Appendix 3. Renewable energy zones

June 2022

Appendix to 2022 ISP for the National Electricity Market

Important notice

Purpose

This is Appendix 3 to the 2022 *Integrated System Plan* (ISP), available at https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp.

AEMO publishes the 2022 ISP under the National Electricity Rules. This publication has been prepared by AEMO using information available at 15 October 2021 (for Draft 2022 ISP modelling) and 19 May 2022 (for 2022 ISP modelling). AEMO has acknowledged throughout the document where modelling has been updated to reflect the latest inputs and assumptions. Information made available after these dates has been included in this publication where practical.

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Version control

Version	Release date	Changes
1.0	30/6/2022	Initial release

AEMO acknowledges the Traditional Owners of country throughout Australia and recognises their continuing connection to land, waters and culture. We pay respect to Elders past and present.

ISP Appendices

Contents

Figures

A3.1 Introduction

Renewable Energy Zones (REZs) are high-quality resource areas where clusters of large-scale renewable energy projects can be developed using economies of scale. REZs include onshore renewable energy zones and Offshore Wind Zones (OWZs), all of which are subject to the same regulatory processes including REZ Design Reports.

This ISP signals the need for significant investment in renewable generation to reduce emissions and replace retiring power stations, largely clustered into REZs. The development of new generation in areas away from coal and gas basins necessitates network investment to unlock renewables across all NEM regions. Economic and engineering assessments undertaken to develop this ISP considered the efficient network and generation needed in an optimal development plan, that can adapt over time.

This Appendix 3[1] provides detail on these REZs and the VRE development opportunities within them. It sets out:

- **A3.2 REZ candidates.**
  - A map of the 41 short-listed REZs including six OWZs across eastern Australia that AEMO has identified following rigorous consultation.
  - An overview of how these candidate zones were identified.
- **A3.2 Social licence.**
  - A map of the candidate onshore REZ and OWZs overlaid on a map that shows indigenous estates and native land titles.
  - A discussion on undergrounding transmission lines.
- **A3.4 REZ development overview** to help NEM stakeholders visualise the scale and speed of expected VRE development projected in all scenarios:
  - An overview of expected VRE development across the NEM, highlighting the REZs of greatest near-term interest.
  - Information on resource diversity, expected capacity factor and curtailment (as REZs with high-quality wind and solar resources generally experience high network utilisation and low curtailment).
  - An outline of the process for initiating REZ design reports.
- **A3.4 REZ scorecards** to help NEM stakeholders target detailed data for specific REZs:
  - Individual scorecards for each REZ arranged by state, including assessments of resource quality, network capability, and preferred timing across scenarios for additional generation capacity.

[1] The outcomes presented in this appendix are based on CDP 11 which features actionable timings for Marinus Link and HumeLink, as well as a staged delivery of VNI West. CDP11 was chosen because it represents a likely path of development for the NEM, it presents a consistent transmission investment path for all scenarios, and the long-term development outcomes for generation investments are similar to those that would result from the ODP. The accompanying Generation Outlook data files contain ISP development opportunity information for other CDPs. See Appendix 6 for more details

A3.2 REZ candidates

An efficiently located REZ can be identified by considering a range of factors, primarily:

- Quality of renewable resources, diversity relative to other renewable resources, and correlation with demand.
- The cost of developing or augmenting transmission connections to transport the renewable generation produced in the REZ to consumers.
- The proximity to load, and the network losses incurred to transport generated electricity to load centres.
- The critical physical must-have requirements to enable the connection of new resources (particularly inverter-based equipment) and ensure continued power system security.

REZ candidates were initially developed in consultation with stakeholders for the 2018 ISP[2] and used as inputs to the ISP model. REZ candidates have been continuously updated and refined through the 2020 ISP and 2021 IASR consultation process. Futher details on the selection of REZ candidates is detailed in the IASR[3], and the 41 REZ including six OWZs studied are shown in Figure 1. Details and costs of REZ augmentation options are detailed in the Transmission Cost Report[4].

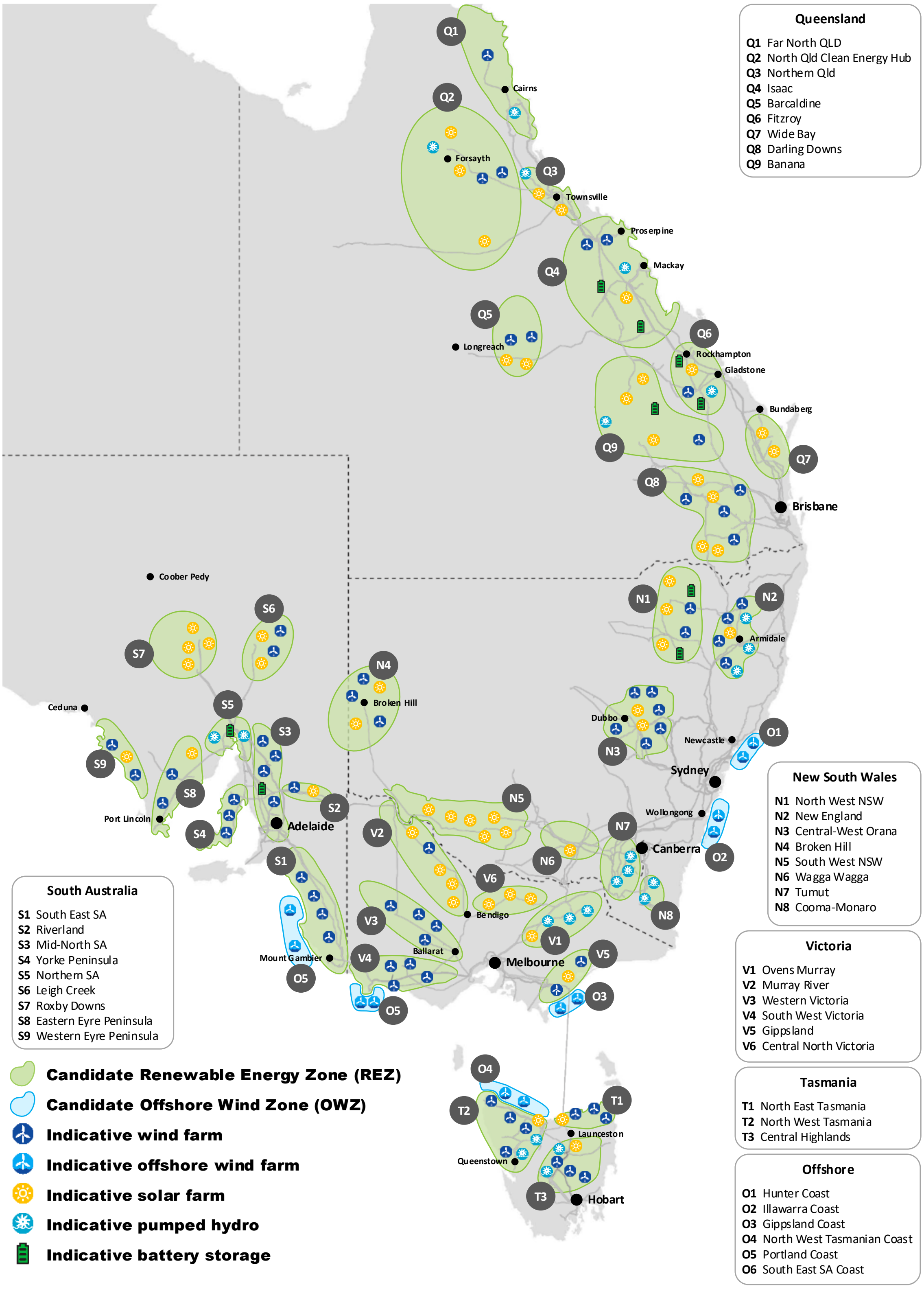
Renewable energy developers and network companies should consider opportunities for early and active engagement with communities, land title holders and affected persons as part of the detailed designs for REZs.

[2] At https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/isp/2018/integrated-system-plan-2018_final.pdf?la=en&hash=40A09040B912C8DE0298FDF4D2C02C6C.

[3] At https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios.

[4] At https://aemo.com.au/-/media/files/major-publications/isp/2021/transmission-cost-report.pdf?la=en.

Figure 1 2022 REZ including OWZ candidates



† AEMO has updated the REZ boundaries for N5 aligned with geographical area of the SWNSW REZ in Schedule 1 of the draft REZ declaration, available at https://www.energy.nsw.gov.au/sites/default/files/2022-03/Draft%20South-West%20REZ%20Declaration.pdf. AEMO will update all relevant parameters in the 2024 ISP.

‡ EnergyCo is in the early stages of planning for two new REZs in the Hunter-Central Coast and Illawarra regions of New South Wales, as set out under the New South Wales Electricity Infrastructure Act 2020. These REZs are not shown because they are not yet geographically defined

A3.3 Social licence

Australia will need large VRE growth in each of the scenarios as coal-fired stations retire. The ISP seeks to limit the impact of VRE developments by concentrating these developments in REZs and limiting the proportion of land within a REZ that can be developed. VRE developments will tend to be concentrated or clustered in particular areas within the REZ where the network access and/or land use is most suitable. AEMO recognises that building social licence will be pivotal to the success or failure of these REZs.

Early community engagement and integrated land use planning is key to ensure investments have appropriate social licence. In some instances, these early engagements and land use planning may lead to alternative developments. AEMO is a supporter of the Energy Charter which is progressing work on social licence issues with regards to landholder access[5].

This section provides insights from the ISP to support governments, councils and rule-makers in evolving their frameworks to support social licence. These topics include:

- **Indigenous interests** – the candidate REZs overlap significantly with native title and Indigenous estates. It is important that traditional landowners and councils are consulted early.
- **Undergrounding transmission lines** – this may be feasible for generator connection assets, where distances are shorter, and the investment cost is largely dictated by the capital cost of generation
- **Land acquisition** –the approach to, and cost of, acquiring land is an important and crucial part of any infrastructure development.

A3.3.1 Indigenous interests

REZ developments could provide a range of opportunities for Indigenous communities in regional and remote areas. As REZs progress from concepts to pre-feasibility studies, it is important that Traditional Owners and land councils are consulted early in the process. Early and genuine engagement can:

- Improve designs by considering local knowledge.
- Minimise the impact on areas of cultural significance.
- Provide training, employment and other opportunities for local First Nations people.
- Enable the social licence to deliver timely infrastructure.

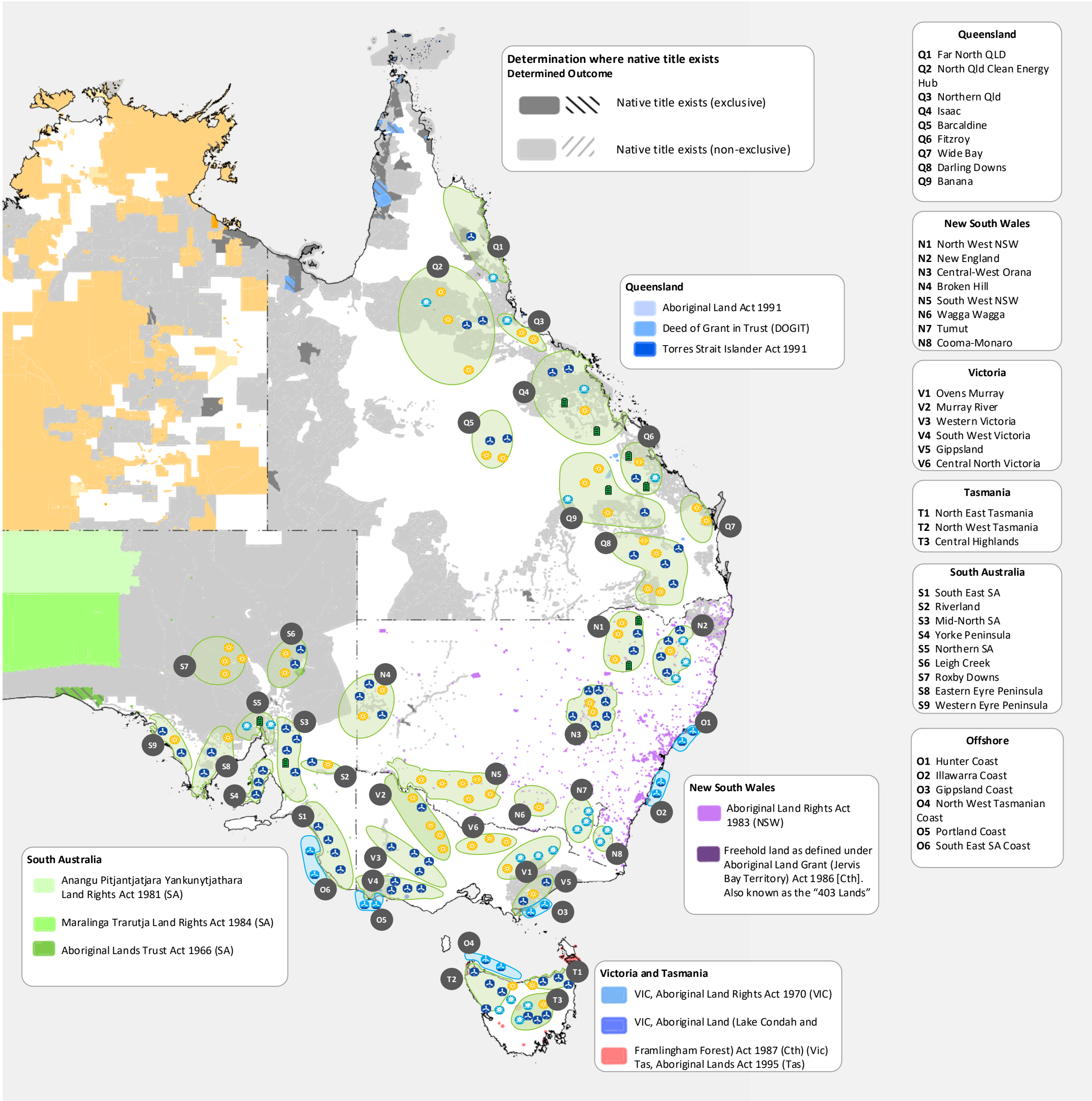
The National Native Title Tribunal has developed a map of Indigenous Estates across Australia[6]. This map shows land granted under specified Indigenous land granted instruments.

Figure 2 overlays candidate REZs across the native title map to illustrate the broader impacts that energy infrastructure development could have on Indigenous lands and interests, and to highlight a significant overlap between Indigenous land granted and potential energy infrastructure.

[5] See https://www.theenergycharter.com.au/landholder-and-community-engagement/.

[6] National Native Title Tribunal Indigenous Estates, as of April 2022, at http://www.nntt.gov.au/Maps/Indigenous_Estates_and_Determinations_A1L.pdf.

Figure 2 Candidate REZs and OWZs shown on the National Native Title Tribunal Indigenous Estates map



This figure has been reproduced with the permission of the National Native Title Tribunal.

A3.3.2 Undergrounding transmission lines

Overhead lines are often an economic, flexible, and responsive design choice for augmenting the high-voltage transmission network. Overhead lines represent the vast majority of the Australian transmission network, and have reliably served the community for many years.

In the 2021 *Transmission Cost Report*[7], AEMO found that the costs of underground cables are approximately four to 25 times higher than overhead lines – depending on a range of design factors such as voltage, capacity and whether the cables can be direct buried or require tunnels. AEMO publishes a Transmission Cost Database[8] that allows stakeholders to explore cost estimates for overhead transmission lines and underground cables.

In contrast to transmission projects in countries that have high population and energy density, Australian transmission projects tend to stretch very long distances. Implementing underground transmission network over these long distances will often be cost-prohibitive, and should only be considered on a case-by-case basis. Opportunities for undergrounding network may be feasible for generator connection assets, where distances are shorter, and the investment cost is largely dictated by the capital cost of generation (for example, wind or solar farms).

A3.3.3 Land acquisition for transmission easements

The approach to, and cost of, acquiring land is an important and crucial part of any infrastructure development.

Once a project has passed the RIT-T, the current NEM framework typically involves the TNSP requesting an allowance to acquire land based on market rates and an estimation for negotiating with landowners above that rate. The AER is then required to review whether that allowance is prudent and efficient. Once an investment is approved, the TNSP then has a financial incentive (via the capital expenditure sharing scheme [CESS]) to acquire land for the lowest cost.

For Project EnergyConnect, as an example, the approved cost of acquiring land was approximately 5% of the total capex, including a margin for negotiating above market rates.

Stage 2 of the AEMC's Transmission Planning Investment Review is considering the issue of land acquisition and how this links to social licence[9]. AEMO supports revisions to the framework that can improve incentives to acquire land through negotiation.

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[7] AEMO. *2021 Transmission Cost Report*, at https://aemo.com.au/en/consultations/current-and-closed-consultations/transmission-costs-for-the-2022-integrated-system-plan .

[8] AEMO. *Transmission Cost Database*, at https://aemo.com.au/en/consultations/current-and-closed-consultations/transmission-costs-for-the-2022-integrated-system-plan.

[9] See https://www.aemc.gov.au/market-reviews-advice/transmission-planning-and-investment-review.

A3.4 REZ development overview

The following section presents AEMO's prioritisation and development of identified REZs within each NEM region. AEMO has worked with state governments as part of defining the locations and renewable resources within the REZs in each state.

Factors that generally affect the development of a REZ include, but are not limited to:

- Energy targets, policies and scenarios.
- Resource quality.
- Existing transmission network capacity.
- Demand correlation and correlation with other favourable REZs.
- Cost of developing or augmenting the transmission network.
- Proximity to the load centre.
- Social licence for development of the generation, storage and associated network.

Under every scenario – *Progressive Change, Step Change, Slow Change and Hydrogen Superpower* – large increases in VRE are needed. Targeted and strategic investment is required to balance resources across states and unlock much-needed REZs.

There is already approximately 15 GW of utility scale VRE installed in the NEM, and approximately another 6 GW is expected to be operational over the next few years, as either committed or anticipated projects[10]. Allowing for the strong growth in DER, Australia will still need an additional 44 GW to 540 GW of new VRE in REZs by 2050, depending on the scenario.

Figure 3 to Figure 6 show the forecast geographical dispersion of VRE for 2029-30, 2039-40 and 2049-50 for each scenario. In the next decade, more wind capacity is needed to complement the strong uptake of distributed PV. Once there is sufficient storage and network investment to take advantage of cheaper solar resources, grid-scale solar is projected to accelerate again.

[10] Data is as of February 2022, AEMO Generation Information Page, at https://www.aemo.com.au/energy-systems/electricity/nationalelectricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information. Definitions of committed and anticipated are included in each Generation Information update.

Figure 3 Forecast geographic dispersion of new VRE developments in the *Step Change* scenario in 2029-30 (left), 2039-40 (middle), 2049-50 (right)

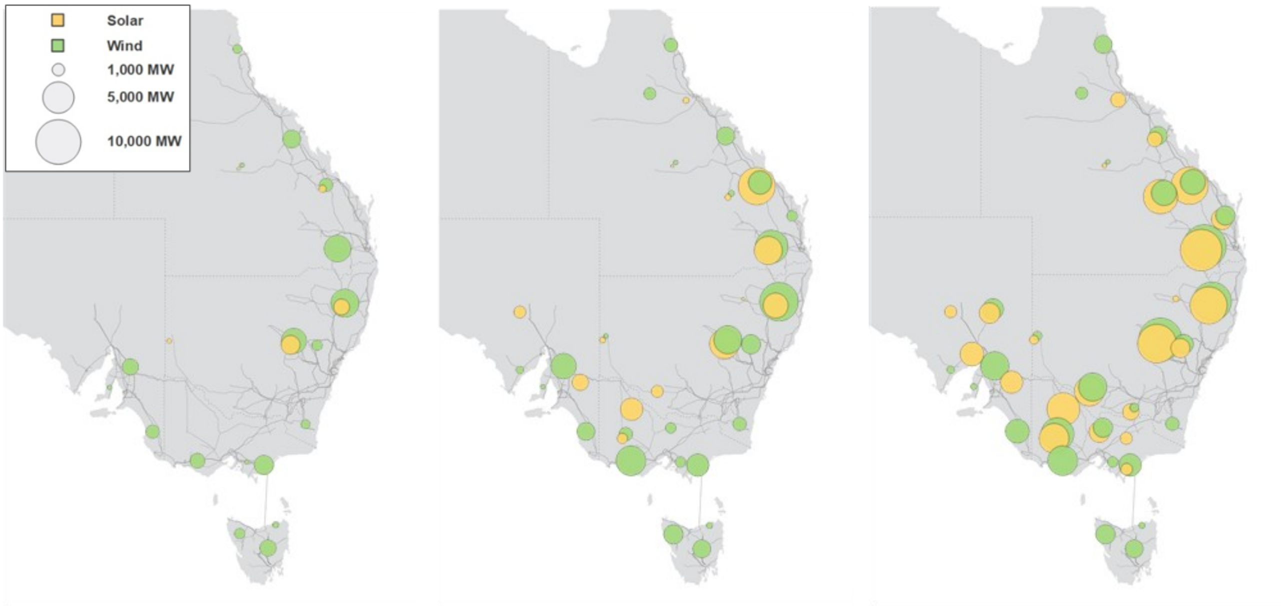


Figure 4 Forecast geographic dispersion of new VRE developments in the *Progressive Change* scenario in 2029-30 (left), 2039-40 (middle), 2049-2050 (right)

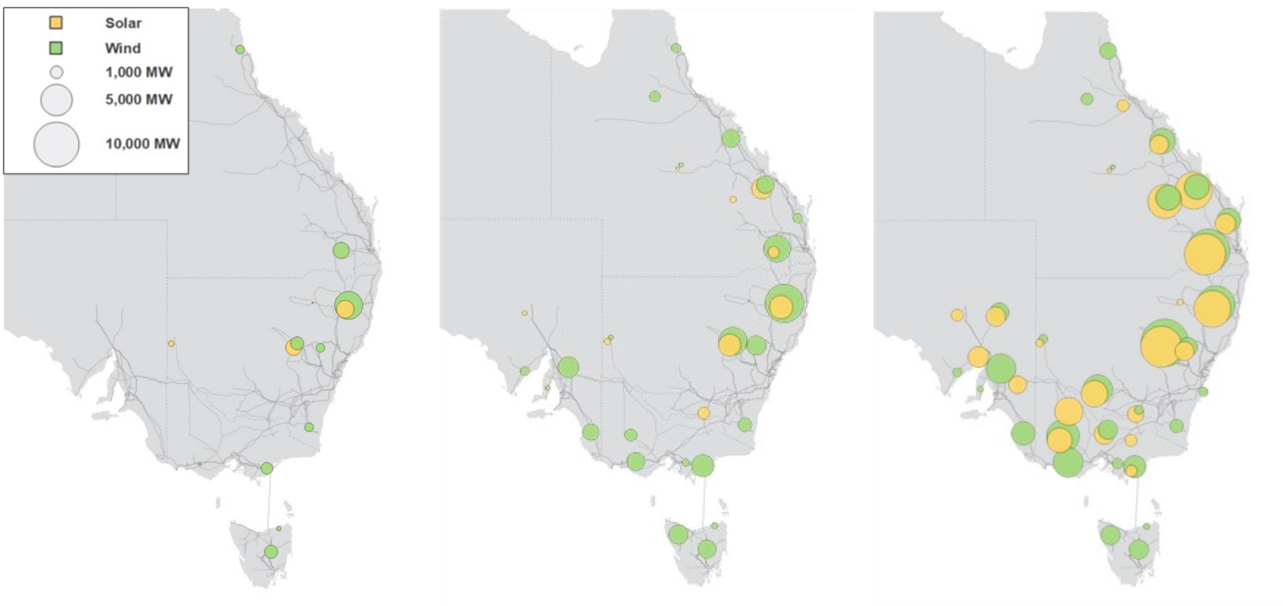


Figure 5 Forecast geographic dispersion of new VRE developments in the *Slow Change* scenario in 2029 30 (left), 2039-40 (middle), 2049-50 (right)

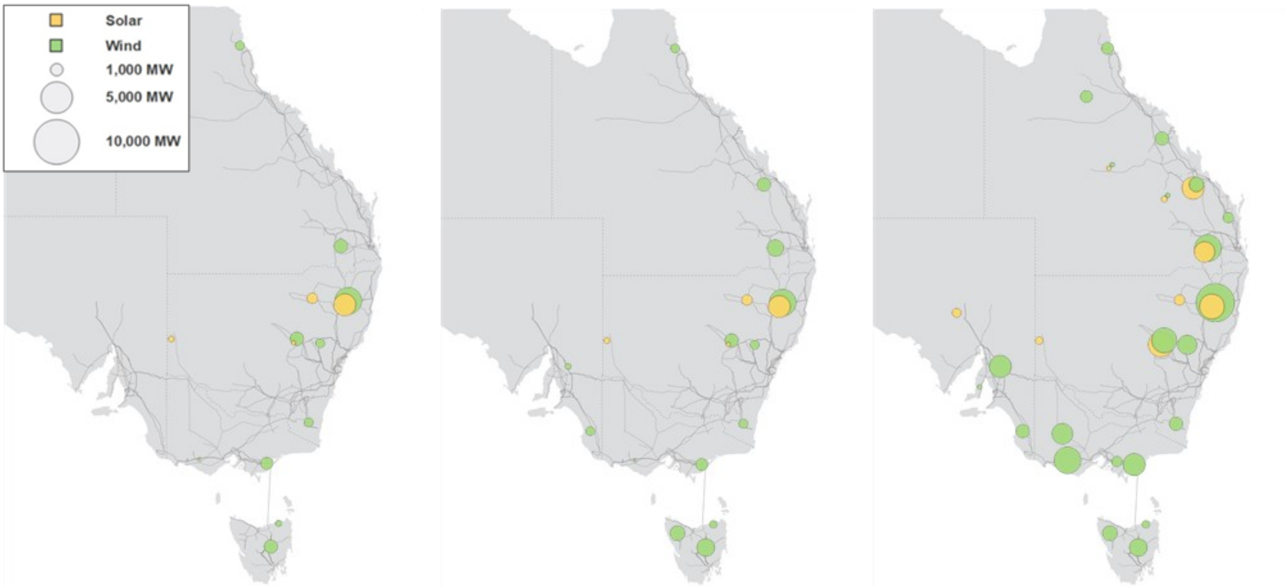
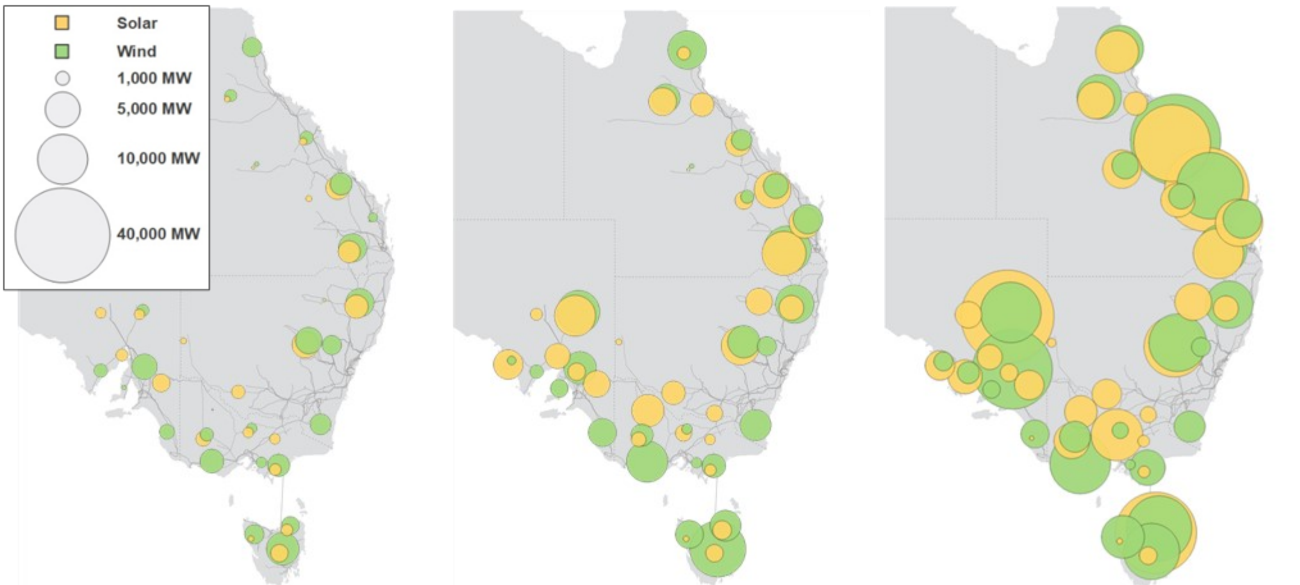


Figure 6 Forecast geographic dispersion of new VRE developments in the *Hydrogen Superpower* scenario in 2029-30 (left), 2039-40 (middle), 2049-50 (right)

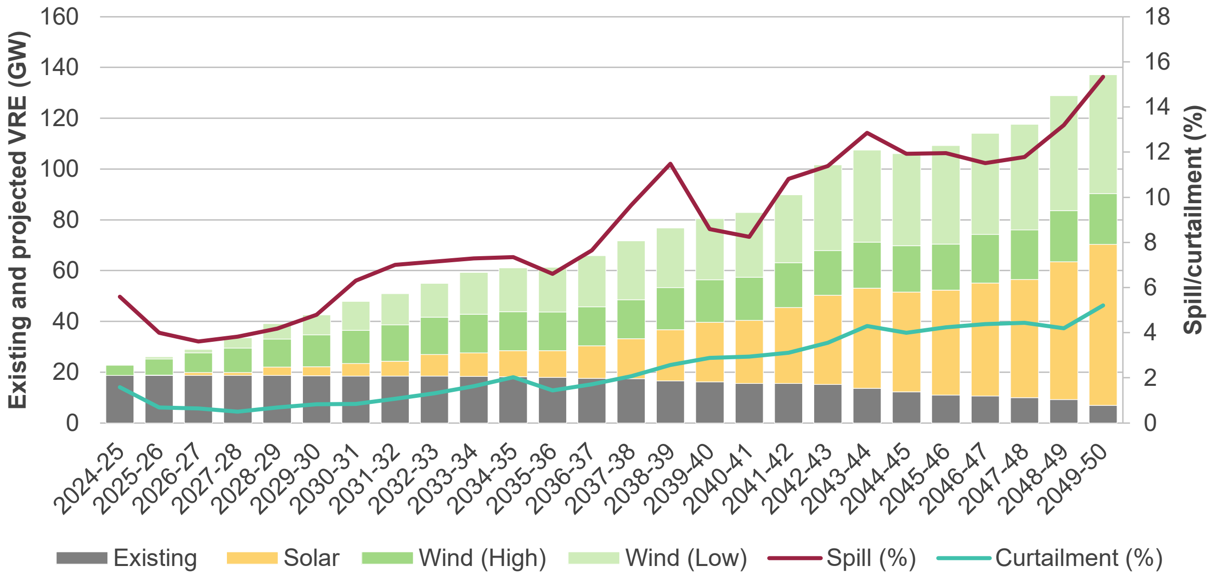


A3.4.1 Diversity of resources in REZs

In the 2022 ISP, AEMO optimised investment in wind, solar and transmission development within each REZ. This optimisation allowed for the consideration of resource diversity and economic levels of energy spill[11] and curtailment[12] to maximise the development of VRE while minimising the transmission network expansion.

As an example, Figure 7 shows forecasts of cumulative utility-scale VRE for REZs across the NEM for the *Step Change* scenario, and the economic levels of energy spill and transmission curtailment. To accommodate the projected utility-scale VRE[13] of approximately 135 GW by 2050, the forecast economic spill is 15% and transmission curtailment is approximately 5%.

Figure 7 Projected utility-scale VRE in REZ for the NEM, economic spill and transmission curtailment



A3.4.2 REZ development

This section provides a high-level overview of long-term REZ development across the NEM. Detailed projections for individual REZs are provided in Section A3.6. Transmission augmentations required to facilitate these large VRE developments is described in more detail in Appendix 5.

New South Wales

In New South Wales, almost 40 GW of new utility-scale wind and solar VRE in REZs is projected as being required by 2050 to assist in replacing retiring coal-fired generation capacity. Figure 8 shows the utility-scale VRE projected for each REZ in New South Wales under the *Step Change* scenario. This modelling indicates:

- From the start of the study horizon, there is an immediate increase in VRE in the Central-West Orana REZ, with 3,700 MW new VRE capacity by 2028-29. By 2031-32 this has increased to over 5,000 MW, and by 2041-42 is over 10,000 MW.

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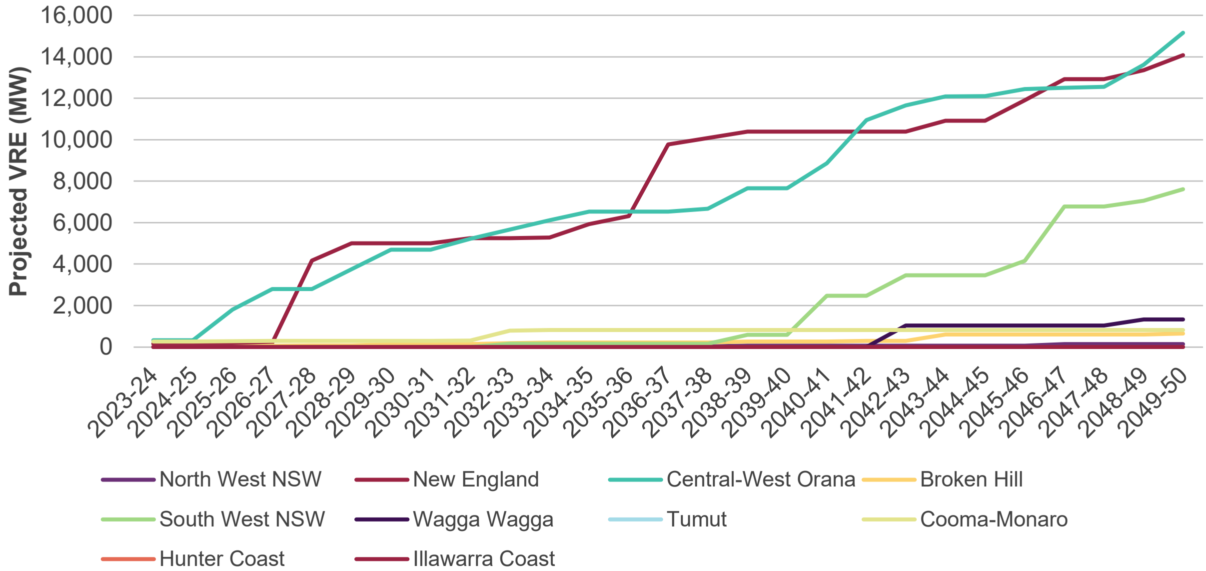
[11] Economic spill happens when generation reduces output due to market price.

[12] Curtailment happens when generation is constrained down or off due to operational limits.

[13] Figures referring to “utility-scale VRE” do not include DER, for example rooftop PV.

- Starting from 2027-28 significant VRE begins to be installed in the New England REZ, with installed capacity developing at a rate similar to that of the Central-West Orana REZ to also reach 5,000 MW new VRE capacity by 2028-29 and 10,000 MW by 2037-38.
- South West NSW only shows VRE developments later in the scenario, with over 2,000 MW new VRE projected by 2040-41, and over 6,500 MW by 2046-47.
- Other REZs in New South Wales, such as Wagga Wagga and Cooma-Monaro, also see smaller developments later in the study horizon, and account for less than 10% of the total projected utility-scale VRE developments in New South Wales.
- No offshore wind development is projected in the *Step Change* scenario results for New South Wales, largely due to the assumptions around cost and availability. See Section A3.4.3 for information about offshore wind development in the offshore wind sensitivity.

Figure 8 New South Wales utility-scale VRE development in REZs for *Step Change* scenario

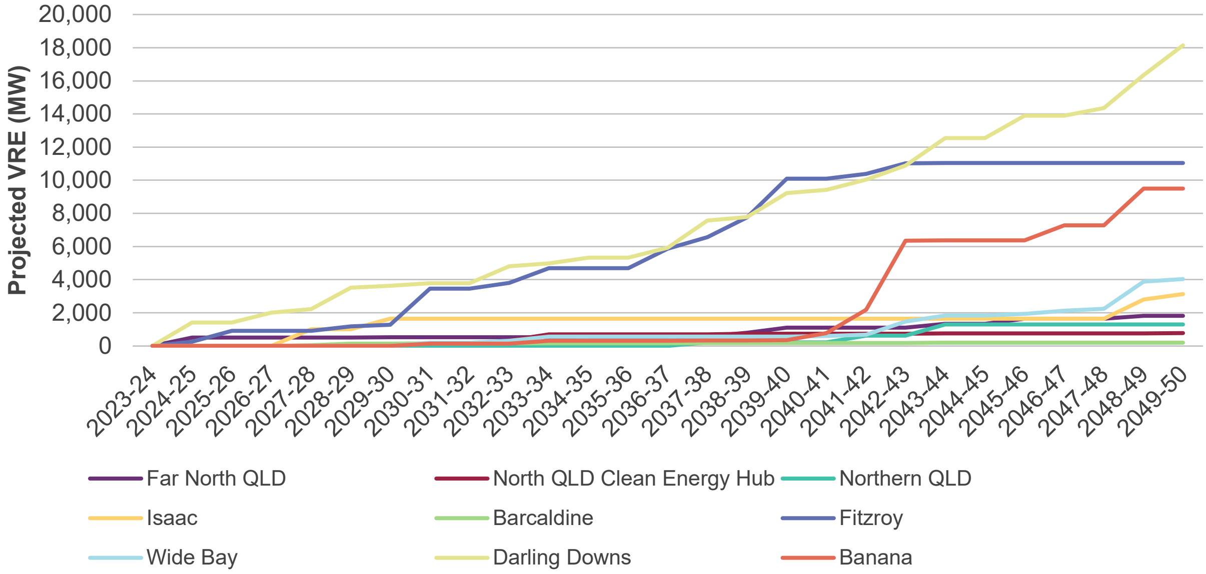


Queensland

In Queensland, approximately 48 GW of new utility-scale wind and solar VRE is projected as being required by 2050 to assist in replacing retiring generation. Figure 9 shows the utility-scale VRE projected for each REZ in Queensland under the *Step Change* scenario. This modelling indicates:

- VRE developments are mostly split between Fitzroy and Darling Downs, with developments also shown in the Banana REZ after 2040.
- Darling Downs sees the largest amount of projected new VRE capacity, with immediate developments taking advantage of spare network capacity, and with 4,000 MW new VRE by 2032-33, and 10,000 MW by 2041-42.
- From the start of the study horizon, there is an increase in VRE in Fitzroy, with over 3,000 MW new VRE capacity installed by 2030-31. By 2039-40 this has increased to over 10,000 MW.
- The Banana REZ is projected to see developments later in the scenario, with 9,500 MW new VRE capacity by 2049-50.

Figure 9 Queensland utility-scale VRE development in REZs for *Step Change* scenario

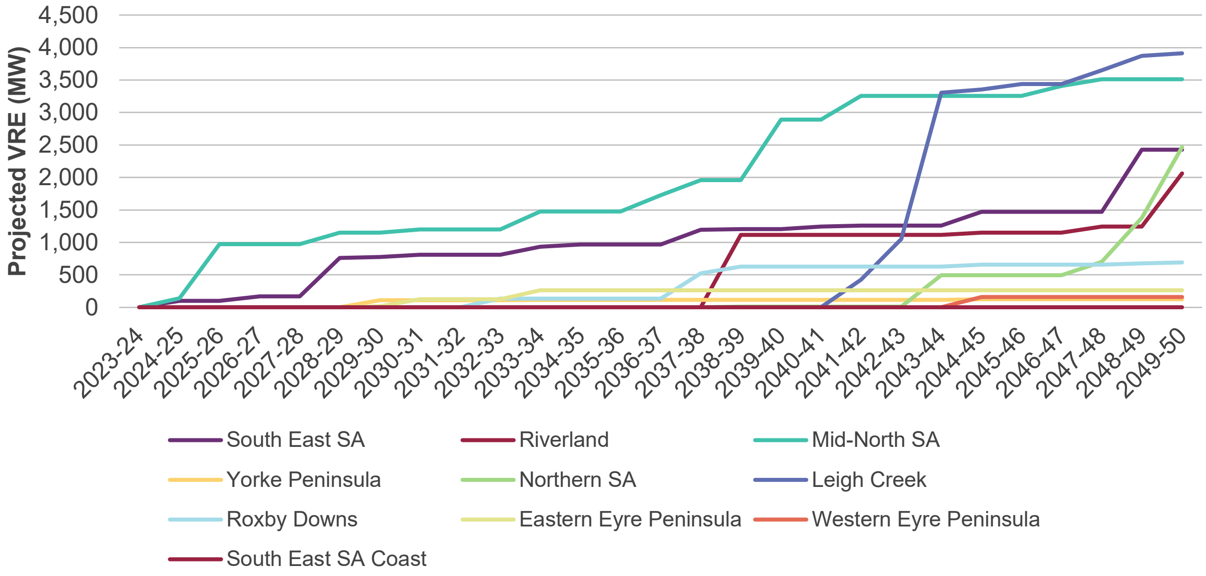


South Australia

In South Australia, approximately 15.5 GW of new utility-scale wind and solar VRE is projected as being required by 2050 to assist in replacing retiring gas generation capacity, utilising the additional capacity provided by the Project EnergyConnect interconnector. Figure 10 shows the utility-scale VRE projected for each REZ in South Australia under the *Step Change* scenario. This modelling indicates:

- The projected VRE is eventually dispersed over many REZs throughout South Australia, with the largest share of early development occurring in the South East SA and Mid-North SA REZs due to the high-quality wind resource.
- The Mid-North SA REZ sees an immediate increase in VRE, with an additional 1,000 MW of new VRE capacity by 2028-29, and 2,900 MW by 2039-40.
- The South East SA REZ also sees an immediate increase in VRE with over 750 MW new capacity by 2028-29 and over 1,200 MW by 2038-39.
- The Leigh Creek REZ is projected to see developments after 2041-42, with 3,900 MW new VRE capacity by 2049-50.

Figure 10 South Australia utility-scale VRE development in REZs for *Step Change* scenario



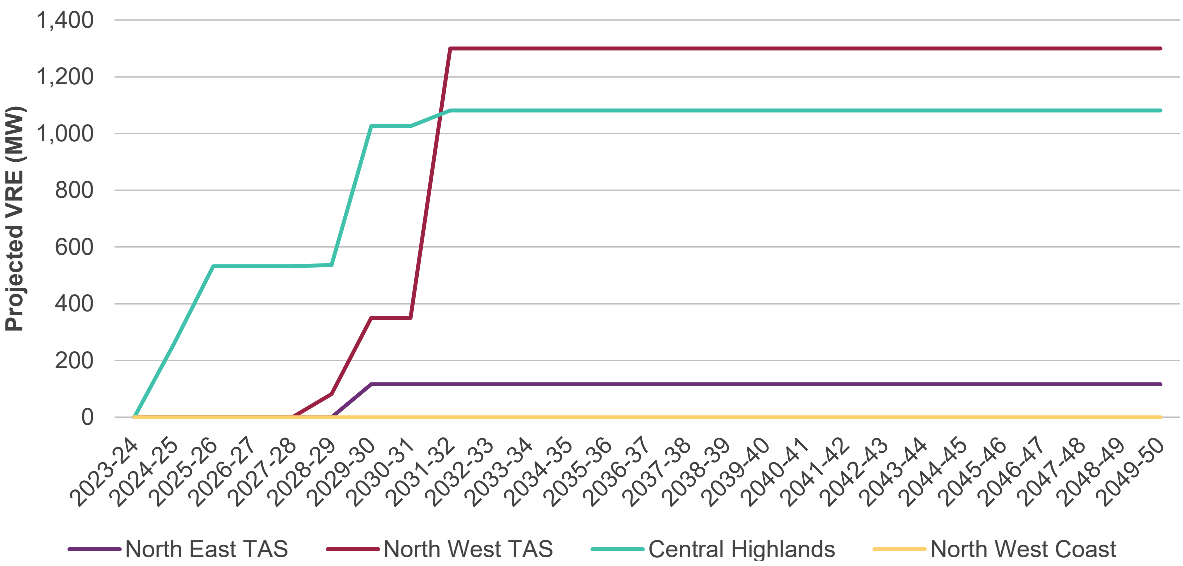
Tasmania

In Tasmania, close to 2.5 GW of new utility-scale wind VRE is projected as being required by 2031-32, utilising transmission capacity released by the development of Marinus Link.

Figure 11 shows the utility-scale VRE projected for each REZ in Tasmania under the *Step Change* scenario. This modelling indicates:

- Over 1,000 MW of new wind is projected for the Central Highlands REZs by 2029-30.
- 1,300 MW of new wind is projected for the North West Tasmania REZs by 2031-32.
- No further additional utility-scale VRE capacity is forecast as required from 2032-33.
- No offshore wind development is projected in the *Step Change* scenario results in Tasmania.

Figure 11 Tasmania utility-scale VRE development in REZs for *Step Change* scenario



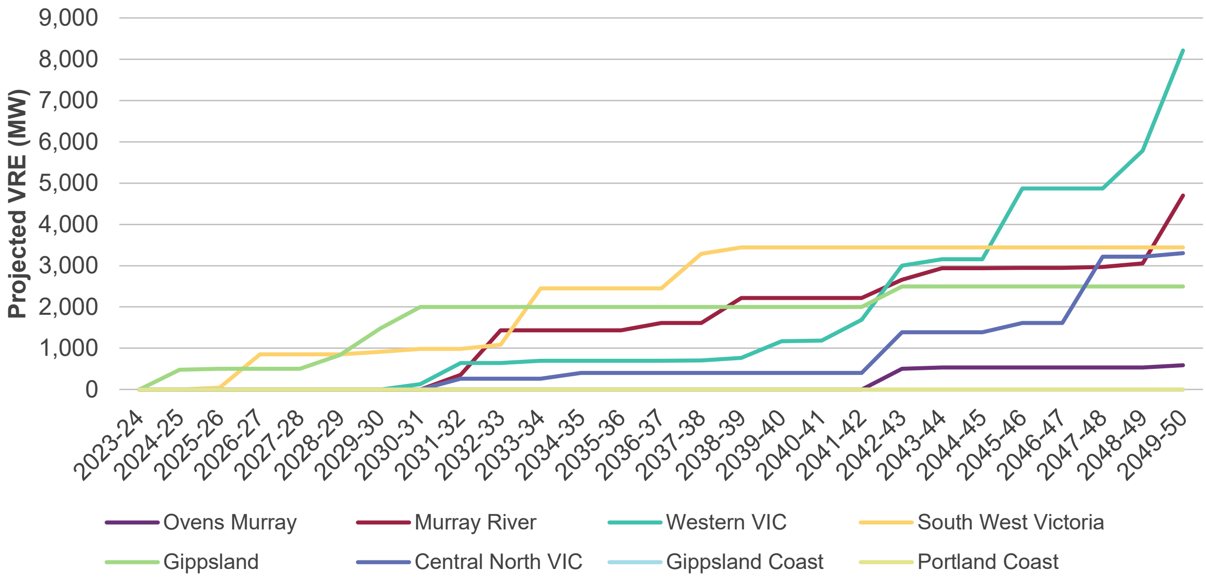
Victoria

In Victoria, over 22.7 GW of new utility-scale wind and solar VRE in REZs is projected as being required by 2049-50 to assist in replacing retiring generation.

Figure 12 shows the utility-scale VRE projected for each REZ in Victoria under the *Step Change* scenario. This modelling indicates:

- Approximately 3,000 MW new utility-scale VRE is forecast as required in Victoria by 2030-31. This new VRE is predominantly located in the South West Victoria and Gippsland REZs, utilising the existing spare network capacity.
- Over 2,000 MW of new VRE capacity is projected in the Murray River and Western Victoria REZs combined in the early 2030s, utilising the additional REZ network capacity from VNI West. Both of these REZs show larger developments after 2040, with over 8,000 MW in Western Victoria and 4,700 MW in Murray River by 2050.
- After 2040, new utility-scale VRE is projected to connect to the Central North Victoria, with up to 3,300 MW by 2050.
- No offshore wind development is projected in the *Step Change* scenario results for Victoria, largely due to the assumptions around cost and availability. See Section A3.4.3 for information about offshore wind development in the offshore wind sensitivity.

Figure 12 Victoria utility-scale VRE development in REZs for *Step Change* scenario



A3.4.3 *Offshore Wind* sensitivity

In March 2022, the Victorian Government announced a new target to build 9 GW of offshore wind by 2040[14]. Subsequently, in April 2022, the Commonwealth Government announced Gippsland as Australia's first

[14] Victorian Government. *Victoria Launches Australia's First Offshore Wind Targets*, at https://www.premier.vic.gov.au/victoria-launches-australias-first-offshore-wind-targets.

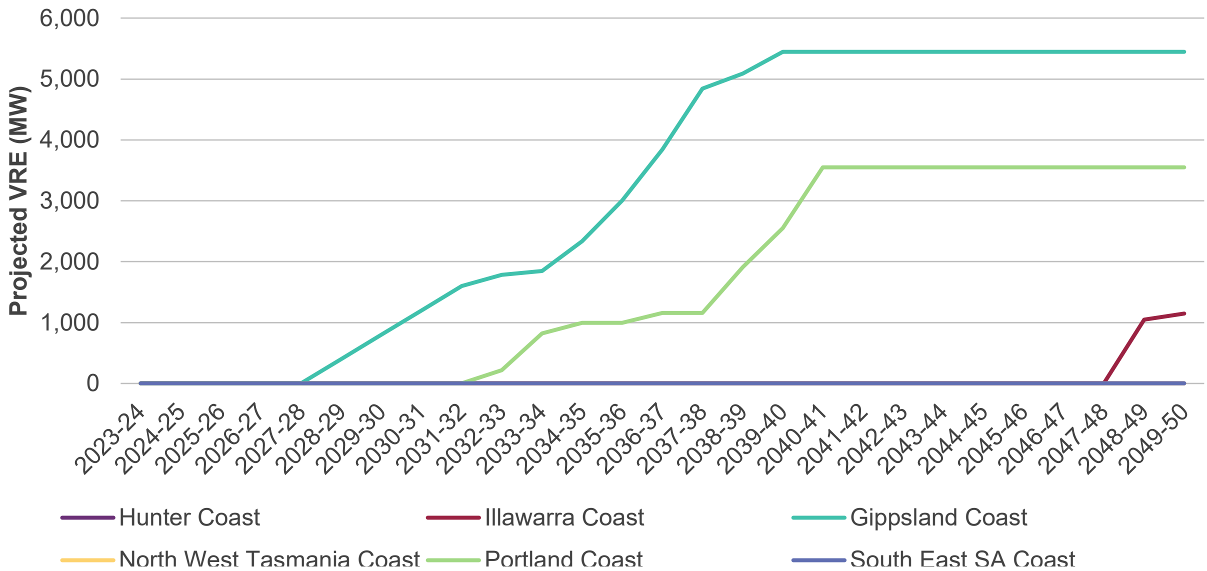
offshore wind priority assessment[15]. AEMO has conducted an *Offshore Wind* sensitivity on the *Step Change* scenario to explore the potential impact of the Victorian Government's ambition for offshore wind development. This sensitivity included:

- Offshore wind ramping up to 2 GW by 2032, 4 GW by 2035, and 9 GW by 2040 (with gradual developments between these years). To meet the early developments from 2028 to 2032, the lead time for Gippsland developments has been reduced, reflecting the growing maturity of announced projects in that OWZ.
- Updated offshore wind build cost projections based on updated capital costs from the Draft GenCost 2021-22 report[16]. The *Global NZE post 2050* scenario has been applied to reflect this lower anticipated cost.

Figure 13 shows the VRE development in OWZs under the Offshore Wind sensitivity on the Step Change scenario. By 2049-50, just over 10,000 MW of offshore wind in the NEM is developed under this sensitivity. This modelling indicates:

- Offshore wind development is projected for Victoria off the Gippsland Coast in the late 2020s increasing to over 3,000 MW by 2035-36 and almost 5,500 MW by 2040-41.
- In Victoria, Portland Coast offshore wind development is projected for 2032-33, increasing to approximately 1,000 MW by 2035-36 and to over 3,500 MW by 2040-41.
- Illawarra Coast in NSW is projected to develop just over 1,100 MW in the late 2040s.
- No offshore wind development is projected in the Hunter Coast in NSW, North West Tasmania Coast and South East SA Coast under this *Step Change* sensitivity.

Figure 13 Offshore wind development in OWZs for the offshore wind sensitivity on the *Step Change* scenario



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[15] Commonwealth Government. *Gippsland for Australia's first offshore wind priority assessment*, at https://www.minister.industry.gov.au/ministers/wilson/media-releases/gippsland-australias-first-offshore-wind-priority-assessment#:~:text=%E2%80%9CThe%20Morrison%20Government%20is%20getting,Energy%20and%20Emissions%20Reduction%20Tim.

[16] CSIRO. Draft GenCost 2021-22, at https://publications.csiro.au/publications/publication/PIcsiro:EP2021-3374.

A3.5 REZ design reports

REZ design reports[17] are part of a new framework that relates to improving network planning for REZs. This framework allows AEMO to trigger REZ designs by the jurisdictional planning body if:

- Transmission network development is required on the ODP within 12 years, and
- The decision is supported by the Minister of the relevant jurisdiction.

In addition to the network design and costing details, REZ design reports place additional obligations on the jurisdictional planning bodies to undertake consultation with potential generators, local councils, local community members and members of the public.

AEMO is continuing to work with state governments to align future REZ design reports with state initiatives. For the 2022 ISP no REZ design reports have been requested, but a need for preparatory activities for some REZ network developments has been determined (see Appendix 5 for more details on preparatory activities). In the event that a state government declares a priority REZ, AEMO can trigger a REZ design report by issuing an ISP update notice.

[17] NER clause 5.24.1

A3.6 REZ scorecards

A3.6.1 REZ scorecard details

The REZ scorecards in this section provide an overview of the characteristics of each REZ. The following table explains the criteria in the scorecards.

<table>
<tr><th colspan="7">REZ report card details</th></tr>
<tr><td colspan="7">REZ assessments</td></tr>
<tr><td>REZ grouping</td><td colspan="6">REZs are grouped into the following:
• REZs where design and community engagement are progressing.
• REZs where the coordination of generation infrastructure may be required.
• REZs where transmission and generation infrastructure coordination is required.
• REZs where infrastructure coordination can start later.</td></tr>
<tr><td colspan="7">Renewable resources</td></tr>
<tr><td rowspan="3">Map legend</td><td colspan="6">Indicative generation is shown based on the resource availability:</td></tr>
<tr><td>Wind</td><td>Offshore Wind</td><td>Solar</td><td colspan="3">Hydro</td></tr>
<tr><td colspan="3">The green shading shows the indicative geographic area of the REZ. Augmentation options shown are described in more detail in the Transmission Cost Report[18].</td><td colspan="3"></td></tr>
<tr><td rowspan="15">Metrics</td><td colspan="6">Solar average capacity factor based on eleven reference years:</td></tr>
<tr><td>≥30%</td><td>≥28%</td><td>≥26%</td><td>≥24%</td><td>≥22%</td><td><22%</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td></tr>
<tr><td colspan="6">Wind average capacity factor based on eleven reference years:</td></tr>
<tr><td>≥45%</td><td>≥40%</td><td>≥35%</td><td>≥30%</td><td colspan="2"><30%</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>D</td><td colspan="2">E</td></tr>
<tr><td colspan="6">Correlation between demand describes whether the REZ resources are available at the same time as the regional demand, using a statistical correlation factor. A higher correlation represents that the resource is more available at regional demand:</td></tr>
<tr><td>≥0.12</td><td>≥0.06</td><td>≥0.0</td><td>≥-0.10</td><td>≥-0.20</td><td><-0.20</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td></tr>
<tr><td colspan="6">Loss factor robustness is a sensitivity of Marginal Loss Factor (MLF) to additional generation inside the REZ. This is calculated using the Step Change scenario outcomes. The measure used is the additional generation (MW) that can be added before the MLF changes by -0.05:</td></tr>
<tr><td>≥1000</td><td>≥800</td><td>≥600</td><td>≥400</td><td>≥200</td><td><200</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td></tr>
<tr><td colspan="7">Renewable resources</td><td colspan="6">Estimated potential REZ size in MW based on the geographical size and resource quality in the REZ. Additional capacity (MW) above the resource limit is allowed for within the market modelling, but this incurs a penalty factor to account for likely social licence and community support costs. This can occur for all scenarios, but is predominantly seen in the Hydrogen Superpower results.</td></tr>
</table>

[18] At https://aemo.com.au/-/media/files/major-publications/isp/2021/transmission-cost-report.pdf?la=en.

REZ report card details		
Climate hazard		
	The REZ temperature score is based on the projected once in 10-year maximum temperatures[A] for the years 2030 and 2050. Temperature scores for OWZs consider the area on land that the OWZ is expected to connect.	
	Score	**Description**
	A	Once in 10-year maximum temperature projections range between 28°C and 38°C for the years 2030 and 2050.
	B	Once in 10-year maximum temperature projections range between 30°C and 44°C for the years 2030 and 2050.
	C	Once in 10-year maximum temperature projections range between 32°C and 48°C for the years 2030 and 2050.
	D	Once in 10-year maximum temperature projections range between 34°C and 50°C for the years 2030 and 2050.
	E	Once in 10-year maximum temperature projections range between 44°C and 52°C for the years 2030 and 2050.
Bushfire	The REZ bushfire score is based on the projection of annual average FFDI "high" fire danger days[B] around the years 2030 and 2050 and the probability of large bushfires occurring (a dominant input). Bushfire scores for OWZs consider the area on land that the OWZ is expected to connect.	
	Score	**Description**
	A	Model projections associate less than half the days of a year with high fire danger days and a probability of zero large fires in 20 years.
	B	Model projections associate less than half the days of a year with high fire danger days and a probability of one large fire in 20 years.
	C	Model projections associate more than half the days of a year with high fire danger days and a probability of one large fire in 20 years.
	D	Model projections associate more than half the days of a year with high fire danger days and a probability of between one and four large fires in 20 years.
	E	Model projections associate more than half the days of a year with high fire danger days and a probability of one large fire in three years.
Variable generation outlook		
Scenario	Long term market simulations of different scenarios named *Progressive Change*, *Step Change*, *Slow Change* and *Hydrogen Superpower*. The offshore wind zone scorecards also capture the offshore wind sensitivity for each scenario.	
Existing, committed and anticipated generation	The existing, committed and anticipated generation as of 22/02/2022, based on the advised Not Summer capacities.	
Projected variable generation	Long-term market simulations projected variable energy outlook for utility-scale solar and wind generation at different times intervals across all scenarios. All VRE projections are based on CDP 11 and is in addition to existing, committed and anticipated generation. All values are round to nearest 50 MW.	
Transmission expansion forecasts		
Transmission limit	The limit represents the network limit for the total VRE within a REZ. REZ expansion options are linearised, they are not discrete options.	
Transmission curtailment	Curtailment happens when generation reduces output due to transmission network congestion. It is represented as a percentage of VRE. The transmission curtailment is calculated based on the DLT zonal network model representation and is rounded to nearest 1%.	
Economic spill	Economic spill happens when generation reduces output due to market price. It is represented as a percentage of VRE and rounded to nearest 1%.	

A. Once in 10-year maximum temperature data was provided by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) for 2030 and 2050.
B. A "high" fire danger day is defined as any day where the Forest Fire Danger Index (FFDI) is greater than 12.
C. Advised seasonal generation capacities are taken into account in the modelling, and are detailed in the Inputs and Assumptions Workbook.

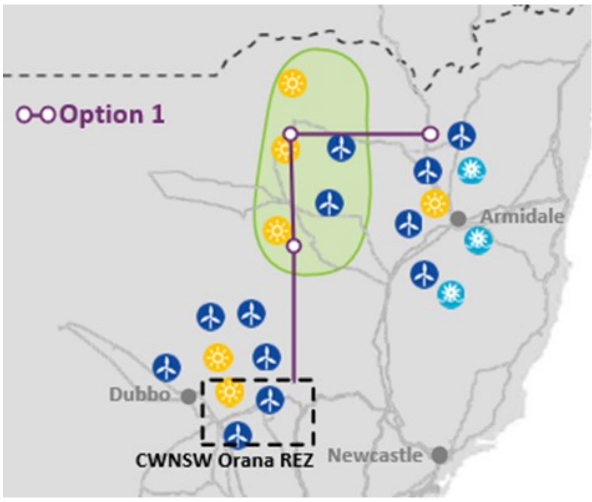
A3.6.2 New South Wales

N1 – North West NSW

Summary

The North-West New South Wales (NWNSW) REZ is located to the west of the existing QNI. While this zone has high-quality solar resources, the wind resource is estimated to be mostly inadequate for wind farm development.

If generation significantly increases in NWNSW and New England REZs, increased connection capacity between the two REZs may be required. The sharing of resources across the network augmentation will allow for better transmission utilisation and reduction in transmission build.



Existing network capability

The existing 132 kV network is weak and would require significant network upgrades to accommodate VRE greater than the transmission network limit of approximately 170 MW.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	B			D		
Renewable Potential (MW)	6,385			-		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	F	B	B	B

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	F	F	F

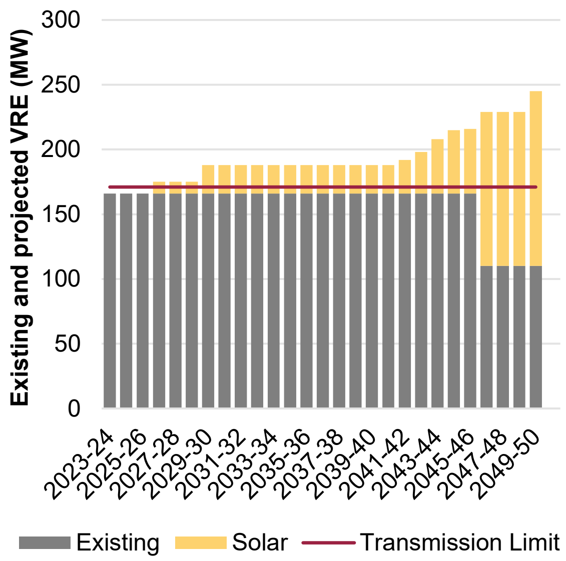
Climate hazard

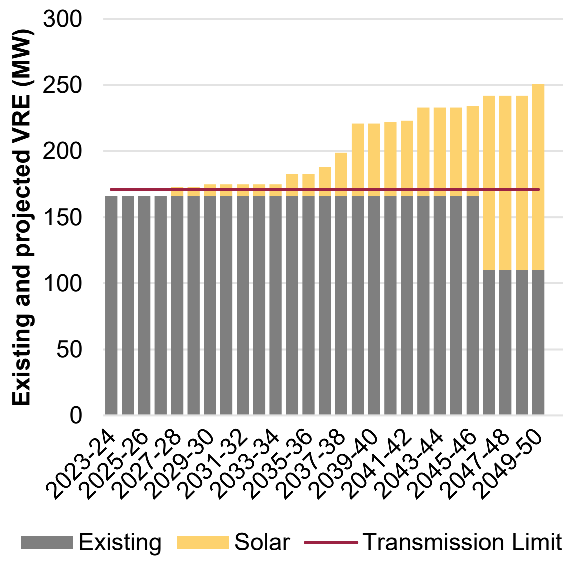
Temperature score	D	**Bushfire score**	E

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	56/110/0	-	-	150	There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all scenarios, did not project any additional wind for this REZ.			
Step Change		-	50	150				
Slow Change		550	550	550				
Hydrogen Superpower		50	3,350	6,400				

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)





VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	1%	24%	1%	14%	3%	34%
Step Change	-	19%	2%	27%	2%	40%
Slow Change	9%	62%	34%	31%	21%	43%
Hydrogen Superpower	1%	28%	2%	20%	-	33%

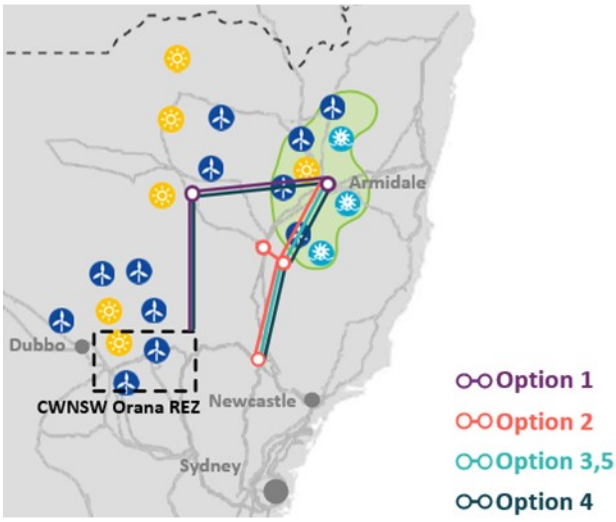
N2 – New England

Summary

The New England REZ was formally declared under the *NSW Electricity Infrastructure Investment Act 2020* on 17 December 2021[19], and has legislated this REZ to be declared with an intended 8,000 MW of additional transmission network capacity.

New England is located to the east of and along the existing QNI†. This REZ has moderate to good wind and solar resources in close proximity to the 330 kV network. Interest in the area includes large scale solar and wind generation as well as pumped hydro generation.

The sharing of resources across the network augmentation will allow for better transmission utilisation and reduction in transmission build.



Existing network capability

The existing network capacity, following completion of the committed QNI Minor upgrade, is limited by transient and voltage stability on the circuits between Bulli Creek, Sapphire and Dumaresq. Thermal limits on the 330 kV circuits between Armidale, Tamworth, Muswellbrook and Liddell can also restrict flows on this network.

REZ grouping

REZ design and community engagement is progressing	A registration of interest, initiated by the NSW Government, closed on 23 July 2021‡. This, along with the formal REZ declaration on 17 December 2021 are the first step in ongoing engagement with the community and industry to help inform network design.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	D			C		
Renewable Potential (MW)	2,985			7,400		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	F	B	B	B

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	B	A*	A

*New England REZ Transmission Link and Sydney Ring improve the MLF robustness for VRE within this REZ.

Climate hazard

Temperature score	C	**Bushfire score**	E

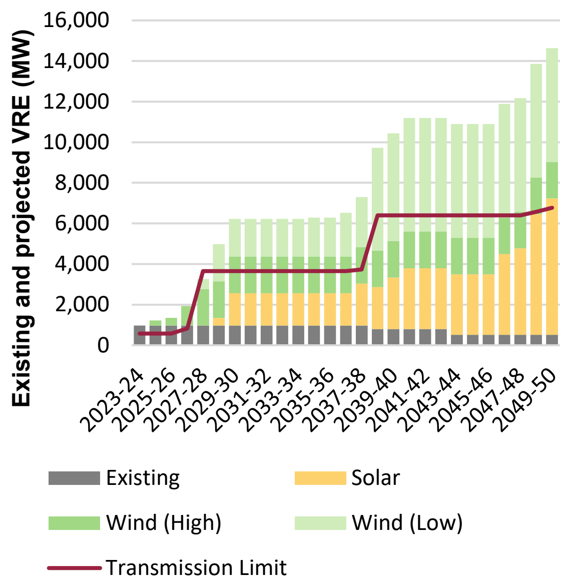
VRE outlook

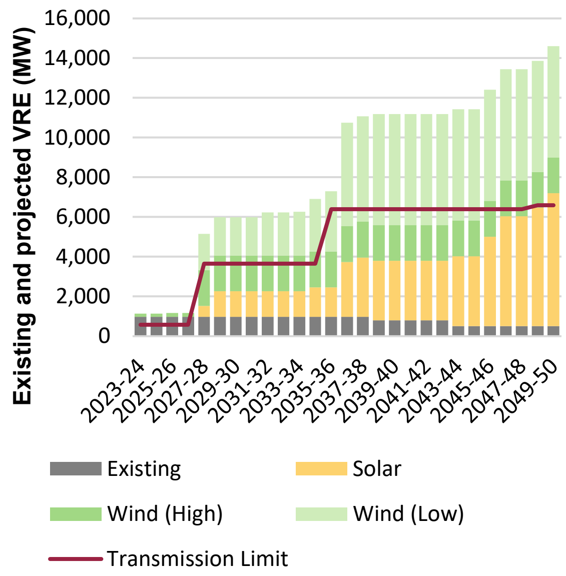
	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	20/515/0	1,600	2,550	6,700	442/0/0	3,650	7,100	7,400
Step Change		1,300	3,000	6,700		3,700	7,400	7,400
Slow Change		2,500	2,500	3,000		3,450	3,450	7,400

[19] NSW Government, *New England Renewable Energy Zone declaration*, at New England Renewable Energy Zone declaration | Energy NSW

Hydrogen Superpower		2,600	3,000	3,000		3,850	7,400	10,600

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	1%	6%	-	3%	1%	9%
Step Change	1%	4%	1%	5%	1%	12%
Slow Change	-	18%	1%	4%	1%	5%
Hydrogen Superpower	1%	8%	-	7%	-	15%

† Options shown are a subset of the Central New South Wales to Northern New South Wales flow path options.
‡ New South Wales Government New England Expression of Interest, available at https://www.energy.nsw.gov.au/renewables/renewable-energy-zones#-why-is-the-nsw-government-delivering-renewable-energy-zones-.

N3 – Central-West Orana

Summary

The Central West Orana REZ is electrically close to the Sydney load centre and has moderate wind and solar resources.

Central West Orana REZ has been identified by the New South Wales Government as the State's first pilot REZ†. The *NSW Electricity Infrastructure Investment Act 2020* legislates the REZ be declared with an intended 3,000 MW of additional transmission network capacity.

Due to the nature of the project, which is currently going through consultation on corridor selection, specific information on the project is not able to be provided, but it is expected to include new transmission lines connecting to a 500 kV and 330 kV loop in the vicinity of the Central-West Orana REZ indicative location.

Note: The transmission study corridor is currently under consultation. More information is available at https://energy.nsw.gov.au/renewables/renewable-energy-zones.

Existing network capability

The project to establish the Central West Orana REZ is considered anticipated, and as such the existing network capability is approximately 3,900 MW.

REZ grouping

REZ design and community engagement is progressing	In May 2020, the NSW Department of Planning, Industry and Environment called for renewable energy, energy storage and emerging energy project proponents to register their interest in being part of the first pilot REZ. They received expression of interest of 27,000 MW of new generation and storage projects‡. Consultations with local communities and regional stakeholders have been initiated by New South Wales Government. In early November 2021, Central-West Orana was formally declared a Renewable Energy Zone as the first step to formalising the REZ under the *Electricity Infrastructure Investment Act 2020*.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	C			C		
Renewable Potential (MW)	6,850			3,000		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	F	B	B	C
MLF Robustness	**2024-25**		**2029-30**		**2034-35**	
	A		A		A	

Climate hazard

Temperature score	C	**Bushfire score**	E

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	657/150/0	1,300	2,300	8,000	113/0/0	800	3,500	10,550
Step Change		1,700	4,050	6,850		3,000	3,600	8,300
Slow Change		100	100	3,000		800	800	3,000

Hydrogen Superpower		3,250	6,700	17,250		3,100	4,900	15,350

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)

VRE curtailment

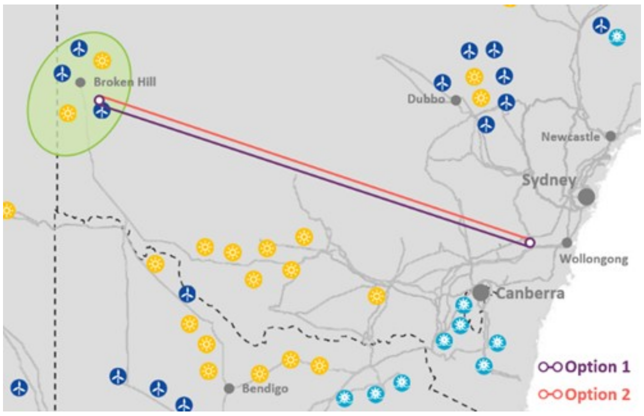
Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	7%	-	3%	2%	11%
Step Change	-	3%	1%	9%	1%	16%
Slow Change	-	17%	-	3%	-	7%
Hydrogen Superpower	-	6%	1%	12%	-	18%

† See https://energy.nsw.gov.au/renewables/renewable-energy-zones#-centralwest-orana-renewable-energy-zone-pilot-.
‡ New South Wales Government Central-West Orana REZ at: https://www.energy.nsw.gov.au/renewables/renewable-energy-zones#-centralwest-orana-renewable-energy-zone-.

N4 – Broken Hill

Summary

Broken Hill REZ has excellent solar resources. It is connected to the New South Wales grid via a 220 kV line from Buronga with an approximate length of 270 km.



Existing network capability

Due to the existing utility-scale solar and wind generation projects already operating in this REZ, there is no additional network capacity within this REZ.

Further development of new generation development in this REZ requires significant transmission network augmentation due to the distance of the REZ from the main transmission paths of the shared network.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	B			D		
Renewable Potential (MW)	8,000			5,100		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	B	B	C

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	F	F	F

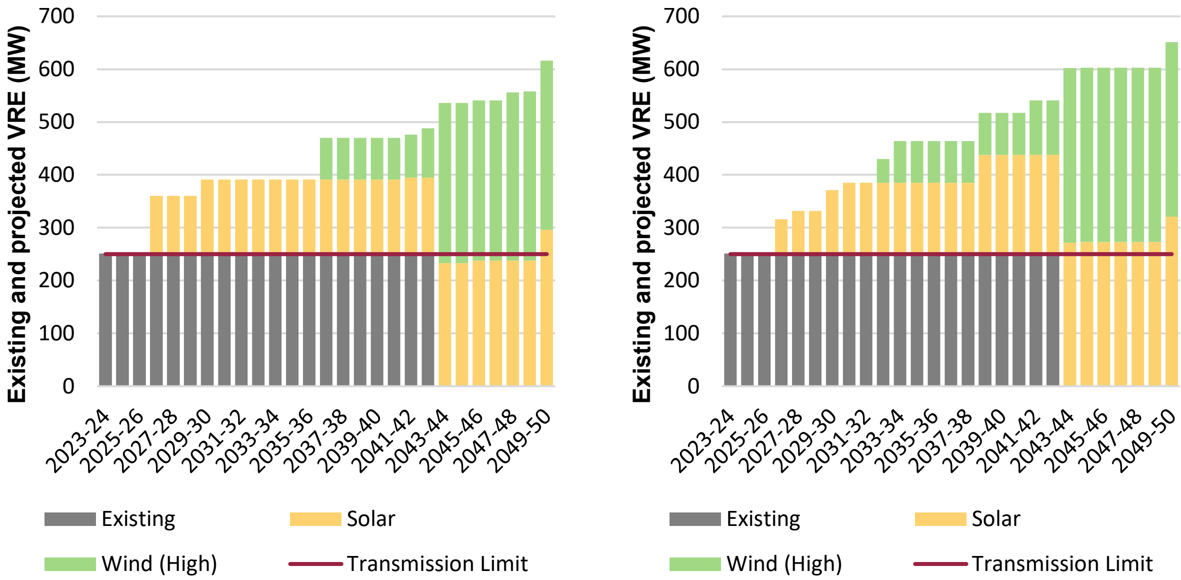
Climate hazard

Temperature score	E	**Bushfire score**	C

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	53/0/0	150	150	300	198/0/0	-	100	300
Step Change		100	200	300		-	100	350
Slow Change		200	200	250		-	-	-
Hydrogen Superpower		150	200	400		-	-	-

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)



VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	1%	11%	1%	8%	1%	32%
Step Change	-	10%	1%	15%	1%	36%
Slow Change	1%	25%	2%	9%	-	23%
Hydrogen Superpower	1%	15%	-	29%	1%	51%

N5 – South West NSW

Summary

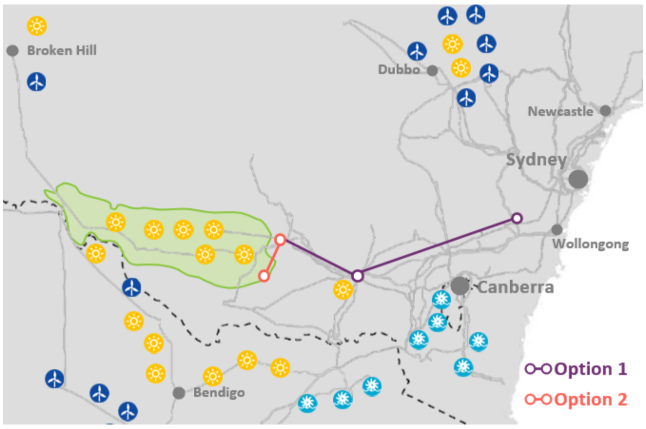
The South West REZ has good solar resource and incorporates the Darlington Point substation which marks the transition from 330 kV to 220 kV. Further west, the 220 kV links to North West Victoria and Broken Hill.

This REZ is one of three REZs which are being targeted for further development under the NSW Electricity Infrastructure Roadmap.

Existing network capability

Due to the existing utility-scale solar projects already operating within this REZ, there is no additional capacity. Further development of new generation in this REZ requires network augmentation towards the greater Sydney load centre.

The capacity within this REZ and ability to transfer energy from the REZ to the main load centres in the greater Sydney area will be improved with the construction of Project EnergyConnect and HumeLink projects. Furthermore, one option for VNI West (Kerang route) would also increase the capacity of this REZ.



AEMO has updated the REZ boundaries for N5 aligned with geographical area of the SWNSW REZ in Schedule 1 of the draft REZ declaration, available at https://www.energy.nsw.gov.au/sites/default/files/2022-03/Draft%20South-West%20REZ%20Declaration.pdf. AEMO will update all relevant parameters in the 2024 ISP.

REZ grouping

REZ design and community engagement is progressing	A registration of interest, initiated by the NSW Government, closed on 24 November 2021†. This was the first step in engaging the industry to help inform network design.

Metrics

Resource	Solar			Wind		
Resource Quality	C			E		
Renewable Potential (MW)	3,964			4,300		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	F	B	B	B

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	C	A*	A

* Project EnergyConnect and HumeLink improve the MLF robustness for VRE within this REZ

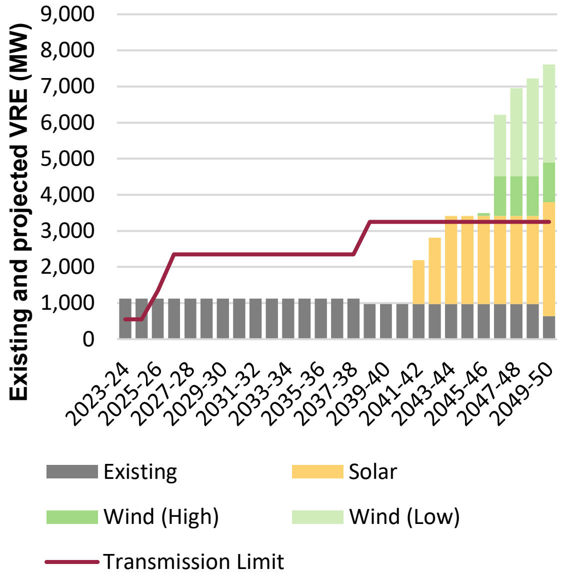
Climate hazard

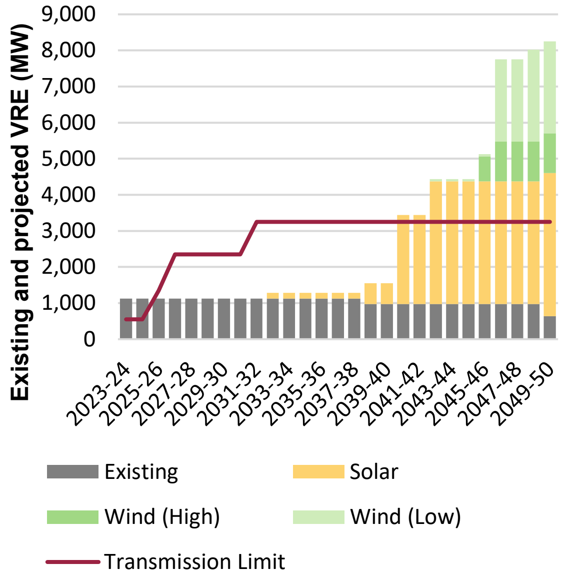
Temperature score	E	**Bushfire score**	D

VRE outlook

	Solar PV (MW)				Wind (MW)			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	972/122/0	-	-	3,150	-	-	-	3,800
Step Change		-	600	3,950		-	-	3,650
Slow Change		-	-	-		-	-	-
Hydrogen Superpower		700	2,550	3,950		-	-	-

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





VRE curtailment

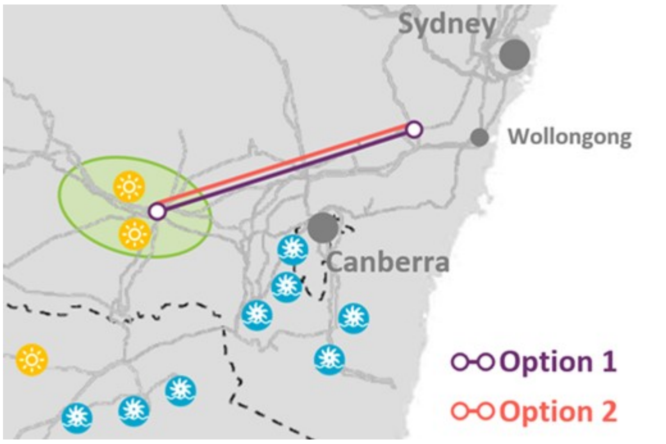
Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	10%	-	4%	-	21%
Step Change	-	5%	-	9%	-	25%
Slow Change	-	25%	-	2%	-	8%
Hydrogen Superpower	-	10%	-	24%	-	36%

† New South Wales Government South-West REZ registration of Interest, available at https://www.energy.nsw.gov.au/renewables/renewable-energy-zones#-southwest-renewable-energy-zone-.

N6 – Wagga Wagga

Summary

This REZ extends to the west of Wagga Wagga and has moderate wind and solar resources.



Existing network capability

There is no additional capacity within this REZ due to congestion in the surrounding 330 kV networks. Further development of new generation in this REZ requires network augmentation towards the greater Sydney load centre.

Additionally, the capacity within this REZ and ability to transfer energy from the REZ to the main load centres in the greater Sydney area are improved with the proposed HumeLink project. Options shown do not depend upon HumeLink as a pre-requisite.

REZ grouping

Coordination of generation infrastructure may be required	The modelling outcomes identify this zone for development of solar generation in the 2030s across the *Step Change* and *Hydrogen Superpower* scenarios. This REZ could benefit from community engagements and from coordination of generation.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	C			E		
Renewable Potential (MW)	1,028			1,000		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	F	B	B	C

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	B	A*	A

*HumeLink improves the MLF robustness for VRE within this REZ.

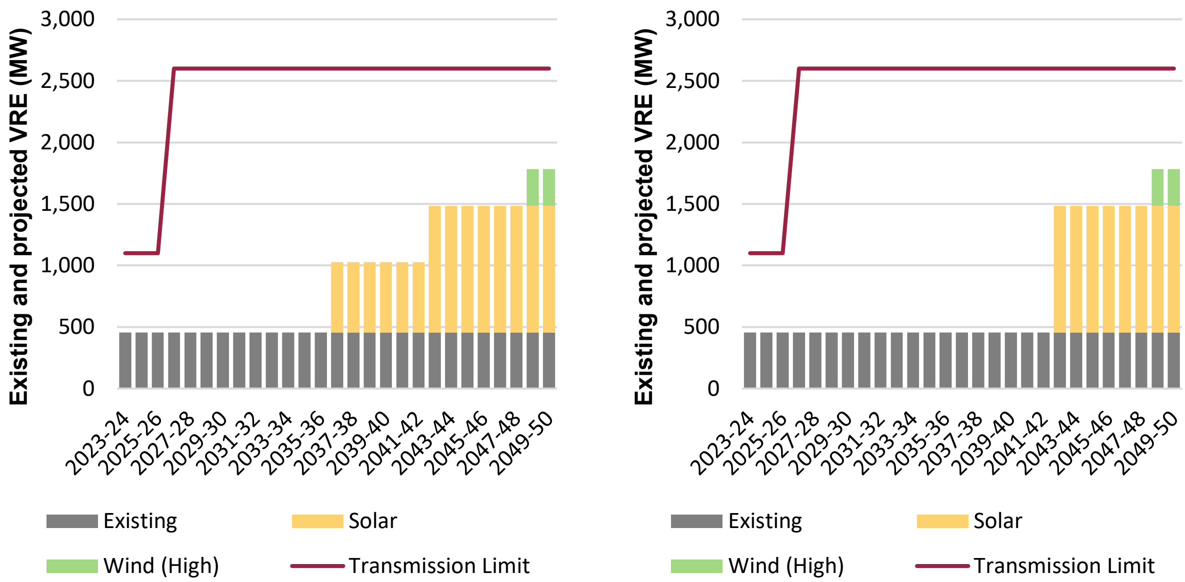
Climate hazard

Temperature score	D	**Bushfire score**	D

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	121/369/0	-	550	1,050	-	-	-	300
Step Change		-	-	1,050		-	-	300
Slow Change		-	-	-		-	-	-
Hydrogen Superpower		-	1,050	1,050		-	-	-

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)



VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	12%	-	6%	-	28%
Step Change	-	9%	-	13%	-	29%
Slow Change	-	28%	-	3%	-	8%
Hydrogen Superpower	-	11%	-	28%	-	7%

N7 – Tumut

Summary

The Tumut REZ has been identified due to the potential for additional pumped hydro generation in association with Snowy 2.0 and the proposed actionable ISP HumeLink.

The HumeLink project † will enable the connection of more than 2,000 MW of pumped hydro generation (Snowy 2.0) in the Tumut REZ area.

Existing network capability

There is no additional capacity within this REZ. Further development of new generation in this REZ is associated with the HumeLink project. Currently the 330 kV transmission network around Lower and Upper Tumut is congested during peak demand periods. A careful balance of generation from the existing hydro units and flow between Victoria and New South Wales is required to prevent overloads within this area.

REZ grouping

Design and community engagements are progressing	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years. Ongoing community engagements is underway for HumeLink.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	D			B		
Renewable Potential (MW)	-			-		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	F	C	C	C

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	N/A*	N/A	N/A

*No VRE is projected for this REZ.

Climate hazard

Temperature score	C	**Bushfire score**	E

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	There is no existing, committed or anticipated solar generation for this REZ. The modelling outcomes, for all scenarios, did not project any additional solar for this REZ.				There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all scenarios, did not project any additional wind for this REZ.			
Step Change								
Slow Change								
Hydrogen Superpower								

Transmission access expansion forecast and VRE curtailment

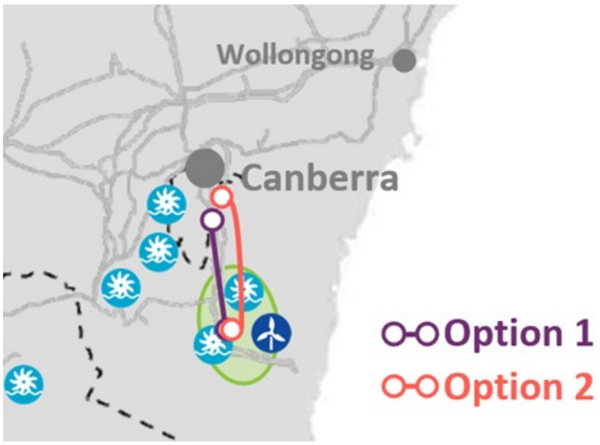
There is no existing, committed, anticipated VRE projects for this REZ and the modelling outcomes, for all scenarios, did not project any additional VRE for this REZ. Therefore, no VRE curtailment or transmission expansion occurs in this REZ.

† See https://www.transgrid.com.au/humelink.

N8 – Cooma-Monaro

Summary

The Cooma-Monaro REZ has been identified for its pumped hydro potential. This REZ has moderate to good quality wind resources.



Existing network capability

The existing 132 kV network connecting Cooma-Monaro REZ to Canberra, Williamsdale and Munyang can accommodate approximately 200 MW of additional generation.

REZ grouping

Coordination of generation and transmission infrastructure may be required	The modelling outcomes identify this zone for development of wind generation in the 2020s for all scenarios. This REZ could benefit from early community engagements and from the coordination of generation.

Metrics

Resource	Solar			Wind		
Resource Quality	D			B		
Renewable Potential (MW)	-			300		
Demand Correlation	2029-30	2039-40	2049-50	2029-30	2039-40	2049-50
	F	F	E	C	C	C
MLF Robustness	2024-25		2029-30		2034-35	
	F		F		C*	

*The indicative 330 kV expansion from Stockdill area to this REZ will increase the MLF robustness for VRE if developed.

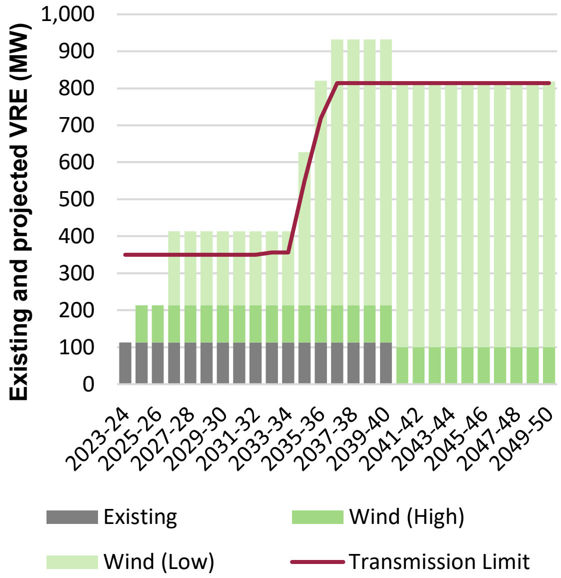
Climate hazard

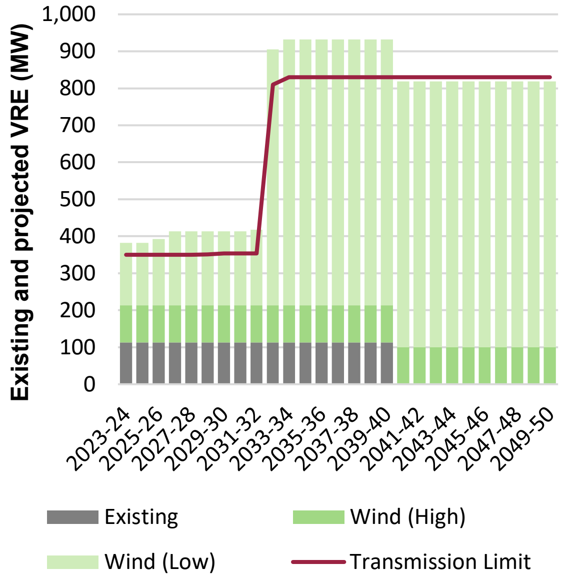
Temperature score	B	Bushfire score	E

VRE outlook

	Solar PV (MW)				Wind (MW)			
	Existing/ committed/ anticipated	Projected 2029-30	Projected 2039-40	Projected 2049-50	Existing/ committed/ anticipated	Projected 2029-30	Projected 2039-40	Projected 2049-50
Progressive Change	There is no existing, committed or anticipated solar generation for this REZ. The modelling outcomes, for all scenarios, did not project any additional solar for this REZ.				113/0/0	300	800	800
Step Change						300	800	800
Slow Change						300	300	800
Hydrogen Superpower						1,800	4,100	4,100

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)





VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	1%	6%	1%	4%	-	9%
Step Change	1%	6%	-	7%	-	17%
Slow Change	1%	12%	1%	5%	-	7%
Hydrogen Superpower	-	4%	-	9%	-	15%

A3.6.3 Queensland

Q1 – Far North QLD

Summary

The Far North Queensland (FNQ) REZ is at the most northerly section of Powerlink's network. It has excellent wind and moderate solar resources and has existing hydroelectric power stations.

Three options are proposed that progressively increase network capacity and allow for upgrades based on where generation develops.

Existing network capability

Maximum export capability from the FNQ REZ is limited by voltage stability for a contingency of a Ross to Chalumbin 275 kV circuit. The existing network will allow for a total of approximately 750 MW of VRE to be connected.

Output from this REZ can also be limited by network capacity further south which can result in the need for additional network augmentations. Output from this REZ is included in the NQ1, NQ2 and NQ3 Group Constraints to take this into account.

Powerlink has also recently announced plans for upgrades to transmission networks in the Q1 REZ as part of the Northern Queensland Renewable Energy Zone[20]. AEMO considers this to be an anticipated project.

REZ grouping

Coordination of generation infrastructure may be required	The modelling outcomes identify this zone for development of wind generation in all scenarios in the 2020s and further expanded in the 2030s and 2040s. This REZ could benefit from early community engagements and from the coordination of generation.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	C			A		
Renewable Potential (MW)	1,100			2,280		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	C	B	C
MLF Robustness	**2024-25**		**2029-30**		**2034-35**	
	E		E		E	

Climate hazard

Temperature score	B	**Bushfire score**	A

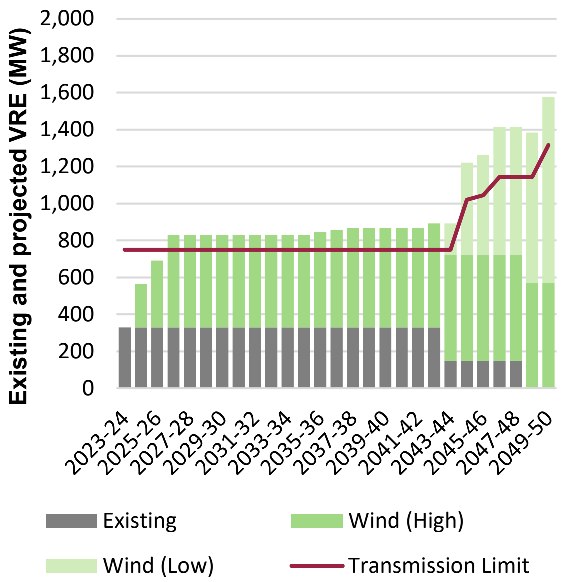
VRE outlook

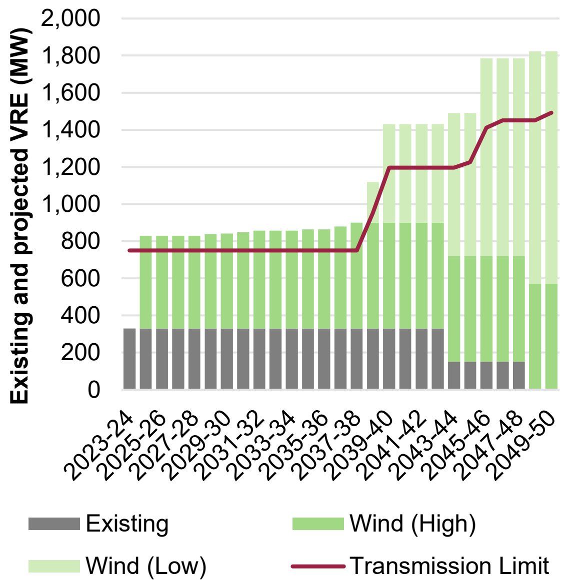
	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	-	-	-	-	180/150/0	500	550	1,600
Step Change		-	-	-		500	1,100	1,800

[20] Powerlink. *Queensland Renewable Energy Zones*, at https://www.powerlink.com.au/queensland-renewable-energy-zones.

Slow Change		-	-	-		500	500	850
Hydrogen Superpower		-	1,100	10,700		2,250	8,500	12,450

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





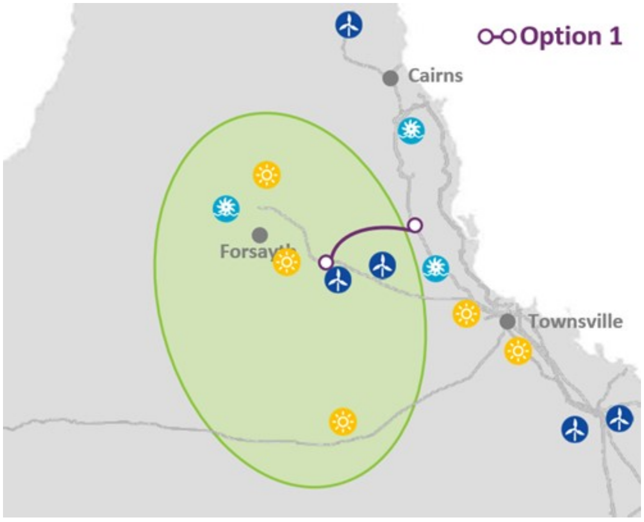
VRE curtailment

Scenario	**2029-30**		**2039-40**		**2049-50**	
	Transmission curtailment	**Economic spill**	**Transmission curtailment**	**Economic spill**	**Transmission curtailment**	**Economic spill**
Progressive Change	-	-	1%	4%	-	16%
Step Change	-	5%	1%	10%	-	18%
Slow Change	-	-	-	3%	-	6%
Hydrogen Superpower	2%	6%	-	8%	-	25%

Q2 – North Queensland Clean Energy Hub

Summary

The Clean Energy Hub REZ is at the north-western section of Powerlink's network and has excellent wind and solar resources.



Existing network capability

Currently the REZ is supplied via a 132 kV line from Ross. Interest in this area includes the development of Kidston pumped storage project, for which Powerlink has received a 'Notice to Proceed' to develop a single-circuit 275 kV line†. Due to there being only a single circuit line, maximum output may be limited to the largest allowable generator contingency size.

Output from this REZ can also be limited by network capacity further south which can result in the need for additional network augmentations. Output from this REZ is included in the NQ1, NQ2 and NQ3 group constraints.

REZ grouping

Coordination of generation infrastructure may be required	The modelling outcomes identify this zone for development of wind generation in the 2030s across the *Progressive Change* and *Step Change* scenario. This build is brought forward under the *Hydrogen Superpower* scenario. This REZ could benefit from early community engagements and from the coordination of generation.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	A			B		
Renewable Potential (MW)	8,000			18,600		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	B	B	B

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	F	F	F

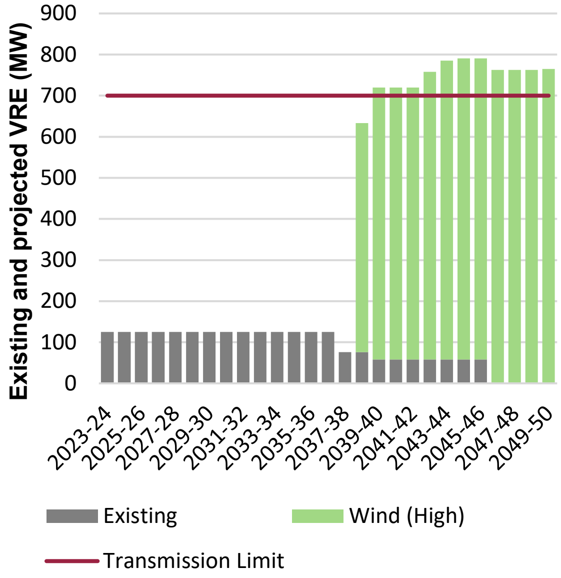
Climate hazard

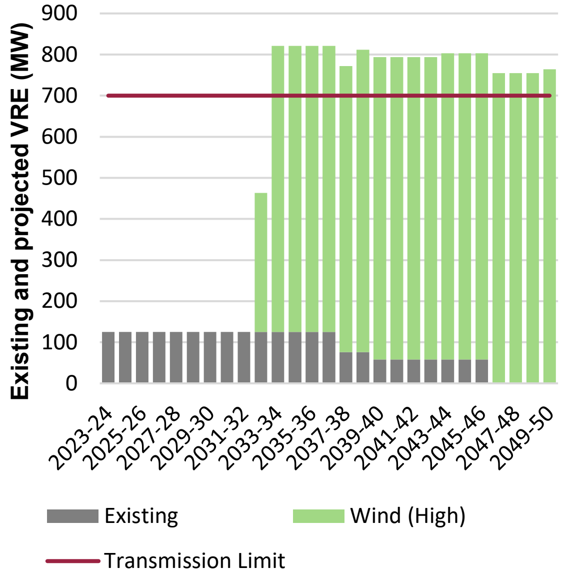
Temperature score	D	**Bushfire score**	C

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	67/15/0	-	-	-	0/43/0	-	650	750
Step Change		-	-	-		-	750	750
Slow Change		-	-	-		-	-	750
Hydrogen Superpower		150	4,350	8,000		750	4,700	11,250

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	13%	-	3%	-	16%
Step Change	-	11%	-	9%	-	18%
Slow Change	-	21%	-	9%	-	5%
Hydrogen Superpower	1%	10%	-	14%	-	24%

† Powerlink, Genex-Kidston connection project, at https://www.powerlink.com.au/projects/genex-kidston-connection-project.

Q3 – Northern Queensland

Summary

The North Queensland REZ encompasses Townsville and the surrounding area. It has good quality solar and wind resources and is situated close to the high capacity 275 kV network. There are already a number of existing utility-scale solar generation projects operational within this REZ.

Existing network capability

Due to the existing high voltage infrastructure, there are no augmentation options specifically for this REZ. Existing network capacity can allow for up to approximately 1,200 MW of new generator connections, shared between Q1, Q2 and Q3.

Output from this REZ can be limited by network capacity further south which can result in the need for additional network augmentations. Output from this REZ is included in the NQ1, NQ2 and NQ3 group constraints.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	B			C		
Renewable Potential (MW)	3,400			-		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	B	B	B

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	E	E	E

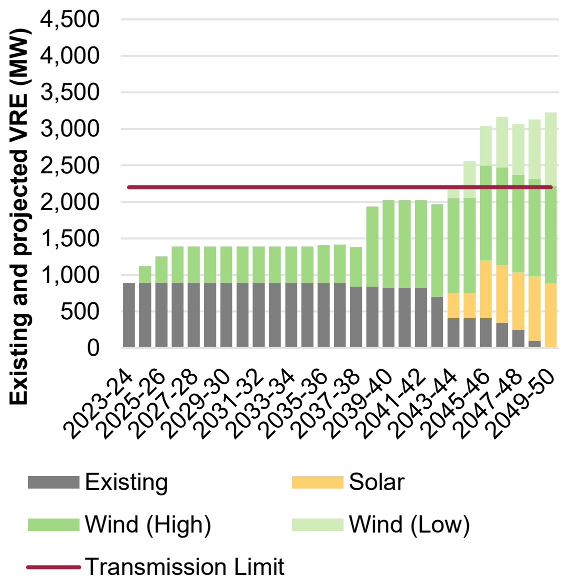
Climate hazard

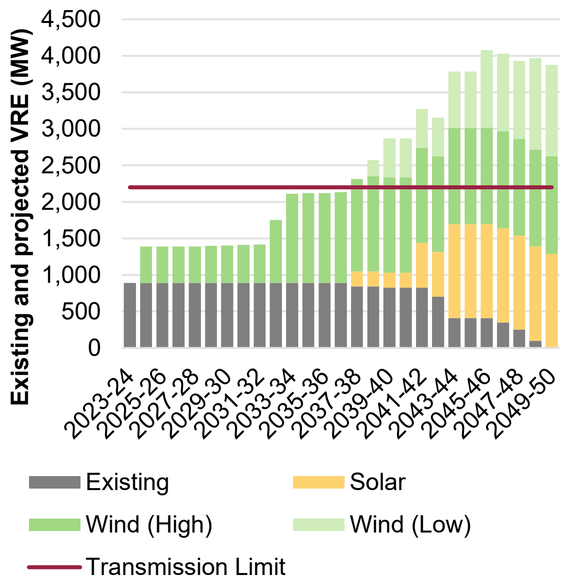
Temperature score	C	**Bushfire score**	E

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	448/0/0	-	-	900	There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all scenarios, did not project any additional wind for this REZ.			
Step Change		-	200	1,300				
Slow Change		-	-	-				
Hydrogen Superpower		-	3,400	3,400				

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)





Note: The transmission access expansion forecasts show the results for NQ1 group constraint augmentation, which includes VRE projections for Q1, Q2 and Q3

VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	4%	-	4%	-	18%
Step Change	-	18%	-	25%	-	31%
Slow Change	-	14%	-	8%	-	-
Hydrogen Superpower	-	13%	-	12%	-	30%

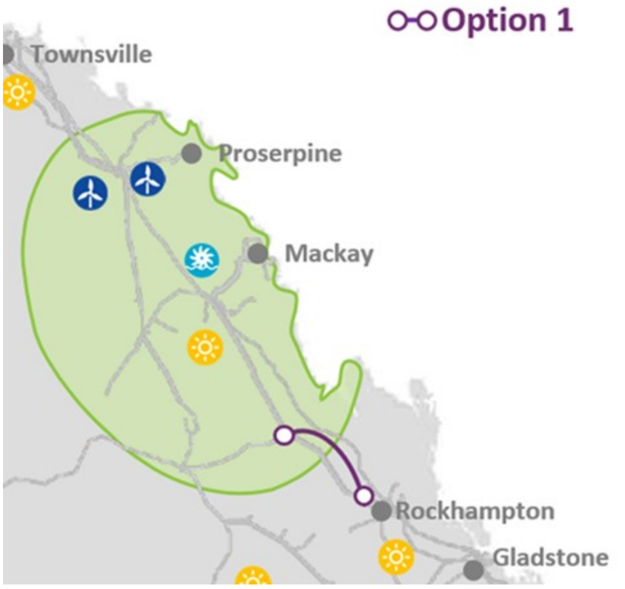
Transmission curtailment for this REZ is not captured. The transmission infrastructure required to upgrade this REZ increases capacity on the 275 kV back bone for Q1, Q2 and Q3.

Q4 – Isaac

Summary

The Isaac REZ has good wind and solar resources covering Collinsville and Mackay areas ,and has a number of utility-scale solar generation projects already in operation.

There are numerous potential pumped hydro locations to the north east and south east of Nebo. This REZ has a good diversity of resources – wind, solar and storage. Locating storage in this zone could maximise transmission utilisation towards Brisbane.



Existing network capability

The Isaac REZ forms part of the NQ transmission backbone from Nebo to Strathmore. Due to the existing high voltage infrastructure, there are no augmentation options specifically for this REZ. The associated augmentations are the NQ2 and NQ3 group constraint augmentations that facilitate power from Q1 to Q5 to be transmitted south to the load centres.

The network has the ability to support up to a total of 2,500 MW of generation across the REZs in northern Queensland, depending on the level of storage in these REZs.

REZ grouping

Coordination of generation infrastructure may be required	The modelling outcomes identify this zone for development of wind generation in the 2020s across the *Step Change* and *Hydrogen Superpower* scenarios. This REZ could benefit from early community engagements and from coordination of generation.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	B			C		
Renewable Potential (MW)	6,900			3,800		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	B	B	C
MLF Robustness	**2024-25**		**2029-30**		**2034-35**	
	B		C		C	

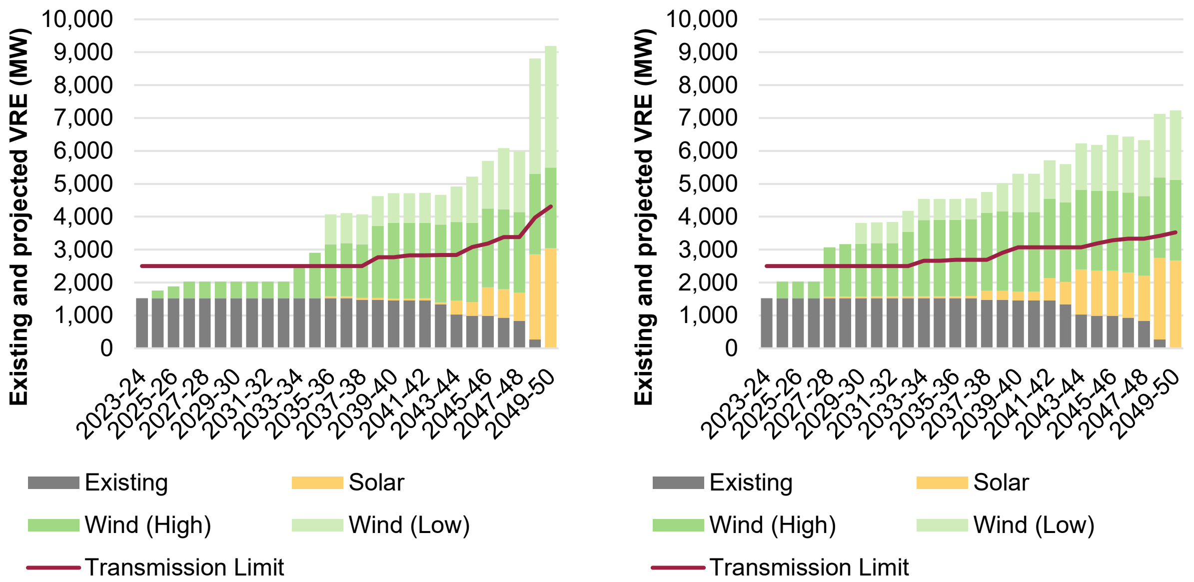
Climate hazard

Temperature score	C	**Bushfire score**	C

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	622/0/0	-	-	2,050	-	-	1,900	3,700
Step Change		-	-	1,250		1,650	1,650	1,850
Slow Change		-	-	-		-	-	1,000
Hydrogen Superpower		350	3,500	33,500		1,000	2,350	45,200

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)



Note: The transmission access expansion forecasts show the results for NQ2 group constraint augmentation, which includes VRE projections for Q1, Q2, Q3, Q4 and Q5.

VRE curtailment

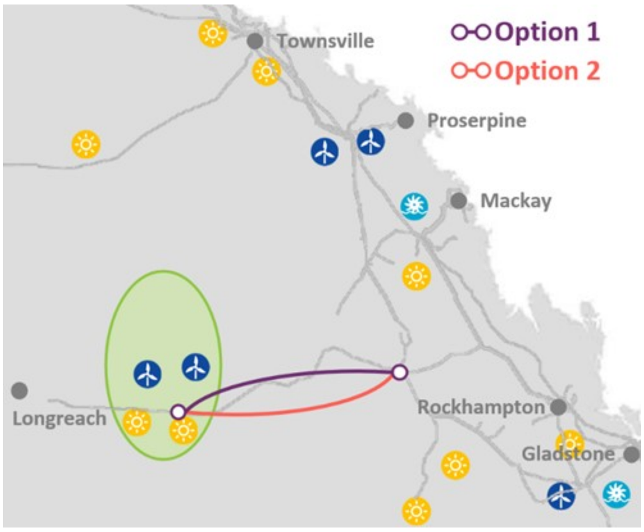
Scenario	**2029-30**		**2039-40**		**2049-50**	
	Transmission curtailment	**Economic spill**	**Transmission curtailment**	**Economic spill**	**Transmission curtailment**	**Economic spill**
Progressive Change	-	16%	-	3%	-	13%
Step Change	-	6%	-	11%	-	19%
Slow Change	-	23%	-	5%	-	5%
Hydrogen Superpower	-	7%	-	10%	-	9%

Transmission curtailment for this REZ is not captured. The transmission infrastructure required to upgrade this REZ increase capacity on the 275 kV back bone for the connection of Q1, Q2, Q3, Q4 and Q5.

Q5 – Barcaldine

Summary

This REZ has excellent solar resources and moderate wind resources but is located a long way from the Queensland transmission backbone. Barcaldine REZ has not been identified as having significant potential pumped hydro capability.



Existing network capability

This REZ is fed via a 132 kV line from Lilyvale.

Currently there is limited spare network capacity available within the Barcaldine REZ. Output from this REZ can be limited by network capacity further south which can result in the need for additional network augmentations. Output from this REZ is included in the NQ2 and NQ3 group constraints to take this into account.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

<table>
<tr><td>Resource</td><td colspan="3">Solar</td><td colspan="3">Wind</td></tr>
<tr><td>Resource Quality</td><td colspan="3">A</td><td colspan="3">D</td></tr>
<tr><td>Renewable Potential (MW)</td><td colspan="3">8,000</td><td colspan="3">3,900</td></tr>
<tr><td rowspan="2">Demand Correlation</td><td>2029-30</td><td>2039-40</td><td>2049-50</td><td>2029-30</td><td>2039-40</td><td>2049-50</td></tr>
<tr><td>F</td><td>F</td><td>E</td><td>B</td><td>B</td><td>C</td></tr>
<tr><td rowspan="2">MLF Robustness</td><td colspan="2">2024-25</td><td colspan="2">2029-30</td><td colspan="2">2034-35</td></tr>
<tr><td colspan="2">F</td><td colspan="2">F</td><td colspan="2">F</td></tr>
</table>

Climate hazard

Temperature score	D	**Bushfire score**	C

VRE outlook

<table>
<tr><td rowspan="3"></td><td colspan="4">Solar PV (MW)</td><td colspan="4">Wind (MW)</td></tr>
<tr><td rowspan="2">Existing/ committed/ anticipated</td><td colspan="3">Projected</td><td rowspan="2">Existing/ committed/ anticipated</td><td colspan="3">Projected</td></tr>
<tr><td>2029-30</td><td>2039-40</td><td>2049-50</td><td>2029-30</td><td>2039-40</td><td>2049-50</td></tr>
<tr><td>Progressive Change</td><td rowspan="4">14/0/0</td><td></td><td>50</td><td>100</td><td rowspan="4">-</td><td>-</td><td>100</td><td>100</td></tr>
<tr><td>Step Change</td><td>50</td><td>50</td><td>100</td><td>100</td><td>100</td><td>100</td></tr>
<tr><td>Slow Change</td><td>-</td><td>-</td><td>100</td><td>-</td><td>-</td><td>100</td></tr>
<tr><td>Hydrogen Superpower</td><td>50</td><td>50</td><td>8,000</td><td>100</td><td>100</td><td>3,900</td></tr>
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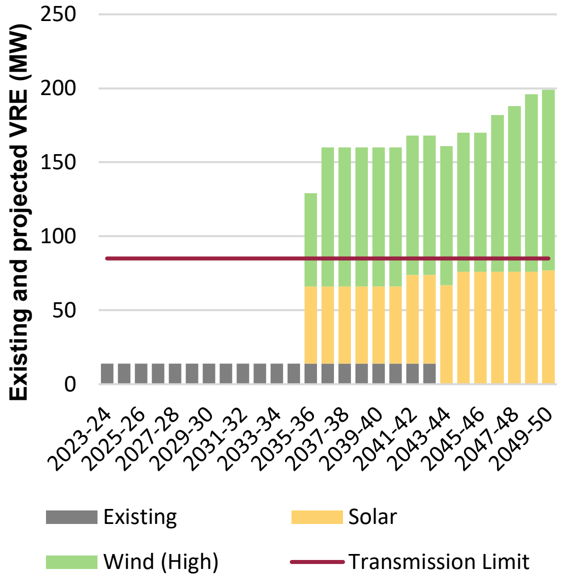
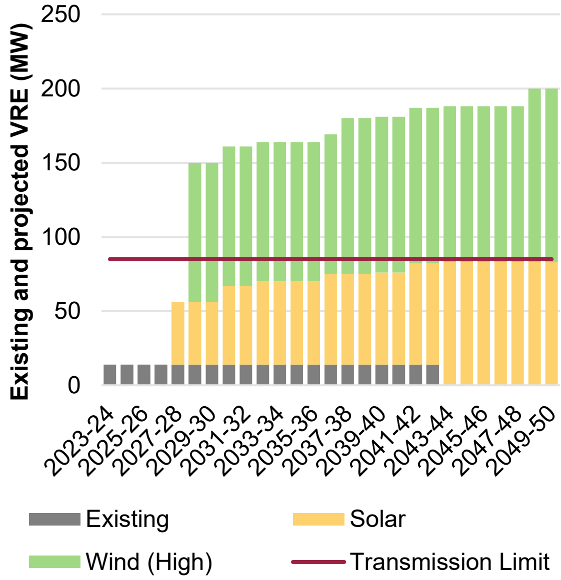
Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)





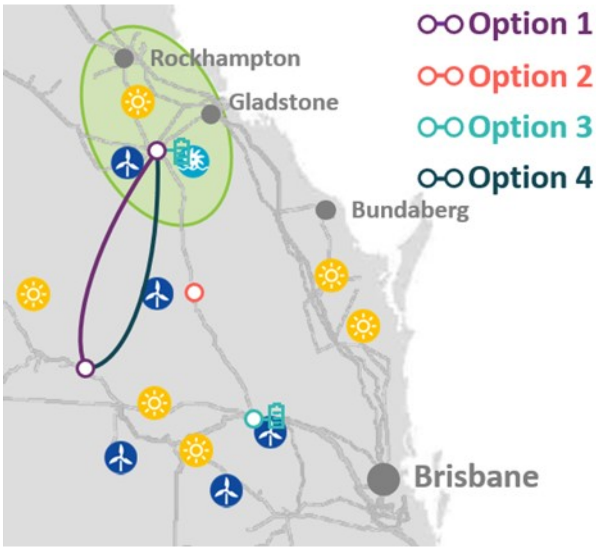
VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	20%	-	11%	1%	34%
Step Change	-	12%	1%	25%	1%	39%
Slow Change	-	25%	-	18%	1%	18%
Hydrogen Superpower	1%	18%	1%	31%	-	32%

Q6- Fitzroy

Summary

The Fitzroy REZ is in Central Queensland and covers a strong part of the network where Gladstone and Callide generators are connected. This REZ has good solar and wind resources.



Existing network capability

The network has the ability to support up to 2,100 MW of power transfer from Central Queensland to Southern Queensland (CQ-SQ) which is defined as the transient stability limit of the network (for a contingency of Calvale–Halys 275 kV circuit).

Due to the existing high voltage infrastructure, there are no augmentation options specifically for this REZ. The associated augmentations are the NQ3 group constraint augmentations that facilitate power from Q1 to Q6 to be transmitted south to the load centres.

REZ grouping

Transmission and generation infrastructure coordination is required	Preparatory activities were done for the 2020 ISP relating to the CQ-SQ upgrade and Gladstone Grid re-enforcement options. To assess the potential need for actionable status in the next ISP, AEMO will escalate the costs from the preparatory activities requested in the 2020 ISP as the options presented are not expected to change for these projects.

Metrics

Resource	Solar			Wind		
Resource Quality	B			C		
Renewable Potential (MW)	7,533			3,500		
Demand Correlation	2029-30	2039-40	2049-50	2029-30	2039-40	2049-50
	F	F	F	A	A	B

MLF Robustness	2024-25	2029-30	2034-35
	A	A	A

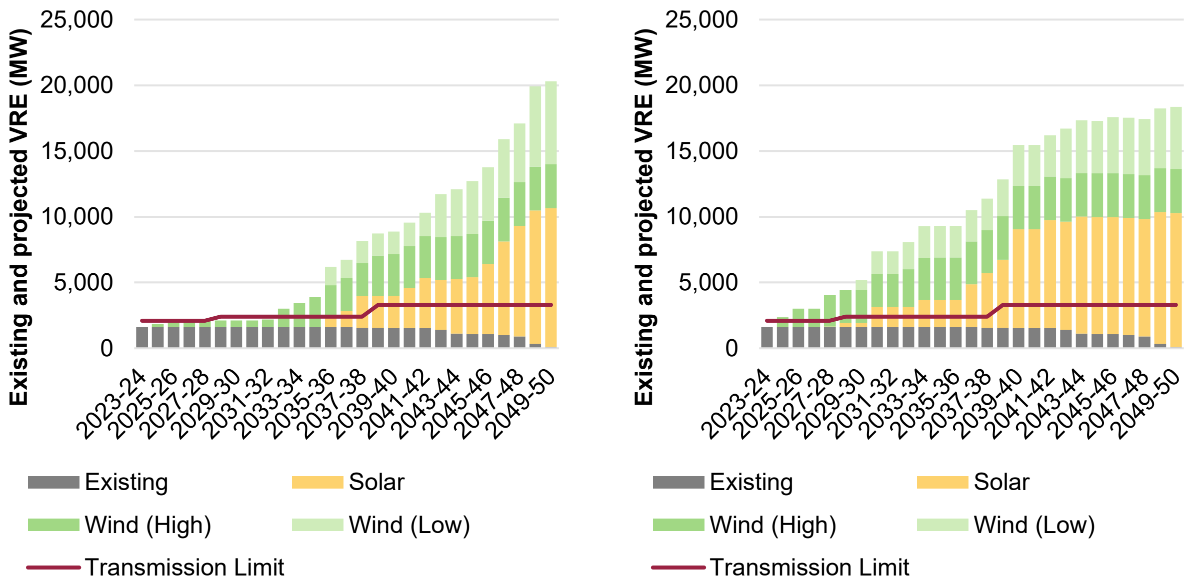
Climate hazard

Temperature score	C	Bushfire score	B

VRE outlook

	Solar PV (MW)				Wind (MW)			
	Existing/ committed/ anticipated	Projected			Existing/ committed/ anticipated	Projected		
		2029-30	2039-40	2049-50		2029-30	2039-40	2049-50
Progressive Change	0/0/82	-	2,400	7,550	-	-	1,700	3,500
Step Change		250	7,250	7,550		1,000	2,850	3,500
Slow Change		-	-	2,700		-	900	1,200
Hydrogen Superpower		3,150	7,450	38,150		2,550	3,500	24,300

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)



Note: The transmission access expansion forecasts show the results for the NQ3 group constraint augmentation, including projected VRE for all REZs north of the NQ3; this includes Q1, Q2, Q3, Q4, Q5 and Q6. The transmission limit is modelled using the CNQ-SQ flow path limit as opposed to a static number.

VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	23%	-	2%	-	8%
Step Change	-	5%	-	6%	-	11%
Slow Change	-	43%	-	2%	-	6%
Hydrogen Superpower	-	8%	-	9%	-	16%

Transmission curtailment for this REZ is not captured. The transmission infrastructure required to upgrade this REZ increase capacity on the 275 kV back bone for the connection of Q1, Q2, Q3, Q4, Q5 and Q6.

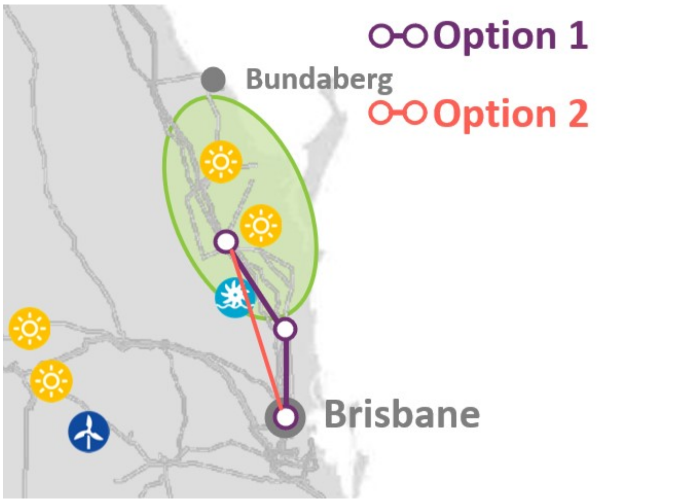
Q7 – Wide Bay

Summary

The Wide Bay area has moderate solar resources and already has a number of large solar generators operational within the REZ.

Rebuild of the existing single-circuit lines as double-circuits to help reduce challenges around obtaining easements, should the generation interest exceed the current network capacity.

The Queensland Government has announced additional storage development plans to support the transition to renewable generation. A key project being considered is the Borumba Pumped Hydro project, located in the Wide Bay REZ, which has a storage capacity in excess of 24 hours.



Existing network capability

The existing network facilitates power transfer from Central Queensland to the load centre in Brisbane. This is a 275 kV transmission backbone and can support up to approximately 500 MW of generation connecting in the area north of Brisbane up to Gympie.

REZ grouping

Coordination of generation infrastructure may be required	The modelling outcomes identify this zone for development of wind and solar generation. This REZ could benefit from early community engagements and from the coordination of generation.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	C			D		
Renewable Potential (MW)	2,200			1,100		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	F	B	B	B
MLF Robustness	**2024-25**		**2029-30**		**2034-35**	
	A		A		A	

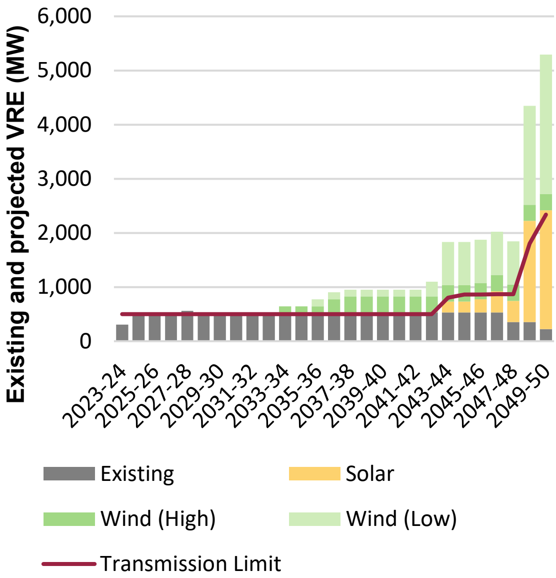
Climate hazard

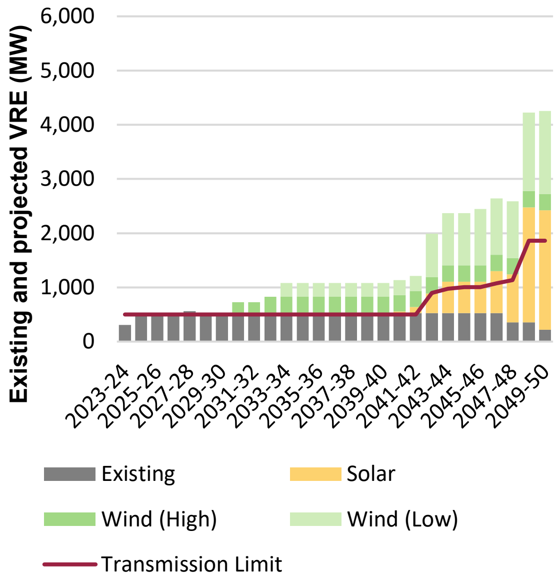
Temperature score	B	**Bushfire score**	E

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	131/176/274	-	-	2,200	-	-	400	2,850
Step Change		-	-	2,200		-	550	1,850
Slow Change		-	-	-		-	-	600
Hydrogen Superpower		-	5,100	11,450		450	4,800	7,600

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





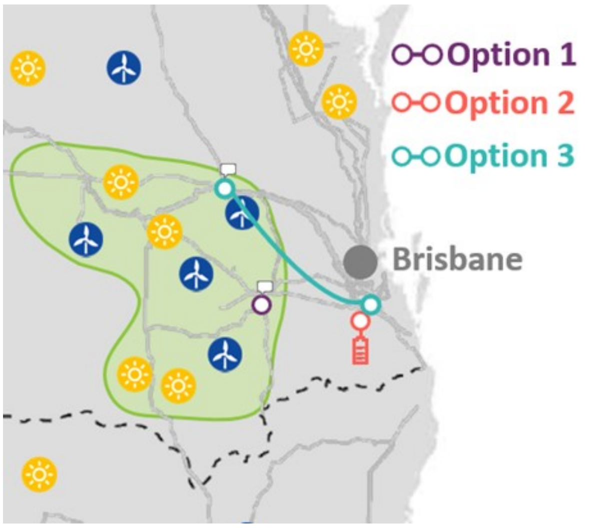
VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	21%	1%	8%	1%	15%
Step Change	-	16%	-	18%	1%	22%
Slow Change	-	27%	-	11%	-	11%
Hydrogen Superpower	1%	14%	-	9%	-	20%

Q8 – Darling Downs

Summary

The Darling Downs REZ extends from the border of NSW around Dumaresq, up to Columboola within the Surat region of Queensland, and has good solar and wind resources. A number of large solar and wind projects are already connected within the zone.



Existing network capability

The Darling Downs REZ has high network capacity and is near QNI and Brisbane. Furthermore, the ultimate retirement of generation within this REZ will allow for increased VRE connections.

Under high demand conditions, this corridor can only facilitate 1,300 MW into the greater SEQ area from generation connected around the Bulli Creek area. Generation connected around the Halys area will be required to allow the full 3,000 MW REZ capacity to be able to be utilised. The Middle Ridge site is very constrained – further investigation is required to determine the feasibility of any expansion of this substation.

REZ grouping

Transmission and generation infrastructure coordination is required	Preparatory activities relating to the development of this REZ are required to assess the potential need for actionable status in the next ISP.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	C			C		
Renewable Potential (MW)	6,992			5,600		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	F	A	A	B
MLF Robustness	**2024-25**		**2029-30**		**2034-35**	
	A		A		A	

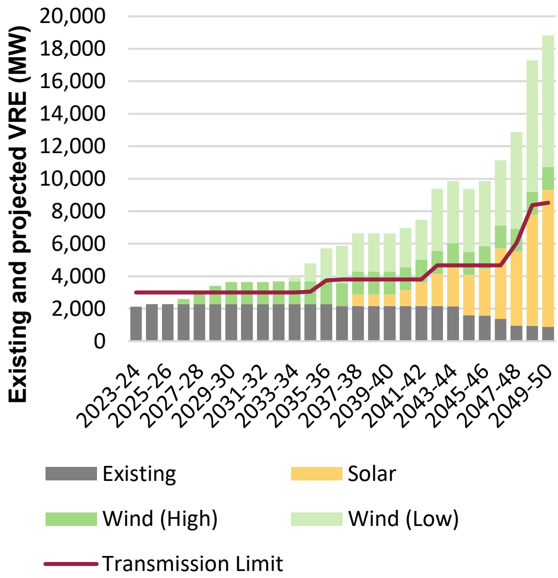
Climate hazard

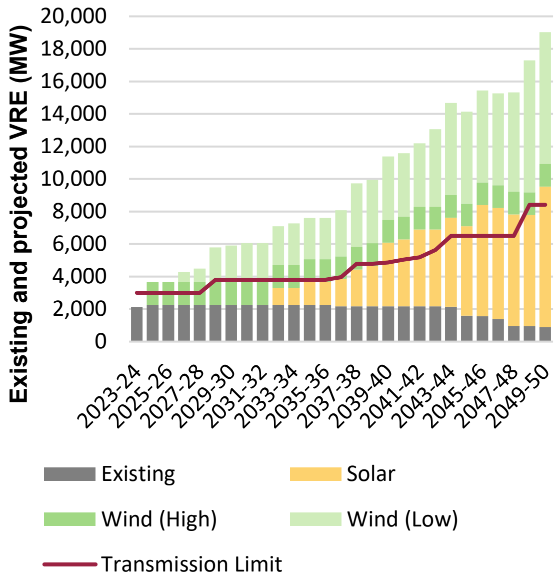
Temperature score	C	**Bushfire score**	E

VRE outlook

	Solar PV (MW)				Wind (MW)			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	293/1,067/0	-	700	8,450	453/173/300	1,400	3,750	9,500
Step Change		-	3,900	8,650		3,650	5,300	9,500
Slow Change		-	-	2,050		850	1,400	3,650
Hydrogen Superpower		2,400	9,750	13,200		3,900	11,350	13,200

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)





VRE curtailment

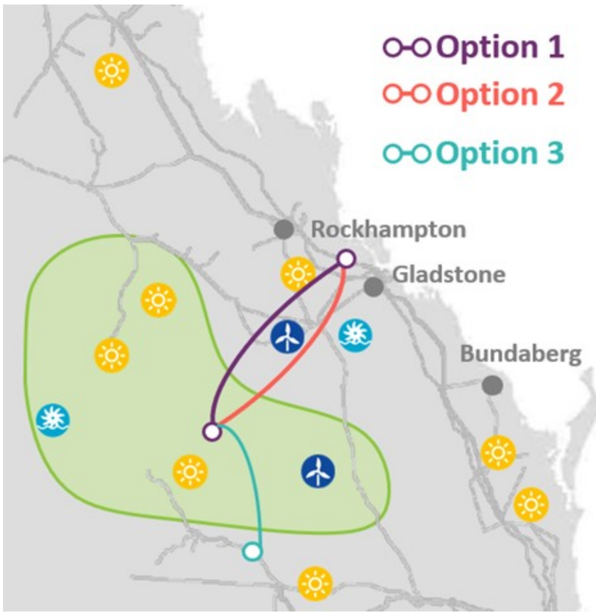
Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	4%	-	3%	1%	9%
Step Change	-	4%	1%	9%	-	11%
Slow Change	-	7%	-	3%	-	7%
Hydrogen Superpower	1%	7%	-	7%	-	16%

Q9 – Banana

Summary

The Banana REZ is located roughly 200 km south-west of Gladstone and lies north of the CQ-SQ flow path. It has moderate wind and excellent solar resources. There are currently no generators and very little high voltage network in this area.

The first two options are proposals that transport the power to the Gladstone region. Substation location both within the Banana REZ and the connection point within the Gladstone section will be based on where generation and load develop.



Existing network capability

There is very little high voltage network in the area currently. There is some low capacity 132 kV network on the edge of the REZ to support the townships of Moura and Biloela.

There is very little spare capacity within the current network, which does not extend very far into the REZ.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	B			D		
Renewable Potential (MW)	6,100			3,400		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	F	A	A	B

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	E	F	F

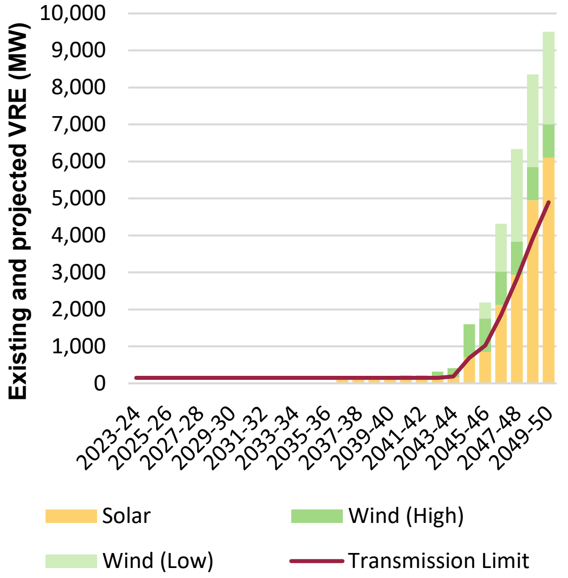
Climate hazard

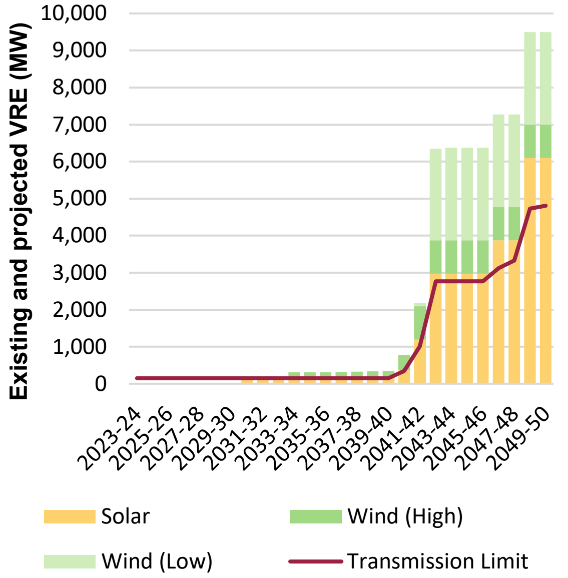
Temperature score	C	**Bushfire score**	B

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	-	-	150	6,100	-	-	-	3,400
Step Change		-	150	6,100		-	150	3,400
Slow Change		-	-	150		-	-	150
Hydrogen Superpower		200	1,800	6,100		-	900	3,400

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	-	-	14%	1%	13%
Step Change	-	-	1%	23%	1%	15%
Slow Change	-	-	-	-	-	18%
Hydrogen Superpower	1%	27%	1%	17%	-	28%

A3.6.4 South Australia

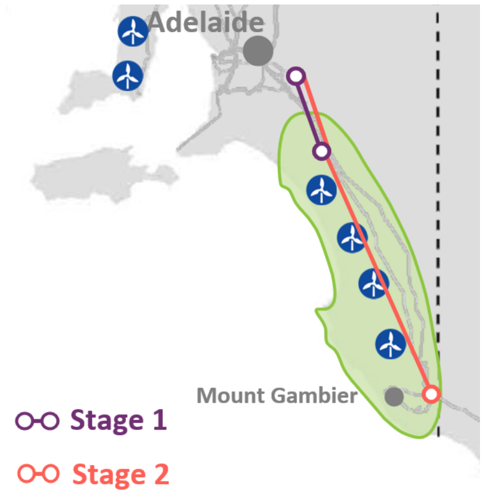
S1 – South East SA

Summary

The South East SA REZ lies on the major 275 kV route of the South Australia – Victoria Heywood interconnector. The REZ has moderate to good quality wind resources, as evidenced by the high proportion of wind generation (over 300 MW) in or near the South East border with Victoria.

Existing network capability

The existing network capacity of this REZ is approximately 400 MW. Further network augmentation is required to allow additional generation to be built. Network augmentations would be smaller if generation is located relatively close to Adelaide, and larger if located further south towards Mount Gambier.



REZ grouping	
Transmission and generation infrastructure coordination is required	Preparatory activities relating to Tailem Bend to Tungkillo 275 kV upgrade options are required to assess the potential need for actionable status in the next ISP.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	E			C		
Renewable Potential (MW)	100			3,200		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	C	C	C

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	N/A	N/A	N/A

*No MLF robustness scores are shown as the MLF robustness for VRE in this REZ is heavily dependent on market conditions and interconnector flows.

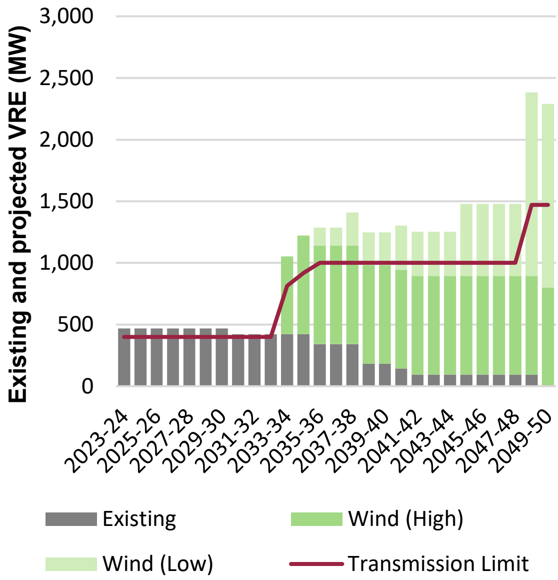
Climate hazard

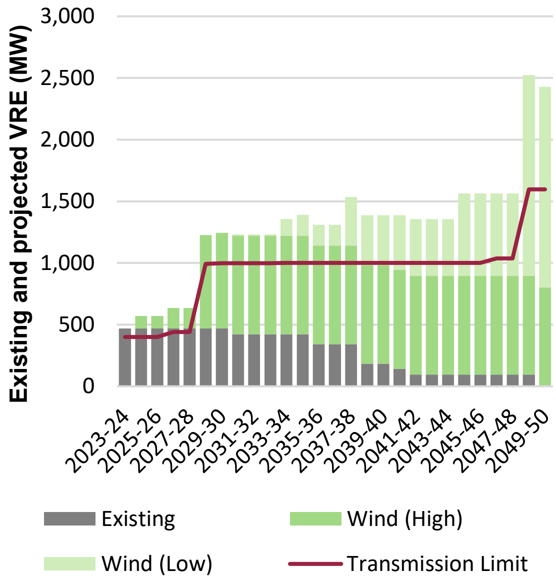
Temperature score	D	**Bushfire score**	D

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	95/33/14	-	-	-	325/0/0	-	1,050	2,300
Step Change		-	-	-		800	1,200	2,450
Slow Change		-	-	-		-	300	800
Hydrogen Superpower		-	-	100		900	3,200	3,200

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)





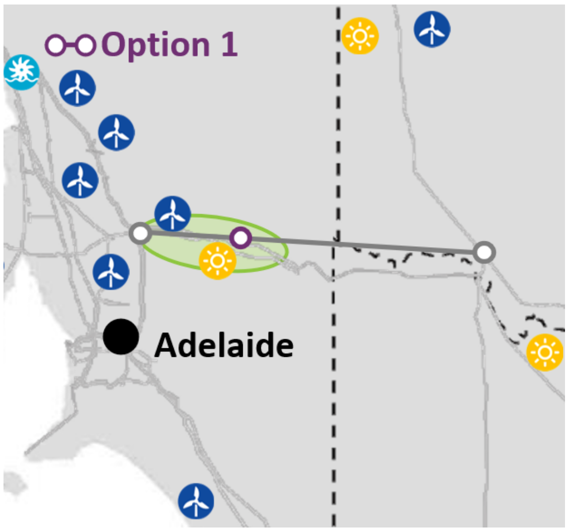
VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	14%	-	5%	1%	22%
Step Change	-	9%	1%	14%	1%	25%
Slow Change	-	27%	-	12%	-	11%
Hydrogen Superpower	1%	9%	-	12%	-	12%

S2 - Riverland

Summary

The Riverland REZ is on the South Australian side of the proposed Project EnergyConnect route. It has good solar quality resources.



Existing network capability

There is minimal existing renewable generation in the zone. Prior to Project EnergyConnect, approximately 130 MW can be connected in this REZ. Once Project EnergyConnect is commissioned, approximately 800 MW can be accommodated.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	C			E		
Renewable Potential (MW)	4,000			1,400		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	B	B	B

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	A	A	A

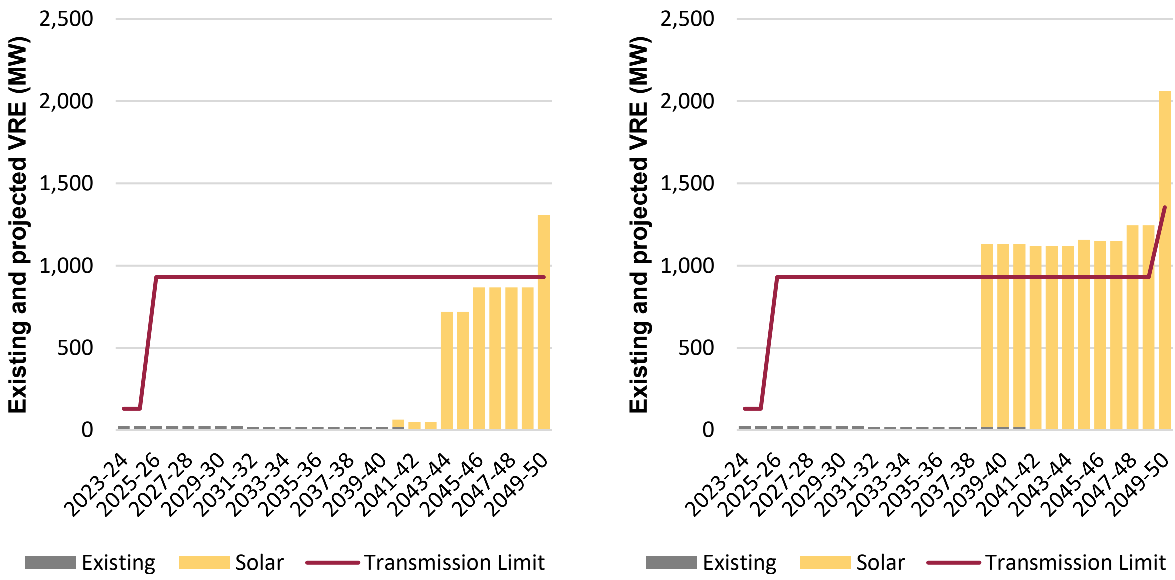
Climate hazard

Temperature score	E	**Bushfire score**	C

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	0/25/0	-	-	1,300	There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all scenarios, did not project any additional wind for this REZ.			
Step Change		-	1,100	2,050				
Slow Change		-	-	-				
Hydrogen Superpower		1,300	3,200	4,000				

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)



VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	25%	-	18%	-	40%
Step Change	-	24%	-	27%	-	44%
Slow Change	-	36%	-	27%		
Hydrogen Superpower	-	11%	-	37%	-	48%

S3 – Mid-North SA

Summary

The Mid-North SA REZ has moderate quality wind and solar resources. There are several major wind farms in service in this REZ, totalling > 950 MW installed capacity.

Four 275 kV parallel circuits provide the bulk transmission along the corridor from Davenport to near Adelaide (Para) which traverse this REZ. This transmission corridor forms the backbone for exporting power from REZs north and west of this REZ in South Australia.

Existing network capability

This REZ can accommodate approximately 1,000 MW additional generation along the 275 kV corridor.

The capability of this zone to accommodate new generation is subject to the MN1 mid-north group constraint†.

REZ grouping

Transmission and generation infrastructure coordination is required	Preparatory activities relating to the Davenport to Adelaide 275kV upgrade options (including need for control schemes and underlying 132 kV network upgrades) are required to assess the potential need for actionable status in the next ISP.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	D			C		
Renewable Potential (MW)	1,300			4,600		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	C	C	C

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	A	A	A

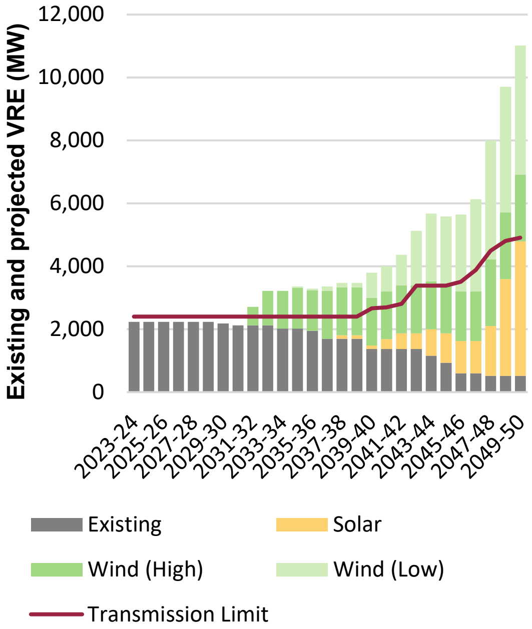
Climate hazard

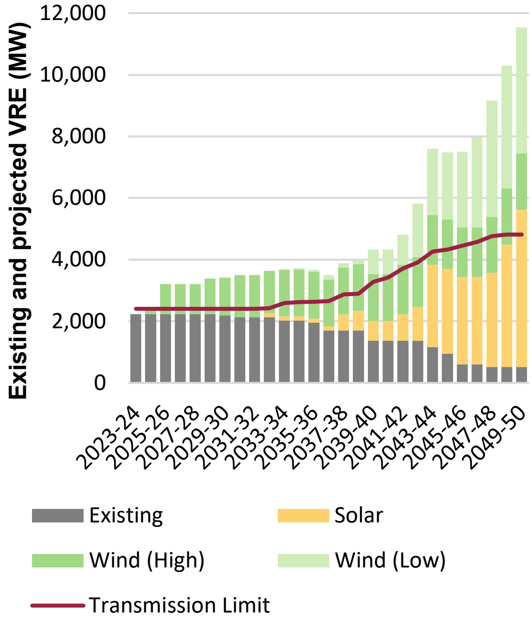
Temperature score	D	**Bushfire score**	D

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	-	-	-	-	1,335/0/0	-	1,950	3,950
Step Change		-	-	-		1,150	2,900	3,500
Slow Change		-	-	-		-	200	2,300
Hydrogen Superpower		-	1,300	1,300		2,950	4,600	28,900

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)





Note: The transmission access expansion forecasts show the results for the MN1 group constraint augmentation.

VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	6%	-	4%	-	15%
Step Change	-	6%	-	9%	-	17%
Slow Change	-	15%	-	5%	-	9%
Hydrogen Superpower	-	4%	-	13%	-	17%

Transmission curtailment for this REZ is not captured. The transmission infrastructure required to upgrade this REZ increases capacity on the 275 kV back bone for S3, S4, S6, S7, S8 and S9.

† Additional augmentation is required in Mid-North when the combination of generation in S3, S4, S5, S6, S7, S8, S9 >2,400 MW.

S4 – Yorke Peninsula

Summary

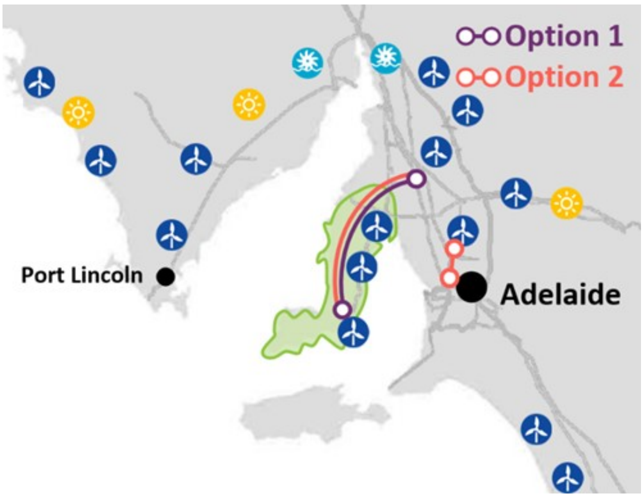
The Yorke Peninsula REZ has good quality wind resources.

A single 132 kV line extends from Hummocks to Wattle Point (towards the end of Yorke Peninsula).

Existing network capability

The existing 132 kV network has no additional network capacity. Transmission augmentation is required to connect any significant additional generation in this REZ.

The capability of this zone to accommodate new generation is subject to the MN1 mid-north group constraint†.



REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	Solar			Wind		
Resource Quality	D			C		
Renewable Potential (MW)	-			1,400		
Demand Correlation	2029-30	2039-40	2049-50	2029-30	2039-40	2049-50
	F	F	E	C	C	C

MLF Robustness	2024-25	2029-30	2034-35
	F	F	F

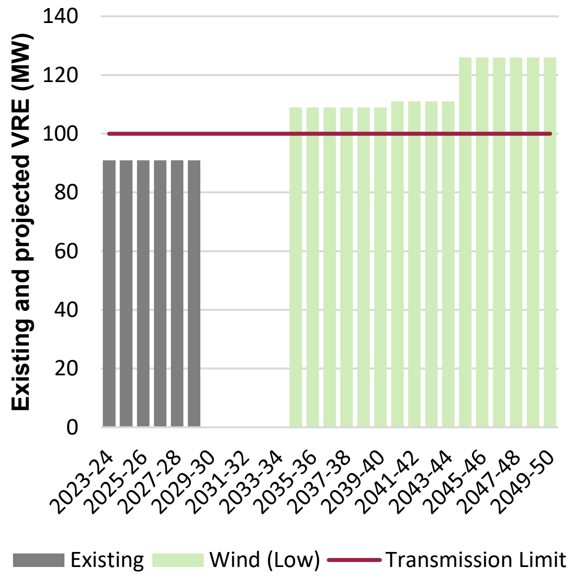
Climate hazard

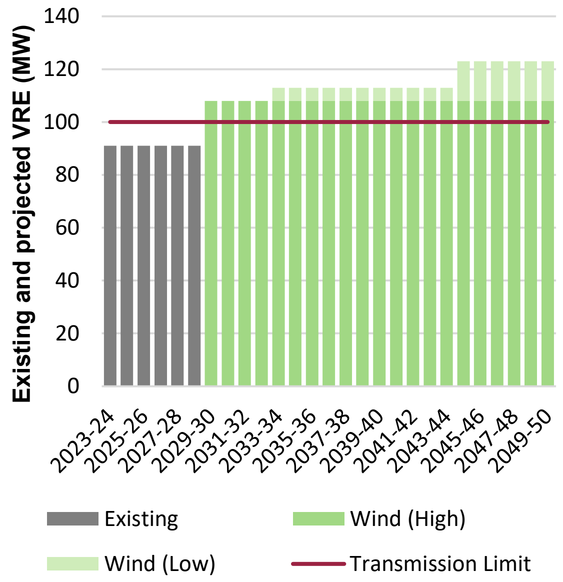
Temperature score	D	Bushfire score	C

VRE outlook

	Solar PV (MW)				Wind (MW)			
	Existing/ committed/ anticipated	Projected			Existing/ committed/ anticipated	Projected		
		2029-30	2039-40	2049-50		2029-30	2039-40	2049-50
Progressive Change	There is no existing, committed or anticipated solar generation for this REZ. The modelling outcomes, for all scenarios, did not project any additional solar for this REZ.				111/0/0	-	100	150
Step Change						100	100	100
Slow Change						-	-	100
Hydrogen Superpower						100	1,400	1,400

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)





VRE curtailment

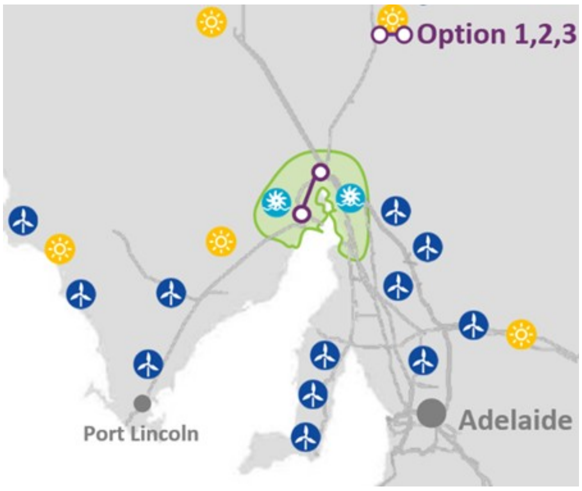
Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	-	-	9%	-	34%
Step Change	-	11%	-	23%	-	39%
Slow Change	-	-	-	-	-	16%
Hydrogen Superpower	-	11%	-	19%	-	45%

† Additional augmentation is required in Mid-North when the combination of generation in S3, S4, S5, S6, S7, S8, S9 >2,400 MW.

S5 – Northern SA

Summary

The Northern SA REZ has good solar and moderate wind resources. This REZ forms a candidate for a hydrogen electrolyser facility in South Australia.



Existing network capability

The capability of this zone to accommodate new generation is subject to the MN1 mid-north and NSA1 northern group constraint†.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	C			C		
Renewable Potential (MW)	2,900			-		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	C	C	C
MLF Robustness	**2024-25**		**2029-30**		**2034-35**	
	C		C		C	

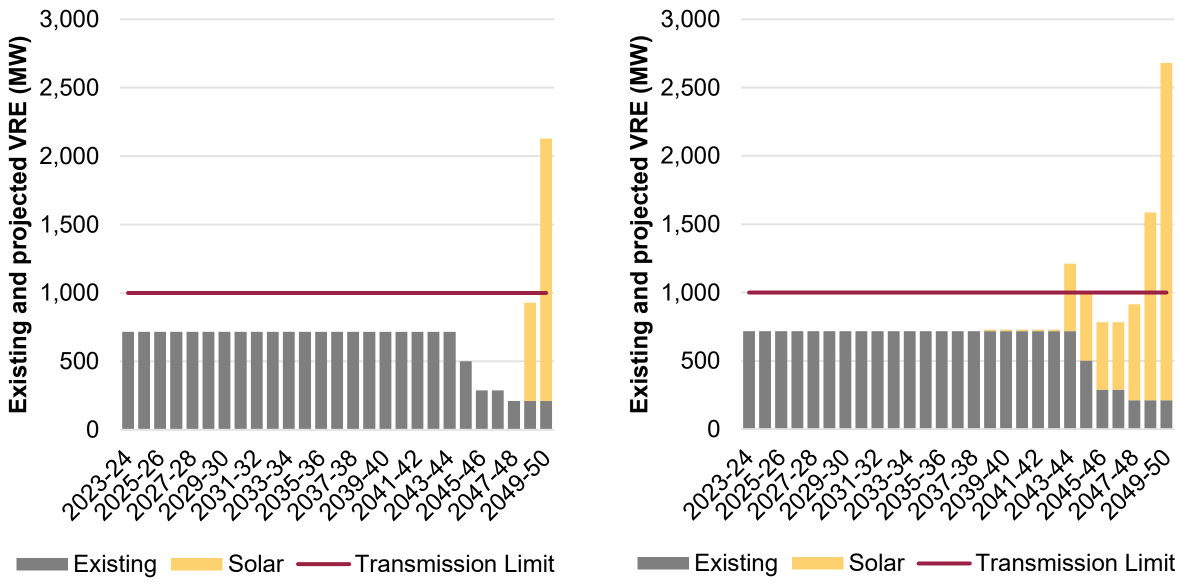
Climate hazard

Temperature score	E	**Bushfire score**	D

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	270/0/79	-	-	1,900	126/86/210	-	-	-
Step Change		-	-	2,450		-	-	-
Slow Change		-	-	-		-	-	-
Hydrogen Superpower		550	2,900	2,900		-	-	-

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)



Note: S5 forecast shows results for the NSA1 group constraint augmentation.

VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	11%	-	7%	-	31%
Step Change	-	10%	-	15%	-	39%
Slow Change	-	22%	-	12%	-	8%
Hydrogen Superpower	-	11%	-	25%	-	48%

Transmission curtailment for this REZ is not captured. The transmission infrastructure required to upgrade this REZ increases capacity on the 275 kV back bone for S5, S8 and S9.

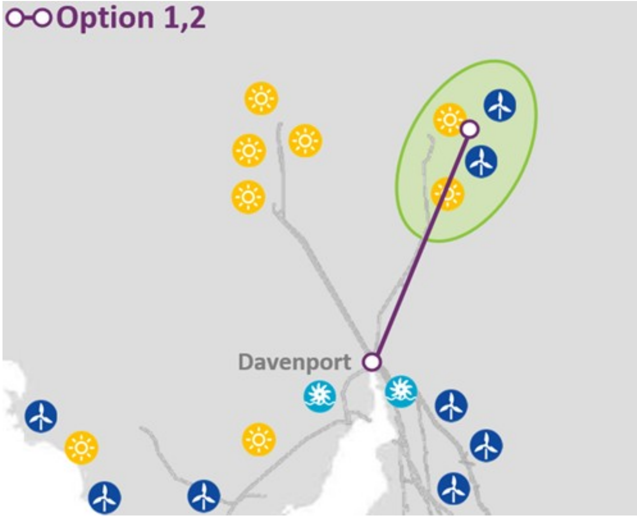
† Additional augmentation is required in Mid-North when the combination of generation in S3, S4, S5, S6, S7, S8, S9 >2,400 MW or in Eyre Peninsula when S5, S8, S9 > 500 MW.

S6 – Leigh Creek

Summary

The Leigh Creek REZ is located between 150 and 350 km north-east of Davenport. It has excellent solar resources and good wind resources.

This REZ is currently supplied with a single 132 kV line.



Existing network capability

There is no additional network capacity within this REZ.

The capability of this zone to accommodate new generation is subject to the MN1 mid-north group constraint†.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	Solar			Wind		
Resource Quality	A			B		
Renewable Potential (MW)	6,500			2,400		
Demand Correlation	2029-30	2039-40	2049-50	2029-30	2039-40	2049-50
	F	F	E	C	C	C

MLF Robustness	2024-25	2029-30	2034-35
	F	F	F

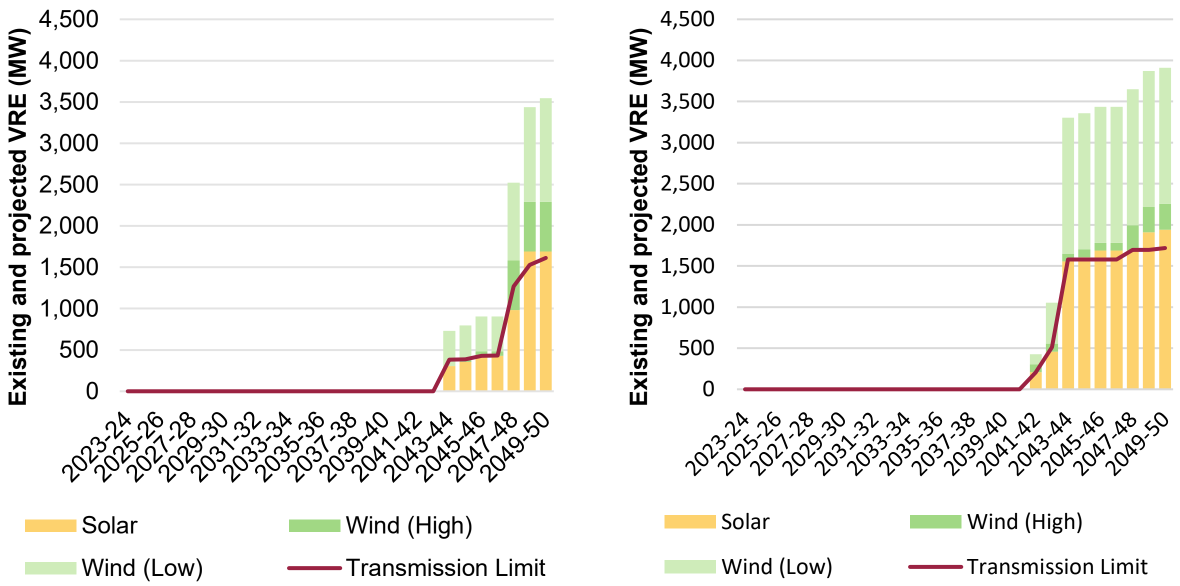
Climate hazard

Temperature score	D	Bushfire score	C

VRE outlook

	Solar PV (MW)				Wind (MW)			
	Existing/ committed/ anticipated	Projected			Existing/ committed/ anticipated	Projected		
		2029-30	2039-40	2049-50		2029-30	2039-40	2049-50
Progressive Change	-	-	-	1,700	-	-	-	1,850
Step Change		-	-	1,950		-	-	1,950
Slow Change		-	-			-	-	-
Hydrogen Superpower		500	7,950	41,800		600	8,900	17,200

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)

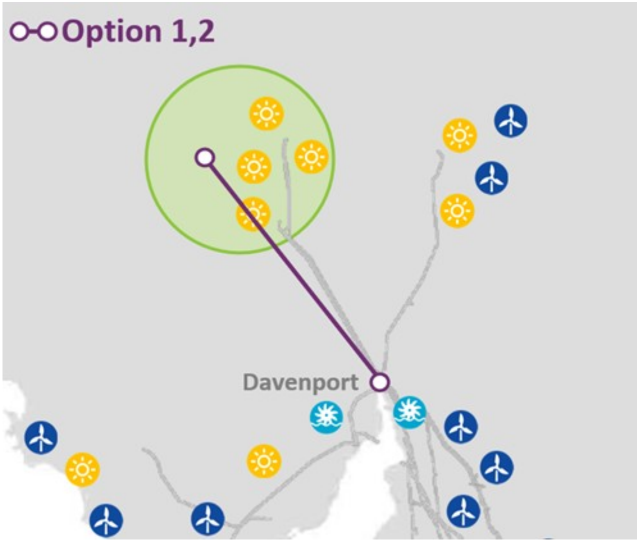


VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	-	-	-	1%	27%
Step Change	-	-	-	-	-	32%
Slow Change	-	-	-	-	-	-
Hydrogen Superpower	1%	13%	-	12%	-	23%

† Additional augmentation is required in Mid-North when the combination of generation in S3, S4, S5, S6, S7, S8, S9 >2,400 MW.

S7 – Roxby Downs

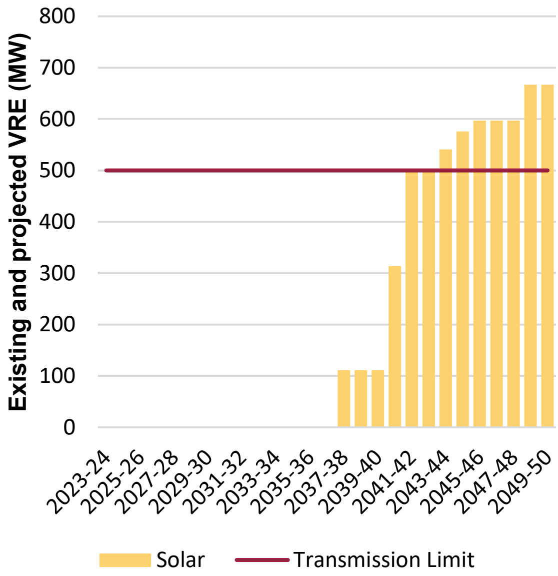
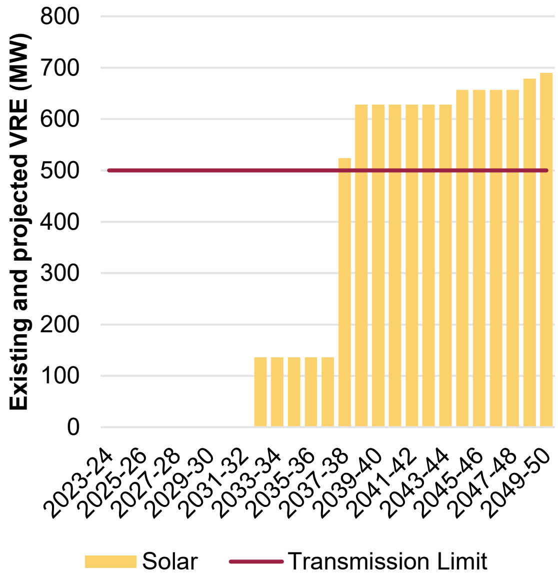
Summary	
The Roxby Downs REZ is located a few hundred kilometres north-west of Davenport. It has excellent solar resources. The only significant load in the area is the Olympic Dam and Carrapateena mines. This REZ is currently connected with a 132 kV line that provides supply to small loads, and two privately owned 275 kV lines from Davenport that provide supply to large mines in the area.	
Existing network capability	
The existing network capacity of this REZ is 500 MW, although the capability of this zone to accommodate new generation is subject to the MN1 mid-north group constraint†.	

REZ grouping	
Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics						
Resource	**Solar**			**Wind**		
Resource Quality	A			D		
Renewable Potential (MW)	3,400			-		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	B	B	C
MLF Robustness	**2024-25**		**2029-30**		**2034-35**	
	E		E		E	

Climate hazard			
Temperature score	E	**Bushfire score**	C

VRE outlook								
	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	-	-	100	650	There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all scenarios, did not project any additional wind for this REZ.			
Step Change		-	650	700				
Slow Change		-	-	450				
Hydrogen Superpower		550	750	3,400				

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)	
	

VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	-	-	12%	-	42%
Step Change	-	-	1%	30%	-	47%
Slow Change	-	-	-	-	-	23%
Hydrogen Superpower	1%	17%	-	47%	-	48%

† Additional augmentation is required in Mid-North when the combination of generation in S3, S4, S5, S6, S7, S8, S9 >2,400 MW.

S8 – Eastern Eyre Peninsula

Summary

The Eastern Eyre Peninsula REZ has moderate to good quality wind resources.

The Eyre Peninsula Link is a committed project that will replace the existing Cultana–Yadnarie–Port Lincoln 132 kV single-circuit line with a new double-circuit 132 kV line. The section between Cultana to Yadnarie will be built to operate at 275 kV, however it will be energised at 132 kV upon commissioning. This project is due to be completed by December 2022.

Existing network capability

The existing network capacity of this REZ is 300 MW (subject to the capacity of the 275/132 kV transformers)†.

The capability of this zone to accommodate new generation is subject to the MN1-SA mid-north and NSA1 northern group constraint‡.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	D			C		
Renewable Potential (MW)	5,000			2,300		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	B	B	C

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	F	F	F

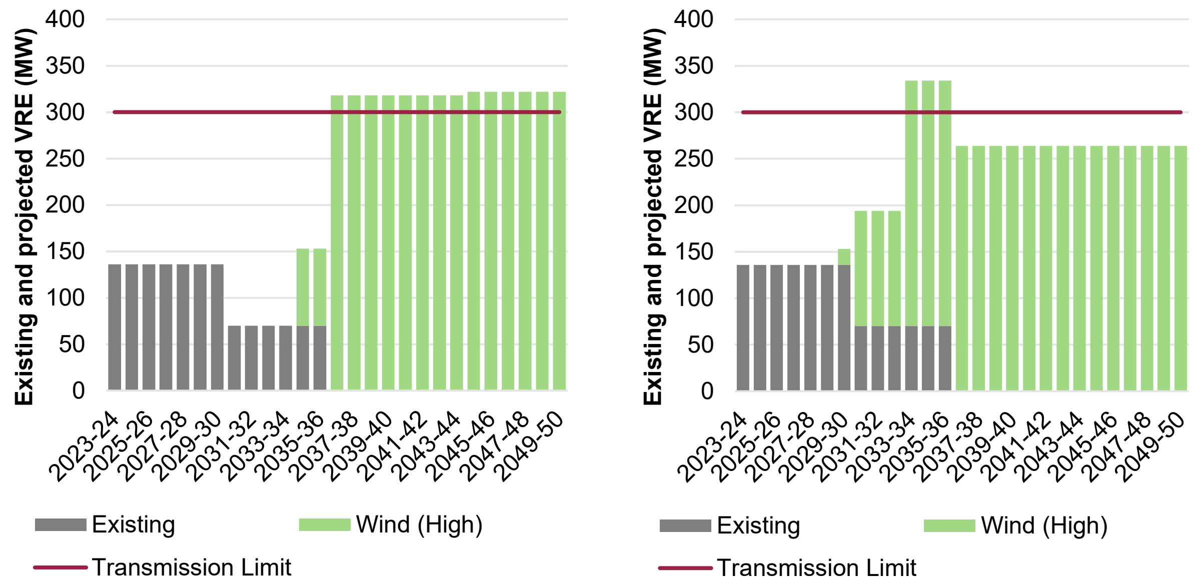
Climate hazard

Temperature score	D	**Bushfire score**	D

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	-	-	-	-	136/0/0	-	300	300
Step Change		-	-	-		-	250	250
Slow Change		-	-	-		-	-	-
Hydrogen Superpower		-	-	5,000		850	850	2,300

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)



VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	8%	-	7%	-	29%
Step Change	-	12%	-	17%	-	34%
Slow Change	-	15%	-	-	-	-
Hydrogen Superpower	-	7%	-	22%	-	38%

S9 – Western Eyre Peninsula

Summary

The Western Eyre Peninsula REZ shares the same electrical network as the Eastern Eyre Peninsula. It has good solar and moderate wind resources. There are no generators currently connected or committed within this REZ.

Existing network capability

There is no additional network capacity within this REZ.

The capability of this zone to accommodate new generation is subject to the MN1-SA mid-north and NSA1 northern group constraint†.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	Solar			Wind		
Resource Quality	C			C		
Renewable Potential (MW)	4,000			1,500		
Demand Correlation	2029-30	2039-40	2049-50	2029-30	2039-40	2049-50
	F	F	E	C	C	C
MLF Robustness	2024-25		2029-30		2034-35	
	N/A		N/A		N/A	

*There is currently no network connecting this REZ to the transmission network.

Climate hazard

Temperature score	D	Bushfire score	C

VRE outlook

	Solar PV (MW)				Wind (MW)			
	Existing/ committed/ anticipated	Projected			Existing/ committed/ anticipated	Projected		
		2029-30	2039-40	2049-50		2029-30	2039-40	2049-50
Progressive Change	-	-	-	-	-	-	-	-
Step Change		-	-	-		-	-	-
Slow Change		-	-	-		-	-	-
Hydrogen Superpower		-	4,000	4,000		-	400	1,750

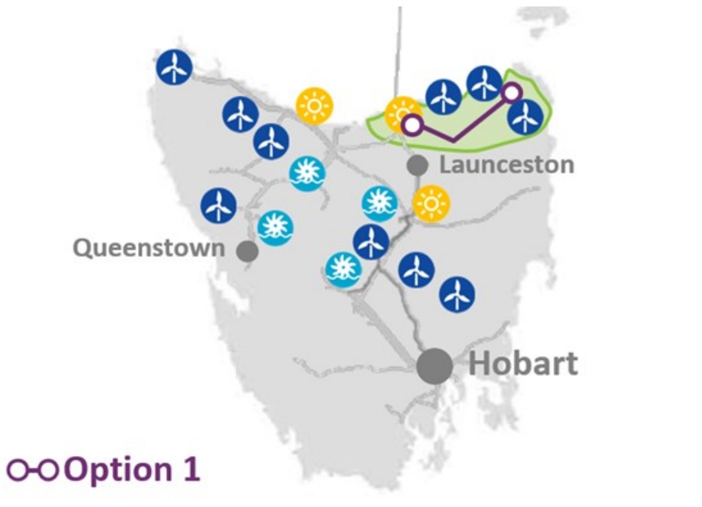
Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)
The modelling outcomes for this REZ do not forecast any VRE under *Progressive Change* and *Step Change* scenario.

VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	-	-	-	-	-
Step Change	-	-	-	-	-	-
Slow Change	-	-	-	-	-	-
Hydrogen Superpower	-	-	-	32%	-	44%

A3.6.5 Tasmania

T1 – North East Tasmania

Summary	
This REZ has excellent quality wind resources. North East Tasmania is distanced from the proposed Marinus Link augmentations and therefore upgrades are not influenced by the proposed new interconnector.	
Existing network capability	
Currently there is no capacity on the 110 kV network from Hadspen to Derby. There is approximately 268 MW of total REZ network capacity for existing and new VRE available at George Town.	

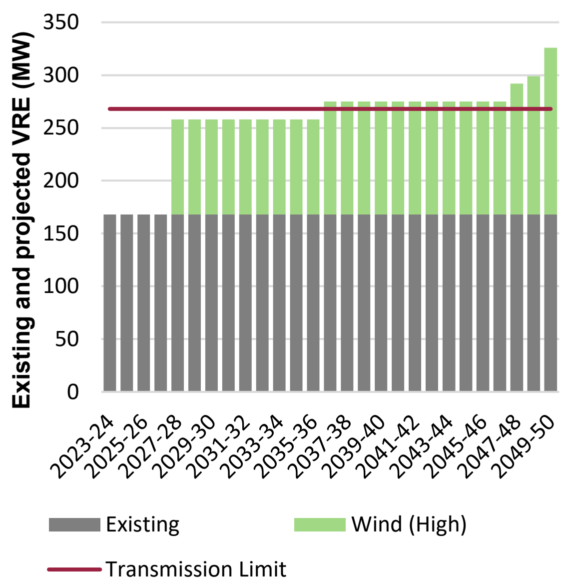
REZ grouping	
Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

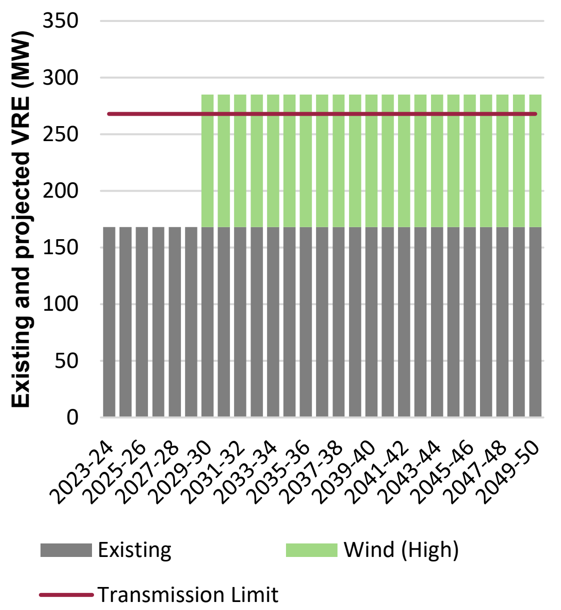
Metrics						
Resource	**Solar**			**Wind**		
Resource Quality	F			A		
Renewable Potential (MW)	300			1,400		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	C	C	C
MLF Robustness	**2024-25**		**2029-30**		**2034-35**	
	A*		A		A	
*MLF robustness has been calculated at the 220 kV connection near George Town as there is currently no capacity left on the 110 kV network.						

Climate hazard			
Temperature score	A	**Bushfire score**	B

VRE outlook								
	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	-	-	-	-	168/0/0	100	100	150
Step Change		-	-	-		100	100	100
Slow Change		-	-	-		150	200	200
Hydrogen Superpower		550	1,250	24,050		1,100	3,700	15,500

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	7%	-	6%	1%	13%
Step Change	-	7%	-	9%	-	18%
Slow Change	-	16%	4%	14%	2%	11%
Hydrogen Superpower	1%	4%	-	5%	-	13%

T2 – North West Tasmania

Summary

This REZ has excellent quality wind resources and good pumped hydro resources. The North West Tasmania augmentation options are highly dependent on Marinus Link, with some REZ network capacity increase already included in the proposed Marinus Link AC augmentations.

Existing network capability

The current total REZ transmission limit for existing and new VRE before any network upgrade in North West Tasmania is approximately 592 MW. Future REZ generators are assumed to have a runback scheme in place to reduce generation output post contingency to within network capacity for lines currently covered by the Network Control System Protection Scheme (NCSPS), but not for new transmission lines.

REZ grouping

Design and community engagements are progressing	The modelling outcomes identify this zone for development of wind generation in the late 2020s across the *Step Change* and *Hydrogen Superpower* scenarios and in the 2030s for the *Progressive Change* and *Slow Change* scenarios. Ongoing community engagements is underway in order to ensure coordination of generation with network upgrade requirements.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	F			A		
Renewable Potential (MW)	150			5,000		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	C	C	C
MLF Robustness	**2024-25**		**2029-30**		**2034-35**	
	D		B*		B	

*Marinus Link upgrades improve MLF robustness for VRE within this REZ.

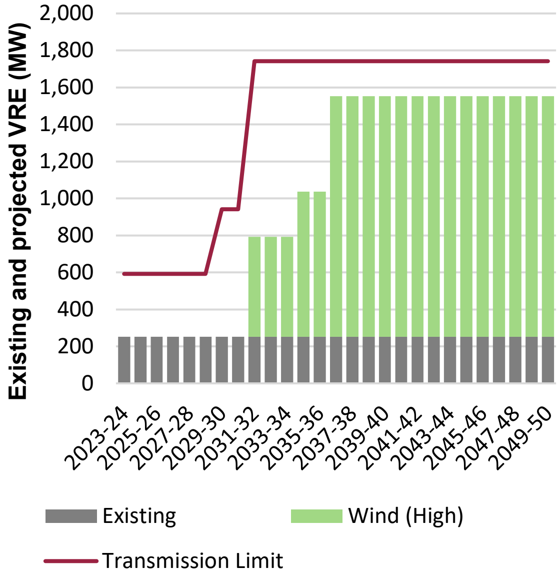
Climate hazard

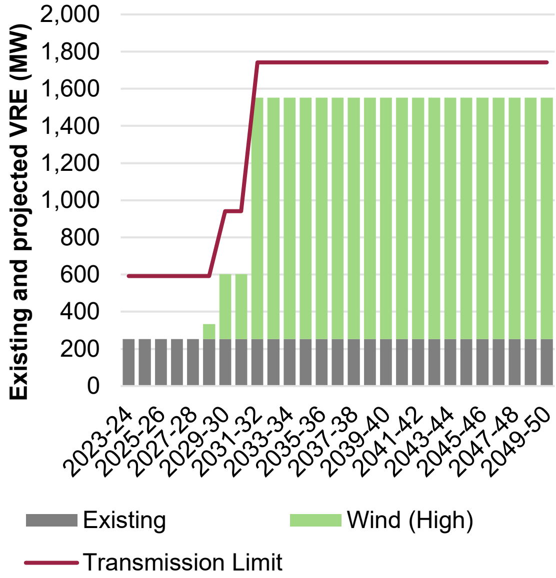
Temperature score	A	**Bushfire score**	A

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	-	-	-	-	252/0/0	-	1,300	1,300
Step Change		-	-	-		350	1,300	1,300
Slow Change		-	-	-		-	850	850
Hydrogen Superpower		150	150	150		1,300	2,950	6,550

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)





VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	5%	-	1%	-	4%
Step Change	-	4%	-	2%	-	6%
Slow Change	-	13%	-	8%	-	5%
Hydrogen Superpower	-	2%	-	6%	-	16%

T3 – Central Highlands

Summary

This REZ has excellent quality wind resources and has good pumped hydro resources. It is located close to major load centres at Hobart. The Tasmania Central Highlands augmentation options are influenced by the Marinus Link augmentations, with REZ network capacity increase already included in the proposed Marinus Link Palmerston to Sheffield 220 kV AC augmentations.

Existing network capability

The current total REZ transmission limit for existing and new VRE before any network upgrade in the Central Highlands is approximately 622 MW. VRE development opportunities are anticipated around the Liapootah, Waddamana and Palmerston substations.

Note that a runback scheme is not considered for any new transmission lines.

REZ grouping

Design and community engagements are progressing	The modelling outcomes identify this zone for development of wind generation in the 2020s across all scenarios. Ongoing community engagements is underway in order to ensure coordination of generation with network upgrade requirements.

Metrics

Resource	Solar			Wind		
Resource Quality	F			A		
Renewable Potential (MW)	150			3,400		
Demand Correlation	2029-30	2039-40	2049-50	2029-30	2039-40	2049-50
	F	F	E	C	C	C

MLF Robustness	2024-25	2029-30	2034-35
	D	C*	B

Marinus Link upgrades improve MLF robustness for VRE within this REZ.

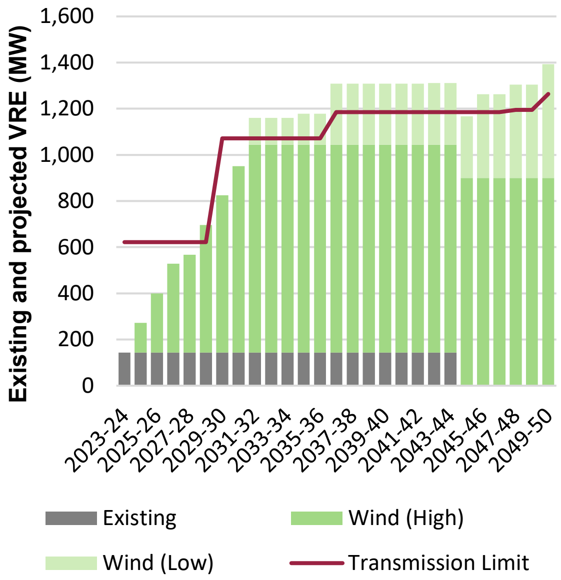
Climate hazard

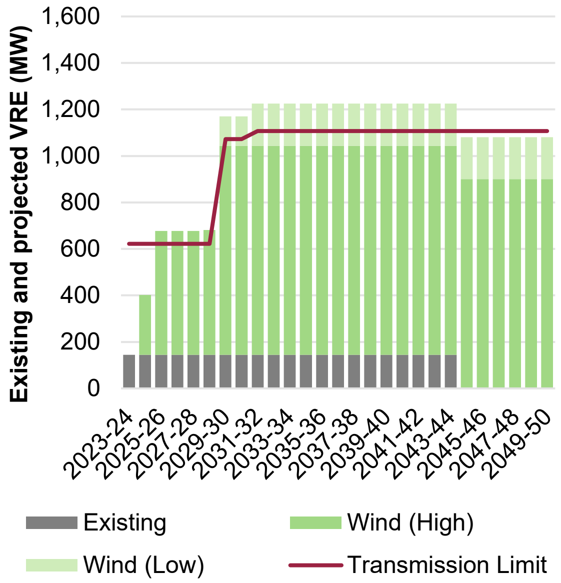
Temperature score	A	Bushfire score	D

VRE outlook

	Solar PV (MW)				Wind (MW)			
	Existing/ committed/ anticipated	Projected			Existing/ committed/ anticipated	Projected		
		2029-30	2039-40	2049-50		2029-30	2039-40	2049-50
Progressive Change	-	-	-	-	144/0/0	700	1,150	1,400
Step Change		-	-	-		1,050	1,100	1,100
Slow Change		-	-	-		650	1,100	1,100
Hydrogen Superpower		1,100	1,100	1,100		3,700	11,450	11,450

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





VRE curtailment

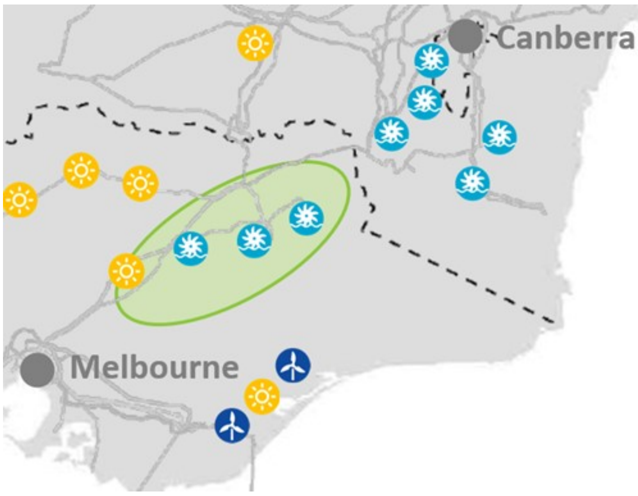
Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	3%	-	2%	-	5%
Step Change	-	3%	-	4%	-	7%
Slow Change	-	11%	2%	10%	-	6%
Hydrogen Superpower	1%	2%	-	2%	-	8%

A3.6.6 Victoria

V1 – Ovens Murray

Summary

The Ovens Murray REZ has been identified as a candidate REZ due to this REZ having good pumped hydro resources. There is currently 770 MW of installed hydro generation within this zone.



Existing network capability

The current network capacity for VRE in Ovens Murray is approximately 350 MW.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	Solar			Wind		
Resource Quality	E			A		
Renewable Potential (MW)	1,000			-		
Demand Correlation	2029-30	2039-40	2049-50	2029-30	2039-40	2049-50
	F	F	F	C	C	C

MLF Robustness	2024-25	2029-30	2034-35
	A	A	A

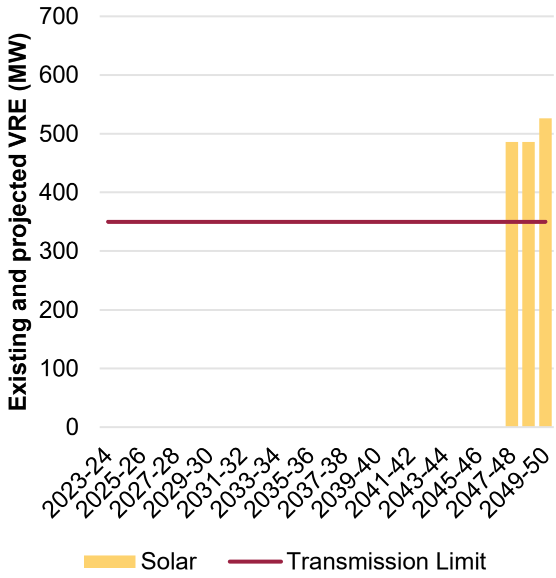
Climate hazard

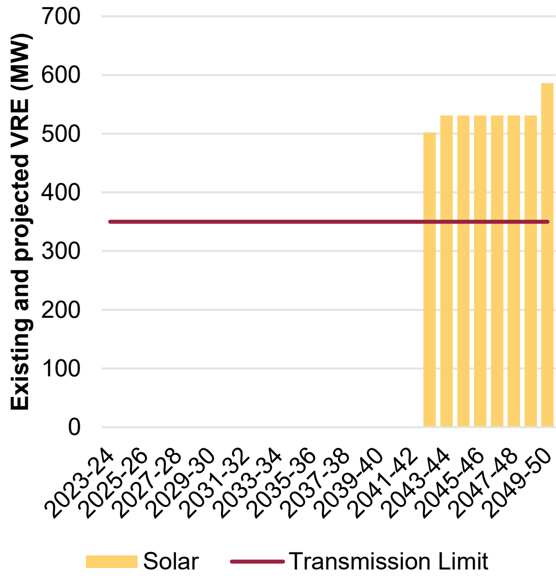
Temperature score	B	Bushfire score	E

VRE outlook

	Solar PV (MW)				Wind (MW)			
	Existing/ committed/ anticipated	Projected			Existing/ committed/ anticipated	Projected		
		2029-30	2039-40	2049-50		2029-30	2039-40	2049-50
Progressive Change	-	-	-	550	There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all scenarios, did not project any additional wind for this REZ.			
Step Change		-	-	600				
Slow Change		-	-	-				
Hydrogen Superpower		400	450	650				

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)





VRE curtailment

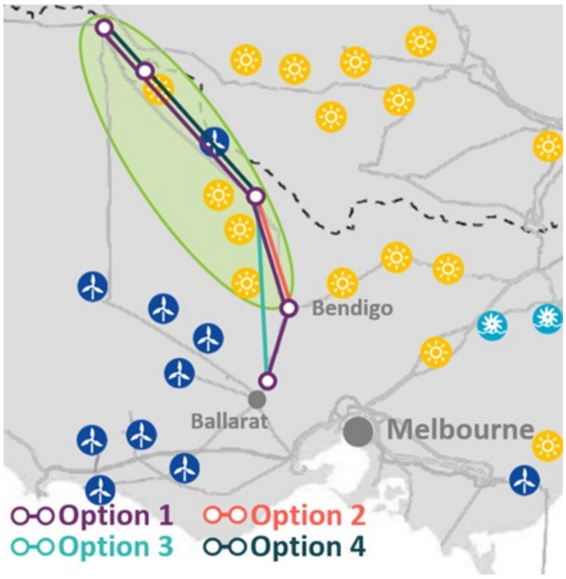
Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	-	-	-	1%	33%
Step Change	-	-	-	-	14%	16%
Slow Change	-	-	-	-	-	-
Hydrogen Superpower	1%	16%	7%	15%	18%	17%

V2 – Murray River

Summary

The Murray River REZ has good solar resources. Despite being remote and electrically weak, this REZ has attracted significant investment in solar generation. Voltage stability and thermal limits currently restrict the output of generators within this REZ.

The proposed VNI West project could upgrade transfer capability between Victoria and New South Wales via Kerang, and significantly increase the ability for renewable generation to connect in this zone.



Existing network capability

No additional capacity to connect new generation.

REZ grouping

Coordination of generation infrastructure may be required	The modelling outcomes identify this zone for development of solar generation in the 2030s across the *Step Change* and *Hydrogen Superpower* scenarios. This REZ could benefit from early community engagements and from coordination of generation. This will be assessed in future ISPs.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	C			D		
Renewable Potential (MW)	4,700			-		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	F	B	B	B

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	C	C	B*

* VNI West improves MLF robustness for VRE within this REZ.

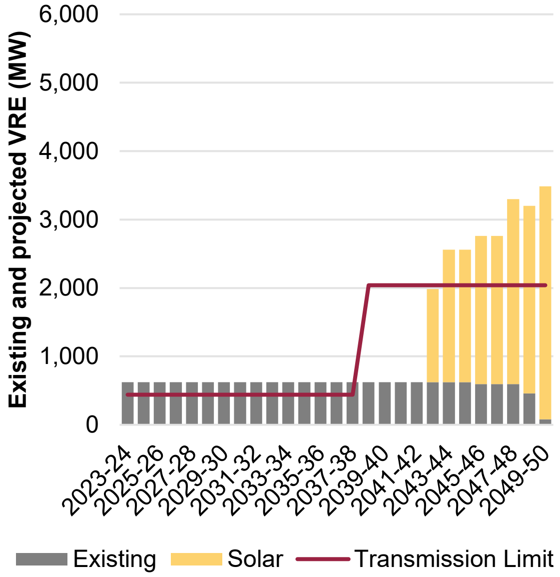
Climate hazard

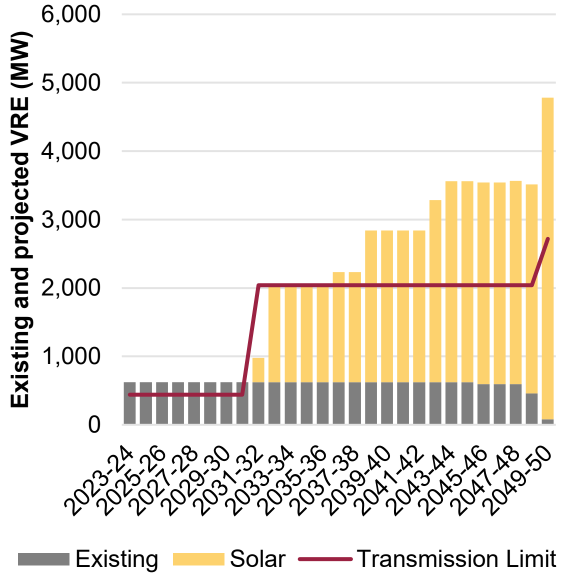
Temperature score	E	**Bushfire score**	C

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	607/27/0	-		3,400	There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all scenarios, did not project any additional wind for this REZ.			
Step Change		-	2,200	4,700				
Slow Change		-	-	-				
Hydrogen Superpower		-	4,550	4,700				

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





VRE curtailment

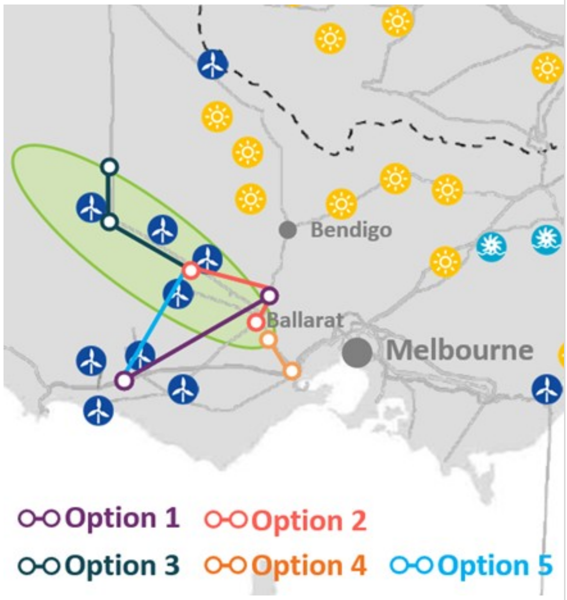
Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	3%	26%	-	5%	3%	24%
Step Change	3%	18%	3%	12%	2%	25%
Slow Change	1%	50%	1%	36%	-	19%
Hydrogen Superpower	3%	17%	1%	22%	-	26%

V3 – Western Victoria

Summary

The Western Victoria REZ has good to excellent quality wind resources. The existing and committed renewable generation within this REZ exceeds 1 GW, all of which is from wind generation. The current network is constrained west of Ballarat and cannot support any further connection of renewable generation without transmission augmentation.

The Western Renewables Link is an anticipated project, with the preferred option to expand generation within this zone.



Existing network capability

Network capacity is anticipated to be sufficient for existing and committed generation following completion of Western Renewables Link.

REZ grouping

Coordination of generation infrastructure may be required	The modelling outcomes identify this zone for development of wind generation in the 2030s across the *Step Change* and *Progressive Change* scenarios. This build is brought forward under the *Hydrogen Superpower* scenario. This REZ could benefit from community engagements and from coordination of generation. This will be assessed in future ISPs.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	E			B		
Renewable Potential (MW)	400			2,600		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	B	B	C

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	A*	A	A

*Assumes Western Renewables Link in service and assumes new VRE connecting around Ballarat.

Climate hazard

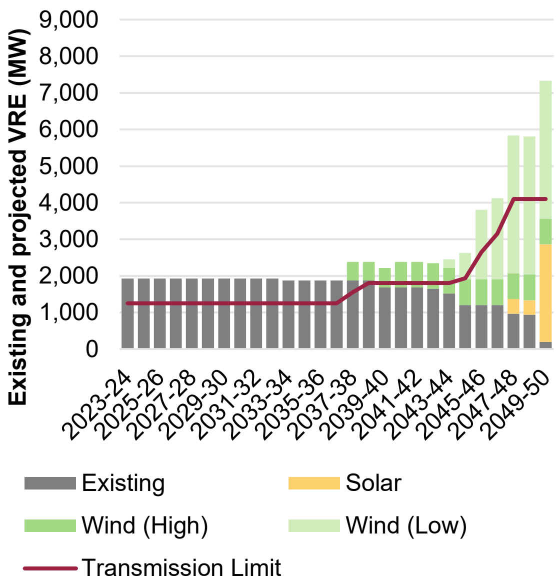
Temperature score	D	**Bushfire score**	D

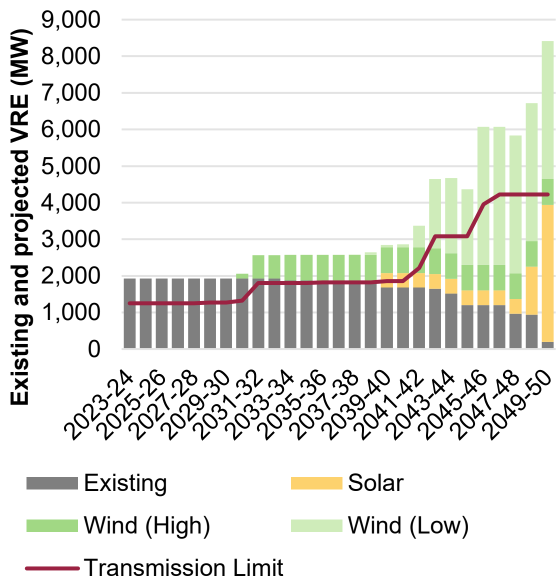
VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	-	-	-	2,650	1,726/209/0	-	550	4,450
Step Change		-	400	3,750		-	750	4,450

Slow Change		-	-	-		-	-	1,800
Hydrogen Superpower		900	900	5,200		700	2,100	4,100

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





VRE curtailment

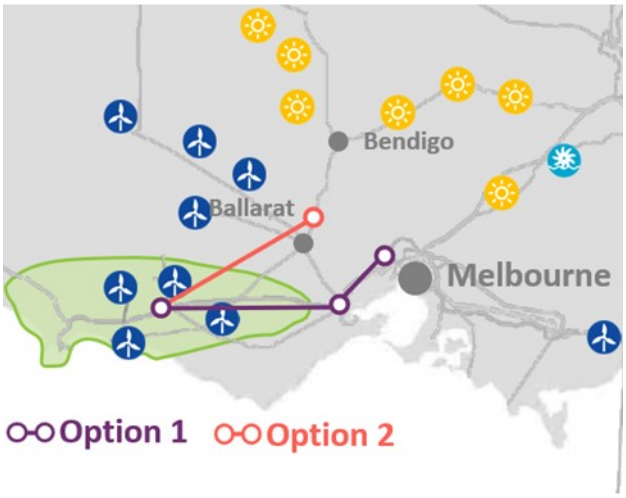
Scenario	**2029-30**		**2039-40**		**2049-50**	
	Transmission curtailment	**Economic spill**	**Transmission curtailment**	**Economic spill**	**Transmission curtailment**	**Economic spill**
Progressive Change	3%	6%	-	2%	-	7%
Step Change	2%	5%	1%	5%	-	9%
Slow Change	2%	15%	1%	9%	-	6%
Hydrogen Superpower	2%	6%	-	9%	-	24%

V4 – South West Victoria

Summary

The South West Victoria REZ has moderate to good quality wind resources in close proximity to the 500 kV and 220 kV networks in the area.

The total in-service, committed and anticipated wind generation in the area exceeds 2 GW.



Existing network capability

Currently the 220 kV network is already congested.

The current total network limit is approximately 2,500 MW for this REZ.

REZ grouping

Transmission and generation infrastructure coordination is required	Preparatory activities relating to 500 kV upgrade options are required to assess the potential need for actionable status in the next ISP.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	F			B		
Renewable Potential (MW)	-			3,442		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	C	C	C

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	A	A	A

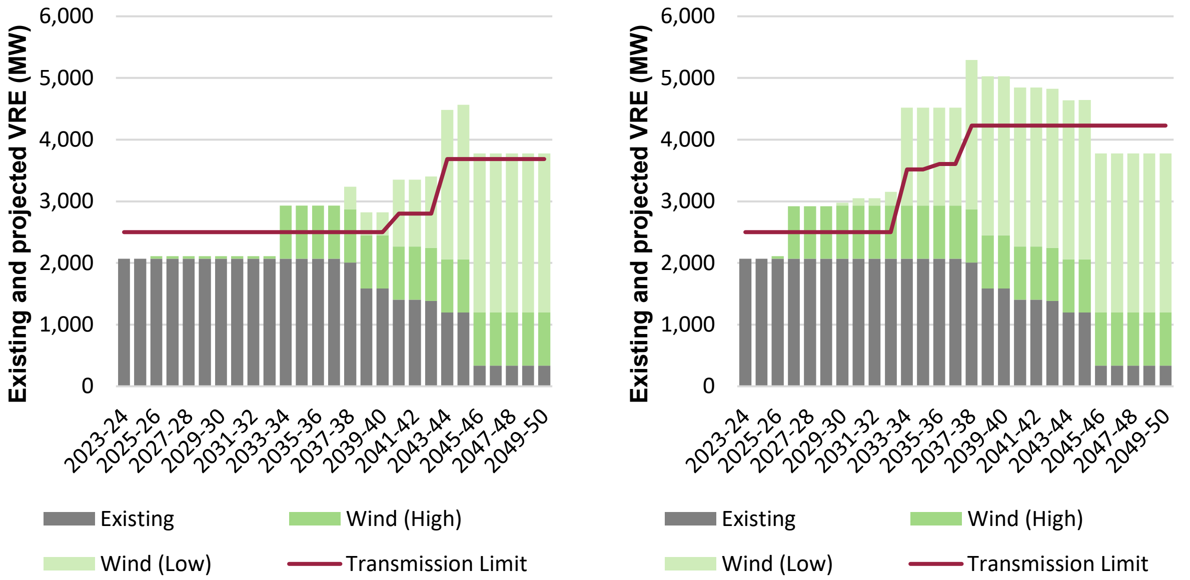
Climate hazard

Temperature score	C	**Bushfire score**	D

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	There is no existing, committed or anticipated solar generation for this REZ. The modelling outcomes, for all scenarios, did not project any additional solar for this REZ.				1,855/0/158	50	1,250	3,450
Step Change						900	3,450	3,450
Slow Change						50	50	2,700
Hydrogen Superpower						2,250	6,850	14,950

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right)



VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	5%	-	2%	-	5%
Step Change	1%	4%	1%	3%	-	5%
Slow Change	-	13%	-	9%	1%	6%
Hydrogen Superpower	2%	3%	-	4%	-	7%

V5 - Gippsland

Summary

The Gippsland REZ has moderate quality wind resources, bordering on the 500 kV networks. There is currently significant wind generation interest in this area.

Existing network capability

Due to the strong network at the border of this REZ (with multiple 500 kV and 220 kV lines from Latrobe Valley to Melbourne designed to transport energy from major Victorian brown coal power stations), significant generation can be accommodated.

Approximately 2,000 MW of VRE can be accommodated prior to network augmentations. Options shown extend the network further to allow for cost-efficient connection of generation back to the main network.

REZ grouping

Coordination of generation infrastructure may be required	The modelling outcomes identify this zone for development of wind generation in the 2030s across the *Step Change* and *Progressive Change* scenarios. This build is brought forward under the *Hydrogen Superpower* scenario. This REZ could benefit from community engagements and from coordination of generation. This will be assessed in future ISPs.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	F			C		
Renewable Potential (MW)	500			2,000		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	E	C	C	C
MLF Robustness	**2024-25**		**2029-30**		**2034-35**	
	A		A		A	

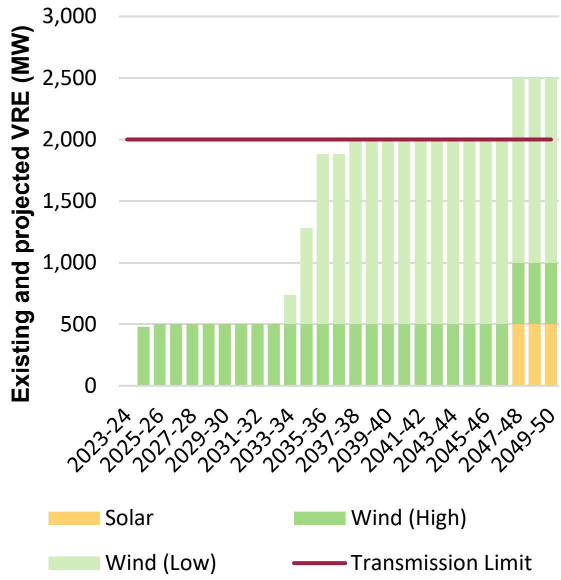
Climate hazard

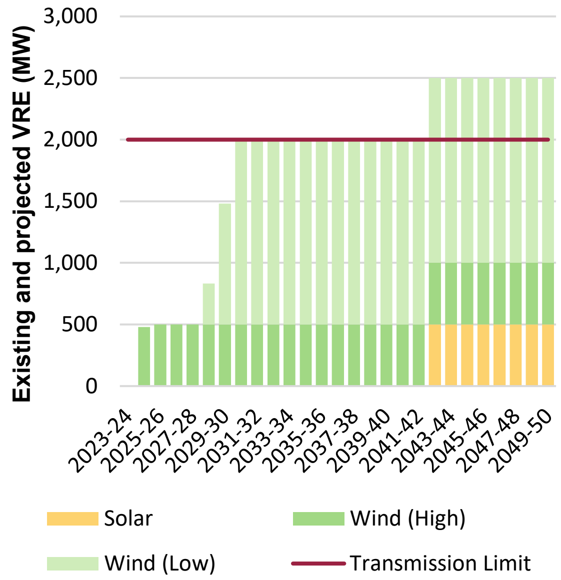
Temperature score	C	**Bushfire score**	D

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	-	-	-	500	-	500	2,000	2,000
Step Change		-	-	500		1,500	2,000	2,000
Slow Change		-	-	-		500	500	2,000
Hydrogen Superpower		500	500	500		2,100	2,150	5,100

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	6%	-	2%	-	9%
Step Change	-	4%	-	3%	-	5%
Slow Change	-	14%	-	8%	-	4%
Hydrogen Superpower	-	4%	-	11%	-	14%

V6 – Central North Victoria

Summary

The Central North Victoria REZ has moderate quality wind and solar resources. In addition to the currently in service and committed solar farms, there are enquires for approximately 2.5 GW of additional solar.

Existing network capability

The current total network capacity in Central North Victoria is approximately 800 MW.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	**Solar**			**Wind**		
Resource Quality	D			D		
Renewable Potential (MW)	1,700			1,600		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**	**2029-30**	**2039-40**	**2049-50**
	F	F	F	B	B	B

MLF Robustness	**2024-25**	**2029-30**	**2034-35**
	D	D	B*

* VNI West improves MLF robustness for VRE within this REZ.

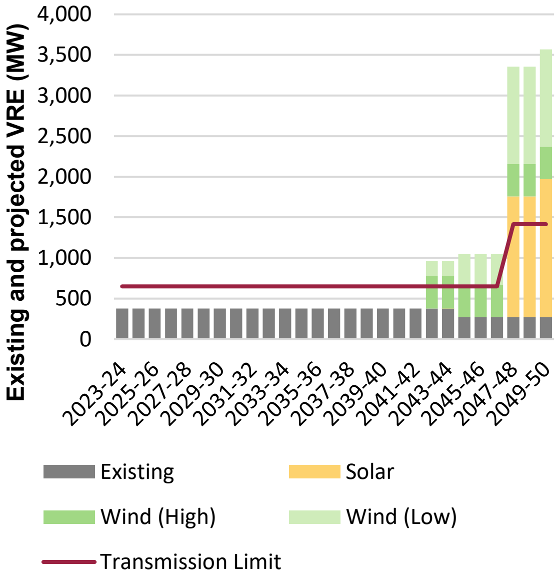
Climate hazard

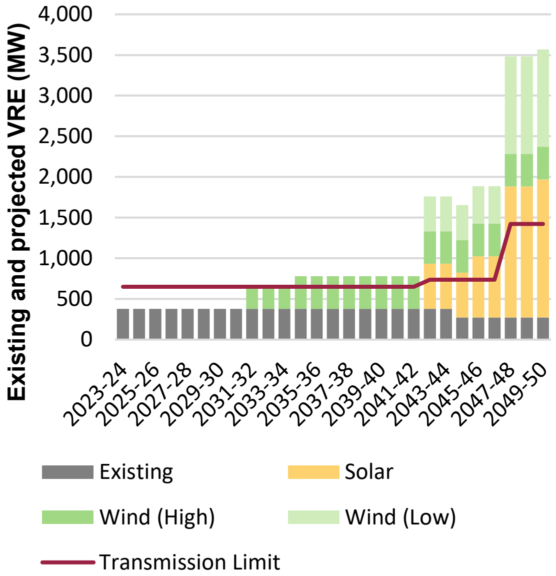
Temperature score	D	**Bushfire score**	D

VRE outlook

	Solar PV (MW)				**Wind (MW)**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	311/0/75	-	-	1,700	-	-	-	1,600
Step Change		-	-	1,700		-	400	1,600
Slow Change		-	-	-		-	-	-
Hydrogen Superpower		400	1,150	10,900		400	400	1,150

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right)





VRE curtailment

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	21%	-	7%	1%	18%
Step Change	-	13%	-	8%	1%	20%
Slow Change	-	56%	-	31%	-	24%
Hydrogen Superpower	1%	11%	-	23%	-	25%

A3.6.7 Offshore wind zones

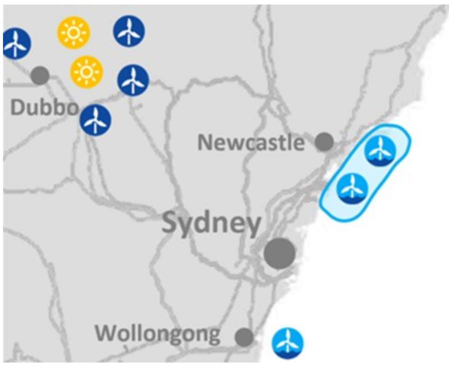
The *Offshore Electricity Infrastructure Act 2021*[21] outlines how and where offshore electricity infrastructure for renewable generation can be constructed. The declaration of areas suitable for offshore energy infrastructure is a Ministerial decision, and companies wishing to undertake these activities within a declared area need to first obtain a licence.

The OWZs, which are REZs, shown are still at the conceptual stage, and are currently based on proponent interest as opposed to formally declared offshore renewable infrastructure areas.

Under the ISP core scenarios, OWZs are not developed except for O2 – Illawarra which has offshore wind development under the *Progressive Change* scenario at the end of the horizon in 2050. The 2022 ISP has explored an *Offshore Wind* sensitivity which tests the impact of the Victorian Government's offshore wind policy, and includes an updated cost for offshore wind development. The OWZ scorecards show the projected VRE development under the core ISP scenarios as well as under the offshore wind sensitivity.

[21] Australian Government, *Regulating offshore renewable energy infrastructure*, at https://www.industry.gov.au/regulations-and-standards/regulating-offshore-renewable-energy-infrastructure

O1 – Hunter Coast

Summary	
The Hunter Coast OWZ has been identified for the offshore wind resource potential in relatively shallow waters close to shore, with a connection point near to the Sydney load centre.	
Existing network capability	
Newcastle has multiple 330 kV lines already connected, and is situated near to the Sydney load centre. Network capacity is shared with local gas generation and hydro generation output. The current network transmission limit is approximately 5,500 MW.	

REZ grouping			
Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.		
Metrics			
Resource	**Offshore wind**		
Resource Quality	B		
Renewable Potential (MW)	10,000		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**
	B	B	C

Climate hazard			
Temperature score	A	**Bushfire score**	E

VRE outlook								
	Offshore Wind (MW) - Core ISP scenarios				**Offshore Wind (MW) - Offshore wind sensitivity**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all core scenarios and the offshore wind sensitivities, did not project any wind for this REZ.				There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all core scenarios and the offshore wind sensitivities, did not project any wind for this REZ.			
Step Change								
Slow Change								
Hydrogen Superpower								

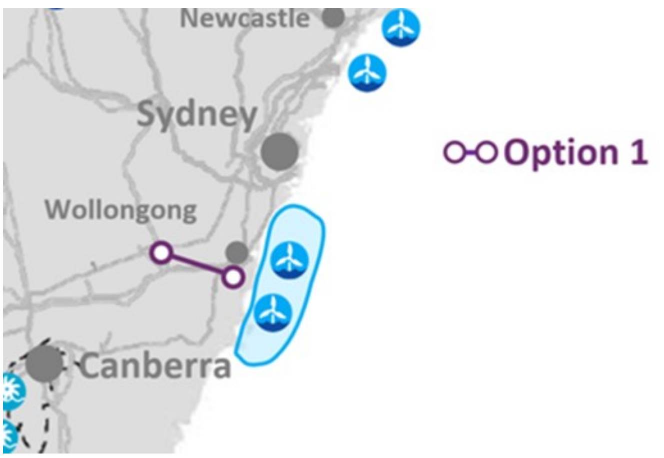
Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right) for the *Offshore Wind* sensitivity
There are no existing, committed, anticipated VRE projects for this REZ and the modelling outcomes, for all scenarios and the offshore wind sensitivities, did not project any additional VRE for this REZ. Therefore, no VRE curtailment or transmission expansion occurs in this REZ.

O2 – Illawarra Coast

Summary

The Illawarra Coast OWZ has been identified for the offshore wind resource potential in relatively shallow waters close to shore, with a connection point near to the Sydney load centre.

To be able to facilitate large amounts of offshore wind connecting in this part of the 330 kV network, it is anticipated that expansion will be required to connect to the 500 kV backbone.



Existing network capability

Dapto has multiple 330 kV lines already connected and is situated near to the Sydney load centre. Network capacity is shared with local gas generation and hydro generation output. The current network capacity is approximately 1,000 MW.

REZ grouping

Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics

Resource	**Offshore Wind**		
Resource Quality	B		
Renewable Potential (MW)	10,000		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**
	C	C	C

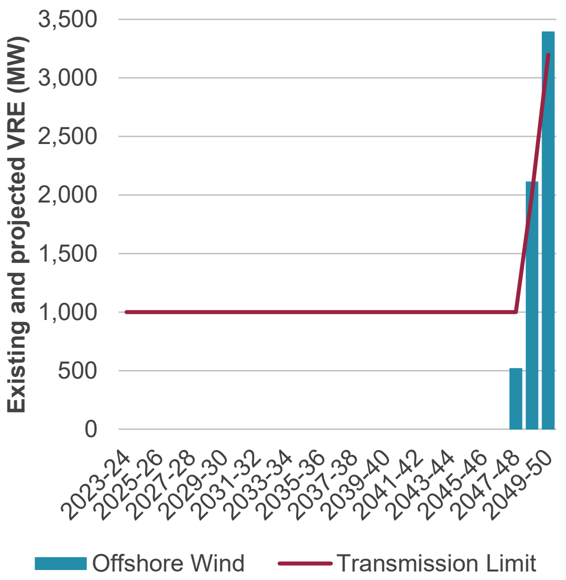
Climate hazard

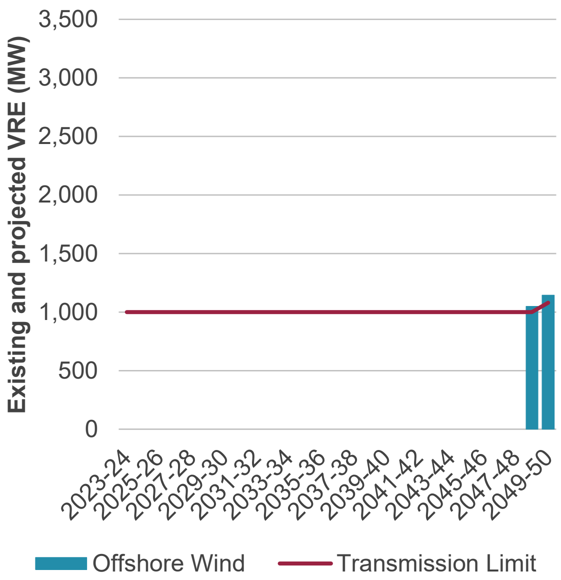
Temperature score	C	**Bushfire score**	C

VRE outlook

	Offshore Wind (MW) – Core ISP scenarios				**Offshore Wind (MW) – Offshore wind sensitivity**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	-	-	-	350	-	-	-	3,400
Step Change		-	-	-		-	-	1,150
Slow Change		-	-	-		-	-	-
Hydrogen Superpower		-	-	-		-	-	-

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right) for the *Offshore Wind* sensitivity





VRE curtailment – offshore wind sensitivity

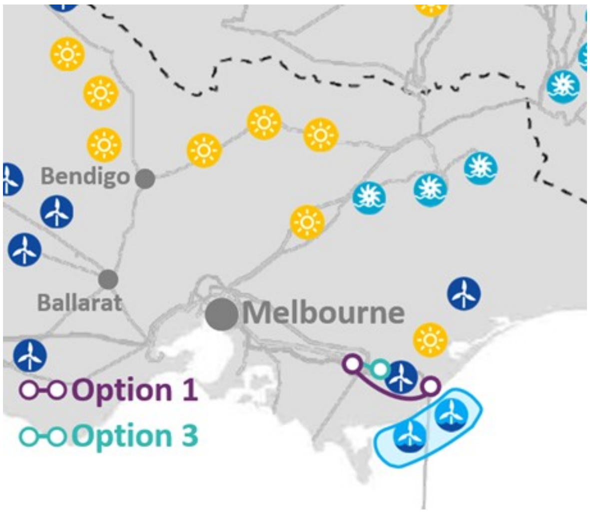
	2029-30		2039-40		2049-50	
	Transmission curtailment	**Economic spill**	**Transmission curtailment**	**Economic spill**	**Transmission curtailment**	**Economic spill**
Progressive Change	-	-	-	-	-	9%
Step Change	-	-	-	-	-	0%
Slow Change	-	-	-	-	-	-
Hydrogen Superpower	-	-	-	-	-	-

O3 – Gippsland Coast

Summary

The Gippsland Coast OWZ has been identified for the offshore wind resource potential in relatively shallow waters close to shore, with opportunity to connect back to the existing 500 kV network. There is currently significant interest in this area, including a large offshore wind farm of 2,000 MW, but projects have not developed sufficiently at this stage to be considered anticipated.

In the offshore wind sensitivity, 4 GW of offshore wind is projected in the Gippsland Coast and Portland Coast OWZs combined by 2035 and 9 GW by 2040.



Existing network capability

Gippsland OWZ connects to the 500 kV network in the Gippsland REZ, which has a 2,000 MW transmission network limit.

REZ grouping

Coordination of generation may be required	The potential legislation of Victoria's offshore wind policy may require coordination of generation for this REZ. The modelling outcomes in the offshore wind sensitivity identify this zone for development of offshore wind generation in all scenarios.

Metrics

Resource	**Wind**		
Resource Quality	A		
Renewable Potential (MW)	10,000		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**
	C	C	C

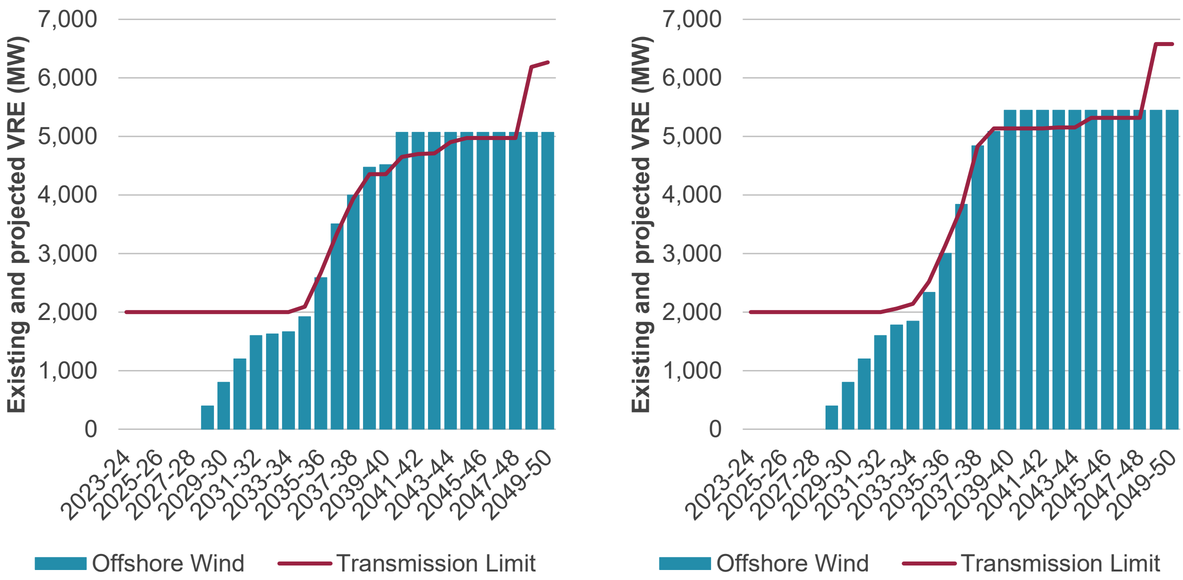
Climate hazard

Temperature score	C	**Bushfire score**	D

VRE outlook

	Offshore Wind (MW) – Core ISP scenarios				**Offshore Wind (MW) – Offshore wind sensitivity**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all core scenarios and the offshore wind sensitivities, did not project any wind for this REZ.				-	800	4,500	5,050
Step Change						800	5,450	5,450
Slow Change						800	4,250	4,600
Hydrogen Superpower						800	4,050	4,050

Transmission access expansion forecast for *Progressive Change (left)* and *Step Change* (right) for the *Offshore Wind* sensitivity



The transmission limit represents the transmission requirements for the connection of VRE in O3 – Gippsland Coast and V5 – Gippsland. Gippsland Coast OWZ connects into the network in Gippsland REZ.

VRE curtailment – offshore wind sensitivity

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	7%	-	3%	-	3%
Step Change	-	4%	-	3%	-	4%
Slow Change	-	16%	4%	43%	1%	6%
Hydrogen Superpower	1%	6%	-	7%	-	12%

O4 – North West Tasmania Coast

Summary	
The North West Tasmania Coast OWZ has been identified for the offshore wind resource potential in relatively shallow waters close to shore, with a connection point close to existing 220 kV networks. Due to recent enquiries by offshore wind proponents around the North East Coast of Tasmania, subsequent ISPs will explore the potential for and impacts of an additional offshore wind zone in North East Tasmania.	
Existing network capability	
North West Tasmania coast REZ connects to the 220 kV network within the North West REZ. The total REZ transmission network limit for existing and new VRE is included as part of the North West REZ limit of 592 MW.	

REZ grouping	
Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics			
Resource	Wind		
Resource Quality	A		
Renewable Potential (MW)	10,000		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**
	C	C	C

Climate hazard			
Temperature score	A	**Bushfire score**	A

VRE outlook								
	Offshore Wind (MW) – Core ISP scenarios				**Offshore Wind (MW) – Offshore wind sensitivity**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	There is no existing, committed or anticipated offshore wind generation for this REZ. The modelling outcomes, for all scenarios, did not project any offshore wind for this REZ.				There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all core scenarios and the step change offshore wind sensitivity, did not project any additional wind for this REZ.			
Step Change								
Slow Change								
Hydrogen Superpower								

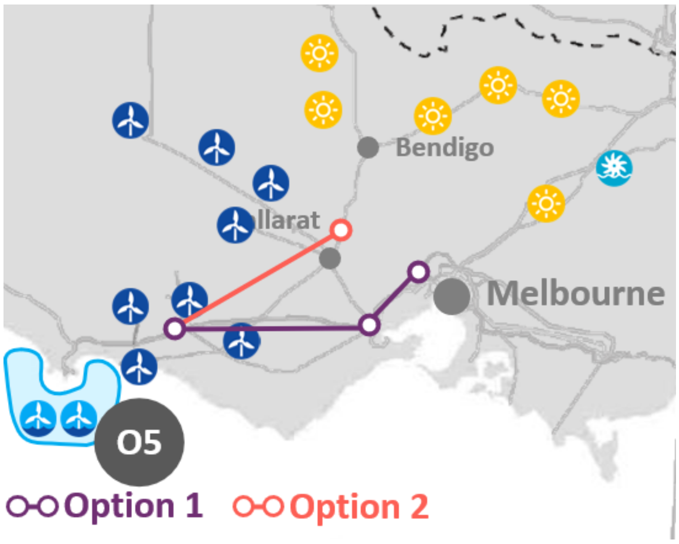
Transmission access expansion forecast for *Progressive Change* and *Step Change* for the *Offshore Wind* sensitivity
There are no existing, committed, anticipated VRE projects for this REZ and the modelling outcomes, for all scenarios and the offshore wind sensitivities, did not project any additional VRE for this REZ. Therefore, no VRE curtailment or transmission expansion occurs in this REZ.

O5 – Portland Coast

Summary

The Portland Coast OWZ has been identified for the offshore wind resource potential in relatively shallow waters close to shore, with a connection point near to the Portland. There is currently interest in this area, including a large offshore wind farm of 1,000 MW, but projects have not developed sufficiently at this stage to be considered anticipated.

In the offshore wind sensitivity, 4 GW of offshore wind is projected in the Gippsland Coast and Portland Coast OWZs combined by 2035 and 9 GW by 2040.



Existing network capability

Portland coast OWZ connects to the 500 kV network in the South West Victoria REZ, which has a 2,500 MW transmission network limit.

REZ grouping

Coordination of generation may be required	The potential legislation of Victoria's offshore wind policy may require coordination of generation for this REZ. The modelling outcomes in the offshore wind sensitivity identify this zone for development of offshore wind generation in all scenarios.

Metrics

Resource	**Wind**		
Resource Quality	A		
Renewable Potential (MW)	10,000		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**
	C	C	C

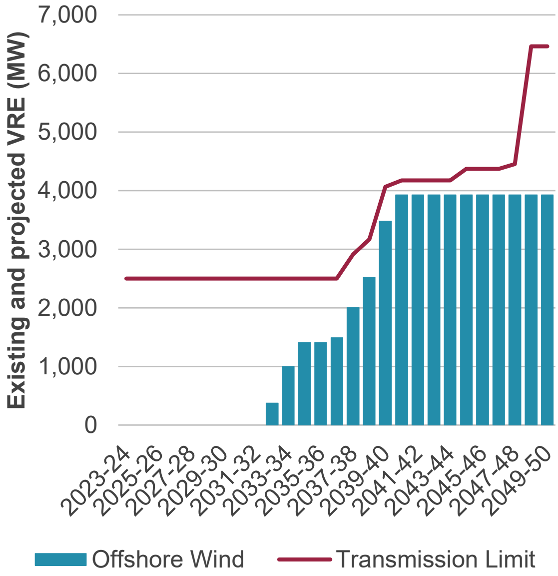
Climate hazard

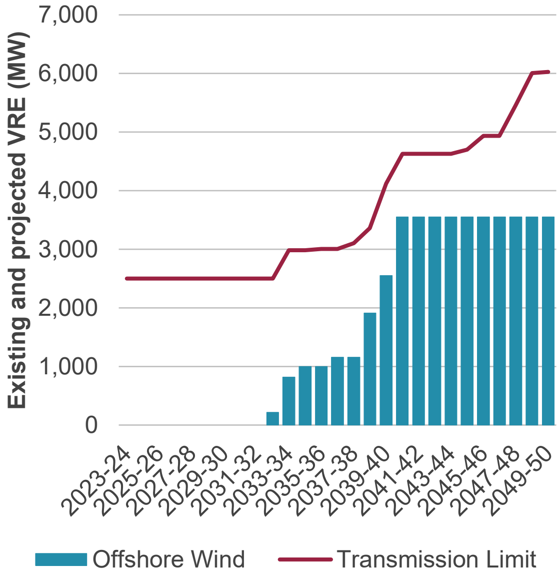
Temperature score	C	**Bushfire score**	D

VRE outlook

	Offshore Wind (MW) – Core ISP scenarios				**Offshore Wind (MW) – Offshore wind sensitivity**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	There is no existing, committed or anticipated offshore wind generation for this REZ. The modelling outcomes, for all scenarios, did not project any offshore wind for this REZ.				-	-	3,500	3,950
Step Change						-	2,550	3,550
Slow Change						-	3,750	4,400
Hydrogen Superpower						-	3,950	4,950

Transmission access expansion forecast for *Progressive Change (left*) and *Step Change* (right) for the *Offshore Wind* sensitivity





The transmission limit represents the transmission requirements for connection of VRE in O5 – Portland Coast and V4 – South West Victoria. Portland Coast OWZ connects into the network at South West Victoria.

VRE curtailment - offshore wind sensitivity

Scenario	2029-30		2039-40		2049-50	
	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill	Transmission curtailment	Economic spill
Progressive Change	-	-	1%	4%	-	4%
Step Change	-	-	-	4%	-	5%
Slow Change	-	-	4%	39%	1%	6%
Hydrogen Superpower	-	-	-	6%	-	11%

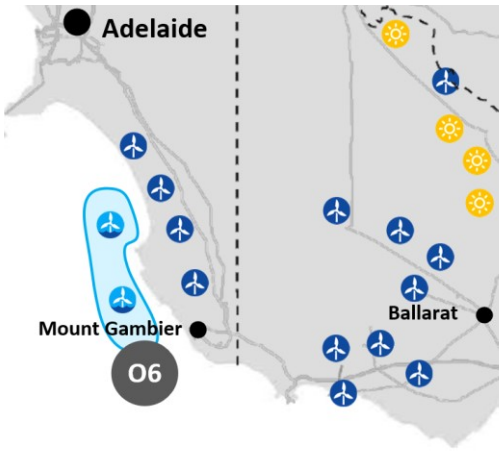
O6 – South East SA Coast

Summary

The South East Coast OWZ has been identified for the offshore wind resource potential in relatively shallow waters close to shore, with a connection point near to the South East SA. There is currently interest in this area of approximately 600 MW, but projects have not developed sufficiently at this stage to be considered anticipated.

Existing network capability

South East SA coast OWZ connects to the 275 kV network in the South East SA REZ, which has a 400 MW transmission network limit.



REZ grouping	
Infrastructure coordination can start later	Modelling outcomes indicate a low likelihood that significant investment in VRE and transmission infrastructure will be optimally required in the next 12 years.

Metrics			
Resource	**Wind**		
Resource Quality	10,000		
Renewable Potential (MW)	A		
Demand Correlation	**2029-30**	**2039-40**	**2049-50**
	C	C	C

Climate hazard			
Temperature score	D	**Bushfire score**	D

VRE outlook

	Offshore Wind (MW) – Core ISP scenarios				**Offshore Wind (MW) – Offshore wind sensitivity**			
	Existing/ committed/ anticipated	**Projected**			**Existing/ committed/ anticipated**	**Projected**		
		2029-30	**2039-40**	**2049-50**		**2029-30**	**2039-40**	**2049-50**
Progressive Change	There is no existing, committed or anticipated offshore wind generation for this REZ. The modelling outcomes, for all scenarios, did not project any offshore wind for this REZ.				There is no existing, committed or anticipated wind generation for this REZ. The modelling outcomes, for all core scenarios and the step change offshore wind sensitivity, did not project any additional wind for this REZ.			
Step Change								
Slow Change								
Hydrogen Superpower								

Transmission access expansion forecast for *Progressive Change* and *Step Change* for the *Offshore Wind* sensitivity

There is no existing, committed, anticipated VRE projects for this REZ and the modelling outcomes, for all scenarios and the offshore wind sensitivities, did not project any additional VRE for this REZ. Therefore, no VRE curtailment or transmission expansion occurs in this REZ.