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A study of community experiences in Renewable Energy Zones in NSW and the case for more equity and coordination of the clean energy transformation.

Research report

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A report by the Sydney Environment Institute and the Australia Institute.

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Initials

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
ARENA	Australian Renewable Energy Agency
CEC	Clean Energy Council
CEFC	Clean Energy Finance Corporation
CPA	Community Power Agency
CWO	Central-West Orana
DA	Development Application
DCP	Development Control Plan
DPIE	Department of Planning, Industry and Environment
ESB	Energy Security Board
EIS	Environmental Impact Statement
EP&A Act	NSW *Environmental Planning and Assessment Act* 1979
EPC	Engineering, Procurement and Construction contract
EII Act	NSW *Electricity Infrastructure Investment Act* 2020
IPC	Independent Planning Commission
ISP	Integrated System Plan
GRRR	Gulgong Residents for Responsible Renewables
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plans
NE	New England
NEM	National Electricity Market
MW	megawatt
OEH	NSW Office of Environment and Heritage
PPA	Power Purchase Agreement
RAP	Registered Aboriginal Party
REZ	Renewable Energy Zone
SEARs	NSW Planning Secretary's Environmental Assessment Requirements
SSD	State Significant Development

Overview and recommendations

The technological shift away from coal to renewable energy for electricity generation is also a spatial shift: it involves moving electricity generation infrastructure away from traditional coal regions to new dedicated Renewable Energy Zones (REZ). Many of these zones are in parts of rural Australia that have not hosted energy utilities at this scale before, and will host billions of dollars worth of new electricity infrastructure.

This report presents the first significant analysis of this aspect of the Australian energy transition. It is based on findings from social research in communities that will host these zones. The research involved multiple field trips and extensive interviews with local people. We focused on two areas in New South Wales as case studies: central-west Orana and New England.

These areas were chosen because they will be the first two REZs developed in Australia: after the passage of NWS's Electricity Infrastructure Investment Act (EII Act) in November 2020, the central-west Orana region was chosen as the first formally defined REZ. It will host around 3,000 MW of solar and wind power within about five years—enough to power 1.4 million homes. Both these areas already have large-scale wind and solar generators concentrated near existing transmission infrastructure, so they provide valuable case studies to reveal the issues that will arise as REZs are built out.

Large-scale renewables bring diverse benefits to communities that are welcomed by many locals, whether or not they stand to receive direct benefits. However, our qualitative research finds that even when residents are generally supportive of renewable energy, they have concerns that are not being addressed. Many people we spoke to had little understanding of what REZs would mean for their community. Even well-designed projects can create negative experiences and expectations of change. Benefits for some can mean adversity to others. This presents a critical challenge for decision makers in government, the NEM market bodies, and project developers and investors.

Governments must be careful in coordinating the many separate projects that make up a REZ. The high density of solar, wind, storage and transmission projects in one area will have significant cumulative impact. On the other hand, REZs are a huge opportunity for both regional communities and decarbonisation in Australia. If national REZ policy is to succeed it must be socially and environmentally sustainable. This must include bringing meaningful and equitable long-term development to local communities at the key sites of new electricity infrastructure.

In the coming chapters we use the voices of local people to describe the granular social impact of large-scale renewable energy on communities. We have organised this report to first contextualise REZs within the energy policy and regulation landscape (Chapter 3), analyse the spatial distribution and shift of renewable energy projects planned in NSW (Chapter 4) and present the characteristics of the new electricity infrastructure regional context (Chapter 5). In Chapters 6, 7 and 8 we describe and analyse experiences and issues arising from large-scale renewable energy developments among REZ residents, landowners, councils, project developers and other stakeholders. We summarise the key points and

make recommendations for future policy development and implementation at the beginning of each chapter. The key recommendations are listed below.

The issues we explore are relevant anywhere that clean energy is being built on a large scale, and a future study could survey communities in REZs across the National Electricity Market (NEM).

SUMMARY OF RECOMMENDATIONS

The key recommendations made in this report fall under four main themes, each of which is summarised—along with its associated recommendations—below.

- **Benefit sharing**: Neither the economic benefits nor the potential economic harms of renewable energy developments are distributed equally across a community. This unevenness can become a cause of dissatisfaction and conflict.
    - State governments should formalise more inclusive benefit sharing arrangements, which should also include new transmission infrastructure. Some energy companies have already put excellent initiatives in place, but these are on a voluntary basis. We support proposals to aggregate a portion of community funds within each REZ, and using this money—in combination with government funding—to create significant assets or programs that contribute to long-term economic growth and social sustainability.
    - Benefit sharing requirements and developer contributions to local government should be defined within the broader economic planning framework of REZs, with guidelines that promote transparency and certainty as well as sustained growth and social equity objectives across host communities.
    - Project owners should face stronger regulatory accountability for community benefit commitments made during the planning process.

- **First Nations participation**: In the past, Indigenous participation in energy planning has been largely limited to consultation on the Cultural Heritage aspects of Environmental Impact Statements (EIS). Many proposed new REZs have relatively large Aboriginal populations, presenting an opportunity for renewable energy infrastructure to contribute significantly to Indigenous socioeconomic development.
    - The ministerial guidelines and policies issued under section 4 of the EII Act should be designed to bring training, employment, and co-investment opportunities for Traditional Owners, landholding groups and all Indigenous residents.
    - There must be stronger processes for culturally appropriate consultation and inclusion of Traditional Owners and other Aboriginal residents in all aspects of REZ development—including socially sustainable benefits—along with more robust protection of lands and cultural heritage.
    - Engagement of Indigenous specialists to undertake consultation with Aboriginal residents and groups should be a requirement of all the scoping phases of project developments.

- **Managing cumulative impacts:** REZs are designed to deliver many projects over a short period, concentrated in a defined area. The focused, cumulative impact could create negative consequences. These would be minimised with careful spatial planning and scheduling of construction.
    - Government agencies should integrate their roles coordinating development rollouts to minimise negative impacts in host communities.
    - The State Significant Development assessment process for renewables projects should include measures to coordinate projects at the regional level.
    - Assessment of the cumulative impact of projects by individual project proponents is difficult and carries an inherent conflict of interest. Cumulative impact should therefore be assessed independently, not by proponents.

- **Economic coordination and broad partnership:** Effective REZ development requires a multisectoral approach by governments and developers to enhance the economic benefits to communities, including skills retention.
    - NSW Electricity Infrastructure Roadmap goals for REZ communities require more proactively planned and better resourced government-industry-community partnerships to build sustained growth in local economies, better social equity outcomes and enhance resilience in pandemic or other adverse conditions.
    - A strengthened EIS review and monitoring process could be used to achieve optimal community engagement and development opportunities. Local communities and councils are likely to have high expectations for the impact of REZs, so continuous consultation and improvement practices by planners are recommended as the new reformed Environmental Impact Statement, Social Impact Assessment Guidelines and State Significant Development requirements roll out.

1. Introduction

KEY POINTS

- The clean energy transition will shift electricity generation and investment to new regions.
- It is vital that Renewable Energy Zone policy builds and maintains 'social licence' in these places, that it works to sustain the momentum of the clean energy transition, and that it brings meaningful and equitable development to populations on the front line of change.
- This report presents findings from fieldwork-based social research conducted in the first two Australian NSW Renewable Energy Zones. It examines the experiences and expectations of renewable energy from the perspective of the communities that are hosting the new infrastructure.

In 2022 the world is in the grips of an international energy crisis, sparked by the Russian invasion of Ukraine. The ultimate solution to an international energy shortage is to increase domestic supply. In Australia, the federal, state and territory governments have agreed to an Integrated System Plan (ISP) for the National Energy Market (NEM), with the aim of increasing renewable energy supply. The ISP calls for dedicated new REZs to host this new energy generation and storage infrastructure. The REZ concept is an evolving model that originated in Texas in 2003[1], and New South Wales is leading its implementation in Australia.

In November 2020 the NSW Government announced an Electricity Infrastructure Roadmap and legislation. This was legislated in *EII Act 2020*.[2] This new law is detailed and ambitious. In addition to creating a target and policy roadmap for the energy transition, it establishes a sophisticated new economic and planning regulatory system. This system seeks a balance between centralised planning and free-market rivalry and innovation: it allows for a high level of government coordination of private investment in transmission, generation and storage in REZs, and facilitates this investment through a framework for companies to tender competitively for grid access and long-term energy service agreements.

REZs are the keystone holding up the grid as Australia makes the transition from a coal-dominated energy supply to a clean, fossil. fuel-free future. Since 2010, 12 Australian coal power stations have been decommissioned,[3] to be replaced by hundreds of solar and wind generators. This historic transformation away from coal, which has been the backbone of Australia's energy system for nearly a century, will literally change the landscape. As the old generators in coal regions retire, the clean energy infrastructure with which they are being replaced are being built in other areas. Most of the generators and associated storage and

[1] Hurlbut, David (2008), 'Competitive Renewable Energy Zones in Texas', paper presented to the *Clean Energy States Grant Program Workshop*, National Governors Association Center for Best Practices, Washington, 18 November.

[2] NSW Parliament (1979), Environmental Planning and Assessment Act 1979, Sydney, Act no. 203.

[3] Burke, Paul, Rohan Best & Frank Jotzo (2018), Closures of Coal-fired Power Stations in Australia: Local Unemployment Effects, CCEP Working Paper 1809, September 2018, Canberra: Crawford School of Public Policy, The Australian National University.

transmission that will power Austalia's renewable grid will be built in localities that have never hosted large-scale electricity infrastructure before.

This report is the first major study to examine the social impacts of this spatial transition and its policy implications. We present findings from field research conducted in the first two REZs to be built in Australia, and examine the experiences and expectations of renewable energy from the perspective of local communities.

1.1 THE ORANA REZ PILOT PROJECT

In November 2021 the NSW Government gazetted the first national pilot REZ. The Central-West Orana Renewable Energy Zone (CWO REZ) is a special planning region in the centre of the state. It will attract billions of dollars' worth of solar and wind insfrastructure, and to a lesser extent, battery storage. All this will be connected to dedicated new transmission network electricity infrastructure.[4]

The federal government has a Memorandum of Understanding with NSW to support this national pilot. Within around five years the Orana REZ is likely to host around 3,000 MW of solar and wind, enough to power 1.4 million homes.[5] Other states are keen to implement similar projects, and there are a total of 35 candidate REZs proposed in the Australian Energy Market Operator's (AEMO) draft 2022 Integrated System Plan, covering a significant area from far north Queensland to the southern tip of Victoria, into South Australia and across Bass Strait to Tasmania (Figure 1.2).[6]

To get a sense of scale we can compare this national rollout to the Nyngan Solar Plant, which was the first truly large-scale solar facility in Australia when it was commissioned in 2015.[7] The Nyngan plant sits just west of the boundary of the Central-West Orana REZ, oaround 250 hectares of flat, dry agricultural land. It comprises 1.35 million solar PV modules and can generate a total of 102 MW. The Step Change scenario in AEMO's draft Integrated System Plan 2022 predicts the capacity of new large-scale renewables over the next 30 years to be equivalent to over 1100 around 1200 Nyngan Solar Plants.[8]

[4] NSW Government (undated-b), *Central-West Orana Renewable Energy Zone declaration*, NSW Government, viewed 18 November 2021 <https://www.energy.nsw.gov.au/renewables/renewable-energy-zones/central-west-orana-renewable-energy-zone-declaration>.

[5] NSW DPIE (2021b), *Australia's first Renewable Energy Zone declared*, NSW Department of Planning, Industry and Environment, 11 November, <https://www.environment.nsw.gov.au/news/australias-first-renewable-energy-zone-declared>.

[6] The location and boundaries of REZs will be determined by state governments, but the ISP scheme is a strong indicator of the distribution and scale of REZs under consideration by states. AEMO (2021). Draft 2022 Integrated System Plan. Melbourne, Australian Energy Market Operator. p. 38

[7] AGL (undated), *Nyngan Solar Plant*, 1 March 2021 <https://www.agl.com.au/about-agl/how-we-source-energy/nyngan-solar-plant>.

[8] The Step Change scenario predicts 122 GW of new large-scale renewable energy of which roughly half would be solar and half wind. AEMO (2021). Draft 2022 Integrated System Plan. Melbourne, Australian Energy Market Operator. p.36

Figure 1.1. Rural lands looking out on the White Rock wind farm near Glen Innes.

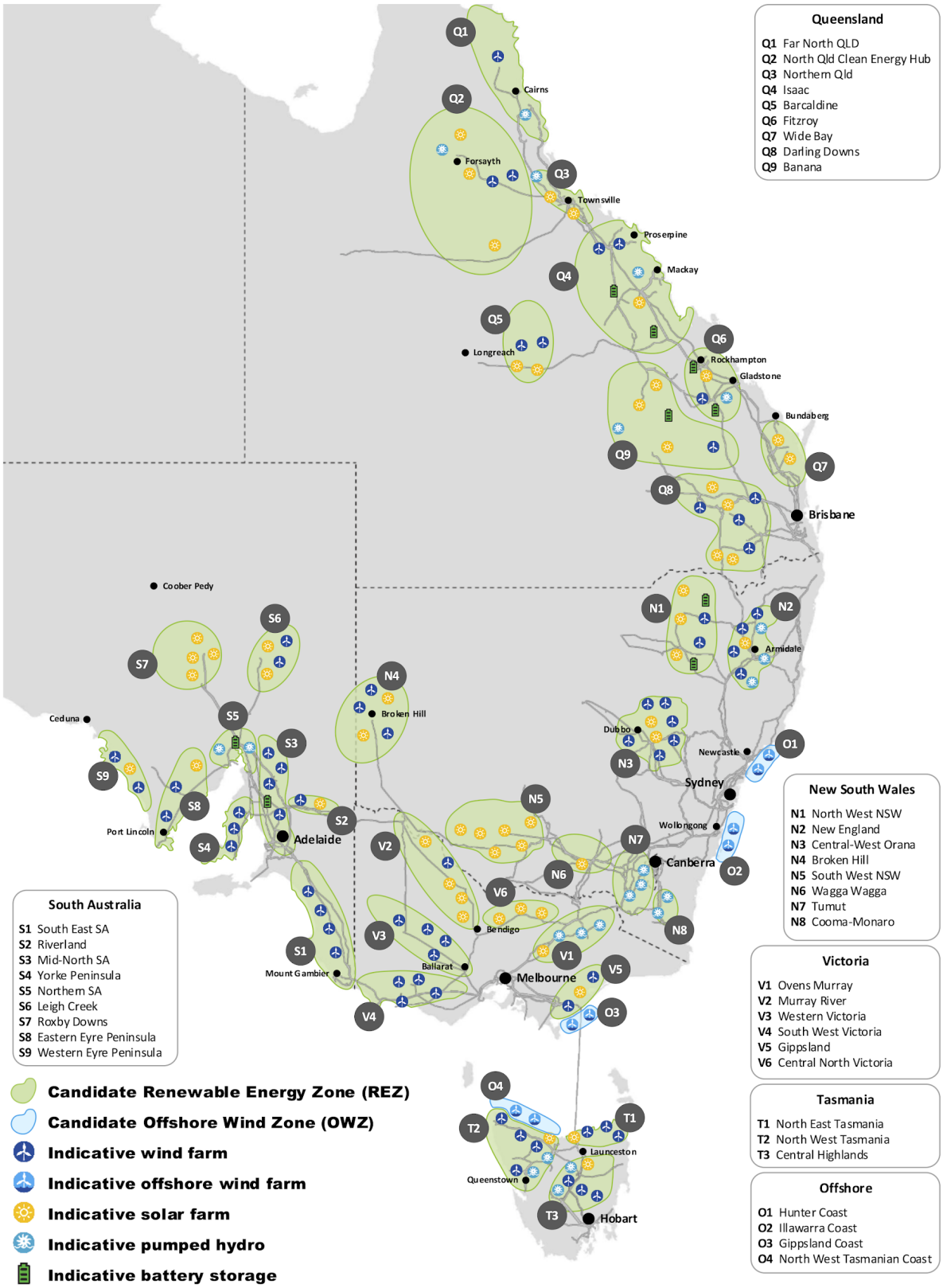

Figure 1.2 Renewable Energy Zone locations in the draft 2022 Integrated System Plan[9]

[9] AEMO (2021b*) Appendix 3. Renewable energy zones*, Australian Energy Market Operator, p.7

1.2 REGULATORY ISSUES AND THE NEED FOR SOCIAL LICENSE

Changes of this magnitude are social, economic and cultural as much as they are technological. Rural Australia is not all empty space awaiting an energy revolution. Productive, diverse, and culturally rich ways of life are long-established in farming communities, Aboriginal lands, and towns.

To sustain the momentum of the clean energy transition, it will be vital that REZ policy builds and maintains broad community acceptance—what we refer to as "social licence"—to operate in these places, and also that it brings meaningful and equitable development for populations on the front line of change. This will only be achieved with innovative planning that facilitates proactive engagement between developers, government authorities and residents, in order to create beneficial outcomes that make a difference at every scale of life, from the paddock to the planet.

Figure 1.3 Cows and wind turbines at wind farm near Inverell

REZs are a much-needed policy initiative. The science of climate change is clear, and it states that the world requires rapid decarbonisation. This will necessitate renewable energy deployment at scale over the 2020s. The planning challenge in Australia is that the two regulatory processes that have governed large-scale renewables were not designed with this pattern of development in mind. At the national level there is electricity law, which defines processes around conventional transmission infrastructure but has little to say about the process for planning and building hundreds of large-scale solar and wind farms. At the state level there are planning laws, but these are not designed for electricity infrastructure development.

In 2022 governments and market bodies are working to make these out-of-date energy planning regimes fit for purpose. The primary flaw in the existing regime is that transmission is evaluated and planned on a least-cost basis, without fully considering the complex social and economic impacts of the new generation that it will facilitate. This risk is that this would mean that once the transmission backbone of a REZ is in place, billions of dollars of energy project investment is a fait accompli. REZ communities could find themselves in a very weak position, facing inappropriate intensity and scale of generation and storage project developments that are essentially inevitable once a REZ transmission backbone has been approved, if they do not have agency in the process of change.

The *EII Act* allows the Minister to declare and build transmission infrastructure, establish a contractual system for underwriting new generation, storage and firming projects in the REZs, and set up a scheme for the new electricity utilities to contribute to transmission costs. The Act also aims to "to foster local community support for investment in new generation, storage, network and related infrastructure" (section 3(1)(d)). Community support and consent to the development of REZ at local levels will be key to the success of the NSW energy transition. We welcome the commitment in this legislation to consultation with First Nations communities (section 4). We support the creation of a state Renewable Energy Sector Board with union and consumer membership (section 7), as well as a renewable energy Jobs Advocate (section 10).

However, the Act is a necessarily broad statement of policy. Our report is meant as a contribution to the all-important detail contained in delegated legislation and the policies, procedures and plans of the bodies that will implement them: the department, Energy Corporation of NSW (EnergyCo NSW) and the new Consumer Trustee. As the finely detailed stages of REZ planning commence in 2022, it is an opportune time for agencies, investors and government to consider the findings of this report. Before developers complete their individual projects, there needs to be broad local and regional negotiation. This will lift the tide for all the boats; it will improve equity and social licence for all developers, including the transmission developer and the broader clean energy industry.

Governments and energy regulators are now turning their attention to these issues of local planning and engagement. In March 2022, Matt Kean, the NSW Treasurer and Minister for Energy, and Dugald Saunders, the Minister for Agriculture and Western New South Wales, announced the formation of a cross-agency taskforce that will address many of the issues raised in this report. The review is being conducted by the NSW Agriculture Commissioner and will conclude at the end of 2022. The terms of reference direct the taskforce to consider

whether there are any new policy measures required to maximise benefits and minimise negative impacts from renewable energy development over the next 20 years, with a focus on three areas:

a. providing adequate workforce, supply chains and housing supply;
b. minimising land use conflicts and promoting coexistence; and
c. maximising the economic benefits for farmers and regional communities.[10]

In 2020 the national Energy Security Board (ESB) consulted on amendments to the rules of the National Electricity Market (NEM) to ensure REZs are well planned. The ESB noted that REZs are a new category of infrastructure that requires a new approach to planning. The ESB's consultation paper proposed that the transmission grid is like a highway, but the REZ is like a city and proper planning will require "granular local knowledge".[11]

In the following chapters we provide that granular local knowledge. We have conducted eight field trips to from the Central-West Orana REZ and the New England REZ, speaking to landowners, residents, local government officers, businesses and people working in renewable energy. We found that people in the REZs were generally positive about renewable energy, but little appreciation of the scale and speed of the clean energy construction being planned in and around their communities.

Oppositional stances can quickly emerge when residents experience poor consultation, weak planning processes or anxiety about the many unknowns of new energy developments in the countryside. Our study reports on these human dimensions of change and the opportunities that exist in REZ communities for supporting a clean energy transformation from the ground up.

[10] Terms of Reference for Review: Review of the adequacy of the existing framework to manage issues and opportunities from the forecast growth in the renewable energy and the agricultural sector in NSW, n.d.

[11] COAG (2020), Energy Security Board Renewable Energy Zones Planning: Consultation Paper and Draft Rules, Canberra: Energy Security Board, Council of Australian Governments., p. 9.

2. Research methodology

The development of REZs in NSW is an unfolding process, with a range of effects on social, environmental and economic life in rural NSW. We designed our methods to be flexible enough to capture the process as it takes place. Two primary methodologies were used in the study: ethnographic research and policy and industry analysis. We surveyed the scale of renewable energy industry developments, mapped these for our fieldwork locales, and created quantified estimates for the scale of projects registered in the NSW Planning pipeline.

2.1 FIELDWORK

The project fieldwork involved visiting rural and regional locales in the new REZ areas to get a sense of the relationships, activities and dynamics of everyday life.[12] As researchers, we are interested in how renewable energy materialises within existing patterns of economic activity and social/environmental relationships. The main criteria for identifying significant locales were:

1. Those containing projects that were already operating (including Nyngan, where AGL build the state's first solar plant);
2. Those with significant scale and intensity of development (including Wellington, with seven solar and wind projects installed or under development in the near-surrounds of the town); and
3. Those in contention for development (including Uralla, where two nearby proposed solar farms have been heavily debated including one that was cancelled).

The research team made eight field trips to the Central-West Orana and New England REZ areas and surrounds, staying mostly in the parts of the REZs that were subject to large solar and wind developments. During these trips, we visited small and large towns, and several other locations. We met with a variety of community members for semi-structured interviews and visits to solar and wind installations. We conducted 44 interviews in total. We also observed community life and commerce, including a local art show and festival, and attended wind and solar farm facilities, as well as properties where landholders were either hosts or neighbours to renewable energy facilities.

We recorded interviews and discussions where appropriate, and wrote up daily field notes as well as interpretive documentation of the insights and issues we were discovering about rollout of renewable energy on the ground. These data were analysed to collate and synthesise themes coming out of our research. Our interpretation of the changes and issues for rural communities was connected to parallel industry and policy analysis.

[12] The project 'Regional Communities and Renewable Energy in NSW: A Socio-Economic Study' was approved by University of Sydney Human Research Ethics Committee, No. 2019/055.

2.2 POLICY AND INDUSTRY ANALYSIS

In addition to our fieldwork, we also reviewed both NSW and Commonwealth energy policies. Our analysis of REZ policy was particularly focussed on the AEMO Integrated System Plan, the NSW Electricity Strategy, and the ESB work in this area. We also had briefing meetings with public servants and ministerial advisors in NSW and Victoria.

In order to create a sense of the scale of renewable energy infrastructure developments on regional levels, we collected data from NSW and Commonwealth government sources. The distribution of energy developments and investments was quantified on a state and regional level to map the flow of benefits from the industry in NSW. We sought to identify and estimate the scale of existing, approved and planned renewable energy projects, all of which was compiled in an Excel spreadsheet. Data for the spreadsheet were gathered mainly from NSW Government Major Project websites,[13] AEMO's regularly updated generation information database,[14] project specific websites and from field work notes.

Data collected about various projects included:

- Their generation capacity estimate;
- Their owner;
- Their parent company;
- The previous use for the land and area;
- Their location;
- The estimated number of jobs created during construction and operation;
- Their costs;
- Information about private and public funding, PPAs and EPC contracts; and
- Their current stage of completion.

As a comparison for illustrating the scale and spatial shift of energy transition in rural NSW, existing and planned upgrades as well as announced closures of coal generation are presented in the charts. Capacity (MW)[15] estimates were sourced from any or all of:

- Project-specific websites or the project owner's website;
- The AEMO's generation database (especially if the plant is already operating);[16]
- The latest update on the NSW Government Major Projects website; and

[13] NSW Government (2019b), *Major projects website, old*, viewed 22 November 2019 <http://majorprojects.planning.nsw.gov.au/>, NSW Government (2020g), *Major projects website, new.*, viewed 2 March 2020 <https://www.planningportal.nsw.gov.au/major-projects>.

[14] AEMO (2020a), *Generation information*, Australian Energy Market Operator, 31 January 2020, viewed 31 January 2020 <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information>.

[15] Capacity in megawatts (MW) can be stated as direct current (DC) or alternating current (AC). Solar pv and wind turbines produce DC voltage, which is then converted to AC for the national grid. This means that the capacity in AC is a bit lower than the installed capacity in DC due to conversion losses. It is often not clear which figure is presented when the capacity of an installation is stated, which leads to small inaccuracies in the capacity estimates. Also, in project development phase the size of the project may change multiple times, or a range for capacity instead of fixed figure may be presented. In this case either the latest available information was used, or a mean value was calculated.

[16] There are additional 22 operational 70 kW to 5 MW small scale solar installations in NSW and another six operational 5–24 MW medium scale installations, which are not included in our spreadsheet. ACT is a part of NSW region in the NEM classification used by AEMO, but are not part of the scope of this study and are also excluded from the calculations.

- Local newspapers or online news platforms such as Renew Economy.

Coal generation capacity information was taken exclusively from AEMO's generation database—specifically, they come from the 29th July 2020 update, as do the other AEMO-specific numbers presented in this report. Only large-scale (≥ 25 MW) projects are included in the figures, with the exception of the White Rock Solar Farm (20 MW), because it adjoins White Rock Wind Farm and understood here as a part of the same project entity.

Maps were compiled with ArcGIS software. Base maps were sourced either from ESRI public maps provided by global GIS community or from the NSW Government's Spatial Service Database.[17] The current land-use data is based on the publicly available 2013 version and is produced by the Department of Planning, Industry & Environment. The description of current primary production is based on Australian Land Use and Management Classification.[18] The most relevant rural land use classes for the area and project locations were selected and clustered for clarity. Project location data were added to maps by using publicly available EIS documents from Major Project website and phase checked from AEMO's generation data and company websites.[19]

[17] NSW Government (undated-c), *Spatial services*, viewed 1 October 2021 <https://www.spatial.nsw.gov.au/products_and_services/web_services/access_web_services>.

[18] NSW SEED (undated), *NSW landuse 2013*, SEED: The Central Resource of Sharing and Enabling Environmental Data in NSW, 1 October 2021 <https://datasets.seed.nsw.gov.au/dataset/nsw-landuse-2013>.

[19] The footprint and location of projects might have small inaccuracies due to available data.

3. Renewable Energy Zones: remaking the electricity and planning policy landscape

KEY POINTS

- Australia has not had a coherent energy policy at the national level, so states and territories have set their own emissions and renewable energy targets, and have begun planning electricity infrastructure.
- In 2022, state energy ministers agreed to negotiate a national energy transition agreement.
- REZs are the nationally agreed policy for delivering the new clean energy generation and storage that is required to replace ageing coal power stations as they retire.
- The pace of energy transition puts pressure on state and national energy policy and also on state planning regimes.
- States have the authority over the land-use planning and regulation of REZs.
- NSW, Victoria and Queensland have all made major REZ commitments and NSW is the first state to establish an institutional framework for REZs.
- 2022 is a critical time for rapidly implementing REZ plans in NSW, Victoria and Queensland.
- The existing national electricity law is not fit for purpose for REZs, as it does not provide for planning and coordination of projects or realisation of potential socio-economic benefits.
- REZs require an unprecedented level of community participation, social impact assessment, and sustained local benefits.
- Adverse impacts in REZ communities are a political and implementation risk for the ISP and thus the clean energy transition overall.

In June 2022 energy ministers met for the first time since the federal election, when a new Labor government and many climate-oriented independent and Australian Greens candidates were elected. The previous federal government's energy policy changed frequently and was not in step with state and territory decarbonisation ambitions. The Meeting Communique heralded a 'new era of cooperation and collaboration' and stated that ministers will negotiate a national energy transition agreement.[20]

For the past nine years Australia has lacked a coherent climate and energy policy at the national level, although the Liberal National Coalition government did agree to a plan for enabling the national grid to facilitate the secure transition from coal to clean energy. This is the Blueprint for the Future proposed designed by the Independent Review into the Future Security of the National Electricity Market conducted led by Chief Scientist Alan Finkel (referred to hereafter as the "Finkel Review").[21] It was agreed to in 2017 by the federal and

[20] This would be a new iteration of the Australian Energy Market Agreement. Energy Ministers' Meeting Secretariat (2022) Meeting Communique, 8 June.

[21] Finkel, Alan (2017), *Independent Review into the Future Security of the National Electricity Market: Blueprint for the Future,* Adelaide: Expert Panel to the Energy Council, Council of Australian Governments (COAG)

all state and territory governments in the NEM. [22] The ISP is the most important of the recommendations.

The NEM is governed jointly by the federal and state and territory governments. The impact of this shared governance is that the ISP is designed by AEMO on behalf of all governments but it is then implemented by states. REZs are vital for the national transition to succeed but they are under the authority of the state where they are situated. This chapter will locate REZs conceptually within national and state energy and planning policy.

2022 is a critical phase for REZ policy: it is the year during which the national vision must begin to be translated into detailed plans,designs and contractual agreements with developers. There is significant time pressure to get REZs built out before coal power stations retire or fail. The Liddell coal power station in NSW will be closed by April 2023.[23] In the draft 2022 ISP AEMO warns that '[a]ll brown coal generation and over two-thirds of black coal generation could withdraw by 2032'.[24]

Market conditions are becoming increasingly unfavourable for coal generators. States must build the institutional capacity to plan transmission and generation while managing economic regulation to pay for infrastructure and ensure that diverse regional communities are positively involved in the wave of development heading their way.

Our research field trips in 2019 focused on what the ESB has called the "granular" level of REZ planning.[25] We believe that the local impacts of specific renewable energy projects and local responses to those impacts will significantly determine the sustainability of the REZ model. In this chapter we analyse the REZ policy and its implications from the point of view that these granular, local conditions are vitally important.

3.1 THE NATIONAL CONTEXT: STATE LEADERSHIP NEEDED

3.1.1 Coal retirements are proceeding without bipartisan climate and energy policy and REZs must keep up

In 2021 the Glasgow Conference called on parties to make "accelerating efforts towards the phasedown of unabated coal power".[26] Despite this, Australia has no national date set for the decarbonisation of the electricity sector. There is a national renewable energy target of 23.5% by 2020 and all states have their own net zero emissions targets for 2050. Some states and territories also have nearer-term renewable electricity targets: ACT achieved its goal of 100% by 2020; Tasmania 100% by 2022, Victoria, Queensland and Northern Territory

[22] Western Australia and the Northern Territory are not part of the National Electricity Market. Agreement was made through the Council of Australian Governments Energy Council when it adopted the Integrated System Plan and 48 others of the 50 recommendations of the Finkel Review.

[23] The first unit is scheduled to retire in April 2022 and the rest in April 2023. AEMO (2020d), 2020 Electricity Statement of Opportunities: A Report for the National Electricity Market, Sydney: Australian Energy Market Operator., p. 121

[24] AEMO (2021a), p.9

[25] COAG (2020), Energy Security Board Renewable Energy Zones Planning: Consultation Paper and Draft Rules, Canberra: Energy Security Board, Council of Australian Governments., p. 9.

[26] UNFCCC (2021), Glasgow Climate Pact, United Nations Framework Convention on Climate Change, clause 20.

50% by 2030.[27] NSW has announced a 35% cut in emissions by 2030 compared to 2005 level, most of which will come from increase in renewable energy.[28]

Economic factors are driving the transition from coal to clean energy in Australia and around the world.[29] Early data from 2020 showed coal generation capacity declined for the first time on record, but 2021 coal consumption figures are expected to rise again to a record high.[30] Although Australia does not have an advanced coal phase outtimetable (like Germany or the UK) it is at a leading edge of the transition with some of the highest levels of renewable energy penetration. The AEMO is planning to accommodate 100% instantaneous wind and solar by 2025.[31]

The energy policy challenge is to ensure that there is enough investment in new supplies of energy to replace coal as it becomes increasingly unreliable and is eventually retired. Coal has been the mainstay of the Australian electricity sector for a century but it has already declined significantly. There are currently 16 coal power stations in the NEM and 4 in WA. Over the next 15 years, all but one of the five coal power stations in NSW are expected to retire.

The former federal Liberal National Coalition government supported the Liberal government in NSW to develop its REZs. In January 2020 Prime Minister Scott Morrison signed a comprehensive energy agreement with New South Wales Premier Gladys Berejiklian, which included over $2 billion in spending initiatives and committed the governments to collaborate on electricity and gas policy, including accelerating REZ development, as recommended by the Finkel Review.[32] The two big Labor states of Victoria and Queensland are implementing their own plans for rapid development of REZs over the early years of the 2020s, but have not enjoyed a similar level of bipartisanship from the federal government. The Federal Government should support these states.

3.1.2 Integrated System Plan is already having local impacts as priority projects are built

The ISP consists of two infrastructure elements: new or upgraded interconnections between regions, and new or upgraded transmission to provide regional backbones connecting large-scale renewable projects in REZs. In this report we are concerned with REZ transmission and associated clean energy development.

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[27] Atholia, Timoth de, Gordon Flannigan & Sharon Lai (2020), Renewable Energy Investment in Australia*,* March Bulletin, Sydney: Reserve Bank of Australia.

[28] NSW Government (2020d), Net Zero Plan Stage 1: 2020-2030*,* Sydney: NSW Department of Planning, Industry and Environment.

[29] See AEMO (2019), Maintaining Power System Security with High Penetrations of Wind and Solar Generation, Sydney: Australian Energy Market Operator., p. 3.

[30] Shearer, Christian (2020), 'Analysis: The global coal fleet shrank for first time on record in 2020', CarbonBrief, 3 August. Kuykendall, Taylor (2021), *World coal power generation set for record year in 2021 – IEA*, S&P Global: Market Intelligence, 17 December, <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/world-coal-power-generation-set-for-record-year-in-2021-8211-iea-68129039>.

[31] Parkinson, Giles (2021a), 'New AEMO boss wants Australian grids ready to handle 100 pct renewables by 2025', *RenewEconomy*, 13 July.

[32] NSW Government (2020f), Memorandum of Understanding - NSW Energy Package*,* 31 January, Sydney: The Commonwealth of Australia and the State of NSW., p. 6.

The draft 2022 ISP finds that 'Step Change' is the most likely of the four scenarios modelled. Step Change predicts rapid growth of large-scale renewables, small-scale distributed energy, electrification of transport, households and industry. By 2050 this would see renewable energy capacity in the NEM treble by 2030 and increase by 122 GW by 2050, mostly in REZs.[33] All these new resources will be enabled by an investment of around $12.5 billion in 10,000 km of transmission.[34]

REZs will produce a spatial shift in the nation's energy infrastructure that will be hugely significant at the local level. When domestic consumption of coal for electricity was at its peak in 2008,[35] there were 31 coal power stations in operation, concentrated in various regions. If the REZ vision is successful, there could be up to 1,000 renewable energy generators built across large development zones in new areas of the states.

NSW has the most developed institutional model for REZs but Victoria and Queensland are also moving fast. By 2030, Victoria plans to develop six REZs with a capacity of up of 9,500 MW. The chief coal retirement risk is the aging 1480 MW Yallourn power station, with its four units scheduled to retire beween 2027 and 2032. Based on ISP transmission upgrade scenarios, Queensland's likely REZ capacity is about 15,000 MW.[36] The government has announced a policy to develop three extensive "QREZs" or "corridors" to help achieve 50% renewables by 2030 and support economic recovery after Covid-19.[37]

State governments have committed to several priority projects, which will help maintain reliability as coal retires:[38]

- South Australia has installed four synchronous condensers, which will compensate for lost inertia services supplied by coal and gas;
- Victoria will build the Western Victoria Transmission Network Project to support the Western Victoria REZ and a 250 MW battery to increase imports from NSW;
- NSW will build the Central-West Orana REZ Transmission link and the HumeLink transmission upgrade to increase capacity to the Snowy Hydro scheme and
- Interstate interconnector projects will also be delivered:
    - Project EnergyConnect, a new link between South Australia and NSW;
    - VNI Minor, to upgrade the existing Victoria-NSW Interconnector; and
    - QNI Minor, to upgrade the interconnector between Queensland and NSW.

REZ transmission designs will require detailed assessment and planning but the draft boundaries provided by the AEMO process already included land use as well as energy

[33] AEMO (2021). Draft 2022 Integrated System Plan. Melbourne, Australian Energy Market Operator., p. 36

[34] Ibid., p.11

[35] DEE (2019), Australian Energy Update 2019, Australian Energy Statistics, September, Canberra: Department of Environment and Energy., p. 9.

[36] AEMO (2020c), 2020 ISP Appendix 5. Renewable Energy Zones, July, Melbourne: Australian Energy Market Operator., pp. 28-32.

[37] Queensland Government (2021b), *Queensland Renewable Energy Zones*, Department of Energy and Public Works, 15 March, <https://www.dnrme.qld.gov.au/energy/initiatives/queensland-renewable-energy-zones/about>.

[38] AEMO (2020b), 2020 Integrated System Plan: For the National Electricity Market, Sydney: Australian Energy Market Operator., p. 14, 31.

criteria. The initial mapping process commissioned by AEMO to identify areas of rich renewable energy potential used a total of 10 criteria to screen areas for consideration as REZs.[39] These included four energy criteria: solar resource, wind resource, transmission network proximity and demand matching (the correlation between historical demand and the predicted solar and wind output). Areas identified by these criteria were then evaluated against six land use criteria: population, terrain complexity, roads, land cover, average property size, and protected areas.[40]

3.1.3 No network development or local planning schemes for REZ delivery

The rules of the National Electricity Market were not designed to deliver REZs and offer states little guidance on the development of such infrastructure. As a result, the rules developed for transmission lines built to connect coal zones and the Snowy scheme to population centres are being applied to REZs, which are are far more extensive in their local impact, encompassing a network of multiple transmission lines as well as generation and storage infrastructure.

The ESBs and state governments have recognised the need for a new approach to transmission planning, but the previous federal government did little to provide leadership in this area. The newly elected federal Labor government will bring more focus to ISP planning as part of its delivery of its $20 billion Rewiring the Nation policy. AEMO's 2022 draft ISP says "proactive engagement and integrated land-use planning is also needed at a jurisdictional level".[41]

While the NSW *EII Act* 2020 aims to maximise community benefits and facilitate involvement, there are no directions or processes to these ends (save Ministerial guidance for Indigenous consultation) in the Act. If REZs are treated simply as transmission projects under national electricity planning rules, there may not be suitable coordination of projects (see Figure 3.1). There will be no consideration about maximisation of economic benefits in the region. In a socio-technical change of ISP magnitude, government coordination and resourcing are necessary for facilitation of training, sustained employment opportunities and population growth in the REZ regions.

In September 2020 the ESB conducted a consultation about REZ planning. Our submission argued that REZs 'could make a very substantial and broad contribution to regional communities but that this requires a development process far more comprehensive than would be possible within the narrow remit of the National Electricity Rules'.[42]

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[39] AEMO (2020c), 2020 ISP Appendix 5. Renewable Energy Zones, July, Melbourne: Australian Energy Market Operator., p. 8.

[40] ibid.

[41] AEMO (2021). Draft 2022 Integrated System Plan. Melbourne, Australian Energy Market Operator., p. 11

[42] Connor, Linda, Dan Cass & Rebecca Pearse (2020), The Australia Institute and University of Sydney Response to Consultation Paper and Draft Rules – REZ Planning (Step 1), Canberra and Sydney: Australia Institute and Sydney Environment Institute.

In June 2021 the ESB published a framework for REZ planning that proposes interim recommendations.[43] These would improve the process but are still largely written from the perspective of power system planning and security and project investment. There is more to be done to take into consideration the granular impacts of REZs and the social processes we address in our research.

3.2 NSW: HOME OF THE NATIONAL PILOT AND THE FIRST STATE TO CREATE REZ AGENCY

3.2.1 Renewable Energy Action Plan laid the groundwork for REZs

NSW can draw on its own experience as well as other jurisdictions, to rapidly build institutional capacity to develop REZs. NSW has undertaken concerted regional renewable energy planning since 2012 when Rob Stokes, then NSW Parliamentary Secretary for Renewable Energy, initiated a joint industry-government Renewable Energy Taskforce to conduct consultations. This led to the Renewable Energy Action Plan (the Plan) which commenced in 2013 and concluded in 2018. The Central-West Orana, New England, and South-West REZs were first detailed in the NSW Transmission Infrastructure Strategy in 2018. In 2016 transmission network operator TransGrid made the first detailed proposal for a REZ in NSW, in New England.[44]

Over the period of the Plan the amount of large-scale renewable energy generation in NSW trebled, with 14 new solar and wind farms built (over 1,100 MW), worth around $2.8 billion.[45] The Plan provided $64.9 million to the first large-scale solar farms in Australia, at Nyngan and Broken Hill, and supported the Beryl Solar Farm near Gulgong and Dubbo Solar Hub, which are both within the Central-West Orana REZ.

[43] ESB (2021), Energy Security Board: Interim Framework for Renewable Energy Zones, Energy Security Board.

[44] In 2016 the NSW transmission network operator TransGrid produced the first detailed proposal for a dedicated renewable energy zone in NSW, the 'New England Renewable Energy Hub'. Transgrid (2016), Renewable Energy Hub Knowledge Sharing Report, June, Sydney: Transgrid for Australian Renewable Energy Agency and the NSW Office of Environment & Heritage.

[45] NSW DPE (2018), Department of Planning and Environment (2018) NSW Renewable Energy Action Plan Completion Report, December, Sydney: Department of Planning and Environment.

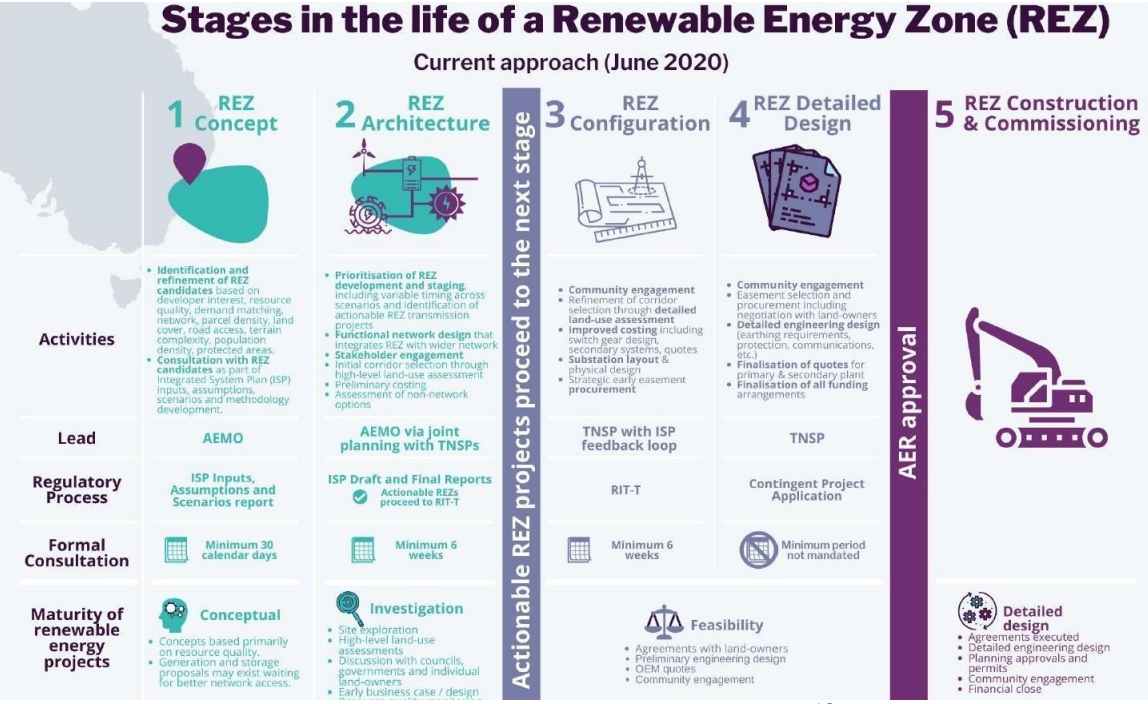

Figure 3.1 REZ planning within national regulatory framework[46]

The Plan was designed to accelerate the growth of clean energy and put it on a politically stable footing. There were measures to attract investment, build community support, drive research and development, promote community-ownership of renewable energy, set minimum consultation standards for wind projects and increase the price households were paid for solar PV exports.[47]

The Plan delivered large-scale solar projects in and around the Central West region. The departmental completion report showed it had broad impact across the sector, including assisting large corporations organise power purchase agreements with renewable energy generators and providing start-up grants for community-owned energy co-ops.

Many of the measures in the Plan dealt with planning issues that continue to be critical for REZs such as 'encouraging developers to undertake early and meaningful consultation and deliver public benefit.'[48] It produced a Wind Energy Planning Framework in 2016 and Large-Scale Solar Guideline in 2018, which apply to State Significant Developments.[49]

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[46] Source: AEMO (2020c), 2020 ISP Appendix 5. Renewable Energy Zones, July, Melbourne: Australian Energy Market Operator., p. 15.

[47] NSW Government (2013), NSW Renewable Energy Action Plan, Sydney: NSW Government.

[48] NSW DPE (2018), Department of Planning and Environment (2018) NSW Renewable Energy Action Plan Completion Report, December, Sydney: Department of Planning and Environment.

[49] SSDs are major projects of minimum $30 million value or $10 million and in an environmentally sensitive area of State significance. NSW DPIE (undated-a), *State significant development: The SSD process, Explaining each step of the process*, viewed 2 March 2021 <https://www.planningportal.nsw.gov.au/major-projects/assessment/state-significant-development/ssd-process>.

In May 2022 the NSW government released draft guidelines for the planning of REZs by EnergyCo and the Consumer Trustee (AEMO Services). These have not been considered in detail in the preparation of this report.[50] The other key process underway is the NSW Agriculture Commissioner's review cited above.

3.2.2 Five REZs will replace retiring NSW coal

NSW has moved ahead of other states because it faces multiple coal retirements over the next 15 years, commencing in 2022. There are five coal-fired generators in NSW, which produce around 80% of electricity generated. The state government expects all but Mt Piper to retire by 2035.[51] The closure of Eraring and Bayswater coal power stations will require significant new generation and storage capacity built across multiple REZs.

In 2017 the NSW government proposed three REZs: Central-West Orana (wind and solar), New England (pumped hydro, solar and wind) and South-West (solar) (Figure 3.2). A total of ten potential energy zones were identified by the NSW government.[52] In 2020, when NSW passed legislation to govern REZ development, negotiations with the Labor opposition led to the addition of two new REZs: Hunter-Central Coast (which includes existing black coal generators and mines) and Illawarra (a coal mining and steel production region).[53] These REZs were not included in the NSW government's original Transmission Infrastructure Strategy nor the ISP and EnergyCo is in the early stage of planning them.[54]

The CWO REZ is the first formally declared REZ in Australia.[55] It combines two REZ candidates from the 2018 ISP: Central NSW Tablelands and Central-West NSW.[56] Solar potential of 15,000 MW and 3,000 MW of wind was estimated in 2018.[57] Capacity estimates have changed for each REZ over time and different organisations present different figures (examples of different estimates for CWO REZ and NE REZ in Appendix 1). In current NSW Government's REZ plans it is projected that around 3,000 MW in total would be built by the mid 2020s, enough capacity to power around 1.3 million homes.

Central-West Orana was prioritised for a number of reasons including its proximity to transmission, mix of energy resources and also the degree of interest from investors in

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[50] EnergyCo, AEMO Services (2022), Network Authorisation Guidelines (Draft), May, Sydney: Energy Corporation of NSW & Australian Energy Market Operator Services.

[51] NSW DPIE (2019), NSW Electricity Strategy: Our Plan for a Reliable, Affordable and Sustainable Electricity System, Sydney: NSW Department of Planning, Industry and Environment., p. 4.

[52] NSW Government (2018), NSW Government Submission on AEMO's Integrated System Plan, March, Sydney: NSW Government.

[53] Mazengarb, Michael (2020a), 'NSW to transform Hunter coal region into state's next renewable energy zone', *RenewEconomy*, 17 November.

[54] NSW Government (undated-a), *Renewable Energy Zones*, Energy NSW, viewed 10 October 2020 <https://energy.nsw.gov.au/renewables/renewable-energy-zones>.

[55] NSW Government (undated-b), *Central-West Orana Renewable Energy Zone declaration*, NSW Government, viewed 18 November 2021 <https://www.energy.nsw.gov.au/renewables/renewable-energy-zones/central-west-orana-renewable-energy-zone-declaration>.

[56] AEMO (2020c), 2020 ISP Appendix 5. Renewable Energy Zones, July, Melbourne: Australian Energy Market Operator., p. 11.

[57] NSW Government (2018), NSW Government Submission on AEMO's Integrated System Plan, March, Sydney: NSW Government., p 8.

building new projects in the region. In 2020 the NSW government sought expressions of interest for the CWO REZ which was well over-subscribed: $38 billion worth of investment proposals, totalling 27,000 MW of generation and storage projects.[58] The ISP 2020 provides a preliminary calculation of the levelised cost of electricity including transmission for each REZ, which ranks CWO REZ as the third lowest cost region for solar, at about $42 / MWh and around $58 / MWh for wind.[59]

The New England REZ declaration is out to consultation. It combines the ISP 2018 REZs New England and Northern New South Wales Tablelands. In 2020 ISP it had estimated potential for 3,500 MW of solar and 7,500 MW of wind and there are around 1,500 pumped hydro sites identified in and surrounding the REZ. Similarly, to CWO REZ, NSW Government sought expressions of interest and received proposals well over planned capacity, 34,000 MW.[60] The predicted levelised cost of electricity for solar in New England is at about $45 / MWh and around $61 / MWh for wind.[61]

The AEMO has estimated that South-West REZ together with Victoria's northwest region has potential for 6,000 MW of solar and 9,140 MW for wind. The predicted levelised cost of electricity for solar in this REZ is at about $57 / MWh (3rd highest REZ) and around $88 / MWh for wind (highest REZ).[62]

[58] NSW Government (2020b), *Renewable Energy Zone sparking investment boom*, NSW Government, 23 June, <https://energy.nsw.gov.au/renewable-energy-zone-sparking-investment-boom>.

[59] AEMO (2020b), 2020 Integrated System Plan: For the National Electricity Market, Sydney: Australian Energy Market Operator., p. 46.

[60] NSW DPIE (2021c), *Renewable energy investment boom beckons for New England REZ*, Department of Planning, Industry and Environment, 27 August, <https://www.environment.nsw.gov.au/news/renewable-energy-investment-boom-beckons-for-new-england-rez>.

[61] Ibid.

[62] Ibid.

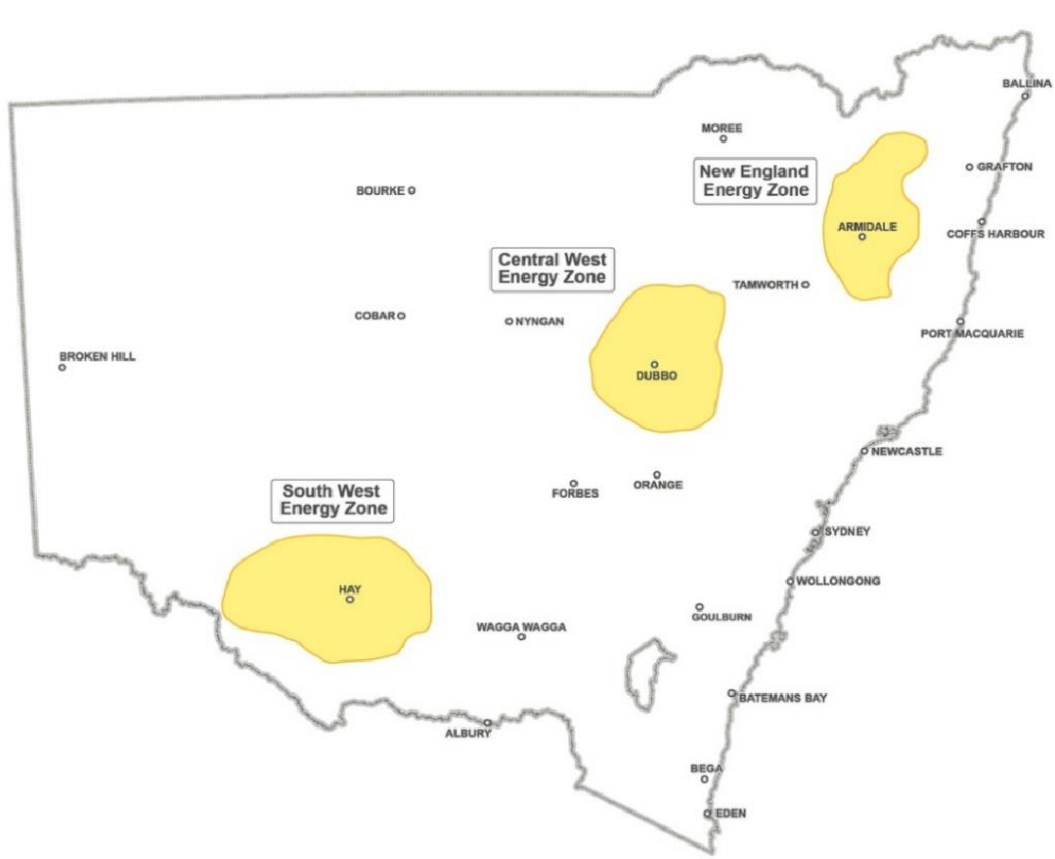

Figure 3.2: Initial NSW REZs[63]

3.2.3 Implementation of REZs in NSW: Electricity Infrastructure Investment Act 2020 and the Energy Corporation of NSW

In November 2020 the NSW Parliament passed the *EII Act 2020* (NSW) to implement its Electricity Infrastructure Roadmap and take REZs from the whiteboard to the paddock.[64] This established the system for planning REZs so that it keeps up with coal retirements. It established a mechanism for designing transmission, allocating transmission access rights to projects, negotiating Long Term Energy Service Agreements for energy and storage and a Consumer Trustee to represent the public interest. The legislation creates a process for assessing the electricity reliability situation in NSW as coal retires and guaranteeing reliability.

Another important element of REZ implementation is the Energy Corporation of NSW, a newly activated statutory authority that was gazetted in 1987.[65] Under the *EII Act*, the Minister must appoint an 'infrastructure planner' when declaring a REZ. In practice, this is expected to be the Energy Corporation or EnergyCo for the five legislated REZs. The Corporation has wide powers to influence the development of energy resources in NSW

[63] Source: NSW Government (2018), NSW Government Submission on AEMO's Integrated System Plan, March, Sydney: NSW Government., p. 4.

[64] NSW Parliament (2020a), Electricity Infrastructure Investment Act 2020, Sydney, Act no. 44/2020.

[65] NSW Parliament (1987), Energy and Utilities Administration Act 1987, Sydney, Act no. 103/1987.

including research, planning, construction and ownership of assets and may also conduct inquiries into energy matters broadly. Government information websites describe the Corporation as 'lead[ing] the delivery of NSW REZs' and 'tak[ing] a holistic view of REZ planning and consultation and … work[ing] with communities to ensure the benefits of investment are equitably shared within host regions'.[66]

EnergyCo has authority to design the REZs and enter into contracts for their construction. The new legislation created a 'Consumer Trustee' for NSW electricity planning purposes and an AEMO subsidiary (AEMO Services Ltd) has been appointed to this role. It will advise the Minister and EnergyCo on the level of network expenditure to build a REZ, and authorise the new transmission projects. The legislation gives the government a process to recoup the costs of REZ transmission from generators that connect to it. The Consumer Trustee can also impose conditions to the transmission projects to give effect to the guidelines about consultation and negotiation with First Nations community and the plan for the renewable energy sector in the State.

New positions have been established to advise the Minister and advocate on state-wide planning of renewable energy and employment (Part 2). A Renewable Energy Sector Board with industry, trade union and consumer representatives, will advise the Minister on a plan for the sector, from planning and operation of energy facilities to construction and manufacture of components used by the sector. The plan will seek to maximise local training and employment opportunities and prioritise local procurement. An 'electricity infrastructure jobs advocate' will advise the Minister on workforce development in the REZs and also on opportunities to develop export industries around the technologies deployed.

The task of coordinating the objects and provisions of the *EII Act 2020* with implementation of the NSW *Environmental Planning and Assessment Act* 1979 (*EP&A Act*) is substantial, as the objects have an unparalleled scope of community consultation and socio-economic benefits.[67] They are distinguished by an emphasis not only on infrastructure investment and upgrade of electricity supply, but also by provisions that include: fostering local community support for new electricity generation and infrastructure; promoting 'local industry, manufacturing and jobs'; a strong focus on Aboriginal and Torres Strait Islander people in NSW, with regard to 'increasing employment and income opportunities'; and, 'promot[ing] consultation and negotiation with the traditional Aboriginal owners of land on which generation, storage and network infrastructure is proposed to be constructed or operated'.

The reorientation required for NSW REZ planning is already underway, including a new Social Impact Assessment (SIA) Guideline for State Significant Developments,[68] with considerably clarified requirements aimed at 'better proponent-community relations and more socially sustainable outcomes'.[69] A SIA will now be required for all State Significant

[66] NSW Government (undated-a), *Renewable Energy Zones*, Energy NSW, viewed 10 October 2020 <https://energy.nsw.gov.au/renewables/renewable-energy-zones>.

[67] NSW Parliament (1979), Environmental Planning and Assessment Act 1979, Sydney, Act no. 203.

[68] NSW DPIE (2021a), Social Impact Asssessment Guideline for State Significant Projects July 2021, Sydney: Department of Planning, Industry and Environment.

[69] NSW DPIE (undated-c), *Social Impact Assessment*, viewed 2 March 2021 <https://www.planningportal.nsw.gov.au/major-projects/assessment/state-significant-development/ssd-process>.

Developments, as part of their Environmental Impact Statement, the key document in the public exhibition and response during assessment.[70] Revisions and reworking of other assessment procedures and guidelines will require wide public and technical consultation to create the regulatory underpinning for effective implementation of the REZs and can be a useful model for assessment procedures as other states' REZ planning develops.

There is a long pipeline before any major REZ program can be brought to fruition. The broad planning of boundaries for the CWO REZ and NE REZs has been done. After the REZs are declared under section 19(1) of the *EII Act*, the next phases will be the granular planning of exactly where the transmission and projects will be built. The NSW mapping process for the first three REZs used the original ten ISP screening criteria, complemented by an additional 25 data layers for REZ selection.[71]

3.3 CONCLUSION

REZs will require brisk policy innovation and implementation over 2022 to 2024 if they are to be deployed successfully in a timely manner. It will be necessary to have steady settings in national electricity policy and regulation, to ensure investment flows into REZs. The pace of energy transition puts pressure on state and national energy policy and on state planning regimes.

The ISP was never intended to provide states with a community-level scheme for engagement and planning and this is where states must create their own institutional capacity. REZs focus renewable energy development into regions, and this requires an unprecedented level of community participation and social impact assessment, to ensure ISP implementation is well-understood, orderly, and equitable. Socio-economic and cultural relations to land and locality in rural Australia are complex and intense. As we will demonstrate in chapter 6, negative impacts can give rise to strong opposition in small communities, which is a political and implementation risk for the ISP and thus the clean energy transition overall.

[70] Renewable energy projects that are classified as SSDs have not required a SIA in the past, unlike some other SSDs such as coal projects.

[71] NSW Government (2018), NSW Government Submission on AEMO's Integrated System Plan, March, Sydney: NSW Government., p. 3.

4. Spatial shift: the social geography of the NSW energy transition

KEY POINTS

- Renewable energy transition involves a marked geographic shift as electricity infrastructures are installed in new areas of rural NSW.
- NSW will significantly expand its generation capacity to replace coal with renewable energy and storage.
- Generation will shift from the coal power of Hunter and Central Coast to multiple REZs in the centre, north and south west of the state.
- Generation asset ownership is expanding and diversifying, with many new, private and overseas companies holding large-scale renewable energy projects. Diversity of companies also means diversity of corporate practices in project localities.
- Ownership changes are very common in the globalised energy sector, and can carry risks for community/corporate relationships as well as consistency of owners' implementation of approval conditions and community commitments.

The clean energy transition is usually discussed in terms of technology, cost, reliability and emissions. But changing *how* electricity is generated will also entail a dramatic shift in *where* it is generated. The NSW Electricity Infrastructure Roadmap will catalyse $32 billion in private investment, estimated to increase Gross State Product by 0.5% over the mid 2030s.[72] The construction boom in utility-scale solar and wind will mostly be in communities that have never hosted large-scale energy generation.

In this chapter we provide data mapping the geographic shift and the emerging corporate structure of electricity generation in NSW. We show that the new investment is mainly proposed in REZs in the state's centre (Figure 4.1), north (Figure 4.3), and south west (Figure 4.4), instead of Hunter Valley which currently hosts the bulk of generation capacity. Notably, in November 2020, the Hunter-Central Coast and Illawarra were also included in future REZs named in the *EII Act*.[73] Besides the changing regions of electricity generation, we show how the range of companies owning generation assets will expand and diversify dramatically. The energy transition will also expand the area of land used by electricity generators.

[72] NSW DPIE (2020), NSW Electricity Infrastructure Roadmap: Building an Energy Superpower Detailed Report, Sydney: NSW Department of Planning, Industry and Environment., p. 14.

[73] Hannam, Peter (2020), 'NSW's coal heartland to host state's newest renewable energy zone', *Sydney Morning Herald*, 16 November, NSW Parliament (2020b), Electricity Infrastructure Investment Bill 2020, Sydney, Act no. 44/2020.

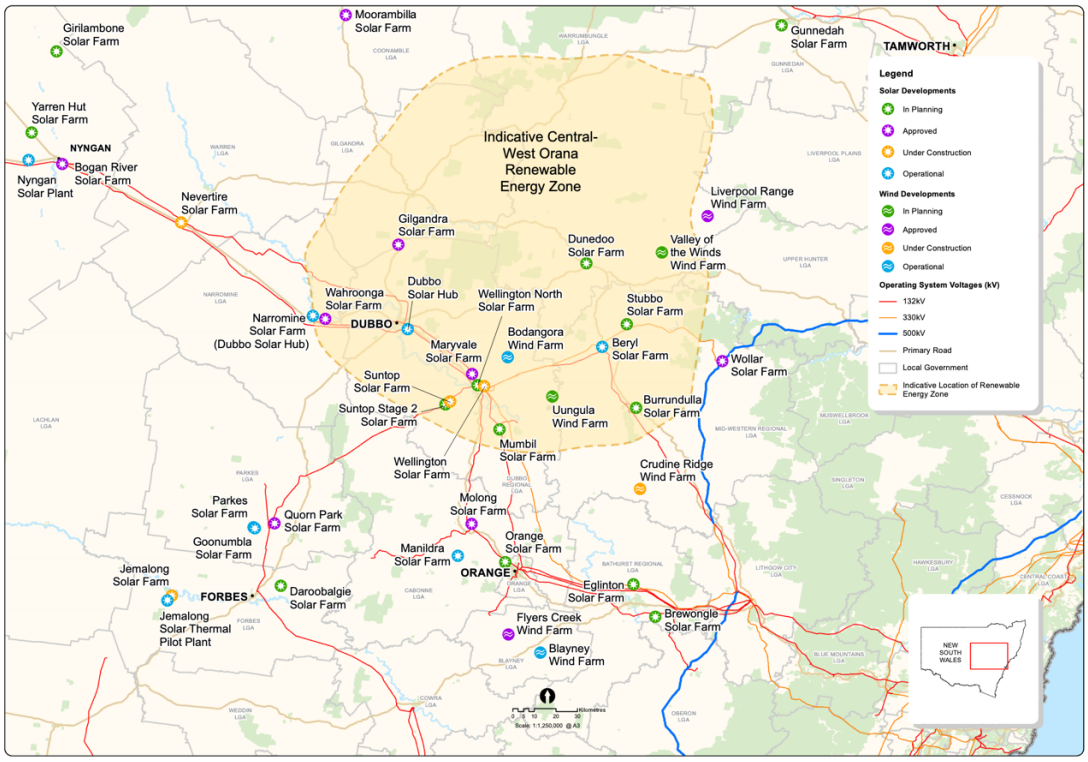

Figure 4.1 Indicative location of Central-West Orana REZ[74]

4.1 MORE GENERATION CAPACITY OVER A LARGE AREA IN NEW REGIONS

The purpose of the Electricity Infrastructure Roadmap is to increase the supply of renewable energy and storage, to replace the Liddell (2,000 MW), Vales Point (1,320 MW), Eraring (2,880 MW) and Bayswater (2,640 MW) coal power stations, which are predicted to retire between 2023 and 2035.[75]

It is projected that this coal generation capacity of 8,840 MW can be safely replaced by 3,000 MW of 'firm' capacity which the government will procure and up to 12,000 MW of renewable energy projects enabled by new grid capacity in the REZs. The government intends that much of the firm capacity would be pumped hydro projects, but some could be wind or solar projects in the REZs backed up with on-site batteries. In fact, individual solar and wind projects, especially the recent development phase projects, tend to have at least a reserve for on-site storage in their EIS documents, though the size of planned storage is often modest (ranging from 10 MWh to a few hundred MWh). What this means is that the Roadmap may increase generation capacity in NSW by perhaps 50–70%.

[74] NSW Government (2020c), *Central West Orana REZ map*, NSW Government, 1 March 2021 <https://energy.nsw.gov.au/sites/default/files/2020-12/REZ%20Map_CWO_20201113.pdf>.

[75] NSW Government (2019a), NSW Electricity Strategy: Our Plan for a Reliable, Affordable and Sustainable Electricity System, Sydney: NSW Department of Planning, Industry and Environment, Edis, Tristan & Johanna Bowyer (2021), Fast Erosion of Coal Plant Profits in the National Electricity Market: Analysis of Likely 2025 Generation Mix Shows Coal Plant Revenue Reductions of 44% - 67%, Sydney: Green Energy Markets and Institute for Energy Economics and Financial Analysis.

In Figure 4.2 we chart the capacity of existing and proposed large-scale generation in NSW. This shows that the coal generators expected to retire by 2035 will be replaced by a much larger capacity of solar and wind. In early 2021, NSW had 2,300 MW of installed capacity from 12 wind and 12 large-scale solar farms in the state. This equates to 13% of the 17,100 MW of the generation capacity operating. The capacity estimates for proposed solar and wind farms in the pipeline will increase this by a factor of 8.

In early 2021, there were 8 solar farms and 4 wind farms in construction or commissioning and a pipeline of proposed or approved projects including 22 wind and 64 solar farms. This adds up to around 20,000 MW of new capacity. These projects are large-scale electricity generators, ranging in capacity from 30 MW to 1,000 MW. These are all the projects in the NSW Department of Planning, Industry and Environment (DPIE) planning portal database, not limited to the REZ areas.

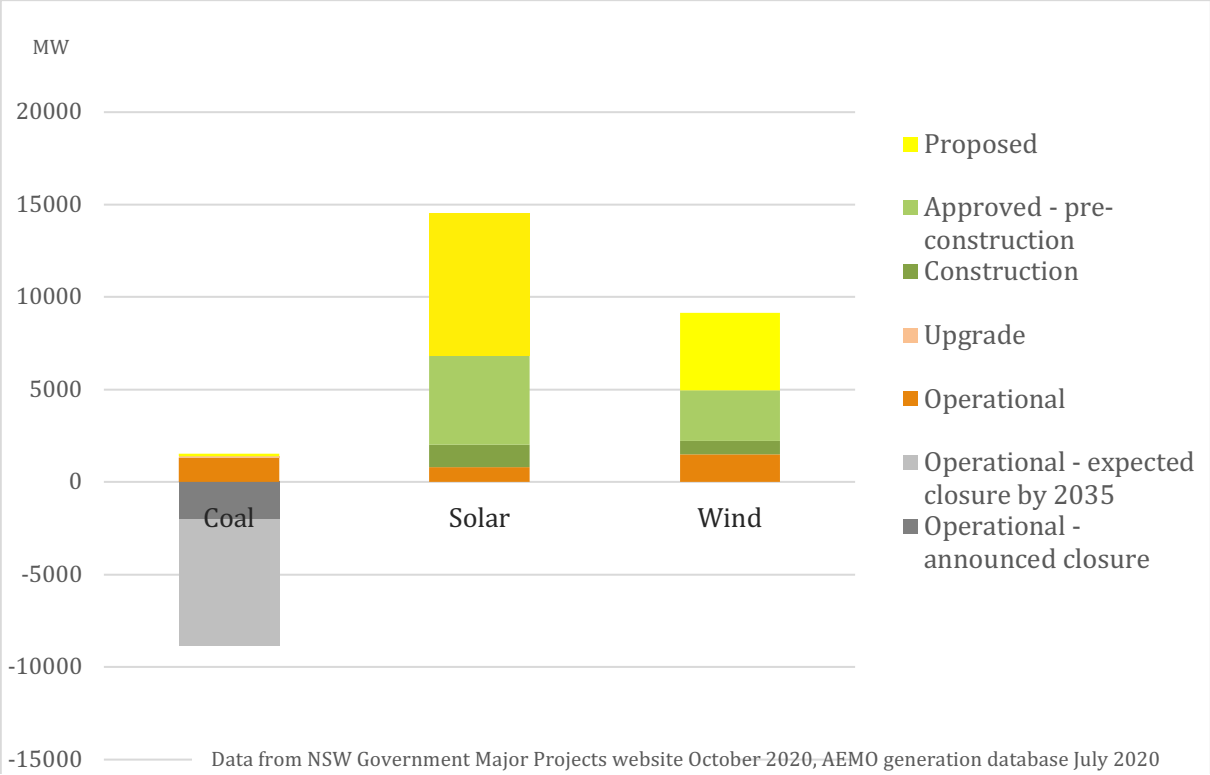

Figure 4.2 Capacity of existing and proposed coal, large-scale wind and solar projects in NSW[76]

[76] Source: AEMO (2020a), *Generation information*, Australian Energy Market Operator, 31 January 2020, viewed 31 January 2020 <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information>, NSW Government (2020g), *Major projects website, new.*, viewed 2 March 2020 <https://www.planningportal.nsw.gov.au/major-projects>.

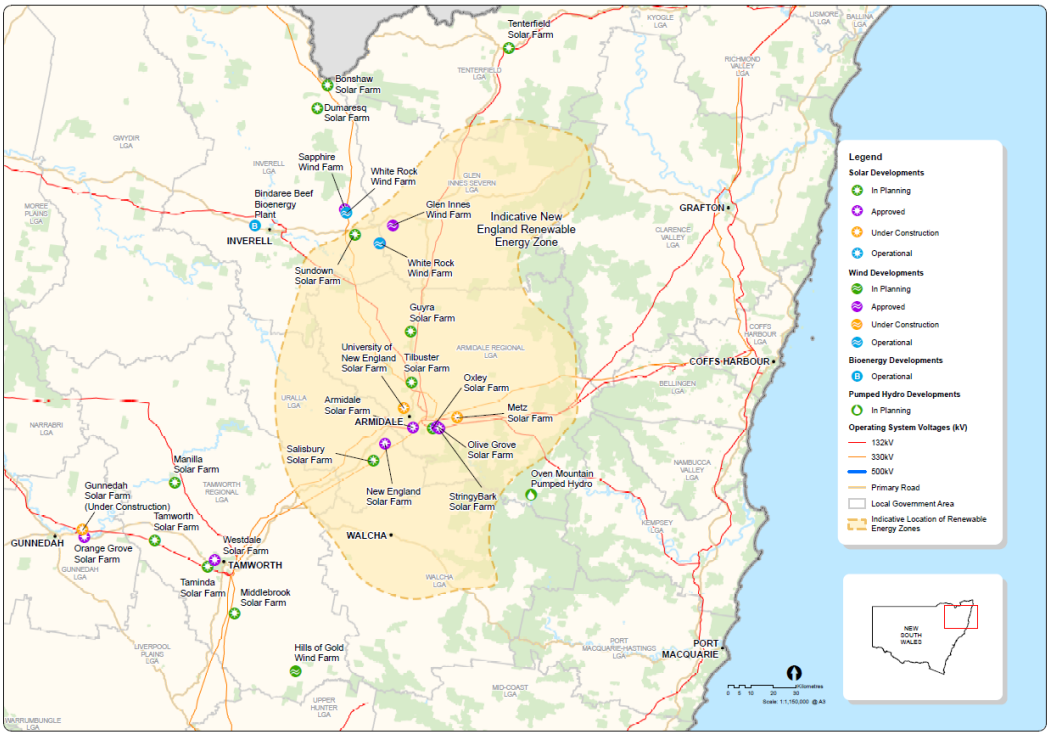

Figure 4.3 Indicative location of New England REZ[77]

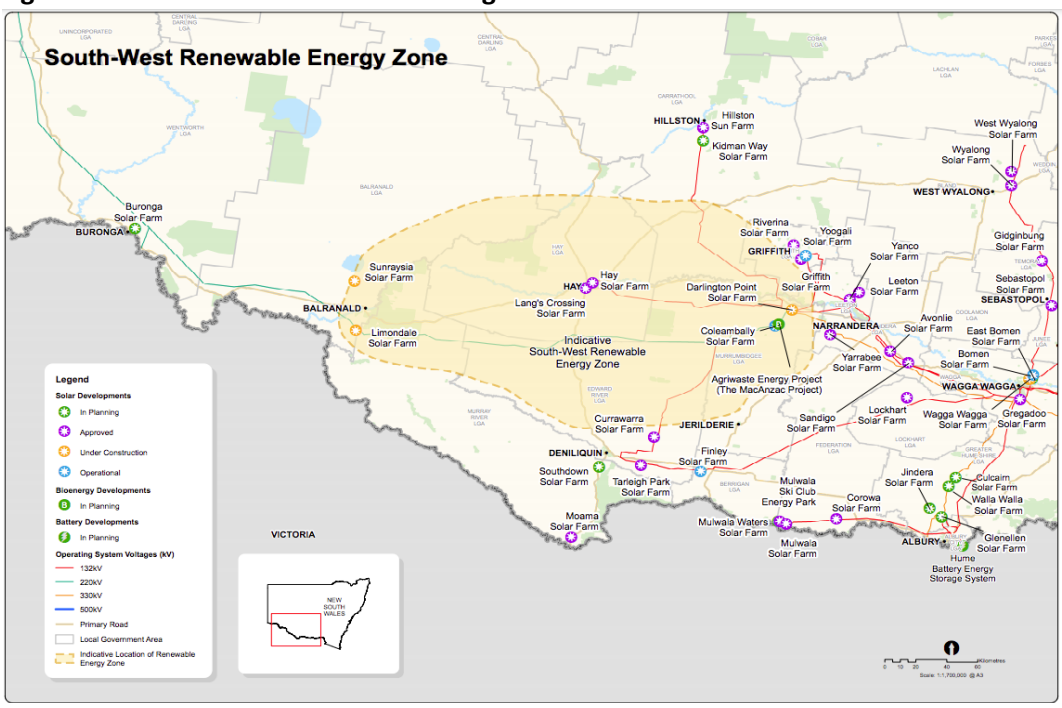

Figure 4.4 Indicative location of South-West REZ[78]

[77] NSW Government (2020e), *New England REZ map*, NSW Government, 1 March 2021 <https://energy.nsw.gov.au/sites/default/files/2020-12/REZ%20Map%20NE_20201202.pdf>.

[78] NSW Government (2020a), *South-West REZ map*, NSW Government, 1 March 2021 <https://energy.nsw.gov.au/sites/default/files/2020-12/REZ%20Map_SW_20201203.pdf>.

4.2 SHIFT OF GENERATION OUT OF HUNTER VALLEY REGION

As the grid repowers from coal to renewable energy this will produce socio-economic change in rural areas. The renewable energy project pipeline is a significant spatial shift in how energy production is organised. Big wind and solar projects are being set up in new areas of regional NSW where agricultural land use dominates. Figure 4.5 illustrates the new geography of electricity taking shape in the state.

Historically most generation in NSW was based around the black coal deposits of Hunter Valley region. The Australian Energy Market Commission has created an online visualisation of the changing generation mix which shows that in the early 2000s NSW had a few large coal-fired power stations north and west from Sydney and some additional gas generators to provide the bulk of generation (Figure 4.6).[79] By 2019 more than 30 new wind and solar farms had been built throughout the state.

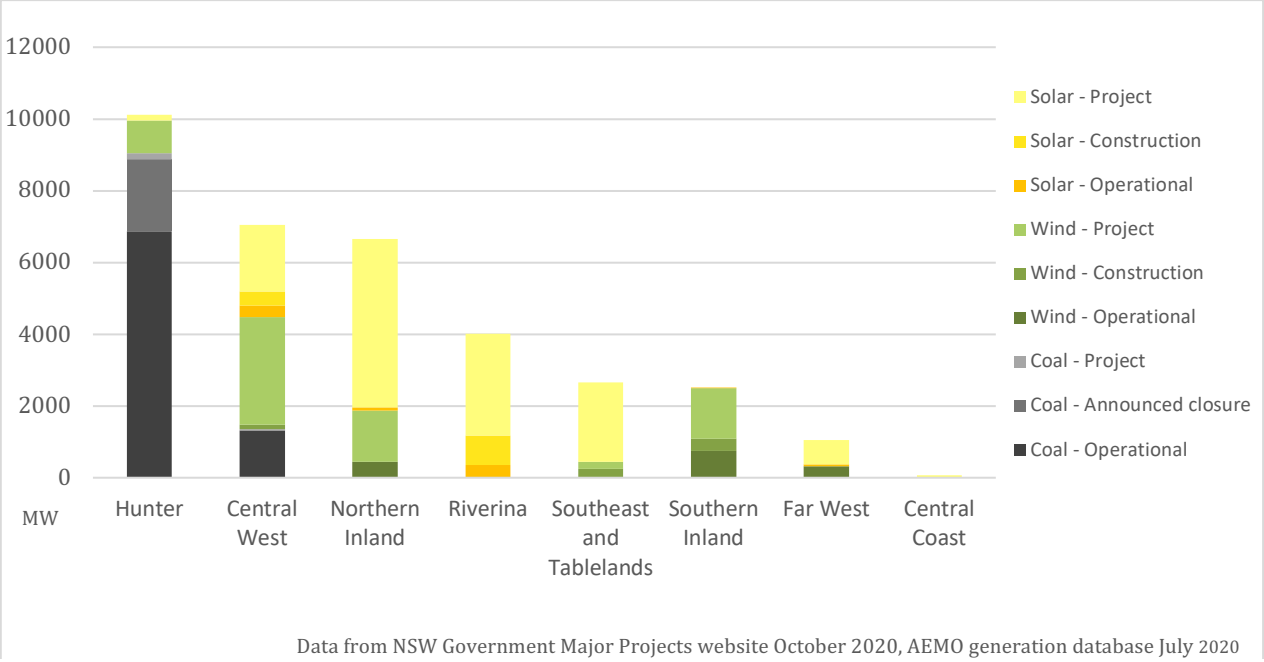

Figure 4.5 Large scale generation capacity by NSW region (MW): operational, under construction and planned

Over the next 15 years, much of the coal generation will be replaced by new generation concentrated in the three REZs in the Central West (up to 5,500 MW of new capacity), New England (6,600 MW) and South West regions (4,000 MW). Plans for the Hunter-Central Coast and Illawarra REZs added in the *EII Act 2020* (section 23) are forming around large battery storage and hydrogen production. The Hunter Valley has seen some big new announcements. For example Origin Energy announced a 700 MW battery plan for Eraring power station site, and there are some preliminary proposals for a large solar farm in the old Kurri Kurri smelter location and another 1,200 MW battery nearby.[80] Federal seed

[79] AEMC (2019), *New data visualisation on changing generation*, Australian Energy Market Commission, 19 June, viewed 1 March 2021 <https://www.aemc.gov.au/news-centre/media-releases/new-data-visualisation-changing-generation >, AEMC (undated), *NSW (Changing generation mix)*, Australian Energy Market Commission, viewed 1 March 2021 <https://www.aemc.gov.au/energy-system/electricity/changing-generation-mix/nsw>.

[80] Mazengarb, Michael (2021), 'Origin Energy plans mammoth 700MW big battery in NSW's Hunter Region',

funding for one of the national 'hydrogen clusters' has been allocated for a group of Hunter industry and education partners.[81] These plans aim to utilise the legacy of existing strong grid and freed up transmission capacity when the coal power stations progressively close, as well as make use of the existing expertise in energy generation in the region.

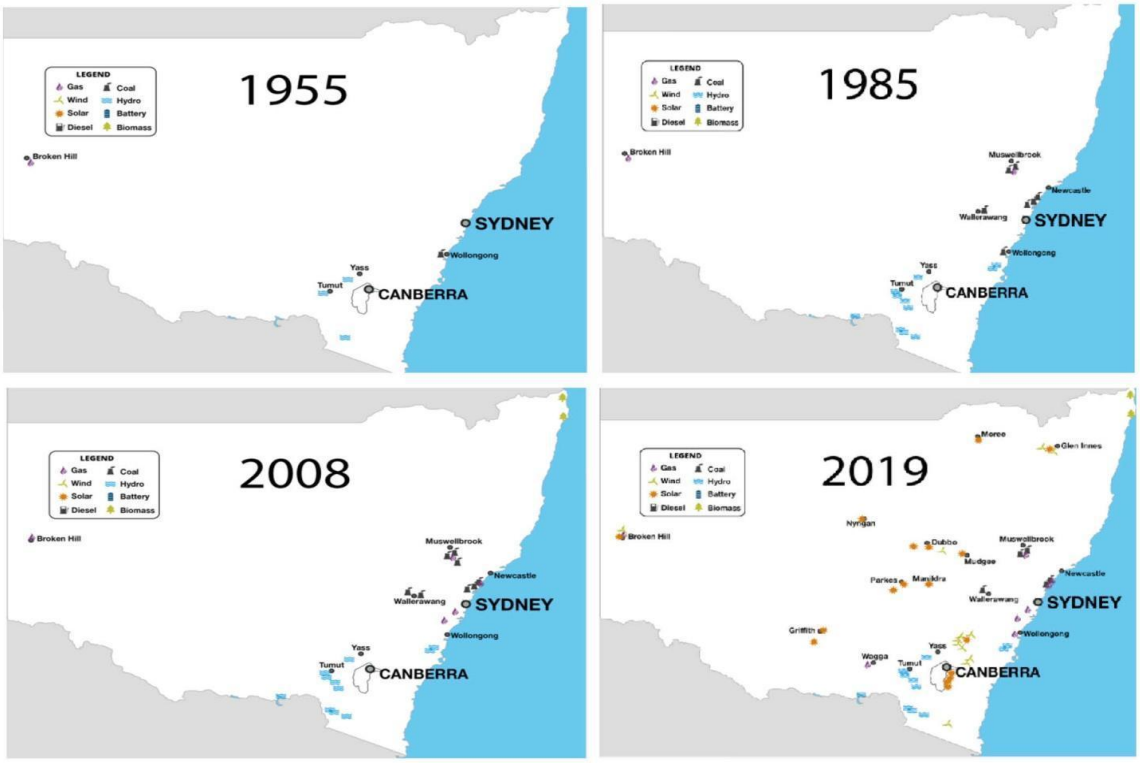

Figure 4.6 Generation mix in NSW over the past six decades[82]

4.3 INCREASING CORPORATE DIVERSITY OF GENERATORS

Ownership of electricity generation and retail companies are highly concentrated sectors in Australia. One of the outcomes of the clean energy transition is the expanded number of Independent Power Producers – private firms that generate electricity for sale on the wholesale market. Renewable energy Independent Power Producers are increasing competition in the market and are the biggest change in the ownership structure of the energy industry since privatisation and marketisation began in the mid 1990s.

Currently more than half of generation capacity in NSW is held by AGL Energy (30%) and Origin Energy (26%) which are both listed Australian companies.[83] Coal generation capacity in NSW is concentrated in a few powerplants, which are owned by just four companies. But this is changing with expanding wind and solar installations.

RenewEconomy, 12 January.. McCloyGroup put forward plans for Kurri to be 'reborn' Kirkwood, Ian (2020), 'Kurri reborn', *Newcastle Herald*, 15 January., while CEP proposes a battery at Kurri Kurri Morton, Adam (2021), 'World's biggest battery with 1,200MW capacity set to be built in NSW Hunter Valley', *The Guardian*, 5 February..

[81] Kelly, Matthew (2021), 'Hunter Hydrogen … with a capital H', *Newcastle Herald*, 2 January.

[82] AEMC (2019), *NSW (Changing generation mix)*, Australian Energy Market Commission, viewed 1 March 2021 <https://www.aemc.gov.au/energy-system/electricity/changing-generation-mix/nsw>.

[83] AER (2020), State of the Energy Market 2020, Melbourne: Australian Energy Regulator., p. 83.

Figure 4.7 below shows the diversity of renewable energy companies leading project development in NSW currently. By installed capacity, AGL remains the biggest generator, mainly due to coal. However, if we compare existing generation to the full current pipeline of projects it demonstrates that AGL is becoming a relatively small player in generator ownership. Several newer entrants have larger renewable energy portfolios than either AGL or Origin. The largest solar and wind developers are CWP (2734 MW), UPC/AC Renewables (1920 MW), Epuron (1536 MW), Tilt renewables (1528 MW), Photon and Reach Solar. In NSW there are over 60 different developers that have proposed or already developed large-scale renewable energy projects.

The new Independent Power Producers are less likely to be Australian listed entities. There are European multinational infrastructure and energy giants, Asian utility companies, turbine and solar manufacturers, as well as Australian developers owned by local and international private equity. There is also more flux within the Independent Power Producers model. Large-scale solar and wind projects often change owners at some stage of the development. Companies that develop renewables projects often do so with the intention of selling those assets once operational.

The entities themselves are also changing, with mergers and acquisitions take place, often driven by the global trend that large fossil fuel companies are shrinking and clean energy giants are rising.[84] Companies with both fossil fuel and renewable energy generation are increasingly deconsolidating by spinning off their renewables operations to take advantage of favourable financial conditions for renewables, while renewable energy entities are consolidating. Most of the large owners in Australia manage renewable energy assets across markets in Asia, Europe and North America. Assets regularly change hands as companies make decisions about how best to manage their renewable energy portfolios.

For example, CWP was originally a joint venture between two European developers, but has since sold half of its Australian business to a Thai renewables company.[85] UPC/AC is another example of a multinational corporation. UPC Group is made up of a large number of subsidiaries and joint ventures and is mainly privately owned by six private shareholders, most from USA. AC is a subsidiary of a multinational group listed in the Philippines.[86] Goldwind is a Chinese state-owned turbine manufacturer, Neoen is a French utility giant, and Tilt, Reach Solar and Epuron are Australian originated developers. In March 2021, Tilt's Australian portfolio of renewable energy assets was sold to the Powering Australian Renewables Fund (PowAR), which is 80% owned by the Queensland State Government's investment fund QIC (which itself manages Australian Government Future Fund money), and 20 % owned by AGL, which developed the PowAR model.[87]

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[84] Blunt, Katherine & Sarah McFarlane (2020), 'The new green energy giants challenging Exxon and BP ', *Wall Street Journal*, 20 December.

[85] Vorrath, Sophie (2016), 'Thai wind giant buys stake in CWP, sees "tremendous potential" in Australian market', *RenewEconomy*, 14 March.

[86] UPC Renewables (undated-a), *Our major shareholders*, viewed 1 March 2021 <https://upc-ac.com/about/our-parent-companies/>, UPC Renewables (undated-b), *Our mission*, viewed 1 March 2021 <https://upc-renewables.weebly.com/about.html>.

[87] Macdonald-Smith, Angela & Elouise Fowler (2021), 'AGL's $2.7b Tilt deal shows keen renewables appetite', *Australian*

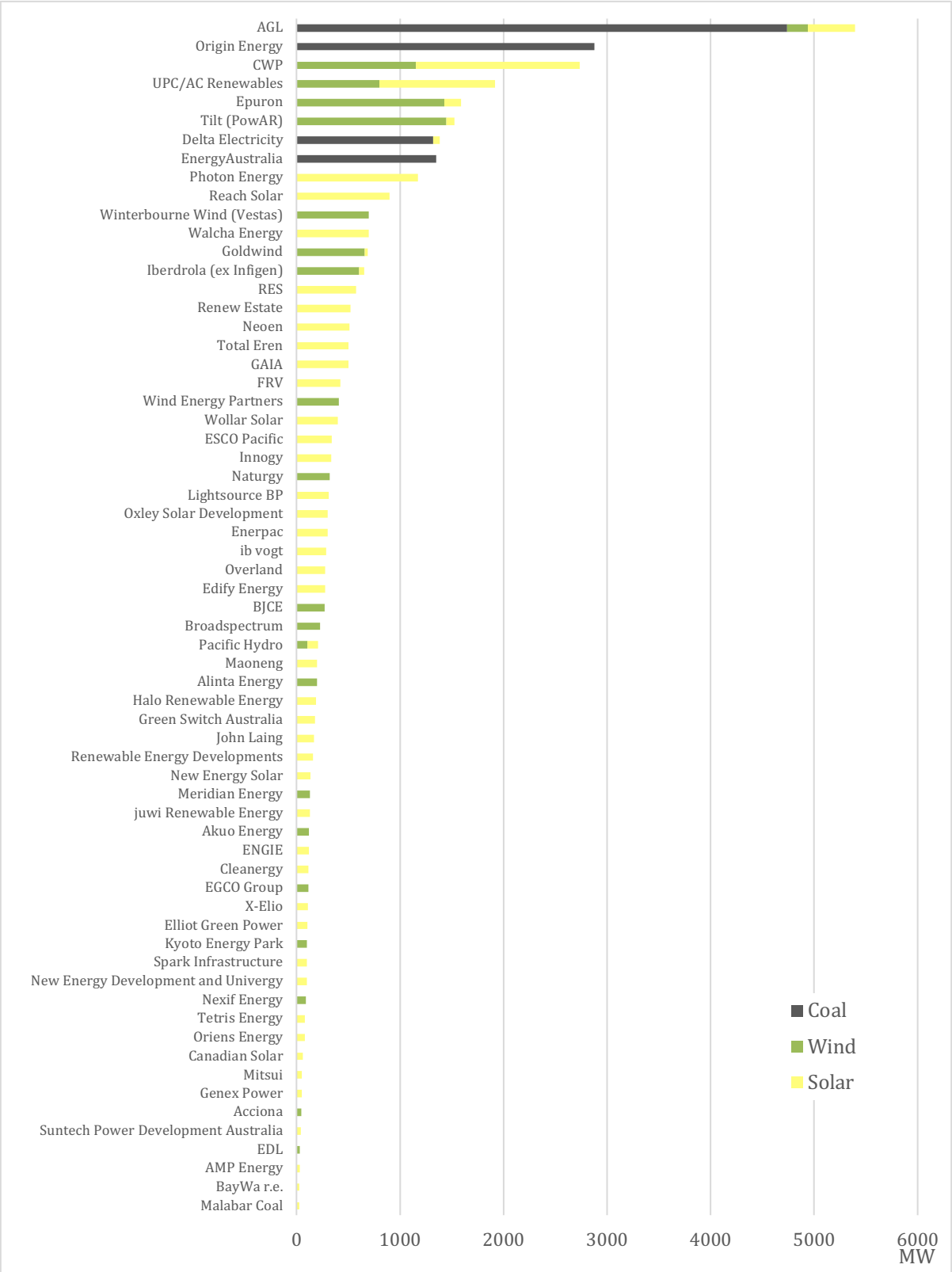

Figure 4.7 Companies owning and developing wind, solar and coal generation capacity in NSW (existing and planned, MW), January 2021.

Financial Review, 15 March.

Most of the new investment is financed by market sources, whether equity from owners and developers, private banks, or other forms of project asset finance. Private power purchase agreements are often critical for securing these deals. However public funding both in grants and through the Australian government Clean Energy Finance Corporation (CEFC) has played a significant role, especially in the first projects realised both in Central-West Orana and New England. For example, in New England CEFC partly financed Sapphire wind farm, which was also awarded a 20-year contract in ACT's wind power auctioning scheme.[88] The NSW Government's renewable energy roadmap is backed by public finance in the form of 20-year power purchase agreements that will be similarly reverse auctioned to the lowest bidders. Two early projects, the Nyngan and Broken Hill solar farms in the west of the state, received funding from the Australian Renewable Energy Agency (ARENA).[89]

4.4 CONCLUSION

Good public policy will set the tone for the investment environment in the new REZs. Significant expansions of electricity capacity are being rolled out across NSW through the large-scale wind and solar developments detailed here. The developers of the new renewable energy installations are mostly new companies, not the large energy companies well-known in NSW. Residents may have positive or negative attitudes towards the investment and ownership of the projects proposed, as well as many other changes that are involved. Transnational companies and ownership changes are very common in the globalised energy sector, and diversity of companies also means diversity of corporate practices.

The transition process entails a marked shift in the social and economic geography of electricity. Large-scale energy generation brings a constellation of rapid changes that can be challenging for residents. Sensitivity to local residents' social life, connections to land, livelihoods and values as well as awareness of the dynamic and diversified investment landscape are important considerations for policy development relating to REZs. In the following chapters we look more closely at the REZ contexts, and then residents' experiences and expectations of renewable energy developments where proposals, projects and operations are already located.

[88] CEFC (undated), *270MW Sapphire Wind Farm uses new efficient Vestas technology*, Clean Energy Finance Corporation, viewed 1 March 2021 <https://www.cefc.com.au/case-studies/270mw-sapphire-wind-farm-uses-new-efficient-vestas-technology/>.

[89] ARENA (undated), *AGL Solar Project*, Australian Renewable Energy Agency, viewed 1 March 2021 <https://arena.gov.au/projects/agl-solar-project/>.

5. Renewable Energy Zones in context: Central-West Orana and New England

KEY POINTS

- Each REZ is unique, with a diversity of suitable resource locations, existing land use and socio-economic conditions that will interact with renewable energy development.
- The national pilot REZ in Central-West Orana is geographically diverse, stretching from the Central Tablelands to drier plains country further west.
- New England (NE) REZ is located in the Northern Tablelands and North West Slopes of the Great Dividing Range in northern NSW.
- Rural land use dominates in both REZs, with grazing, cropping, vineyards and some irrigated agriculture in CWO REZ, and grazing as well as areas of intensive horticulture in NE REZ.
- Both REZs have several smaller towns and a large population centre: Dubbo in CWO REZ (population c. 38,000) and Armidale in NE REZ (population c. 25,000).
- The REZs are located on Country of several Aboriginal groups, including the large Wiradjuri nation in CWO REZ, and Ambeyang, Anaiwan, Ngoorabul, Kwaimbul, Radhun, Yaniwan and part of Kamilaroi nations in NE REZ.
- The main employment profile of the two REZs is similar: agriculture dominates in rural areas; health care and social assistance, education and training, retail trade, local government, accommodation and food services in the towns.
- Significant renewable energy installations and projects already exist in both REZs, and competitive clustering of projects around higher voltage transmission lines and substations has created some concentrated areas of impact on residents and environment.

RECOMMENDATIONS

- There needs to be revision of the least-cost principle of transmission grid rollout in order to avert inequity in access to benefits and entrenched community opposition to the REZ model.
- Managing State Significant Development requirements for renewables projects to prevent adverse cumulative impacts caused by density of development is crucial in concentrated areas of REZs.

Our field research in the first two priority REZs in NSW, Central-West Orana and New England, was focused on those areas which will bear the most intense concentration of developments (see Figure 3.2: Initial NSW REZs). In this chapter we describe existing patterns of socio-economic and land use relationships in the REZs and how they interact with renewables development. Community acceptance and equitable socio-economic outcomes in these areas will be crucial to successful implementation.[90]

[90] Some designated REZs in NSW where there is strong community opposition to WFs have not been prioritised, despite excellent resources. Southern Tablelands REZ is an example noted in the 2020 ISP.

The existing NEM backbone creates constraints for REZ planning but neither the boundaries nor the exact locations of transmission infrastructure have been finalised (see Appendix 1 for more detail on the transmission networks and capacity of CWO and NE REZs). The AEMO designed REZs primarily to provide least-cost access to solar, wind and pumped hydro resources. They cut across the many scales and types of land use and regional divisions designated by different levels of government in Australia.

Each REZ is unique and contains a diversity of suitable resource locations, existing land use and socio-economic conditions. The location of transmission infrastructure needs to take account of the unique profile of each REZ to maximise positive benefits for residents as well as the cost and quality of electricity supplied. Least-cost overall should include protocols for minimising social conflict and protecting important cultural, environmental, economic and Indigenous values. The areas that will host the greatest concentration of projects deserve the closest examination to understand the social impact of locating energy installations there.

It is currently unclear how NSW Government will reconcile the National Electricity Rules' lowest cost imperative for transmission infrastructure with inclusive and equitable benefit sharing mechanisms. RE-Alliance recently published a report calling for inclusion of social and environmental costs to the current process for approving transmission augmentation (the RIT-T process administered by the Australian Energy Regulator) and better engagement and benefit sharing for transmission impacted communities.[91] Our observations support such calls and indicate the need for close attention to transmission infrastructure impacts and community considerations as a part of coordinated REZ development. There is already one opposition group along the planned CWO REZ transmission corridor, Merriwa Cassilis Alliance,[92] while in Victoria AusNet transmission consultation group recently lost community members due to accusations of deception and lack of empathy and respect.[93]

The NSW government has moved a long way towards establishing its own energy infrastructure regime for REZs to provide better certainty for investors compared to the NEM's open access regime. As a result, renewables development in REZs is likely to increase especially near new transmission infrastructure. The open access system means that although generators have a right to connect to the transmission network, there is no guarantee they will be able to sell their output nor avoid certain penalties for the variability of their generation.[94] This can cause significant uncertainties for investors and thus for host communities. The AEMC is considering changing the open access regime for 'Dedicated

<https://www.aemo.com.au/aemo/apps/visualisations/map.html.>

[91] Healey, Kate (2021), Building Trust for Transmission: Earning the Social Licence Needed to Plug in Australia's Renewable Energy Zones, Canberra: RE Alliance.

[92] Ibid., p. 6. Kinbacher, Lucy (2021), 'Merriwa Cassilis Alliance established to safeguard strategic ag land ', *The Land*, 3 March.

[93] Vorrath, Sophie (2021), '"Last straw:" Community members slam AusNet grid plans, quit consultations', *RenewEconomy*, 12 July.

[94] This is partly due to how AEMO's dispatch engine works, but also more problematically due to the level of network congestion outside a single generator's control. AEMC (2017), Fact Sheet: How Transmission Frameworks Work in the NEM*,* Sydney: Australian Energy Market Commission.

Connection Assets', which would protect access rights of participants[95] in areas such as the NSW planned REZs.

5.1 CENTRAL-WEST ORANA REZ

The CWO REZ is an amalgam of contiguous parts of two NSW Planning regions, Central West and Orana.[96] The two regions are in central north NSW, extending from the Queensland border to the local government areas of Cobar and Bourke in the Western plains, to the Central Tablelands in the east. Combined, the population of Central West and Orana is over 300,000, although the area of the REZ has a smaller population.[97]

As with other REZs, exactly how much new capacity CWO REZ could host will depend on the final transmission design and related decisions such as system strength planning. Different agencies give different estimates of what the final generation capacity will be (see Appendix 1: A.3). EnergyCo is currently carrying out a competitive tender for a Network Operator for CWO REZ.

The major land use in the REZ is for grazing and cropping, with some mining, National Parks and a few large State Forests. The alluvial soils near rivers are especially valued locally, and some of this land is irrigated. The largest sources of employment include agriculture, health care and social assistance, retail trade, education and training, accommodation and food services. Mining (coal in the east, metallic and other minerals to the north and west) is an important source of employment in the localities where mines are located.

The Aboriginal Traditional Owners for most of the REZ are the various clans and dialect groups of the Wiradjuri, the largest Indigenous nation in NSW. Their land abounded with plentiful fish, game, and yam pastures in the alluvial soils.[98] Guided by Aboriginal walking trails (some of which are today's highways), explorers from the British colony at Sydney finally made a crossing of the Great Dividing Range in 1813. This opened western NSW to pastoral settlement to support the expanding colony, replicating the invasion that had occurred on the eastern side of the Range, with the same disasters of dispossession and disease for inland NSW Aboriginal nations.

The explorer John Oxley visited the Central West in 1818 and reported on its high suitability for pastoral settlement. Settlers drove their cattle and sheep across the ranges from the early 1820s, and small villages like Dubbo and Wellington grew into towns as population expanded with the stimulus of migration of Irish settlers fleeing the Great Famine from the mid-1840s, and gold rushes from the 1850s.

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[95] AEMC (2020), Connection to Dedicated Connection Assets, Sydney: Australian Energy Market Commission.

[96] It also overlaps with a Commonwealth government Regional Development Area, Orana. https://www.rdaorana.org.au/

[97] There are no readily available socio-demographic statistics for REZs which do not correspond with any ABS statistical collection area.

[98] Hambrett, Micaela (2018), 'How the Wiradjuri people of Central West NSW survived first contact with European settlers', *ABC News*, 20 August.

There was fierce Wiradjuri resistance to European settlers and the colonial government declared martial law in 1824, initiating a period of extreme violence and massacres.[99] Most Wiradjuri were dispossessed of their lands and food sources by 1840s. Those who survived were dispersed in small groups, finding work on stations and enduring forced relocation to government established 'reserves' or 'missions' under the administration of the Aborigines Protection Board.

The Wiradjuri presence today in the region and in public life, as well as connections to ancestral country, is strong. There are several Local Aboriginal Land Councils in the REZ, with collective land rights under the *NSW Aboriginal Land Rights Act (1983),* as well as many Aboriginal Corporations, land resource management, cultural, sporting, and other organisations. There are Wiradjuri groups that have current Native Title claims that are partly within the REZ. The proportion of Indigenous residents varies in different local government areas of the REZ, but overall is significantly above the NSW average of 2.9%.[100]

The main population centres are the regional towns that are the capitals of local government areas. The largest town in the REZ is Dubbo (population 38,000). It is the focus of a diversified and prosperous regional economy that includes agriculture, education, tourism, construction, mining, health care and social assistance, hospitality, and retail, as well as other town-based professional, administrative, and technical services. The smaller rural towns are the hub of the agricultural economy in their hinterland, with urban concentrations of services, retail, and tourism. These include the towns of Wellington, Dunedoo and Gilgandra. These local economies can flourish when seasons are good and rural commodity prices high, but they are vulnerable to drought downturns as in recent years, and the vicissitudes of global markets. Their less diversified economies are reflected in fewer employment and training opportunities for disadvantaged groups in the labour market.

Our field trips focussed on the southern part of the REZ where most projects are located, as well as some project areas east and south of the indicative REZ boundary. As the NSW Energy map of indicative REZ boundaries shows (Figure 3.2: Initial NSW REZs), there are many developments located outside the mapped boundary. For example, the small town of Nyngan 170 km north west of Dubbo was the first to see a utility scale solar farm built by AGL on a property approximately 10km northwest of the town (operational since 2016, see Figure 5.1).

The area of the CWO REZ is extensive, covering all or part of four Local Government Areas, but the majority of renewable energy development is in the southern third, clustered around existing high voltage transmission lines near Wellington (see Figure 5.1 and Appendix 1 Figure A.1).

[99] The most comprehensive source of information on colonial frontier massacres is the University of Newcastle website *Colonial Frontier Massacre in Australia s 1788-1930* https://c21ch.newcastle.edu.au/colonialmassacres/.

[100] All demographic statistics in this chapter are from ABS Quick Stats 2016.

Figure 5.1 Nyngan Solar plant

Wellington: Our attention was drawn early on to the rural district of Wellington (which was incorporated into Dubbo Regional Council in 2016) because of the concentrated renewables development (Figure 5.4). Some of the projects are located very near to the town where the 330kv line connects to a substation.[101]

Wellington district has a population of about 10,000, with half of these living in town. The town has a maximum-security Correctional Centre on its edge, the second biggest industry employer in town after aged care services. The renewables construction wave is showing in everyday life of the town with the accommodation capacity near full of out-of-town construction workers. Residents who are renters face rising rent and housing shortages.

Figure 5.2 Outskirts of Wellington (left) and Wellington town (right)

[101] In general, the majority of large-scale generation connects to the main grid through a distribution company-owned substation.

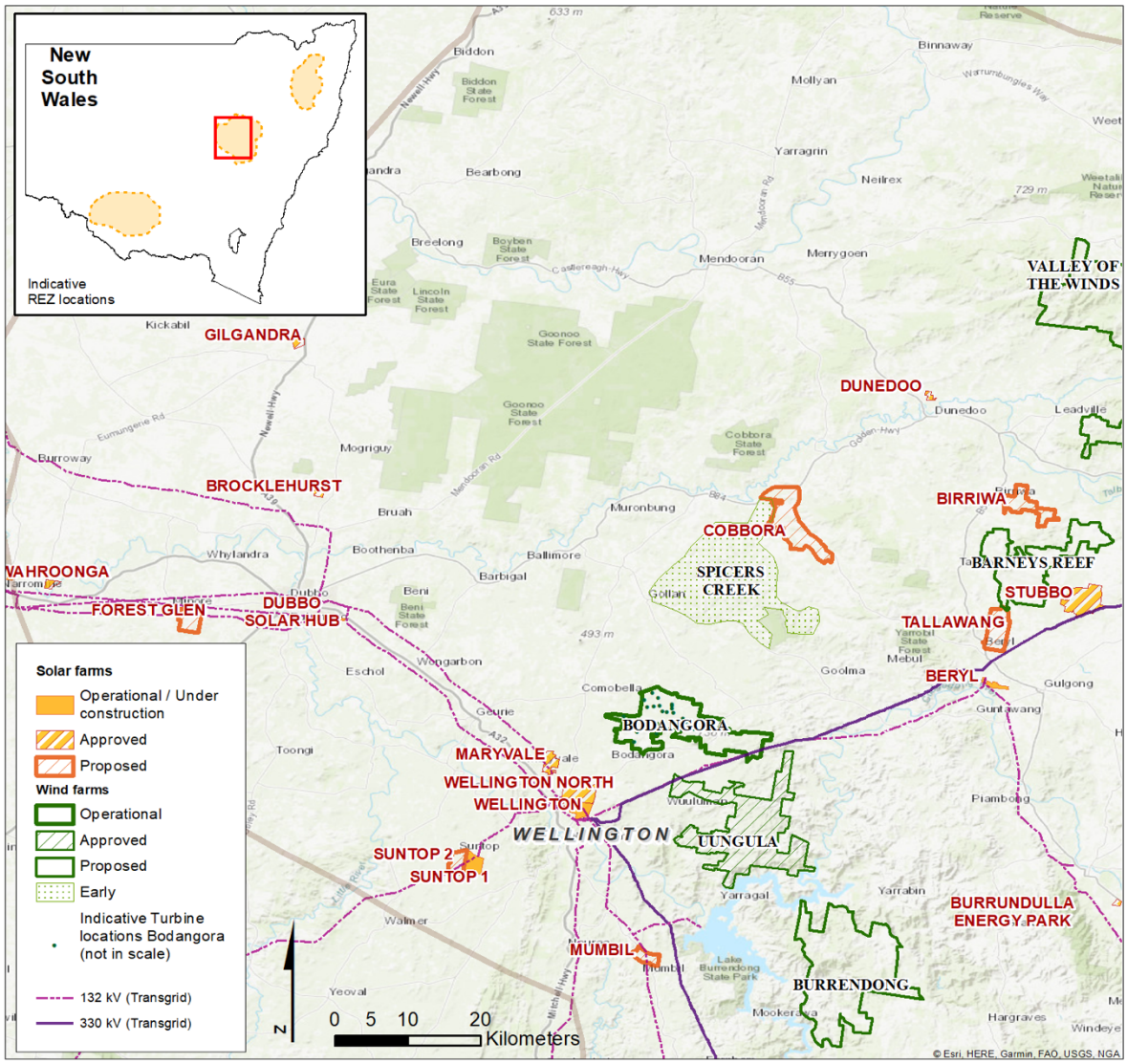

Figure 5.3 Field study focus area in CWO REZ

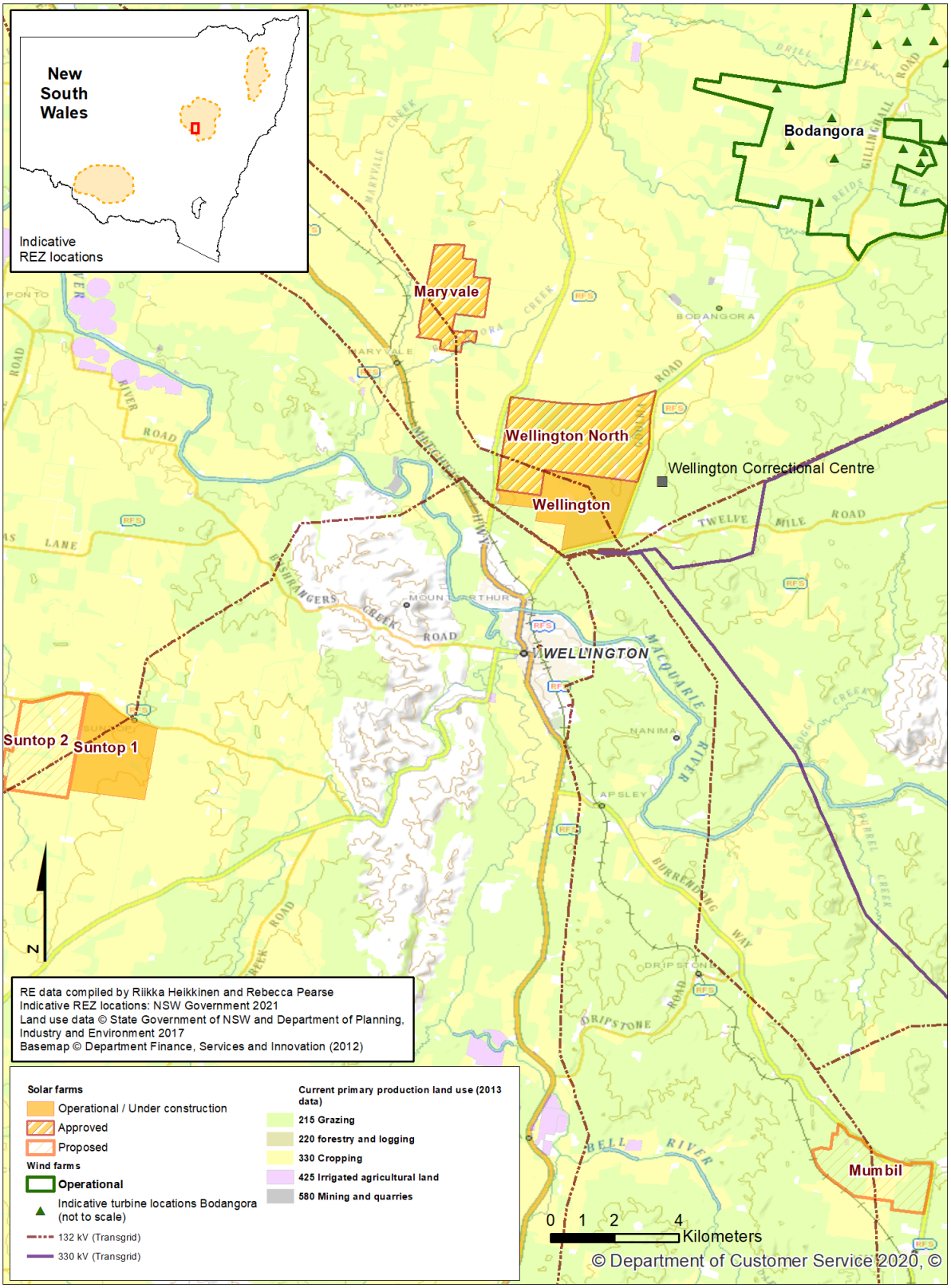

Figure 5.4. Current and proposed renewable energy projects near Wellington and existing primary production land use

Most of the land surrounding Wellington is under agricultural land use. Existing land use north and west of town is mainly cropping, while south and east is predominantly grazing. The higher and steeper Mount Arthur area is forested and contains remnant native vegetation. The high value irrigated agricultural land is near the rivers. As Figure 5.4 shows, the solar projects are proposed mainly on dry farmland, and wind projects such as Bodangora (and nearby Uungala) mainly on grazing land. The prospect of using agricultural land for energy infrastructure is a concern for some farmers and ag-related enterprises. The less intensive footprint of wind farms allows continued grazing, which we observed at Bodangora. As of now, we have not encountered any 'agrivoltaic' (dual agriculture and solar) land use examples in CWO REZ although there is growing international interest in systems for agricultural production under solar panels.[102]

Many of the characteristics and current trends in renewables development are already visible in Wellington making the town and its surroundings an illustrative case area for some of the likely local dynamics inside the REZs (see Chapter 6). The corporate presence includes:

- Bodangora Wind Farm, now owned by Iberdrola Australia, which acquired the ASX-listed company Infigen in December 2020
- Wellington Solar Farm, initially developed by US-based First Solar and now owned by UK-based Lightsource BP
- Wellington North solar farm, developed by ASX-listed electricity and gas gentailer AGL, and acquired by Lightsource BP in July 2020
- Suntop 1, Suntop 2 and Maryvale Solar Farms, owned by Amsterdam-based Photon Energy in partnership with developer Canadian Solar and Sydney-based Polpo Investments
- Mumbil Solar Farm, originally proposed by Photon Energy, and since sold to Australian company Epuron

This profile of ownership exemplifies some patterns of renewable energy development throughout the state, as shown in Chapter 4 (Figure 4.7). There is a relatively large number of operators and developers. This contrasts with the concentration of ownership in coal and gas generation. There are only four coal generators in NSW and Australian gentailer AGL for example has a much larger proportion of its energy assets in coal and gas compared to renewables.

There are large transnational renewable energy companies in Wellington. Photon is in partnership with Canadian Solar and Polpo Investments (the former providing the majority of capital), and Lightsource BP, a renewables company partnership with a major oil and gas transnational. Infigen, a medium sized wind power company with projects in several states, suffered financial difficulties and was taken over in August 2020 by Spanish energy company Iberdrola, also a major fossil fuel transnational. Infigen was delisted from the Australian stock exchange, which Giles Parkinson (2020) has argued is part of a trend that creates a

[102] Bellini, Emiliano (2021), ''Agrivoltaics can certainly be a viable and meaningful alternative to large-scale solar'', *PV Magazine*, 15 June.

renewables development information gap with few Australia-based companies listed.[103] Some projects like Wellington Solar Farm are onsold from one or more developers to different developers or operators. Ownership turnover of projects is common. In Chapter 6 we discuss some of the local concerns that can arise.

The timelines to commissioning can be lengthy. For example, it was seven years from initial application to commissioning for Bodangora Wind Farm. The Mumbil project illustrates the precarious nature of some projects, which can be stalled for years at various stages due to uncertainties of financing, grid connection and other barriers. Photon Energy initiated the development application process in 2017. After purchase by Epuron in 2019, the EIS has yet to be produced. The company is trying to maintain community relationships. The latest newsletter (April 2020) on the Mumbil website states that 'in response to current market conditions', the project's progress will be 'slower than expected'.

Projects that are operational or are well advanced have a variety of Power Purchase Agreements, for example with Snowy Hydro 2.0 (Wellington Solar Farm), Energy Australia (Bodangora Wind Farm), and Amazon.com (Suntop 1 Solar Farm). Wellington North was originally planned to supply power to previous owner AGL, also a retailer.

5.2 NEW ENGLAND REZ

The New England REZ is in the Northern Tablelands region of NSW, extending from Glen Innes and Inverell in the north and north-west to Walcha in the south, including part or all of five local government areas. The area sits on the Great Dividing Range on the New England Plateau and averages about 1000 m above sea level with a temperate climate.

Apart from the towns, the existing land use is mainly grazing, with some cropping especially around Inverell, and patches of intensive horticulture (see Appendix 2). Compared to CWO REZ, there is notably little land classified as irrigated agricultural land. The rugged mountainous landscape east from Armidale and Glen Innes on the Great Dividing Range is mainly forested and hosts National Parks, separating the New England Plateau from the coast. There are also other patches of remnant native vegetation around towns, mainly on steeper or rocky terrain, not used for primary production.

There are several Aboriginal Traditional Owner groups in the REZ. Anaiwan, Yaniwan, Radhun and Ambeyang lands extend from Inverell to Guyra to Uralla and Walcha, taking in Armidale. Ngoorabul lands are in the north around Glen Innes. Further to the northwest are Kwaimbul lands, incorporating a National Park of the same name. The southwest part of the REZ takes in a small part of the extensive Kamilaroi lands. Pre-contact relationships to land were dynamic, and there was cyclical movement of groups to the coast and western rivers with the changing seasons and food sources.

[103] Parkinson, Giles (2020), 'Iberdrola set to take full control of Infigen, another window on energy market closes', *RenewEconomy*, 11 September, Trommsdorff, Max, Jinsuk Kang, Christian Reise, Stephan Schindele, Georg Bopp, Andrea Ehmann, Axel Weselek, Petra Högy & Tabea Obergfell (forthcoming), 'Combining food and energy production: Design of an agrivoltaic system applied in arable and vegetable farming in Germany', *Renewable and Sustainable Energy Reviews*, 140.

John Oxley was the first settler explorer to visit the Northern Tablelands in 1818 and wrote enthusiastically about the verdant country's potential for pastoralism. As early settlers appropriated the land further south, the Northern Tablelands became occupied by squatters from the 1830s. As in Central West, Aboriginal groups were dispossessed of their land and food sources by mid-19th century. Population numbers plummeted due to frontier violence and disease. People were scattered in small groups with subsistence from work on stations, and people of different language groups, much smaller in original numbers than the Wiradjuri, were brought together in government reserves.

There are six Local Aboriginal Land councils in the REZ, and Aboriginal residents make up between 6% and 8.5% of population in different Local Government Areas, much higher than the NSW average. Aboriginal residents today are strongly involved in natural resource management, local land services and other organisations in New England. They are Traditional Owners of Indigenous Protected Areas such as Boorabee and the Willows, a protection zone for the koala, a Ngoorabul totemic animal. A recent notable book by a New England Anaiwan linguist and historian, Callum Clayton-Dixon, tells the history of colonial New England from an Aboriginal perspective of resistance and resilience.[104]

The largest town in the NE REZ is Armidale (pop. 25,000). Armidale is a significant city in the wider northern NSW region, established in the 1830s, with rapid growth during the gold rushes from the 1850s and the coming of railways in 1880s and 1890s. The main campus of University of New England, Australia's oldest regional university, is located there. Like Dubbo in Central West, Armidale city offers a large range of retail, social services, hospitality, and pastoralism related businesses as well as a spectrum of private schools offering boarding facilities for rural students. The 'High Country' rural towns of Glen Innes and Inverell are at the hub of pastoral sub-regions, with sheep and beef cattle farming, meat processing, aged care, and local government administration among the most stated occupations. The towns of Uralla and Walcha in the south of the REZ have similar local economies. Armidale has not fared as well as Dubbo in recent years, and unemployment has risen. All the New England towns are vulnerable to the economic adversity brought by drought, loss of markets and downturns in global prices for rural commodities.

Our field trips focussed on the northern part of the REZ, on wind projects located within the Glen Innes (Figure 5.3) and Inverell boundaries, as well as to the south near Uralla, where most solar projects are sited plus a priority pumped hydro proposal. Like the CWO REZ, the projects are clustered close to higher voltage transmission lines and substations (See Figure 5.4).

[104] Clayton-Dixon, Callum (2020), *Surviving New England: A History of Aboriginal Resistane and Resilience Through the First Forty Years of the Colonial Apocalypse*, Armidale: Newara Aboriginal Corporation.

Figure 5.5 Glen Innes main street (left) and Glen Innes suburbs (right)

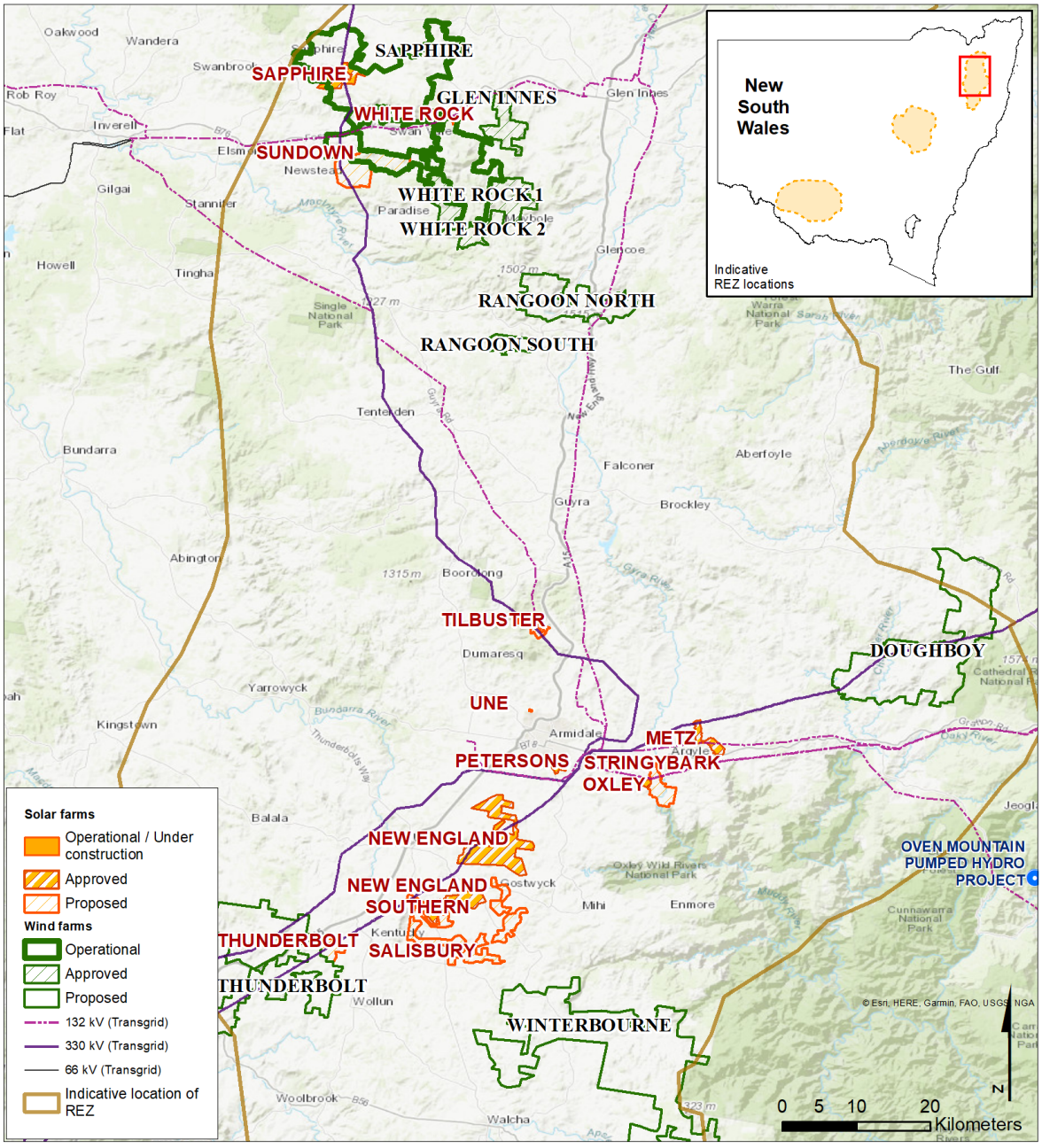

Figure 5.6 Current and proposed renewable energy projects in New England field work area

The corporate presence in NE REZ includes:

- Sapphire wind farm, operated by CWP Renewables, majority owned by Swiss-based private equity firm Partners Group
- White Rock Stage 1 Wind Farm and White Rock Solar Farm, initial development by Australian Epuron, then developed and operated by China-based CECEP Wind-Power Corporation (CECWPC) and Chinese company GoldWind
- Sundown Solar Farm owned by private Australian company Sundown Solar. Developer CWP Solar Pty Ltd
- Metz Solar Farm, initial development by UK and Netherlands based Infinergy Pacific, now owned by Arab Emirates-based FRV
- New England Solar Farm, owned by Hong Kong and Philippines-based UPC/AC Renewables
- Walcha Energy Project, consisting of Salisbury Solar Farm, partnership of Mirus Wind and Australian Energy Estate; and Winterbourne Wind Farm, original owner Australian Winterbourne Wind Pty Ltd, now majority ownership by Denmark-based turbine manufacturer Vestas
- Oven Mountain pumped hydro, owned by a small Oven Mountain project company in partnership with Hong-Kong owned gentailer Alinta energy

The earliest projects in the northern part of the REZ, now operational, have Power Purchase Agreements (PPA) in place – with ACT Government (Sapphire Wind Farm), and Origin Energy (White Rock Wind Farm). Landowners have full access to their grazing land on both these installations. The White Rock Solar Farm is in dual use, with the landholder grazing sheep in the robustly fenced area, which is also used as a lambing pen. Ownership is wholly or partly transnational, including Metz Solar Farm near Armidale, which is about to enter construction phase after achieving a PPA with Snowy Hydro 2.0. One project in the north, Sundown Solar Farm, has stalled, making no progress since initial application in January 2017, suggesting the Australian owner has not been able to achieve financing/negotiate a PPA.

Other projects in the northern and central parts of the NE REZ that have not yet moved beyond the first stage of the application process include two large wind farms: Rangoon Wind Farm, owned by Australia NZ company, Meridian Energy and Doughboy Wind Farm, owned by Australian Epuron.

In the southern part of the REZ, there are several large-scale developments. The New England Solar Farm is now in construction, having secured bank debt financing but not a Power Purchase Agreement.[105] The project has a strong presence in Uralla as a workforce hub and focus of community relations. The Winterbourne Wind Farm and Salisbury Solar Farm that are part of the Walcha Energy Project have initiated applications but are yet to submit Environmental Impact Statements. These developments are majority or wholly owned by transnational companies. The Oven Mountain Hydro Project is a priority storage project for the NSW government and is an announced State Significant Infrastructure

[105] Parkinson, Giles (2021b), 'Biggest solar and battery project in NSW to go ahead after landing debt finance', *RenewEconomy*, 11 February.

Development. The project has received ARENA funding and a pre-investment grant from the NSW Emerging Energy program (Mazengarb 2020).[106]

The battery/hybrid gas-battery storage projects of three other NE REZ operators – Goldwind, CWP Renewables, and UPC/AC Renewables – have received capital grants towards construction from the Emerging Energy Program. Three other pre-investment grants for pumped hydro and battery have been allocated in the NE REZ, to UPC/AC Renewables and Walcha Energy.

Large operators and proponents in NE REZ are located near the high-voltage transmission line and close to the Queensland border (see Figure 5.3 and Appendix 1, Figure A2). They have burgeoning plans for additional storage projects. The NSW government's alacrity in providing grants suggests that the companies have high expectations of dispatchable energy exports to Queensland via an upgraded interconnector soon (see Appendix 1: Figure A.2).

5.3 CONCLUSION

The operational generators as well as the approved and proposed projects in the two REZs are mostly located in the hinterland of small rural towns, where grazing and cropping are the major land use. While the areas of the REZs appear large, the competitive clustering of projects around higher voltage transmission lines and substations delimits a much smaller area of impact. This is particularly pronounced in CWO REZ.

Proliferation of projects in certain parts of the REZs and the least-cost principle for expansion of high voltage transmission lines will transform landscapes, in some areas much more than others. There is a lack of predictability in open access project development for the developer, and hence any new infrastructure with more certain access to the grid is likely to create further clustering of projects, depending on where the new infrastructure is located.

The corporations developing and operating large scale renewable energy in Australia are changing. There are new players including transnational energy companies and private equity firms. Their balance sheets or project finance resources are significant and can fund increasingly large and innovative generation and storage projects. For the community the frequent ownership changes, the accumulation of developments and possible construction of separate grid lines going to substations from installations creates uncertainty and lack of predictability.

Socio-economic changes are already acutely manifest in some places and are analysed in Chapter 6. The cumulative aspects of labile ownership patterns, operational uncertainty due to open grid access, and concentrated renewables development are risks for adverse responses to further development, which requires a strong regulatory climate that is inclusive of REZ communities.

[106] Mazengarb, Michael (2020b), 'NSW fast-tracks $1B Oven Mountain pumped-hydro project', ibid., 12 October.

6. Local perspectives on REZ developments

KEY POINTS

- While general support for renewable energy in NSW regions is high, opposition to individual projects can occur, and may intensify with increasing scale and density of REZ developments.
- The pace and sequencing of renewable energy developments is important for orderly management of community impacts and benefits, from prospecting to construction and operation.
- New legislation and regulatory instruments for SSDs and electricity infrastructure in NSW promise to improve favourable outcomes for residents but non-inclusive EIS and planning requirements for past renewable project rollout in rural NSW carry legacy issues of adverse community impacts that are a risk for future REZ development.
- Different groups of constituents experience different levels of impact, related to the power they have to influence project development, which is shaped by existing social differences and inequalities.
- Large scale developments in a local government area impinge on many council functions, but permitted overrides in the legislation and planning assessment regime for renewable energy SSDs do not appropriately recognize local government plans and concerns.

RECOMMENDATIONS

- There must be stronger processes for culturally appropriate consultation and inclusion of Traditional Owners and other Aboriginal residents in all aspects of REZ development including socially sustainable benefits and more robust protection of lands and cultural heritage.
- Engagement of Indigenous specialists to undertake consultation with Aboriginal residents and groups should be a requirement of the scoping study prior to SEARS, as well as the EIS consultation, action plan and accountability processes in the Development Approval.
- Assessment of cumulative impact of projects by individual proponents is both difficult and carries an inherent conflict of interest, and should be augmented by independent appraisal.
- A strengthened EIS review and monitoring process should be a central pillar of REZ development, to achieve optimal community engagement and development opportunities. Expectations of local communities and councils are likely to be high, and continuous consultation and improvement practices by planners are recommended as the new EIS and SSD requirements roll out.

Regional communities are very supportive of renewable energy and a large proportion of households and businesses have invested in it. Residents in regional NSW, like most of Australia, respond positively to questions about renewable energy, but when people are

confronted with the prospect of a renewable energy project nearby, the reality can be more complicated.[107]

Rural residents, motivated by the high cost of electricity, unreliable transmission and exorbitant diesel costs for pumps, have made themselves well informed about household and farm solar, and rates of installation are generally high. Battery storage is also increasing, and there is NSW government support to assist with home battery and solar purchases.[108]

Household and medium scale installation firms based in the larger towns have a good customer base. During our visits, mayors, development officers and planners proudly cited their council's rooftop solar statistics which can reach well above the NSW state average of 24.6%, and are part of well-established local government renewable energy scenarios for cost and emissions reductions.[109]

Large-scale renewables construction bring business to town. A council officer in a New England Local Government Area reflected:

> I'd say the overall impact on the community has been hugely positive. The town has gone from being really quite stagnant to quite vibrant. You know, we had a number of main street shops empty before it started, now you go down every day of the week and it's pretty lively.

This sense of new life and prosperity and a new industry can be linked with 'good jobs' that bring long-term residents, something smaller towns strive for but find difficult to achieve, as the council officer went on to explain:

> There's an engineering consulting firm who have just put on a permanent engineer who had been working around the wind farms, but now he's settled here with his family in a full-time job. So people come in from elsewhere to work for a while and some of them fall in love with the place and stay. It has been hard to attract those sorts of people in the past. We had the gaps and now we've got the exposure to fill them.

New employment that brings young families to settle in town is a benefit valued by the whole community. However, renewables development led by individual projects, their siting

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[107] A 2014 survey of NSW residents by the Office of Environment and Heritage found that there was high support (91%) for renewable energy electricity in NSW, while in a hypothetical scenario, support for local wind and solar farms declined the closer they were to respondents' residences NSW OEH (2015), Community Attitudes to Renewable Energy in NSW*,* Sydney: Action Matters for the Office of Environment and Heritage.. See also the IPSOS surveys Ipsos (2018), The Ipsos Climate Change Report 2018*,* November, Sydney: Ipsos, Ipsos (2020), The Ipsos Climate Change Report 2020*,* November, Sydney: Ipsos.

[108] Natural Solar (2020), *The Empowering Homes solar and battery Program supported by the NSW Government has been expanded today to include 15 new regions, and 204 postcodes across NSW*, Natural Solar, 1 March 2021 <https://naturalsolar.com.au/solar-news/empowering-homes-program/>.

[109] In some LGAs of Central-West Orana rates are especially high: Dubbo Regional Council 41.3%, Narromine 40.8 % and Warrumbungle Shire 41.5 % https://pv-map.apvi.org.au/historical#8/-31.644/149.300. In New England rates are lower with Inverell the highest at 30.4 % https://pv-map.apvi.org.au/historical#8/-31.130/150.254

decisions and diverse company policies, means that the course of each wind or solar project development creates variable impacts across a rural locale. Within each REZ, there are different experiences and issues, and sometimes only partial resolutions when conflict arises.

In this chapter we analyse the process of renewables development based on our field research. We start with the moments of arrival and negotiations over renewable energy site locations. This continues through the development application timeline and post-approval, focussing on the issues that arise in the process for residents and organisations in project localities.

6.1 ARRIVAL OF RENEWABLE ENERGY AFFECTS CONSTITUENTS DIFFERENTLY

Private companies develop and operate new renewable energy generation in NSW. They are driven by the logic of investment and market prices, and these considerations shape their initial contacts in targeted localities. The arrival of renewable energy to a rural locale looks different depending on who you are. For landholders, it might be a note in the letterbox, or knock at the door from a resource prospector or a consultant seeking initial discussion about a wind or solar farm site. For a local government official or councillor, it might be a report from the planning staff about recent interactions with the renewable energy developers. For a resident, it might be reading reports of a new project coming to town in the local newspaper or Facebook group, or even a metropolitan news source if the project is of significant size.

The developments bring new and novel infrastructure to rural land. In our experience, the following groups are key constituents in the planning assessment process that determines whether and how renewable energy will go ahead in a local setting:

- Landholders
- Indigenous groups
- Local businesses
- Town residents
- Local councils
- Natural resource and heritage managers
- Civil society organisations

Renewable energy developers engage with each constituent group both individually and collectively. The most intense individual relationships are the commercial negotiations between landholders and developers to lease or buy land for the siting of turbines or solar arrays. The primary collective relationships are between the developer and the state government, inclusive of local government authorities.

Each of the above groups have representative bodies in political and social life (e.g. NSW Farmers Association, Local Aboriginal Land Councils, NSW Office of Environment and Heritage, Chambers of Commerce, Local Land Services, Landcare, Rotary and other civil society organisations). Like all developments, large-scale wind and solar projects are

regulated. The NSW planning system is the main body mediating the impacts and flow of benefits from renewables developments.

6.1.1 'Salt and pepper' rollout

The arrival of utility scale renewable energy in the countryside presents a patchy picture reflecting the historical state of renewable energy planning and policy more generally as well as the vicissitudes of energy markets. Some local government staff, elected representatives and environmental consultants in the REZs referred to the renewable energy rollout as uncoordinated, or as 'salt and pepper'. One reflected:

> You would hope the Department of Planning at least, at a State level, would try and bring everyone together. But they don't seem to like to do that. … They don't like any problems, I think is probably the best way I can explain it. … I just don't know if they really understand the situation here – so many solar farms together.

This on-the-ground perspective on regional renewable project planning highlights why granular knowledge and coordination are needed.

The challenge of the salt and pepper pattern is compounded by the fact that different types of constituents experience different levels of impact. Part of their experience is due to their degree of power to influence where projects go and how they are developed. This power is shaped by existing social differences and inequalities.

6.1.2 'Big box' development has big impacts

Utility-scale renewable energy developments are big and getting bigger. Wind farms are much more extensive but less intensive; solar arrays cover much of the ground within a focused area whereas wind turbines are spaced out over sometimes very large areas. Wind and solar occupy different topographies. Wind farms tend to be located on ridge lands, solar farms on flat lands, so different types of grazing and cropping rural land are affected.

Renewable energy generators have local environmental impacts. A typical operational NSW solar farm of 100MW would occupy several hundred hectares of land, with around a million panels on ground-mounted steel frames concreted in place, and hundreds of inverters plus a main substation, access roads and other infrastructure. A wind farm may be between 3000 and 10000 hectares, most of which is fully available for agricultural purposes. The highly distributed footprint of the installation is typically around 100 - 150 square hectares: about one square hectare for each turbine or around three hectares per turbine when other infrastructure like roads and substations is included.

White Rock Wind Farm (owned by Chinese company Goldwind) was the first to be operational in what is now the designated New England REZ. Extending over more than a dozen landowners' properties, it has 175 MW generation capacity, with 70 turbines having a tip height of 150 m. The project also involves a 20MW solar installation, which also functions as a lambing pen due to the high-quality fences. Stage 2 of the White Rock development has been approved and will add a further 48 larger turbines.

White Rock has a typical layout, with turbines in linear strings connected to each other and to the adjoining substation via ground cables and access roads. Turbines are spaced a minimum few hundred meters apart to avoid interfering turbulence. The 'strings' of connected individual turbines are up to 10 kilometres in length and lead to the substation and transmission line, which, in turn, connects the project to the national grid.

The largest solar farm project in the two REZs we studied is New England Solar Farm (UPC\AC Renewables, a joint venture between UPC Renewables (Hong Kong) and AC Energy (Philippines)) near Uralla. It was approved in March 2020, with 720 MW capacity from 2.6 million PV modules arranged in rows, extending across 2000 hectares of former grazing land in three solar array areas. This is one of the biggest solar arrays in the state.

While industry-focused media reports of renewable energy celebrate the increasing scale and density of developments, residents in the vicinity may perceive them as an industrial transformation of the countryside, not necessarily welcomed by everyone. This is a perspective we heard numerous times in the field. Developers are aware of this, and frank about the communication task before them when they arrive in a rural setting. One wind farm community engagement officer told us:

> This is 'big box' construction. It's hard for people to imagine. There are major earthworks, and the scale can be a shock to residents of the district, like having your backyard bulldozed. This can create opposition, especially in the early stages. We have to work on community relations, lots of flyers and main street meetings. We host landowner visitors from other communities, they need to see what is involved. People seem to have settled down now.

This level of hands-on community liaison work is essential to the effective management of large-scale renewable energy projects.

The scale of renewable energy development means a large amount of electricity will be supplied to the grid, which is a collective benefit already appreciated by some. The spatial shift of generation to the REZ regions can be a source of pride. For example, one local councillor and landholder enjoyed the fact that inland NSW was becoming a net producer of electricity for the populous coast dwellers.

6.1.3 Prospecting and early negotiations can set the tone

The first important local impact of renewable energy is generally when commercial negotiations commence with landholders whose land is ideal for wind or solar development. Favourably located landowners are contacted by prospectors wanting property access agreements. Monitoring instruments may be erected and other surveys done.

Wind farm prospectors search for the best ridges where turbines can be built and solar developers search for well irradiated paddocks. All developers seek locations close to a favourably linked substation or high voltage transmission line.

Neighbours may only learn of these visits by word of mouth or chance observation. They are the second order of 'non-involved' or 'associated' landholders, in developer parlance, destined to receive lesser amounts or possibly no direct benefit from projects.

From the first stage of prospecting until financial close, it is a competitive situation. Where the energy resource is rich and transmission connection is easy, there may be several companies prospecting and approaching landowners. As some residents commented, the lack of coordination by public authorities at this stage can contribute to confusion and anxiety.

Solar farm projects are simpler negotiations from the start. They are smaller in area than wind farms which means the developer can often lease or purchase all the land that is required for the project from a single landowner.

In the case of wind farms a landholder may become confident they will host turbines and receive appropriate payments, only to be quietly dropped from the project. A developer may change the design of the project. For example, as turbine size and generation capacity increase, the developer needs less turbines to produce same amount of electricity.

A landholder can find out by indirect means that they have been dropped when they hear of neighbours attending meetings and commencing lease negotiations. As one landholder put it:

> We were not getting any more invitations to meetings or communications from neighbours. We just realised that we were no longer in the loop. It was a time of stress and uncertainty that affected the whole family, and I had a lot of ill-health. I have adjusted to the situation now but it was very hard at the time.

Inside the tent of well-placed landholders at potential wind farm sites, people may find they are cooperating with their neighbours well. They are usually required to not disclose commercial information with each other, but some report seeking forms of collective information sharing and negotiation with renewable energy developers at early stages. On the other side, renewable energy companies are careful to negotiate individual contracts with standard arrangements for payments that are tailored to fit the particular circumstances of each landholder. Payments and compensations are also necessary for hosting key roads, access points, transmission line connection and substation infrastructure.

Wind farm plans may take many months or years to finalise. The number, type or layout of turbines and other features of the design may change several times. Over long periods there may be a series of companies holding the project. There is plenty of scope for miscommunication and disappointment. Even at this early stage, people often express shock that a project proposal is underway nearby and they have not been consulted.

Changes and miscommunications surrounding initial commercial negotiations are crucial moments in the overall development process. There is a lot at stake in these early days of project development. Negative feelings can be a foundation for local action groups as well as alliances with external anti-renewable energy groups, especially well-organised wind farm opponents, who amplify the local antagonism. Bodangora, one of the earliest wind

farm projects in the CWO REZ, attracted substantial local opposition bolstered by visits and submissions by national anti-wind farm lobby the Waubra Foundation and prominent critic David Mortimer.[110]

6.2 DEVELOPMENT APPLICATIONS IN THE STATE PLANNING REGIME

Once the siting and associated commercial arrangements are in place, a renewable energy project moves onward to the administrative processes necessary for approval from the state government. In NSW the DPIE is the primary agency responsible for managing the impacts of renewable energy developments. This is the same planning regime that governs development of mining projects on rural lands, large housing and industrial developments and the like.

Utility wind and solar are currently deemed 'significant' under the state planning regime and dealt with as individual project proposals. In NSW, renewable energy projects over $30 million dollars' worth of capital investment are classified as State Significant Developments (SSDs), which in practice means all utility scale wind farms and solar farms over 30 MW. The Development Application (DA) process begins with the developer's initial consultations with DPIE, the issuing of the Planning Secretary's Environmental Assessment Requirements (SEARs) and the preparation of an EIS. The SEARs mandate wide consultation, including with relevant government authorities, service providers, affected landholders, local Aboriginal land councils and corporations, nearby residents and community groups.

Renewable energy EISs must address a range of impacts including: biodiversity, heritage (which includes Aboriginal heritage), land, visual, noise, transport, water, hazards and electromagnetic interference, and 'socio-economic issues'. Many of these requirements have policies and guidelines that must be followed. Socio-economic effects have been left largely undefined apart from construction workforce impacts.[111] The NSW DPIE's new Social Impact Assessment Guideline for all state significant projects will provide a more consistent and rigorous framework for consultation and actions.[112]

EISs are essentially management documents, in which a proponent is required to outline the justification for the project, its economic, social and environmental impacts in terms of potential risks and harms as well as benefits, and the ways any adverse impacts will be managed or mitigated. Developers contract the EIS work to large environmental consultancy firms, who produce the SEARs assessment reports and navigate with the plethora of government departments, civic organisations and individuals that are deemed relevant to the successful outcome of the development application.

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[110] For more information on organised wind farm opposition, see Chapman, Simon & Fiona Crichton (2017), *Wind Turbine Syndrome: A Communicated Disease* Sydney: Sydney University Press.

[111] NSW DPIE (undated-a), *State significant development: The SSD process, Explaining each step of the process*, viewed 2 March 2021 <https://www.planningportal.nsw.gov.au/major-projects/assessment/state-significant-development/ssd-process>.

[112] NSW DPIE (2021a), Social Impact Asssessment Guideline for State Significant Projects July 2021, Sydney: Department of Planning, Industry and Environment.

6.2.1 Local government: the 'small cog' in the state planning process

Councils are the most visible and important level of government for rural residents in NSW. The infrastructure, services and facilities that local governments provide are felt in all areas of daily life. Large scale developments in a local government area impinge on many council functions, relevant to land use, roads and infrastructure, waste, and other services. The planning system assessment process for SSDs does not however include a major role for local government. The consent authority for renewable energy major projects is the Independent Planning Commission, or the Minister for Planning.

Developers are not required to undertake any additional consultations in the renewable energy locality with councils or other local authorities during the initial phase of prospecting and negotiating land agreements. As different groups of residents become aware of the possibility of renewable energy projects in their area, they may seek independent information from local government staff. These personnel however may not have received any formal contact from the developer. One council officer told us:

> It can be difficult for us to handle these queries. We don't know much at the outset. … We are such a small cog in a big wheel.

A further example of marginality cited by some officers is the lack of mandated infrastructure contributions by renewables developers. Part 7 of the *NSW EP&A Act* requires some SSD developers to provide planning infrastructure contributions to host councils. Council officers commented to us on the perceived inequity that renewables projects are exempted, and on the higher value of benefits SSD projects like mining can bring to local government revenue, with contributions of up to one per cent of estimated project cost. These mandatory requirements also draw Councils 'into the loop' of negotiations with developers early on, which does not need to occur with the renewables projects.

Once the SEARs are issued, the developer is obliged to consult with the council that is hosting the development. But the scope of council authority is limited, and one officer commented:

> As renewable energy projects are SSDs, roads approval is really the only area that impacts us from a formal perspective.

Council submissions often request that the provisions of their own Local Environmental Plans (LEP) and Development Control Plans (DCP) be adhered to when the EIS shows breaches. Councils are well-placed to understand and advise on the cumulative impacts of renewable energy projects in their area.

However, each project is assessed individually, and council LEPs or DCP amendments to deal with cumulative or other impacts of renewables projects can be overridden by the SSD provisions of the NSW's *Environmental Planning and Assessment Act 1979* (NSW).

Mid-Western Regional Council, for example, objected to part of Beryl Solar Farm being built on R5 zoned land (Rural Residential), as such development is prohibited under its LEP. The developer, First Solar, responded that as a SSD, such development was permitted, citing

section 89(E)3, of the EP&A Act: "[D]evelopment consent may be granted despite the development being partly prohibited by an environmental planning instrument".[113]

Planning for cumulative impacts cannot proceed effectively in this project-driven system, as one council officer commented:

> A few years ago, we got concerned about the cumulative impacts of so many solar farm developments coming along at the same time. It's difficult to plan for that. It's really market forces when they get built, or don't get built.

Individual proponent responsibility for assessing cumulative impacts of their project, coupled with the SSD override of local government planning instruments, was viewed by some of our research participants as carrying inherent conflicts of interest. The planning department's new Cumulative Impact Guideline leaves assessment responsibility in the hands of individual proponents, while aiming to ensure that the assessment 'integrates decision-making on projects with decision-making on the broader strategic planning framework' and is an iterative process that 'informs further action at the strategic-level to reduce adverse cumulative impacts of other development over time' (NSW DPIE 2021, p. 8.). We recommend that these assessments would be further improved by an independent evaluation, based on expert appraisal of the proponent's baseline and other cumulative impact data and projections.

In general, we encountered a pervasive sub-text commentary among engaged residents as well as local authorities in the REZ localities. The substance was that insufficiently coordinated intersectoral planning and policy were not keeping up with the conditions of rapid renewable energy and infrastructure development, and that renewable energy's potential for local benefits for residents and environment was a low order of political priority.

6.2.2 Aboriginal cultural heritage consultation should be strengthened

There are specific requirements in every renewable energy SEARs for assessing impact of the development on Aboriginal heritage, through consultation with Aboriginal residents and organisation representatives, and archaeological surveys. Detailed guidelines for Aboriginal cultural heritage consultation and reporting, archaeological investigations, and a heritage manual, are attached to the SEARs.

Few individual Aboriginal residents are likely to be private landowners, and thus are not usually the focus of company prospecting and hosting negotiations. For purposes of EIS consultation, including archaeological surveys, a proponent must compile a list of Registered Aboriginal Parties (RAPs) by expression of interest notifications to Aboriginal organisations and relevant government agencies, as well as through local media. Any Aboriginal person or group may apply for RAP status, the criterion for which is the holding of 'relevant cultural

[113] First Solar (2017), Submissions Report: Beryl Solar Farm, Sydney: NGH Environmental, for first Solar., p. 52.

knowledge' of the project area, whether through ancestral connection or other personal or historical links.[114]

Consultants generally seek contact with the Local Aboriginal Land Councils (LALC).[115] The persistence with which consultants undertake other efforts at seeking expressions of interest is variable, and often deemed as superficial, judging by EIS submissions in different project localities over more than a decade. The following submission from the Dubbo Office of Environment and Heritage (OEH) for Photon's Maryvale Solar Farm is indicative of the concerns:

> OEH believes that adequate consultation with the local Aboriginal community has not occurred. OEH has a list of over 18 Registered Aboriginal Parties (RAPs) that represents individuals and Aboriginal organisations that may hold Cultural Knowledge relevant to this development. The proponent has only consulted with one of these RAPs, the Local Aboriginal Land Council (LALC). Within this particular Aboriginal community not all knowledge is held by the LALC members and not all knowledge holders are associated with the LALC. [116]

Aboriginal people or organisations who are not listed as a RAP may take paid work to assist with the archaeological surveys and other assessments of cultural heritage significance. Walking surveys of a percentage of the project site are carried out in the company of archaeological consultants, and finds are recorded and evaluated as to cultural significance, on the basis of which an Aboriginal Heritage Cultural Management Plan must be drawn up in agreement with the RAPs.[117]

In the long-settled rural areas of the NSW REZs, much Aboriginal heritage will have been destroyed, but when located, 'scar trees', burial sites, large stone tools or other significant places or objects require special attention for preservation. Objections to the EIS are generally expressed through bureaucratic channels such as submissions from the NSW OEH main and regional offices, or by presentations from Aboriginal Land Council or community members at a public hearing. Issues include criticisms of inadequate consultation procedures, the rigour and validity of the archaeological survey, extent of cultural knowledge of RAPs, the EIS assessment of the significance of objects, and the arrangements to be made for their preservation.

The EIS assessment process has inherent difficulties as the status of cultural knowledge and people who hold this knowledge may be contested, especially in locales where Aboriginal groups may have pre-existing bases of conflict, such as several divided LALCs or competing Native Title claims. The OEH consultation requirements tend to assume levels of consensus

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[114] For further information see NSW ALC (2011), Using the law to protect Aboriginal culture and heritage: culture and heritage: Consultation, Parramatta: NSW Aboriginal Land Council.

[115] There are 120 LALCs in NSW, under the aegis of the NSW Aboriginal Land Council, a statutory representative body established under the NSW Aboriginal Land Rights Act (1983).

[116] OEH, NSW (2018), Maryvale Solar Farm - Exhibition of EIS, Submission to Major Projects Planing Portal, Dubbo: NSW Office of Environment & Heritage.

[117] Developers are also obliged to avoid any sites or objects already officially listed as among NSW Aboriginal Heritage sites (AHIMS).

or agreement, in ways that may not reflect community dynamics. The large majority of EIS consultants are non-Aboriginal, and do not have cultural skills to understand and negotiate across these sorts of barriers for the Aboriginal cultural heritage assessment. The proponent may thus end up with a deficient assessment and long-term disputes with Aboriginal parties, which employment of skilled Aboriginal community liaison consultants may have prevented.

Ultimately, Native Title holders or claimants, or NSW Land Rights holders have no power to stop a major development on their lands, only to make submissions to consent authorities if they oppose the development.[118] Land Use Agreements can incorporate various forms of mitigation or compensation, which may or may not be satisfactory to all rights holders. In NSW, the successful major project applicant will receive an Aboriginal Impact Permit under section 90 of the *National Parks and Wildlife Act 1974*. This permit, which permits 'impacts' (such as relocation, removal, or damage) may be granted by the consent authority with or without the permission of the Traditional Owners or land rights holders concerned.[119] In worst cases, this weakness of legal rights, which is mirrored in some other state jurisdictions, can cause much anger and suffering for Indigenous residents in major project locations, and requires remediation by all governments in Australia.

6.2.3 Community consultation and involvement

'The community' and 'community groups' have been loosely defined concepts throughout NSW planning documentation. The exception to this is the requirement for assessing 'heritage issues', which subsumes 'likely Aboriginal and historic (cultural and archaeological) impacts of the development' as discussed above, and for which there are multiple guideline and procedures documents.

There has been limited necessity or opportunity within the EIS framework for consultants to undertake targeted consultation to facilitate beneficial outcomes and minimal adverse impacts for an inclusively defined local community. For example, outcomes for Aboriginal residents have rarely gone beyond mandated cultural heritage considerations despite the socio-economic disadvantage of this group.

The NSW Government's Electricity Strategy[120] outlines a prominent role for community engagement and local development opportunities as a beneficial outcome of the REZ planning. These are broad brush statements that typically have become translated, in the current planning system, via the DPIE Secretary's Environmental Assessment Requirements (SEARs), into a set of requirements for individual projects. New instruments for the REZs such as merit criteria in project selection and a separate fee to be used for community purposes, as well as the Social Impact Assessment Guideline[121] create possibilities for more socially sustainable outcomes.

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[118] O'Neill, Lily, Brad Riley, Ganur Maynard & Janet Hunt (2020), 'Why most Aboriginal people have little say over clean energy projects planned for their land', The Conversation, 10 August.

[119] NSW Parliament (1974), National Parks and Wildlife Act 1974, Sydney, Act no. 80.

[120] NSW DPIE (2019), NSW Electricity Strategy: Our Plan for a Reliable, Affordable and Sustainable Electricity System, Sydney: NSW Department of Planning, Industry and Environment.

[121] NSW DPIE (2021a), Social Impact Asssessment Guideline for State Significant Projects July 2021, Sydney: Department of

6.2.4 EIS: critical but hard for locals to engage

The renewable energy major project assessment process is co-ordinated by DPIE officers, and the approving body is usually the Independent Planning Commission (IPC). From local residents' and organisations' perspective, the EIS is the key element of the assessment. After the initial prospecting and landholder option agreement phase, the process of completing the EIS can vary from less than one year to several years. The costs for the complex array of consulting firms, technical expertise, agency liaison and community outreach are high. Some projects collapse at this stage.

The community consultation procedures that consultants follow in the preparation of the EIS include information dissemination on websites and by email contacts, social media, door-knocking and letters to landholder neighbours, local media ads, public information days, brochures, and presentations to local clubs and organisations.

In contrast to developers' early direct contacts with landowners in the vicinity of the project site, much EIS consultation relies on the relevant individuals or groups responding to the messaging, a challenge for residents focussed on the all-consuming tasks of agrarian production or community obligations, especially in severe drought. So it is not surprising when objections later emerge from individuals and groups who feel they have not been adequately consulted and are 'in the dark' about the impacts of a project. Dissatisfaction with consultation is one of the most common public objections, as in the following submission to the Beryl Solar Farm EIS from a Gulgong landholder:

> [T]he Proponent has failed to ensure that all relevant persons have been adequately notified as to the proposed development.
> Rationale: A key point of the SEARS was to obtain a "Social Licence to Operate" from the local community. It has become obvious that the notification process has been inadequate. A number of affected residents have not received letters claimed to have been sent, others considered the "Dear Resident" addressed letter from a solar company to be junk advertising mail and were discarded, some were not able to attend a one off meeting organised on a week day and during work hours and none have been given the opportunity to participate in a "Community Consultative Forum" as other similar projects have established this to ensure that as many people as possible are fully informed.[122]

The EIS is put on public exhibit, and submissions from the public and organisations (which include NSW Government departments, statutory bodies and Councils) are called for. The NSW Planning Portal for Major Projects provides a full and easily navigable archive of public documents relating to the EIS and other documents relevant to the determination for every SSD.[123]

Planning, Industry and Environment.

[122] In its response, the First Solar outlined the extensive schedule of consultation it had undertaken, and no 'mitigation measures' were suggested. First Solar (2017), Submissions Report: Beryl Solar Farm, Sydney: NGH Environmental, for first Solar.

[123] NSW DPIE (undated-b), *Assessments: State Significant Development* Department of Planning, Industry and Environment, viewed 1 March 2021 <https://www.planningportal.nsw.gov.au/major-projects/assessment/state-significant-development>.

EISs are huge documents with a main report of several hundred pages and many appendices. Generally, 28 days are given for the public exhibition, which frequently arouses critical comment in the community due to the length and complexity of documentation, as well as access problems. If there are sufficient protests, the period of exhibition may be extended.

Some rural residents live in telecommunication 'black holes' so online access is impossible, while others are limited users of internet, so the availability of hard copies can be a vexed issue. Complaints about proponent unresponsiveness to requests for extra hard copies in public facilities are not uncommon and can add weight to general dissatisfaction expressed about proponent commitments to the community.

Submissions are classified by DPIE officers as 'object', 'comment' or 'support', and the proponent is required to respond to all submissions. Some projects attract dozens or even hundreds of local objector submissions, over 'hot' issues like road changes and traffic flow, transmission lines and substation locations, loss of productive rural land, or proximity and visual prominence of solar panels and turbines.

If sufficient submissions are received, or the project is judged to have significant opposition, a public hearing is conducted by an IPC panel.[124] There is wide public notification of the hearing, including local media ads and contacts with all parties who made submissions. Where there is significant opposition, these hearings can extend over a couple of days, with large public audiences, a plethora of technical experts on both sides, and strongly felt expressions for or against the project from individuals and group representatives. Hearings can be very emotional events for residents both in favour of and in opposition to a project.

The IPC writes a public report from the hearing, and this is considered along with all the other evidence when making the determination on the application. The determination of the EIS is an iterative process and proponents may continue to revise it but there is little opportunity for residents to have input into the process after the submissions and any public hearing. As the *EII Act 2020* (NSW) has expanded the anticipated scope of socio-economic benefits of renewables development, it is likely and highly desirable that project assessments will become part of more highly integrated planning frameworks and more inclusive of community participation (as indicated in the new Social Impact Assessment Guidelines).

6.3 POST APPROVAL – THE FINANCIAL CLOSE TO THE BUILD

Obtaining a development approval is not the only consent needed for a wind or solar project, but it is a key milestone in the permission process. Moving towards the build, companies have a lot of further negotiating work to do with regulators, transmission companies, financiers and contractors.

Our analysis of the project data we collected from NSW shows it is very common that the ownership of a wind or solar farm will change many times during the lifetime of the project.

[124] Some major projects have two public hearings but this is not usual for renewable energy projects.

Renewable energy projects are most often set up with a so-called 'project company' structure, where a single wind or solar farm forms its own company as a subsidiary of the parent company, to enable versatile ownership and financing arrangements, or to facilitate future on-selling of the project. Developers may sell a project after securing approval, before the building and operating phase, while others sell after construction, and some continue as an energy operator.

Corporate ownership arrangements can be a factor in how REZ residents experience the renewable energy process, and there is much comparing of the merits and demerits of different companies across projects, and in the different stages, where ownership changes. The discontinuity of relationships formed during the development application phase may sometimes come as a surprise to hosts and other residents, and new owners may find it challenging to uphold the promises and shared understandings agreed with the previous owner. New owners do not always put in the same effort in trying to establish local relationships, especially if the project is already in or near operation phase, which can in turn lead to disappointment and disengagement among residents.

Moving from development approval to construction has been tricky for renewable energy developers in NSW, and across Australia, in the context of regulatory uncertainty. There is often a period of a year or more between the approval and construction start while the company secures financing, waits for a grid connection, signs an Engineering, Procurement and Construction (EPC) contract, and finalises plans. Residents may experience this period as a hiatus with uncertain outcome. Landholders with contracts may be anxious to see construction begin, while neighbours unhappy with the development maybe be waiting and hoping the project is not realised. For the companies it is a period of high-pressure activity but this is not visible at the site. Financial close can be hard to attain, with uncertain grid connection circumstances, a short-term contracts market and highly volatile electricity prices.

Engaging in reverse auctions on the electricity market and securing PPAs for all or part of their energy generated, is a common precondition for financial close especially for smaller companies. Large companies with balance sheet financing may not be so dependent on these arrangements. Some projects do not make it through these hurdles, and are 'mothballed' for indefinite periods of time. Public knowledge about changes of ownership and defunct or mothballed projects can contribute to people's perceptions that renewable energy is not a sustained or reliable form of economic development for the area.

6.3.1 Community engagement in the pre-construction phase

As projects move into construction phase either with the signing of the EPC contract with a lead contractor, or tendering separate construction packages, they make renewed efforts at community engagement. It is important for the owner and the construction company to get broad support for the changes taking place by building or renewing relationships and securing the social licence to operate. This is a timely moment at which to set up an office in town. One community engagement officer explained:

> In the early phase of the build we set up a shopfront in town. There was lots of contact with people who were concerned about the wind farm, wanting basic info.

> Some were quite alarmed. We had a lot of info on our website, but locals responded to 'seeing things', especially the turbines coming in. Lots don't use or even have access to internet. Then as the build advanced, people saw all the construction, and we got more enquiries about jobs.

Some companies are more appreciative than others, in both consultation stage and pre-construction, of the limited internet and email access and usage in many rural areas and the extent of transmission and telecommunication disadvantage that exists. Undertaking improvements in these important amenities can be an important way of winning residents' acceptance of the project. Shop fronts, face-to-face meetings, local newspaper ads, and mailed newsletters solidify the company's presence during EIS consultation and pre-construction, when interest in job opportunities will be high.

Construction is a complex phase of project development, with benefits and opportunities as well as disruptions and divisions in host communities. These aspects will be discussed in Chapter 7.

6.3.2 Normal operations

An operating wind or solar utility is an understated affair. Most of the activity is away from sight, set on private property. Workers come in and out over the day much as for other farm activities. Each wind farm utility will have a site headquarters, which is likely a demountable building where up to a dozen staff may work across the day. They will move across the land undertaking different forms of maintenance, observations, and groundskeeping. We had three visits to wind farms in our study, two with a tour of operations from staff. We also viewed solar farm sites, sometimes with landholders talking us through their experiences.

After construction, the normal operations of renewable energy projects are not labour-intensive. Solar farms are smaller employers of operations staff than wind farms. Perhaps one staff member will be routinely on site for a 50-150MW solar farm, or nearby if they are assigned to multiple installations (which was the case for one small solar farm we visited). Ground maintenance workers also visit regularly. Wind farms may employ several full-time staff as well as technical maintenance crews that cycle through. Local services and suppliers are called upon as needed. As the MW capacity of both wind and solar farms increases, the number of workers increases proportionately.

6.4 CONCLUSIONS

When analysed as a phase of industrial and economic development, rural and regional stakeholders have had mixed experiences of the renewable energy rollout in northern and central west NSW. Major investment in the regions is welcomed, as is the prospect of a renewable energy transition. The economic benefits are tangible, but flow unevenly and it becomes apparent that the wave of project construction may not bring the sustained economic growth that politicians announce but may bring other unwelcome impacts. In the next chapter we look more closely at the patterns of opportunities and impacts that residents are experiencing in the renewables rollout.

7. The uneven flow of benefits and unexpected impacts on communities

KEY POINTS

- Large-scale renewable energy brings diverse benefits to communities that are welcomed by many locals whether or not they stand to receive direct financial rewards.
- The economic benefits and potential harms of renewable energy developments are not distributed equally across a host locality and this unevenness can become a cause of dissatisfaction and conflict.
- Host landowners receive substantial financial benefits that can diversify and 'droughtproof' farm enterprises.
- While all major development projects can have negative effects, renewable energy projects in REZs face particular challenges of cumulative impacts from concentrated and intensive development in rural localities.
- Community members most likely to oppose developments are non-hosting landowners nearby or other residents who anticipate or experience adverse impacts without expectations of benefits.
- Wind farms are more likely to energise organised opponent groups but solar farms sited in sensitive locations for locals can also be highly contentious.
- Successful outcomes during construction depend on strong regulatory accountability and a proactive problem-solving approach by contractors to deeply felt local concerns about adverse impacts including disruption to tourism, property values, damage to environment, cultural and Aboriginal heritage, change to loved landscapes, and physical harms such as noise, dust, road deterioration and traffic congestion.
- Project construction employs significant numbers of workers for short periods but makes a limited contribution to ongoing employment and skills development.

RECOMMENDATIONS

- We support guidelines developed by NSW DPIE,[125] Clean Energy Council,[126] and RE-Alliance,[127] for community engagement and benefit sharing.
- State governments and developers should coordinate the timing of all generation and transmission projects across a REZ in order to minimise adverse cumulative impacts of construction cycles and intensive development.
- Government agencies should integrate their roles phasing and coordinating rollouts to maximise socio-economic equity outcomes and minimise disadvantage and division in host communities.
- NSW Electricity Infrastructure Roadmap goals for REZ communities require more proactively planned and better resourced government-industry-community partnerships in REZs to build sustained growth in local economies, better social equity outcomes and enhanced resilience in pandemic or other adverse conditions.

[125] NSW DPIE (2021a), Social Impact Assessment Guideline for State Significant Projects July 2021, Sydney: Department of Planning, Industry and Environment.

[126] Lane, Taryn & Jarra Hicks (2019), A Guide to the Benefit Sharing Options for Renewable Energy Projects, Melbourne: Clean Energy Council.

[127] RE Alliance (2021), Community Benefits Handbook: How Regional Australia Can Prosper from the Clean Energy Boom, Bungendore: RE Alliance.

Renewable energy developments have a positive economic impact on communities because they bring business to towns and income to farms. Governments are likely to tally up all the economic benefits of REZs as public policy positives. Our research, however, indicates that the unevenness of the flow of financial benefits can turn what is ultimately a good thing into a cause of dissatisfaction and division in local communities.

The primary local beneficiaries of REZs are the landowners who host solar, wind and battery installations. They will receive secure income for 20 years or more from this infrastructure. Interviewees told us how renewables can diversify income and 'drought proof' a farm.

Neighbours, however, may get no income, for reasons that are beyond their control. One question for governments is how to regulate the flow of financial benefits to reduce the inequity between those who earn income from renewables and those who miss out.

At the same time that renewable developments have clear financial benefits for landowners, there may be negative impacts such as construction disruption. The economic 'hit' of the construction phase, which is good in theory, can also have negative impacts on local economies. Our research strongly suggests that planners and developers must carefully coordinate and manage the entire infrastructure build in REZs, from the early communications with potential hosts to the phasing of projects as well as the flow of financial benefits.

If governments do not carefully coordinate REZs they will find that negative impacts will accumulate but positive benefits will not.

7.1 SETTING THE SCENE: 'DROUGHT PROOFING', LONG NEGOTIATIONS, COMPLEX IMPACTS

The income that renewables developments provide to landowners can be critically important for them. Not all landowners decide to sign up to host solar or wind infrastructure. Even those that do may experience negative impacts. The process of negotiation itself is generally long, complicated and unpredictable. The economic stimulus provided by renewables developments can have positive or also unexpected negative consequences on local communities.

7.1.1 CASHING IN AND OPTING OUT

Signing a contract with a company to host wind turbines, solar panels and associated infrastructure means a steady income for 20+ years with no risk or investment in a fixed asset.[128] Those whose properties are selected for a renewable energy installation are the biggest 'winners' in the REZ in terms of immediate and long-term economic benefits.

> The prospect of establishing solar production on our farm alongside grazing is exciting. Farming families need to drought proof their farms through diversification.

[128] We learned of one proposal by a group of host landowners to secure profit-sharing agreements, based on the amount of MWh sold in the electricity market, as an alternative form of hosting payment to the standard MW installed capacity, but this was unsuccessful.

> It means we can secure the future on the land for our children and help the move towards a zero emissions target.[129]

Individual landholders can lease or sell to solar and wind farm developers. In the case of leasing, this means they capture most of the rent from renewable energy. This rent can aid farm-level productivity and investment. Like having a household member engaged in wage work, it is a farm-level form of economic diversification.

Landowners hosting 5 or 6 turbines and some infrastructure may receive well over $100,000 per year depending on turbine size and quality of the site for generation. One landowner told us:

> You feel pretty happy when that quarterly payment comes in. It saves a lot of financial worry especially as it's been so hard with the drought in the last few years.

Landowners talk about renewable energy payments as 'drought proofing' their properties – there is cash to buy feed for animals, make repairs, pay the bills, and invest in improvements. Project installation works often improve infrastructure. A wind turbine host whose property had extensive road and fencing improvements said:

> I've got good roads now. I can get around the property much easier and see parts of it I hardly knew. I've got much better fencing and gates, and the maintenance workers are good. They leave the gates exactly as they found them.

When the researchers were mingling with participants after a community forum on renewable energy, one farming couple expressed a common sentiment: 'We came because we want to find out how to get some [turbines] too'.

Not everyone who gets the deal is happy with it. One hosting landowner couple told us:

> We're moving into a house in town. It was hard during construction but even now it's operating we can't live with it. The land is so different, roads and cuttings and levelled ground. And there's a lot of traffic coming and going. It's not peaceful to live here, it upsets us. We won't sell up, we need the income, but we don't want to live here anymore.

These landowners are fortunate in that they can reap the economic benefits of hosting while avoiding the disruption of construction. Many farmers in REZs have multiple landholdings that can be quite scattered. They may live on another property, or in a nearby town, where schooling, partner's work and other amenities are more accessible.

Negotiations with hosts for options agreements, then a lease contract, can be lengthy and complicated, especially for wind farms where the geographic spread can impact on many agricultural functions. For example, if turbine placements interrupt aerial work, spraying, or remove air strips, companies will pay for the extra expenses for planes using another strip,

[129] Croft, A (2019), Submission support: New England Solar Farm, Sydney: NSW Department of Planning, p. 8.

different routes and more fuel. There are lots of 'fine scale farm management' negotiations, such as negotiation on types of fencing and gates, some of which must be done with neighbours with whom hosts already have cooperative arrangements in place. Negotiations for solar farms are often simpler due to the smaller area of land which means there may be only one landowner involved.

We encountered one group of landholders with properties covering a large turbine cluster who undertook collective negotiations with the developer and secured some advantages particularly over the standard and siting of infrastructure. In general, these landholders were satisfied with their collective negotiations, which did not include discussion of payment amounts, which the companies keep as confidential negotiations.[130]

There are landholders who reject the opportunity to host. State governments do not force landowners to accept renewable energy developments in the way they do with petroleum or other minerals, which are subsurface and thus Crown assets.

In NE REZ, a residential religious community declined to host turbines for the Sapphire Wind Farm, and the company rearranged its proposed layout accordingly, removing all turbines from the property. Even with solar farms, developers may redesign or relocate panel arrays and other infrastructure when the landholder imposes limitations as part of negotiations or other residents raise concerns. Companies discover such issues during early notifications, as part of hosting negotiations or through submissions to the EIS public exhibition.

Developers must negotiate an Indigenous Land Use Agreement (ILUA) when the land is subject to a Native Title claim, or is held under Native Title. Commercial dealings with Local Aboriginal Land Council land held under the *NSW Aboriginal Land Rights Act (1983)* must be approved by the NSW Aboriginal Land Council. There have been no ILUAs or other land agreements to date with renewable companies in NSW. Future project sites are likely to include Aboriginal lands as density of REZ development increases.

7.1.2 The downsides of the construction 'hit'

The most visible and broadest economic impact of utility-scale renewable energy is the wave of construction that brings temporary labour and commerce to rural and regional towns. Most residents and local government personnel we spoke to recognize the stimulus renewable energy developments can provide for local economies, in both the town and the countryside. The extent of the benefits, the disadvantages that may accrue, and the prospects of renewable energy leading to long term economic growth that regional areas so badly need, are subjects of considerable debate.

The construction phase of renewable energy and other large-scale projects in a predominantly rural region, sometimes referred to as 'the hit', has an immediate economic impact. EPC contractors organise much of the construction workforce and arrange

[130] From the developer perspective there are many reasons for confidentiality. Some companies offer different sums per turbine to different land holders on the same project, although this is seen as bad practice in the industry. Another reason is the difference between projects – some projects just are better than others so there is more leeway in the negotiations. In some areas there might be a competitor that has to be outbid, and the older projects get often less money (lower turbine size and hence less generation). There has been also a trend towards rising rent levels.

accommodation and amenities, which are sometimes spread across several rural towns. Most project construction requires dozens to hundreds of workers for periods varying from several months to a year or more.

Companies and EPC contractors usually have some guidelines for employing local workers and tradespeople. For example, electricians and mechanics 'with entry level qualifications' in the project district are often recruited, one project contractor explained. Recruiting locally can be cost efficient and may contribute to good community relations. However, these initiatives may backfire when locals blame the construction projects for loss of essential services, as those qualified take up much better paid jobs on renewables projects. 'You just can't get a mechanic to come out to the property any more to repair a tractor', one farmer complained to us. 'They're getting big money on the wind farms.'

Local workforce size and capacity for the range of renewable industry jobs available may be limited, especially on larger projects at peak times in the construction cycle. Residents seeking work may not have the industry tickets, and if training opportunities are not quickly made available or have not been planned for, they will be ineligible for jobs. There was considerable frustration expressed to us by a range of interviewees from mayors to council staff to business organisations regarding lack of accessible training programs to qualify local workers, especially in disadvantaged groups, for renewables employment.

Construction sub-contractors often employ their own work crews that move around from build to build. In CWO REZ for example we spoke to a security guard at solar farm construction site who was a fly-in-fly-out worker who lived in another part of the state and moved from one project to the next with the same employer. He was happy to have this contract and satisfied with the conditions.

The tight deadlines and challenges of fast and flexible recruitment for projects means that even contractors using less skilled labour may bring their own crews. However, it should be noted that this is still additional employment created by renewables construction. These jobs usually offer some basic construction tickets and longer-term contracts for workers. Even if they do not live in the construction locality, they are often recruited initially for construction projects in other non-metropolitan regions, and thus add value to regional economies and communities.

The benefits to hospitality and retail businesses in the smaller towns are tangible. Renewable energy developers can gain much good will from this economic stimulus, even if short-term. As one town worker commented,

> [Renewable energy companies] are very keen to keep a good name in the community. The workers would fill their vehicles in town before they left, or they'd get local caterers, or they'd sponsor local activities, that sort of thing.

There is a boom in casual work for the locals: motels are fully booked, pubs well-patronised, cafes expand into catering, and supermarkets put on extra staff. Main streets depleted by drought can feel busy again. This was the experience in Inverell in the New England Highlands. A local chamber of commerce member hypothesised that the consecutive

developments of Wind Rock and Sapphire Wind Farms 'masked' the economic effects of the drought. *The Land* rural newspaper reported similarly on the impact of two wind farms under construction to the west of Glen Innes:

> [T]here are so many incredibly large deliveries passing through town that the state highway patrol has booked four rooms at the Central Motel for the duration of construction, according to hotel manager Wanda Kelly. Next door owner of the Great Central Hotel Tony Hills says the new wave of men in hi-vis has delivered a 10 per cent lift to his business.[131]

However, such opportunities do not go far towards solving the problems of skills training and lack of long-term employment especially among youth and Aboriginal residents. Those personnel tasked with promoting economic growth do not view the construction hit as sustainable economic development. One officer commented:

> I think the real issue around renewable energy is the [construction] hit, and managing the hit in your community. It's a huge peak in terms of the labour and the work that's generated during construction. And then it drops down, you know, it might drop down from 40 to 2 for a solar farm, and that's not sustainable. That's not regional economic development, it's not lasting.

Other sectors are seen to provide more economic opportunity, although not without problems to be managed:

> If you have a choice of a renewable development or a coal mine moving in, the coal mine will probably make more money, bring more economic stimulants to the town. But I think it will bring a lot more negative social impact as well.

7.1.3 Economic benefits are hard to capture

Business opportunities in renewables development can be limited by the small scale of enterprises at the level of local government and surrounding districts. Wind and solar developers have worked through the Clean Energy Council to develop a guideline for companies. The Best Practice Charter for Renewable Energy Developments, endorsed by 48 companies, includes a commitment to 'providing local employment and procurement opportunities wherever possible'.[132]

Project contractors seek out local suppliers where available, governed by procurement guidelines and cost efficiency considerations, as well as the encouragement of councils and town commerce organisations. This can provide a welcome opportunity for expansion for some businesses. One council officer related to us:

> We encouraged local businesses to go out and gear up to for the new work. Some did, some just didn't have the capacity to work in that larger business field. The local

[131] Brown, Jamie (2017), ' Wind power divides local community', *The Land*, 24 July.

[132] CEC (2021), *Best Practice Charter for Renewable Energy Developments*, Clean Energy Council, viewed 21 October 2021 <https://www.cleanenergycouncil.org.au/advocacy-initiatives/community-engagement/best-practice-charter>.

> crane hire firm, they've bought additional plant and got a lot of work out of the project. They've continued to expand on the back of it and picked up other larger projects.

He went on to explain that construction also stimulated economic diversification for farmers and other small-scale ag businesses:

> A lot of earth moving contractors were engaged out there. Quite a few locals bought water carts to supply. A lot of them have got other businesses – they might be farmers; they might be rural shed builders. They're operating in that sort of local commercial and agribusiness environment.

He noted the opportunity for new council enterprises to step up to fill gaps in essential supplies when developers are ill-prepared.

> Wind farm engineers can be very slow off the mark in terms of actually making sure that the build can be resourced. They progress to a point where the project has to proceed and then it's panic stations and they have to get stuff or the project's going to fail.
>
> One of the issues that our council saw coming with the wind farms was that they hadn't planned their resourcing well and we could see that they had a huge demand for aggregate products and there wasn't a quarry big enough in the region that had the approval limit big enough to supply that need. Gravel supplies have to be locally sourced, it's just not economical to freight. It would sink a project. So we purchased an existing local business [and expanded it] and we're running this quarry and will be converting it into our town water storage.

In preparation for the intensifying REZ development, there will be a need for multiple government agencies to have a more integrated role phasing and coordinating rollouts that prioritise sustainable growth and social equity outcomes in high impact localities. This should be part of cumulative impact assessment, where planning instruments are in step with local government, training providers, and developers. Accessible delivery of training for worker accreditation, job-ready programs and business development is a prerequisite for sustainable employment growth that can extend beyond the construction hit.

The restrictions imposed by the Covid-19 pandemic have given additional urgency to the need to build employment and business capacity in project localities, as mobility of workers in NSW and other states has been restricted. This has limited the availability of fly-in-fly-out and drive-in-drive-out workers who commute interstate and across regions for intensive periods of shift work. It is likely to be a recurrent phenomenon and is a significant impediment to construction progress and a cost burden on developers. Those developers who maximize local employment and capacity building are advantaged in this situation. Government-industry-community partnerships that build sustainable local economies and better social equity outcomes in the REZs will enhance the resilience of renewable energy transition in pandemic or other adverse conditions.

7.2 MANAGING CONTESTED IMPACTS

Like all developments, wind and solar farms create a set of changes that may be contested. The relationship between renewables projects and existing economic, environmental, heritage and amenity values can trigger intense disputes but also create new benefits.

7.2.1 Conflict with tourism

Many small country towns and villages capitalise on local natural attractions and historic heritage to sustain local enterprises. Small operators conduct tours and nature-based sport and recreation, or run museums, cultural festivals and retail shops from these towns, capturing international tourists, backpackers, 'grey nomads' and other travellers and outdoor activity enthusiasts. Local councils and civic organisations are actively involved in many of these initiatives.

The arrival of a renewable energy project can be perceived as a serious disruption to tourism businesses, due to negative landscape impacts during construction (dust, traffic congestion, noise, earthworks and unsightly infrastructure or scarring of the landscape) as well as visitor accommodation and hospitality services taken up by temporary workers. The Beryl Solar Farm, discussed below, is a notable example. Tourism-related businesses judged that it would devalue the local heritage experience and threaten their livelihoods, so they were prominent in a resident coalition to fight against it.

Productive negotiations do occur. We encountered one example of cooperation between a council, the construction companies for the White Rock and Sapphire wind farms, and tourism operators in the New England town of Glen Innes, where the annual Australian Celtic Festival was threatened by lack of accommodation due to construction worker bookings. The council infrastructure officer related to us:

> We get about 4000-5000 people that come for that, for a week. So, we flagged that with the wind farm construction companies ahead of time. We said "You know, we really don't want the town booked out for that week. Any chance you can take a break? Send the blokes for a holiday?" And they said "Yep, no worries, happy to do that."

Such arrangements, negotiated during EIS consultation, can avoid disruption of visitor focussed events and activities that sustain local businesses. If renewable energy is seen as a threat to established businesses that depend on visitors, this becomes a threat to the social licence of the emerging industry and REZ delivery.

7.2.2 Neighbour discontent

The community members most likely to become discontented tend to be 'non-associated' or 'non-involved landholders' and other residents who feel adversely impacted and receive little or no financial benefits. The vagaries of topographical variation and transmission grid access can seem cruel to some landholders who miss out on the income flow or land sale from hosting renewable energy installations. If early contacts or plans are careless this can sow the seeds of long-term community strife.

Wind farms are more contentious than solar farms, because the turbines are visible and audible at a distance. Our interviews, and content of public submissions to EISs, indicate that immediate neighbours are the residents most likely to see themselves as big losers, especially in the case of wind farms where the geographic extent means there can be a large number of immediate neighbours. They are not benefitting from substantial host payments or a lucrative property sale, but are disrupted by many months of construction, and anticipate adverse impacts including on property values long term. Antagonism towards non-residential hosting neighbours, who get the income but not the disruption, can be intense in these situations.[133]

Attempts by developers to downplay any decline in property values and landscape amenity in targeted sites are badly received. The Glen Innes Wind Farm has been in the development application process since 2007, owned by Nexif Energy Australia Pty Ltd. The project is located 15km to the west of Glen Innes, in the Furracabad Valley. In the 2008 EIS, the proponent found little scenic value and low value of 'overgrazed land', eliciting strong objections from residents such as Respondent C9:

> The [proponent has] significantly downplayed the rural visual amenity of the Furracabad Valley. The Environmental Assessment implies that the … area may have some "degree of attractiveness, (false - it has a high degree of attractiveness) even where it is subject to overgrazing (false – no overgrazing) and can exhibit character and beauty for some viewers." (False - All viewers).

The Proponent could only reply that the valley is 'undoubtedly a pleasant rural setting' but had no National, State or Regional classification of 'high scenic value'.[134] Such missteps by developers do nothing to quell the property valuation anxieties of residents and set the whole project on a wrong footing from the start.

We spoke to neighbours of other projects who described themselves as 'left out of the loop' after initial developer contacts and who were derisory about 'neighbour payments'. They said that the few thousand dollars per annum that some companies pay cannot allay negative feelings that develop, both among residents, and towards the developer, who may be accused of tokenism and disrespect during the entire development process.[135] Two neighbours wrote in their EIS objection:

> [The developers had] plans for the wind farm well underway before they held their Open Days …, and before we understood the magnitude of what this development would mean to us and our future. In hindsight, we now know the host landholders were all aware of what was going on, but we as adjoining neighbours were 'left out

[133] The annual reports of the Australian Energy Infrastructure Commissioner (previously the Wind Farm Commissioner) document many of the community-based complaints that arise in relation to wind farm siting and construction. See, NWFC (2019), Annual Report of the National Wind Farm Commissioner, Canberra: Office of the National Wind Farm Commissioner, Commonwealth of Australia.

[134] Aurecon (2009), Glen Innes Wind Farm: Submission Report, Aurecon for Glen Innes Wind Power.

[135] Some neighbours also get payments for grid line easements, which are also small compared to the hosting payments.

> of the loop'. It would appear that we didn't matter and were not important enough to warrant any type of consultation, we were actually an impediment.[136]

These landowners stated that they tried to negotiate a sale of their farm with the developer. No purchase date could be agreed, they declined to sign a contract, and felt 'stuck' in an untenable situation. The proponent made a detailed response providing an alternative perspective on the many points in this submission, with a further invitation to consultation, but no substantive changes were made to the offer or the EIS.[137]

The prospect of significant property devaluation is deeply worrying to landholders, who are usually carrying significant debts and whose main asset is their farm. Although farmland values are currently on the rise, neighbours worry that they will not be part of this trend.[138] Landholders rely on the opinions of local people they trust. One couple's EIS objection to the Glen Innes Wind Farm cited a rural property sales agent in their area:

> He said, 'The towers were seen by most of the market as "repulsive" and could lead to 30 to 50 per cent drop in the value of the land.' We have major concerns that our equity in the farm may decrease.

There is no current or rigorous quantitative evidence that will provide reassurance or clarify the risk of value loss. The most recent study commissioned by the NSW OEH had limited Australian data and inconclusive findings.[139] Proponents rely on these and a few international studies of dubious comparative value to discount landholders' concerns about property devaluation. The many public EIS submissions suggest property devaluation remains a significant concern for landholders where renewable energy is developing.

Our research areas included minimal transmission build so this issue was largely absent in our data. Transmission will be a major issue for REZs. New high voltage transmission lines will be visible in rural landscapes and also will have impact on the machinery and practices available near the transmission lines. They are therefore likely to raise similar concerns. Some landowners expressed worry that compensation for new high voltage transmission lines is lower compared to hosting generation infrastructure, and limits future opportunities to negotiate with the more financially rewarding generators. There is the possibility of a new wave of resident opposition as transmission line corridors are finalised. The conflict over renewable projects suggests that optimal consultation and a review of siting guidelines and compensation arrangements are warranted to avoid damaging consequences for REZ rollout.

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[136] Hewens, RL & HM Hewens (2012), Submission objection: Sapphire Wind Farm, Sydney: NSW Department of Planning., p. 2.

[137] CWP (2012a), Proposed Development of Sapphire Wind Farm Northern NSW, Sydney: Department of Planning and Infrastructure.

[138] Schlesinger, Larry (2020), 'Farmland prices surged in 2019 and will rise again', *Australian Financial Review*, 5 May.

[139] Urbis (2019), Review of the Impact of Wind Farms on Property Values, Sydney: Urbis for NSW Office of Environment and Heritage.

7.2.3 Organised opposition to renewable energy

Neighbours and other locals who miss out on hosting facilities or face the disruption and anticipated harms of a renewable energy project can be vociferous opponents in the local media. The Bodangora Wind Farm Awareness Group mounted a sustained and vehement public protest campaign during the entire EIS process. The group had connection to the anti-wind farm lobby the Waubra Foundation and prominent critic David Mortimer.[140]

> '[W]ind turbines [are] the asbestos of the renewable energy industry,' one member told a reporter. 'Really at the end of the day there's been very little research done on the health impacts.' [141]

One local observer commented to us that inexperienced companies could exacerbate these problems:

> When the first wind farm was assessed, there was a lot of community [in-fighting], mainly through the way that the company approached the landholders. They took a very rigid view, case by case landholder. That just pitted people against each other. And there were some really nasty outcomes. To the extent that you had people putting things in other people's water tanks.

Recent debate over a disputed gas-fired power plant proposal had set the scene for the wind debate in Wellington. Bodangora, one of the earliest wind farm projects in the CWO REZ, followed a proposed gas fired power station nearby.[142] This project had been terminated in response to concerted resident and local council objections.[143] When we met with concerned residents involved in opposition to the wind farm, it was clear that the issues from the gas generator project were connected. Proximity to town, health impacts and local commercial implications of the infrastructure were major worries for both proposed utilities.

In reflecting on another wind turbine conflict in the community of Wellingrove, New England, a local farmer observed:

> That was the biggest problem. Those confidential agreements caused dissension. You couldn't tell your neighbour or your friend.

A Wellingrove grazier couple mounted a vigorous protest campaign, succeeding in having a string of 200-metre-high turbines for the Sapphire Wind Farm removed from a conspicuous position on the hillside just above their house, thereby denying nearby landowners the

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[140] For more information on organised wind farm opposition, see Chapman, Simon & Fiona Crichton (2017), *Wind Turbine Syndrome: A Communicated Disease* Sydney: Sydney University Press..

[141] Norris, Andrew (2012), ' Bodangora to meet over wind farm plan', *FarmOnline*, 19 July.

[142] NSW DPE (2015), Modification Request: Wellington Gas Fired Power Station MP 06_0315 MOD 2 Secretary's Environmental Assessment Report Section 75W of the Environmental Planning and Assessment Act 1979, Sydney: NSW Department of Planning and Environment.

[143] Wellington Times (2015), ' Wellington's gas fired power station canned', Wellington Times, 23 August.

opportunity to host and splitting the small community. In defending their stance, they told a reporter:

> But what [potential host neighbours] might not understand is that had those towers gone up we would have lost value to our property by perhaps half to a third. … In fact when we asked for a valuation no one would do that. Agents told us they wouldn't list our property if we did want to sell it.[144]

An industry insider, reflecting on the Wellingrove case and others like it, said:

> It can just get too painful for the companies. They 'do the maths' and decide it is not worth the ongoing reputational damage.

Wind farms are more likely to energise concerted opposition, but solar farms sited in sensitive locations for locals can also be highly contentious. Beryl Solar Farm, developed by First Solar and now owned and operated by New Energy Solar, was vigorously opposed since its early stages. The 87 MW solar farm, located 5km west of the heritage goldmining town of Gulgong, was purchased from a single landowner and in its final form has approximately 950,000 panels on 225 Ha of rural land zoned for primary production.[145] A newly upgraded substation near the solar farm drew in a larger group of objectors beyond the neighbourhood. Located on an approach road to the town, the solar farm and the substation were seen by them as a blight on the town's heritage identity on which its thriving local tourist industry is based.

There were many supporters of the solar farm in the area, but objectors were prominent in EIS public submissions. Objections covered the gamut of adverse socio-economic impacts: visual amenity, noise, health, property devaluation, economic damage, and lack of local benefits, as in the following two examples:

> We already have a loud buzz from the sub station; what will the sound be when the sub station is upgraded? This will be a major eyesore for us and the poor neighbours to look at ugly panels instead of rolling hills. … Use some useless land that is not on the doorstep of a historic tourist destination.

> [We] do not wish to be inundated with never ending rows of solar panels and major upgrades to the substation. It seems that the only ones to benefit from this would be the sellers of the land and First Solar.

A coalition of farmers and tourism-related businesspeople formed Gulgong Residents for Responsible Renewables (GRRR). They were unsuccessful in halting the project, which was commissioned in June 2019, but have remained active in opposing further solar developments. In the wake of the strife over Beryl Solar Farm, it is no surprise that a small solar farm was rejected in August 2020 by a NSW regional planning panel (which decides on

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[144] Brown, Jamie (2017), ' Wind power divides local community', *The Land*, 24 July.

[145] Electricity generation works are permissible on rural land zoned for primary production (RU1) in NSW under the State Environmental Planning Policy (Infrastructure) 2007.

developments worth between $10 and $30 million), citing several grounds including that it was:

> contrary to the objectives of the RU1 Rural Zone which seek to maintain the visual amenity and landscape quality of the area by preserving its rural landscape and environmental and cultural heritage values.[146]

Such sustained and organised opposition tends to dominate more supportive stances and can present a formidable deterrent to renewable energy developers.

Although Beryl Solar Farm was approved, the council was responsive to the strong objections that emerged from many quarters. In 2019 Mid-Western Regional Council, which includes Gulgong, amended its Development Control Plan to insert a set of provisions aimed at minimising land use conflict and other adverse socio-economic impacts of solar farms. While having no standing in the SSD process, some councils see them as a pragmatic and politic response to resident concerns and in negotiations with renewable energy companies.

The more landholders in the vicinity of the proposed installation, the more likely that opposition will gain momentum. In New England REZ, near Invergowrie south of Armidale, French renewable energy company Neoen made an early withdrawal from a solar farm development, announced by the local newspaper headline as 'Solar sunk by people power'.[147] Residents with small rural acreages, many employed in surrounding towns, formed the Saumarez Solar Farm Action Group, and successfully killed off the proposal in its early stages. Despite being strong supporters of renewable energy, they objected to the development in their relatively densely settled rural area. Spokesperson Don Hardman commented,

> [C]ouncils could identify high value areas in their Local Environmental Plans to better guide companies considering solar developments …. Councils getting ahead of the game and showing areas that are "off the books" could save a lot of angst, I think.

This optimistic scenario may be difficult to realise, as the evidence in EISs shows that proponents can disregard council resolutions and Development Control Plans on renewable energy, citing SSD override provisions.

'Angst' is a term that is often used, by local officials as well as residents, when opposition to a development gathers momentum. It sums up well the deep feelings of distress that can be experienced when small communities become polarised. All social life is affected.

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[146] Western Regional Planning Panel (2020), Council Assessment Report: PPSWES-1*,* Sydney: NSW Planning Portal. <https://www.planningportal.nsw.gov.au/planning-panel/5mw-solar-farm>.

[147] Green, Steve (2019), 'People power wins out as Saumarez solar project officially cancelled ', *The Northern Daily Leader*, 1 July.

7.3. CONCLUSIONS

The patterns of local economic gain, tensions and divisions that emerge around REZs will reflect the unavoidable fact that renewable energy projects are commercial developments. They must make a profit and developers and owners strive to maximise that profit. This is a new industry growing exponentially with a model that requires geographically concentrated land-based development in some of the more populous and productive rural districts in the state.

Our research makes a clear case for greater planning and coordination by governments. The principle of the *EII Act* requires the Infrastructure Planner to consult with local governments when assessing and making recommendations about REZ network infrastructure projects (section 30(3)(e)) and future regulations can guide consultation processes (section 30(5)(c)), but the individual generation projects are left to the general NSW planning system. Given patterns of development and contention detailed above, working with local councils to engage civil society and local business groups within key towns at the centre of developments will be important.

Further guidelines and potentially regulation for regional and local public consultation are warranted, particularly about the timing of projects to ensure the flow of benefits is maximised and disruptions managed well. Timing and location of project is a major concern for local councils and in smaller towns where projects are concentrated. The Consumer Trustee's role should become important. We note that DPIE recently clarified that the Consumer Trustee's power 'is a power to determine *which* network infrastructure project should be authorised *when*, having regard to the relative merits of recommended network infrastructure projects and the upgrades required to achieve the infrastructure investment objectives.[148] New network projects are likely to attract new concentrations of wind and solar projects, which currently have no strategic planning framework besides the REZ boundaries and project based EIS evaluation. The next chapter looks at how to enhance benefit sharing from REZ developments.

[148] DPIE (2021) Network Infrastructure Projects (Part 5 of the Electricity Infrastructure Investment Act 2020), Sydney: Department of Planning, Industry and Environment., p. 26.

8. Beyond the build: Enhancing shared benefits

KEY POINTS

- High quality community benefit programs add social and environmental value, achieve social equity outcomes, and positively integrate renewable energy companies into host communities.
- The renewable energy industry is evolving better benefit sharing models but these remain mostly voluntary initiatives.
- Despite their unique First Nations status, and ancestral connection to the land on which all wind and solar farms are located, Aboriginal people are not prominent in the public outreach of the renewable energy industry.
- Indigenous participation in energy planning tends to be limited to Cultural Heritage consultation despite high percentages of Aboriginal residents in the REZs.
- Local governments we spoke to want more formalised contribution requirements from renewables developers that take account of the resources and expertise councils bring to local planning, community services, environment and land management issues.
- Recent revisions to the NSW planning assessment framework for State Significant Developments promise to facilitate improved community benefit sharing in REZ projects.

RECOMMENDATIONS

- Government should review and formalise benefit sharing requirements and developer contributions to local government within the broader economic planning framework of REZs, with guidelines that promote transparency and certainty as well as sustained growth and social equity objectives across the diversity of host communities.
- Owners should have a stronger regulatory accountability for community benefit commitments made during the planning process.
- Pooling part of the community funds within each REZ offers an opportunity to create substantial resources that could be leveraged with government funding to create significant assets or programs.
- REZ instruments should be designed to bring training, employment, co-investment opportunities and stronger heritage protections for Traditional Owners, landholding groups and all Indigenous residents.

Until now, beneficial local economic impacts of large wind and solar projects have been largely incidental. In the future, as state governments roll out REZs there will be more coordination of commercial developers, which is an opportunity to maximise community benefits as part of the clean energy transition. In this chapter, we review renewables companies' current arrangements for benefit sharing. We provide examples of good practice and emerging trends. We discuss the opportunities and obstacles to more sustainable socio-economic outcomes through benefit sharing.

Government-commissioned modelling for the Roadmap presents a highly optimistic picture of economic growth, indicating that the private investment stimulated by the REZs and

other elements of the Roadmap could total $32 billion by 2030.[149] This level of investment was calculated to support up to 6,300 jobs in construction, which would be concentrated in the REZs, and up to 2,800 ongoing jobs. It is not clear how the latter number was calculated, given that renewable energy projects employ relatively few people in operations roles.

Roadmap modelling calculated landholder payments for farms that host the generators and infrastructure. It predicts that these payments could be up to $660 million in New England, $430 million in Central-West Orana, and $280 million in South West REZ.[150] The amounts are high but the number of hosts is low. More nuanced modelling is needed for a more accurate indication of benefits, which at present are very unevenly distributed according to resource suitability of a small number of properties.

Example 1. Sapphire Wind Farm Community Co-Investment[151]
CWP Renewables, the owner/operator of Sapphire Wind Farm in New England REZ, established a Community Co-Investment Initiative, after an extensive community survey by two independent local consultancy organisations, Starfish Initiatives and Akin Consulting. Eligible residents (in several location categories of descending priority: host landowners, neighbours, the two local government areas in which the wind farm is located, and residents in other parts of the New England region) made investment 'pledges' as an indication of interest. Individuals, businesses, community organisations, self-managed super funds and family trusts were eligible to invest a minimum of $1,250 and maximum of $200,000.

The offer was well-subscribed, with a loan maximum of $10 million to Grassroots Renewable Energy Trust, the funder of 100% of Sapphire Wind Farm equity. The scheme provides an investment return of 6% p.a. paid quarterly for 9.5 years commencing 1 July 2019.

It has been well-received in the region, achieving its aim of widely shared benefits: from investment returns; in providing the opportunity for residents to participate in a clean energy project; and as reputational enhancement for CWP. It is not however a scheme that will spread benefits to low socio-economic residents of the region.

CWP's other initiatives include an annual community projects allocation of $187,500, the majority of which goes to Inverell local government area and is administered by the council.

8.1 POLICY INFRASTRUCTURE COMES FIRST

If state governments want increasing control over the pattern of development in generation and distribution infrastructure, they must first create the appropriate policy infrastructure. The NSW government is the leading jurisdiction in this regard.

[149] NSW DPIE (2020), NSW Electricity Infrastructure Roadmap: Building an Energy Superpower Detailed Report, Sydney: NSW Department of Planning, Industry and Environment., p.14.

[150] Ibid, p.15.

[151] CWP (undated), *Our projects: Sapphire Wind Farm*, CWP Renewables, viewed 1 November 2021 <https://cwprenewables.com/our-projects/sapphire-wind-farm/>.

The foundation of the state's energy transition is the Electricity Infrastructure Roadmap. 'A modern electricity system', with 'cheap, clean and reliable electricity' are the catchwords, holding out the promise of economic benefits for all the NEM states, for the NSW economy and for the regions hosting the REZs. The Roadmap announces the prospect of NSW as a 'global energy superpower' waiting in the wings. [152]

The legislation for the Roadmap creates a raft of new statutory entities and instruments for detailed management of REZ planning. This includes community benefit and economic development considerations that would otherwise be absent from the conventional NEM transmission planning process. Substantial revisions undertaken to the NSW planning assessment framework for major projects will facilitate the Roadmap process.

The new EnergyCo has the role of engaging with communities to plan REZs in a 'holistic way' and 'achieve a balance between electricity, agriculture, heritage, visual amenity, mining and other land uses'.

A new Consumer Trustee, AEMO Services Ltd, has been created, to make decisions with the Corporation about infrastructure design. The Consumer Trustee must take into account the various objectives and considerations of the *EII Act* including local community engagement and support for projects, and commitments to improve local employment opportunities. An Electricity Infrastructure Jobs Advocate will advise the Minister on workforce development, training and export opportunities in renewable energy, and a NSW renewable energy sector board has been tasked to create a plan for operation, manufacturing and construction in the renewable energy sector.

Example 2. New England Solar Farm benefit sharing program designed to evolve over time[153]
UPC/AC Renewables EIS proposed the Community Benefit Sharing Initiative (CBSI) developed with Community Power Agency (CPA). CPA is a not-for-profit organisation working with communities, industry and government to support clean energy transition and community energy. CPA was engaged as an independent facilitator and consultant for the community consultation process for the New England Solar Farm, located near the town of Uralla. The project is now under construction, and one element of the CBSI, the Uralla Grants Program, has already been established. Funds of $100,000 p.a. are distributed through a small grants program ($5000 maximum) administered by a Community Reference Group of local residents. The company envisages that changing community expectations may in time shift the grant scheme towards longer term legacy projects.

The future scope of the CBSI as stated in the EIS extends to scholarships and training, energy education, low-interest energy efficiency loans and other benefits focussed on Uralla LGA and a couple of other small locales in the solar farm zone. There are as yet no details of these initiatives on the project website.

[152] Ibid., p. 15.

[153] UPC/AC Renewables (undated), Uralla grants, UPC and AC Renewables, viewed 1 November 2021 <https://newenglandsolarfarm.com.au/urallagrants/>.

8.2 VOLUNTARY BENEFIT SHARING

Community benefit sharing is important for all renewable energy projects and can become a critical factor for the success of a project and the ongoing reputation of its developer or operator. High quality programs add social and environmental value, achieve social equity outcomes, and positively integrate renewable energy companies into host communities. Community benefits go beyond the direct economic benefits that host landowners receive.[154]

New state policy will build on the voluntary benefit sharing practices that have evolved in the renewable energy industry in Australia. The *EII Act* emphasises community benefits and engagement throughout the descriptions of the new policy tools. *The Act* mandates a collection of an Access Fee for the new transmission infrastructure, which must have community and employment purposes.

The Clean Energy Council published important guides in 2018[155] and 2019.[156] They provide extensive analysis of renewable energy project benefit sharing, developing guidelines and best practice examples. Proposals range from community grant schemes, biodiversity and conservation projects, forms of economic stimulus in the host region (construction jobs, training, procurement), sponsorships, training, community co-investment, and various discounted solar and discounted electricity schemes. We have provided examples of some of these that we encountered in the two study REZs as well as one example from Victoria that could be a model for NSW.

Our research suggests a trend in recent EISs towards commitments for broader benefit sharing schemes as projects become larger, planning regimes change, and public expectations increase. However, many of these commitments are yet to be tested as projects progress to completion. Information about community benefits on project websites does not always reflect the details provided in EISs.

The objects of the *NSW EP&A Act 1979* include social benefits for communities, including: 'the social and economic welfare of the community'; 'ecologically sustainable development'; 'the orderly and economic use and development of land'; and 'increased opportunity for community participation in environmental planning and assessment'.[157] Compared to the *EPA&A Act*, the authorities and roles created in the *EII Act* have new specific statutory functions and obligations for the equitable sharing of renewable energy benefits in host communities, such as co-ordinating investment in new infrastructure, 'fostering local support' and supporting local economic development (see Chapter 3).

[154] Some developers make small compensation payments to neighbours for changes and disturbances that they experience.

[155] Hicks, Jarra, Taryn Lane, Emily Wood, Nina Hall, Alicia Webb & Franziska Mey (2018), Enhancing Social Outcomes from Wind Development in Australia: Evaluating Community Engagement and Benefit Sharing.

[156] Lane, Taryn & Jarra Hicks (2019), A Guide to the Benefit Sharing Options for Renewable Energy Projects, Melbourne: Clean Energy Council.

[157] NSW Parliament (1979), Environmental Planning and Assessment Act 1979, Sydney, Act no. 203., Part 1.

Renewable energy companies' voluntary contribution practices that currently exist appear out of step with this legislation. Owners should be accountable for the type and level of community benefits they provide, with guidelines for standards that meet sustained growth and social equity objectives in host communities. In 2019 the NSW Legislative Assembly conducted an inquiry that addressed these issues[158] and in 2020 the ESB has carried these questions into its REZ work.[159]

Example 3. Regional development focus in Victoria's large-scale renewable scheme[160]
An example of regional development through pooling of funds from Victoria that is a potential model for the NSW REZs to follow is the Federation University's initiative of providing renewable energy related training in Ballarat in Victoria. Besides a 'local content requirement', there was a strong focus on regional development in the Victoria State Government's renewable energy auction scheme (VREAS) in 2017/2018. For example, the awarded (wind) companies contributed to the Federation University's initiative, offering scholarships to local electricians, auto mechanics and mechanical fitters to 'open up job opportunities for tradies looking to change career'. Companies participated in the development of the course curriculum. The focus so far has been in providing post-trade qualifications and vocational training, such as Global Wind Organisation Basic Training (GWO – BTT) in Federation TAFE, but Federation University recently announced that it will be proceeding with plans to build and establish an Asia Pacific Renewable Energy Training Centre with further contributions from renewable energy companies.

As wind turbine technicians and other renewable energy specialists are often imported into the REZs, Dubbo or Armidale TAFE may be venues where a similar regional training initiative could be replicated to provide tangible local benefits and value that contribute to sustained economic growth in the REZs.

8.2.1 Community benefit funds

The most common form of benefit sharing for large-scale renewable energy projects in Australia is grants schemes set up for host communities. These 'micro-grants' are allocated each year through publicly announced competitive applications. Selection committees are usually made up of company, community and local government representatives. Annual amounts for community funds generally extend for the life of the installation.

Grants often provide funding to improve the physical environment and amenities such as park and sports ground upgrades and sporting equipment. Physical assets are not the only projects that community funds support. We encountered several initiatives ranging from community co-investment to scholarships, training and skills upscaling.

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[158] NSW Parliament (2019), *Sustainability of energy supply and resources in NSW: Submissions*, Legislative Assembly, viewed 17 November 2021 <https://www.parliament.nsw.gov.au/committees/inquiries/Pages/inquiry-details.aspx?pk=2542#tab-submissions>.

[159] COAG (2021), Energy Security Board: Renewable Energy Zones, Council of Australian Governments, Energy Council.

[160] For more information see: Federation University (2019), 'Media release: New scholarships in turbine training announced', 8 November, Federation University (2020), 'Media release: Renewable energy ambitions fuelled by new $500,000 partnerships', 30 September.

There is an emerging benchmark for community funds of around $500 - $1500 per MW per year for wind farms and $130-$800 per MW per year for solar projects.[161] Australian Wind Alliance estimated in 2018 that the Community Enhancement Funds of wind farms in NSW totaled about one million dollars annually.[162]

If these rates are maintained in REZs then they will result in large funds being available for host communities, which vary considerably in type and scale. The NSW government is planning for the first three REZs to have up to 12,000 MW of transmission capacity. If this capacity is fully subscribed by large-scale solar and wind (with 2/3 solar and 1/3 wind), it would result in funding for communities of $1 million - $6.4 million from solar and $2 million - $6 million per year from wind. Each decade, that is up to $124 million in funding for community projects in the first three of the NSW REZs.

With so many renewable energy projects now operational or in the pipeline, many wonder about the capacity of small localities to absorb the funds in a way that makes a meaningful contribution. As one council officer wryly commented:

> There's the age-old question of community benefit funds. When you times it by say seven projects, and then get down to year 15, 16 in some of these projects, there are going to be a lot of kids with new boots and equipment.

A decade ago, CWP first proposed that community funding should be pooled in order to increase impact. In the 2011 EIS for Sapphire wind farm CWP proposed that given two other wind farms were under development in the same part of New England there was an opportunity to amalgamate the community funds:

> There is the possibility of a significant income into the council areas to support community-based projects from the combination of community funds also provided by the White Rock Wind Farm and the Glen Innes Wind Farm. As each wind farm is built, the opportunity exists for funding to be combined into a single pool of monies to enable more substantial community projects to be realized.[163]

However, this idea did not progress. Individual operators need to maintain good relations in the immediate vicinity of their installations, and community committees may be reluctant to join a wider pool, especially if local councils become the managers. As one council officer commented, 'There is probably some anti-council sentiment in that.' He was referring to the longstanding gripes that residents often express about excessive local government taxes that they link to unnecessary council expenditure and expensive administration.

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[161] Lane, Taryn & Jarra Hicks (2019), A Guide to the Benefit Sharing Options for Renewable Energy Projects, Melbourne: Clean Energy Council., p. 14.

[162] AWA (2018), Building Stronger Communities: Wind's Growing Role in Regional Australiar, Bungendore: Australian Wind Alliance., p. 29.

[163] NSW DPI (2013), Major Project Assessment: Sapphire Wind Farm Northern Tablelands, NSW (09_0093), Director-General's Environmental Assessment Report Section 75I of the Environmental Planning and Assessment Act 1979, Sydney: Department of Planning and Infrastructure., p. 259.

The potential for 'legacy initiatives'[164] with a larger funding pool continues to be discussed by both developers and local government officers. However we have not encountered any examples of community fund pooling among the existing operations in the two REZs. Pooling of funds might create opportunities that are otherwise hard to capture in benefit sharing initiatives. For example, there is little discussion of the extent of transmission and telecommunication disadvantage that exists in many rural areas and of how this may be addressed as part of REZ planning. If state governments want community fund pooling to occur, then they will likely have to lead this process. Residents will not accept inflexible definitions of eligible communities, as experiences of locality can vary widely and cross bureaucratic boundaries.

If funding pools are used to build significant facilities there will need to be long-term provisions for maintenance, funding and control. Local councils are already concerned that they have to take on responsibility for park improvements, public toilets, sportsground stands and other small projects after the community fund has delivered them.

One officer explained:

> The risk is that community facilities inevitably fall back to council when they cease to be supported or cease to function. And because an expectation has been built, council has to come in and pick up the pieces.

In summary, local governments want clarity around community benefit funds and more formalised contribution requirements from renewables developers and that take account of the resources and expertise councils bring to local planning, community services, environment and land management issues. The concerns we identified have been recorded in the wider scope of a recent NSW Productivity Commission report on Infrastructure Contributions, with a series of wide-ranging recommendations for change.[165]

[164] Lane, Taryn & Jarra Hicks (2019), A Guide to the Benefit Sharing Options for Renewable Energy Projects, Melbourne: Clean Energy Council., p. 20.

[165] PC (2020), Review of Infrastructure Contributions in New South Wales, Sydney: Productivity Commission.

Example 4. White Rock Wind Farm Local Business Participation Program[166]
Goldwind/CECEP's White Rock Wind Farm in the NE REZ employs local residents in community liaison positions and has a policy of supporting procurement from local businesses and developing their capacity to supply. Their Local Business Participation Program was activated in the lead up to construction. They established an EOI database and worked with the EPC contractor to hold information forums in their 'host town', Glen Innes. All the project's Main Contractors were supplied with this information, encouraging them to use local businesses. This was reinforced during construction with weekly 'tool box' meetings in town, planning worker and supplies needs. The community liaison officer told us she was proactive in contacting local businesses, helping them develop a supply chain for the company with new products. Now the project is in operational phase, the head of the operations office maintains these local business connections, with various transactions large and small 'every day'. 'He knows everybody in the local businesses,' she said. Both the community liaison officer and the head of the operations office are local residents employed since early in the construction phase. They work from an onsite office with several other continuing employees in administration and engineering.

8.2.2 Benefit sharing with Aboriginal communities in REZs

There is significant potential for REZs to bring employment, training and investment opportunities for Traditional Owners and Aboriginal residents. Aboriginal and Torres Strait Islander peoples make up 2.9% of the NSW population. All the REZ LGAs have much higher percentages of including Mid-Western Regional 5.4%; Dubbo Region 6%; Uralla 6.9%; Armidale Regional 7.4%, and Inverell 8.5%.
Renewable energy is a land-based industry. Despite their unique First Nations status, and ancestral connection to the land on which all wind and solar farms are located, Aboriginal people have not been prominent in the discourse around the clean energy transition or in the public outreach of the renewable energy industry. Acknowledgment of Country statements on company websites are still rare. Most publicity pictures are of Anglo-European people. Aboriginal organisations or groups are not common on lists of company contributions to community projects.

Aboriginal Cultural Heritage provisions of the EIS process afford some measure of protection from loss or damage to significant objects and places. However, as discussed in Chapter 6, there is dissatisfaction with the standards of consultation, assessment and Aboriginal Cultural Heritage Management Plans. This dissatisfaction is consistently expressed in submissions to many wind and solar farm EISs in NSW, often channelled through officers of Heritage NSW or land management agencies on behalf of Aboriginal organisations and Registered Aboriginal Parties.

In general, apart from the Aboriginal cultural heritage assessment process, planning assessment and guidelines take little account of the high percentages of Aboriginal residents in the REZs.

[166] For more information see: White Rock Wind Farm (undated), *Local business partnership program*, Goldwind, viewed 1 November 2021 <https://whiterockwindfarm.com/community/community-fund-and-sponsorship-2/ >.

In 2022 it feels like this might be changing. Governments have made grants to Traditional Owner Corporations to make clean energy development plans.[167] Last year the First Nations Clean Energy Network was launched. This national organisation works to 'ensure our people are part of the renewable energy revolution'.[168] It endorsed a guide for companies seeking to negotiate strong agreements with First Nations communities, written by academics at the Centre for Aboriginal Economic Policy Research at the Australian National University College of Arts & Social Sciences.[169]

Two NSW guidelines are an opportunity to create the strong negotiation and planning framework envisaged by Centre for Aboriginal Economic Policy Research and the First Nations Clean Energy Network. The general guideline is the DPIE's new Social Impact Assessment Guideline for State Significant Projects published in July 2021, which will apply for the first time to renewable energy project. The other is the First Nations guidelines issued under section 4 of the *EII Act* due for publication in early 2022 and especially focusing on First Nations economic participation.

Aboriginal disadvantage means that any negative impacts on lower income households, such as through rental increases during development peaks, will likely affect Aboriginal residents significantly. Positive impacts such as business development and generator hosting are also less likely. Such inequities are in urgent need of attention as part of cross-sectoral policy and planning including for construction 'hits' in REZs.

The most important opportunities apart from land use agreements discussed in Chapter 6 are likely to be in targeted co-investment and partnerships for employment and training. DPIE's new Engagement Guidelines for State Significant Developments (2021) promises to raise the standard of proponent and departmental consultation and participation initiatives.

The early engagement recommended in the Guidelines is particularly important for Aboriginal residents. It would be an improvement if this was required as part of the proponent's scoping study prior to the issue of SEARs. It would involve early engagement with Aboriginal elders and community leaders, community-owned enterprises and Aboriginal-owned businesses in addition to statutory bodies like Local Area Land Councils, state agencies and educators.

The Guidelines' recommendation that 'engagement should be a discrete, planned activity undertaken by and with experienced Indigenous engagement specialists'[170] if applied as a requirement to the proponent's scoping study, would provide a better foundation for the SEARs. It would also increase the chance of a higher quality EIS and sustained benefits

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[167] For example $1.1 million was granted in Victoria to help eight organisations develop plans for their communities. See Andrews, Daniel (2021), *Traditional owners empowered to a clean energy future*, Honorable Danial Andrews, Premier of Victoria, <https://www.premier.vic.gov.au/traditional-owners-empowered-clean-energy-future>.

[168] FNCEN (undated), *What we stand for*, First Nations Clean Energy Network, viewed 21 December 2021 <https://www.firstnationscleanenergy.org.au/what_we_stand_for>.

[169] O'Neill, Lily, Brad Riley, Ganur Maynard & Janet Hunt (2021), Clean Energy Agreement Making on First Nations Land: What Do Strong Agreements Contain?, Canberra: Centre for Aboriginal Economic Policy Research, Australian National University.

[170] DPIE (2021c), Undertaking Engagement Guidelines for State Significant Projects, Sydney: Department of Planning, Industry and Environment., p. 11.

across the spectrum of cultural heritage and socio-economic outcomes for Aboriginal communities in the REZ. This requirement for specialised Indigenous expertise should be carried into the EIS consultation, action plan and accountability processes in the Development Approval.

Example 5. Wellington North Solar Farm community benefits: scholarships, rooftop solar and energy discounts[171]

Developer and gentailer AGL found during community consultations for the Wellington North Solar Plant EIS that 'community members would favour a longer-term focus on community benefits,' noting that small community project grants were already available from another nearby solar farm grants scheme, and Dubbo Regional Council. The EIS committed to rollout of a number of benefit schemes, including provision of apprenticeship scholarships to address the concerns residents expressed about youth unemployment and consequent social marginality. In addition, their EIS community benefits proposal included: rooftop solar installation for nearest non-hosting neighbours most impacted by construction activities; an energy discount for all new and existing AGL Energy Limited customers in Wellington; and, a community grants fund during the construction phase of the project.

Prior to development approval, AGL sold the development to Lightsource BP and it was approved in April 2021. It is not yet clear how the new owner, which is one of the world's largest solar developers (and not a gentailer) will follow through on AGL's commitments that came out of its community consultation in the EIS.

8.2.3 Local government levies

The construction of REZs will have significant impacts on local roads and other infrastructure. This is already apparent in areas of concentrated development in CWO REZ and NE REZs and will increase as more generators, storage and new transmission corridors are built. State governments will need to either provide funding directly for local infrastructure or create stronger mechanisms for local government to levy renewable energy projects.

Companies voluntarily negotiate agreements with councils for road works and some other infrastructure and services costs. Councils receive some property taxes for wind and solar farm installations in NSW. We have learned from hosts that these are levied as part of the host landowner's local government tax bill, and are usually paid by the renewable energy company through arrangements agreed with council.

Local council personnel we spoke to expressed dissatisfaction there is no formalised developer contribution that would better reflect the impacts and opportunities of renewables development at local government level. In NSW, many SSDs are required under section 7.12 of the *EP&A Act* to make a Development Consent Contribution with local councils for a up to one per cent of the project cost to support infrastructure works

[171] For more information: AGL (2018), Wellington North Solar Plant: Environmental Impact Statement Overview, Sydney: AGL, Lightsource BP (2021), *Lightsource BP on track to develop 600MW solar hub in NSW, Australia*, Lightsource BP, 13 May, <https://www.lightsourcebp.com/au/2021/05/wellington-solar-hub/>.

throughout the LGA.[172] Renewable energy projects that are classified as SSDs do not attract this levy.

As one council officer put it:

> So there's no contribution back to council like there is with a normal [SSD] development, where we've got what's called a section 94[173] contribution which might be 1% of the development cost. This comes back to council, to use to develop the community. That never happened on these projects.

Host council EIS submissions often request a developer contribution, which is always sharply rebutted by the Proponent. For example, Inverell Council made a submission requesting a Planning Agreement ('Section 94A Contribution Plan') with Sapphire Wind Farm. The proponent opposed the levy and stated that if it had to provide a section 94 contribution, this would reduce the amount if would provide voluntarily to the community fund:

> As Sapphire Wind Farm is considered a transitional Part 3A project, the consent authority is either the Planning Assessment Commission (PAC) or the Department of Primary Industries (DoPI). Therefore, the Proponent is not obliged to consider section 94A contributions unless directed by the DoPI and will be guided by their decision in regard to this requirement.
>
> The Proponent has already made a voluntary commitment (Statement of Commitment 104) to providing a Community Fund annually, based on the number and size of turbines selected for the site. Should the Project also be required to provide section 94A contributions, then the Proponent will look to offset this cost from the Community Fund (CWP EIS Response to Submissions 2012).[174]

There is no formalised legal framework for the developer to enter into a voluntary planning agreement with the council, although many renewables developers have entered into agreements to secure council support in the development application phase or for arrangements to manage community benefit funds. For example, as part of the EIS process, Armidale Regional Council recently announced a $1.5 million planning agreement to establish a Community Benefit Fund with Germany-based Enerparc, the developer of the Tilbuster Solar Farm in NE REZ.[175]

In summary, local governments we spoke to want more formalised contribution requirements from renewables developers that take account of the resources and expertise

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[172] NSW Parliament (2000), Environmental Planning and Assessment Regulation 2000, Sydney, Act no. 203.

[173] Now s7.12.

[174] CWP (2012b), Preferred Project Report and Response to Submissions, May, Sydney: Department of Planning and Infrastructure.

[175] ARC (2021), *Community to benefit from planning agreement with proposed Tilbuster Solar Farm* Armidale Regional Council, 2 November, <https://www.armidaleregional.nsw.gov.au/news/news-2021/community-to-benefit-from-planning-agreement-with-proposed-tilbuster-solar-farm>.

councils bring to local planning, community services, environment and land management issues.

8.3 BEYOND THE CONSTRUCTION HIT: REGIONAL ECONOMIC POLICY

Renewable energy generation is not a job-rich activity in the host communities. The clean energy transition will have to be coordinated with regional economic policy in order to deliver long-term economic stimulus in REZ localities.

The 'construction hit' that generates the highest employment will not produce long term jobs in the absence of phasing of projects and coordination by government. Typically, the project developer hires specialised contractors for different phases of the development: an environmental consultant to produce the necessary planning reports, an EPC contract brings in construction sub-contractors with their own crews. Wind turbine manufacturers often continue with maintenance contracts during operations.

As the White Rock example box shows, there are opportunities to create work for local business where owners prioritise this as part of their corporate commitment and employ locals in key liaison roles. However, this will not change the fact that the low number of jobs involved in renewable energy production is a core feature and strength of the technologies. Along with the zero cost of the wind or solar energy input, it is the reason that solar and wind have such low short run marginal costs.

What this means for the social licence of REZs is that there may not be any amount of community and stakeholder involvement, consultation and participation in the planning process that can fully address the concerns of disaffected neighbours or locals who are sceptical about the clean energy transition. Many small issues of complaint cannot be countered with a handful of ongoing jobs.

It is more likely that communities will come to accommodate what they perceive as negative social and amenity impacts if they see significant, ongoing economic benefits. Many of the reservations about renewable energy projects relate to stakeholders' evaluation of costs that are not easily quantifiable: rural neighbours' division and 'angst' and unwelcome changes to familiar rural landscapes.

In 2021 the NSW government announced it would spend $750 million up to 2030 on a Net Zero Industry and Innovation Program, as part of the Electricity Infrastructure Roadmap.[176] One of the early announcements in NSW was for a green hydrogen production hub in the Hunter-Central Coast REZ.[177]

This program will support decarbonisation of industry by reducing emissions in existing facilities and stimulating new facilities. The strategy is to concentrate new facilities in Clean

[176] DPIE (2021b), Net Zero Industry and Innovation Program: Driving a Clean Industry Revolution, Sydney: Department of Planning, Industry and Environment.

[177] DPIE (2021a), *Hunter hydrogen hub to drive jobs, investment and a net zero future*, 12 March, <https://www.environment.nsw.gov.au/news/hunter-hydrogen-hub-to-drive-jobs>.

Manufacturing Precincts in or around REZs where there are appropriate resources such as abundant energy, transport hubs and workforces. Soon after the Callide C coal power station explosion in June 2021, Queensland announced that it will develop a similar strategy.[178]

Regional economic policies are needed to address the concern expressed by local governments and business chambers in the REZs we visited, who understand that wind and solar farms only provide a large number of jobs during the 'construction hit', not as ongoing operations.

8.4 CONCLUSION

The renewable energy industry has voluntary benefit sharing models, which continue to evolve. As States move into REZ development they can formalise and improve on standard industry practice. The Infrastructure Planner, EnergyCo,will need to do so in each REZ. Section 26(2) of the *EII Act* requires that 'fees [for access] determined by the consumer trustee must include a component that is to be used for a community purpose prescribed by the regulations.' There is an opportunity here to consider pooling funds at a regional level and distributing them where they can have the most equitable and productive value. Sustained benefits for Aboriginal communities should be a priority, to expand beyond Cultural Heritage consultation and management to include long-term partnerships for training, employment, land use agreements and co-investment.

The massive scale and expansive nature of REZ building will mean that cumulative impacts are unavoidable and should be the focus of policy development. Those cumulative impacts are profoundly transformative in rural areas, and while there is a chance for sustained and equitable development in local economies, there is also a risk of mounting community objections to each wind and solar installation in the pipeline. The *EII Act* introduces an opportunity for a coordinated approach and maximising sustained benefits. Success will depend on using the legislated instruments for building on existing good practices and initiating REZ-specific socio-economic innovations, so that rural and regional communities can be long-term beneficiaries in the clean energy transition.

[178] Queensland announced it would supplement the $500 million Queensland Renewable Energy Fund with $1.5 billion and repurpose it to deliver long term economic stimulus, as the Queensland Renewable Energy and Hydrogen Jobs Fund. This will that encourages jobs-rich manufacturing that takes advantage of low energy costs in REZs and which produces the inputs for clean energy such as wind turbines, batteries and hydrogen electrolysers. Queensland Government (2021a), *Queensland Renewable Energy and Hydrogen Jobs Fund*, 10 June, <https://www.treasury.qld.gov.au/programs-and-policies/queensland-renewable-energy-and-hydrogen-jobs-fund/>.

9. Conclusion

Australia's clean energy transition is also a spatial shift. The federal government will spend $20 billion assisting states to organise interstate interconnectors and REZ transmission networks. Vast quantities of new generation storage and transmission infrastructure will be built in rural communities that have never hosted energy infrastructure.

The NSW communities we visited in our field trips were largely positive about clean energy. However they do not 'own' the concept of REZs. We believe that governments well understand that these communities should be at the centre of REZ planning.

In November 2021, the NSW government announced the formal beginning of the CWO REZ, and it has begun the process of consultation about the NE REZ declaration. Others will follow soon and timelines for the buildout of projects are tight. NSW's coal fleet is not getting any younger and new network infrastructure especially is slow to build.

The *EII Act 2020* aims to maximise community benefits and facilitate involvement, while driving development quickly. In 2022 the legislation's guidelines will be developed and the Infrastructure Planner (EnergyCo), the Consumer Trustee (AEMO Services Ltd), the Renewable Energy Sector Board and the Jobs Advocate will commence detailed implementation of the NSW Electricity Infrastructure Roadmap.

Our field trips took us to parts of Central-West Orana and New England REZs that have already experienced large-scale renewable energy developments. We uncovered what the ESB termed 'granular local knowledge' about the transition.

We find that while REZs will bring considerable benefits, the unevenness of their distribution can become a source of social conflict. We recommend that inclusive planning and better benefit sharing can improve equity and help build and maintain the social licence of the REZ policy.

A key finding of our research is that the location, timing, and sequencing of projects need to be holistically planned. NSW has taken a coordinating role in planning REZ transmission and access arrangements for developers and should also coordinate the pace and pattern of development.

If REZ plans are realised they will cover very large areas in all states where Aboriginal residents are Traditional Owners, have ongoing connections to country both pre- and post-settlement, and hold collective land rights and claims. It is critical that governments use REZ instruments to afford stronger outcomes for Traditional Owners, landholding groups and all Indigenous residents. This should extend to include genuine economic participation and co-investment opportunities.

We outline the case for more focused effort on community consultation and benefit sharing broadly to maximise sustainable economic development opportunities. State government

should extend its coordination role across departments and economic sectors to bring sustained training, employment and co-investment opportunities into REZ plans.

We concur with RE Alliance and the Clean Energy Council in calling for more formalised benefit sharing arrangements written into the regional economic plans for the REZs. Some pooling of community funds within each REZ would offer an opportunity to create substantial resources that could be leveraged with government funding to create significant assets or programs and we believe this model should be explored.

Our policy analysis celebrates the NSW government's REZ initiative as well as the public commitments the NSW government has made to ensuring rural communities are consulted and have a fair share of meaningful benefits as the renewable energy transition arrives in their locales.

The national pilot REZ in Central-West Orana and the New England REZ that is following close behind are leaders in a bold vision for Australia's clean energy transition. If they are used as a policy test bed for innovative participation, benefit sharing and equitable development planning, there will be significant benefits for other communities hosting REZs and for Australia as a whole.

Appendix 1

A.1 CWO REZ AND RE DEVELOPMENT PROFILE

The Central West Orana REZ, chosen for the national pilot REZ, combines two REZ candidates from the 2018 ISP: Central New South Wales Tablelands and Central-West New South Wales.[179]

Distinct to Wellington region is the existing grid connection capacity. There are 66kV, several 132 kV lines and a relatively new 330 kV circuit connection around Wellington, which, in turn, connects to the strong links between the big consumption loads of Sydney, Newcastle and Wollongong and several coal power stations (*see Figure A.1 Central West network*) (TransGrid 2020). Currently, six proposed or operational solar and two wind farms are located near this relatively close connection to the consumption loads of NSW, and therefore the strong part of the NSW grid. [180] The existing substations, which are most often the connection points to the grid for the wind and solar farms, are marked with blue/red/orange points in the TransGrid network map. The colour of the symbol refers to the voltage capacity of the substation, which is determined by the overhead line it is connected to. While the voltage capacity isn't directly linked to the *available* capacity of the grid connection itself, in general "larger" substations have more capacity to start with, and conglomeration of projects especially around Wellington substation would indicate connection capacity availability.

The 330 kV circuit is one of the only options where the main transmission lines towards Sydney are not already congested during peak demand.[181] The existing transmission capacity for hosting new generation was estimated as high as 1000 MW in 2018 ISP (AEMO 2018b, p. 18). Even after some projects started construction, it was still estimated in the draft 2020 ISP (AEMO 2019b, p. 18) that there was 700 MW capacity left. The situation is rapidly changing, since Transgrid estimated in 2020 that only 100 MW of spare capacity currently remains[182] and that the Central West area will also have material congestion problems if all connection applications are realised (see Table A.1. for capacity estimates).[183]

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[179] (2020) 2020 ISP Appendix 5: Renewable Energy Zones, p.11

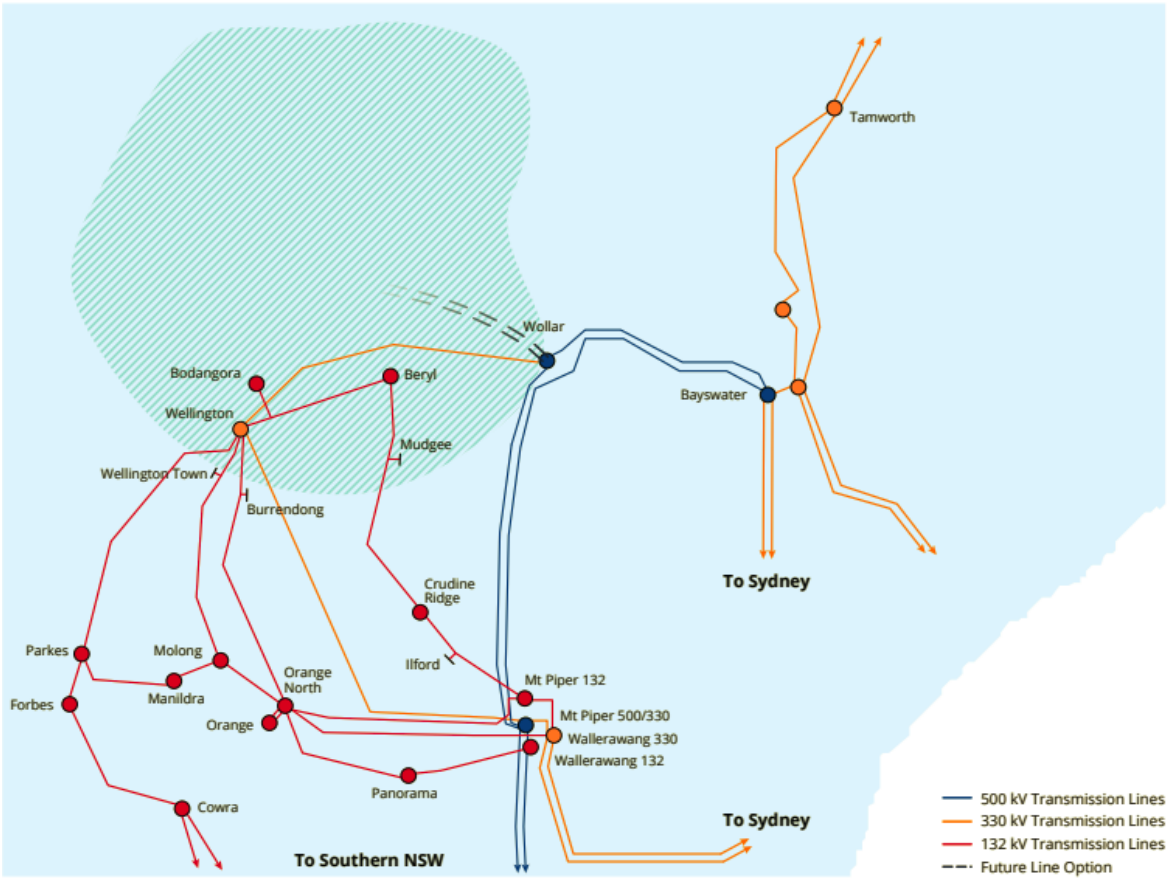
[180] In 2016 Transgrid identified possible new connection points for regional NSW, and the substations with highest available capacity were Wellington, Tamworth in New England and Darlington Point / Griffith in South-West. Of all identified eight locations, Wellington and Tamworth are closest to Sydney, and Wellington is part of recognised renewable energy resources of Central-West area. See https://www.transgrid.com.au/what-we-do/business-services/Infrastructure/Documents/Connection%20Opportunities%20Fact%20Sheet.pdf

[181] The existing shared transmission capacity between southern NSW and major load centres is heavily utilised at times of peak demand. See NSW Electricity Strategy (p. 17) and Transgrid (2019, p. 7), https://energy.nsw.gov.au/sites/default/files/2019-11/NSW%20Electricity%20Strategy%20-%20Final%20detailed%20strategy_0.pdf
https://www.transgrid.com.au/what-we-do/Business-Planning/transmission-annual-planning/Documents/2019%20Transmission%20Annual%20Planning%20Report.pdf

[182] Transgrid 2020, New South Wales Transmission Annual Planning Report, https://www.transgrid.com.au/what-we-do/Business-Planning/transmission-annual-planning/Documents/2020%20Transmission%20Annual%20Planning%20Report.pdf

[183] The only other area in NSW with similar existing transmission capacity – and recognised renewable energy potential – is the Southern Tablelands area Southern Tableland area has excellent wind resources and hosts large portion of the existing wind farms in NSW (see Figure X in Chapter 3), but has also significant community opposition for any new

Figure A.1 : Central West network and indicative Central-West Orana REZ



Source: TransGrid 2020, p. 28

In addition to good grid connection capacity, the existing and forecasted "marginal loss factors" (MLFs) near Wellington have been comparably low encouraging for new generation. MLFs are assigned by AEMO for all generation units inside the NEM and they typically indicate how much capacity there is in the network (how "congested" it is) and how favourably generation is located compared to consumption. The MLFs are calculated yearly and are related to the current open access regime in NEM. Basically, an older project has no protection against newcomers in the same connection point, and accumulating number of projects connecting to the same line can impact all the projects negatively by limiting the amount of usable capacity. For some projects in NSW the credited production has been as low as 75–80 % of the actual production (e.g. Broken Hill Solar Farm) (AEMO 2019c: 21-23). In Wellington area, however, the MLFs are still manageable and the credited generation is around 95 %[184], which generally should not significantly impact the project's financial viability. The uncertainty of long-term production opportunities is a frequent complaint of the investors operating in the Australian market (see e.g. Clean Energy Investor

developments, which has been recognised by AEMO (2018b: 20, 2019b, p. 238).

[184] AEMO 2020. Regions and Marginal Loss Factors: FY 2020-21. The MLFs for NSW generators are on pages 18–21. https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/loss_factors_and_regional_boundaries/2020-21/marginal-loss-factors-for-the-2020-21-financial-year.pdf?la=en

Group's recent submissions to AEMC)[185]. The REZ development and the new EII Act are designed to address this issue by allowing NSW Government to build more transmission capacity, and grant – and importantly also refuse – access to the new infrastructure.

A.2 NE REZ AND RE DEVELOPMENT PROFILE

According to AEMO (2020, p. 24), whereas most of North West NSW is mainly a solar zone, the New England tableland is predominantly a wind zone. Currently, NE REZ has a significantly smaller existing network capacity compared to CWO REZ. AEMO (2020, 23) estimates only 300 MW of existing usable capacity, that can be potentially upgraded in several phases to 5000 MW. Notably, there is already a substantial number of connection applications to Transgrid from the larger Northern NSW area, exceeding the possible grid upgrades (see Table A.2 for different capacity and spare network capacity estimates).

Similar to CWO REZ, the NSW Government lists good natural resources, investment interest and strong existing grid as reasons for selecting NE REZ. New England also has potential sites for pumped hydro development and some proposals have recently received pre-investment funding from the Emerging Energy Program (NSW Government 2020). Mount Oven Pumped Hydro project is the highest priority energy storage project, designed to support new renewable generation in the NE REZ with 600MW storage.

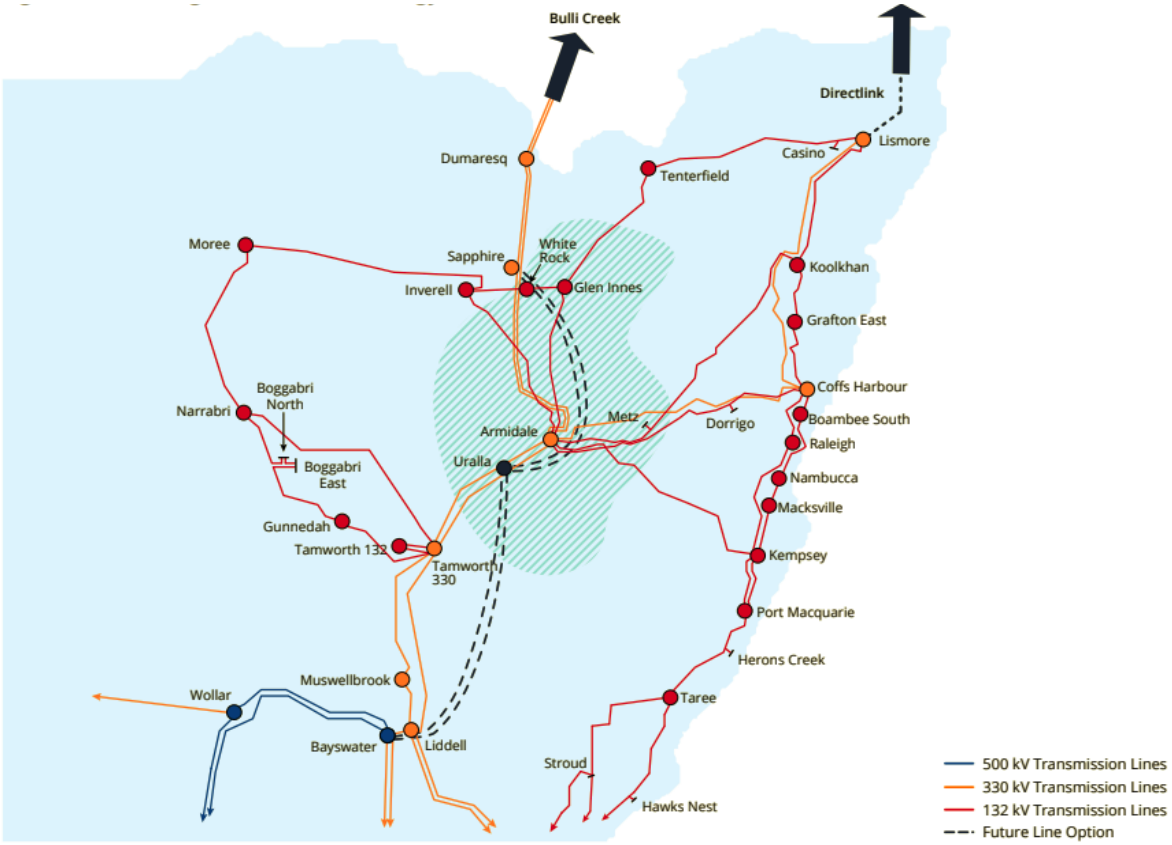


Figure A.2: New England network and indicative New England REZ. Source: TransGrid 2020, p. 29

[185] https://www.aemc.gov.au/sites/default/files/documents/rule_change_submission_-_erc0294_-_clean_energy_investor_group_-_20210121.pdf

The area has several existing high-voltage power lines, which importantly include the existing QLD-NSW interconnector (QNI) and the plan for the QNI Upgrade between Bulli Creek and Bayswater substations (see Figure A.2). While the transmission in the REZ is already congested towards the main loads (Sydney-Wollongong-Newcastle area)[186], there are several possibilities to increase the current capacity ranging from virtual transmission with batteries, technical improvements to existing infrastructure and a new link between Liddell and Tamworth, all considered as a part of the QNI Upgrade (Transgrid 2020). The distance to Liddell and other retiring coal power stations (= the strong links to main loads) from the REZ is relatively short and the whole QNI Upgrade has been identified as a committed ISP project. [187]

Not surprisingly in New England as in CWO REZ, the built and proposed large-scale projects are mainly located near the existing grid and substations, which are marked as red/orange/blue dots in Figure A.2. The size of the projects is somewhat larger compared to CWO REZ, though there are also some mid-scale solar projects (5-25 MW) planned or already built.

A.3 ESTIMATES OF NEW GENERATION CAPACITY: CWO AND NE REZ

REZ resource estimates, network capacity estimates and statistics of different agencies at different times vary as the tables below show. Estimates seem to trend upwards over time, and the most recent projections from TransGrid's 2020 connection applications for CWO REZ show the existing projects, though some still in very early stages of planning, already exceed most estimates.

Table A.1. Estimate of new generation capacity (Central West Orana)

AEMO 2018 ISP - Spare network capacity	Central West: 100 MW Central NSW Tablelands: 1000 MW
AEMO 2018 ISP Estimated resources *Note: Central West Orana is partly on two separate REZs in 2018 ISP; Central West and Central NSW Tablelands*	Central West: Solar: 3750 MW (C) Wind: 1420 MW (C)
	Central NSW Tablelands: Solar: 3000 MW (D) Wind: 1600 MW (B)
AEMO 2020 ISP Network capacity considerations	+3000 MW (by 2022)

[186] See NSW Electricity Strategy (p. 17) https://energy.nsw.gov.au/sites/default/files/2019-11/NSW%20Electricity%20Strategy%20-%20Final%20detailed%20strategy_0.pdf

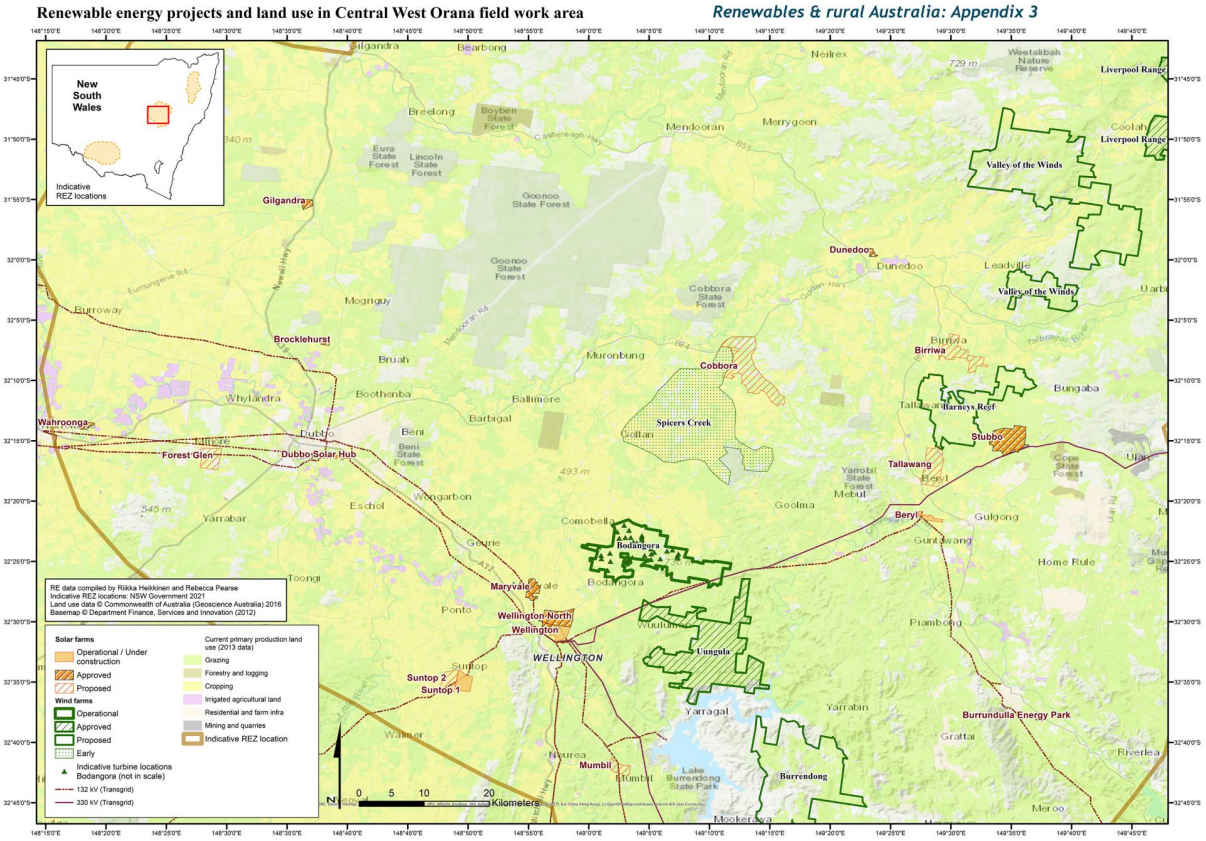
[187] The other link to Queensland shown on Figure A.2, Directlink ,is a privately funded 180MW transmission line owned by a transnational energy investment company, Energy Infrastructure Investments Pty Ltd (https://www.aer.gov.au/system/files/Directlink%20-%20Attachment%2014-2%20-%20Pricing%20Methodology%20-%20January%202019.pdf)

AEMO 2020 ISP Estimated resources	Solar: 7200 MW (C) Wind: 3000 MW (C)
NSW Government 2018 REZ plan	+3000 MW (goal by mid 20s)
Transgrid 2020 connection applications ("Central NSW")	Solar: 9095 MW Wind: 3895 MW Battery storage: 1800 MW
Transgrid 2020 available capacity outside already signed connection agreements	100 MW

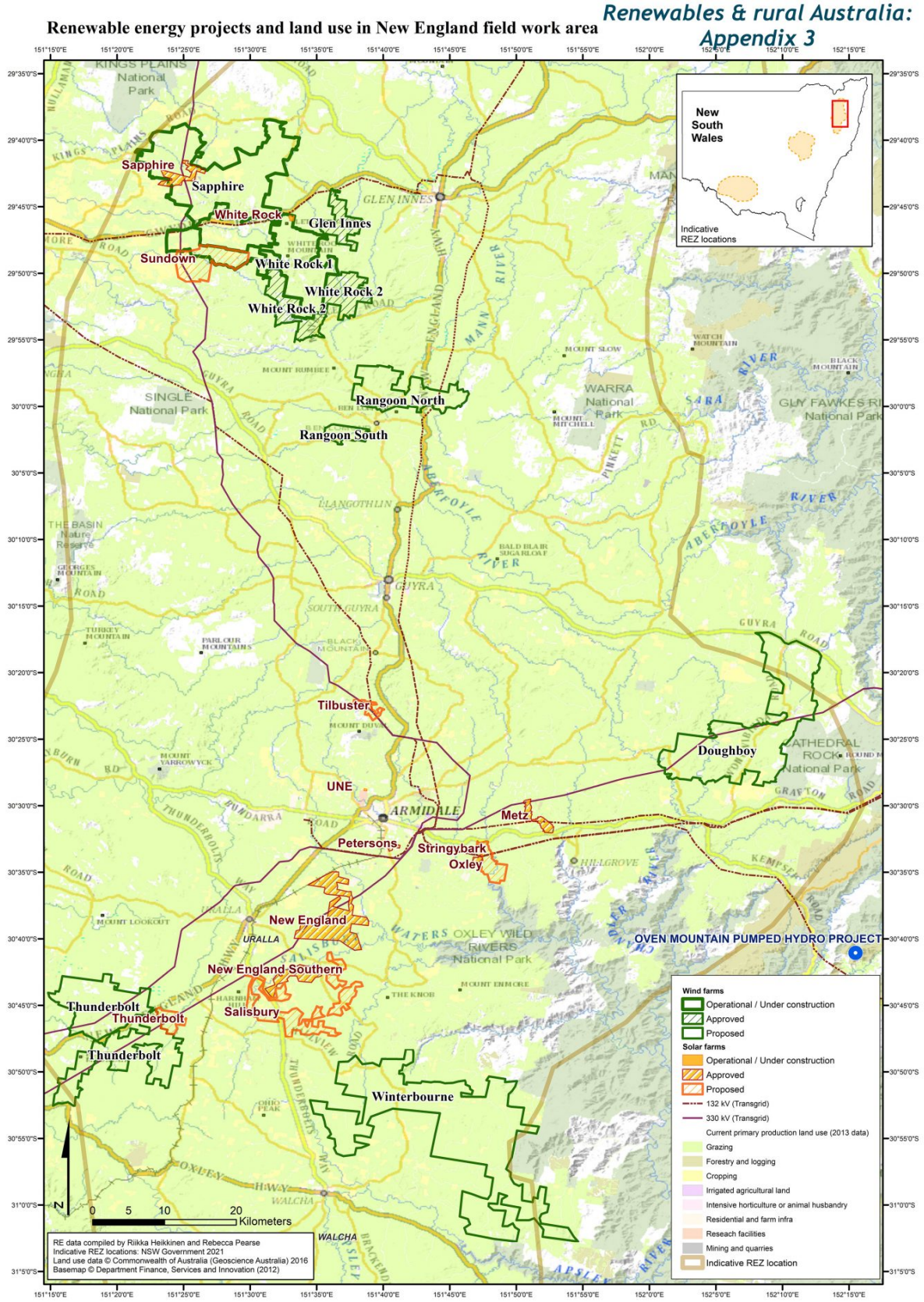
Table A.2. Estimate of new generation capacity (New England)

AEMO 2018 ISP - Spare network capacity	300 MW (called Northern NSW Tablelands REZ)
AEMO 2018 ISP Estimated resources	Solar: 1750 MW (D) Wind 3660 MW (B)
AEMO 2020 ISP Network capacity considerations	Stage 1: +3000–4000 MW Stage 2: +4000–5000 MW
AEMO 2020 ISP Estimated resources	Solar: 3500 MW (C) Wind 7400 MW (C)
NSW Government REZ plan	+8000 MW (no timeframe yet)
Transgrid 2020 connection applications ("Northern NSW")	Solar: 8190 MW Wind: 4612 MW Hydro: 600 MW
Transgrid 2020 available capacity for Northern NSW outside already signed connection agreements	400 MW

Appendix 2


Renewable energy projects and land use in Central West Orana field work area
Renewables & rural Australia: Appendix 3
New South Wales
Indicative REZ locations
Gilgandra
Brocklehurst
Dubbo Solar Hub
Forest Glen
Wahroonga
Suntop 2
Suntop 1
Wellington North
Wellington
Maryvale
Bodangora
Cobbora
Spicers Creek
Dunedoo
Valley of the Winds
Liverpool Range
Barneys Reef
Stubbo
Tallawang
Beryl
Birriwa
Ungula
Burrendong
Burrundulla Energy Park
RE data compiled by Rikka Heikkinen and Rebecca Pearse
Indicative REZ locations: NSW Government 2021
Land use data © Commonwealth of Australia (Geoscience Australia) 2016
Basemap © Department Finance, Services and Innovation (2012)
Solar farms
Operational / Under construction
Approved
Proposed
Wind farms
Operational
Approved
Proposed
Early
Indicative turbine locations
Bodangora (not in scale)
132 kV (Transgrid)
330 kV (Transgrid)
Current primary production land use (2013 data)
Grazing
Forestry and logging
Cropping
Irrigated agricultural land
Residential and farm infra
Mining and quarries
Indicative REZ location
0 5 10 20
Kilometers

Appendix 3


Renewable energy projects and land use in New England field work area
New South Wales
Indicative REZ locations
Sapphire
Sapphire
White Rock
Glen Innes
Sundown
White Rock 1
White Rock 2
White Rock 2
Rangoon North
Rangoon South
Tilbuster
Doughboy
UNE
Metz
Petersons
Stringybark
Oxley
New England
New England Southern
Salisbury
Thunderbolt
Thunderbolt
Thunderbolt
Winterbourne
OVEN MOUNTAIN PUMPED HYDRO PROJECT
Wind farms
Operational / Under construction
Approved
Proposed
Solar farms
Operational / Under construction
Approved
Proposed
132 kV (Transgrid)
330 kV (Transgrid)
Current primary production land use (2013 data)
Grazing
Forestry and logging
Cropping
Irrigated agricultural land
Intensive horticulture or animal husbandry
Residential and farm infra
Reseach facilities
Mining and quarries
Indicative REZ location
0 5 10 20
Kilometers
RE data compiled by Riikka Heikkinen and Rebecca Pearse
Indicative REZ locations: NSW Government 2021
Land use data © Commonwealth of Australia (Geoscience Australia) 2016
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