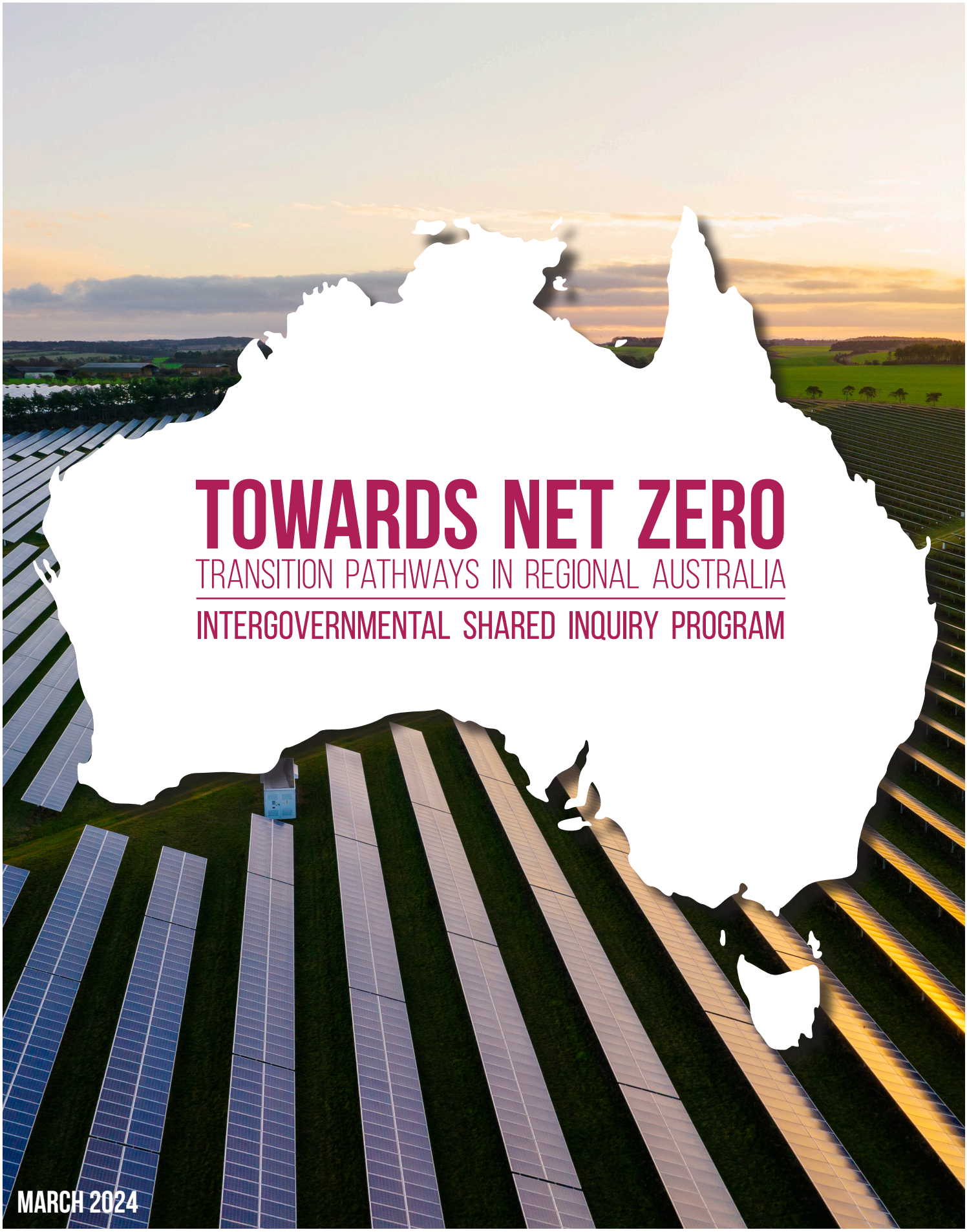
REGIONAL AUSTRALIA INSTITUTE



TOWARDS NET ZERO

TRANSITION PATHWAYS IN REGIONAL AUSTRALIA

INTERGOVERNMENTAL SHARED INQUIRY PROGRAM

MARCH 2024

ABOUT THE REGIONAL AUSTRALIA INSTITUTE

The Regional Australia Institute (RAI) is the nation's first and only independent think-tank dedicated to empowering Australia's regions. We are a not-for-profit organisation that undertakes research to stimulate and activate our rural and regional communities.

RAI celebrates 13 years in 2024. We are proud of the vast array of research, data, and detailed insights the RAI has provided into many of the significant issues and challenges facing regional Australia. The work of the Institute is made possible through research partnerships with federal, state and territory governments, the national Regions Rising event series, regional consultancy projects, membership, and philanthropic funding.

The RAI exists so that decision-makers at all levels of government, not-for-profits, industry, and community have the information they need to ensure the best outcomes for regional Australia. By replacing myths and stereotypes with facts and knowledge, the RAI builds bridges between city and country Australians.

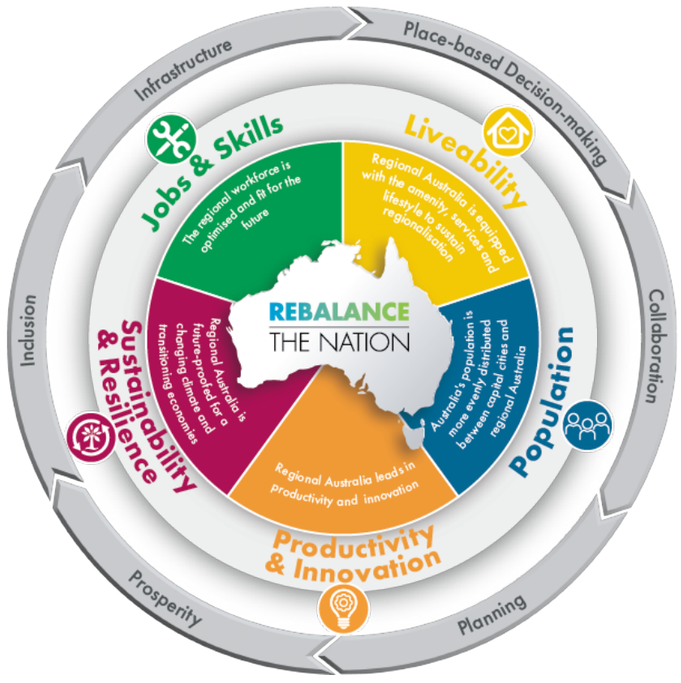
We care about the regions, because when our regions are strong, Australia is strong.

REGIONALISATION AMBITION 2032

Based on more than a decade of research into the most important issues influencing the regions, in 2022, the RAI launched the Regionalisation Ambition 2032 - A Framework to Rebalance the Nation – a 10 year plan for regional Australia.

Designed for all levels of government, industry and the community, the Ambition seeks balanced growth across our nation's regional towns and cities. The Framework underpinning the Ambition outlines crosscutting themes and five pillars each of which are interlinked and equally important. Across each pillar the RAI has outlined key targets, actions and benefits that will contribute to building prosperous regional communities, and a stronger Australia.

See the *Regionalisation Ambition 2032 – A Framework to Rebalance the Nation*



ABOUT THE INTERGOVERNMENTAL SHARED INQUIRY PROGRAM

This report is funded through the Regional Australia Institute's *Intergovernmental Shared Inquiry Program*. The program delivers an annual public interest research agenda focussing on topics of strategic importance to regional Australia through a partnership with federal, state and territory governments.

The Regional Australia Institute acknowledges our funding partners: the Australian Government through the Department of Infrastructure, Transport, Regional Development, Communications and the Arts; the Victorian Government Department of Jobs, Skills, Industry and Regions; the South Australian Government Department of Primary Industries and Regions; the Western Australian Government Department of Primary Industries and Regional Development; and the Queensland Government Department of Regional Development, Manufacturing and Water.

ACKNOWLEDGMENT

The RAI acknowledges and values the contributions from *Transition & Recovery Australia* (TRA). TRA is a regional focussed advisory firm specialising in assisting communities and governments to navigate transitions. TRA conducted the community case studies featured in this report, as well as provided the community transition framework included in the report.

We also acknowledge the contributions of *Constructive Energy*, a regionally based energy consultancy firm specialising in developing renewable energy projects for regional Australia. Constructive Energy conducted the interviews with regional city stakeholders.

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EXECUTIVE SUMMARY

This report is one of four prepared by the Regional Australia Institute in 2023/24, looking into issues affecting regions as we move towards net zero emissions by 2050. This report sets out potential pathways for communities and businesses in regional Australia by exploring Australia's position in the global context; examining the role of Regional Cities; and highlighting the elements of success in communities that are leading the way. It delivers a unique Framework for transition (see page 48).

GLOBAL EXPERIENCES

- Australia has the benefit of learning from the experience of other countries' transition away from legacy resources.
- International examples have shown that inadequate support measures can result in vulnerable communities experiencing poorer economic and social outcomes, as well as depopulation, decades after closure.
- It is crucial that timely and effective measures are implemented to support vulnerable communities.

REGIONAL CITIES

- Regional Cities have a unique opportunity to determine their own decarbonisation pathways and are well placed to benefit from place-based decision making.
- With a strategic vision in place, and broader support and information available, the consultations with stakeholders in this report suggest that investment into transition activities will flow once the returns are evident.
- State and Commonwealth leadership is required to ensure regional initiatives are designed and implemented early, are adequately resourced, and importantly are place-based.

COMMUNITIES LEADING THE WAY

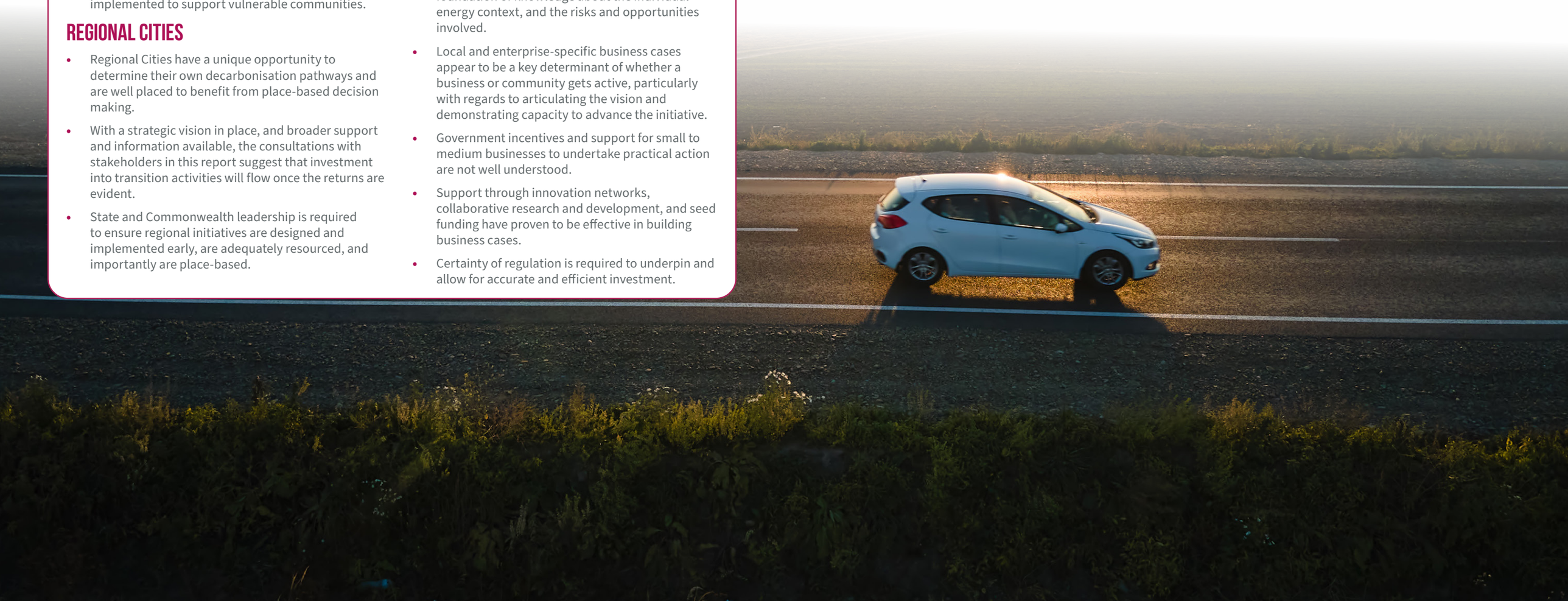
- While government support and leadership is crucial in the transition to net zero, local communities must take the lead on devising local solutions. There is a delicate mix of internal drivers, community momentum, and external support needed for a place to emerge as a leader in the net zero transition.
- The successful community-led initiatives highlighted in this report all shared a solid foundation of knowledge about the individual energy context, and the risks and opportunities involved.
- Local and enterprise-specific business cases appear to be a key determinant of whether a business or community gets active, particularly with regards to articulating the vision and demonstrating capacity to advance the initiative.
- Government incentives and support for small to medium businesses to undertake practical action are not well understood.
- Support through innovation networks, collaborative research and development, and seed funding have proven to be effective in building business cases.
- Certainty of regulation is required to underpin and allow for accurate and efficient investment.

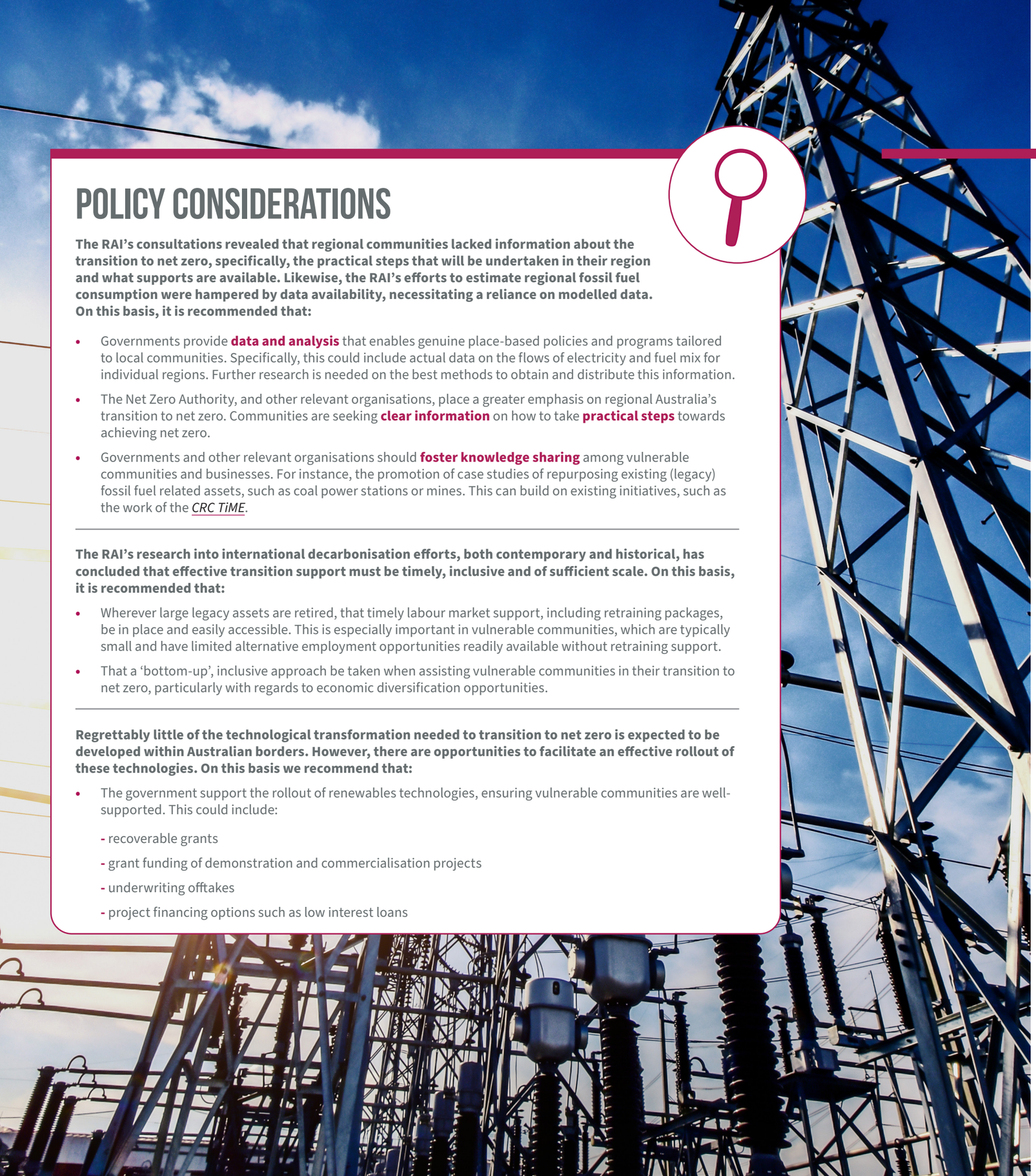
THE PATH TO TRANSITION

Countries with a high reliance on fossil fuels, such as Australia, face the most significant transition journey. Our industry and export composition requires a significant transformation effort compared to most other developed nations. Australia's current political enabling environment is now well-placed to aid in this transition, however, it would benefit from a carbon pricing system and emissions trading system. Recent government pledges are substantial and much needed to assist with the process, however the extent to which less prominent places in regional Australia will be supported is not yet clear.

The net zero transition in regional areas across Australia is in part a story of decentralisation. It opens questions of ownership, control, distribution and responsibility that may lead to new models of energy production, storage and use that benefit the local community. It will be important for experiences and learnings of 'bottom up' models to be broadly shared to overcome the 'top down' existing model of building large hubs of power generation that send energy out to consumers.

There is a wide variety of examples demonstrating the positive and negative implications of transitioning to a net zero economy. Get it wrong, and vulnerable communities will likely depopulate, encounter higher levels of unemployment and face poorer health outcomes. A 'just transition' is crucial to ensure that those vulnerable communities bearing the brunt of the disruption caused by low-carbon policies are not left behind. With effective, timely, and targeted policy support, the less visible smaller regional places which are currently reliant upon fossil fuels could claim a bigger role in Australia's renewable economy in future.





POLICY CONSIDERATIONS

The RAI's consultations revealed that regional communities lacked information about the transition to net zero, specifically, the practical steps that will be undertaken in their region and what supports are available. Likewise, the RAI's efforts to estimate regional fossil fuel consumption were hampered by data availability, necessitating a reliance on modelled data. On this basis, it is recommended that:

- Governments provide **data and analysis** that enables genuine place-based policies and programs tailored to local communities. Specifically, this could include actual data on the flows of electricity and fuel mix for individual regions. Further research is needed on the best methods to obtain and distribute this information.
- The Net Zero Authority, and other relevant organisations, place a greater emphasis on regional Australia's transition to net zero. Communities are seeking **clear information** on how to take **practical steps** towards achieving net zero.
- Governments and other relevant organisations should **foster knowledge sharing** among vulnerable communities and businesses. For instance, the promotion of case studies of repurposing existing (legacy) fossil fuel related assets, such as coal power stations or mines. This can build on existing initiatives, such as the work of the *CRC TiME*.

The RAI's research into international decarbonisation efforts, both contemporary and historical, has concluded that effective transition support must be timely, inclusive and of sufficient scale. On this basis, it is recommended that:

- Wherever large legacy assets are retired, that timely labour market support, including retraining packages, be in place and easily accessible. This is especially important in vulnerable communities, which are typically small and have limited alternative employment opportunities readily available without retraining support.
- That a 'bottom-up', inclusive approach be taken when assisting vulnerable communities in their transition to net zero, particularly with regards to economic diversification opportunities.

Regrettably little of the technological transformation needed to transition to net zero is expected to be developed within Australian borders. However, there are opportunities to facilitate an effective rollout of these technologies. On this basis we recommend that:

- The government support the rollout of renewables technologies, ensuring vulnerable communities are well-supported. This could include:
  - recoverable grants
  - grant funding of demonstration and commercialisation projects
  - underwriting offtakes
  - project financing options such as low interest loans

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CONTENTS

EXECUTIVE SUMMARY 4
POLICY CONSIDERATIONS 6
01. INTRODUCTION 8
02. SCOPE OF RESEARCH 9
03. THE GLOBAL TRANSITION TO NET ZERO 10
04. AUSTRALIA'S PLACE IN THE GLOBAL TRANSITION TO NET ZERO 14
05. CASE STUDIES FROM THE INTERNATIONAL COMMUNITY 22
06. THE UNIQUE POSITION OF REGIONAL CITIES 26
07. REGIONAL CITIES IN TRANSITION 28
08. LEADING THE WAY: COMMUNITY CASE STUDIES 36
09. A FRAMEWORK FOR TRANSITION 48
10. CONCLUSION 53
APPENDIX 1: METHODOLOGY 54
APPENDIX 2: RAI REGIONAL TYPES 57
REFERENCES 59

01. INTRODUCTION

Towards Net Zero: Transition Pathways for Regional Australia is one of four reports prepared by the Regional Australia Institute in 2023/24 looking into issues affecting regional communities in the transition to net zero emissions by 2050. The report sets out the transition pathways for communities and businesses in regional Australia.

This research was conducted under the Intergovernmental Shared Inquiry Program which is jointly funded by the Commonwealth Government and the governments of South Australia, Victoria, Queensland, Western Australia and New South Wales. The three companion reports from the research program are:

TOWARDS NET ZERO: FOSSIL FUEL DEPENDENCY IN REGIONAL AUSTRALIA

TOWARDS NET ZERO: DECARBONISING PIVOTAL INDUSTRIES IN REGIONAL AUSTRALIA

TOWARDS NET ZERO: EMPOWERING REGIONAL COMMUNITIES

This report sets out potential transition pathways for communities and businesses in regional Australia. It reviews experiences globally and in a variety of regional cities and towns. We examine successful transitions, readiness for transition and the support communities may need to transition their economies to meet Australia's net zero emissions target. The report:

- Contextualises Australia's place in the global energy transition
- Highlights lessons learned from comparable international energy transitions
- Presents the findings from interviews with stakeholders in eight Regional Cities about awareness and action on the transition
- Presents case studies of leading place-based examples of accelerated transitions
- Presents a framework to guide business and communities in managing the energy transition in a regional setting

02. SCOPE OF RESEARCH

The social and economic opportunities and challenges of the transition to net zero emissions are well reported in academic, government and consulting literature. Numerous guides for decarbonising have been produced, often with great insight into transition plans and activities occurring in other countries that are further along the transition path. In Australia, the reports produced tend to focus on the needs of major fossil fuel producing regions. Unfortunately, there is little information about pathways to net zero for small and single industry communities outside the main energy producing regions.

To address the gap, this report focuses on regions as consumers of fossil fuels, rather than generators of energy. Viewing communities through the lens of consumption rather than production raises important questions about the opportunities and challenges for small, often remote places, that do not attract the attention of their large, fossil fuel industry specialised neighbours.

The original guiding research questions were:

- Do the focus communities have the capacity to retrain and redeploy their workforces?
- Do they have the capacity to decarbonise local industries?
- Can they diversify their economies sufficiently to replace economic output from fossil fuel and other high carbon producing industries?
- What are their options for new industry specialisations and/or diversification (tourism, agriculture, manufacturing, hydrogen etc)?

During the research process, the focus shifted away from questions of industry adaption, and toward community knowledge and vulnerability. Initial quantitative analysis identified vulnerable regional communities with a high reliance on fossil fuels, and focus was placed on understanding those communities.

Specifically:

- Was the identified vulnerable community aware of its position?
- What were the community's motivations to respond to this vulnerability, and what is their current level of readiness?
- What are some communities already doing to manage their net zero transition pathway?
- What supports may be required to assist these vulnerable regional communities through the net zero transition?
- Presents a framework to guide business and communities in managing the energy transition in a regional setting.



03. THE GLOBAL TRANSITION TO NET ZERO



Over 70 countries, including the largest polluters accounting for 76% of emissions, have set a net zero emissions target.[1] The proposed transition pathways, including the policies and technologies to be utilised, vary widely by country. Likewise, the likelihood of achieving net zero varies considerably, with some countries making excellent progress and others struggling to keep pace. At the time of writing, there are already eight countries that have achieved net zero emissions – however almost all of these are heavily forested carbon sinks with low populations and limited industry.[2]

While the pathway for each country will be unique, Australia has the benefit of gaining insight from countries further along their transition and can incorporate these learnings into its own pathway. An international literature review has been conducted on the UK, Canada and the United States of America. These countries were chosen due to their similarities with Australia, as well as their comparable progress towards net zero emissions.

- Canada has modelled a program for near net zero emissions by 2050, with a decrease in energy demand by one third through improved energy efficiency technologies. This will include new forms of energy generation, including hydropower, nuclear, wind, solar and fossil fuels with carbon capture and storage (CCS). Canada is utilising a variety of policy instruments, including carbon pricing, regulations, investment incentives and public procurement of green technology (Conigrave, 2023). Canada faces challenges in its transition, notably the importance of the oil and gas industry in different provinces and the significant exports it generates for the country.
- The United States is developing and utilising a variety of new technologies, such as a widespread EV deployment, decarbonising electricity and switching to clean fuels (such as hydrogen), cutting energy waste through end-user products, and reducing methane gas emissions[3]. These initiatives involve close collaboration between all levels of government, industry, and the community.
- The UK is pursuing broader objectives through its Environmental Improvement Plan, including improving biodiversity, air quality, water quality and natural capital. A focus on green industries and high skilled jobs has become part of the transition plan, accounting for the economic and social concerns surrounding the transition. The UK is already familiar with the challenges involved in reducing fossil fuels, notably the economic and social decline from the removal of the coal industry. The actions taken after the closing of coal mines in the 1980s, demonstrated the social and economic impacts that can occur on the surrounding communities. A case study is detailed later in this document.

The graphs in Figure 1 have been constructed using data from KPMG's Net Zero Readiness Index. This tool compares 32 countries in their efforts to reduce emissions, as well as assesses their readiness and ability to achieve these emissions reductions by 2050. The countries include a mix of developed and developing countries, as well as mixture of large and small populations. The index is comprised of 103 indicators, including the county's commitments to decarbonise (both past and present) and the enabling environment. These are conducted at the national level.

The third index – sector readiness – examines the five largest industry emitters: electricity, transport, agriculture, construction, manufacturing. This index looks at the industries' decarbonisation status, government action and capability to actually deliver.

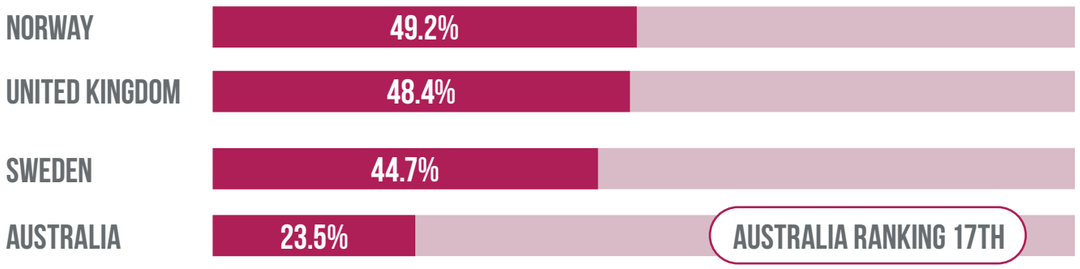
Australia currently ranks 17th of the small group of 32 selected countries. Australia ranked very highly (5th) on the 'enabling environment' score due to the regulatory infrastructure in place. Australia's score was dragged down due to our large agricultural industry (particularly meat and dairy), as well as our reliance on coal for power generation. The lack of an emissions trading system or carbon pricing system was also a detractor from our international ranking.

Other reputable indices include the Climate Transparency Report 2021 (based on 100 indicators across the largest 20 countries) and the Green Future Index 22 (ranking 76 economies and published by MIT Technology Review Insights). These, and other similar indices, typically place Australia in the bottom half of the rankings. The Green Futures Index places Australia in a category described as making 'slow and uneven progress or commitment toward building a green future'. Likewise, the Climate Action Tracker places Australia mostly in the 'insufficient' category across a range of metrics, however climate finance is considered to be 'critically insufficient'.

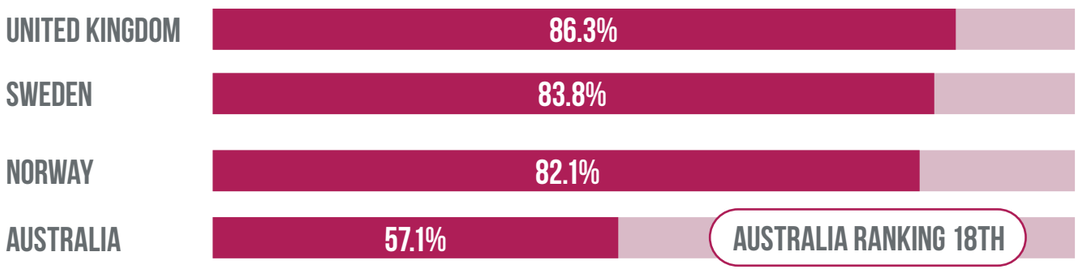
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HOW AUSTRALIA COMPARES TO TOP PERFORMING COUNTRIES IN THE NET ZERO TRANSITION

1. NET ZERO READINESS INDEX



2. NATIONAL PREPAREDNESS SCORE



3. SECTOR READINESS SCORE

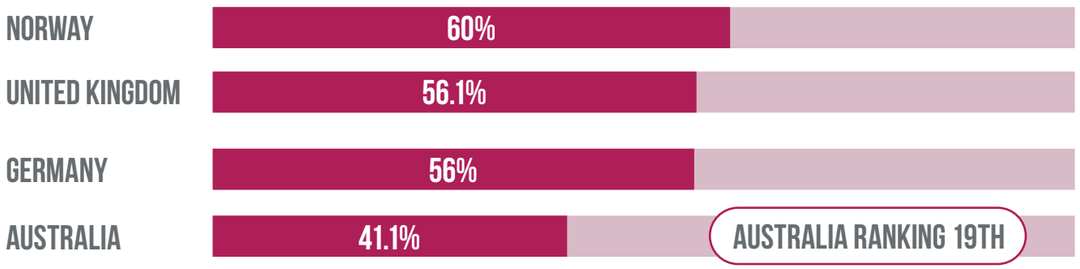


Figure 1: How Australia compares to top performing countries in the net zero transition

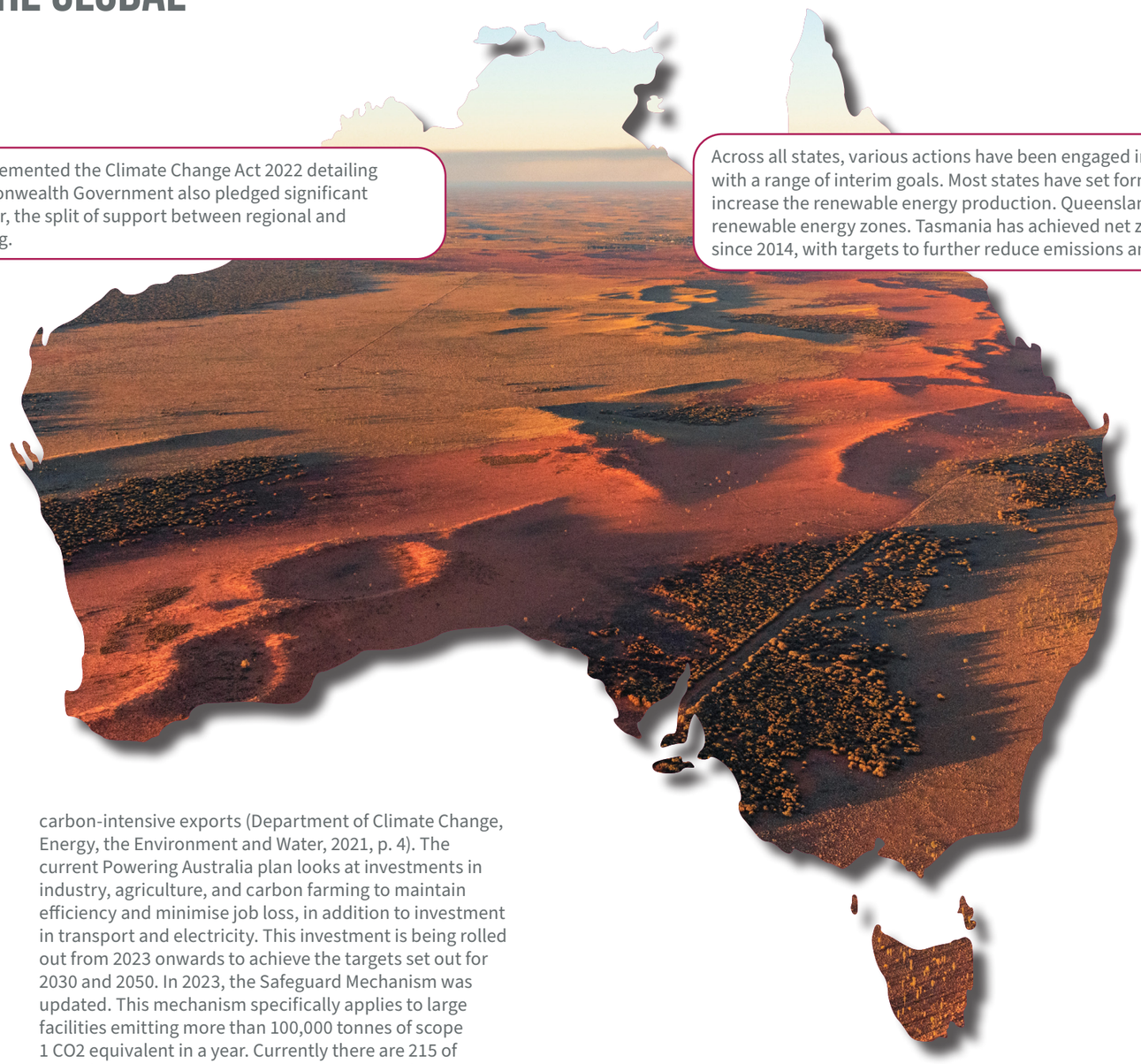
Source: KPMG (2021). Net Zero Readiness Index 2021. home.kpmg/NZRI



04. AUSTRALIA'S PLACE IN THE GLOBAL TRANSITION TO NET ZERO

In 2022 the Commonwealth Government implemented the Climate Change Act 2022 detailing the transition to net zero by 2050. The Commonwealth Government also pledged significant investment to support the transition. However, the split of support between regional and metropolitan is unknown at the time of writing.

Across all states, various actions have been engaged in to transition towards net zero by 2050, with a range of interim goals. Most states have set formal interim goals to reduce emissions and increase the renewable energy production. Queensland, NSW, and Victoria are establishing renewable energy zones. Tasmania has achieved net zero annual emissions on several occasions since 2014, with targets to further reduce emissions and maintain their current performance.



In September 2022, the Commonwealth Government implemented the *Climate Change Act 2022 (Cth)* detailing Australia's plan to transition to net zero by 2050. In line with the Paris Agreement, the Australian Government pledged a 43% reduction in greenhouse gas emissions by 2030 from 2005 levels, as well as a longer-term goal of achieving net zero emissions by 2050. The policies included $20bn to decarbonise the electricity grid, $3bn to support renewables manufacturing, $100m to train 10,000 new energy apprentices, and $500m for electric vehicle charging and hydrogen fuelling infrastructure[4]. Also announced in the 2023-24 budget was the new National Net Zero Authority to help guide Australia's net zero transition[5]. The Net Zero Authority will support workers transition out of emissions-intensive sectors to new employment; support communities to take advantage of clean energy industries; and help investors engage with opportunities. This was a significant increase on previous targets and brought Australia in line with commitments from other advanced economies, however the split in the support between metropolitan and regional areas is unknown at the time of writing.

Consultations with regional communities uncovered a wide spectrum of outlooks regarding the opportunities resulting from net zero. The regions heavily reliant upon fossil fuels generally had a less optimistic outlook. However, one notion consistent amongst all interviewees was the feeling of insufficient government support and limited understanding of the particulars involved in the transition. Independent of this national commitment, several states have announced their own net zero emissions targets, notably Tasmania which aims for net zero emissions as close as 2030.

The current federal plan for moving towards net zero is the 'Powering Australia Plan', replacing the previous government plan 'The Plan to Deliver Net Zero: The Australian Way' in 2021. The main driver of the previous plan for net zero was the reliance on trading partners to transform energy systems and shift demand away from carbon-intensive exports (Department of Climate Change, Energy, the Environment and Water, 2021, p. 4). The current Powering Australia plan looks at investments in industry, agriculture, and carbon farming to maintain efficiency and minimise job loss, in addition to investment in transport and electricity. This investment is being rolled out from 2023 onwards to achieve the targets set out for 2030 and 2050. In 2023, the Safeguard Mechanism was updated. This mechanism specifically applies to large facilities emitting more than 100,000 tonnes of scope 1 CO2 equivalent in a year. Currently there are 215 of these facilities, primarily across mining, manufacturing, transport and waste, and collectively they produce over a quarter of Australia's emissions.

These specific reductions targets are in line with the national targets but with a greater number of interim targets to create a more steady and predictable reduction.

In addition to the plan, the *Climate Change Act 2022 (Cth)* was introduced at a federal level to create a policy base for moving forward. The legislation places emphasis on the recording and reporting of emission targets, in addition to the social and economic transitions of communities. The legislation requires the minister to update the emissions target based on Australia's performance and to prepare an annual statement of Australia's progress towards net zero, the first of which was released in December 2022. This statement must address issues within regional and rural Australia on the transition. The statements will specifically reference the social, economic, and employment benefits of emissions reduction and the physical impact of climate change.

A focus of the actions involves expanding markets for minerals and metals, as well as building the hydrogen energy market and the carbon market. The commercialisation of hydrogen as a renewable energy source is receiving further investment at a federal level. There are also investments for increasing electric vehicles and improving accessibility to charging stations.

Research on Australia's net zero transition demonstrates it is possible by 2050, however it requires a significant transformation of infrastructure, including development of wind and solar electricity to replace existing fossil fuels, gas power plants for reliability after coal plants are retired, and building of carbon capture systems. It is paramount that policy design does not further inequalities at the regional level, particularly rural areas and that are heavily reliant upon fossil fuels.

Australia's adoption of net zero by 2050 will be challenging to reach if renewable energy alternatives, such as wind and solar, do not receive sufficient investment. Many state governments are increasing their investment and targeting policy actions to support the growth of this infrastructure. State governments have also implemented policies for regional transitions, including job creation and alternative forms of energy production.

4.1 WESTERN AUSTRALIA



The Western Australia State Government has released the *Climate Resilient WA: Directions for the State's Climate Adaptation Strategy*. This strategy identified four directions to accelerate action, and support a comprehensive long-term approach to climate risk, resilience and adaption:

- Produce and communicate credible climate information
- Build public sector climate capability and strengthen accountability
- Enhance sector-wide and community partnerships to unite and coordinate action
- Empower and support the climate resilience of Aboriginal people

There are currently no formal interim targets to achieve net zero emissions by 2050, however, legislation expected to be introduced in 2023 will formalise the target to reduce government emissions by 80 per cent below 2020 levels by 2030. To achieve this goal the WA Government will implement energy efficiency measures, procurement of renewable energy, reduced emissions in government vehicles, and use local offsets. For example, government owned company Synergy will transition out of coal-fired power generation by 2030, and $3.8bn will be invested into green power infrastructure in the South West Interconnected System (SWIS).

4.2 SOUTH AUSTRALIA



The *South Australian Government Climate Change Action Plan 2021-2025* outlines government-led objectives and actions to build a strong, climate-smart economy.

This plan involved seven key focus areas:

- Clean energy transformation
- Climate-smart economy
- Climate-smart agriculture, landscapes, and habitats
- Low emissions transport
- Climate-smart built and urban environments
- Resilient communities
- Government leading by example

The South Australian Government has set goals to reduce South Australia's greenhouse gas emissions by more than 50% below 2005 levels by 2030. In the 2020 financial year, South Australia emitted 25.4 million tonnes of carbon dioxide equivalent, representing a 31.1% reduction in greenhouse gas emissions, making sound progress toward achieving its 2030 targets. Much of this achievement can be attributed to the transition towards renewable sources of energy production, as of 2022, 71% of South Australia's energy was generated from these sources.

4.3 NORTHERN TERRITORY



A three-year plan was developed to guide the Northern Territory Government actions to deliver their climate change response. This plan will be reviewed in 2025. The climate response framework is built around four key objectives:

- Net zero emissions by 2050
- A resilient Territory
- Opportunities from a low carbon future
- Inform and involve all Territorians

A key part of this transition plan is investing into renewable energy production. The Northern Territory Government is investing in battery storage systems to improve network stability and energy security. It is also working towards bringing solar power generation and storage to remote Territory communities. This is expected to reduce emissions by approximately 250,000 tonnes CO2-e. In addition to solar power generation, the Territory is also looking at hydrogen production and export through public and private partnerships.

In addition, the Territory is providing support to improve energy efficiency in households and businesses. This is through grants to assist businesses to reduce energy efficiency, and regulatory reviews to ensure appropriate energy efficiency requirements are adapted into town planning and building sectors.

The government is investigating how to promote the increase of electric vehicle purchases. They have outlined four priority areas in the *Northern Territory Electric Vehicle Strategy and Implementation Plan – 2021-2026*:

- Vehicle costs and availability
- Vehicle charging
- Knowledge, skills, and innovation
- Consumer information

4.4 QUEENSLAND



The *Queensland Energy and Jobs Plan (the Plan)* was released in September 2022, and outlines the government's plan to transform Queensland's electricity system to deliver clean, reliable and affordable energy. The Plan leverages Queensland's natural advantages to:

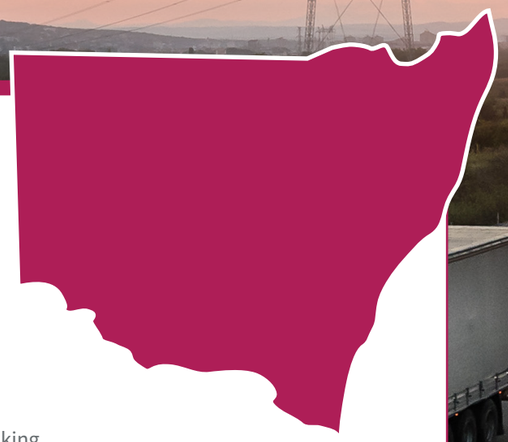
- Build a competitive energy system – a new Queensland SuperGrid – for the economy and industries as a platform for accelerating growth
- Deliver affordable energy for households and businesses, and support more rooftop solar and batteries
- Drive better outcomes for workers and communities as partners in the energy transformation

The Plan has renewable energy targets of 50% renewable energy by 2030, 70% by 2032 and 80% by 2035, and a commitment to legislate these targets. The Plan is accompanied by the Queensland SuperGrid Infrastructure Blueprint, which sets out the optimal infrastructure pathway to build the Queensland SuperGrid – the renewable energy, storage, and network infrastructure necessary to achieve the renewable energy target, at least cost, and while maintaining a safe, secure and reliable electricity supply.

Some actions already underway include the investment of $8.4m to support the carbon farming industry and create jobs for Traditional Owners, providing long-term income certainty to support the development of 150 megawatts of large-scale power production, and supporting environmentally responsible projects through 'Green Bonds' issued through the Queensland Treasury Corporation.

The Queensland Government is establishing Queensland Renewable Energy Zones (QREZ) and investing $145m towards this project as part of its COVID-19 economic recovery plan. This incorporates both wind and solar power with batteries as well as pumped hydro being built in targeted areas to maximise cost efficiency and improve transmission across the state. The three zones are the Northern QREZ in Far North Queensland, Central QREZ and Southern QREZ.

4.5 NEW SOUTH WALES



NSW has established a target of net zero emissions by 2050, with an interim target of reducing emissions by 50% by 2030 compared to 2005 levels, whilst also maintaining economic growth. The *NSW Climate Change Adaption Strategy* outlines four priorities:

- Develop robust and trusted metrics and information on climate change risk
- Complete climate change risk and opportunity assessments
- Develop and deliver adaptation action plans
- Embed climate change adaptation in NSW Government decision-making

NSW is looking at the commercialisation of hydrogen production as a new technology to reduce emissions in a cost-effective manner. Through further development of this industry, NSW has established a target of 10% hydrogen in the gas network by 2030.

NSW has established five Renewable Energy Zones, including the Central-West Orana, New England, South West, Hunter-Central Coast, and Illawarra Renewable Energy Zones. These will focus on the development of new energy infrastructure, including generators (such as solar and wind farms), storage (such as batteries and pumped hydro), and high-voltage transmission infrastructure.

4.6 VICTORIA



Victoria has set the overall target of net zero emissions by 2050, with interim targets of emissions below 2005 emissions levels of:

- 28-33% by 2025
- 45-50% by 2030
- 75-80% by 2035

The Victorian Government is scheduled to update the 2040 target by 2028.

In addition to emissions reduction targets, the Victorian Government has implemented renewable energy targets in the *Renewable Energy (Jobs and Investment) Act 2017 (VIC)*. These targets are:

- By 2020, 25% of electricity generated from renewable energy sources *(achieved)*
- By 2025, 40% of electricity generated from renewable energy sources
- By 2030, 50% of electricity generated from renewable energy sources

Key actions Victoria is currently taking are:

- Increasing the 2030 Victorian renewable energy target to 65%
- Bringing back the State Electricity Commission (SEC)
- Setting the biggest energy storage targets in Australia
- Setting a target for 50% of new light vehicle sales to be zero emissions vehicles by 2030
- Working towards carbon-neutral pasture-based dairy farming

The Australian Energy Market Operators (AEMO) Integrated System Plan (ISP) identified six Victorian renewable energy zones:

- Central North
- Gippsland
- Murray River
- Ovens Murray
- South Victoria
- Western Victoria

These zones are currently under development, with AEMO assisting to identify network investments that support the zones' timely and efficient development. The overarching planning and development of the zones is managed by VicGrid, with a $540m REZ fund that will be used to strengthen the grid and unlock REZ potential. Victoria is also investing in the first offshore wind farm in an area of the Bass Strait off Gippsland. This will produce at least 2 gigawatts (GW) of power by the end of 2032 and aims to produce 9GW by 2040.

4.7 TASMANIA



Tasmania reached net zero emissions in 2014 and maintained net zero from then to 2022. The state has been able to generate 100 per cent of its electricity needs from renewable sources since 2020 and has an extensive electric vehicle charging network.

Tasmania has previously set a three-year action plan towards reaching net zero. *Tasmania's Climate Change Action Plan 2017-2021* sets the government agenda for action on climate change to June 2021. Key actions during this time included building an electric vehicle charging network, incorporating electric vehicles in government fleets, improving business efficiency, and reducing waste, and delivering on a Climate Resilient Councils project to 17 of the state's 29 councils. From June 2021 the Tasmanian Government has further delivered on improving the electric vehicle network, invested in a hydrogen powered bus trial and electric bus trial, and allocated $10m to replace government-owned fossil fuel boilers with renewable alternatives,

Tasmania's Climate Change Action Plan 2023-2025 has three main priorities:

- Information and knowledge
- Transition and innovation
- Adaption and resilience

4.8 AUSTRALIAN CAPITAL TERRITORY



The ACT is committed to net zero emissions by 2045, based on 1990 levels. This includes progressive interim goals:

- 50 to 60% by 2025
- 65 to 75% by 2030
- 90 to 95% by 2040

These targets are legislated under *Climate Change and Greenhouse Gas Reduction Act 2010 (ACT)*.

The priorities for the ACT are:

- Working together: Collaboration between community, government and businesses to reach community driven solutions
- Transport: Increase the use of public transport and other sustainable modes of transportation, as well as incentivising the use of zero emissions vehicles
- Building and energy: Focus on incentivising the transition from gas to electricity in new suburbs, as well as improving energy efficiency in homes and buildings
- Waste: Capture of methane to generate electricity at Mugga Lane Landfill, improving household waste education and the collation of food and garden waste, supporting food rescue organisations, and investigating organic waste processing
- Land use: Involve improving sustainable farming practices and building resilience in ecological communities and ecosystems

05. CASE STUDIES FROM THE INTERNATIONAL COMMUNITY

5.1 UK COALMINE CLOSURES IN THE 1980S

The UK's coal mining sector employed 1.2 million people at its peak in the 1920s, and today employs less than 1,000 people. Today, the former coal regions are still marked by high unemployment, lower wages, and poorer health outcomes. The UK Government's handling of the transition, which is regarded as poorly conducted, is often criticised for its belated support – often provided several years after a closure occurred. By this time, high employment and outward migration had set in, and outcomes for the community were difficult to reverse.

At its peak in 1920, the coal sector in the UK employed almost 1.2 million people. In the early 1980s, just before the reforms, 71% of the UK's electricity came from coal-fired power station. This provided the coal miner's union significant influence due its ability to effectively shut down the electrical system through industrial action. This occurred on multiple occasions, most notably the strikes of 1972, 1974, and 1984. During the 1980s, Margaret Thatcher's Conservative Government implemented a series of industrial reforms to privatise the UK's state-owned electricity and coal-mining industries. The result was an employment collapse, falling from 240,000 workers in 1981 to 60,000 a decade later in 1991[6]. As of 2020, the sector employed around 1,000 people, and generated less than 2% of the UK's electricity. The deadline for the complete phaseout of coal is set for October 2024.

Although the UK Government stated it was determined to ensure a steady and well-managed transfer to the private sector, and numerous support measures were indeed put in place, the UK's transition away from coal is generally considered a failure on the regional economic and social front. Studies have shown that the mine closures resulted in population decline and lower workforce participation rates, even decades after the closures (Aragon, Rud, & Toews, 2015)[7].

Between 1985 and 1986, 55 coal mines were closed, then from 1987 to 1993 approximately 12 mines were closed every year (Aragon, Rud, & Toews, 2015). the closure of coal mines resulted in structural change in the social and economic landscape of the affected regions. The results were heterogenous, with some regions recovering quickly with external investment, while others experienced a slower recovery – with investment levels and pre-existing structural issues a key determinant. The effectiveness of these policies varied, as implementation did not occur during mine closures, but rather 10-15 years afterwards (Beatty, Fothergill, & Powell, 2007)[8].

The UK coalfields are interesting case studies for regional Australia, given that they were generally isolated from urban centres (Bennett, Beynon, & Hudson, 2000)[9]. This presented unique challenges, such as attracting new industries where there was limited access. Current government policies now focus on developing partnerships and community empowerment to assist in the required restructuring of a community after a mine closure (Bennett, Beynon, & Hudson, 2000).

Even today, 30 years after the closures, many regions experience higher levels of unemployment. It is also important to look beyond the headline figures - whilst a significant number of non-coal jobs have been created, many are low paid in comparison to coal industry salaries. The Yorkshire region, which was well connected to other areas of the UK through the motorway network and infrastructure investment through the 1990s and early 2000s, saw a strong recovery after the closing of coal mines (Fieldhouse & Hollywood, 1999)[10]. Yorkshire, one of the largest coal mining regions, experienced a net increase of 55,000 non-coal jobs between 1981 to 2004. Even with a comparatively strong recovery, the regional unemployment rate was 17% in 1999, over a decade after the last coal mine closed. The rates of unemployment, including hidden unemployment from people who left the labour force because of being permanently sick or retired, were similarly high in Durham, South Wales, and Northumberland in 1991 (Fieldhouse & Hollywood, 1999).

The transferability of skills was a key factor in how easily former coal miners could transition into other industries (Fieldhouse & Hollywood, 1999). For example, workers above ground, including electricians, mechanics, and fitters, found it easier to transfer to other industries, while those trained below ground found it harder due to the lack of transferable skills (Fieldhouse & Hollywood, 1999). A survey of miners' experiences after mine closures showed that many of those interviewed felt there was no

- The closure of coal mines in the UK and transition away from coal powered electricity generation is generally not regarded as an economic or social success. This is generally seen as a consequence of late government interventions – which occurred over a decade after the first mine closures. This resulted in slower recovery and left communities to engage in their own recovery with limited national government support.
- Regions with pre-existing social issues had slower recovery times, with more social services needed to support the transition.
- Replacement jobs were generally lower paid than mining jobs, impacting the outlook for younger workers who emigrated away from regions.
- Regional connectivity improved recovery times and in attracting new industries, such as manufacturing.
- Active engagement of local government is essential in attracting new industries to previous mining towns.
- Labour market retraining assisted in the transition, particularly for underground miners whose skills couldn't be easily transitioned to new industries.

assistance in learning to apply for new positions either inside or outside the mining industry (Murray, Baldwin, Ridgway, & Winder, 2005)[11].

Again, looking beyond the headline figures, an often-overlooked risk associated with the closures was the rise in hidden unemployment. Collectively, the official unemployment rates were not substantially higher in coal regions compared to the national rate however, there were higher rates of early retirement and those considered permanently disabled after the mines closed – which due to the way the unemployment rate is calculated, was not factored in.

Today, some of the most deprived neighbourhoods in the UK are former coalfields (Beatty, Fothergill, & Gore, 2019)[12]. In South Wales, former coalfields have continued to have low job densities and high rates of commuting to larger regional towns for work (Beatty, Fothergill, & Gore, 2019). The working age within these regions is also generally higher, as a large proportion of youth migrate out of the region for employment opportunities. Generally, the employment opportunities within these regions are lower paid, forcing youth to leave for higher paying positions (Fothergill, 2019)[13]. There has been a large net outflow of youth from these communities, creating an older and generally less qualified workforce than surrounding regions.

The closure of the UK's coalfields is generally not regarded as a success story in terms of the residents' economic and social welfare. It does however provide valuable learnings for other communities looking to transition away from fossil fuels. The primary criticism of the UK's coalfield transition was timing. Although the UK Government provided support to local communities, it was limited in value and was provided, in many cases, years after the closures. By this time the downward cycle of limited job opportunities, emigration, and poor health outcomes had become entrenched.





5.2 RUHR REGION, GERMANY

Germany's Ruhr Valley experienced two rapid transformations in its recent history. Starting in the early 1800s, the region had a massive expansion of coal mine openings, totalling 300 operating coal mines by 1850. The Ruhr became Europe's largest industrial hub for the next 100 years and was home to heavy industry, particularly steel – all of which was powered by coal. At peak employment levels in the 1950s, 480,000 workers were employed in the mines – equating to 40% of the Valley's workforce. In only a handful of decades, the Ruhr region has undergone its second major transformation. The Ruhr's last coal mine closed in 2018 and the region has been labelled as a global centre of renewable energy.

Between 1955 and 2018, almost 500,000 mining jobs were lost, with the last coal mine shutting down in late 2018. When including the adjacent iron and steel manufacturing industries, a total of 839,000 production jobs were lost in the second half of the 20th century. Throughout this period, approximately 330,000 jobs in the renewable energy sector have been created, with a total of 801,000 service jobs (as opposed to production jobs). Where once residents had to time their laundry chores carefully as a change in the wind would turn their laundry black, the region is now one of the largest green sites in Germany[14].

This transformation did not occur naturally: it was the result of decades of cooperation between business, communities and all levels of government; sizeable support packages; and careful policy implementation. Indeed, there was much opposition to this transformation. Initially, industry was opposed to economic diversification, failed to recognise the decline of coal mining, and continued investing in the industry.

Two decisions are acknowledged as underpinning this successful transformation. First was the German Government's decision to pursue a more inclusive engagement strategy with trade unions and industry. And the second, was a 'bottom-up' approach that empowered local stakeholders to cooperate with state and national governments[15].

The Ruhr Valley similarly had a dependence on coal, with 40% of its workforce engaged in the mines. All 300 were closed down between 1955 and 2018. The German Government is generally considered to have managed the Ruhr's transformation well. Timely and sizable investments were made into new infrastructure (including renewables), diversifying the economy and providing labour market support. A major factor in achieving positive outcomes was the government decision for an inclusive engagement strategy, with a 'bottom-up' approach that empowered local stakeholders.

- The Ruhr Valley is generally considered a successful transition away from legacy resources. Two key decisions are attributed to a successful transition:
  - Pursuit of an inclusive engagement strategy between trade unions and industries.
  - Empowering local stakeholders to engage and cooperate with state and national governments.
- Labour market incentives to retrain were offered to assist in the transition.
- Transformation was assisted by cooperation between business, community, and all levels of government; support packages; and careful policy implementation.
- Implementation with a strong policy support system can improve the economic transition.

The Ruhr is vastly different to regional Australia. It is a densely populated 2,700 square kilometre region home to five million people spread throughout 53 towns and cities, making it the third most populous region in Europe behind London and Paris. It is also well connected by land, air and water, and close to major destinations in Europe. However, there are many lessons which can be learned and applied to the Australian context.

- Governments at all levels agreed upon an orderly phase out of coal and were committed to supporting the communities most exposed to the transition. (It is well worth noting that this agreement overcame staunch opposition, particularly from industry, and progress was slow until the German Government adopted a more decentralised and inclusive engagement strategy with partnership from trade unions)[16].
- Major government projects were implemented including the building of new universities and colleges, and today these universities are leaders in environmental technology.
- Massive government funding was made available for economic diversification, including infrastructure, education, tourism, cultural sites and developing the services sector.
- Labour market support was provided to the retrenched workers, including retraining incentives.
- Major environmental restoration projects were invested in.

Lessons can also be learned from how the Ruhr redevelopment model could be improved. The model has been criticised for focussing on large mining companies and not placing enough emphasis on the mid-sized businesses and industries adjacent to the coal and heavy manufacturing industries.

Today the Ruhr attracts 250,000 visitors annually, with former mines a key attraction. Food festivals, music concerts and cultural events are held in the former mines themselves. Job creation is strong and the reputation of the region is shifting. However, there is still much work to be done. The unemployment rate of the region is almost double that of national average – 9.7% compared to 5.6% (as of 2021), income levels are lower, and there are higher rates of child poverty. Environmental restoration work continues, as the landscape remains brittle and the region regularly battles with sinkholes as a result of centuries of mining[17]. Though obstacles remain, the future of the Ruhr looks bright, with multiple levels of government committed to improving its future.



06. THE UNIQUE POSITION OF REGIONAL CITIES

Regional Cities are unique in that they are generally quite diversified economies and not closely connected to a major metropolitan area.

Regional Cities have a unique opportunity to determine their own decarbonisation pathways and are well placed to benefit from place-based decision making.

Regional Cities face complex challenges in their transition to net zero. Given their high degree of diversification, Regional Cities are similarly situated alongside Metropolitan areas (Sydney, Melbourne, Brisbane, Perth and Adelaide) in terms of their limited direct exposure to the selected four industries (manufacturing, transport, mining, agriculture), with only 12.3% of their workforce directly engaged.

The Regional Australia Institute categorises regions according to regional type. An overview of the types is in Appendix 2. Table 1 shows the proportion of the workforce engaged across the regional types by industry sectors - highlighting the four largest users of fossil fuels and aggregating all others.

Table 1: Share of workforce by industry and region type

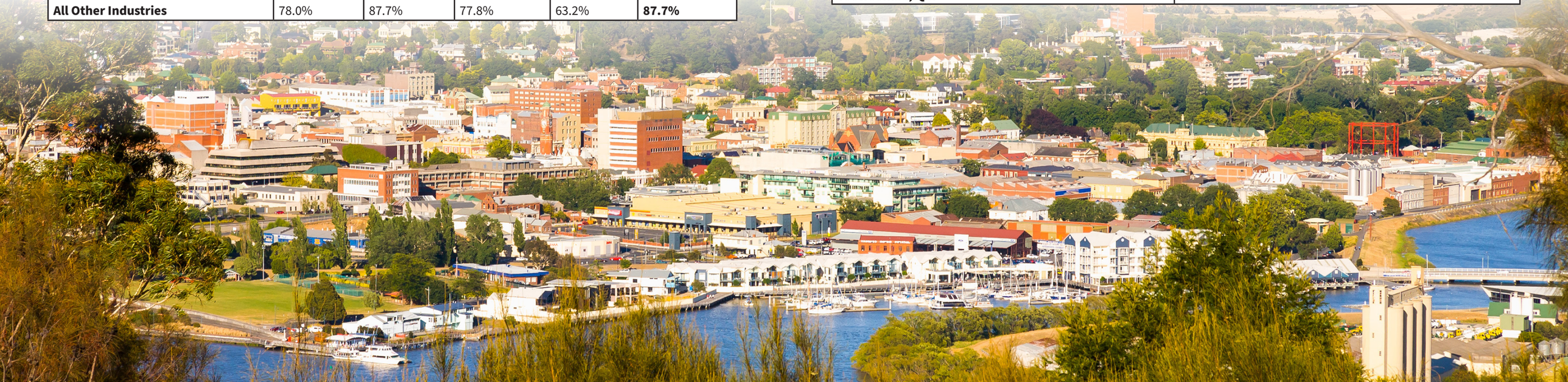
Industry	Connected Lifestyle Regions	Metropolitan Areas	Industry and Service Hubs	Heartland Regions	Regional Cities
Manufacturing (less food)	3.7%	4.5%	3.0%	3.1%	**4.1%**
Food Product Manufacturing	4.5%	1.6%	2.6%	3.2%	**1.7%**
Transport	3.3%	4.8%	4.0%	3.8%	**3.7%**
Mining	1.4%	0.8%	6.7%	10.6%	**0.9%**
Agriculture	9.0%	0.5%	5.9%	16.2%	**1.8%**
All Other Industries	78.0%	87.7%	77.8%	63.2%	**87.7%**

Within Regional Cities, there is a significant spread of industry composition, ranging from service focussed economies through to more traditional economies focussed on the industrial output of goods[18]. The latter group, with a high share of transportation and manufacturing enterprises, and thus a high reliance on fossil fuels, is shown in Table 2. These Regional Cities are relatively high population centres with heightened transition challenges due to their diversified economies. Despite this, they have generally flown under the radar of the national transition conversation which to date has been focussed on the major resource basins.

A sample of these Regional Cities with a high reliance on fossil fuels were selected for consultations to determine their current level of awareness and to investigate their strategies for the transition to net zero.

Table 2: Share of workforce in transportation and manufacturing industries in regional cities

Local Government Area	Share of workforce engaged in transportation or manufacturing industries
Gladstone, Qld	22.8%
Glenorchy, Tas	19.9%
Wodonga, Vic	16.5%
Harvey, WA	16.3%
Port Stephens, NSW	15.2%
Tamworth, NSW	13.2%
Greater Shepparton, Vic	13.0%
Mackay, Qld	13.0%
Wollongong, NSW	11.7%
Bunbury, WA	11.2%
Cessnock, NSW	11.2%
Rockhampton, Qld	10.8%
Newcastle, NSW	10.6%
Toowoomba, Qld	10.6%



07. REGIONAL CITIES IN TRANSITION

Consultations with stakeholders showed a desire for additional information about the transition process and activities to be undertaken in each region.

The level of preparedness varied across locations but no region could be considered fully prepared.

Leaders were generally aware of the need to transition and regions are likely to invest in transition activities when the returns are evident.



7.1 METHOD

Following the identification of the highly fossil fuel reliant regions of Australia, a selection of Regional Cities with a high reliance on fossil fuels were selected for consultation to determine their current level of awareness, as well as their strategies for the net zero transition. The 10 regional centres with a high reliance on fossil fuels that were selected for consultation were:

- Rockhampton, QLD
- Bundaberg, QLD
- Darwin, NT
- Gladstone, QLD
- Harvey, WA
- Mackay, QLD
- Wodonga, VIC
- Port Stephens, NSW
- Toowoomba, QLD
- Port Pirie and Port Augusta, SA

Consultations occurred across a wide variety of stakeholders, including council representatives, research organisations, business networks, training organisations, climate action networks, and community organisations. In addition to establishing a baseline level of awareness, consultations also examined the perceived level of support in regional communities and whether it was considered sufficient.

A detailed description of the methodology is in Appendix 1.

Figure 2 provides an overview of the share of workforce in fossil fuel intensive industries in each city.

SHARE OF WORKFORCE IN FOSSIL FUEL INTENSIVE INDUSTRIES

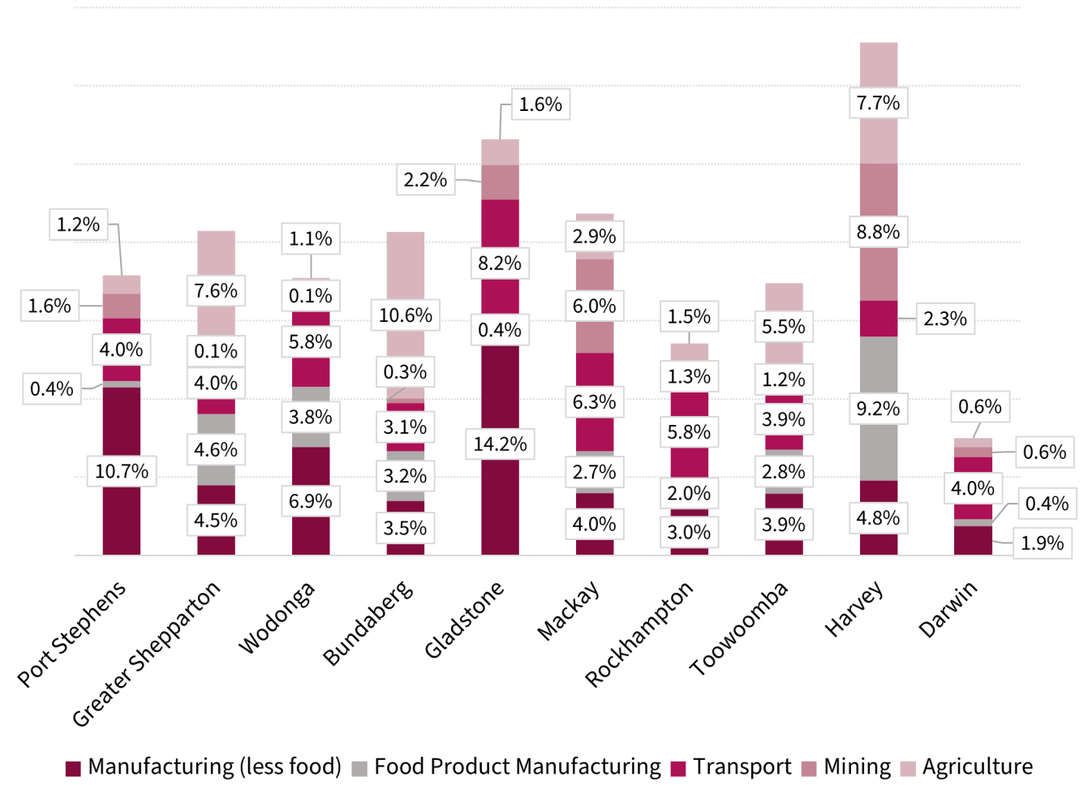


Figure 2: Share of workforce in fossil fuel intensive industries



7.2 ROCKHAMPTON (QLD)

Interpretations of what net zero meant varied amongst survey participants from Rockhampton. Responses were broadly themed around reducing emissions, decarbonising energy and sourcing offsets. Most respondents did not consider themselves to have a high level of understanding around the region becoming net zero. Their self-rating sometimes conflicted with their responses which often revealed a relatively high level of knowledge. This may reflect a general sense of uncertainty but awareness of the complexity and scale of the task.

Research participants reported that Rockhampton seems to be in the early stages of preparedness for a net zero transition. While consultations discovered an awareness and concern for the obviously exposed industries and communities, i.e. coal mining and coal towns, there was a sense due to Rockhampton's size and economic diversity, the city will be less exposed. The only examples of transition provided were large scale renewable energy projects (solar and wind power) and the Renewable Energy Zone which were seen as both positive steps towards the green economy and yet problematic in their roll-out and impact.

There was a universal sense from research participants of a lack of information, planning and coordination in relation to the transition process. Participants expressed that this, along with market-led innovation plus collaboration within the community, would be critical to achieving net zero. One key success factor nominated was the ability of the region to secure cross-sector collaboration and strategic regional planning across the critical contributors of hydro, solar and wind electricity generation, alongside agriculture and mining.

7.3 BUNDABERG (QLD)

Interviewees from Bundaberg described varied interpretations of what net zero means but had a common thread of reducing carbon emissions. Several interviewees mentioned the high number of unknowns in the transition and most did not consider themselves to have high levels of understanding around the region becoming net zero. All respondents were high-level operators in their respective enterprises including directors, CEOs and senior managers.

Bundaberg interviewees seemed generally deeply concerned about the potential consequences of climate change and see a large gap between what is happening locally and what is required. In that sense they seem to be aware of the problem but lack information about potential solutions. There was a common impression that the highly agriculture-dependent region could be 'part of the solution', not just a casualty of net zero. There was also a general impression that the wider community hadn't engaged with net zero because there was not enough information and also because they had more pressing issues to manage such as unemployment, crime, housing shortages and cost-of-living factors. More prominence needs to be given to the transition to facilitate strategic planning. While there are many other challenges facing the regional city, many interviewees were keen for Bundaberg to benefit from the transition through opportunities like developing agriculture, green energy, a circular economy and widespread use of electric vehicles. This diversity of opportunity underpinned a level of confidence in the redeployment of workers displaced by the transition.

7.4 DARWIN (NT)

The cross section of respondents from Darwin was a good representation of the community. The Darwin leaders see themselves 'in the hot seat' at the nexus of fossil fuels and the impacts of climate change. Interviewees expressed deep concern for remote communities and a palpable hunger for a new economy pathway that delivers for the community in a way that is more equitable and sustainable.

Interviewees were mindful of the scale of efforts required to 'shift the dial', but they generally shared a perception that it needs to happen and will happen if there is appropriate investment in communication and information, workforce development and major project development. Key strategies favoured were reducing emissions via renewable energy and offsetting via sequestration. Specific challenges were the plans to expand gas production and the lack of access to decarbonisation opportunities for remote communities.

Interviewees seemed deeply concerned about the vulnerability of remote Territory communities to climate change – either from rising sea levels to changing seasonal patterns and high temperatures. There was a sense that this next layer of challenges would fall on a Territory already struggling with high levels of regional disadvantage including a near complete lack of education, information or programs to help. On the other hand, there was a high level of positivity about how the change could benefit the Territory. Opportunities included renewable energy – specifically on-country, carbon credits, hydrogen, and new economy products and services – especially in the context of proximity to Asia. New renewables businesses were thought to be the best chance for re-employment of workers displaced by the energy transition.

7.5 GLADSTONE (QLD)

Gladstone interviewees recognised the level of attention that its significant major industries were getting from the Queensland and Commonwealth Governments. The implication was that these major industries are 'on the radar' for support. In addition, large-scale renewables and hydrogen concepts are getting attention, and there was optimism about further investment into 'the new economy'. Perhaps because of this focus on 'the big end' of town, participants shared few examples of community-level initiatives.

The interviewees had high levels of scepticism that it would be possible to decarbonise the city and its industries, and also had the highest awareness of the international context. This may reflect the highly export-centric nature of the gas, coal and aluminium industries in this community. While the respondents were not 'anti' renewables or transitioning to a green economy, they regarded the Australian and international initiatives as insufficient to support change and were sceptical about the volume and quality of credits required to offset.





7.6 HARVEY (WA)

Harvey Council is in south-west WA, not far from the coal mining region around Collie. As a recognised fossil fuel supply area, Collie itself was not part of this study as there are a range of policies and programs designed to help it transition to net zero emissions. While not an energy producing area itself, one interviewee described Harvey's dependence on energy intensive industries as bringing vulnerability to the transition: "With Harvey's reliance on mining and other carbon heavy industries, pretty much everyone is exposed."

Interviewees were interested that RAI chose Harvey as a case study, as they believed there was little strategic discussion about the impact of the transition on the local government area. The participants' view of Harvey's readiness for net zero is perhaps best summed up by this quote:

> **"Not front of mind for everyone. Too little too late if everyone [is] not on the same page. No leadership from federal government - no framework that has stuck. Big polluters keep pumping out CO2 but where are the forests to actually compensate? The other thing is, everyone [is] going [on] with [the] day to day and not making any real steps to change the reality of the situation."**

Another interviewee said, "I can't really see net zero happening in my lifetime at all." There was a commonality across the interviews that people couldn't see a pathway for their area to transition to net zero emissions. The general perception from the interviews is that Harvey is exposed to negative impacts of decarbonisation efforts and, given the lack of commensurate government responses, that the situation is dire.

Similar to Gladstone, there seems to be a perception that the 'big players' in the region are saying they are doing something, but that it is hard to know if anything is actually happening, and the big players are in a neighbouring local government area.



7.7 MACKAY (QLD)

From the interviews it appears that some regional leaders see Mackay as well positioned for the decarbonisation challenge. Despite a hunger for more information and coordination, the city seems to be at the early stages of planning for net zero. While expressing concern for the mining equipment, technology and services (METS) industries that are a big part of Mackay's economy, and which will be negatively affected by decarbonisation, interviewees expressed general positivity about the transition. One interviewee noted that relationships between businesses in the METS industries were driving change:

> **"The mining industry requirements are being pushed down from BHP and this is having a trickle-down effect. The corporate social responsibility drive is causing that. We are being impacted by the top-down approach from corporate business, not government policy."**

In that context it was also apparent that people did not see the wider region's coal mines closing any time soon. This is due to the coal being for coking/steel production and that the messaging around this sector, as opposed to thermal coal, is that it will be required for decades to come. In this context the following comment was of note. "The narrative of decarbonisation versus coal is not helpful. We need to change the conversation to [the] coexistence of coal and decarbonisation."

The region is seen as having a great deal of capacity, skills and expertise that directly apply to the new economy. Some interviewees though were concerned about the pathways for the smaller communities west of Mackay where economies rely on ongoing coal mining and do not have the diversity of options that Mackay itself is developing.

7.8 WODONGA (VIC)

Interviewees from Wodonga included business, industry and community leaders and all shared the view that the net zero emissions transition was inevitable and positive for the region. In that context, they did recognise some elements of the community as resistant to change or divided into people and organisations that were 'getting on with it' and a number that were ignoring the issue until there was a compelling financial case to change.

The interviews did not reveal a sense of fear or resistance to net zero, more a sense of overwhelming opportunity with fundamental limits like workforce availability and product viability. In the broader context there is seen to be a change in consumer expectations leading to an advantage for products and businesses that are socially responsible, including their carbon footprint.

Wodonga interviewees had the clearest and simplest explanations of what the net zero transition is, including an understanding of different emission reduction approaches. Respondents regarded themselves as having low levels of knowledge about the transition in relation to Wodonga but this was contradicted by their responses to the interview questions which were, in general, well informed.

7.9 PORT STEPHENS (NSW)

The Port Stephens interviews highlighted that apart from what happens at the Tomago Aluminium Smelter, participants view the city as a passenger whose destiny is driven by what is occurring in the nearby Hunter region and Newcastle. There are concerns that there are few options in the city to redeploy workers displaced by the energy transition. There are serious concerns relating to how the region maintains its natural appeal with growth pressures, even if they are centred around renewables, but overall the net zero transition is regarded as necessary and beneficial.

Interviewees showed a good understanding of the net zero emissions transition and a deeper extension of the concept of resources, not just carbon emissions. There are small scale transition examples including a shopping centre at Salamander Bay that is largely self-powered with renewable energy and a council which has "a fair amount" of solar on buildings and has adopted a net zero by 2030 strategy.

7.10 TOOWOOMBA (QLD)

Two people were interviewed from Toowoomba and both were from government agencies so the findings are unlikely to be representative of the broader community. Both respondents are directly involved in the Queensland Transition Plan and can be regarded as having a high degree of current knowledge around the issue.

The Toowoomba interviewees noted that the city appears to be doing quite well and not feeling the need to transition based on any immediate threats. It appears that at least parts of the community are highly exposed to decarbonisation but are not really engaging with it in a positive or negative sense. It appears that Toowoomba has, in general, a low level of preparedness for net zero, partly due its more diversified economy. The most exposed industries were seen as coal power, intensive agriculture and transport, and it was noted that there are more exposed regions to Toowoomba's west.



7.11 PORT PIRIE AND PORT AUGUSTA (SA)

Two people were interviewed from Port Pirie and Port Augusta in South Australia's Upper Spencer Gulf region.

There seem to be some differences between the overall regional perspective and the local Port Pirie perspective. It appears that the general community in the Upper Spencer Gulf is aware of and responding to opportunities in the emerging net zero economy, however the decarbonisation of the Nyrstar lead smelter is seen as an almost insurmountable issue locally.

Despite this, the outlook and general perception seems fundamentally positive. There appear to be a significant number of 'new economy' opportunities in the region and the community appears to be progressive. That said, there are also signs of an undercurrent in the community of some feeling threatened by the net zero transition – especially parts of the community which are tied to the smelter who are unable to imagine such a large energy user ever being powered by renewables.

Participants expressed some frustration that the cost of energy is undermining the generally positive perception of SA's advanced position in renewable energy generation.

7.12 CONCLUSION

Despite the emergence of common themes, not all Regional Cities are the same in relation to the net zero transition. Even cities that appear similar on the surface like Bundaberg, Rockhampton and Mackay are quite different in terms of net zero preparedness.

While it is true to say that from the interviews no Regional Cities could be regarded as well prepared, there was a marked difference between those that saw the transition as an opportunity and those that were deeply sceptical or fearful. From these discussions with regional leaders it is clear that in mid-2023 the understanding of what the net zero transition entails varies widely, as does the understanding of which industries and communities might be vulnerable to adverse social and economic impacts.

Common themes emerged around the lack of information and coordination and the **need for additional information and resourcing** to support exposed sectors. The interviewers reported that generally it seemed most people are personally optimistic about moving towards net zero, however there is still a negative view which seems to be based on a lack of clarity from the Commonwealth Government framework.

Regional leaders noted a conflict between an industry need to meet shareholder requirements and generate profit at the lowest cost, while appearing to be doing things to make net zero a reality. A main point from all interviewees is that **an international carbon trading framework** that can hold companies and regions to account needs to be in place and be able to survive the political cycle.

Changes are happening in the Regional Cities at a slow pace as there are **no perceived economic or legislated drivers** in place yet. There is an understanding that making no change will have economic impact as the climate changes, yet this alone is not enough to drive the changes.

All interviewees were looking for **leadership from State and Commonwealth governments**, and most felt that what is currently in place is insufficient to catalyse the scale of change needed in the time available. While these concerns about the scale and timing of support are real, from the interviews it is also clear that in Regional Cities there are organisations and individuals ready and hungry for change, and these people almost universally regard net zero as a positive for their regions.

State and Commonwealth leadership is required to ensure regional initiatives are designed and implemented early, are adequately resourced and, importantly, are place-based. Regional Cities have a unique opportunity to determine their own decarbonisation pathway and are well placed to benefit from place-based decision making. With a strategic vision in place, and broader support available, RAI's interviews with regional stakeholders indicate that investment into transition activities will flow once the returns are evident.

08. LEADING THE WAY: COMMUNITY CASE STUDIES

This section presents a series of case studies which identify actionable insights from small towns and key industries that are making significant progress to decarbonise and de-risk their transition to net zero emissions. The case studies highlight the enablers and barriers that small communities and their key industries experience in making the transition to net zero. Each case study examines the underlying factors that have contributed to the progress made and innovation implemented. Importantly, in addition to describing the 'what' of the transition activity, emphasis has been placed on ensuring a clear understanding of 'how' the specific transition activity occurred.

The case studies cover locations across different states and territories, a range of carbon-intensive sectors relevant to small towns, and specific innovations being pursued. The four regional communities, and the focus of their innovation, that were involved in this study are:

- Yarram, Victoria – timber
- Korumburra, Victoria – food product manufacturing
- Katanning, Western Australia – community energy
- Ulverstone, Tasmania – food product manufacturing

These case studies provide insights to policy makers for the different types of programs and support that will be necessary in progressing transition efforts in communities across regional Australia.

While each case study is unique, each of the case studies sheds light on some common key themes:

- Opportunities: the drivers of net zero action
- Enablers of zero action
- Collaborators
- Community involvement
- Challenges

8.1 CASE STUDY: RADIAL TIMBER - YARRAM, WELLINGTON SHIRE, VIC

Yarram is a small town in a prosperous farming district with a history of timber harvesting and milling, situated in the Shire of Wellington, 221km east of Melbourne, in Gippsland, Victoria. With a population of over 2000 it is close to the east coast of Victoria. The community is facing major state-wide timber industry changes and opportunities associated with Australia's first Commonwealth declared offshore wind energy zones in Bass Strait, within relative proximity to Yarram and district.

OPPORTUNITY IDENTIFIED

Radial Timber is an Australian, privately owned timber business established 20 years ago. It operates a small mill with 22 local staff in Yarram, annually producing 12,000m^3 of wood and supplying specialty products to the construction industry. With a unique system of milling, it focuses on technology that maximises the use of a range of log sizes. Derived from Victorian hardwoods, product is distributed from an outlet in Dandenong South, in Melbourne's south-eastern corridor.

The owner of Radial Timber, Chris McEvoy, has had a desire since 2016 to create a closed loop energy and waste system, minimising and reusing waste to reduce costs and maximise benefit including production of by-products.

From a business perspective, the motivation is not directly focussed on net zero but more about an efficient integrated system that reduces waste through maximum timber gain and a reduction in time and costs associated with production. This will reduce reliance on grid supplied energy, see an uptake of new technology for net energy and waste emissions, and facilitate better control of decisions for further innovation.

COLLABORATION INITIATED

In 2019, the Latrobe Valley Authority (LVA) undertook an 'entrepreneurial discovery process'[19] in Gippsland on innovative energy projects as part of its responsibility to identify and support energy transition post the announcement of the closure of the Hazelwood Coal Mine by Engie in March 2017.

The LVA was able to use a different way of working to the 'business as usual' grant system for development that is often based on fixed grants with pre-set timelines and milestones. It provided seed funding (approximately $200,000 over two years) for innovation research through a 'Bioenergy Innovation Network', comprising of some 80 individuals representing community, industry, government and academia, researching and building significant levels of evidence on woody biomass availability, utilisation and suitable technologies for the region. Over time this built significant levels of evidence for progress as required and supported an emerging range of partners to determine and make collective decisions and actions regarding how to strategically support and enable the growth of the bioenergy sector, including supply chains, new products and markets.

After speaking with people and organisations in Yarram who indicated an interest in an opportunity for an energy park partnering with business, it was agreed to test a value proposition for actioning:

'Could a circular economy energy park provide economic stimulus to the Yarram and district community through the use of solar, battery and pyrolysis technology in a timber mill setting?' With continued local support, LVA staff with interested parties including, Radial Timber and GridEdge, undertook a comprehensive testing of the opportunity using a value proposition framework.[20] The participants and other key organisations then carried out further innovation inquiries to test the critical requirements for success.

The original opportunity included potential to explore renewable energy sharing arrangements across community sites such as the local recreation reserve. Over time this has evolved, with consideration now being given to how sites such as the local swimming pool and hospital could access and use available excess heat. The result of the combination of the initial inquiries led to an agreed plan to execute stage one of the project.

In 2021, with a well evidenced plan supported by strong partner and agency commitment including state government agents, the proposal successfully received $2m from the Victorian Forestry Plan Innovation Fund for the first stage of the project at Radial Timber.

OPPORTUNITY REALISED

Solar panels for power generation and batteries for energy storage are now installed at Radial Timber and a pyrolysis unit is being manufactured for installation on site. GridEdge, a local renewable energy provider of Sodium Nickel Chloride molten salt batteries, has supplied the battery technology (a 100 KW Solar PV and 90 kWh SoNick battery system comprising 4 x 22.5 kWh, 620V SoNick batteries and 100 KW ElPower PCS with a power conditioning system or inverter) which has been installed in both wet and dry mills.

Earth Systems, an Australian headquartered environmental sciences and engineering business, has been commissioned to build the 'Charmaker' pyrolysis unit. This technology converts a multitude of woody biomass types and waste biomass forms into a quality biochar with a very high fixed carbon content which can have many uses, including being a source of high-quality carbon capture, and producing high-grade heat through the process. Pyroligneous acid, more commonly known as wood vinegar, is a third product derived from condensing wood smoke. Syngas will also be produced and channelled through the battery system, which will further reduce the mill's electricity costs.

Solar and batteries will reduce some of the power costs at the mill and reduce downtime from power outages. Brownouts and power outages in regional communities can cause regular machinery stoppages resulting in the need to reprogram machinery at a substantial cost.

In addition, this system has the potential to radically reduce drying and curing time, resulting in less energy being used, a faster turnover of production, and use of a range of hard wood plantation species.

THE BIGGER PICTURE

Alongside this specific action on energy and waste management, Radial Timber and Heartwood Plantations are involved with applied research with the University of Melbourne and Qld Department of Forestry and Agriculture through the 'Gippsland Federal Forestry Hub'. Heartwood Plantations, a forestry plantation management advisory company, and Radial Timber are working with researchers, investigating improved and innovative silviculture practices on Radial Timber's privately owned plantations, with the aim of creating long term efficient and sustainable plantations and harvesting practices.

Given the current challenges facing the timber industry in Victoria, associated with a shift from native forest harvesting to plantations, Radial Timber's model is an illustration of a decentralised, local, profitable small business, with small-scale efficiency and a relatively low carbon footprint. With an anticipated increase in localised plantations, the number of small operators could grow. This would benefit small town communities, suppliers and workers, and reduce large scale issues associated with training, work force management, markets, product quality and availability. This way of working could lead to a series of micro mills that continue to contribute to and take the risk away from larger scale sites.

Radial Timber and Heartwood Plantations' work continues to expand and they are refining plantation management practices including trialling mixed species planting for biodiversity, as well as protecting and enhancing important landscape assets such as waterways and remnant vegetation. Furthermore, Heartwood has successfully integrated agricultural grazing of cattle, sheep and goats into its plantation system to control weeds, improve nutrient cycling, minimise fire risks and better engage with the rural community.



KEY INSIGHTS ON PROGRESS

From a business owners' perspective, learning about new technology systems ie. circular economy, production of energy and other products from waste is not enough. Government incentives and support for small to medium businesses to undertake practical action is generally not clear or necessarily helpful, especially when associated with a need to support community and local decisions.

Fortunately, the LVA as a government agency has been able demonstrate how to support and facilitate collaborative developmental partnerships over time. Its identification and focus on strengths for future economic, social and environmental benefit has meant a very different outcome to the 'business as usual' approach to financial support for small businesses, which often see rigid timelines, milestones and pre-determined activities and time-consuming reporting requirements imposed.

One of the challenges facing small businesses like Radial Timber has been the lack of information about trusted renewable energy and waste management technologies that de-risks investment in a fiscally tight, changing sector. Radial Timber owner, Chris McEvoy, emphasised "The need for confidence in making a decision to invest for the longer term". A common message identified is that the market is flooded with start-ups, new players advertising and pursuing businesses to invest in new technology products, which cannot easily be verified for value or quality. This can lead to a delay of take up or experiences that damage confidence and further investment.

8.2 CASE STUDY: BURRA FOODS - KORUMBURRA, SOUTH GIPPSLAND SHIRE, VIC

Understanding the sustainability challenges and opportunities for small to medium food manufacturing businesses in regional locations across Australia close to farm suppliers is important for the future growth of Australian manufacturing and the achievement of net zero. One example is the story of Burra Foods based in the small town of Korumburra, in Gippsland, Victoria, 120km south-east of Melbourne.

Established 30 years ago with steady growth and currently employing 170 mostly local residents, Burra Foods exports over 80% of its products with a base of customers throughout Australia, Asia and the Middle East. Burra Foods is now owned by overseas interests. It produces concentrated milk products, cream cheese, bulk processed milk, milk powders and infant formula.

Burra Foods faces many sustainability challenges yet also opportunities. It sits in a tough market where investment, regulation and support is needed so it can meet an increasing community expectation for businesses to demonstrate environmental and food quality credentials.

OPPORTUNITY IDENTIFIED

Alongside an already installed 600m^2 of solar panels, a current opportunity being reviewed by the company is the installation of a biogas plant to generate electricity from waste products, through a waste innovation company that focuses on renewable energy from agriculture. This could lead to a reduction in electrical emissions and follows a standard business project scoping, stage gate and approval process.

The biogas plant project is still in the scoping stage, where return of electricity is being calculated to ensure there is financial saving. As the biogas plant will be powered by biogenic sources, it will have nil emissions. Once a business case is built, a full benefits analysis will be completed including calculating the emissions offset by using biogenic electricity rather than grid electricity. If approved and installed, this would then be verified through actual data, and monitored over a two-to-three-year return period.

Most opportunities reviewed to date have included an element of cost saving as a key focus. A grant through a Victorian Government 'Business Recovery Energy Efficiency Fund' supported boiler upgrades on an existing unit, which was completed in 2022. A biogas electricity plant could focus on finding a way to insulate the company to price spikes seen over the last two years in both electricity and gas. If the project ends up price neutral but reduces emissions, the company has indicated it would be difficult to see it progress due to the simplicity of buying power versus the capital and risk of it running a power plant itself with its increased downtime, even with reduced emissions. Ultimately the bottom line will direct the company's investments.

The ability to install a large battery to stabilise the power grid at the factory (there are currently 8-12 power outages a year which result in significant product loss), may allow the purchase and storage of power during cheaper midday periods.

Burra continues to monitor industry changes and international expectations. Its current state could be best described as 'in transition', with a firmer regulatory framework and more robust technical solutions needed before the company could invest with confidence.

COLLABORATION INITIATED

Burra Foods actively seeks out new knowledge on sustainable practices, with an eye to the future, engaging with researchers, national and international led industry groups including Dairy Australia and its sustainability group, the New Zealand Dairy Research Institute, and the Australian Packaging Covenant Organisation. In addition, Burra Foods is an active member of Food and Fibre Gippsland (F&FG), a regional member-based advocacy group. F&FG has connected Burra Foods to organisations such as Envaqua through its relationship with the Dutch Embassy, with Burra Foods participating in an invitational 'Tech Talk' series. The purpose of these discussions was to share knowledge around water reuse and recycling.

F&FG has also organised visits for two consular-supported industry delegations from Denmark to discuss waste processing. These recent visits have focussed on deriving high-value proteins from Burra Foods' existing waste streams, through the use of cutting-edge technologies held by the Danish businesses. These relationships have been fostered through F&FG's relationship with the Danish Trade Council and Danish Consulate General. Burra Foods is interested in exploring how these technologies can be used, which could result in new product lines and significantly reduce waste volumes. However, the business has indicated, the upfront costs for installation and refit are an inhibitor for adoption at this stage.

CHALLENGES ADDRESSED

The current challenge for Burra Foods is the need to complete an overarching carbon accounting summary, before being able to develop a sustainability plan. To date most opportunities have been ad hoc and have been focussed on efficiency, energy or yield improvement programs which are based on financial returns, but often provide some emission reduction benefit.

The business has been unable to prioritise funding carbon accounting, the basis required to begin to understand net zero opportunities. It indicated the National Greenhouse and Energy Reporting Scheme (NGERS), is not a suitably wide and stable base for building a carbon reduction plan, due to it being an older measurement of emissions, and unaligned to global expectations and science.

For the scope 1 and 2 emission challenges of Burra Foods, capital expenditure vs operational expenditure is the biggest challenge, that is, choosing between options with different ongoing or upfront costs. Burra Foods indicated if all transport was electrified, and either gas transitioned to hydrogen or wood fired boilers were used, the majority of emissions would be removed from its business. The challenge here is the hydrogen industry is not influenceable for a small company like Burra Foods, and without surety of future technology it said it was difficult to justify going down either the hydrogen or biomass boiler route. For transport, the company said the initial capital outlay was prohibitive to fully transitioning to new electric trucks. Over time it said there was a clear benefit where running costs become significantly cheaper using electricity versus diesel, but the availability and capital outlay for the vehicles and charging stations are the barriers.

THE BIGGER PICTURE

Methane produced on farms is easily the biggest dairy industry challenge for manufacturers like Burra Foods, that relies on farm practices and potential new innovations. Locally, the history of farm operators and climate change and regulation has been combative, making it difficult for a single company to control. Burra Foods said it should be approached as a nationwide opportunity rather than a commercial opportunity. Secondly, with 12-month milk contracts but 5–20 year sustainability plans, Burra indicated it would be difficult for processors to influence farm behaviour and strategy. Farms are often capital intensive which can prohibit further expenditure. Some farms are rented, which also makes it difficult for the person who owns the cows to invest in emissions reductions which are fixed to the land.

The shift to non-fossil fuel transport and machinery across supply chains, both on and off the farm, is a key sustainability and eventual cost reduction factor. The issue of readiness, regulation and simplification of technology is recognised as a key contribution to the broader sector, especially as it is also associated with multiple suppliers and third-party transport carriers.



KEY INSIGHTS ON PROGRESS

Burra Foods indicated without complete full carbon accounting, it would be difficult for it to be certain the NGERS has been conducted as required. It said NGERS is an old legislative framework, which was difficult to use and deviates from more modern standards that are in use. The company believes in an export market, it is paramount Australian and international standards align.

Burra Foods said certainty of regulation is required to underpin and allow for accurate and efficient capital investment. It indicated while the Australian Government has made net zero commitments, this doesn't directly translate to specific and practical company commitments or legislation to reduce carbon emissions for a business of Burra's size. Secondly, Burra said overseas ownership added an additional higher-level lens to all decisions, and if there was no market or government imperative, capital expenditure would be difficult to justify purely to reduce emissions. The current dairy industry in Australia is incredibly tough – with high prices for dairy products at supermarkets, yet poor returns for farmers – this prohibits a longer-term focus and emphasises short term financial goals as a way of getting on track.

Regulatory and timing certainty would greatly assist in aligning organisations like Burra Foods to establish a strategic and capital investment plan to achieve sustainable outcomes. In the absence of this, the company's strategy is focussed and capital deployed mostly on financial returns. It said it is considered risky to commit to a particular strategy for emissions reduction in the absence of regulatory certainty.

A clear direction for reducing emissions in the agriculture industry is critical. The company believes there is still a substantial discussion to be had on soil sequestration. It said there are many different smaller agriculture businesses which are all interconnected but have very different ideas of what climate change and emissions reduction looks like. Burra said having a framework to assess an organisations' business practices and performance on various sustainability and ethical issues would be helpful.

Having more alignment at the base and core of the production industry would then allow for a common path forward: define what the goalposts are and allow for industry to get on with the job of doing it – rather than asking what it will be.

8.3 CASE STUDY: KATANNING ENERGY - KATANNING, SHIRE OF KATANNING, WA



Katanning Energy in south-west WA is a community-focussed organisation with a vision to see Katanning living and supported by a reliable, clean and cheap renewable electricity supply through a combination of site specific and commercial scale solar, wind and battery solutions. Katanning Energy has a unique 'bottom up' approach of making each individual site energy secure through efficient demand and onsite supply and storage. The goal is for this to be supported by a localised micro-grid allowing intra-community trading and shifting of energy locally, and a virtual power plant exporting to the broader WA grid.

It is taking a data-driven approach to advise local residents and businesses on energy efficiency and renewable energy solutions. The Katanning Energy model involves aggregating local demand to create the volumes and regular work required to establish a local business with the skilled labour required to complete the energy transition to this town of 4,000 people.

Financially, Katanning Energy has identified $7m is exported from the Katanning community to the Perth based network energy operator and retailer annually through electricity bills. The goal is to turn this financial flow around and re-invest it into the Katanning community and local energy management.

OPPORTUNITY IDENTIFIED

Katanning Energy was founded on the need for trusted advice on purchasing solar and batteries for Katanning residents and businesses. With many competing non tailored options online, no local suppliers within 200km, or advisors to talk to, local businesses were confused, uncertain and hesitant about investing in solar.

Katanning Energy found it could provide individualised advice, deliver a tailored solution, with a better-quality product, at a competitive price, therefore accelerating solar and battery take up locally. It provides local businesses and residents with a detailed physical or virtual site audit, an analysis of their energy usage and cost data, and an understanding of what is wanted to be achieved, now and into the future. It's a local, personalised and trusted service.

COLLABORATION INITIATED

Katanning Energy was created after the local community banded together to identify efficiencies and cost-savings for refitting a local co-op store that had been forced to close after 97 years, in part due to high costs associated with old equipment and infrastructure. This led to a two year collaboration to identify and apply practical energy solutions for community benefit across Katanning and surrounds, which led to the launch of Katanning Energy in June 2021.

Katanning Energy approached a number of prominent individuals and leaders to support its efforts to help educate the community and change the local energy landscape. Katanning Energy engaged with the President of the Katanning Regional Business Association, shire councillors, business owners, sports club leaders, church leaders, and community volunteers. Katanning Energy also approached a recently retired partner of a local accounting firm to assist on the board with financial management and community-facing advisory support. The Shire of Katanning originally provided in-kind support of meeting rooms and facilities, as well as a small grant to develop a concept logo and branding.

As in many regional towns, leaders of the community wear many hats and are often the social connectors and key points of knowledge transfer between individuals and groups. In Katanning, the conversations and collaboration that have occurred to address the identified opportunity highlight the importance of trusted networks for productive collaborations and innovation in regions.

In mid-2023 Katanning Energy was able to help establish a new small business in Katanning with the appropriate skilled labour that is Clean Energy Council accredited to do this work, in a partnership arrangement that commences with a minimum of two local installations per week. Based on Katanning Energy data, there is steady work for this small business for the next 10 years to transition all 1,465 sites within and 366 outside the town boundary. Additionally, Katanning Energy has attained 'approved supplier status' with major Perth-based wholesalers, giving it access to lower solar panel, inverter and battery prices which it can pass on to the community. Katanning Energy also issues solar trading credits which are traded with a broker to reduce community costs further.

CHALLENGES ADDRESSED

Katanning Energy operates within the South West Interconnected System (SWIS). Energy delivery within the SWIS excludes competition of supply for residential and small business, with limited competition in the medium-scale business and above market.

Katanning Energy had been operating for less than a year when a temporary regulatory ruling in WA significantly reduced solar installations February 2022 to April 2023 in regional parts of the SWIS. The ruling was intended to ensure stability of the distribution network but had the effect of inhibiting new solar and battery installs. The rule required all new significant electrical works on premises, including solar and battery installations, to be fitted with a circuit breaker preventing a draw of more than 32 amps, resulting in an immediate cut off of the power supply.

Homeowners who went ahead with this found they couldn't run high draw appliances such as air conditioners and stoves at the same time.

Not prepared to inconvenience the community, Katanning Energy took the decision to pause all installations until the issue was resolved, which significantly halted its momentum. Some WA solar businesses were forced to close. Katanning Energy was able to survive this period because of voluntary hours and extremely low overheads. Homeowners and solar installers made their concerns known to the network operator. Based on evidence of local impact, Katanning Energy along with others, took efforts to lobby State and Commonwealth Members of Parliament. The pilot regulatory step was removed in April 2023 after it was concluded that the existing electricity network could cope with a full 63 amp draw across all areas of the SWIS.

COMMUNITY AS A LEAD

Community-led energy groups like Katanning Energy want to maximise local benefits in terms of energy security, reliability, sustainability, and cost reduction. They want to entice and increase the necessary skilled labour required for the local clean energy transition. The circular economy benefits of a local energy retailer are also potentially significant. Through detailed energy assessment data, Katanning Energy estimates town electricity expenditure exceeds $7m annually, and will grow to $7.9m in future years when an electric vehicle changeover in the community is complete. These are significant costs that could firstly be reduced, and secondly be re-circulated through the local economy.

To achieve these benefits requires a greater level of community control than network operators may be willing to support. Katanning has local energy storage as part of its vision, however for the foreseeable future it will be targeting smaller batteries at individual premises where the cost-benefit is highest to the individual and community. Katanning is unlikely to be supported through government grants, and has recently turned down the idea of community battery installation due to the high cost, high risk and low returns.

State and Commonwealth governments have introduced community battery programs in recognition of the value of stand-alone energy solutions for improving energy security and sustainability in suitable regional areas. Providing significant grants for batteries is not a solution that can scale across every regional community and is not necessarily required. The reliability of the electricity network, remoteness, distance of energy infrastructure and the regional bushfire risk are all relevant factors in considering the need for stand-alone energy production and storage solutions.

Recent research, funded by the Victorian Government and Hepburn region partners, found community batteries are not financially viable. Those installed to date in WA are owned by the network operator, connected to the grid, and located in highly populated areas only, where there is high prevalence of solar so they function to smooth the gap between peak solar production and peak demand. This scenario is best described as an 'in-community' battery and not community initiated owned or operated.

THE BIGGER PICTURE

More community energy groups are coming together wanting to take action on energy security, rising costs and climate change. The simple and affordable step of installing solar panels at homes and businesses has seen high adoption across Australia. Taking the next step of achieving storage through batteries separates into individual or community options.

All options involve high upfront costs. Raising funds locally and pooling funds can be a good start, but community organisations will find it difficult to achieve significant progress without either securing grant funding or standing up a model that generates significant cashflow to enter financing arrangements. A greater range of financing options would be needed for community energy groups to pursue battery solutions in locations where they are needed, and not already supported through a government grant.

Community members interested in a local energy movement need to consider what organisation type is most appropriate for them, depending on whether their priorities lean more or less towards community advocacy or the delivery and management of community-wide solutions. Group aims and organisational type will inform the organisational structure and operating model, and whether they will interface with energy retailers and distributors. It will inform how they will engage with and gain support of government agencies and regulators.

KEY INSIGHTS ON PROGRESS

The net zero transition in regional areas across Australia is in part a story of decentralisation. This opens up critical questions of ownership, control, distribution and responsibility that may lead to new models of energy production, storage and use that can benefit a local community. It will be important for experiences and the learnings of groups like Katanning to be more broadly shared to overcome the 'top down' existing model of building large hubs of power generation that send energy out to regions.

A key challenge for governments at all levels is how to best harness community momentum, significant voluntary contributions and goodwill of community members to reduce emissions and achieve net zero for their communities, whilst maintaining network stability and covering network costs where appropriate. Improving information on needs assessment and cost-benefits within state and national development plans, including regulations and infrastructure, and working alongside community groups would assist in identifying options, and determining which solutions are most appropriate and viable.

8.4 CASE STUDY: FOOD MANUFACTURING FACILITY – ULVERSTONE, CENTRAL COAST COUNCIL, TAS

The fertile lands surrounding Ulverstone in north-west Tasmania have made it a hub for agriculture and food manufacturing. One major food manufacturing business with prominent brands in the Australian market has a large frozen potato facility in Ulverstone, which is a major employer and economic growth driver in the region. This facility produces coated, uncoated and value-added potato products, employing 320 people across eight automated pack lines. Its supply of 300,000 tonnes of potatoes each year comes from 165 local growers.

In recent years the facility has undergone significant upgrades to improve its output capacity and productivity while at the same time reducing energy use and emissions. This has improved the plant's long-term viability and provided security to employees and growers. The facility upgrades have been funded in part through innovation and clean technology grants from the Commonwealth and Tasmanian Governments.

OPPORTUNITY IDENTIFIED

Potato processing is an energy-intensive activity that can involve washing, cutting, coating, cooking, processing and packing. It requires boilers and steam as well as sufficient energy to power automated heavy machinery, conveyor belt lines and others. Prior to 2012, the Ulverstone facility was powered by an onsite coal-fired generator and the company was among the largest coal users in Tasmania.

Two significant facility upgrades in 2012 and 2018 have radically improved its energy use, efficiency and productivity. In 2012 a highly efficient 8MW natural gas co-generation plant was installed to supply electricity and steam, resulting in a halving of carbon emissions that saves 39,000 tonnes per year. In 2018 the facility had a 500KW heat exchanger installed which recovers heat from the refrigeration system and uses it to pre-heat boiler feedwater, saving 16,000 gigajoules of natural gas per year. Also included in this later upgrade was an increase in storage and refrigeration facilities to store 165 tonnes of potatoes.

Economically the Ulverstone facility investments made sense due to rising energy prices and the significant cost reductions that would be achieved, making the operations more productive and the business more competitive. Greater energy efficiency directly impacts the bottom line and the cost of energy can be the single largest uncontrolled expense for large manufacturing businesses.

Environmentally the shift from coal would be of significant benefit in reducing Tasmania's emissions and also beneficial in terms of air quality. The Ulverstone facility substitution of coal is important because coal can generate up to 103.7kg of carbon emissions per Btu whereas natural gas produces around 53.1kg per Btu. Eventually, onsite high output electricity generation and battery technology will likely improve to the point of displacing natural gas in most applications, however the almost halving in emissions from coal to gas demonstrates the value of gas as a transition energy source.

There were also pragmatic considerations in terms of the security of ongoing supply of coal in Tasmania from the single remaining Cornwall Coal mine at Cullenswood in the north-east. For heavy industrial and manufacturing businesses that rely on coal as a heat source, the impacts of coal supply stopping for any reason would be substantial. The Cullenswood coal deposit is expected to be exhausted in 2023 and Cornwall Coal has an application pending with the Commonwealth Government for a new mine that would operate until 2026-2027.

COLLABORATION INITIATED

The company has been successful in securing grants from the Commonwealth and Tasmanian Governments for upgrades. As a major employer in the region in its own right and the major buyer of produce from 165 local farmers, the company is important for the future of the north-west region of Tasmania. The 2012 upgrade received a $3m Australian Government grant with the company contributing $13m for a total project cost of $16m. The Tasmanian Government also took the opportunity to invest $2m to expand the new natural gas pipeline that was built as part of the project, so that it could accommodate the future needs of the Ulverstone community and not only the factory. The 2018 upgrade was supported by a $12m Australian Government grant with the company investing $39.3m for a total project cost of $51.3m. The local economic benefits over 10 years were calculated at $164m.

THE BIGGER PICTURE

The food manufacturing industry in Australia is worth more than $133bn and employs 273,000 people, with 40% of those in regions. Large-scale food manufacturing is necessarily energy intensive to produce food at such a scale and rate of output to feed Australia's growing population. Companies that can pair large scale output with high product healthiness play a vital role in our society. But all companies, no matter their scale and contribution, need to play their part in the transition to net zero emissions.

Examples such as the Ulverstone facility show what is possible in terms of upgrading existing manufacturing plants using the latest energy technology and innovation to maximise efficiency and productivity. It will be important for all food manufacturing operations to adopt similar approaches in the coming years as current facilities using old technology reach their end of life and require upgrading or replacement. Recent Commonwealth Government commitments such as the $15bn National Reconstruction Fund could be an important vehicle for businesses to invest in low emissions technologies that in aggregate will make a very significant contribution to net zero.

KEY INSIGHTS ON PROGRESS

Innovative facility upgrades that focus on high efficiency and make best use of natural resources are essential to achieve the national net zero targets. The Ulverstone facility is subject to its parent company's 2030 sustainability targets across energy use (15% reduction), freshwater intake (15% reduction), carbon emissions (20% reduction) and waste (zero waste to landfill).

The company funds a significant research program to develop intellectual property that directly benefits the farmers that supply the Ulverstone facility, through for example, developing new and improved potato varieties and improving farming practices. The company is also developing precision agriculture methods for potato growing to increase yields. The company collaborates with and supports the Tasmania Institute of Agriculture on cooperative research efforts, as well as providing student work placements.

The company is an active member of the Tasmanian Agricultural Productivity Group (TAPG), which is a cross-sectoral body which brings together primary producers, the food and non-food agricultural manufacturing sector, plantation forestry, agribusiness (services to agriculture) and government. TAPG plays a significant role in knowledge-building and knowledge sharing in Tasmania and seeks to address issues of common concern to the primary, secondary and service levels of Tasmanian agriculture.



REGIONAL AUSTRALIA INSTITUTE

8.5 OVERALL FINDINGS

These case studies show the delicate mix of internal drivers, community momentum, and external support that are needed in order for a business or community to be a leader in the net zero transition.

For each case study, a solid foundation of knowledge (and research) about their energy context and the risks and opportunities they face in coming years was very important. Each applied a different method, but they all built a good understanding of where the risks and opportunities lie. For each case study, this understanding is deeply rooted in their place of operation – for the businesses this reflected the innovation and business ecosystem they are part of, and for the communities it reflected their particular needs and capabilities.

For both businesses and community, the foundational knowledge helped them find a solid business case for action. It is critical that a good return on investment was able to be mapped out. Substantial transition action requires a move away from business as usual, and investment in new equipment and services. Regional and business leaders quite reasonably expect to see a good business case for those investments. In some of the case studies access to public support like innovation networks, collaborative R&D, and even seed or matched funding helped to build that business case.

Local leadership is important in each case study, whether it represents the community needs as in Katanning, or it provides the impetus for a good case to be put to international owners as with Burra Foods. In each case study it's proven important to articulate the vision and demonstrate capacity to advance each initiative.

Each case study shows that the leaders have been able to demonstrate innovation, discovering new opportunities and supports, and working with others in the region (or nationally) to advance their aspirations. Each demonstrates many aspects of collaboration and the ability to stitch together and manage multi-level stakeholders and programs.

Each case study also shows a commitment to transparency and monitoring outcomes. Whether this is for a community enterprise like Katanning Energy, where it needs to keep showing the community what impact it is having, or in tracking the business impacts of investments like the case of Radial Timber.

Each case study shows how quickly a business or community group can mature, building the institutional capacity to deliver on a net zero transition initiative. Staff capacities and roles have been advanced, partnering with external funders and advisors. And where 'institutional capital' is thinly spread, as in Katanning Energy, there is recognition that expertise needs to be shared more widely to enhance the sustainability of the venture.

Long term sustainability is a feature of each case study as their business systems and strategic directions are built to last beyond the current round of activities, and beyond the next as well. All four organisations have a clear emphasis on their contributions to local, regional and global sustainability through their transition initiatives, but are also looking inward to ensure that their efforts are able to be carried forward in the long term.



09. A FRAMEWORK FOR TRANSITION

This section shares a framework for regional net zero emissions transitions developed by Transition & Recovery Australia. The framework has been informed by practical experiences with the Latrobe Valley Authority and represents the approaches used by Transition & Recovery Australia in its work with regional communities.

9.1 CONDITIONS FOR EFFECTIVE TRANSITIONS

The Transition & Recovery Australia Transition Framework details seven pre-conditions for effective transitions.

1) TRANSITION AT A POINT IN TIME

Recent years have seen climate change impact on people, environments and businesses in ways that are more visible, more pronounced and in some instances catastrophic. Changes and their consequences range from practical effects of 'green' investment decisions, natural resource loss and availability, disaster recovery, business vulnerability, industry rethink and redirection, policy change, energy costs and security, job location and housing availability.

All of these changes have been experienced at a very local level across regional and rural communities, especially in places that rely on carbon-intensive industries such as energy generation, agriculture, forestry, fisheries, mining and manufacturing. For some communities, the degree, multiplicity and timing of change has been fairly quick, while for others the 'writing is on the wall' and people can see that it's only a matter of time before serious impacts emerge.

2) A SENSE OF URGENCY FOR SOME AND AN EMERGING INTEREST FOR OTHERS

The implications of net zero in communities faced with the closure of fossil fuel-based industries (e.g. Latrobe Valley in Victoria, Collie in WA and the Hunter Valley in NSW) is resulting in a high degree of urgency and anxiety, an understanding that it is a very complex and critical situation and also an expectation that there will be an orderly transition supported strongly by governments.

For other regional places around the country, the lead time for impacts and the types of change to emerge takes many forms that are particular to that place and circumstance. This differentiation across regional communities, combined with different levels of readiness for action, presents today as a broad spectrum of highly localised emerging transition activity and approaches.

What is common to these 'urgent' and 'emerging' transition scenarios, is that their history, culture, lifestyle, opportunities and connections, their families, workers, care givers, volunteers, business owners, service providers and the many interest groups and individuals that contribute, are all part of the fabric of their society and economy where people live and work. These connected factors are what gives each place its unique, albeit gradually changing, identity and character. They are all important building blocks for a successful place-based transition and are to be understood as such.

3) A WELL-MANAGED TRANSITION

Regardless of timing, location and impact, all communities depend on a well-managed transition that suits their context over a long timeframe, to protect jobs and to support the underlying economic and social drivers of prosperity. For transition to be 'managed' there is a requirement for a 'manager' and this can take many forms, which have implications for what can feasibly be done, and what expectations can be reasonably held for what transition will achieve. At present, we can observe a mismatch between broadly high expectations and the overall relatively simplistic structures set up to deliver transition in regions and communities.

Transition approaches and actions already in place or underway in Australia and other places, as well as research, and practical experience, can tell us a lot about what it takes to prepare, organise, and undertake immediate, mid-term and longer-term effective transition and transformation for the future.

4) INVESTING IN PEOPLE AND SYSTEM CAPABILITY - BEYOND INFRASTRUCTURE

The transition experience to date here in Australia through the work of the Latrobe Valley Authority in Victoria[21] and in Collie and the Hunter Valley, helps us understand what works and what further needs to be done. Likewise, evidence of successful approaches in other places like the European Union (EU), can shed a light on what is required for having the best conditions in place to support long term change in regions to take up transition.

So, what are the common messages:

- Build in place-based collaboration, governance and innovation capacity for long term resilience both locally and across sectors and levels of decision making.
- Focus on evidence based, agreed local understanding of the unique context, potential opportunities as well as global forces and directions.
- Create and authorise space, time, and bespoke resources for a range of inclusive fit for purpose partnerships to test and determine proposals for actioning and commitment to, for collective and individual benefit.
- Provide skilled regular support to those responsible for building the conditions listed above and tell the story as it emerges through deliberate monitoring collection and sharing of evidence.

5) A WAY OF WORKING: 'THE PRACTICE OF HOW'

Whilst the usual approach to economic and social development through service delivery, business support, training and infrastructure is still relevant to transition, the transition experience to date suggests it is not nearly sufficient and in fact is a simple response to a much more complex situation which is systems based and multi-faceted. It requires a much broader design scope that includes creating natural 'point of time' developmental activities associated with levels of sector/policy/program interdependence and connectivity. What is needed are flexible resources and skilled support for a process that involves people:

- Initially seeking to understand the complexity of the situation through a 'place' context analysis including an inquiry regarding innovative, future facing work already underway by whom, in what field (all sectors) and where.
- Exploring initial further potential of what is underway in each example with a relevant range of actors (researchers, practitioners, business owners, policy designers, program and regulatory experts, peak bodies, planners etc.) and organisations that have an interest or expertise to contribute, and if the evidence stacks up, a more detailed inquiry into conditions[22] for success that follows.
- Assisting the development of evidence 'type' for collection over time, formats for collection and presentation, when, how and to who. This evidence is formative in nature and is built on a range of data types according to need like levels of multi governance in place, levels of inclusiveness, networks established etc., as well as the more usual data e.g. funding committed, levels of innovation, investment etc.

6) A TRANSITION FRAMEWORK FOR DEVELOPMENT AND ASSESSMENT[23]

Transition & Recovery Australia has used its practical experience and 'practice of how' in the field (through leadership of the Latrobe Valley Authority) over five years, observing the transition underway in other locations (Australia and the EU) and applying key transition research to test a framework for understanding point of time levels of transition practice and outcomes 'in place', as well as further development opportunities.

If done well, the use of such a framework can test for levels of mutual benefits for those involved, including local, state and national governments. To date there are good examples of outcomes and impacts that have changed the way agencies work, design programs and implement more flexible funding models. Importantly, this new way of working can reduce double up and overlay of resources including expenditure, resulting in better return on investment due to more targeted and evidenced based decisions, including better coordination of service delivery and infrastructure benefit.

Lastly, but most importantly, it can lead to a change in community sentiment and attitude to working with government agencies and business through partnerships that demonstrate mutual respect and recognition of knowledge and experience. This is incredibly important for rural communities that often feel forgotten or not valued for their contribution and are critical now in the steps we take towards achieving net zero.

7) A RADICAL SHIFT TO THE WAY OF WORKING IN PARTNERSHIP WITH COMMUNITIES

The approach outlined above requires a long lead time and careful but skilled, enthusiastic leadership to build on community strengths known and identified for the future, with organisations and individuals already available both locally and beyond each community. It is also an opportunity to build practice across communities, to share ideas and what has been learned, and to understand whether opportunities identified are already underway in other places either creating an opportunity for collaboration or specialisation/ diversification.

9.2 TRANSITION FRAMEWORK

This Transition Framework has been designed by Transition & Recovery Australia to incorporate contemporary concepts identified internationally as critical to the long-term transition and transformation of regions facing economic, social and environmental challenges. It can be used by transition practitioners to learn, understand and draw conclusions. The Framework continues to evolve through testing and application in regions.

A set of research tools and question guides can be wrapped around this framework to provide a user-driven and self-guided approach to designing and implementing a regional net zero transition plan.

For the purposes of observation and opportunity assessment, in applying the Framework a five-point maturity scale is used: (1) Not applicable; (2) Undeveloped; (3) Emerging; (4) Developing; (5) Highly developed.

A PLACE-BASED CONTEXT

1

Requires a thorough understanding of the specific situation and people arrangements that exist in the location:

- Context analysis -geographic location, demographics, LGA, main industries, other relevant readily available data.
- Key organisations –business, training, workforce, government, interest groups, community groups/advocates.
- Key industry background –type, size, history, product, ownership, future plans.

DEALING WITH UNDERLYING DRIVERS

2

The origins and incentives behind the decisions taken, focussing on the 'why', and the influence of local, state, or federal policies on these actions.

- Mission orientation and policy design that enables innovation including through bespoke arrangements, funding and support for the particular transition opportunity.
- Dedicated flexible resourcing commitment over the long-term.
- Willingness and ability to partner with local people, businesses and organisations to learn an understand what works (developmental approach).
- Purpose-built innovation policy and programs that drive transition and transformation.

DEVELOPING OPPORTUNITIES THROUGH DISCOVERY, LEARNING AND ENTREPRENEURSHIP

3

It is important to learn about transition opportunities, who is involved in entrepreneurial activity and what's already happening:

- What is the identified innovation/change with potential and how was this arrived at?
- Where did it originate from, who was involved, who knew about it, who were/are the early partners?
- Details of the opportunity potential and the value proposition identified including proposed suitability and reasons for why it is being pursued.
- What was/is the process undertaken to learn about and test the reality and suitability of the value proposition? What was tested, how and who with, what partnerships were formed, what resources were used?
- What expertise/research was sought and where from, what other factors were considered for creating a solid, economic, socially, and environmentally accepted business case for change?

MULTILEVEL AND INCLUSIVE PARTNERSHIPS

4

Multilevel governance is about putting in place participatory structures that allow many actors to be involved and contribute to processes that share learning, make decisions and build commitment for action:

- What collaborative network arrangements are in place and who leads them (complementary horizontal and/or vertical networks that coexist and overlap to enable broader collective views to inform different levels of required decision)?
- Who is involved, what roles do they play, what are their individual and shared responsibilities?
- What efforts have been made to go beyond the 'usual suspects' in finding people with knowledge and experience who have a contribution to make to the opportunity potential or are already undertaking leading work?
- How is the experience and knowledge of people found or identified? This can include multiple independent and interdependent actors, private and public, internal or external.
- What processes are in place to build collective learning and negotiation for decision-making where authority and influence are shared between stakeholders (this builds trust and collective intelligence upon which decisions can be made)?
- Is there awareness or understanding of the different levels of system and agency involvement?
- Has there been demonstrated collaborative leadership and decision-making across organisations?
- What skills and knowledge have been drawn on to enable effective collaborative networks?

CAPABILITY AND CAPACITY

5

The key to a successful transition in regions is the level and quality of knowledge, interest, ability, and willingness of participants/partners to be to be involved in collaborative endeavours and commit to collective responsibilities:

- Who led and who supported the work?
- What steps were taken and what was required to involve people and gain buy-in, coordinate, facilitate and manage relationships and activities?
- What skills were identified and developed to undertake what was required?
- What level of success/readiness/capacity e.g., time, organisation, resources/support, attitude was experienced/ available/provided?
- Did the people involved see benefit and did it influence change in their organisation, approach, attitude?

SUCCESS FACTORS BASED ON EVIDENCE

6

Key success factors are evidence-based, like technology and policies, decision-making, how information is gathered and used, the effectiveness of plans, unintended outcomes or impacts, and the challenges encountered:

- What success factors were identified and tested eg. technologies, skills, policies/regulations (local, state, federal), costs/savings, applications, timelines, planning requirements etc, who was involved and how?
- How information was sought/shared, decisions made/checked and conclusions reached?
- What, how and who collected evidence and information for consideration and decisions?
- What documentation, plans and reports were produced, by whom and how was it shared/published/used?
- What unintended outcomes/impacts or unexpected changes occurred directly and in other sectors/organisations, that are necessary/helpful/independently good consequences/impacts?
- What were the challenges in undertaking this work?

STEPS TO SUSTAINABILITY

7

Longer-term development can be forecast based on knowledge already learned and built on through further testing as projects progress:

- What conclusions were reached: starting activities, timelines, resource availability, organisational support?
- What are the next steps for development –what else needs to be tested and further research required, who else needs to be involved and in what capacity, what resources and support are required?
- What local, national and international drivers of change have been identified that may impact decisions and the viability of opportunities pursued?
- What forecasting PESTLE (Political, Economic, Social, Technological, Legal, Environmental) factors need to be considered for next steps development?
- Are there opportunities for scalability, diversification or specialisation that can grow benefits?

9.3 USING THE FRAMEWORK

To demonstrate the applicability of the framework, Table 3 summarises the key findings from each of the case studies against the seven domains. It identifies points of strength that can be leveraged and also points of weakness which need to be addressed in advancing the transitions initiative.

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Table 3: Transition conditions assessment of the four case studies

Transition Conditions	Yarram Timber	Burra Foods	Katanning	Tasmanian food manufacturer
1. Place-based context	High level of local engagement	Links to local supply chains and community capability	Owned by community	History of local engagement
2. Dealing with underlying drivers	Local entrepreneurs involved	International HQ support	Nimble organisation with clear mission	Linked to parent company goals
3. Developing opportunities through discovery, learning and entrepreneurship	Dedicated resources to learn from and with others	Emerging 'system approach' across all supply chain participants	Data-driven organisation that finds solutions based for individual sites	Supporting cooperative research
4. Multilevel and inclusive partnerships	Demonstrates benefit of acting on 'collective knowledge'	Wider engagement opportunities available	Active support for broader regional WA community energy efforts	Mature partnerships with State and Commonwealth Governments
5. Success factors based on evidence	Records progress for transparency, efficiency	Working to balance local drivers and international strategies	As analysis deepens KE adjusts its focus and adapts	Close monitoring of progress shifting out of fossil fuels
6. Capability and capacity	Significant long-term change required across broader community	Dedicated quality and sustainability team now in place	High reliance on individuals, lack of local expertise	Ongoing energy tech improvements being led internally
7. Steps to sustainability	Excellent example of long-term system vision, early specialisation and activation	Example of a medium business building a case for investment	Meeting unique local needs, needs to balance business and community goals	Local initiatives leading the way, but still under international ownership

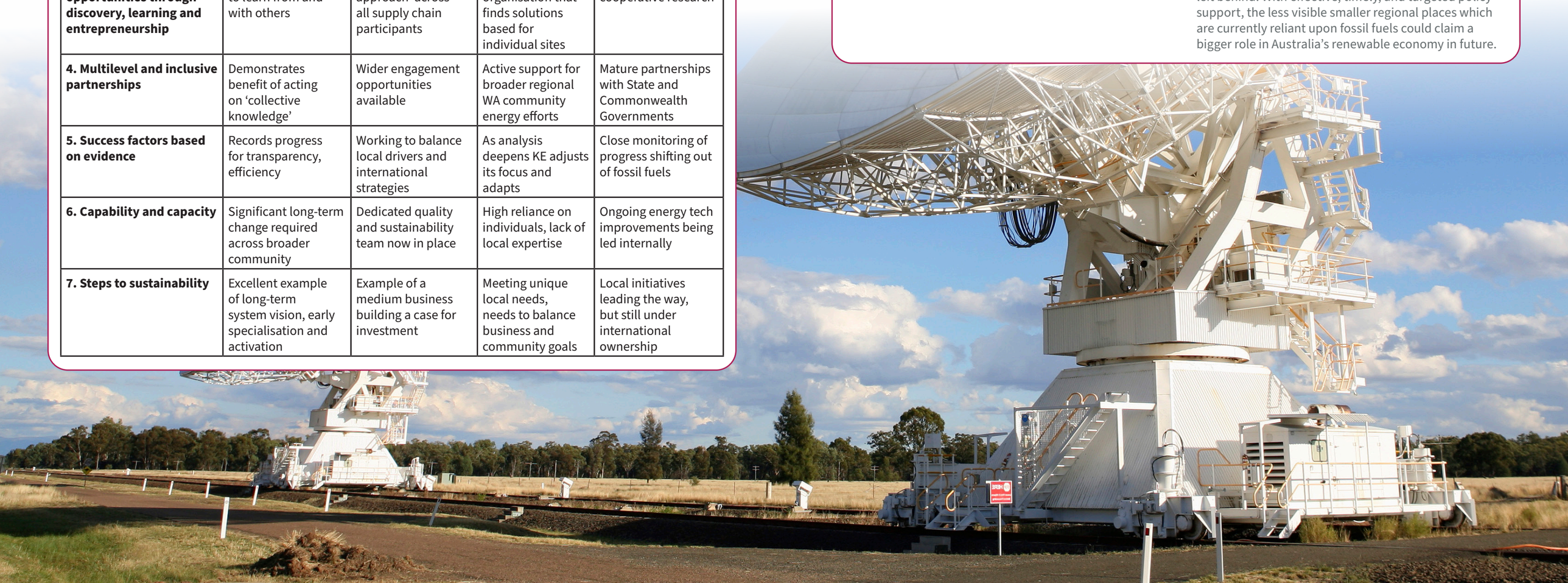
10. CONCLUSION

This report sets out potential transition pathways for communities and businesses in regional Australia by exploring Australia's position in the global context; examining the role of Regional Cities; and highlighting the elements of success in communities that are leading the way.

Countries with a high reliance on fossil fuels such as Australia, face the most significant transition processes. Our industry and export composition requires a significant transformation effort compared to most other developed nations. Australia's current political enabling environment is now well-placed to aid in this transition, however it would benefit from a carbon pricing system and emissions trading system. Recent government pledges are substantial and much needed to assist with the process, however the extent to which less prominent places in regional Australia will be supported is not yet clear.

The net zero transition in regional areas across Australia is in part a story of decentralisation. It opens up questions of ownership, control, distribution and responsibility that may lead to new models of energy production, storage and use that benefit the local community. It will be important for experiences and learnings of 'bottom up' models to be broadly shared to overcome the 'top down' existing model of building large hubs of power generation that send energy out to consumers.

There are a wide variety of examples demonstrating the positive and negative implications of transitioning to a net zero economy. Get it wrong, and vulnerable communities will likely depopulate, encounter higher levels of unemployment and face poorer health outcomes. A 'just transition' is crucial to ensure that those vulnerable communities bearing the brunt of the disruption caused by low-carbon policies are not left behind. With effective, timely, and targeted policy support, the less visible smaller regional places which are currently reliant upon fossil fuels could claim a bigger role in Australia's renewable economy in future.



APPENDIX 1: METHODOLOGY

REGIONAL CITY INTERVIEWS

Consultations with the Regional Cities were conducted by Constructive Energy, a regionally based energy consultancy firm specialising in developing renewable energy projects for regional Australia. Thirty-four semi-structured interviews were conducted with community and business leaders in 10 locations. In addition to establishing a baseline level of awareness, consultations also examined the perceived level of support in regional communities and whether it was considered sufficient.

REGIONAL CITY INTERVIEWS

Ten Regional Cities were selected for consultation based on their high reliance on fossil fuel intensive industries and a distribution across states and territories:

- Rockhampton, QLD
- Bundaberg, QLD
- Darwin, NT
- Gladstone, QLD
- Harvey, WA
- Mackay, QLD
- Wodonga, VIC
- Port Stephens, NSW
- Toowoomba, QLD
- Port Pirie and Port Augusta, SA

REGIONAL CITY INTERVIEW PARTICIPANTS

Consultations with the Regional Cities were led by Constructive Energy, a regionally based energy consultancy firm specialising in developing renewable energy projects for regional Australia.

Consultations occurred across a wide variety of stakeholders, including council representatives, research organisations, business networks, training organisations, climate action networks, and community organisations. In addition to the consultant's extensive network of existing contacts, the consultant employed the use of direct outreach to targeted participants. The following table is a list of participants who chose to take part.

Regional City	Number of participants	Participants
Port Pirie	2	Councillor of Port Pirie Council, CEO of RDA Far North
Gladstone	3	Senior managers of Boyne Smelter, Jeld Industries, Gladstone Area Water Board
Harvey	3	Councillors of Shire of Harvey Council, Owner of Preece Construction
Mackay	4	CEO of Mackay Sugar, Director of Linked Group, Senior Manager of Greater Whitsunday Alliance
Wodonga	3	Senior managers of Businesses Wodonga, RAW, Veue Code 200 Pubs
Bundaberg	4	Senior managers of Regional Business HQ, Bundaberg Council, Bundaberg Tourism, and Gidarjil Development Corporation
Port Stephens	4	Senior managers of Business Port Stephens, Eco Network, Tilligerry Community Association
Rockhampton	5	Councillors of Rockhampton Regional Council; Senior managers of Beef Australia Field Day, Manufacturing Hub, Capricornia Chamber of Commerce
Darwin	4	Council of the City of Darwin, West Daly Regional Council, Senior manager of Children's Ground Darwin
Toowoomba	2	Mayor of Toowoomba Regional Council; Department of Regional Development, Manufacturing and Water

COMMUNITY CASE STUDIES

The four community case studies were conducted by Transition & Recovery Australia (TRA), a regional focussed advisory firm specialising in assisting communities and governments to navigate transitions. It is led the former CEO of the Latrobe Valley Authority (LVA) and builds on the success of the LVA by building a framework that can be applied to communities transitioning to a low-carbon future. Whilst this framework is applicable to the broader community, the case studies focussed on the leaders of the specific energy transition initiative. The case study approach agreed to by the RAI and Transition Recovery Australia is as follows:

- Agree on the framework to analyse and collect information on each case study location
- Case study identification and selection
- Develop common interview questions derived from framework
- Develop a repeatable process for each case study involving:
  - Location, sector and innovation research
  - First level interviewee identification, liaison and scheduling
  - Second level interview or group sessions
- Develop specific location interview questions
- Conduct interviews
- Case study write up
- Seek approval/edits from interviewees

The RAI and Transition & Recovery Australia agreed to use TRA's framework as a guide as this provided a number of benefits:

- It considers the specific activity in each location using currently recognised approaches to contemporary regional development.
- It provides for a broad understanding of the conditions for success and the readiness levels for innovation at a local level.
- It allows for comparison across locations of approach, capacity for success, industry readiness and potential, impact on other sectors, sustainability and applicability in other places.
- It offers policy and decision makers insight into the starting points and policy implications for further work to be done in supporting development of successful conditions needed for sustainability in small rural locations.

CASE STUDY SELECTION

The case study selection criteria were developed to ensure that each case study demonstrated a particular aspect of innovative de-carbonisation that has broader applicability in other places. Each case study will present different locations, sectors, and technologies that are relevant to regional Australia. These industries are important to regional Australia, forming a large part of the regional economy and are major employers. They also have above average consumption of fossil fuels. This makes them ideal candidates for case studies. The region selection criteria included:

Location	Sector	Technology
State	Manufacturing, including food manufacturing	Electrification
Remoteness	Agriculture, including aquaculture and forestry	Local energy, including microgrids
Population	Waste	Renewable energy generation
Size	Transport	Energy reduction
Geography		Circular economy
		Digitisation

CASE STUDY PARTICIPANTS

Case Study 1: Yarram, VIC (Radial Timber)
Interviewees
Owner, Radial Timber
Owners, GridEdge
Founder and GM, Heartwood Plantations
Community Engagement, Star of the South
Managing Director, Mycelia

Case Study 2: Korumburra, VIC (Burra Foods)
Interviewees
GM, Quality, Burra Foods
Acting CEO, Food and Fibre Gippsland

Case Study 3: Katanning, WA (Katanning Energy)
Interviewees
Board Member, Katanning Energy - Energy Management Consultant
Board Member, Katanning Energy - Former Partner, RSM (accounting firm)
Former Board Member, Katanning Energy - Katanning Shire Councillor
President, Katanning Regional Business Association

Case Study 4: Ulverstone, TAS (Food manufacturer)
This case study was prepared from publicly available information.

APPENDIX 2: RAI REGIONAL TYPES

The Regional Australia Institute uses a framework of four regional types to describe different places in regional Australia. The typology recognises that socio-economic experiences vary according to location in relation to characteristics like population size, economic fundamentals and proximity to regional centres or capital cities.



The classification of RAI typologies applies to local government areas (LGA) while the ABS Remoteness Structure (RS) is based on the Statistical Areas Level 1 (SA1). However, the RAI creates a basic correspondence between the RAI typologies and ABS RS.

RAI Typologies	Number of LGAs
Metropolitan	118
Regional City	48
Connected Lifestyle Area	58
Industry & Service Hub	37
Heartland Region	286

ABS Remoteness	Number of LGAs
Major Cities of Australia	136
Inner Regional Australia	132
Outer Regional Australia	142
Remote Australia	61
Very Remote Australia	76

Table 4: Number of LGAs in the Categories of Each Regional Structure

Table 5: Number of LGAs in the Categories of Both Regional Structures					
	Major Cities of Australia	**Inner Regional Australia**	**Outer Regional Australia**	**Remote Australia**	**Very Remote Australia**
Metropolitan	117	1			
Regional City	13	29	6		
Connected Lifestyle Area	6	47	5		
Industry & Service Hub		16	16	5	
Heartland Region		39	115	56	76

According to the correspondence, the major differences between the typologies and RS are:

- All “Metropolitan” LGAs in the RAI typologies are “Major Cities of Australia” in the ABS RS, except Wollondilly which belongs to the category of “Inner Regional Australia”. On the other hand, some Major Cities of Australia in the RS are classified as either “Regional City” or “Connected Lifestyle Area” in the typologies. Among them, the Regional Cities include Central Coast (NSW), Cessnock, Lake Macquarie, Maitland, Newcastle, Shellharbour, Tweed, Wollongong, Greater Geelong, Gold Coast, Noosa, Sunshine Coast, and Mandurah; and the Connected Lifestyle Areas include Kiama, Queanbeyan-Palerang Regional, Moorabool, Gawler, Murray, and Serpentine-Jarrahdale.
- All Regional Cities and Connected Lifestyle Areas are either Major Cities, Inner Regional or Outer Regional. Most Industry & Service Hubs are Inner Regional or Outer Regional, except for Mount Isa, Broome, Karratha, Port Hedland, and Alice Springs which are Remote areas in the RS. These three types together overlap much with Inner Regional, as well as some parts of Major Cities and Outer Regional.
- All Very Remote, as well as most Outer Regional and Remote, areas in the RS are Heartland Regions in the RAI typologies. However, Heartland Regions also include many Inner Regional areas. The Heartland Regions are as diverse as they are vast.

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