the Australian Government extended the Indigenous Rangers Program from 2021 to 2028, with \$746 million provided to 80 Indigenous ranger organisations over seven years to 2028. At 1 June 2023, the program employed approximately 1,900 people (NIAA, 2023a), and the Indigenous Land and Sea Corporation’s Real Jobs Program continues to fund 109 full time equivalent positions primarily within Indigenous ranger groups in the Northern Territory (ILSC, 2023).

## 6. RECOMMENDATION

Facilitate a First Nations peoples-led action plan to enhance First Nations workforce opportunities in decarbonisation and adaptation, and remove barriers to employment.



## 2.5 Improving communications and transparency

In submissions to the authority's issues paper and during consultation, multiple respondents noted the need for accessible and transparent communication of climate matters, including data and terminology.

*'But this other stuff like 'Net Zero... (and) 'carbon markets' it is so confusing, it's scary, it's scientific. (We know) our world has changed... (but) there is a lack of understanding of these terms and these scientific concepts.'* Central Australia participant (Murawin, 2023)

*'Educate the public on what the transition is, how it will work, what are clear and practical things they can implement themselves as part of the transition and the benefits of the transition.'* Anonymous individual submission

Access to information on climate change supports people, communities and businesses to understand their vulnerability and to plan and take action to reduce or overcome its impacts. Accessible, complete, consistent, up to date and transparent information ensures decision-makers can make informed choices to share the opportunities in decarbonisation, while contributing to the nation-wide effort to lower carbon emissions. Providing material in language for First Nations people and culturally and linguistically diverse people will also improve accessibility.

Open and clear climate information helps build trust between governments, industry and the Australian community. Building trust through improving access to information is key to develop and maintain social licence across Australia. In the authority's engagement process, an emphasis was placed on improving the transparency of, and equitable access to, data on transition impacts. Consultation participants noted that communication and transparency is essential to informed decision making, building trust and facilitating better data-driven analysis and outcomes.

In 2022, the Australian Government published the Australian Data Strategy (Australian Government, 2022c) and commenced the *Data Availability and Transparency Act 2022* (the DAT Act). The authority is committed to alignment with the Australian Data Strategy and its requirements under the DAT Act, including the Strategy's commitment to breaking down unnecessary barriers and simplifying data sharing. In future advice the authority will further consider data transparency and equitable access to data.

## 7. RECOMMENDATION

Support adaptation and transition decision-making, and improve transparency and accountability, by developing simple and accessible tools to explain climate and energy concepts.

## 2.6 Supporting regional and rural communities

Australia's transition has unique social, employment and economic benefits and risks for rural and regional Australia. In consultation, many organisations expressed concern for this disproportionate impact on these communities:

*'Declines in rural incomes has and will have the flow on effect of mental illness, including rising levels of depression' Environmental Justice Australia*

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*'Mining communities will be those most affected by decarbonisation, threatening their very existence...' Australian Mining Cities Alliance*

Several submissions called for targeted support for regional and rural communities that is tailored and responsive to community needs (ACOSS submission), based on plans for affected regions, industries and occupations including efforts to establish new industries and support for retraining (Brotherhood of St Lawrence submission), and focused on investment through initiatives such as Renewable Energy Industrial Precincts (Climateworks; BZE; CPD; WWF submissions).

*'The Authority and Governments should not stereotype mining communities, but instead acknowledge the diversity of circumstances and outlooks.' Australian Mining Cities Alliance*

### 2.6.1 Australia's Net Zero Authority

In May 2023 the Australian Government committed to establishing a Net Zero Authority that will 'ensure the workers, industries and communities that have powered Australia for generations can seize the opportunities of Australia's net zero transformation', through a mission that 'is aligned to the Paris Agreement and is about making sure that no one is held back as the economy changes' (Australian Government, 2023b).

Multiple submissions to the authority, including those from Climateworks, ACOSS, Committee for Sydney, Beyond Zero Emissions and Melbourne Climate Futures discussed avenues for achieving an equitable transition. A recurring theme was that a whole-of-government approach would be necessary to effectively co-ordinate transition planning, and several submissions referenced the importance of the Net Zero Authority to this task. Some respondents emphasised that clear, transparent and coordinated policymaking across different levels of government is critical to ensuring an equitable and accessible distribution of opportunities inherent to transition.

A whole of government approach must clearly establish the roles of each level of government. As guided by the Productivity Commission's findings in its Transitioning Regional Economies report (Productivity Commission, 2017), the Australian Government should focus on national economic development and coordinating between tiers of government to ensure services meet the needs of communities. Reviews of previous approaches to regional development have assessed the implications of a lack of coordination, finding that region-specific spending by state, territory or federal governments is often incorrectly targeted, and the effectiveness of regional development planning and expenditure has been impacted by confusion and overlap between jurisdictions (Productivity Commission, 2017; Smith, 2016; Pugalís & Tan, 2017).

Guided again by the Transitioning Regional Economies Report (Productivity Commission, 2017), a priority for the Australian Government should be working with state and territory governments to establish regional institutions that work in partnership with community, industry and government stakeholders to develop and implement community-led transition plans, advocate for investment and act as a coordination point for community. The Latrobe Valley Authority and Collie Transition Unit are operational examples of regional institutions that have delivered transition plans in partnership with local industry, government, business, and community (LVA, 2023a) (WA Government, 2020a). Effective representative regional institutions should be viewed as enablers for implementation of the Australian Government’s Regional Investment Framework, which is guided by a commitment to place-based decision making and valuing local voices (DITRDCA, 2023e).

The Climate Change Authority intends to consider the progress of Australia’s regional transitions in future reports.





## BOX 2.5 – Regional and rural consultation

For this report, the authority sought to understand how regional and rural communities are experiencing climate change impacts, transition risks and opportunities. Consultations were conducted with 260 people in Bourke (NSW), Katherine (NT), Gladstone (QLD), Mid-North (SA) and East Gippsland (VIC).

### Government action on climate change

Most respondents expressed concerns that:

- policy makers are not acting in the best interests of the community
- there was not enough policy action on climate change
- current policy will not achieve the outcomes required to mitigate climate impacts.

A handful of respondents expressed dissatisfaction in the government acting to reduce the causes and impacts of climate change, citing other priorities or general scepticism in human induced climate change.

*‘Not serious. Fooling around the edges while Rome burns.’ (Katherine participant)*

*‘Governments wasting their money. Climate Change has been happening for years.’ (Katherine participant)*

### Renewable energy

The authority also received feedback from consultation participants on renewable energy projects. They included concerns about reliability, cost, effectiveness and environmental impacts and positive messages around its adoption and implementation more broadly.

*‘Batteries aren’t affordable. Solar isn’t useful if you can’t afford batteries’ (Katherine participant)*

*‘I have solar on my house but bills remain high’ (Gippsland participant)*

### Natural hazards

The severity of natural hazards emerged as a significant issue, where it featured among the top five themes mentioned for Bourke and East Gippsland. It is evident that those interviewed felt that regional communities were overwhelmingly experiencing a rise in the severity of natural hazards, including floods, bushfires, and droughts. In addition to the immediate environmental consequences, these respondents from regions identified subsequent impacts such as economic trade decline resulting from crop and livestock loss, property damage, mental health impacts and community isolation due to damaged transportation infrastructure.

*‘Floods impacted economic trade & transport of goods and freight...for months tourist impact was devastating’ (Bourke/Cobar participant)*

*‘Trauma in community. Science disasters and eco grief’ (Mid North SA participant)*

*‘Overwhelmed with my need to continue to prepare for the next fire’ (Gippsland participant)*

### Implications of the net zero transition for regional communities

There is concern about the potential repercussions of the transition to net zero on regional communities, with a substantial portion of responses expressing apprehension that policy makers and representatives in major urban areas do not understand the unique requirements of regional and rural communities. The general sentiment indicated a need to foster unity among communities by actively involving them in planning to address climate change impacts and transition strategies. A high proportion of respondents expressed their sense that information about climate change, net zero and the transition is lacking or is too complicated for them to understand.

*‘No awareness around net zero, less jargon needed’ (Gladstone participant)*

*‘Net zero not a conversation at the BBQ in the community’ (Gladstone participant)*

*‘Message around climate change not getting through’ (Gladstone participant)*

## 2.7 Energy transition employment pressures

This section of the authority's report looks at the progress, opportunities, and challenges impacting sections of Australia's energy workforce in 2022–23. The Australian Parliament has requested the Climate Change Authority review potential technology transition and emissions pathways for six sectors by 1 August 2024. As part of this, the authority will further consider workforce matters, including skills and opportunities for women.

### 2.7.1 Coal mining and oil and gas extraction

In August 2023, the number of people in full time equivalent (FTE) employment in coal mining was approximately 44,900, which is 2,700 more people than the year prior. FTE employment in oil and gas continued a four-year decline since reaching a high of 26,900 people in 2020, with 20,800 people employed (FTE) in August 2023 (ABS, 2023). The National Skills Commission (NSC, 2022) projects a decline in both industries in the medium term, to approximately 39,000 coal mining jobs and 20,000 oil and gas jobs in 2026. The projections are highly dependent upon assumptions about overseas demand for these commodities, including for coking coal used in the production of steel. Australia exported most of its gas, at 74% of total production in 2019–20 (GA, 2022a) and most of its black coal, at 90% of total black coal production (GA, 2022b).

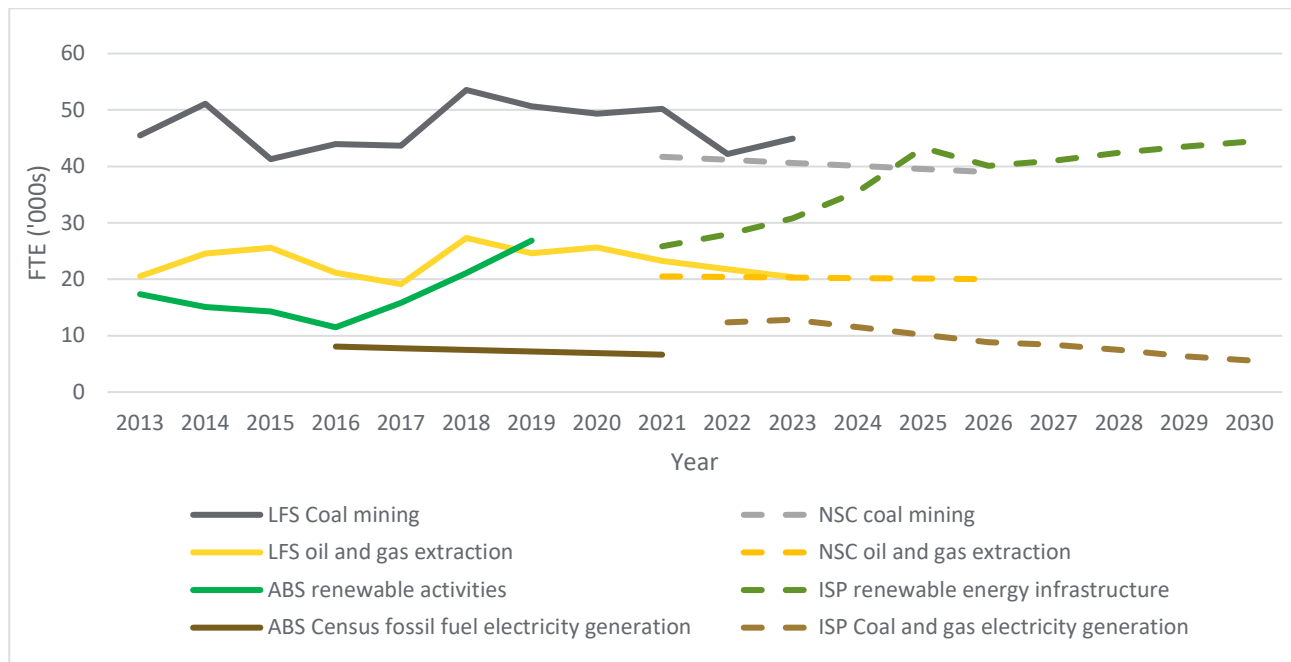
As Figure 2.1 below shows, approximately 6,600 people reported to be employed in fossil fuel electricity generation in the 2021 Census of Population and Housing, down from approximately 8,000 people in 2016 (ABS, 2022b). Analysis for the 2022 Integrated Systems Plan (ISP) projects coal and gas electricity generation to account for approximately 13,000 jobs (FTE) in 2023, 10,000 in 2025 and 6,000 by 2030 under the 'Step Change' scenario, AEMO's optimal development path for the National Electricity Market (Rutovitz, Langdon, Mey, & Briggs, 2023).

### 2.7.2 Renewable energy employment

In 2018–19, there were approximately 26,850 jobs across the renewable energy industry (ABS, 2020). Since this time, analysis for the 2022 ISP projects renewable energy infrastructure labour demand to reach approximately 31,000 roles in 2023 and continue increasing to approximately 43,000 roles in 2025 and 45,000 roles in 2030 (Rutovitz, Langdon, Mey, & Briggs, 2023). This estimate does not include energy efficiency, demand and energy management and electrification due to a lack of data and suitable datasets. Figure 2.1 demonstrates how employment in renewable energy, coal, oil and gas is projected to change over time.

The Australian Government is assessing the current and future capacity of Australia's energy workforce, including through the Australian Energy Employment Report (AEER) (DCCEE, 2023k) and the Clean Energy Capacity Study (CECS) which has produced The Clean Energy Generation Report (JSA, 2023). Regional institutions and state governments are also undertaking targeted exercises for their jurisdictions, including the Latrobe Valley Authority's Gippsland Energy Skills Mapping Report (LVA, 2023b) and the Queensland State Government's Future Energy Workforce Roadmap (Queensland Government, 2023a).

Figure 2.1: Australia's Transitioning Energy Workforce



Notes:

- Coal mining and oil and gas extraction figures are a four-quarter moving average of ABS Labour Force Survey data. Averaged quarters are November – August. The final quarter assessed is August 2023.
- The authority has undertaken linear regression between: ABS Census fossil fuel electricity generation years 2016 and 2021; and NSC coal mining and NSC oil and gas extraction years 2021 and 2026, due to no available data between start and end years.
- Source: (ABS, 2020; ABS, 2023; Rutovitz, Langdon, Mey, & Briggs, 2023; NSC, 2022; ABS, 2022b).

### 2.7.3 Impact on communities

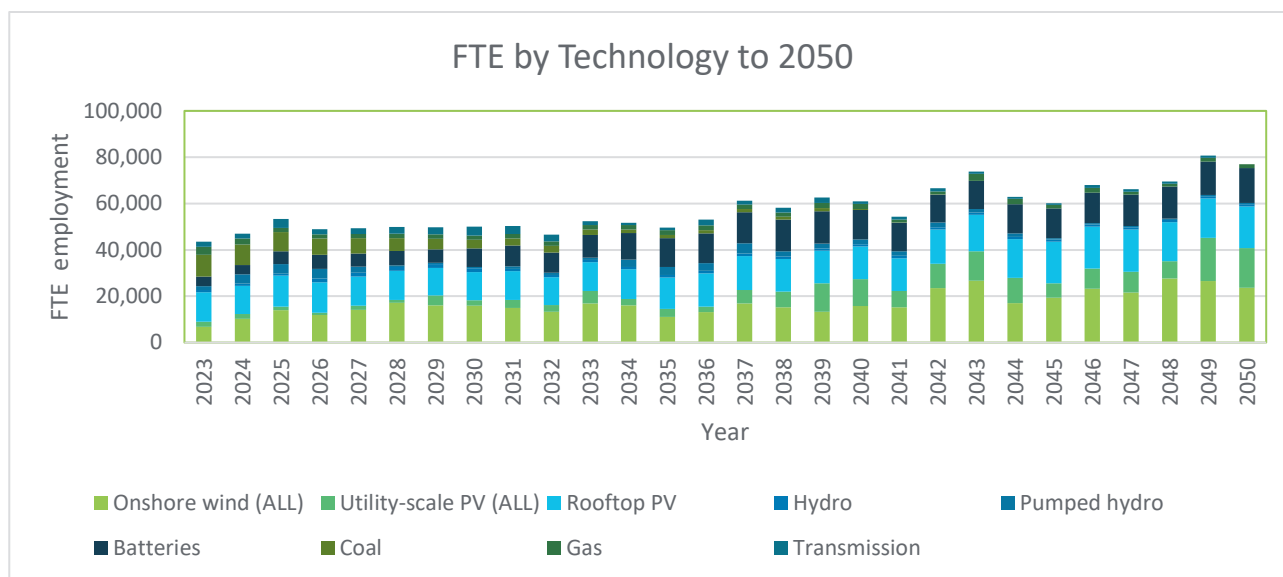
Transition opportunities should not be expected to replace job losses in regions on a one-to-one basis and many regions remain particularly exposed to international decarbonisation pressures on Australia's fossil fuel exports, with little certainty that jobs and job quality will be replaceable (Export Finance Australia, 2022; Smith & Phillips, 2022; Accenture, 2021).

Both short and long-term concentrated job losses are likely to have material impacts on communities (Burke, Best, & Jotzo, 2019). While state government-led schemes, such as the Queensland Government's Energy and Jobs Plan (2022a) can provide much needed certainty to transitioning regions, a gap remains in planning certainty at the national level. The authority notes that the Australian Government has committed for the Net Zero Authority to 'support workers in emissions-intensive sectors to access new employment, skills and support as the net zero transformation continues' (Australian Government, 2023b).



Transferrable occupations, such as machine operators, project managers, electricians, labourers and construction workers can provide significant opportunities for workers and communities transitioning from traditional energy jobs (Briggs, Rutovitz, Dominish, & Nagrath, 2020). However, many roles require long training (or retraining) lead times of four years or more (Infrastructure Australia, 2021) and are regarded as difficult jobs to recruit for (Rutovitz, Langdon, Mey, & Briggs, 2023). There is already significant demand pressure for these roles, which is forecast to continue rising. As Figure 2.2 demonstrates, labour demand for energy infrastructure, including fossil fuel electricity generation, is forecast to rise from 44,000 positions in 2023 to 53,000 positions in 2025 and remain at approximately 50,000 until 2035 before continuing to steadily increase, peaking at approximately 81,000 in 2049.

Figure 2.2: Projected Full Time Employment by Technology under Optimal Development Path



Source: (Rutovitz, Langdon, Mey, & Briggs, 2023).

Early certainty and planning support for regions and workers to address this demand pressure is essential. Skill shortages are posing a high risk to the optimal deployment of infrastructure plans such as the Integrated Systems Plan (Rutovitz, Langdon, Mey, & Briggs, 2023). Further, renewable energy projects are prone to boom-bust cycles (Briggs, et al., 2022a). For example, in the New England Renewable Energy Zone, labour demand for utility solar generation infrastructure is forecast to remain well within current supply until 2027. However, labour demand in 2027 is forecast to ‘boom’, increasing significantly to exceed supply by approximately 750 jobs in 2027 and 900 jobs in 2028. Following this, total demand is projected to ‘bust’, immediately declining from approximately 2,550 jobs in 2028 to 550 in 2030 (Briggs, et al., 2022b). This volatility creates several immediate challenges: investment in local workforce long-lead time training and upskilling for temporary opportunities is unlikely to be substantial and local unemployment impacts are pronounced when demand reduces; fly-in, fly-out or drive-in, drive out workforces create unsustained local demand cycles; and projects are exposed to delays which create decarbonization bottle necks (Briggs, et al., 2022b).

These challenges, alongside others such as the capability of the Vocational Education and Training system to educate and train Australia’s clean energy labour capacity (ISA, 2023), and developing datasets for energy efficiency and electrification labour demand should be addressed through national energy workforce transition planning. The authority will contribute to this planning in our sectoral emissions reduction and technology transition pathways review in 2024.

For more information about the work of the Climate Change Authority, visit our website at <https://www.climatechangeauthority.gov.au/>.

You can also contact us at: <mailto:enquiries@climatechangeauthority.gov.au>