EnergyCo

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Central-West Orana Renewable Energy Zone

Coordinating community impacts and benefits in the REZ

March 2023

The Energy Corporation of NSW (EnergyCo) is part of the **Treasury Cluster**

Acknowledgment of Country

We acknowledge that Aboriginal and Torres Strait Islander peoples are the First Peoples and Traditional Custodians of Australia, and the oldest continuing culture in human history.

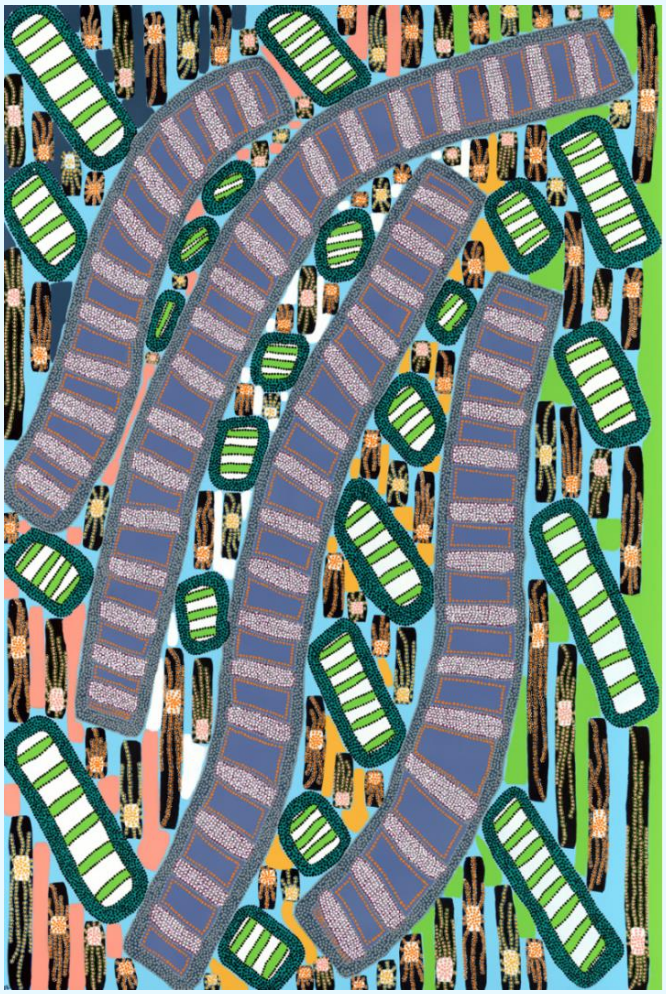
We pay respect to Elders past and present and commit to respecting the lands we walk on, and the communities we walk with.

We celebrate the deep and enduring connection of Aboriginal and Torres Strait Islander peoples to Country and acknowledge their continuing custodianship of the land, seas and sky.

We acknowledge the ongoing stewardship of Aboriginal and Torres Strait Islander peoples, and the important contribution they make to our communities and economies.

We reflect on the continuing impact of government policies and practices, and recognise our responsibility to work together with and for Aboriginal and Torres Strait Islander peoples, families and communities, towards improved economic, social and cultural outcomes.

Artwork:
Regeneration by Josie Rose



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1 Executive summary

The Energy Corporation of NSW (EnergyCo) is the NSW statutory authority appointed to lead the delivery of the Central-West Orana Renewable Energy Zone (REZ) under the NSW Electricity Infrastructure Roadmap. EnergyCo's role includes coordinating benefits for local communities and stakeholders in the REZs who are hosting renewable energy generation and transmission projects.

Since mid-2022, EnergyCo has been investigating how potential cumulative impacts will be mitigated within the Central-West Orana REZ while also providing long-term benefits to the community. These investigations include an extensive program of engagement with local councils, government agencies and other key stakeholders to understand key local issues and priorities in the REZ.

EnergyCo has carried out detailed investigations into a number of areas we've heard are priorities for the community, such as road upgrades, training and skills development, workforce accommodation, telecommunication improvements and waste management. The key findings of these investigations to date, including potential challenges and opportunities, are outlined in this report. The opportunities listed in this report are for consultation purposes only and do not comprise commitments or agreed projects. All final initiatives will be subject to securing funding and applicable governance processes.

To support the ongoing investigations into these areas, EnergyCo is inviting feedback from the wider community between January and March 2023 to understand the types of initiatives people would like to see in their communities. The consultation also aims to seek feedback on how dedicated funding for community and employment purposes will be implemented in the REZ. Following the feedback period, a report will be prepared which will outlines the consultation outcomes and next steps.

This report summarises the research carried out by EnergyCo to date to support the ongoing investigation work in these areas.

Information on how to provide feedback can be found on EnergyCo's website at energyco.nsw.gov.au/cwo.

2 Introduction

EnergyCo is investigating how impacts and benefits to communities will be coordinated in the Central-West Orana Renewable Energy Zone.

2.1 Background

EnergyCo is in the development phase for the state's first renewable energy zone (REZ) in the Central-West Orana region. REZs are modern-day power stations, connecting new clean energy generation and storage to electricity consumers across the State.

As Infrastructure Planner for the Central-West Orana REZ, EnergyCo is responsible for coordinating private sector investment from solar, wind and storage projects as well as planning new transmission infrastructure in the REZ. In this capacity, EnergyCo is taking a leading role in the coordination of impacts and benefits to communities who will be hosting renewable generation and transmission infrastructure.

Since mid-2022, EnergyCo has been carrying out a program of research which aims to:

- understand key topics of concern for local councils and communities
- collect baseline data on the cumulative impacts of projects in the REZ
- develop proposed strategies and initiatives to coordinate potential impacts and provide positive outcomes for REZ communities.

The findings and identified opportunities in this report are based on consideration of the proposed transmission infrastructure and 11 major generation projects, known as Candidate Foundation Generators (CFGs), intending to connect to the REZ transmission network. Developers of renewable energy projects are required to seek the necessary approvals to allow for the construction and operation of their projects in accordance with relevant legislation, in addition to participating in the Consumer Trustee's competitive tender process for access rights before they are able to connect to the REZ transmission network.

This research is separate and in addition to the assessments being carried out by EnergyCo to inform the Environmental Impact Statement (EIS) for the Central-West Orana REZ transmission project.

2.2 How the research was carried out

2.2.1 Key activities

EnergyCo has carried out a range of activities since mid-2022 to inform how community benefits will be delivered in the REZ. The table below outlines the key activities carried out to inform the research.

Table 1: Key activities carried out to inform EnergyCo's research.

Activity	Purpose	Timing
Initial consultation with key stakeholders, including councils, government agencies and elected representatives	Understand issues and priorities in affected Local Government Areas (LGAs)	From mid-2022 to present

Activity	Purpose	Timing
Consultants engaged by EnergyCo to carry out studies into priority areas identified through key stakeholder consultation	Establish baseline data and identify potential opportunities	June to December 2022
Further consultation with key stakeholders	Collect data to inform the studies and test potential opportunities	Late 2022 to present (ongoing)
Presentations to the Central-West Orana REZ Community Reference Group (CRG)	Discuss the potential initiatives under investigation and seek initial feedback via the project's quarterly CRG meetings	December 2022 and January 2023
Consultation with REZ communities	Invite feedback via an online survey on the types of initiatives people would like to see in their communities	January to March 2023 (ongoing)

2.2.2 Consultation with key stakeholders

EnergyCo began an extensive program of stakeholder engagement in mid-2022 to support our investigations into how impacts and benefits will be coordinated in the REZ. This includes targeted consultation with local councils, government agencies, developers, interest groups and other key stakeholders.

Between June 2022 and March 2023, EnergyCo carried out:

- 57 meetings with local councils (Dubbo Regional Council, Mid-Western Regional Council, Warrumbungle Shire Council and Upper Hunter Shire Council)
- 13 meetings with local elected representatives
- 85 meetings with developers of generation projects with planned connections to the REZ transmission network (CFGs)
- 20 meetings with government agencies with an interest in the REZ
- three interactive sessions with three consortia tendering for the Network Operator contract to design, build, finance, operate and maintain the REZ transmission network.

EnergyCo will continue to work closely with key stakeholders on the development and implementation of community benefit initiatives for the REZ.

2.2.3 Studies into priority topics

Independent consultants were engaged by EnergyCo in mid-2022 to conduct detailed studies into the following topics:

- road upgrades
- housing and accommodation
- industry, training and skills
- waste and circular economy
- telecommunication
- social infrastructure.

Further details about the studies, including the challenges and opportunities identified, are provided in this report.

2.2.4 Community consultation

Community feedback is being sought between January and March 2023 to inform EnergyCo's ongoing investigations. Feedback is being collected via an online survey which focuses on the

priority topics discussed in this report. Survey responses received during the consultation period will inform the final strategies and initiatives that will be implemented to manage impacts and provide community benefits for REZ communities.

All feedback received will be captured in a community feedback report which will be published on EnergyCo's website later this year. Further details about the consultation period, including how to provide feedback, can be found at energyco.nsw.gov.au/cwo.

2.3 Purpose of this report

This report summarises EnergyCo's key findings to date on how community impacts and benefits can be coordinated in the Central-West Orana REZ. The report forms part of EnergyCo's consultation with the wider community between January and March 2023. While feedback is not being sought on the report itself, it aims to help the community provide informed feedback as part of the consultation.

The information captured in this document was current at the time of collection between June and December 2022. Due to projects in the REZ being at varying stages of development, the information is likely to evolve over time as further work is completed and new data is received. However, the data collected provides an initial baseline understanding to inform EnergyCo's ongoing investigations into these areas. The research aims to support further discussion and consideration of future opportunities with key stakeholders such as local councils and renewable energy project developers.

The information throughout this report has been produced by consultants engaged by EnergyCo and consolidated to provide consistency where possible. Given assumptions and methodologies will differ between studies, it is acknowledged that there may be some inconsistencies in information at this early stage of investigations.

The information contained within this report is provided for information purposes only and should not be relied upon by third party organisations.

3 About the Central-West Orana REZ

3.1 Regional characteristics

Figure 1: Map of the Central-West Orana REZ.

The Central-West Orana REZ is about 20,000 square kilometres within the Central-West and Orana regions of NSW, on the land of the Wiradjuri, Wailwan and Kamilaroi people.

The REZ includes six LGAs. Four LGAs are within the project area for the REZ transmission project: Dubbo Regional, Mid-Western Regional, Warrumbungle Shire and Upper Hunter Shire Councils.

The Central-West and Orana regions are home to more than 300,000 people in total, and this is expected to increase to more than 306,000 people by 2041. There are 29,800 residents in these regions who identify as Aboriginal or Torres Strait Islander.[1]

The region's population lives in a diverse network of regional centres, including Dubbo, Mudgee, Wellington, Gulgong and Dunedoo, and smaller towns and rural localities, including Wollar, Ulan, Uarbry, Cassilis and Coolah. Most people live in or around the regional centres. Each regional centre has its own catchment, drawing people from the surrounding communities for employment, services and social networks.

The region's broad range of industries, its location and connections to Sydney, Canberra and Newcastle provide a foundation for a diverse regional economy. Mining and agriculture underpin the region's economy and together create 28 per cent of the region's economic output.

Agricultural production is the primary land use activity ranging from intensive and irrigated crops, including vegetables, fodder, stone fruits, grapes and cotton, to extensive broadacre cropping, meat and wool production and forestry. Agricultural production supports an extensive value chain

[1] Department of Planning, Industry and Environment, *Draft Central West and Orana Regional Plan 2041* (NSW Government, 2021).

including major livestock centres in Dubbo and Blayney, transport, logistics and intermodal transport hubs, cotton gins, canneries, packing and processing, and is a significant employer across all parts of the region.

The protection of regionally significant agricultural land from incompatible land uses is identified as a regional strategic goal. This is reflected in Objective 13 of the draft *Central-West Orana Regional Plan 2041* (Department of Planning and Environment, 2021). Parts of the Central-West Orana REZ have also been identified as Biophysical Strategic Agricultural Land (BSAL). BSAL is land with high quality soil and water resources capable of sustaining high levels of productivity, which have been mapped by the NSW Government to provide increased protection from mining and extraction projects.

3.2 Projects in the REZ

A number of renewable energy projects are proposed, approved or under construction within the REZ. According to the NSW Planning Portal, there are more than 30 solar, wind and solar projects of varying capacity planned within the REZ boundary as of March 2023. Of these, EnergyCo is working closely with 11 Candidate Foundation Generators to plan their proposed connections to the REZ transmission network. An interactive map showing the locations of planned generation and transmission projects in the REZ is available at energyco.nsw.gov.au.

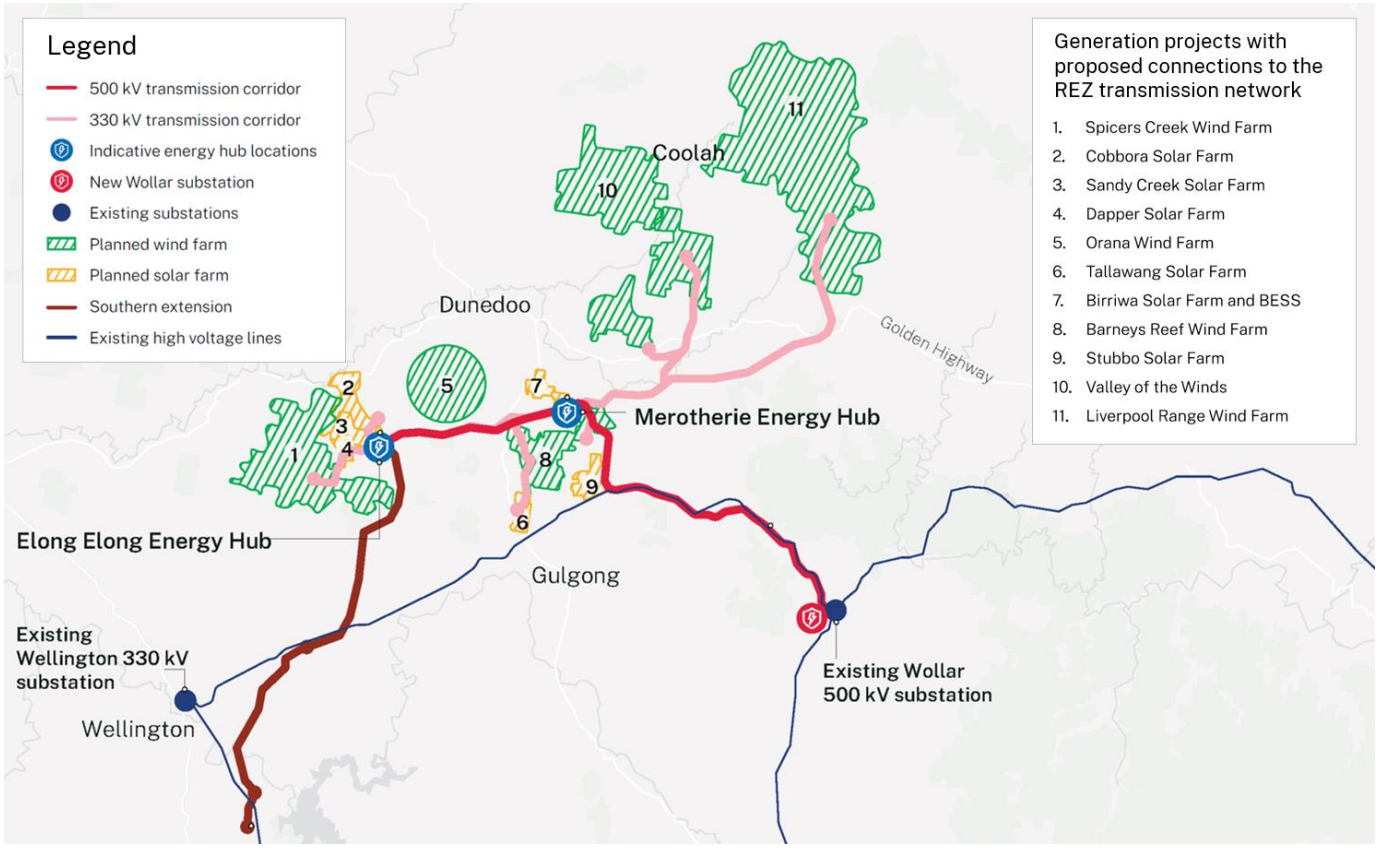


Figure 2: Planned generation projects with proposed connections to the REZ transmission network.

4 Road upgrades

As part of the planning process for the Central-West Orana REZ, EnergyCo has carried out investigations to understand the scope of road upgrades required to facilitate construction of projects in the REZ. Potential road upgrades may include road widening for heavy vehicle movements, intersection upgrades and installing site access roads.

4.1 Overview

4.1.1 Oversize and over-mass vehicle movements

As part of initial investigations, EnergyCo carried out a transport study to identify upgrades that may be required to enable construction and operation of the REZ. The study identifies potential transport routes and constraints for transporting large transmission and renewable energy equipment, including wind turbine blades and masts, and transformers, between the Port of Newcastle and the REZ. These loads would be transported using oversize and over-mass (OSOM) vehicles.

The study assessed a number of factors, including:

- the type of equipment that would need to be transported
- the type of vehicle that would be required
- available routes between the Port of Newcastle and projects in the REZ
- potential route constraints and mitigation measures required.

While EnergyCo is not the proponent for generation projects, we have taken a leading role in coordinating the delivery of required upgrades between the Port of Newcastle and REZ. This is because the mitigation measures required for state roads are common to several renewable generation projects and EnergyCo's proposed work for the REZ transmission project. EnergyCo is continuing to carry out further detailed consultation with Transport for NSW as the state road authority to determine the scope and timing for work required to enable OSOM deliveries.

Figure 3 outlines the proposed route for road upgrades between the Port of Newcastle and the REZ to facilitate OSOM vehicle movements.

4.1.2 Local roads

While upgrades to state roads will be shared by multiple proponents, local road work will typically be specific to individual projects. Each developer will be responsible for minimising and mitigating impacts of their project on the surrounding communities and environment under the requirements of their respective planning approvals. Any proposed road upgrades required to meet construction and operational requirements will be outlined in each project's Environmental Impact Statement (EIS).

EnergyCo is consolidating information from renewable energy generation projects and the REZ transmission project to assist with further consultation with local councils and government agencies. EnergyCo will continue to engage with councils and energy generation projects on the planning and delivery of local road work.

In addition to meeting technical requirements to facilitate construction of the REZ, road upgrades can provide long-term benefits to communities by improving safety and journey management on local roads. EnergyCo is seeking feedback to identify where upgrades required for the REZ may be delivered to also provide benefits to local communities.

Figure 4 outlines where work is expected to be carried out on local roads to facilitate the REZ transmission project and generation projects (Candidate Foundation Generators).

4.2 Next steps

EnergyCo will:

- continue to engage with Transport for NSW to coordinate upgrades to state roads for OSOM vehicle routes
- continue to work with developers of generation projects to understand their requirements for local road upgrades
- determine priorities for local road upgrades in consideration of feedback from communities and councils
- investigate mechanisms for local road upgrades, including funding provisions and delivery bodies.

4.3 Port of Newcastle to the Central-West Orana REZ

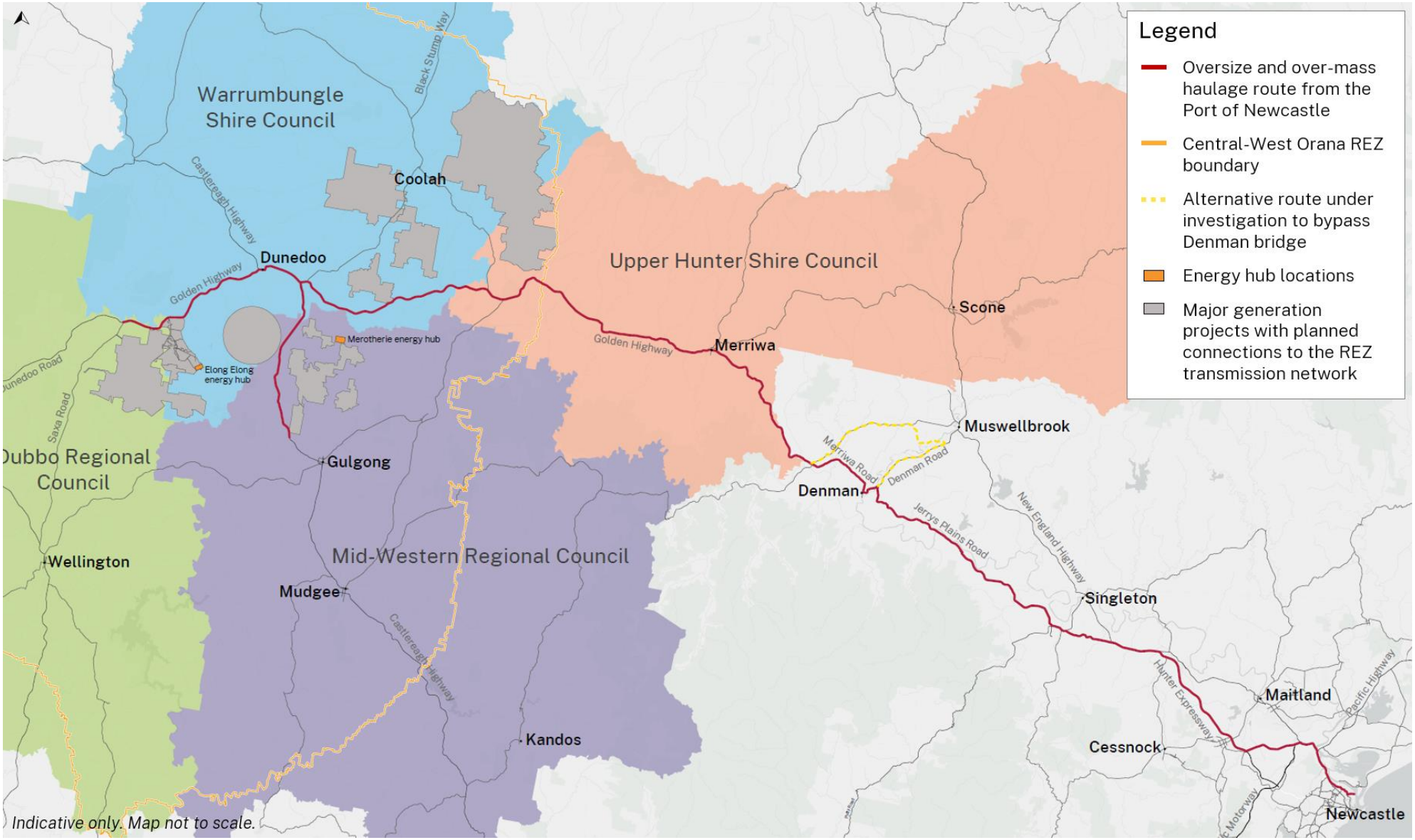
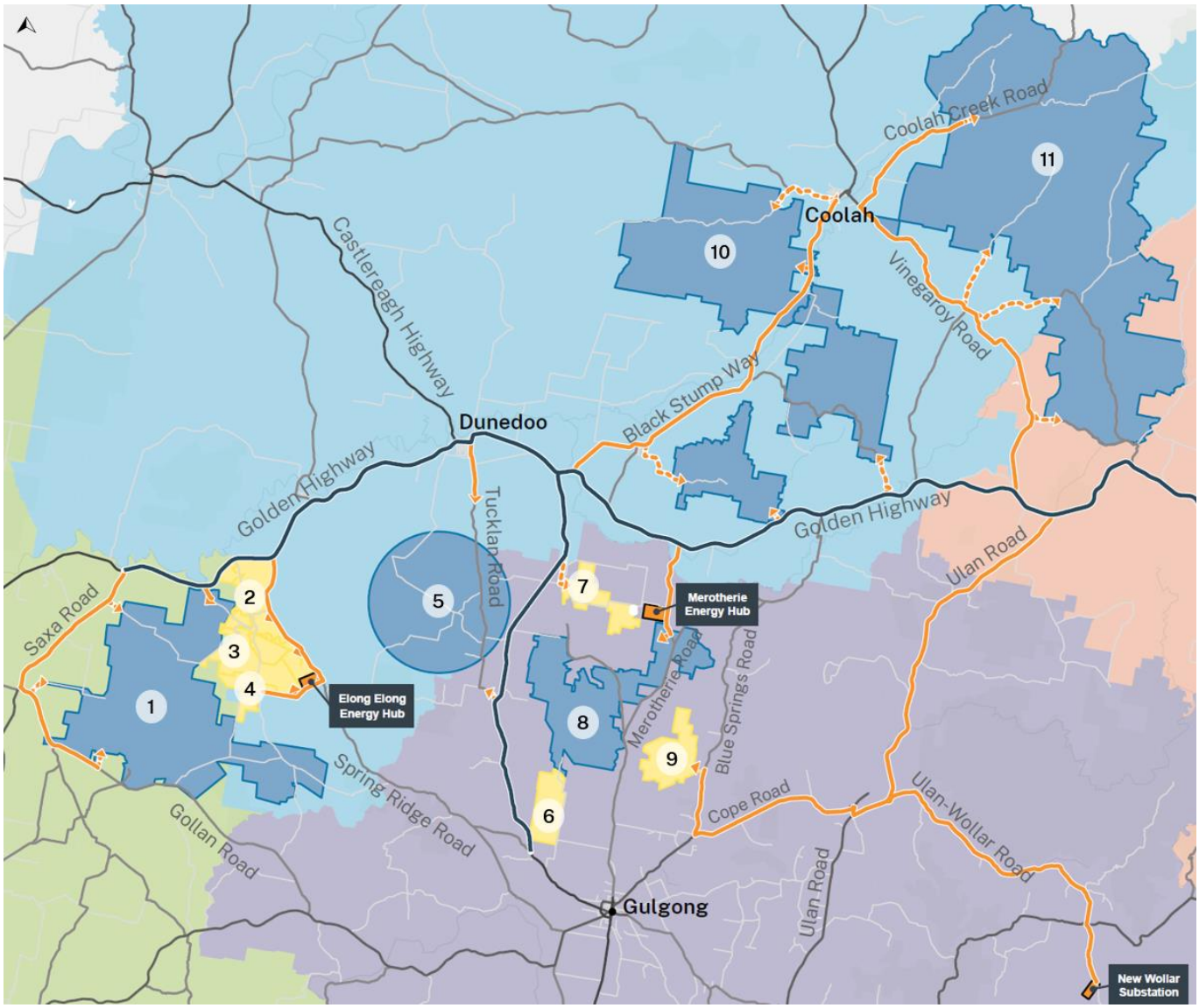


Figure 3: Oversize and overmass vehicle route between the Port of Newcastle and the REZ.

4.4 Local road upgrades in the REZ



Legend

Local government areas (LGAs)

- Dubbo Regional Council
- Mid-Western Regional Council
- Upper Hunter Shire Council
- Warrumbungle Shire Council

REZ infrastructure

- Energy hub footprint
- Indicative local access road
- Indicative site access road
- Wind development
- Solar development

Proposed generation projects with planned connections to the REZ network

1. Spicers Creek Wind Farm
2. Cobbora Solar Farm
3. Sandy Creek Solar Farm
4. Dapper Solar Farm
5. Orana Wind Farm
6. Tallawang Solar Farm
7. Birriwa Solar Farm and Battery Energy Storage System (BESS)
8. Barneys Reef Wind Farm
9. Stubbo Solar Farm
10. Valley of the Winds
11. Liverpool Range Wind Farm

Indicative only. Map not to scale.

Figure 4: Local road upgrades in the Central-West Orana REZ.

5 Housing and accommodation

With a number of renewable energy projects due to start construction in the REZ in the coming years, EnergyCo carried out a study to understand the existing housing context in the REZ and identify potential accommodation solutions for the incoming construction workforce.

5.1 Overview

EnergyCo engaged an environmental and social consultancy, Umwelt, to carry out a study which examined:

- the existing context of regional housing in the REZ, including housing vacancies, supply and affordability trends
- availability of existing short-term accommodation, including demand, supply and occupancy rates
- challenges and opportunities for the provision of workforce accommodation as identified by key stakeholders including councils
- expected workforce numbers and peaks for the REZ transmission project and major planned generation projects with proposed connections to the REZ network
- housing demand and supply, including dwelling approval statistics, land and infrastructure availability and housing typology
- potential approaches to managing workforce accommodation and current practices on other major infrastructure projects.

The study drew from a range of measures and data sources to understand the demographic, socio-economic, and housing and accommodation profiles of the communities in the REZ. This included publicly available secondary datasets including the Australian Census (2016, 2021), as well as local media, and local, regional, and state government plans and strategies. Further information was gathered through consultation with councils, agencies and other key stakeholders to understand opportunities and constraints.

5.2 Summary of findings

5.2.1 Existing housing context

This study identified significant accommodation and housing supply constraints in the REZ. There is a limited supply of medium density housing in the region, a shortage of short-term housing stock and outpaced demand for short-term accommodation versus supply.

There is strong housing demand in the REZ, particularly in Dubbo Regional Council and Mid-Western Regional Council LGAs, and forecast population growth indicates a need for increased permanent housing in these areas. Like many regional areas in NSW, house prices and rents have increased relative to household income in the region, leading to a general decrease in mortgage and rental affordability.

While the region contains strong networks of local manufacturers and suppliers and enough technical capability to deliver workforce housing options, the scale of the incoming workforce is a key challenge for government, industry and business to address.

5.2.2 Central-West Orana REZ construction workforce

Figure 5 shows the projected workforce numbers between 2023 and 2028 during construction of the REZ transmission project and major generation projects with planned connections to the REZ network. Workforce numbers are estimated to exceed 4,000 between mid-2025 and mid-2026, with a peak of about 5,000 in late 2025.

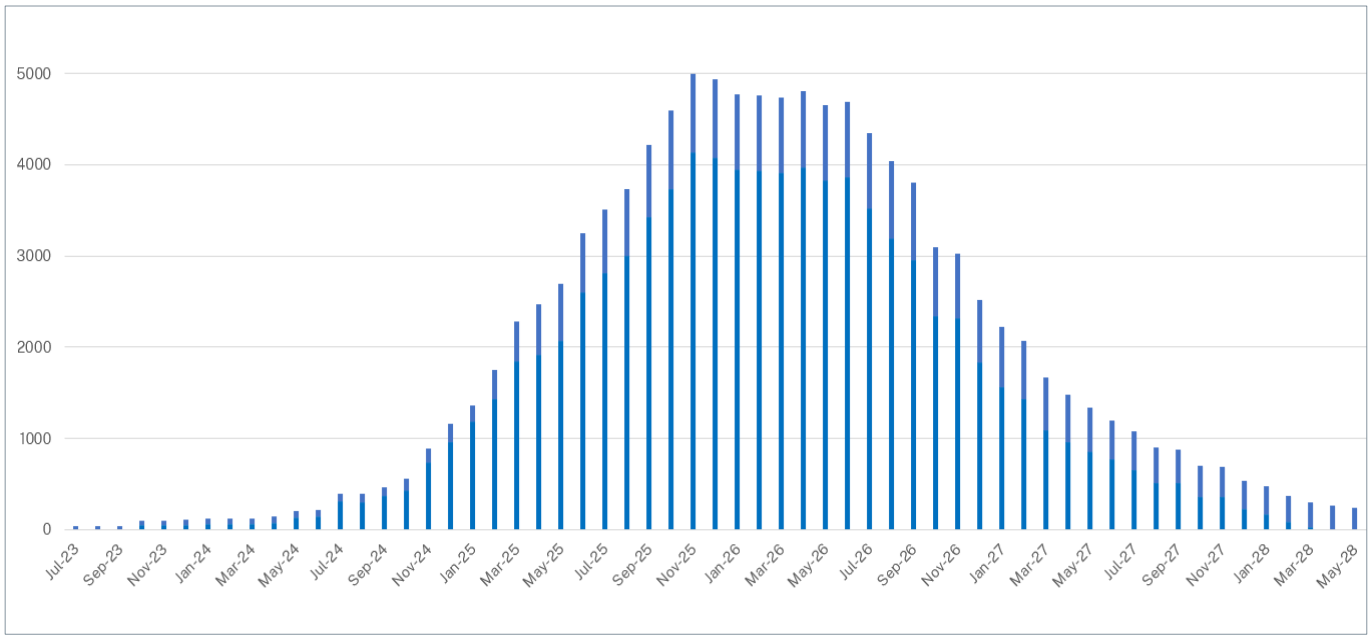


Figure 5: Workforce projection for the REZ transmission project and major generation projects with planned connections to the Central-West Orana REZ transmission network (Candidate Foundation Generators). Source: EnergyCo 2022.

5.3 Opportunities

Addressing the challenges around accommodating the Central-West Orana REZ workforce will require action on a number of fronts. The study has identified the following opportunities to help meet workforce accommodation requirements in the REZ while also minimising impacts and providing long-term benefits for host communities.

5.3.1 Local government areas

There are opportunities within Dubbo Regional Council LGA to support both long-term and temporary accommodation options. Key strengths relate to the City of Dubbo's strategic location as a service centre for surrounding townships, access to the Dubbo airport, the diversified economy and predicted population growth. Dubbo is serviced by high-capacity developers and community housing providers and the local council is proactively seeking opportunities to manage population change.

Warrumbungle Shire LGA presents some opportunities to support both long-term and temporary accommodation options. Key strengths relate to access to substantial Crown land, the strategic location of Dunedoo and proximity to multiple proposed projects.

Mid-Western Regional LGA presents opportunities to support both long-term and temporary accommodation options. Similar to Dubbo, key strengths relate to Mudgee's strategic location as a service centre for surrounding townships and the region's diversified economy and predicted population growth. The area is serviced by high-capacity developers and community housing providers and the local council is proactively seeking opportunities to analyse and manage population change. The area is also highly dependent on tourism which presents potential competition between workforce and visitors to the region.

5.3.2 Strategic use of temporary campsites

One of the most common solutions to accommodate a large influx of workforce population is the construction of temporary workforce camps with housing and basic services provision. The study has suggested ways this can be improved including:

- designing and constructing buildings and places using materials that maximise resource efficiency, including energy, water and materials
- commissioning associated services such as catering, cleaning and transport shuttles from local companies where available
- choosing camp site locations that balance workforce needs with opportunities for communities.

5.3.3 Creating legacy in workforce camps

EnergyCo is investigating several models that may be used to provide legacy housing in the REZ by repurposing pre-fabricated housing from temporary workforce camps. Most temporary dwellings used by non-resident workforces are likely to be sub-contracted to companies specialising in site accommodation, management and support services. However, there is great potential to commission local or non-local pre-fabricated housing companies to develop high-quality moveable dwellings. This housing could be used by construction workforces during construction time frames and could then be used for other purposes, such as aged care housing, tourism accommodation, social housing, or key worker housing after construction peaks pass.

Legacy opportunities also exist through the provision of enabling infrastructure for workforce camps, such as water supply, sewerage systems, electricity and telecommunication infrastructure. Funding provisions for infrastructure will help support housing provision in regional areas and deliver long-term social benefits for communities.

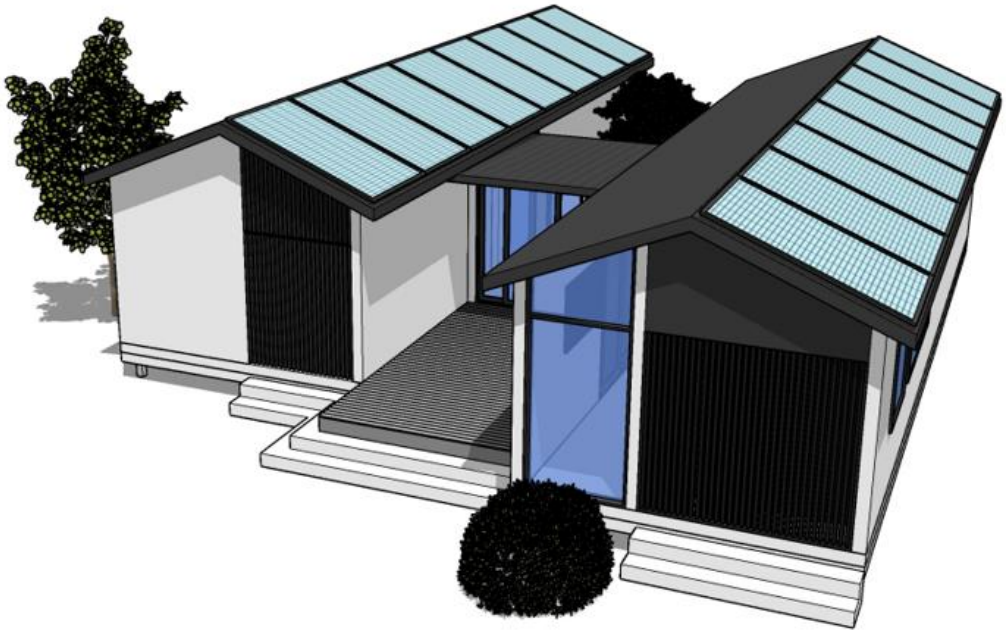


Figure 6: Modular housing concept for legacy re-use. Source: Design Anthology.

5.3.4 Adaptive re-use or extensions to existing buildings

There is opportunity to re-use existing buildings or extend existing buildings to generate accommodation for construction workforces. This may involve temporary or permanent retrofitting of buildings. Examples of this in practice include:

- Ivanhoe, NSW – a mining company has proposed repurposing a former jail to create temporary workforce accommodation

- Melbourne, Victoria – a former aged care facility has been temporarily re-purposed as social housing for older women.

This approach is effective because it is less resource intensive than developing a new building, may bring opportunities to under-utilised spaces, and may address some of the risks of delivering housing with a limited anticipated period of demand as buildings may be adapted again after construction peaks pass. There may also be opportunities for competitive grants to be extended to existing hotels and motels in the region to fund extensions to facilities.

5.3.5 Supporting long-term housing

There may be opportunity to encourage the construction of permanent housing in infill locations. A current example of this is the housing being built in Gilgandra Shire Council to accommodate executives involved in delivering the Inland Rail project. The construction of this housing is being supported by the guaranteed cashflow from leasing arrangements with the Australian Rail Track Corporation. In other instances, capital grants or investment in enabling infrastructure may also be required to support council, community housing or developer-led housing construction.

With the right funding mechanism, long-term housing could be developed and leased by project developers in the short-term, before being transitioned to social housing or affordable housing in the following years. This could be delivered through a mixed-tenure model that combines construction workforces, key worker accommodation and social housing on one site. Alternatively, there may be opportunity to commission the construction of housing to later become legacy projects in the region. This could be delivered as build-to-rent housing with a single entity (like a developer, council, state government or community housing provider) retaining ownership of all dwellings and leasing them to proponents for the duration required for project construction.

5.3.6 Ancillary dwellings and community-integrated solutions

There is a potential to support the use of existing granny flats or ancillary dwellings, or support the generation of new ancillary dwellings, as mechanisms for generating housing supply across the REZ.

Local councils, proponents or peak bodies could take a linkage role in providing opportunities for local community members to rent out bedrooms or granny flats to construction workers, with rental income flowing to participating hosts. Care and regulation will be required to ensure this is managed appropriately and does not function to push up rental prices.

An additional potential community-integrated housing solution is ‘tiny homes’, which could be made available for purchase or rent for participating households with larger back yards and lots to host on their properties. This housing option could enable the generation of income for impacted community members while also generating additional housing supply.

6 Industry, training and skills

With demand increasing for skilled labour in the renewable energy sector, EnergyCo is investigating how we can build workforce capabilities and promote employment opportunities in the REZ.

6.1 Overview

One of the key challenges facing the energy transition under the NSW Electricity Infrastructure Roadmap is the increasing demand for skilled labour in the renewable energy sector. EnergyCo engaged the University of Technology Sydney Institute for Sustainable Futures to carry out a study into this area to inform future planning and strategy for industry training and skills in the REZ. The study investigated the current context of skilled labour in the renewable energy sector, projected employment demand and key occupations required for the REZ workforce.

6.2 Summary of findings

6.2.1 Skills shortages in the renewable energy sector

Skill shortages were identified in a range of key occupations within the renewable energy sector through industry surveys and the Australian Government's National Skills Priority List (2022). Reports of widespread skill shortages were also reflected in the views of renewable energy and transmission workforce, industry, training, and regional stakeholders interviewed for the study.

Table 2: Recruitment challenges and skill shortages for key occupations.

Occupation	Institute for Sustainable Futures Solar & Wind Farms Survey (2019-2020)	Institute for Sustainable Futures Transmission Construction Survey (2021)	National Skills Priority List: current NSW status/ future national demand
Construction manager	High	High	Shortage/Moderate
Mechanical technician	Medium	Low	Shortage/Strong
Electrical engineer	High	High	Shortage/Moderate
Civil engineer	High	Medium	Shortage/Moderate
Electricians	Medium	Low	Shortage/Strong
Transmission lineworker	n/a	High	Shortage/Moderate
Rigger	Low	Medium	Shortage/Moderate
Crane operators	Medium	Low	Shortage/Moderate

6.2.2 Challenges for workforce development

The study identified several challenges to scaling up the workforce in the renewable energy sector:

- renewable energy has a peaky employment profile which presents challenges for investing in training and skills

- short-duration projects, financial uncertainty and the mobility of labour in renewable energy construction has been a barrier to investment in training and apprentices
- the NSW renewable energy and transmission has historically been a 'thin market' (i.e. low demand for training spread across regions) which makes the economics of specialised training challenging and creates gaps in access to training
- according to stakeholders, training facilities and access to training is inadequate and there are variations in access to training across the REZ (i.e. Dubbo is considered to be well serviced, but there is reduced access to training in smaller centres such as Dunedoo, Gilgandra and Warren)
- peak demand for renewable energy and transmission is projected at around two-thirds of the existing workforce in common occupations, which underlines the challenges in sourcing labour from adjacent sectors for the renewable energy and transmission sectors
- there is limited surplus labour capacity due to low unemployment rates.

6.3 Opportunities

The study identified the following opportunities to help increase local workforce capabilities, the availability of skilled labour and employment opportunities in the REZ:

- development of a skills and workforce development working group for the Central-West Orana REZ to improve coordination, information-sharing and collaboration between the government, training stakeholders and the renewable energy sector
- an industry-level training strategy and fund in the REZ, with co-investment and partnership between industry, government and training providers
- assess existing training facilities and evaluate the business case for upgraded, expanded or new training centre(s) in the REZ
- development of training strategies to increase the supply of:
  - electricians within the REZ, including options to increase uptake and completion of electrical apprenticeships and support the development of nationally recognised qualifications, skillsets and micro-credentials for electrical qualifications in renewable energy
  - workers, to avoid shortages that could impact on the delivery and cost of transmission construction, increase local employment, and provide opportunities for disadvantaged labour market groups
  - regional engineers, through partnerships between the renewable energy, transmission and storage sectors, Engineers Australia, universities and the Country University Centre network.
- consultation with wind project developers on options to increase local wind project technicians through the REZ skills and workforce development working group
- training and employment pathways into the sector for school students to:
  - promote training and career pathways in renewable energy
  - enhance school student pathways into apprenticeships and traineeships within the renewable energy sector.
- provide funding and support for employment and training service providers that specialise in placing First Nations youth in apprenticeships, traineeships and employment
- identify and support the transition of adult workers into trades within the sector through the trade pathways program, focusing on accelerating supply by targeting people with relevant work experience or training (partially completed or superseded training)
- programs to increase the participation of women in renewable energy
- increase the role of Group Training Organisations (GTOs) within the REZ.

7 Waste and circular economy

EnergyCo carried out a study to understand waste generation from projects in the REZ and identify opportunities to promote efficient waste management and circular economy.

7.1 Overview

MRA Consulting Group was engaged by EnergyCo to provide an overview of the waste management and circular economy impacts and opportunities from the development of the REZ. The study investigated:

- the types and quantities of waste expected to be generated during construction of the REZ transmission project and major planned generation projects with proposed connections to the REZ network
- existing waste storage and processing infrastructure in the region and its ability to manage project waste volumes
- best practice advice to maximise resource recovery and circular economy opportunities while minimising impacts to local communities.

7.2 Summary of findings

7.2.1 Expected waste volumes

The study identified two main sources of waste for the development of the REZ; construction and workforce accommodation. Construction waste from projects may include packing waste from solar panels, domestic and office waste and workforce accommodation waste, which may include general waste, food waste and co-mingled recycling.

An assessment of estimated waste generation from wind and solar projects on a per megawatt (p/MW) basis in the REZ found:

- solar projects are estimated to generate between 6.65 to 12.46 tonnes p/MW
- wind projects are estimated to generate between 0.96 to 5.91 tonnes p/MW.

Using high-end estimates as a conservative baseline, the average tonnes of waste generated per month over the construction period (t/month) are projected to be:

- Warrumbungle Shire Council – 543t/month
- Mid-Western Regional Council – 702t/month
- Dubbo Regional Council – 329t/month
- cumulative waste generation in the REZ – 1,574t/month.

In addition to construction waste, there will also be waste generated by the workforce including recycling, organics and other residual waste products. Using the per capita average for Central-West Orana residents, this is estimated to be approximately 0.54 tonnes per person per annum.

7.2.2 Existing waste facilities

There are ten NSW Environment Protection Authority (EPA) licenced facilities for storage, processing and disposal of waste in the REZ. The existing licenced waste infrastructure in the region is only capable of preliminary sorting and disposal (landfill) and not the production of recovered products (secondary processing/manufacturing), with the exception of the Dubbo Regional Organics

Processing Facility. The lack of facilities equipped for secondary processing and manufacturing of waste materials is a key challenge for waste management in the REZ.

In relation to the existing waste facilities in the REZ, the study found:

- non-organic recyclables generated from construction of the REZ, such as metal, paper, cardboard, plastics and timber, would need to be transported to Newcastle or Sydney, or local capability would need to be developed for it to be reprocessed
- there is sufficient landfill capacity to handle the non-recyclable waste generated by the establishment of the REZ
- if proponents undertake on-site sorting and communicate with manufacturers (especially for solar projects) to minimise the use of non-recyclables in their packaging, existing facilities can manage the additional waste generated by the REZ and will not require upgrading.

7.3 Opportunities

The study has identified the following opportunities to promote effective waste management and circular economy in the REZ:

- collaboration with stakeholders to identify opportunities for new local waste management services to collect bulk construction waste such as plastic, carboard, timber and metal
- collaboration with stakeholders to identify opportunities for attracting businesses to invest in the long-term recycling of solar panels, wind turbines and other renewable energy-related waste streams (i.e. batteries)
- the development and implementation of waste management protocols to ensure best practice waste management and to minimise the amount of non-recyclable waste produced by REZ projects. Protocols may include:
  - a minimum recycling target of 80 percent where feasible and reasonable for construction waste generated from projects in the REZ
  - a commitment to ensure no solar panels or wind blades are landfilled during construction or operation of projects in the REZ
  - establishment of a waste management plan for each project, which should include a dedicated site waste manager to implement, monitor and conduct waste management and ensure resource recovery practices are followed
  - on-site sorting and recycling infrastructure for all waste material types such as balers for carboard and film plastic, shredders for timber and bulk bins for metal
  - implementation of waste management strategies in accordance with the *Waste Avoidance Resource Recovery Act 2001*
  - detailed estimates of the types and quantities of waste generated during the construction phase of generation projects developed during the EIS stage to allow councils to assess prior to approval.

8 Telecommunication

Mobile and internet connectivity is a widespread issue in the REZ. EnergyCo investigated how the construction of renewable energy infrastructure could help improve telecommunication coverage for communities in the region.

8.1 Overview

Telecommunication coverage is a pre-existing issue in the Central-West Orana region. EnergyCo engaged Agama Group to carry out a study to identify challenges and potential opportunities to improve mobile coverage through the National Broadband Network (NBN) and other telecommunication infrastructure in the REZ. To inform the study, consultation was carried out with councils, Network Operator proponents and renewable energy developers to understand the current state of telecommunication in the region and potential opportunities for collaboration to support telecommunication improvements.

The study examined:

- telecommunication coverage maps to understand existing mobile coverage, including Telstra, Optus and Vodafone/TPG
- current types of National Broadband (NBN) coverage, including:
  - fibre to the premises, predominantly in Dubbo and parts of Mudgee
  - fibre to the node in larger townships
  - fixed wireless within a 10-20 kilometre radius of townships
- NBN satellites provided through Sky Muster, Starlink and OneWeb for areas unable to access to fibre or wireless connection
- optic fibre assets provided by Telstra, Optus and TPG to service mobile towers, transit links from Vocus, Lumea and others, and businesses providing data centre services such as Leading Edge.

8.2 Summary of findings

8.2.1 Mobile coverage

The study found different levels of telecommunication coverage in the REZ between providers:

- Telstra – extensive coverage
- Optus – limited coverage
- Vodafone/TPG – minimal coverage.

In addition to this, stakeholder feedback on access and coverage in the region indicated:

- mobile coverage in the region is less than what is indicated by coverage maps
- due to the lack of coverage, mobile boosters are commonly used to improve indoor coverage
- operations and productivity can be negatively impacted due to the poor mobile coverage
- lack of mobile coverage can impact worker safety and VHF/UHF radios are not always suitable alternatives.

8.2.2 Fixed line and other services

Key findings on fixed line and other services in the region include:

- Dubbo has extensive Fibre to the Premise (FTTP) coverage within the town, while Mudgee has some coverage
- Wellington, Mudgee and Gulgong townships are primarily serviced by Fibre to the Node (FTTN) and have variable service quality
- areas outside main residential areas and within 10-20km of townships are generally serviced by NBN fixed wireless
- all other townships within the study area were serviced by NBN Fixed Wireless and satellite
- there are more operators beginning to offer Low-Earth Orbit (LEO) satellite coverage which is more expensive but provide faster connections with more data
- fibre services were considered to be satisfactory, however most businesses in the region are generally operating on residential grade telecommunication services rather than business grade
- a number of providers offer other optic fibre services in the region as well as data centre capabilities.

8.3 Opportunities

This study identified a number of opportunities that could be considered and further developed to improve telecommunication outcomes within the REZ. Potential options for further investigation are outlined below.

- Consultation between project developers and national and local telecommunication companies to identify potential opportunities to address connectivity and performance issues.
- Collaboration between Government, local councils, and renewable energy developers to improve mobile coverage by siting telecommunications towers in useful locations on project sites and developing a sustainable commercial model in consultation with mobile operators as well as the other local asset holders.
- Investigation of 'neutral host' infrastructure through discussions with the smaller telecommunication providers that offer this approach. Information about this alternative approach would provide knowledge that could generate new ideas and solutions for access and service delivery that could benefit local communities and businesses.
- Project developers could consider making additional optic fibre assets available for third parties on a wholesale basis, possibly combined with mobile towers or shelter assets to boost telecommunication availability and utilisation within and adjacent to the REZ.
- Local data centres and hosting facilities could be used by new or existing wireless carriers that wish to offer services in the areas. Existing data centres provide a location where local computing and storage can be used to offset the need to traverse network links to Sydney and back, therefore providing lower latency and local data aggregation. The introduction and operation of autonomous farming equipment and other emerging technology solutions would also benefit from expanded capabilities of local data centres.
- 'Internet of Things' (IoT) technology can provide a substantial number of farm applications, such as:
  - monitoring tank levels
  - tracking livestock
  - measuring soil moistures
  - activating pumps
  - locking gates
  - monitoring air quality
  - tracking chemical usage.

- Additionally, in the renewable energy infrastructure sector, IoT technology can be used for a number of environment activities including noise monitoring, asset tracking, equipment monitoring, worker health and safety, energy monitoring, temperature and wind monitoring along power line routes, and facility access control. There is a need for increased reliability in communications and data processing capabilities in order to deploy this technology, however its cost effectiveness will increase with the number of devices deployed in the region.

9 Social infrastructure

EnergyCo is investigating the current provision of community services including healthcare, education and recreational services and whether additional services may be required to support increased demand during the construction of projects in the REZ.

9.1 Current status

EnergyCo is currently in the process of carrying out investigations into social infrastructure and will provide an update once the study is complete and key findings and opportunities have been identified.

As part of EnergyCo's current consultation period, we are seeking feedback to understand community views on impacts to community infrastructure and services during construction of the REZ. Feedback received from the community will inform EnergyCo's investigations into this area.

10 Next steps

EnergyCo is seeking community feedback on the topics raised in this report until Friday 31 March 2023. Following the consultation period, EnergyCo will:

- review the identified findings and potential opportunities in consideration of community and stakeholder feedback
- prepare a report outlining the community feedback received and EnergyCo's responses
- develop a draft implementation plan for further consultation with the community and key stakeholders
- work with developers, councils, government agencies and other key stakeholders to implement various initiatives.

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