States of transition

RENEWABLE ENERGY PROGRESS ACROSS AUSTRALIAN JURISDICTIONS

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Acknowledgement

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About Common Capital

Common Capital is a specialist climate, energy, policy and economics firm. We are public benefit focused, working with and for governments to help them unlock the benefits and manage the risks of the net zero transition. Our research, consulting and advisory services help clients navigate rapidly changing technology, market and policy contexts.

We have a particular depth of expertise in initiatives to mobilise catalytic public and private capital to accelerate the development and scaled deployment of zero and negative carbon solutions. We specialise in a systems thinking approach to unlocking market uptake of the innovations required to deliver climate goals across all sectors of the economy.

We provide detailed qualitative and quantitative research and analysis to support all stages of the policy lifecycle – from market sounding to options analysis, business case development, detailed design, implementation, evaluation and reform.

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Acknowledgement of country

Common Capital recognises the First Peoples of this nation and their ongoing connection to culture and country.
We acknowledge First Nations peoples as the Traditional Owners, Custodians and Lore Keepers of the world's oldest living cultures, and pay our respects to their elders – past and present.

Foreword by conservation councils

In the May 2025 federal election, voters overwhelmingly supported action on climate change through continuing the national journey on renewable energy. State and territory governments should heed that message and redouble efforts. We the undersigned nature conservation councils of Australia have commissioned this study as part of our broader recognition that there can be no future for nature without action on climate change. A changing climate is the biggest threat to the survival of species and habitats. Acting on climate change means getting off fossil fuels and powering our homes and businesses with renewable energy. Already, 43% of Australia's energy needs are powered from solar, wind, hydro and batteries. Yet, there is still much more to be done.

While renewable energy is critical in avoiding nature damage from climate change, we want to ensure that the rollout proceeds in a way that safeguards nature and communities. This includes ensuring that minerals sourcing and materials stewardship for renewable energy technologies minimises environmental impacts. Regional strategies to protect and restore nature are needed to increase the pace of the rollout and help jurisdictions meet their renewable energy and emission reduction targets. Restoring nature leads to improved climate resilience because nature stores carbon and cleans our air and water.

First Nations communities have cared for Country, sustainably looking after the land, waters, air, wildlife, climate and culture, for over 60,000 years. Genuine engagement and consultation with First Nations communities is essential to achieving positive environmental and cultural outcomes through the transition to renewable energy consistent with the principles of self-determination.

This is why conservation councils have come together to commission Common Capital to complete this study, to understand the strengths and weaknesses of the renewable energy transition by jurisdiction and help identify opportunities to ensure the renewable energy rollout continues at a rate that aligns with the Paris Agreement and prevents catastrophic climate change. We can have the best of both by developing regional strategies to support renewable energy projects to protect and restore nature.

This report covers jurisdictional progress towards current renewable energy targets, additional deployment that is required to meet net zero commitments, and a high-level understanding of priority areas for policymakers by jurisdiction.

QUEENSLAND CONSERVATION COUNCIL | Nature Conservation Council — The voice for nature in NSW | ENVIRONMENT TASMANIA | Conservation Council of WA | Environment Centre NT — ecnt.org.au | environment victoria

Our approach

The renewable energy transition is well underway in Australia. We sought to investigate the strengths and weaknesses of the transition in each jurisdiction, while identifying opportunities to ensure the renewable energy rollout continues at a rate that aligns with the Paris Agreement, and individual jurisdictional renewable energy and net zero targets.

The findings of this report are based on:

- Extensive desktop research of independent organisation, academic and government literature.
- Future grid demand analysis for National Energy market (NEM) jurisdictions based on the AEMO ISP step change scenario and the Net Zero Australia study.
- Future grid demand analysis for Western Australia, a non NEM jurisdiction, based on the Electricity Statement of Opportunities (ESOO) for the South West Interconnected System (SWIS) and the Australian Energy Statistics data on overall Western Australian electricity consumption.
- Future grid demand analysis for the Northern Territory, a non NEM jurisdiction, based on the current NT grid size with growth following the Tasmanian AEMO ISP generation forecast due to similarities in grid size and population.
- Assessment of pipeline capacity for NEM jurisdictions based on AEMO Generation Information data (January 2025).
- Assessment of pipeline capacity for non-NEM jurisdictions based on extensive desktop review of media releases and public reports on existing and pipeline projects.
- Assessment of current renewable capacity deployment rates based on Clean Energy Council data.
- Storage capacity analysis based on AEMO ISP step change projections for NEM jurisdictions. For non NEM jurisdictions this is based on a bottom-up approach to sourcing data, considering projects that have been announced by private companies or through Government resources.

The South Australian Conservation Council and the Conservation Council ACT were not involved in this project. However, Common Capital has included South Australia within the report to ensure a comprehensive comparison between Australian jurisdictions is possible. The ACT grid is integrated within the NSW grid in Australian Energy Market Operator (AEMO) data hence the ACT is included in all NSW numbers presented in this report.

Table of contents

Executive summary

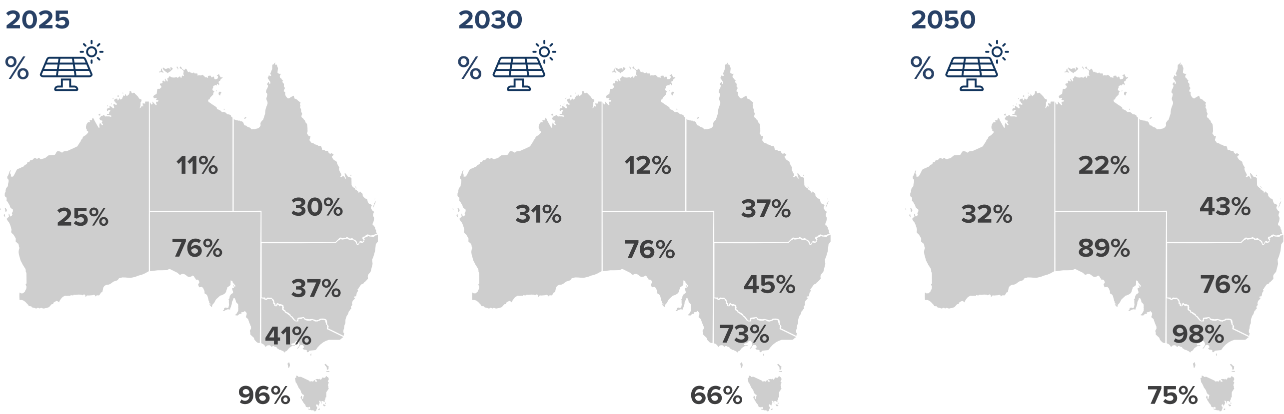
Despite positive progress to date, all jurisdictions have work to do to fully decarbonise their electricity supplies. Some jurisdictions (e.g., Tasmania and South Australia) are tracking well towards 100% renewables today, but all jurisdictions must increase and accelerate the deployment of renewable capacity to meet future electricity demand (see Figure 1). The electrification of residential and commercial energy use, transport and industry will result in a 2-3 times increase in electricity demand across all jurisdictions by 2050 [1] [2]. This must be met with increased renewable generation to ensure a fully decarbonised electricity system, in line with net zero requirements. Most jurisdictions have sufficient renewable generation capacity in the development pipeline to meet future needs. However, between 88%-100%[1] of that generation capacity has only been publicly announced and has

1 . This range excludes the Northern Territory as the SunCable project has been classified as approved, as it has received both Commonwealth Government and Northern Territory Government environmental approvals [9]. This one project dominates the NT project pipeline as it has announced it will provide 4GW of local generation capacity.

Figure 1

Renewable energy deployment must accelerate in all jurisdictions to meet future electricity demand

Renewable generation as a percentage of current and future grid requirements in each jurisdiction in 2025, 2030 and 2050 (based on maintaining current build rates)



Common Capital analysis based on AEMO ISP, AEMO WEM ESOO, Australian Energy Statistics data and Clean Energy Council commissioning data [1] [3] [4] [5] not progressed any further in terms of development. This suggests that while there is sufficient interest from developers to build projects in all jurisdictions, there are other barriers preventing these projects from proceeding. Unlocking this generation capacity will be key to meeting jurisdictional renewable energy and net zero targets.

Unlocking the considerable pipeline capacity and accelerating the deployment of renewable projects in a way that ensures community and environmental concerns are properly considered should be a key focus for policymakers. There are complex, interconnecting barriers that hinder the acceleration of large-scale generation, storage and transmission deployment. Some jurisdictions are making substantial attempts to confront these barriers through different policy approaches – particularly New South Wales, Victoria and South Australia. These attempts largely focus on addressing energy system planning, grid connection and project finance barriers. What these jurisdictions have in common is a strategic, government led approach to the planning and deployment of renewable energy generation and storage deployment. These jurisdictions also have legislated renewable energy targets which they are working towards.

The environmental planning and assessment process is a significant contributor to the rate at which pipeline projects are deployed. This process can take a long time – e.g., a reported average approval time for state significant development projects in NSW of 746 days [6]. This is partly due to the nature of the planning process and the level at which renewable energy projects are assessed, but also due to genuine and strongly felt community concerns around the impacts of projects which need to be considered and addressed. A sub-set of these community concerns pertain to competing land uses and ensuring renewable projects are not deployed at the expense of biodiversity and nature outcomes.

Improving the efficiency of planning assessment processes for generation, storage and critical transmission infrastructure projects while ensuring that community and environmental concerns are properly considered throughout the process is critical part of this. When jurisdictions are identifying priority areas for renewable energy development there is a strong case for the formal integration of both social licence and biodiversity considerations into the strategic planning process. This could include regional mapping to prioritise development on land which has already been cleared while excluding areas of high biodiversity value. At a project level, the development of principles and guidelines around community benefit sharing and best practices for environmental restoration would help to encourage projects to not just avoid harm but also support nature positive outcomes. Integrating the principles and actions set out in the First Nations Clean Energy Strategy into jurisdictional approaches should also be a priority.

There is also a significant opportunity across all jurisdictions to maximise the installation of rooftop PV. Australia has the highest deployment of rooftop PV of anywhere in the world [7]. However, according to a 2019 study by the Institute for Sustainable Futures, University of New South Wales and Australian Photovoltaic Institute (APVI) there is still potential for the installation of considerable additional capacity across residential, commercial and industrial rooftops (almost equivalent to the size of the National Energy Market (NEM)) [8]. The deployment of rooftop PV can help, not hinder, system stability if it is done alongside small-scale batteries, electrification, electric vehicles (EVs) with bidirectional charging and virtual power plants (VPPs). CER provides significant benefits to individuals in the form of energy bill savings and the broader economy in the form of energy network and carbon benefits.

Most jurisdictions have policies and programs in place to incentivise uptake of CER, however, many of these do not match the scale of investment required. All jurisdictions could consider developing a policy framework or approach for delivering CER to homes and businesses. Public funding should be prioritised towards delivering energy equity objectives. For jurisdictions that are not on track to meet their short term 2030 renewable energy targets, accelerating CER uptake while concurrently working to unlock and accelerate the deployment of the existing large scale project pipeline can help get them there.

Key findings

New South Wales

- Currently at 37% renewable generation.
- Legislated renewable energy targets include 12GW generation and 2GW storage by 2030.
- Strong pipeline of generation and storage projects – unlocking the generation capacity in the pipeline and accelerating deployment is a priority.
- Delivering the Roadmap will get NSW close to where it needs to be in 2030 (compared to AEMO ISP step change scenario).
- Significant opportunity under the NSW Consumer Energy Strategy to accelerate CER uptake to complement large-scale deployment.

Victoria

- Currently at 41% renewable generation.
- Legislated renewable energy targets include 40% renewable energy (RE) by 2025, 65% RE by 2030, 95% RE by 2035, and 2.6GW of storage by 2030 and 6.3GW by 2035. This includes 2GW of offshore wind by 2032, 4GW by 2035 and 9GW by 2040.
- On track to meet the 2025 target of 40% renewable generation.
- The pipeline of generation projects in Victoria contains more capacity than 5x the current Victorian grid.
- Best placed jurisdiction when it comes to meeting 2030 and 2050 AEMO ISP requirements – on track for 73% renewable generation in 2030 and 98% in 2050 if the current deployment rate is maintained (conservative assumption) and transmission constraints are resolved.

Queensland

- Currently at 30% renewable generation.
- Renewable energy targets include 50% RE by 2030, 70% RE by 2032 and 80% by 2035.
- Highest per capita uptake of rooftop PV in Australia.
- Highest capacity of large scale generation projects currently under construction, of any jurisdiction.
- All legislated targets are below AEMO ISP step change requirements for 2030, 2032 and 2035 and the government has committed to repealing these targets.

South Australia

- Currently at 76% renewable generation.
- Renewable energy target of 100% RE by 2027.
- Good progress to date. Second most progressed jurisdiction, behind Tasmania.
- Ambitious 2027 target of 100% renewable generation is before Parliament. However, based on current build rate and projected increase in demand, only on track for 75%.
- Not as much large-scale capacity in the pipeline, compared to other jurisdictions.
- Priorities are developing the pipeline, accelerating deployment and increasing uptake of CER.

Tasmania

- Currently at 96% renewable generation. [1]
- Legislated renewable energy targets include 150% RE by 2030 and 200% RE by 2040.[2]
- Only jurisdiction close to 100% renewable generation today.
- Very little generation and storage capacity in the pipeline and very little capacity deployed in the past 10 years (only 2 wind farm projects totalling 400MW).
- There is a need to deploy a greater diversity of renewable energy technologies to reduce the reliance on hydropower, which is increasingly impacted by droughts.

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1 . Average of last 10 years generation used for Tasmania due to annual variations in hydropower output.

2 . Tasmania renewable energy targets are based on a 2020 baseline and equate to 15,750 GWh by 2030 and 21,000 GWh by 2040.

Western Australia

- Currently at 27% renewable generation.
- No renewable energy target as of June 2025.
- Progress is falling behind other jurisdictions, and the WA generation pipeline is much smaller than that of other jurisdictions. Renewable energy targets may help to improve investor confidence.
- Several large battery projects underway (including some of the largest battery projects in Australia – Collie BESS and Kemerton BESS).
- Accelerating uptake of CER could help, particularly in the short-term while the focus is on building the large-scale generation pipeline and accelerating the deployment of existing pipeline projects.

Northern Territory

- Currently at 11% renewable generation.
- No renewable energy target as of June 2025.[1]
- Least progress to date compared to other jurisdictions.
- Very little in the pipeline other than the SunCable project which is proposing to deliver 4GW of capacity locally. SunCable has not yet reached a final investment decision (FID).
- Case studies of good practice in remote Indigenous communities e.g., Marlinja Community Microgrid – reducing energy costs and improving energy security for the community. Opportunity to replicate this model around the Territory.

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1 . The Northern Territory had a non-legislated 50% target by 2030 which was abandoned by the NT Government in March 2025.

National overview

Despite progress on renewable deployment, all jurisdictions need to do more to meet future demand

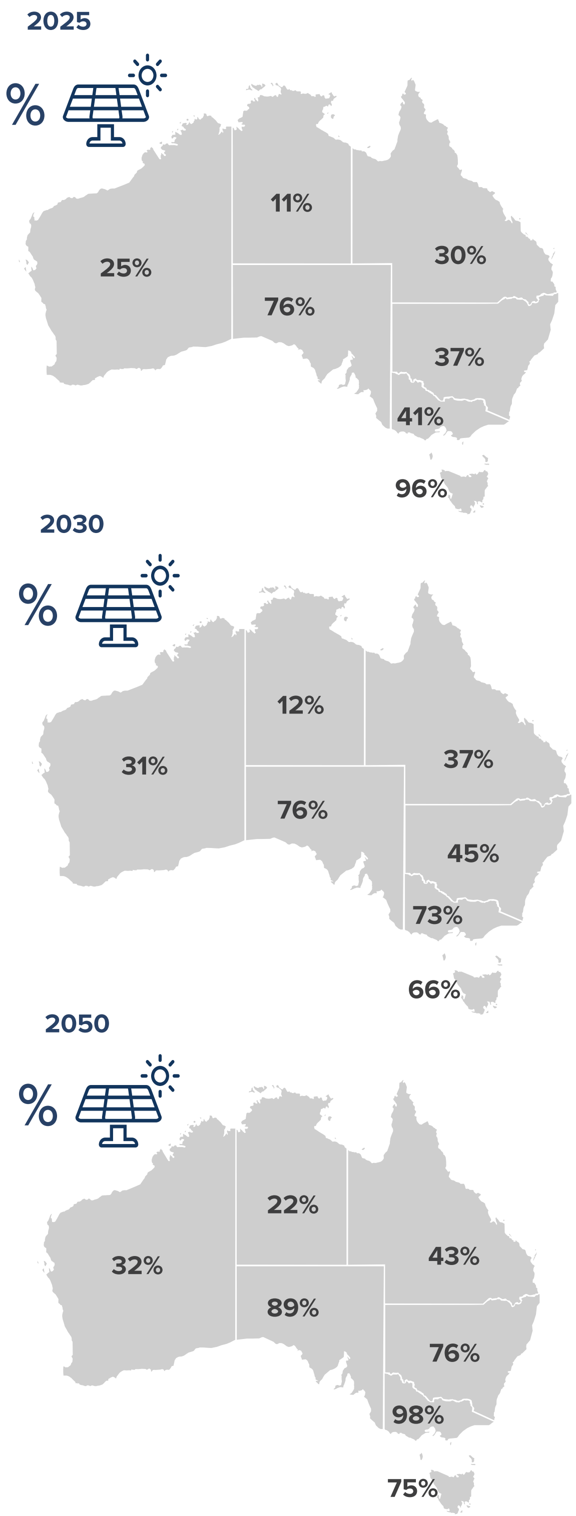
All jurisdictions are making strides towards decarbonising their electricity supplies. Certain jurisdictions have made more progress than others. However, all jurisdictions fall short when considering electricity generation requirements in 2030 and 2050. This is due to the increase in electricity demand that is expected to occur as electrification continues across residential, commercial, industrial and transport energy use towards 2050. Figure 2 shows the percentage of electricity generation from renewable sources in 2025, 2030 and 2050 based on current deployment rates and anticipated increases in demand. The increase in electricity demand from electrification and population and economic growth must be met with increased renewable energy generation to ensure continued alignment with net zero requirements.

Figure 2 shows that Tasmania and South Australia are the best performing jurisdictions in 2025, however, neither jurisdiction is on track to meet future demand requirements in 2030 or 2050 based on a conservative assumption of maintaining current deployment rates. Victoria is the next best jurisdiction in 2025 and will come closest to meeting 2050 demand requirements with renewable generation if current deployment rates are maintained (98%). New South Wales, Queensland and Western Australia are all performing similarly today, but the current deployment rate in NSW is higher, meaning that it will be better placed than the other jurisdictions in 2030 and 2050 (although still well below requirements). The Northern Territory is currently the furthest from 100% renewable energy generation, with 11%. In 2050, if current deployment rates are maintained this will account for 22% of generation.

Figure 2

Renewable energy deployment must accelerate in all jurisdictions to meet future electricity demand

Renewable generation as a percentage of current and future grid requirements in each jurisdiction in 2025, 2030 and 2050 (based on maintaining current build rates)



Common Capital analysis based on AEMO ISP, AEMO WEM ESOO, Australian Energy Statistics data and Clean Energy Council commissioning data [1] [3] [4] [5]

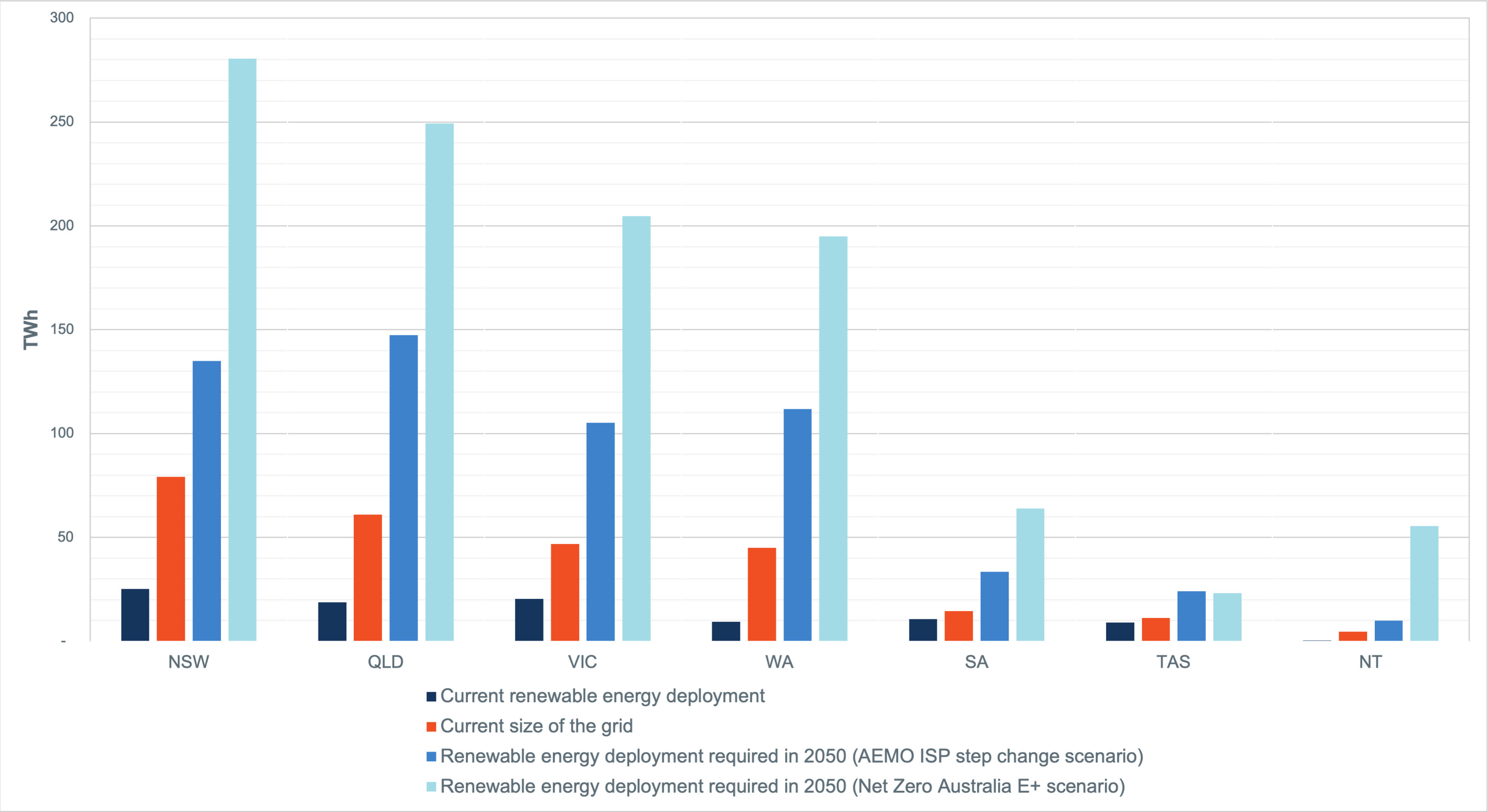
Future grid demand has been modelled in numerous studies under differing scenarios, all of which predict a significant increase in demand that will need to be met by jurisdictions through increased renewable deployment. Figure 3 presents jurisdictions' current grid size and renewable energy deployment compared to two projected demand scenarios. The AEMO ISP step change scenario for NEM jurisdictions suggests that the NEM must double in generation capacity to meet 2050 demand [1]. The AEMO ISP is a roadmap to meet future energy needs and enable net zero by 2050, setting out the grid scale renewable generation, transmission and storage required. The step change scenario is AEMO's central modelling scenario.

Western Australia and the Northern Territory are not part of the NEM. For WA the Electricity Statement of Opportunities (ESOO) for the South West Interconnected System (SWIS) has been used, extrapolating its 10 year projection out to 2050 [3]. This growth curve has the been applied to the whole of WA electricity demand provided by Australian Energy Statistics [4]. The NT demand forecast has been modelled based on the current NT grid size with growth following the Tasmanian AEMO ISP generation forecast due to similarities in grid size and population. The Net Zero Australia study predicts even higher future electricity demand in most jurisdictions based on rapid electrification of industry and transport sectors and assuming an increase in electricity to account for the deployment of carbon dioxide removal (CDR) technologies (e.g., direct air capture) [2]. These scenarios indicate that although jurisdictions are working towards 100% renewables today, they all need to deploy renewable energy at greater speed and scale to ensure they meet 2030 and 2050 demand forecasts.

Figure 3

Jurisdictions will need to deploy renewable generation at greater speed and scale to meet anticipated 2050 demand

Jurisdictions current renewable energy deployment (GWh) compared to current grid size and the expected grid size in 2050 under the Net Zero Australia E+ scenario [2] and the AEMO ISP step-change scenario [1]



Most jurisdictions have enough announced pipeline renewable capacity to meet future needs

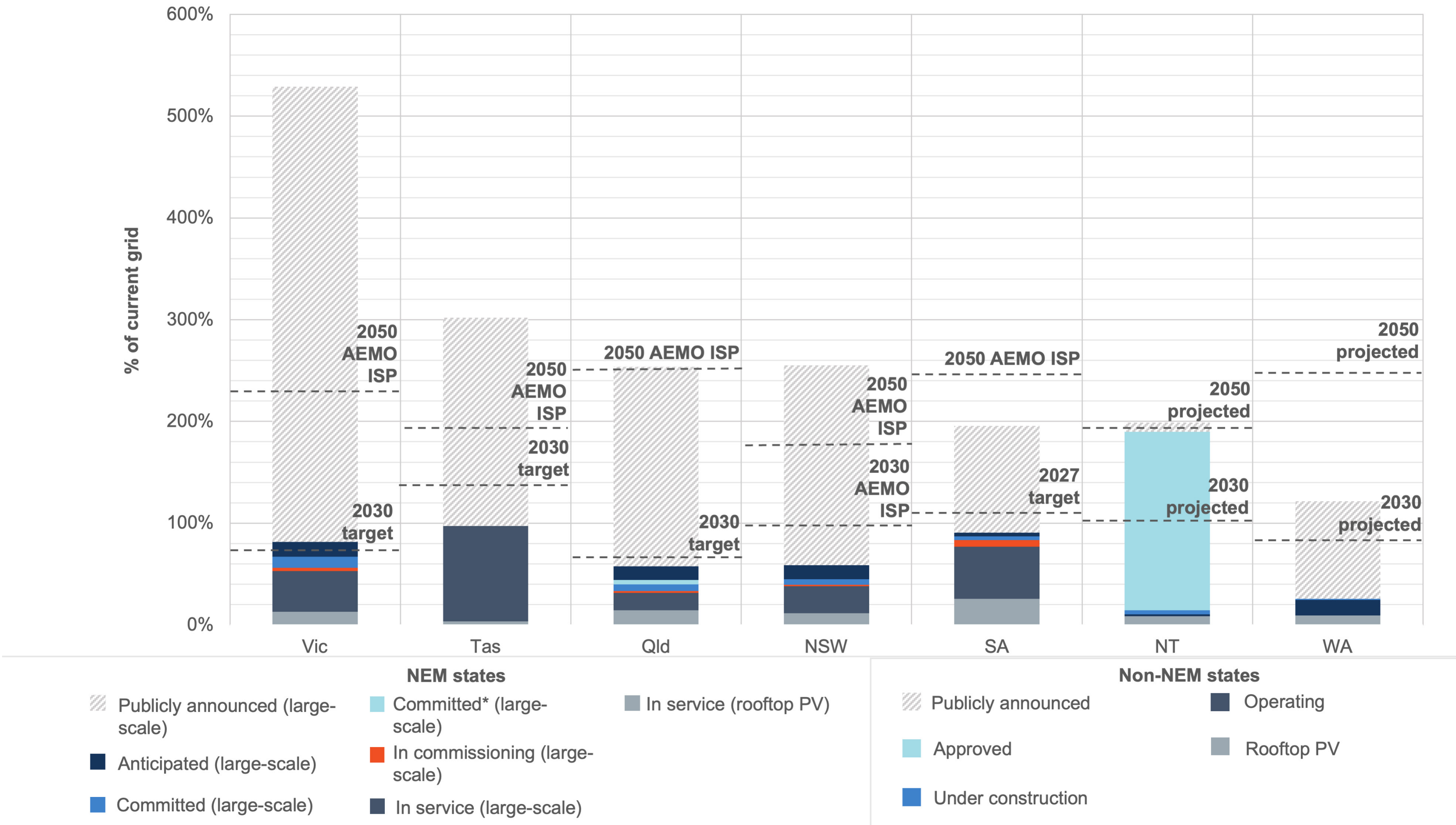
Most jurisdictions have a significant amount of renewable energy generation capacity in the pipeline. Figure 4 shows the renewable energy pipeline of all jurisdictions as a percentage of current grid size. Theoretically, all jurisdictions have enough in the pipeline to reach their interim renewable energy targets, and most would achieve close to or more than their 2050 requirements if all "publicly announced" projects were to progress through development to become operational (with the exception of South Australia and Western Australia). However, this is unlikely to happen under current policy settings as many projects fail along the way, e.g., during environmental or planning assessments, or in reaching final investment decision (FID). Figure 4 shows there is considerable developer interest in building renewable projects in most jurisdictions (particularly in Victoria, Queensland and New South Wales). Therefore, a key consideration for policymakers is unlocking the considerable pipeline of generation capacity.

As seen in Figure 4, Victoria's pipeline is approximately five times its current grid. This is more than enough capacity for Victoria to comfortably reach its legislated 95% renewable generation target. If the New South Wales Roadmap reaches full capacity by 2030, NSW will be close to delivering the generation required to align with AEMO ISP's step change scenario. The Northern Territory has the potential to make significant contributions to its electricity supply if the SunCable project eventuates. SunCable, proposing to be the world's largest solar farm, is expected to deliver up to 4GW of renewable capacity locally, for the Darwin to Katherine network. The project has received environmental approvals from both the Commonwealth and Northern Territory Governments and is hoping to reach FID by 2027 [9]. For these jurisdictions it is about ensuring projects can progress through the pipeline while also accelerating that progress. However, for Western Australia and to a lesser extent South Australia, building the pipeline is also important, as neither jurisdiction has enough capacity announced to achieve long term AEMO ISP generation requirements. Targets and renewable energy plans can provide important signals for investors to pursue projects within jurisdictions, which helps to build and maintain renewable project pipelines.

Figure 4

Most jurisdictions have sufficient renewable generation capacity in the pipeline to meet interim and 2050 targets

Renewable energy projects categorised into AEMO project status classifications (described in the breakout box) for all NEM jurisdictions compared to interim and net zero renewable energy targets [10] [11]. Renewable energy projects categorised into project status classifications for non-NEM jurisdictions



Common Capital analysis using extensive desktop review of media releases and public reports on existing and pipeline projects.

BREAKOUT BOX 2

AEMO Commitment Status categorisation explained

The AEMO Commitment Status categories provide new generation projects with a class of certainty which is determined by assessing the project against the Project Commitment Criteria [11]. The following definitions apply under the categorisation system in order of most to least certain:

- In-service – projects that are installed and fully operational.
- In-commissioning – projects that are undergoing final testing to be able to operate at full-capacity.
- Committed – projects are confirmed and will proceed with known timing. These projects satisfy all five of the commitment criteria (land, contracts, planning, finance and construction).
- Committed* - projects that are likely to proceed. These projects satisfy requirements across land, finance and construction criteria and there is evidence of progress towards meeting the final two criteria (contracts and planning). Construction or installation has also commenced.
- Anticipated – these projects are sufficiently progressed towards meeting three of the five commitment criteria. These projects then have six months to submit a generation information survey, otherwise they will no longer be classified as anticipated.
- Publicly announced – these projects have been announced publicly but are not yet sufficiently progressed to be classified as anticipated, committed* or committed.

The key task of policymakers is unlocking this pipeline capacity and accelerating deployment

Based on the above analysis, it is clear that most jurisdictions have a significant amount of potential capacity in the pipeline. The focus now needs to be on unlocking this capacity and accelerating the deployment of renewable projects in a way that also ensures community and environmental concerns are properly considered. There are complex, interconnecting barriers that hinder the acceleration of large-scale generation, storage and transmission deployment. These include issues around building sufficient transmission infrastructure, grid connection, social licence, planning assessment processes, finance, supply chain and sufficient storage.

Some jurisdictions are making substantial attempts to confront these barriers through different policy approaches – particularly NSW, Victoria and South Australia (as summarised below). These attempts largely focus on addressing energy system planning, grid connection and project finance barriers. What these jurisdictions have in common is a strategic, government led approach to the planning and deployment of renewable energy generation and storage deployment. These jurisdictions also have legislated renewable energy targets which they are working towards.

BREAKOUT BOX 3

NSW is implementing the Electricity Infrastructure Roadmap

NSW has implemented EnergyCo which is a statutory authority responsible for leading the delivery of Renewable Energy Zones (REZs) across the state as part of the Electricity Infrastructure Roadmap (the Roadmap). EnergyCo is working with communities, investors and industry to coordinate the investment required for renewable energy generation in NSW [12]. A NSW Transmission Planning Review is currently underway and is set to conclude in September 2025 [13]. This review was a recommendation of a prior "check up" report which identified reform and further work that was needed to deliver the Roadmap [14]. The outcome of this review will help to provide clarity around reforms needed to continue to accelerate the deployment of renewable generation, storage and transmission infrastructure within NSW.

Victoria is coordinating planning and development through VicGrid

Victoria has implemented VicGrid, the Government agency responsible for planning and developing new infrastructure that will transport energy generated by renewables to the grid. VicGrid is also responsible for providing information to the community and working alongside AEMO to deliver major infrastructure upgrades. VicGrid has recently released a draft Victorian Transmission plan which aims to incorporate community and stakeholder engagement from the beginning of the process and involves a strategic land use assessment to identify suitable areas for development [15]. In addition, Victoria has the State Electricity Commission (SEC), a government-owned renewable energy company that is investing in renewable energy and storage projects, supporting households to electrify and building the workforce required for the renewable energy transition.

Continued over

South Australia is declaring “release areas” on designated land

South Australia has taken a different approach to other jurisdictions under the Hydrogen and Renewable Energy Act 2023 [16] which introduces a process to facilitate renewable energy deployment on designated land (pastoral land, prescribed Crown land and state waters). Specific areas of land are declared as “release areas” and then competitive tenders are run to develop projects on this land. The strategy for planning “release areas” involves multi-criteria analysis and high-level mapping considering the strength of solar and wind resources, presence of existing critical infrastructure such as transmission lines, water, gas pipelines, and roads, and identification of current land uses, industry interest and existing constraints. The Act also establishes a licencing framework that takes an outcomes based approach and brings all approvals under one portfolio (the same portfolio that is responsible for reaching the renewable energy targets). The framework requires proponents to meet best practices across all stages of the renewable infrastructure lifecycle.

The environmental planning and assessment process is a significant contributor to the rate at which pipeline projects are deployed. This process can take a long time – e.g., a reported average approval time for state significant development projects in NSW of 746 days [6]. This is partly due to the nature of the planning process and the level at which renewable energy projects are assessed, but also due to genuine and strongly felt community concerns around the impacts of projects which need to be considered and addressed. A sub-set of these community concerns pertain to competing land uses and ensuring renewable projects are not deployed at the expense of biodiversity and nature outcomes.

For some jurisdictions the task is unlocking the announced pipeline capacity, but also further developing the pipeline. These jurisdictions could enable an environment of investor confidence through the development of comprehensive renewable energy system plans and legislated renewable energy targets, similarly to Victoria, NSW and South Australia. For most jurisdictions there is sufficient capacity in the pipeline and the task is simply unlocking that capacity. These jurisdictions can focus on improving the efficiency of planning assessment processes for generation, storage and critical transmission infrastructure projects while ensuring that community and environmental concerns are properly considered throughout the process. Providing developers with clear guidelines on best practices when it comes to project siting, engaging with communities, and delivering benefit sharing and nature positive outcomes is a critical part of improving the efficiency of assessment processes. Integrating the principles and actions set out in the First Nations Clean Energy Strategy [17] into jurisdictional approaches should also be a priority.

When jurisdictions are identifying priority areas for renewable energy development there is a strong case for the formal integration of both social licence and biodiversity considerations into the strategic planning process. From a social licence perspective that could involve prioritising renewable energy developments in areas where there is likely to be greater community support (e.g., VicGrid approach). Similarly, it is important to take a strategic approach to identifying areas for renewable energy development from a nature perspective. This can be done by conducting regional mapping and prioritising development on land which has already been cleared and excluding areas of high biodiversity value. At a project level, leading jurisdictions are developing principles and requirements for developers around community benefit sharing. Similar guidelines for developers around best practices for environmental restoration and delivery of nature positive outcomes could be considered by jurisdictions. Allowing for the prioritisation of projects which do not just avoid harm but also support nature positive outcomes.

There are local and international examples of renewable energy projects that are using different nature positive, environmental protection and social licencing approaches in the deployment of clean energy across Australian and international jurisdictions. For example, undertaking comprehensive pre-site scoping and research and prioritising use of degraded or low-value land, while avoiding areas of ecological sensitivity, pursuing agri-voltaics (or agri-wind) projects to incorporate renewable energy infrastructure within agricultural landscapes to boost land efficiency and facilitate a circular, mutually beneficial relationship between renewable energy production and the agriculture sector, or undertaking biodiversity enhancement and ecological restoration including planting native species, creating wildlife corridors, and establishing diverse habitats to enrich biodiversity on project sites. Several case studies are included in Appendix Two.

There is also an opportunity to considerably increase rooftop PV deployment in all jurisdictions

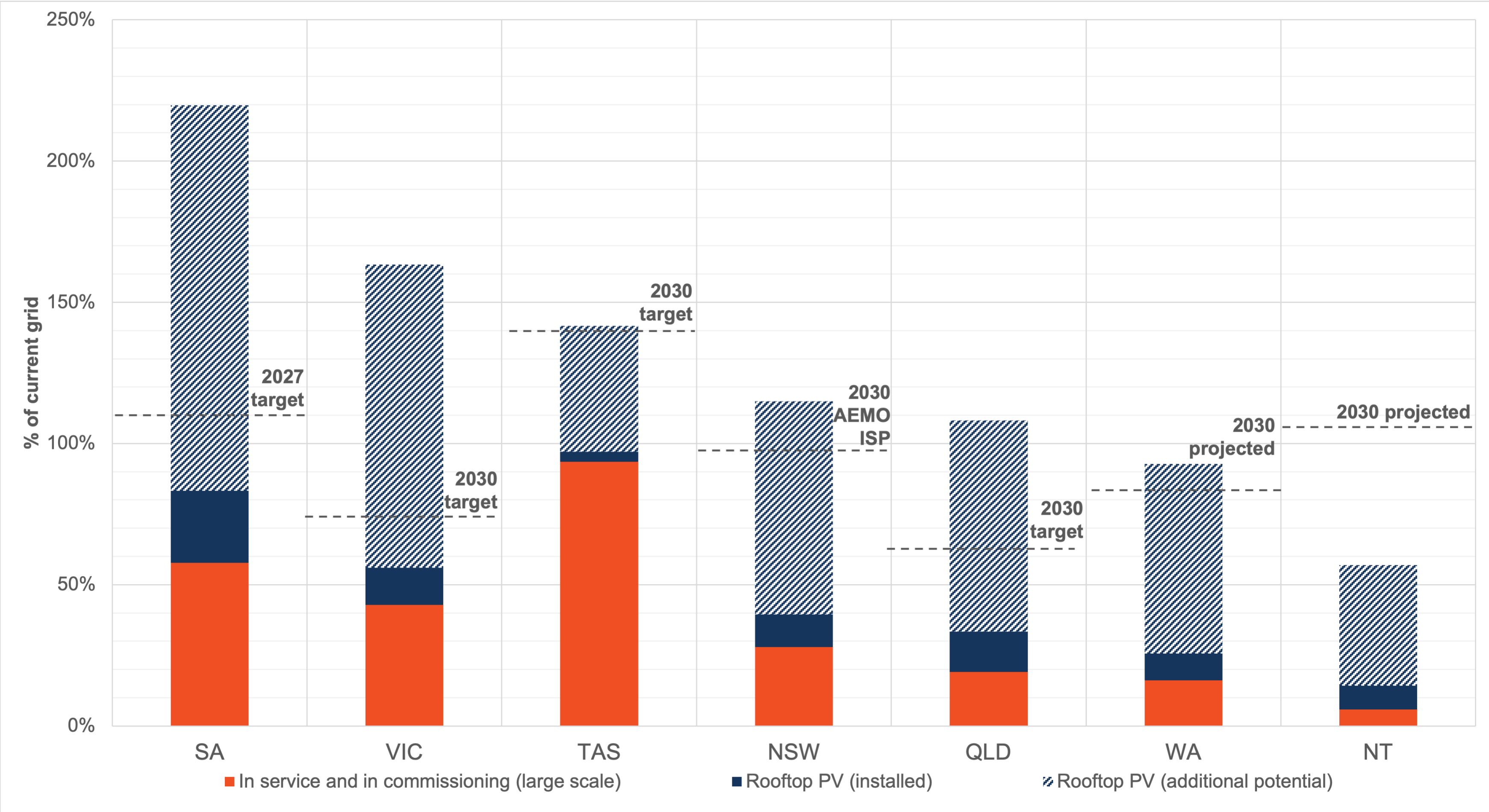
There is a significant opportunity across all jurisdictions to maximise the installation of rooftop PV. Australia has the highest deployment of rooftop PV of anywhere in the world [7]. However, according to a 2019 study by the Institute for Sustainable Futures, University of New South Wales and Australian Photovoltaic Institute there is still potential for the installation of considerable additional capacity across residential, commercial and industrial rooftops (ranging from 5 to 12 times the existing installed capacity across jurisdictions) [8]. There have been concerns that additional rooftop PV would exacerbate the duck curve problem, i.e., critically low demand on the grid during the middle of the day, which could lead to energy system instability. However, combining rooftop PV with other consumer energy resources e.g., household batteries, orchestrated batteries or VPPs, electrification, EVs with vehicle-to-grid (V2G) and controlled loads can help alleviate this concern.

Installing additional rooftop PV would assist jurisdictions in reaching interim renewables targets. Figure 5 shows that all jurisdictions, besides the NT, have sufficient additional rooftop PV capacity to meet 2030 targets. Accelerating rooftop PV deployment in the near-term can provide jurisdictions with the time required to better address the barriers to accelerated large-scale renewable deployment while ensuring interim targets are still met. Both large and small scale generation and storage will be required across all jurisdictions to meet future grid requirements.

Figure 5

Accelerating rooftop PV deployment could help jurisdictions to reach interim renewable energy targets

Additional capacity of rooftop PV compared to current large scale renewable capacity and installed rooftop PV for all jurisdictions as a percentage of current grid size [8] [10]



Common Capital analysis using extensive desktop review of media releases and public reports on existing and pipeline projects.

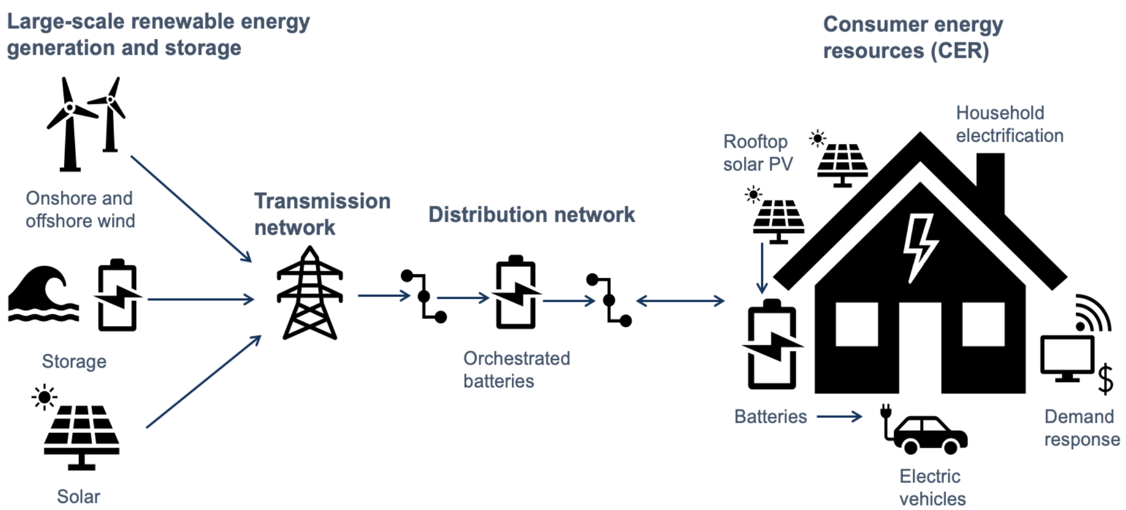
Increased CER uptake can provide significant public and private benefits

The rollout of Consumer Energy Resources (CER) as an integrated solution, including rooftop PV, combined with small-scale batteries, electrification, electric vehicles (EVs) with bidirectional charging and virtual power plants (VPPs) allows for optimised supply and demand management (see Figure 6). CER allows households and businesses to continue investing in rooftop PV, making the most of the significant solar resource in Australia, while also safeguarding energy system stability. CER provides significant benefits to individuals in the form of energy bill savings and the broader economy in the form of energy network and carbon benefits. Accelerated uptake of CER can also reduce the need for as much investment in large scale generation and storage capacity and transmission infrastructure, while shifting energy generation closer to where it is consumed. For jurisdictions that are not on track to meet their short term 2030 renewable energy targets, accelerating CER uptake while also unlocking the existing large scale project pipeline can help get them there.

Figure 6

An integrated rollout of consumer energy resources allows for optimised supply and demand management

Consumer energy resources integrated into the electricity network



Most jurisdictions have policies and programs in place to incentivise uptake of CER, however, many of these do not match the scale of investment required. Commonly, jurisdictions have solar and battery rebate programs in place, but funding is limited and, as such, only a small percentage of the target population is reached. All jurisdictions could consider developing a policy framework or approach for delivering CER to homes and businesses. This could involve setting CER targets, developing an electrification roadmap or gas transition plan and providing funding which is commensurate to the task at hand. Public funding should be prioritised towards delivering energy equity objectives, e.g., prioritised for First Nations households and communities, low-income households, and social and community housing with investigation of other scalable funding mechanisms to expand benefits to the rest of the target population. For jurisdictions with energy obligation schemes in place, these schemes could be redirected towards driving uptake of CER. In jurisdictions without these schemes, consideration could be provided to future implementation of this type of scheme or funding mechanism, or alternative policy mechanisms.

Findings by jurisdiction

New South Wales

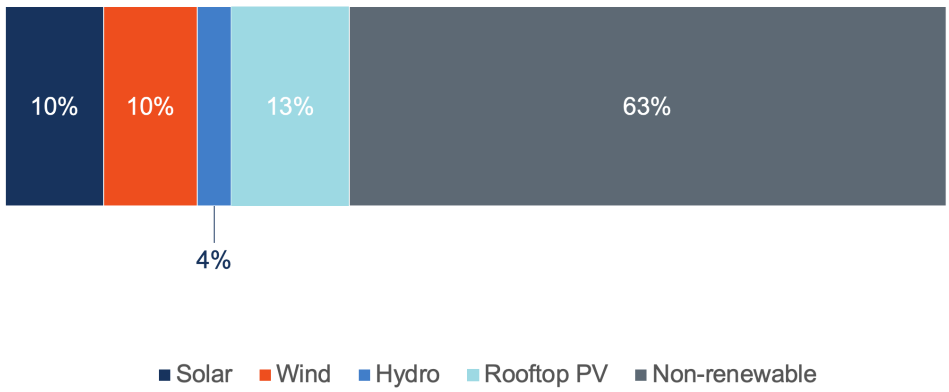
NSW electricity generation is currently 37% renewable

Renewable energy generation currently accounts for 37% of NSW's electricity generation [18]. Figure 7 provides a breakdown of NSW's electricity mix by generation type. Renewable energy generation includes rooftop PV (13%), large-scale solar (10%), wind (10%) and hydro (4%) . The resulting 63% of electricity generation in NSW is from fossil-fuel sources.

Figure 7

Renewable energy accounts for 37% of current NSW electricity generation

NSW electricity generation categorised by generation type for 2024 [18]



NSW has legislated the Electricity Infrastructure Roadmap which will support at least 12GW of renewable energy generation and 2GW of long-duration storage [12]. To ensure NSW reaches the level of renewable generation required under the AEMO ISP step change scenario, renewable energy deployment will need to accelerate.

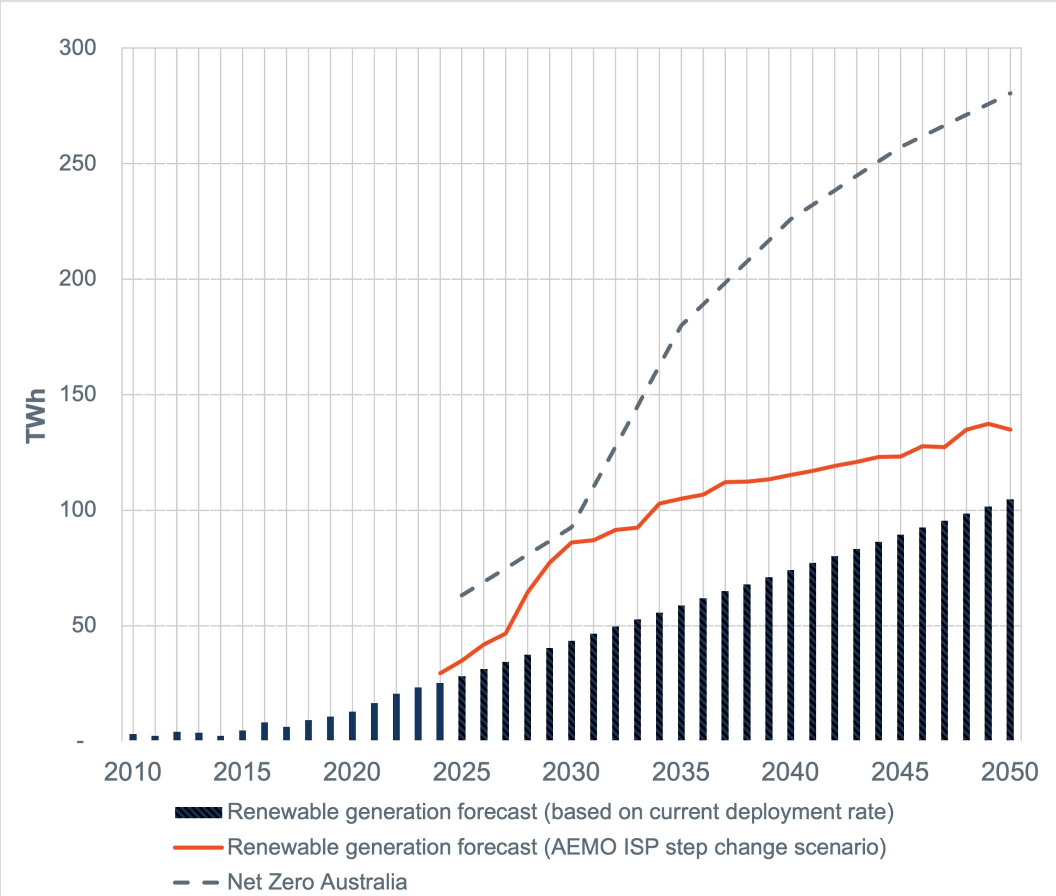
NSW renewable deployment is not on track with AEMO ISP step change requirements

According to the AEMO ISP step change scenario NSW generation should be 83% renewable by 2030. Based on current build rates NSW is not on track to achieve this. The renewable energy generation gap in 2030 is approximately 34 TWh and this gap remains consistent out to 2050, as seen in Figure 8. The gap in renewable energy deployment is even greater under the scenario modelled in the Net Zero Australia study. The build rate modelled in Figure 8 has been calculated based on Clean Energy Council data, using an average of the large-scale renewable generation capacity reaching commissioning over the last five years and APVI data on annual rooftop PV deployment [5] [10]. The red line in Figure 8 refers to the AEMO ISP step change scenario for NSW, while the dashed grey line shows a higher generation scenario modelled for the Net Zero Australia study which includes rapid electrification of industry and transport as well as assumptions around the electricity required for carbon dioxide removal e.g., through Direct Air Capture (DAC). As the implementation of the Roadmap continues towards 2030, the average build rate for NSW is likely to increase, which can assist in reducing the deployment gap. However, even with the Roadmap, it remains vital for NSW to focus on accelerating deployment of renewable energy projects to ensure interim and net zero goals are achieved.

Figure 8

Accelerated renewable energy deployment is required to achieve interim and net zero goals

Renewable energy capacity for New South Wales based on current build rates compared to the AEMO ISP step change scenario [1] and the E+ scenario from the Net Zero Australia study [2]



The build rate modelled has been calculated based on Clean Energy Council data using an average of the large-scale renewable generation capacity reaching commissioning over the last five years [5] and APVI data on annual rooftop PV deployment [10].

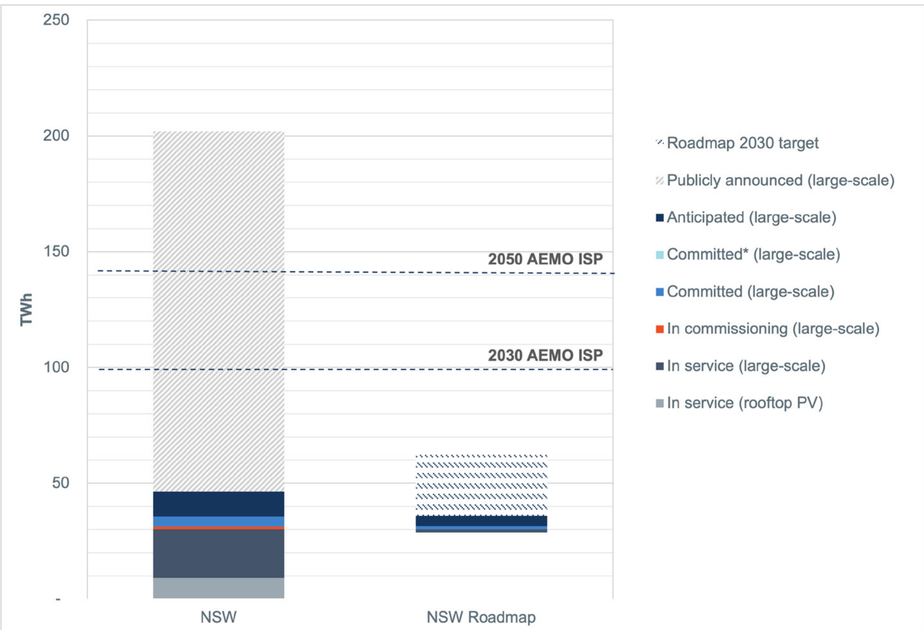
The renewable generation pipeline contains 5x current capacity but only 3% is under construction

NSW has a significant amount of renewable generation capacity in its pipeline, enough to meet 2030 and 2050 AEMO ISP generation forecasts. However, very little of the pipeline is in the advanced stages of deployment, as seen in Figure 9. There is approximately 170 TWh in the NSW pipeline, but only 3% is under construction (i.e., beyond the committed* status of deployment). 97% of the pipeline is only "anticipated" or "publicly announced". Ensuring this "anticipated" and "publicly announced" capacity progresses through development and commissioning will be important to ensuring NSW reaches its future generation requirements. Figure 9 also indicates the role of the NSW Roadmap in this acceleration and demonstrates how close the Roadmap can get NSW to the 2030 and 2050 AEMO ISP renewable generation requirements, if it is delivered in full. If all of the potential Roadmap capacity reaches an "in service" status by 2030, as per the Roadmap targets, NSW renewable energy deployment will be close to the level required by the AEMO ISP in 2030. However, further progression and acceleration of the rest of the pipeline is also required.

Figure 9

There is a large pipeline of renewable energy projects in NSW but most are in the early stages of development

Renewable energy projects categorised into AEMO project status classifications for NSW [11] in comparison with 2030 and 2050 AEMO ISP step change scenarios [1]



The potential capacity of the NSW Roadmap is shown with the same project status classifications to understand its role in the overall pipeline [19].

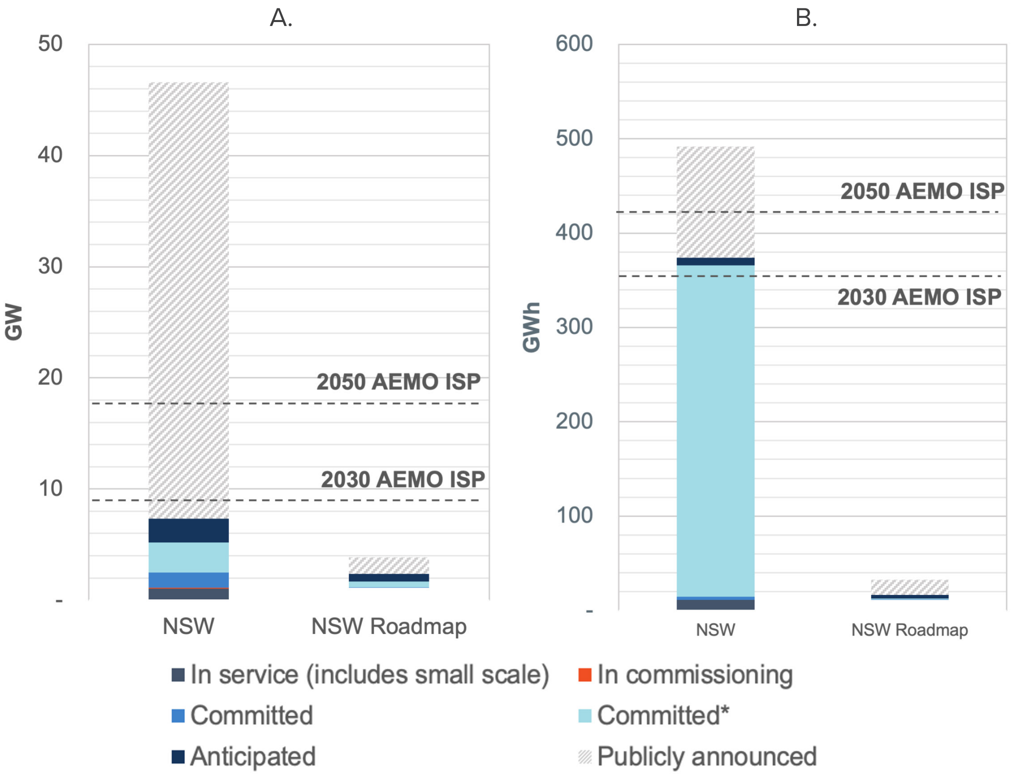
NSW has a strong storage pipeline with sufficient capacity to meet its storage needs

NSW is making significant progress towards deploying the 2030 and 2050 storage requirements modelled in the AEMO ISP step change scenario. When considering the long duration storage capacity required (GWh), NSW has almost enough projects in the advanced stages of deployment to reach the 2030 requirement (see Figure 10). A large portion of this can be attributed to Snowy 2.0, which is expected to provide an additional 350 GWh of large-scale storage (160 hours of operation) to the NEM [20] [21]. Once fully deployed, Snowy 2.0. could provide up to 90% of the required long duration storage capacity for NSW 2030 demand. Different types of storage are required to firm consumer-owned and utility-scale renewables at different times of the day and year. Storage varies in terms of 'depth', i.e., the length of time that electricity can be dispatched at a maximum output before reserves are exhausted. A mix of shallow, medium and deep storage is required to fully decarbonise the grid in NSW [1]. Figure 10 indicates that the combination of the 2GW of long-duration storage that will be delivered through the NSW Roadmap and the completion of Snowy 2.0. will get NSW close to where it needs to be in 2030.

Figure 10

The NSW storage pipeline has sufficient capacity to meet requirements if publicly announced projects progress

Storage projects categorised into AEMO project status classifications for NSW [11] compared to 2030 and 2050 AEMO ISP step change scenario requirements [1] shown in A) as GW and B) as GWh



The potential storage capacity of the NSW Roadmap is shown with the same project status classifications to understand its role in the overall pipeline.

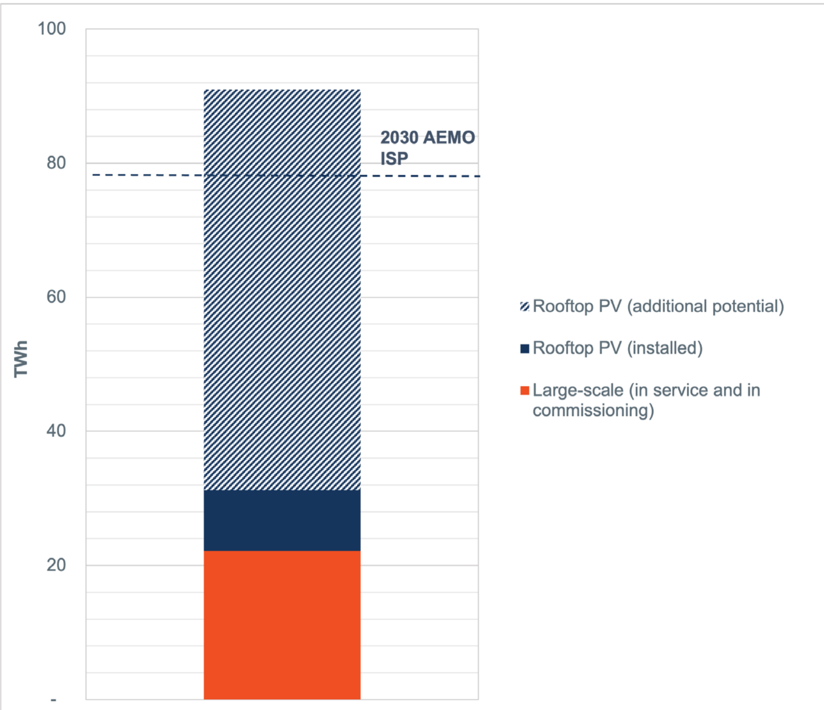
There is also an opportunity to deploy significantly more rooftop PV in NSW

NSW has considerable potential additional rooftop PV capacity. There is adequate potential capacity across residential, commercial and industrial rooftops for NSW to reach AEMO 2030 ISP renewable generation requirements, as seen in Figure 11. Accelerating the uptake of rooftop PV in NSW can reduce the need for as much investment in large scale generation and storage capacity and transmission infrastructure, particularly in the short term. The NSW Government has committed $290m under the Consumer Energy Strategy to help households and small businesses access energy saving technologies. The Strategy has a target of 1 million households and small businesses having access to a rooftop solar and battery system by 2035, rising to nearly 1.5 million households by 2050 [22]. The allocation of the $290m is not yet confirmed, although an announced $239m Home Energy Saver program is anticipated in the second half of 2025 [23]. The details of this program are yet to be announced.

Figure 11

There is considerable untapped potential rooftop PV capacity in NSW

Potential additional rooftop PV [8] compared to currently installed rooftop PV [10] and large-scale renewables in NSW [11]



This is also shown with respect to 2030 AEMO ISP step change generation requirements [1].

Victoria

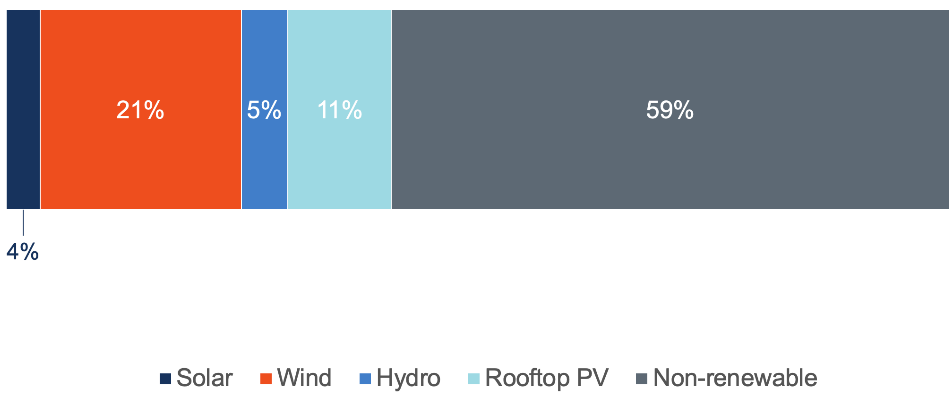
Victoria's electricity generation is currently 41% renewable

Renewable energy generation currently accounts for 41% of Victoria's electricity generation [18]. Figure 12 provides a breakdown of Victoria's electricity mix by generation type. Renewable energy generation was made up of rooftop PV (11%), large-scale solar (4%), wind (21%) and hydro (5%) for 2024. The remaining 59% of electricity generation in Victoria was from fossil-fuel sources.

Figure 12

Renewable energy accounts for 41% of current Victorian electricity generation

Victorian electricity generation categorised by generation type for 2024 [18]



Victoria is on track to achieve its 2025 legislated target of 40% renewable generation. It has also legislated a 65% target for 2030 and a 95% target for 2035 [24]. To ensure Victoria reaches its future renewable energy targets, renewable energy deployment will need to accelerate.

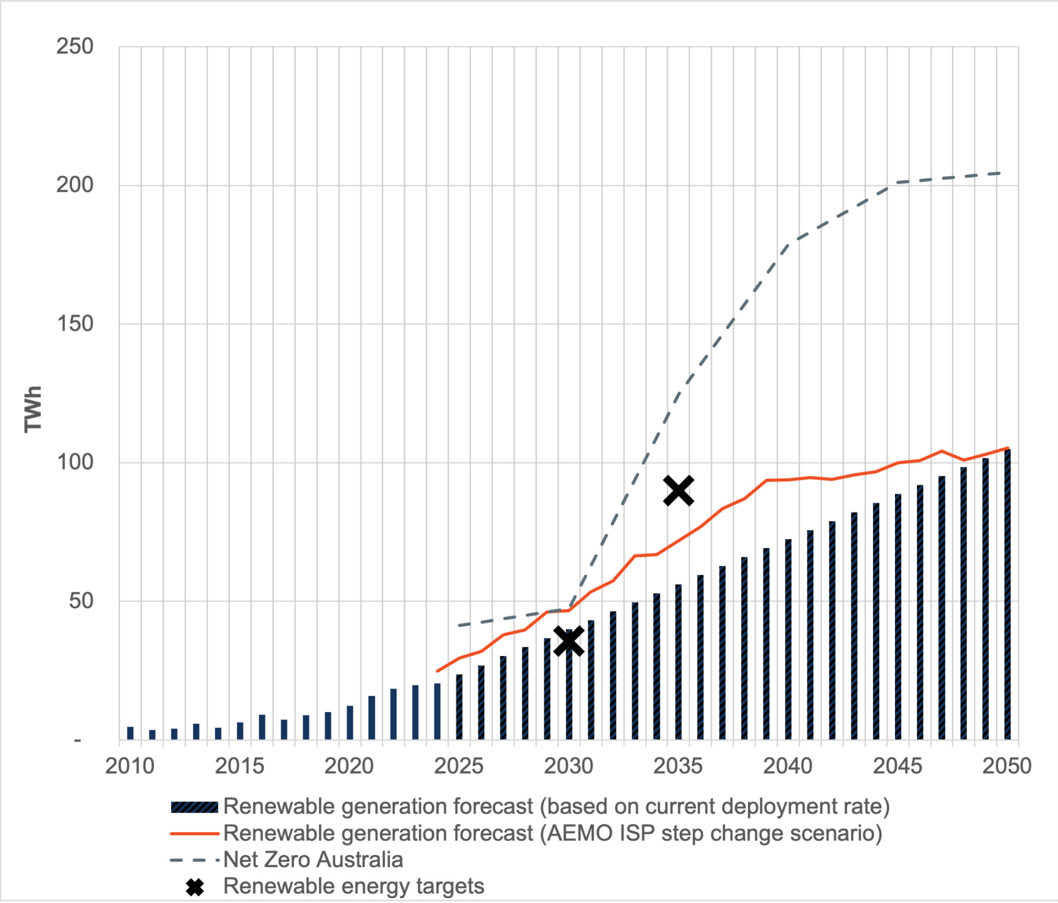
Victoria is on track for its 2030 target but falling behind AEMO ISP step change requirements

Victoria has a 2030 renewable energy target of 65% and based on current build rates it is on track to achieve this target. However, this 65% target is well below the AEMO ISP step change forecast for Victoria which has the state delivering 84% renewable generation by 2030. The build rate modelled in Figure 13 has been calculated based on Clean Energy Council data using an average commissioning rate over the last five years (i.e., the average MW capacity of projects reaching commissioning) [5]. It also includes APVI data on annual rooftop PV deployment [10]. The red line in Figure 13 represents the AEMO ISP step change scenario for Victoria, while the dashed grey line shows a higher generation scenario modelled for the Net Zero Australia study which includes rapid electrification of industry and transport as well as assumptions around the electricity required for carbon dioxide removal e.g., through Direct Air Capture (DAC). The figure indicates that Victoria needs to focus on accelerating deployment of renewable energy projects to ensure it achieves both legislated targets (marked with crosses in Figure 13) and meets even higher potential future electricity demand forecasts.

Figure 13

Victoria is on track for its 2030 target but accelerated deployment is required to reach future targets and requirements

Renewable energy capacity for Victoria based on current build rates compared to the legislated 2030 and 2035 renewable energy targets, AEMO ISP step change scenario [1] and the E+ scenario from the Net Zero Australia study [2]



The build rate modelled has been calculated based on Clean Energy Council data using an average of the large-scale renewable generation capacity reaching commissioning over the last five years and APVI data on annual rooftop PV deployment [5] [10].

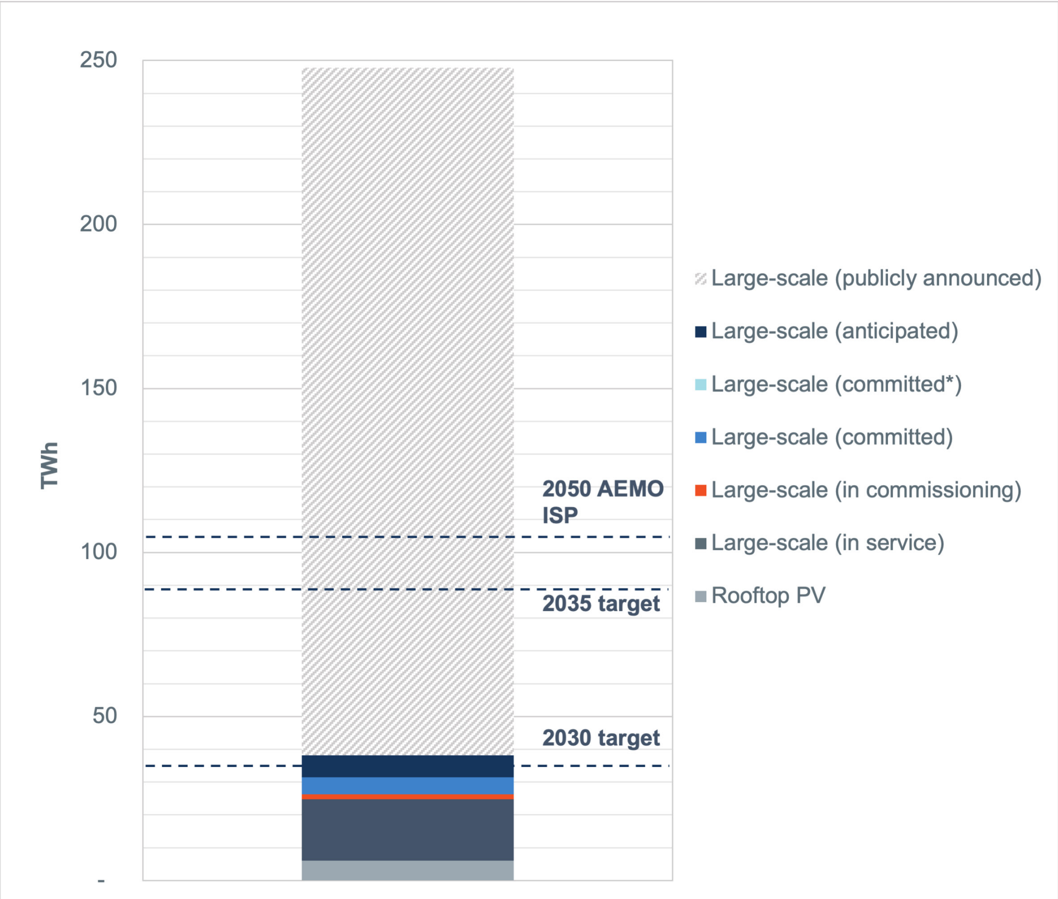
The Victorian renewable pipeline includes 5x the current grid capacity but only 3% is under construction

Victoria has a significant amount of renewable generation capacity in its pipeline, enough to comfortably meet its legislated 95% renewable generation by 2035 target and to meet its 2050 AEMO ISP generation requirements. However, very little of the pipeline is in the advanced stages of deployment, as shown in Figure 14. There is around 220TWh in the Victorian pipeline, which is approximately five times the current Victorian grid. However, only 3% of pipeline capacity is under construction (i.e., beyond the committed* status of deployment). 97% is only "anticipated" or "publicly announced". Offshore wind accounts for around 80% of the "publicly announced" pipeline generation in Victoria. Unlocking as much of this capacity as possible will be important in ensuring Victoria reaches its future generation requirements.

Figure 14

There is a large pipeline of renewable energy projects in Victoria but most are in the early stages of development

Renewable energy projects categorised by AEMO project status classifications [11] for Victoria compared to legislated targets and 2050 AEMO ISP step change scenario requirements [1]



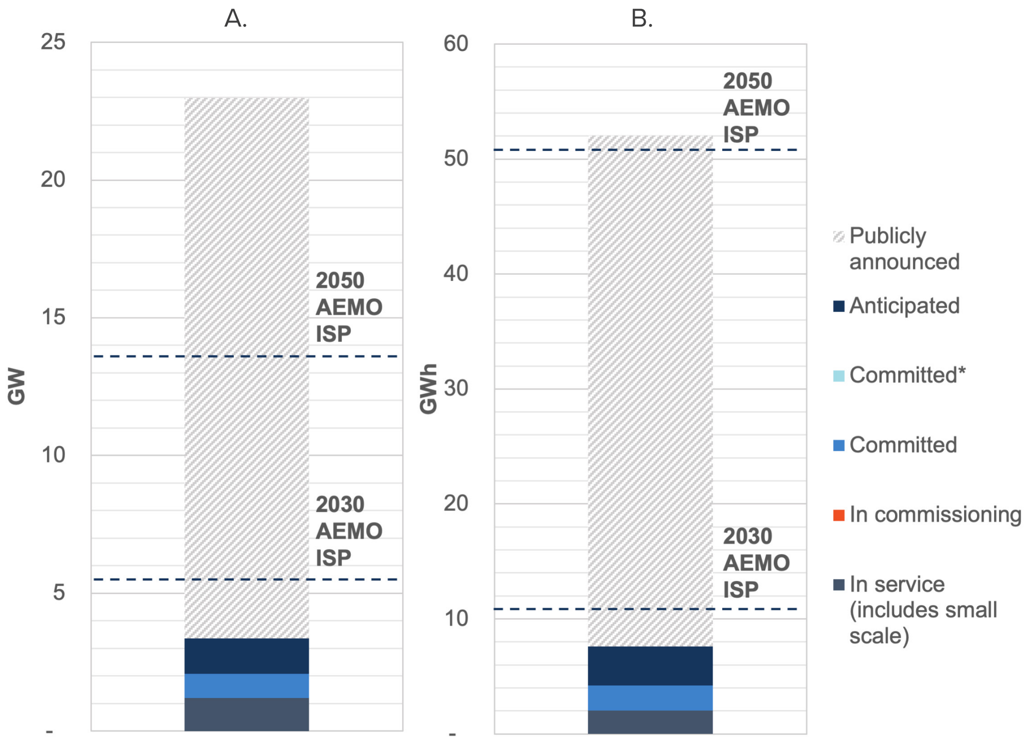
There is sufficient storage capacity in the pipeline for Victoria to meet its targets

Victoria is also making progress towards its legislated 2030 and 2035 large-scale storage targets [25]. Victoria has sufficient storage capacity in the pipeline to reach the legislated 2030 target of 2.6GW [25] (see Figure 15). This legislated 2030 target is just less than half of the 2030 AEMO ISP requirement of 5.5GW, although unlike the target, the ISP includes both large-scale storage and passive and coordinated CER storage. The AEMO ISP large-scale storage requirement for 2030 is 3.8GW (7.6GWh) which should still be in reach, based on the pipeline in Figure 15. The AEMO ISP step change scenario sees 90% of Victoria's storage capacity being provided by passive and coordinated CER in 2050 (compared to 32% in 2030) [1]. This differs from some other jurisdictions that are projected to be more reliant on large-scale storage, e.g., NSW with Snowy 2.0. A focus on driving uptake of CER storage and including CER in future storage targets may be required in Victoria.

Figure 15

Victoria has sufficient capacity in the pipeline to meet its large-scale storage targets

Storage projects categorised by AEMO project status classifications [11] for Victoria compared to AEMO ISP step change projections [1] shown in A) as GW and B) as GWh



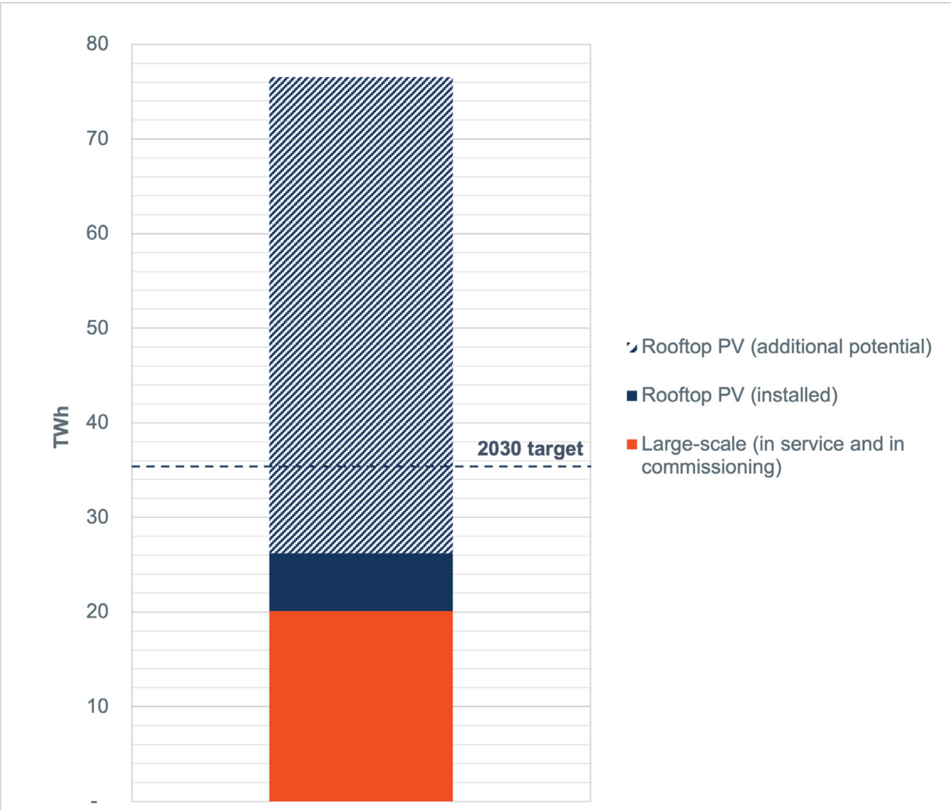
There is an opportunity to deploy significantly more rooftop PV in Victoria

Victoria has a considerable amount of potential additional rooftop PV capacity. There is more than enough potential capacity across residential, commercial and industrial rooftops for Victoria to reach 65% renewable generation as per its renewable energy target, as seen in Figure 16. Accelerating the uptake of rooftop PV in Victoria can reduce the need for as much investment in large scale generation and storage capacity and transmission infrastructure, particularly in the short term. Solar Victoria is responsible for delivering the Victorian Government's $1.3 billion, 10 year, Solar Homes program which provides a range of rebates and interest free loans for solar, battery and efficient hot water systems. This includes specific rebates for rentals, community housing and apartments to enable more equitable access to the energy transition. For Victoria, accelerating rooftop PV uptake while also unlocking the generation capacity in the existing large scale project pipeline can help achieve short- and long-term renewable energy targets.

Figure 16

There is considerable untapped potential rooftop PV capacity in Victoria

Potential additional rooftop PV [8] compared to currently installed rooftop PV [10] and large-scale renewables in Victoria [11]



This is also shown with respect to the 2030 legislated renewable energy target.

Queensland

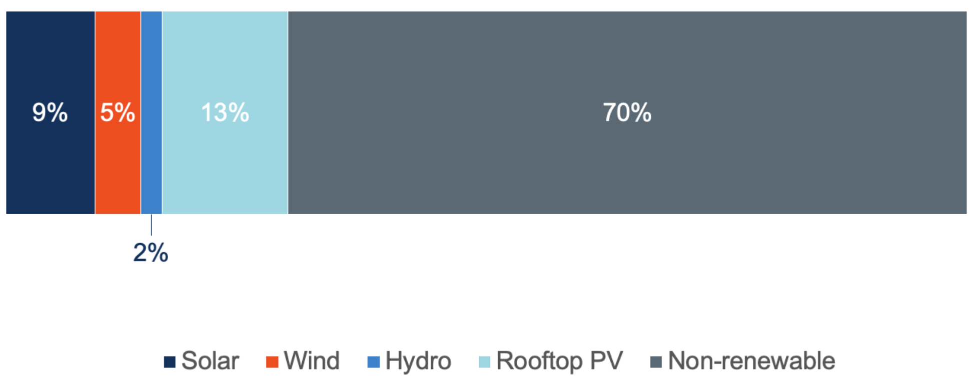
Queensland electricity generation is currently 30% renewable

Renewable energy generation currently accounts for 30% of Queensland electricity generation [18]. Figure 17 provides a breakdown of renewable energy generation by type, which includes rooftop PV (13%), large-scale solar (9%), wind (5%) and hydro (2%). The resulting 70% of electricity generation in Queensland is from fossil-fuel sources.

Figure 17

Renewable energy accounts for 30% of current Queensland electricity generation

Queensland electricity generation categorised by generation type for 2024 [18]



Queensland has legislated a 50% renewable generation target by 2030, a 70% target for 2032 and an 80% target for 2035 [26]. To ensure Queensland reaches its renewable energy targets, renewable energy deployment will need to accelerate. Prior to the last state election in October 2024, the Liberal National Party pledged to repeal these renewable energy targets. A review into Queensland's emission reduction targets has been announced [27], but the repeal of renewable energy targets is yet to be confirmed.

Deployment must accelerate for Queensland to meet its 2030 target

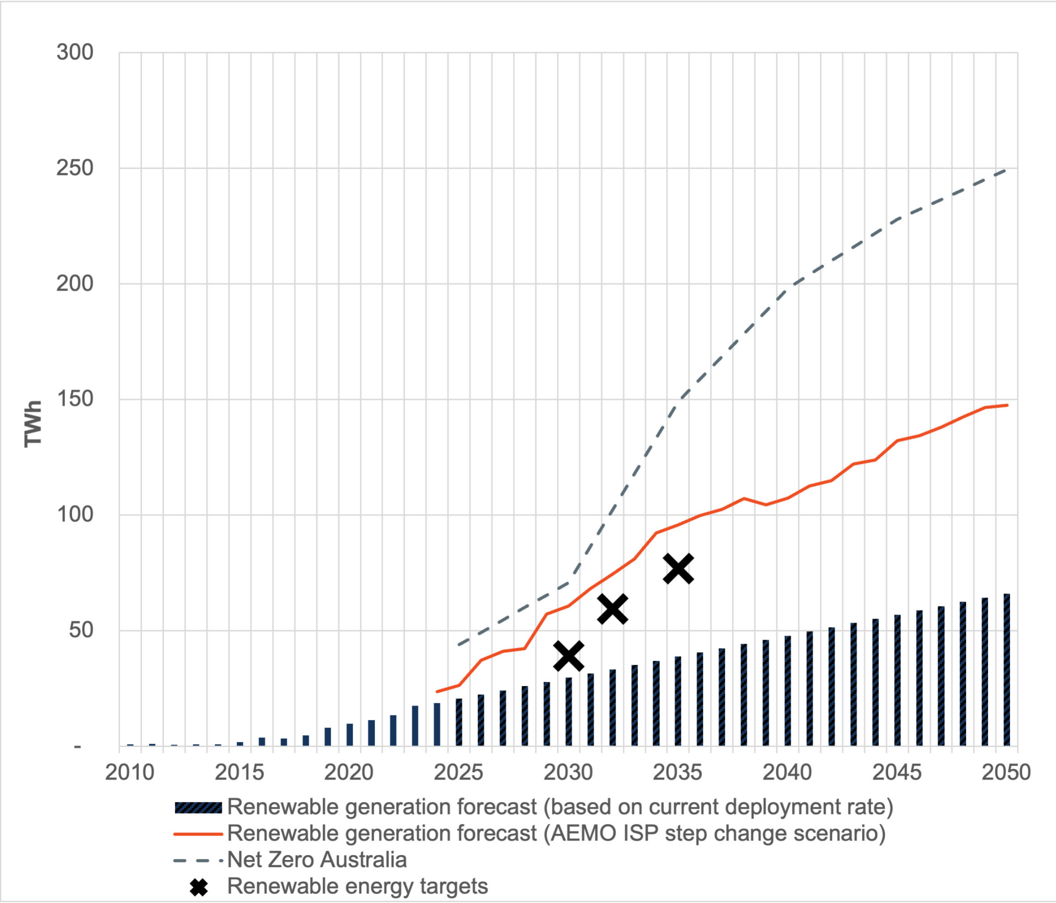
Based on current deployment rates of large scale generation and rooftop PV, Queensland is likely to fall slightly short of its 2030 target. Figure 18 shows the gap between current deployment and legislated targets (marked with crosses). If current deployment rates are maintained, the renewable generation gap is projected to increase beyond 2030. Continued acceleration of deployment will be required post 2030 to meet the 2032 and 2035 targets.

Figure 18 also shows the gap between both current deployment and legislated targets and the AEMO ISP step change generation requirements for Queensland. According to the AEMO ISP step change scenario Queensland generation should be at 73% renewables by 2030 [1]. The gap in renewable energy deployment is even greater under the scenario modelled in the Net Zero Australia study, which assumes rapid electrification of industry and transport as well as assumptions around the electricity required for carbon dioxide removal e.g., through Direct Air Capture (DAC) [2].

Figure 18

Accelerated renewable energy deployment is required to reach future targets and requirements

Renewable energy capacity for Queensland based on current build rates compared to the legislated 2030, 2032 and 2035 renewable energy targets, AEMO ISP step change scenario [1] and the E+ scenario modelled in the Net Zero Australia study [2]



The build rate modelled has been calculated based on Clean Energy Council data using an average of the large-scale renewable generation capacity reaching commissioning over the last five years and APVI data on annual rooftop PV deployment [5] [10].

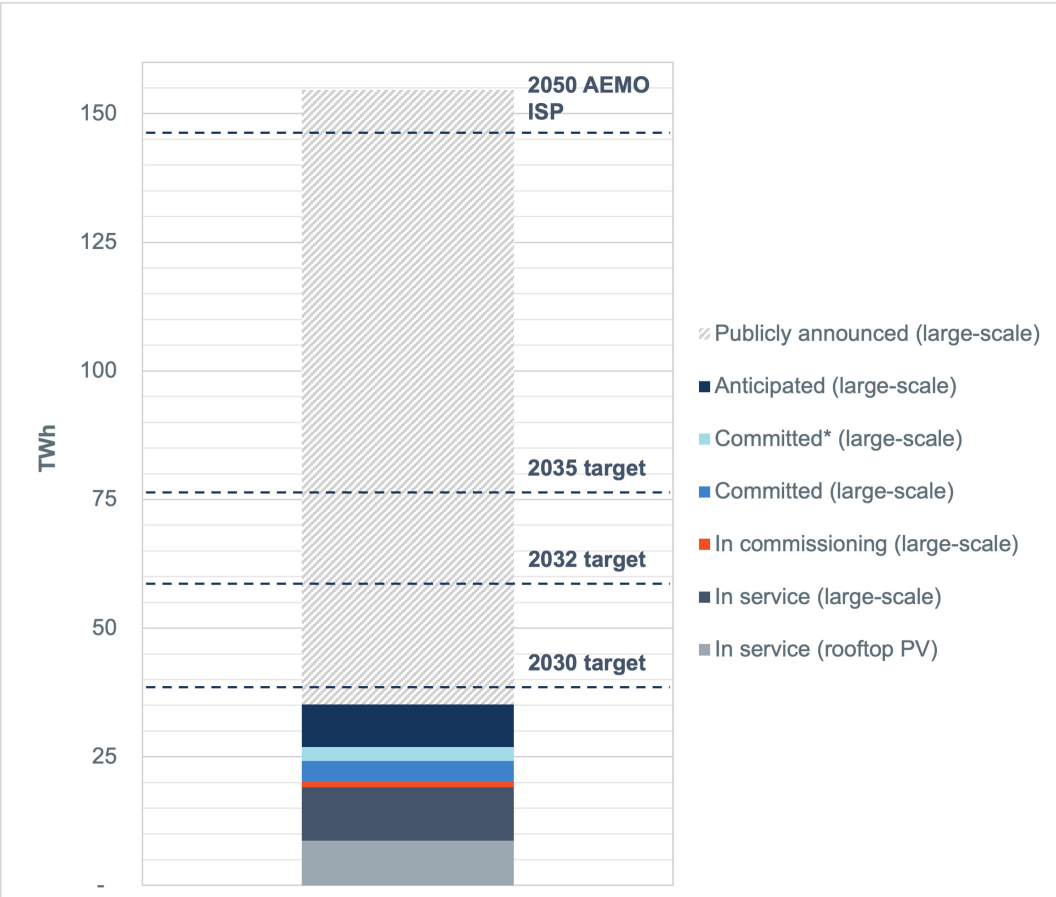
The renewable generation pipeline contains 7x current capacity but only 6% is under construction

Queensland has a significant amount of renewable generation capacity in its pipeline, enough to meet its 2030, 2032 and 2035 targets and almost enough to meet the 2050 AEMO ISP requirements. The pipeline contains seven times the currently deployed renewable generation capacity, which is also more than twice the capacity of the current Queensland electricity grid. However, only 6% of the pipeline is in the advanced stages of deployment, i.e., construction is underway (seen in Figure 19). The majority of the pipeline (94%) is only “anticipated” or “publicly announced”. Unlocking as much of this capacity as possible will be important in ensuring Queensland reaches its future generation requirements.

Figure 19

There is a large pipeline of renewable energy projects in Queensland but most are in the early stages of development

Renewable energy projects categorised by AEMO project status classifications [11] for Queensland compared to interim state-specific targets and AEMO ISP step change requirements [1]



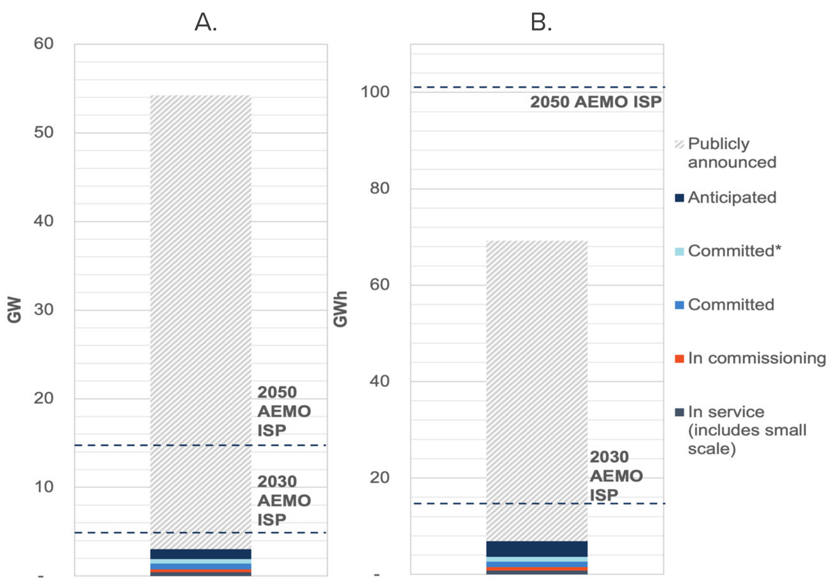
Queensland has a strong storage pipeline but could increase focus on long duration storage

While Queensland has a large pipeline in terms of GW capacity, very little is in the advanced stages of deployment and further, there are few long duration storage projects, resulting in the state being far off the 2050 AEMO ISP GWh storage requirement, as seen in Figure 20. While Queensland does not currently have legislated storage targets, the Queensland SuperGrid Infrastructure Blueprint states that based on current demand forecasts and energy market modelling, the state is expected to need 6GW of long duration storage, which will be complemented by up to 3GW of grid-scale storage to support the government's 50% renewable energy target by 2030 [28]. This forecast is higher than the AEMO ISP forecast of 4.4GW required by 2030, however, the Queensland SuperGrid Infrastructure Blueprint does not indicate the GWh capacity that will be required. The AEMO ISP step change scenario assumes that the proposed Borumba pumped hydro project will come online in 2031-2032, providing 2GW and 48GWh in storage capacity [1]. Borumba is not included in the pipeline data in Figure 20 as it was not in the January 2025 AEMO Generation Information dataset which was used for this analysis. It has since been added to the new AEMO Generation Information data released in April 2025. If this project is delivered in full, providing 48GWh of storage duration, then the rest of the pipeline should bring the state in line with 2050 AEMO ISP step change requirements.

Figure 20

Queensland has sufficient storage capacity to meet projected storage requirements but longer duration projects may be required

Storage projects categorised by AEMO project status classifications [11] for Queensland compared to AEMO ISP step change projections [1] shown in A) as GW and B) as GWh



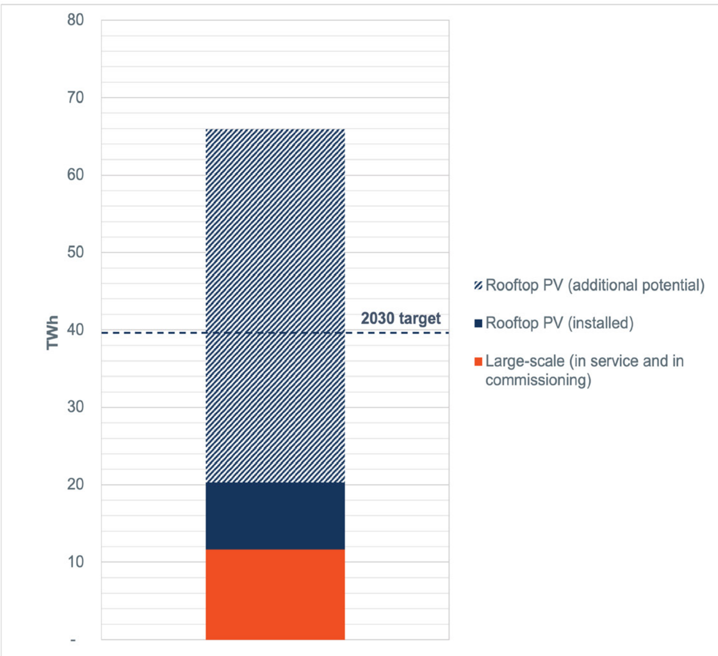
There is an opportunity to deploy significantly more rooftop PV in Queensland

Despite impressive progress to date with rooftop PV deployment, Queensland has considerable potential additional rooftop PV capacity [8]. There is more than enough potential capacity across residential, commercial and industrial rooftops for Queensland to reach its 2030 renewable energy target, as seen in Figure 21. Accelerating the uptake of rooftop PV in Queensland can reduce the need for as much investment in large scale generation and storage capacity and transmission infrastructure, particularly in the short term. The Queensland Government has previously provided financial incentives for rooftop PV and household batteries, however these programs have all ended. There are opportunities for Queensland homes and businesses to participate in Commonwealth Government programs, for example, rooftop PV and household battery incentives under the Small-scale Renewable Energy Scheme. There is an opportunity for the Queensland Government to complement these Commonwealth programs and further accelerate rooftop PV and battery installations for households and small businesses while also unlocking the existing large scale project pipeline to help achieve short- and long-term renewable energy targets and meet future energy system requirements.

Figure 21

There is considerable untapped potential rooftop PV capacity in Queensland

Potential rooftop PV [8] compared to currently installed rooftop PV [10] and large-scale renewables [11] in Queensland



This is also shown with respect to the 2030, 2032 and 2035 legislated renewable energy targets.

South Australia

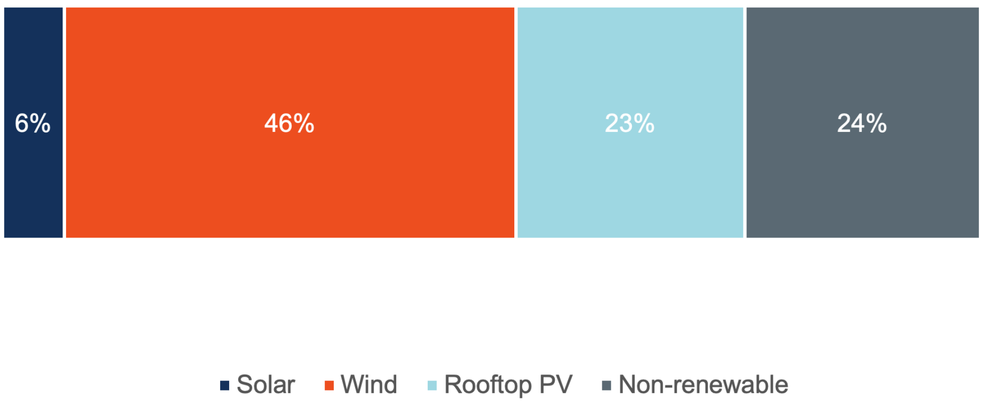
South Australia's electricity generation is currently 76% renewable

Renewable energy generation currently accounts for 76% of South Australia's electricity generation [18]. Figure 22 provides a breakdown of renewable generation by type, including rooftop PV (23%), large-scale solar (6%) and wind (46%). The resulting 24% of electricity generation in South Australia is from fossil-fuel sources.

Figure 22

Renewable energy accounts for 76% of current South Australian electricity generation

South Australia electricity generation categorised by generation type for 2024 [18]



South Australia has a target for 100% renewable generation by 2027. This target is not currently legislated but is before parliament as a Bill to amend the Climate Change and Greenhouse Emissions Reduction Act and previous targets [29]. To ensure South Australia reaches this target, renewable energy deployment will need to accelerate.

Deployment must accelerate for South Australia to meet its 2027 target

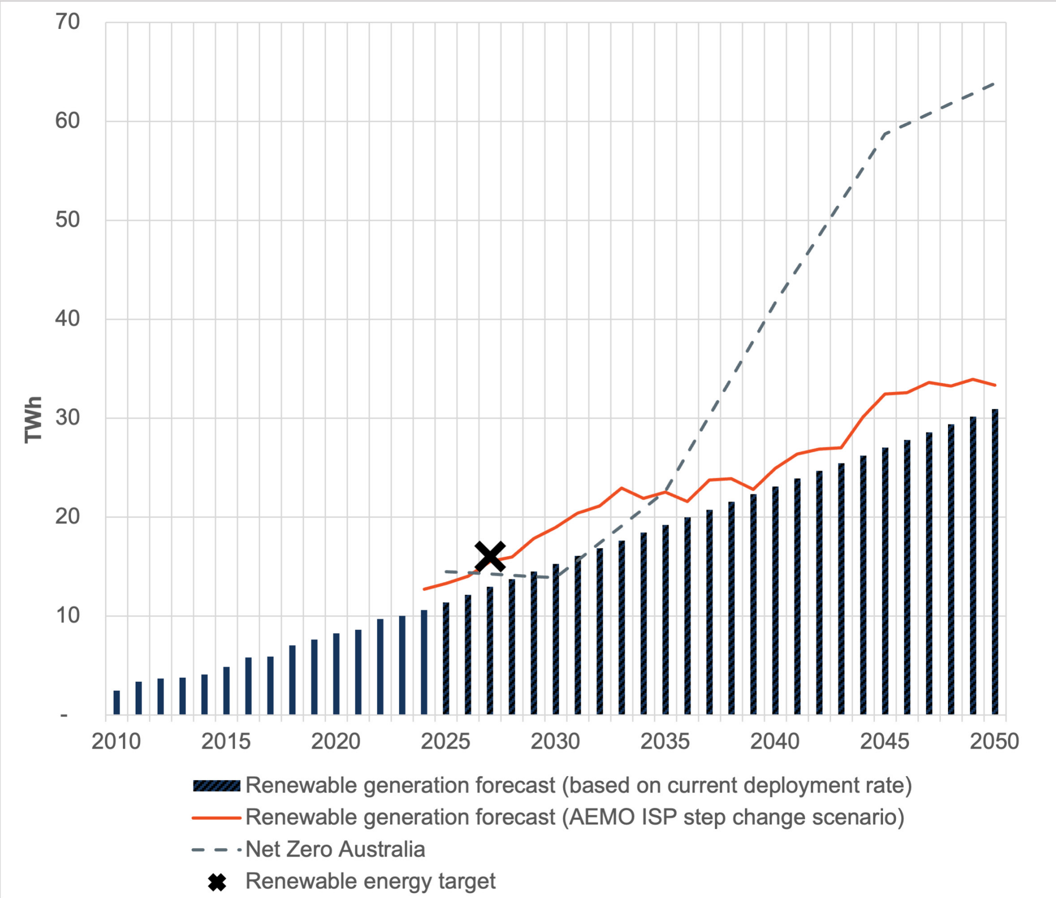
South Australia has set an ambitious 100% renewable energy target for 2027, which is ahead of the AEMO ISP renewable requirement of 86% renewable generation. However, based on current large-scale generation and rooftop PV deployment rates South Australia will fall slightly short of its target. The renewable energy generation gap in 2027 is approximately 3TWh and this gap continues out to 2050, as seen in Figure 23.

The gap in renewable energy deployment is even greater under the Net Zero Australia scenario. The build rate modelled in Figure 23 has been calculated based on Clean Energy Council data using an average of the large-scale renewable generation capacity reaching commissioning over the last five years and APVI data on annual rooftop PV deployment [5] [10]. The red line in Figure 23 refers to the AEMO ISP step change scenario for South Australia [1], while the dashed grey line shows a higher generation scenario modelled for the Net Zero Australia study, which includes rapid electrification of industry and transport as well as assumptions around the electricity required for carbon dioxide removal e.g., through Direct Air Capture (DAC) [2]. The figure indicates that South Australia needs to focus on accelerating deployment of renewable energy projects to ensure it achieves its legislated target (marked with a cross on the chart), and meets the higher demand forecasts.

Figure 23

Accelerated renewable energy deployment is required to meet the 2027 target

Renewable energy capacity for South Australia based on current build compared to the 2027 renewable energy target, AEMO ISP step change scenario [1] and the E+ scenario modelled in the Net Zero Australia study [2]



The build rate modelled has been calculated based on Clean Energy Council data using an average of the large-scale renewable generation capacity reaching commissioning over the last five years and APVI data on annual rooftop PV deployment [5] [10].

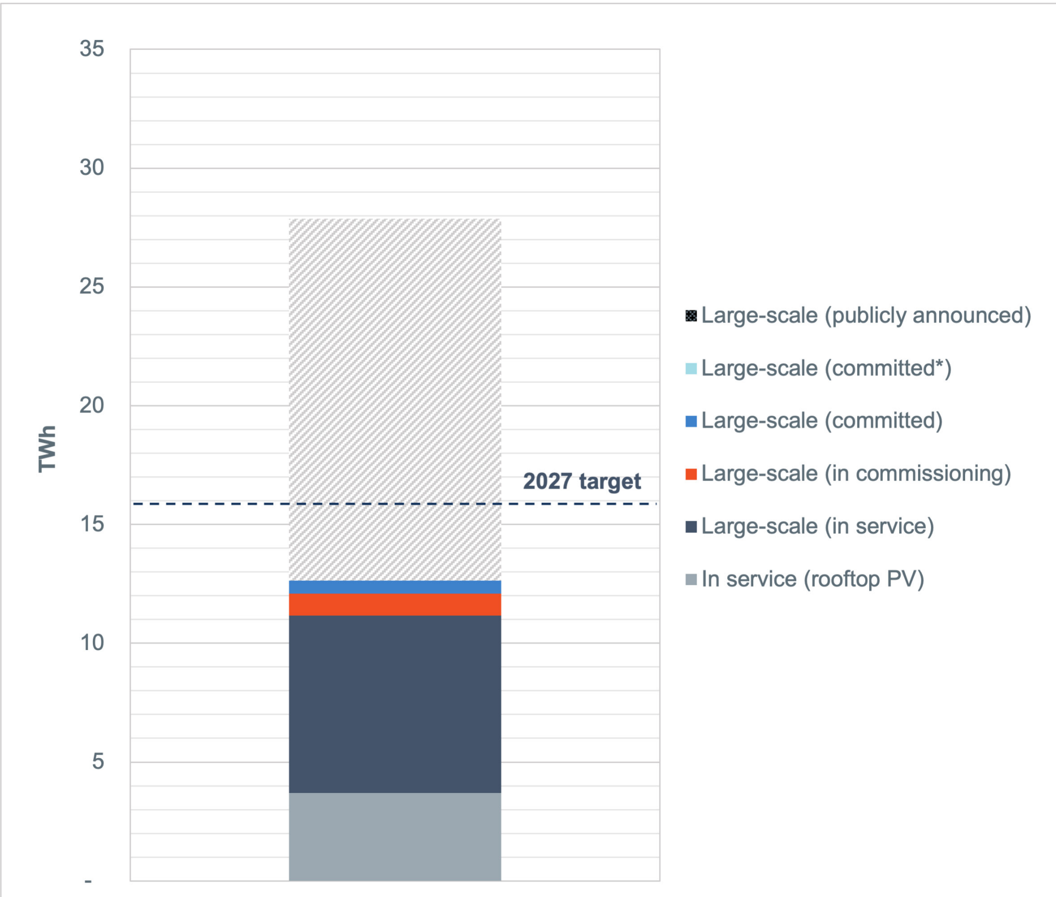
The renewable generation pipeline contains 2.5x current capacity but only 9% is under construction

South Australia has enough renewable generation in its pipeline to meet its 2027 target. However, only a small percentage of the pipeline is in the advanced stages of deployment and there is not enough announced capacity to meet the AEMO ISP 2050 requirements. Only 9% of pipeline capacity is under construction (i.e., beyond the "committed*" status of deployment), as seen in Figure 24. The majority of the pipeline (91%) is only "anticipated" or "publicly announced". Unlocking as much of this capacity as possible will be important in ensuring South Australia reaches its future generation requirements.

Figure 24

The pipeline of renewable energy capacity in South Australia is smaller as a percentage of future grid requirements compared to other jurisdictions

Renewable energy projects categorised by AEMO project status classifications [11] for South Australia compared to the 2027 renewable energy target and 2050 AEMO ISP step change requirements [1]



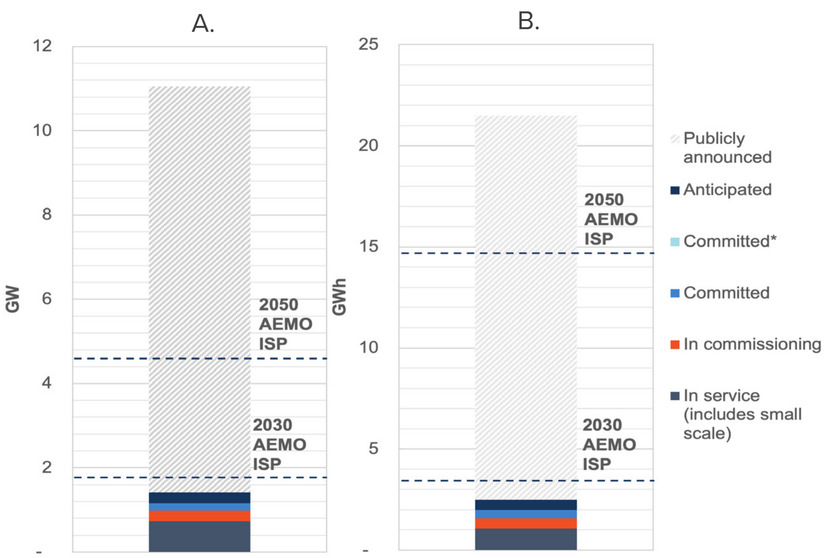
South Australia has deployed enough storage capacity to meet 50% of its 2030 requirements

South Australia has made good progress in storage deployment and has sufficient additional capacity under construction to meet its 2030 AEMO ISP storage requirements (as seen in Figure 25). Further, South Australia has sufficient storage projects in all stages of the pipeline to reach its long-term 2050 AEMO ISP storage requirements. Similar to generation, the challenge for South Australian policymakers will be in unlocking the storage capacity in the pipeline and ensuring “anticipated” and “publicly announced” projects progress through development at the pace needed to meet the system requirements mapped out in the ISP. Similarly to Victoria, the AEMO ISP step change scenario suggests that 80-90% of storage capacity in South Australia will come from coordinated and passive CER in 2050 [1]. A focus on driving uptake of CER storage may be required in South Australia. The South Australian Home Battery Scheme has ended, however, the Commonwealth household battery incentives that have been announced under the Small-scale Renewable Energy Scheme could help to continue to drive uptake of passive CER storage. The South Australian government has several schemes focused on driving uptake of coordinated CER, with incentives for connecting batteries to virtual power plants (VPPs) through the Retailer Energy Productivity Scheme (REPS) [30] and delivering community batteries for Housing SA tenants through the empowering SA Program [31].

Figure 25

South Australia has sufficient storage capacity in the pipeline to meet projected storage requirements

Storage projects categorised by AEMO project status classifications [11] for South Australia compared to AEMO ISP step change requirements [1] shown in A) as GW and B) as GWh



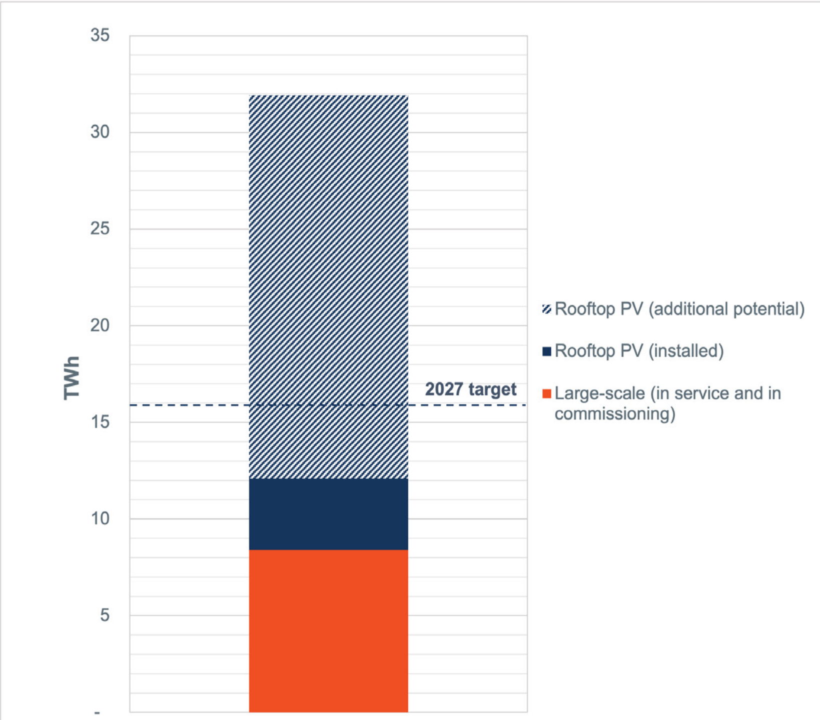
There is an opportunity to deploy significantly more rooftop PV in South Australia

Despite strong progress to date, South Australia has considerable potential additional rooftop PV capacity. There is adequate potential capacity for South Australia to reach its 2027 target and to meet the 2030 AEMO ISP requirements (see Figure 26). Accelerating the uptake of rooftop PV in South Australia can reduce the need for as much investment in large scale generation and storage capacity and transmission infrastructure, particularly in the short term. Due to the high penetration of solar in South Australia (29% of electricity generation from large-scale solar and rooftop PV combined), solar curtailment has sometimes been required to ensure grid stability during minimum demand events. There have been instances when AEMO has directed SA Power Networks to reduce solar exports to safeguard system security [32]. Accelerating rooftop PV uptake, alongside other CER measures which can soak up excess solar during the day, e.g., batteries, electrification, VPPs and flexible demand, can help to achieve the 2027 renewable energy target while also ensuring ongoing system security.

Figure 26

There is considerable untapped potential rooftop PV capacity in South Australia which could help meet the 2027 target

Potential rooftop PV [8] compared to currently installed rooftop PV [10] and large-scale renewables in South Australia [11]



This is also shown with respect to the 2027 renewable energy target.

Tasmania

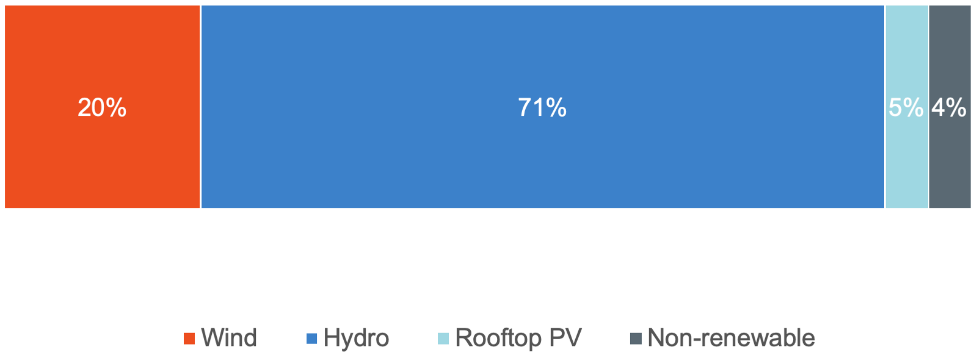
Tasmania's electricity generation is currently 96% renewable

Renewable energy generation currently accounts for 96% of Tasmania's electricity generation [18]. Figure 27 provides a breakdown of renewable energy generation by type, which includes rooftop PV (5%), large-scale solar (0%), wind (20%) and hydro (71%) for 2024. The resulting 4% of electricity generation in Tasmania is from fossil-fuel sources.

Figure 27

Renewable energy accounts for 96% of current Tasmanian electricity generation

Tasmanian electricity generation categorised by generation type for 2024 [18]



Tasmania has legislated a 150% renewable generation target by 2030 and a 200% target by 2040 [33]. To ensure Tasmania reaches its renewable energy targets, renewable energy deployment will need to accelerate. Deploying a greater diversity of renewable energy technologies in Tasmania could also be beneficial to reduce the reliance on hydropower, which is increasingly impacted by droughts [34]. Without a diversity of renewable energy sources, the Tasmanian grid relies on gas generation or imports from Victoria during periods of lower hydropower output. The AEMO ISP step change scenario sees Tasmania increasing the proportion of wind generation in the state's energy mix out to 2050 [1].

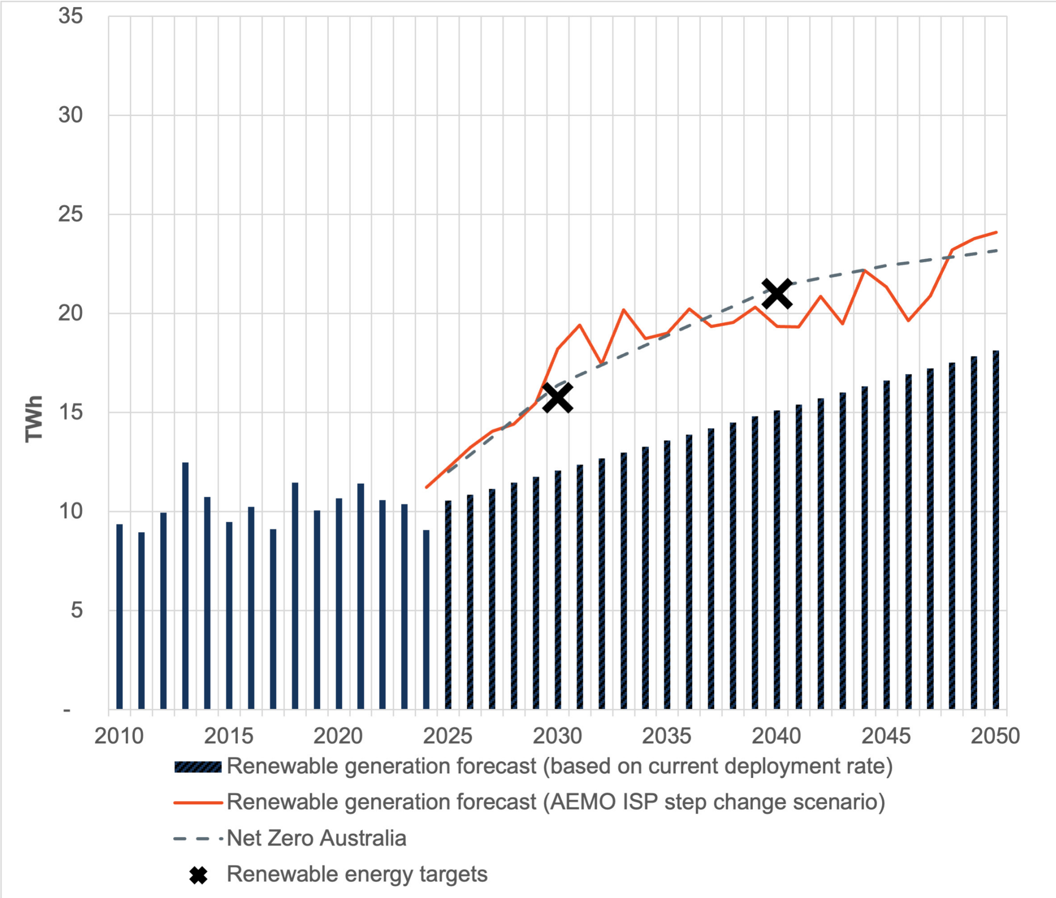
Deployment must accelerate for Tasmania to meet its legislated targets

While Tasmania is already achieving close to 100% renewable energy generation each year, this is projected to change as demand increases due to electrification of households, businesses and transport. Based on current build rates and AEMO ISP projections, Tasmania is on track for 66% renewable generation by 2030 (12TWh compared to the legislated target of 15.7TWh). As such, Tasmania is not on track to achieve its legislated targets. The renewable energy generation gap in 2030 is approximately 3.6TWh and it continues to increase out to 5.6TWh in 2040 when legislated targets reach 200% on 2020 levels, as seen in Figure 28. The build rate modelled in Figure 28 has been calculated based on Clean Energy Council data using an average of the large-scale renewable generation capacity reaching commissioning over the last five years and APVI data on annual rooftop PV deployment [5] [10]. The figure indicates that Tasmania needs to focus on accelerating deployment of renewable energy projects to ensure it achieves both legislated targets (marked with crosses) and meet future anticipated demand.

Figure 28

Accelerated renewable energy deployment is required to meet the legislated 2030 and 2040 targets

Renewable energy capacity for Tasmania based on current build rates compared to the legislated 2030 and 2040 renewable energy targets, AEMO ISP step change scenario [1] and the E+ scenario modelled in the Net Zero Australia study [2]



The build rate modelled has been calculated based on Clean Energy Council data using an average of the large-scale renewable generation capacity reaching commissioning over the last five years and APVI data on annual rooftop PV deployment [5] [10].

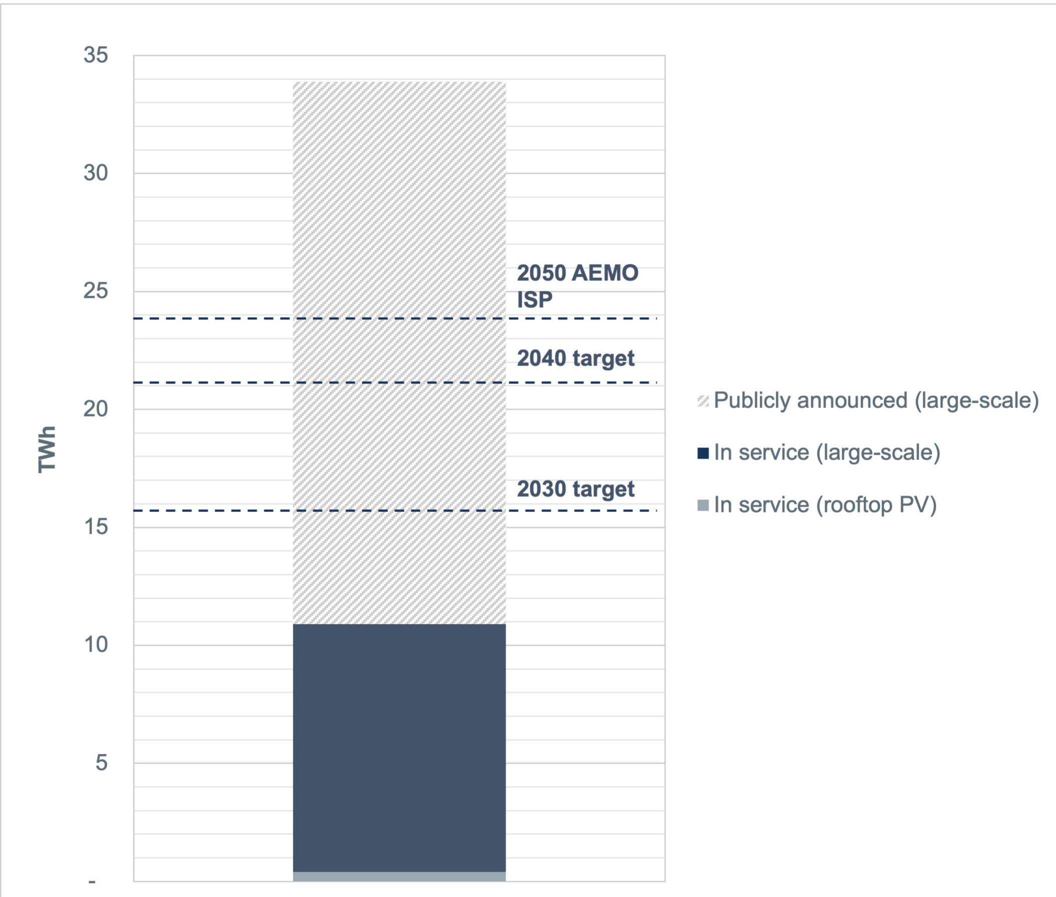
The renewable generation pipeline contains 2.1x current capacity but none is under construction

Tasmania has a significant amount of renewable generation capacity in its pipeline, enough to comfortably meet its legislated targets of 150% by 2030 and 200% by 2040. However, the entire Tasmanian pipeline is classified as “publicly announced”, meaning that all AEMO registered projects are still in the early planning stages, as seen in Figure 29. Unlocking as much of this capacity as possible will be critical in ensuring Tasmania reaches its future generation requirements. The majority of the capacity in the pipeline for Tasmania is for onshore wind projects, with several large-scale solar projects also announced. If these projects all progress, this will help to diversify the state’s renewable energy mix and reduce reliance on hydropower.

Figure 29

There is sufficient publicly announced capacity in Tasmania, but as of January 2025, there were no renewable energy projects under construction

Renewable energy projects categorised by AEMO project status classification [11] for Tasmania compared to the legislated renewable energy targets and the 2050 AEMO ISP step change requirements [1]



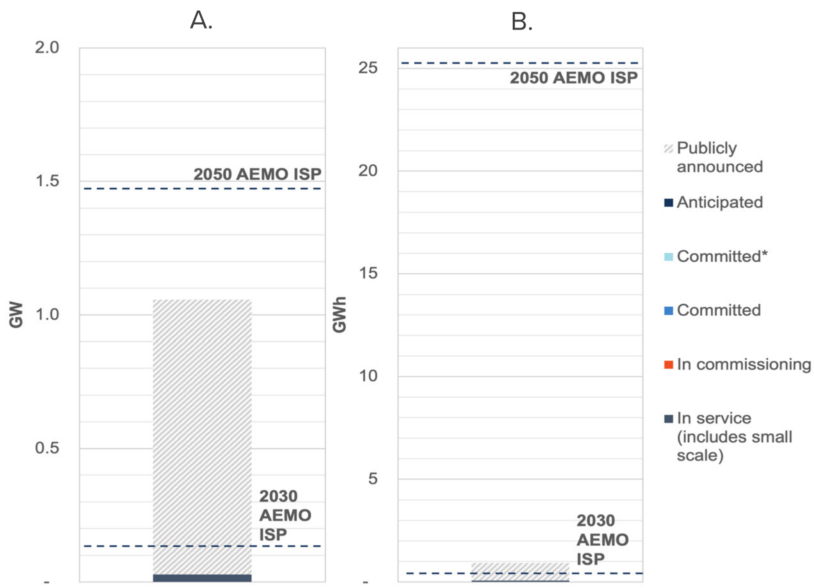
Tasmania needs to accelerate deployment of storage capacity

Tasmania has sufficient storage capacity in the pipeline to reach 2030 AEMO ISP step change requirements as seen in Figure 30. However, there is not enough in the pipeline to reach 2050 AEMO ISP step change projections, and further Tasmania is unlikely to achieve the 2030 AEMO ISP storage projections unless the entire pipeline, most of which is still in the early, uncertain stages of development reaches an "in service" status. Similar to generation, the challenge for Tasmanian policymakers will be in unlocking the storage pipeline and ensuring "anticipated" and "publicly announced" projects progress through development at the pace needed to meet the system requirements mapped out in the ISP. The focus must also be on ensuring longer duration storage projects are added to the pipeline as currently there is a substantial mismatch between storage capacity (GW) and storage duration (GWh).

Figure 30

Longer duration storage projects are required in Tasmania to meet future requirements

Storage projects categorised by AEMO project status classification [11] for Tasmania compared to AEMO ISP step change projections [1] shown in A) as GW and B) as GWh



There is an opportunity to deploy significantly more rooftop PV in Tasmania

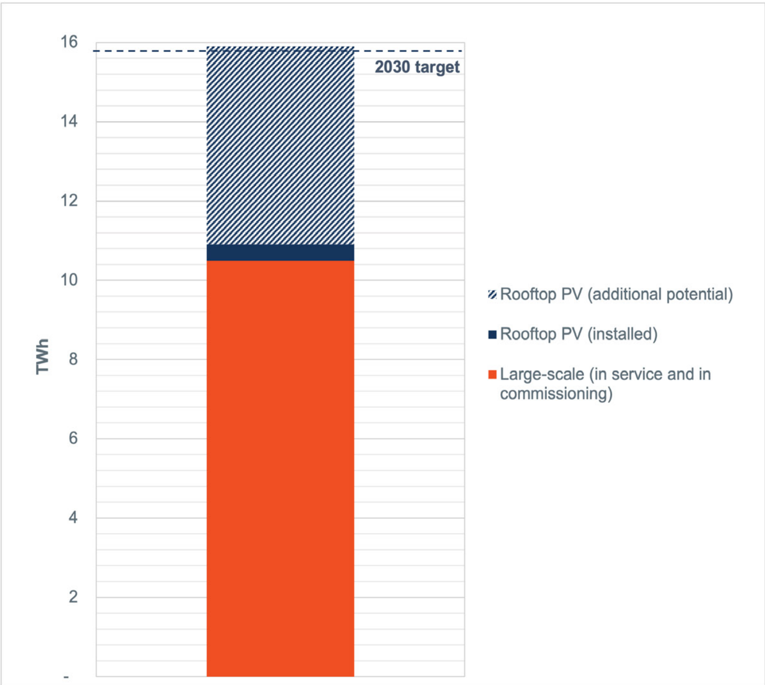
Tasmania has adequate potential additional rooftop PV capacity to reach its legislated target of 150% renewable energy by 2030. Figure 31 indicates that although Tasmania has less potential additional rooftop PV capacity than other jurisdictions, and also has a much lower capacity of rooftop PV already installed, there is enough potential capacity for the state to reach its legislated 2030 target. Accelerating the uptake of rooftop PV in Tasmania can reduce the need for as much investment in large scale generation and storage capacity and transmission infrastructure, particularly in the short term. There are currently no financial incentives offered by the Tasmanian Government to homes or businesses to install rooftop PV systems. For Tasmania accelerating rooftop PV uptake while also unlocking the existing large scale project pipeline can help achieve legislated renewable energy targets and meet future energy system requirements.

To date, Tasmania has relied on hydropower as a source of renewable energy. To reach its future targets a mix of solar, wind and battery storage will also be required. The Tasmanian Government will need to build social licence for these other renewable technologies. There is an opportunity to increase deployment of rooftop PV and small-scale storage to help increase community awareness and acceptance of different renewable technologies.

Figure 31

There is considerable untapped potential rooftop PV capacity in Tasmania which could help meet the 2030 target

Potential rooftop PV [8] compared to currently installed rooftop PV [10] and large-scale renewables in Tasmania [11]



This is shown with respect to the 2030 legislated renewable energy target.

Western Australia

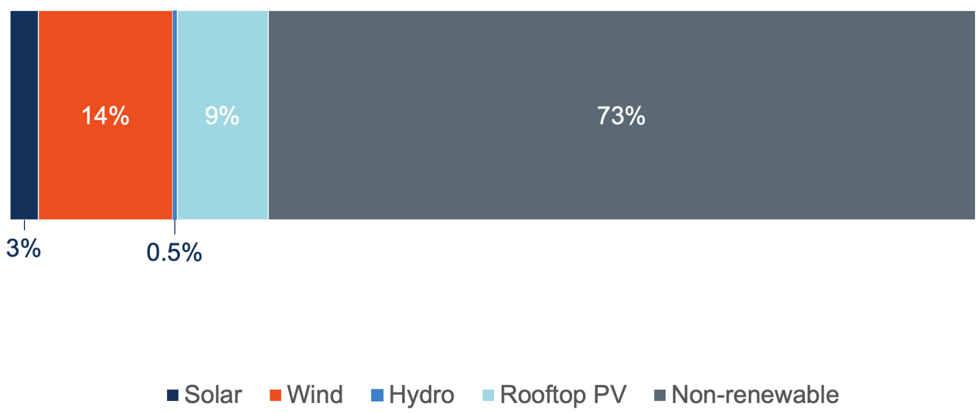
Western Australia's electricity generation is currently 27% renewable

Renewable energy generation currently accounts for 27% of Western Australia's electricity generation [10] [18]. Figure 32 provides a breakdown of renewable energy generation by type, which includes rooftop PV (9%), large-scale solar (3%), wind (14%) and hydro (0.5%) for 2024. The resulting 73% of electricity generation in Western Australia is from fossil-fuel sources.

Figure 32

Renewable energy accounts for 27% of current Western Australian electricity generation

Western Australia electricity generation categorised by generation type for 2024 [10] [18]



Western Australia does not currently have a legislated renewable energy target. The WA Government is expected to introduce a Climate Bill in 2025 that includes a net zero emissions by 2050 target, which would then also require the setting of interim emissions reduction targets for 2035, 2040 and 2045 [35]. Existing WA emissions targets are whole-of-government targets rather than whole-of-economy targets, i.e., they only apply to government operations. However, they do cover the operations of Synergy, Western Power and Horizon Power [36]. Accelerating renewable energy deployment and decarbonising electricity supply will be critical for WA once these emissions targets are in place.

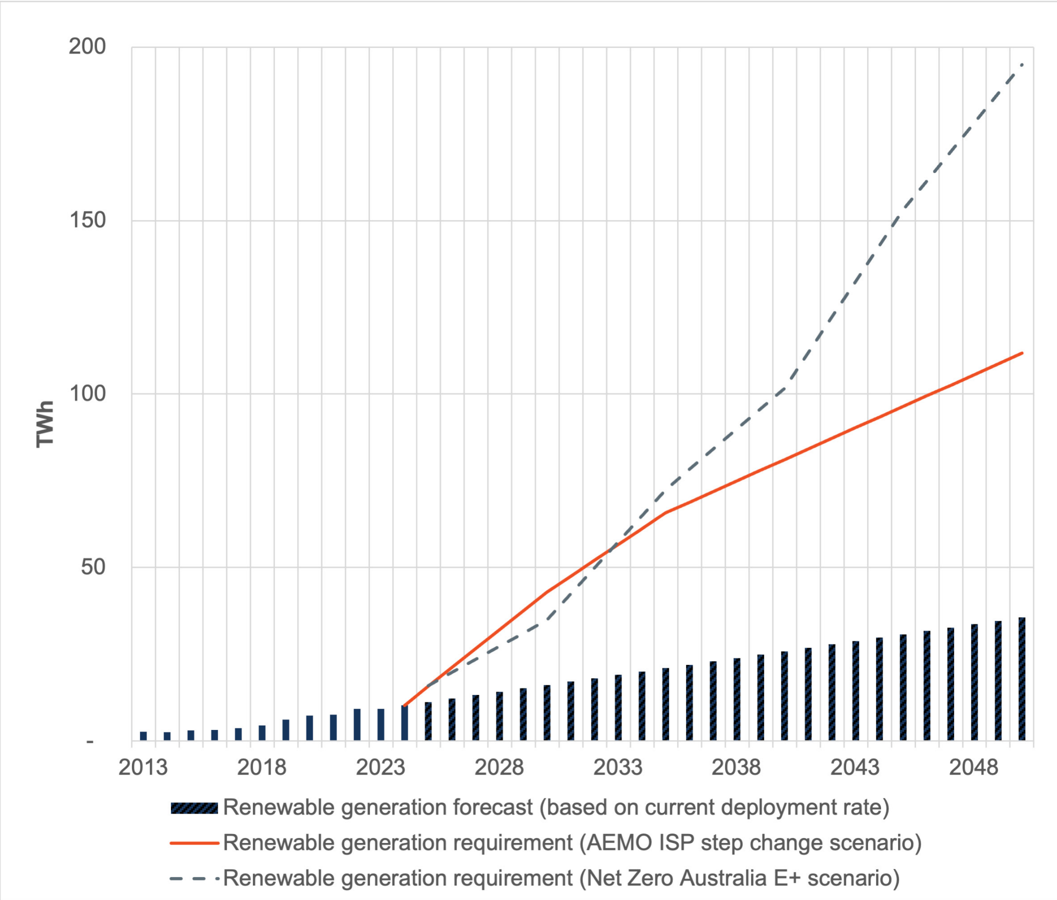
Deployment must accelerate for Western Australia to keep pace with other jurisdictions

Based on current deployment rates of large scale generation and rooftop PV, Western Australia is falling behind other jurisdictions and is likely to fall far short of future renewable generation requirements. Figure 33 shows the gap between current deployment and the level of renewable generation required to meet future demand (extrapolated from AEMO ESOO and Australian Energy Statistics) [1, 3, 4]. According to this projection, Western Australia will need to generate at least 37.5TWh of renewables to meet 2030 requirements. This would require a deployment rate that is around 4.5 times the current rate. The gap in renewable energy deployment is even greater under the scenario modelled in the Net Zero Australia study, which includes rapid electrification of industry and transport as well as assumptions around the electricity required for carbon dioxide removal e.g., through Direct Air Capture (DAC).

Figure 33

Accelerated renewable energy deployment is required for Western Australia to meet future electricity requirements

Renewable energy capacity for Western Australia based on current build rates compared to the scenario extrapolated from the AEMO ESOO [3] and Australian Energy Statistics data [4], and the scenario presented in the Net Zero Australia study [2]



The build rate modelled has been calculated based on Clean Energy Council data using an average of the large-scale renewable generation capacity reaching commissioning over the last five years and APVI data on annual rooftop PV deployment [5] [10].

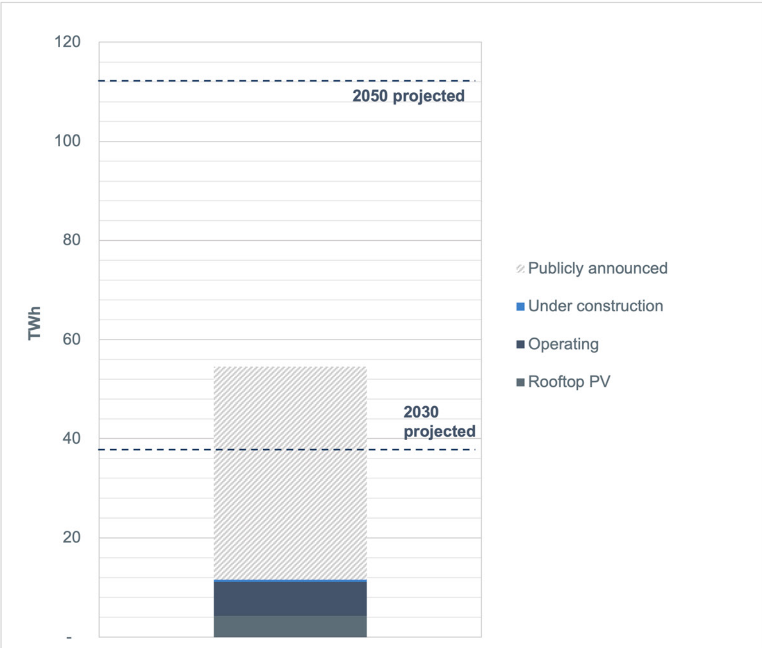
The renewable generation pipeline contains 4x current capacity but only 1% is under construction

Western Australia has enough renewable energy generation capacity in its pipeline to meet its 2030 requirements. However, almost all of that capacity is in the early stages of planning, as seen in Figure 33. Of the 43.5TWh of capacity in the pipeline, 99% is in the least certain deployment status category ("publicly announced"). Unlocking as much of this capacity as possible will be critical in ensuring Western Australia meets its future generation requirements. Figure 34 also shows that there is a need to build the pipeline of announced projects in Western Australia. There is considerably less announced capacity in Western Australia compared to other jurisdictions, proportional to future grid requirements. This suggests that to date there has been less interest from renewable developers and investors in pursuing projects in Western Australia. Some of the initiatives implemented in other jurisdictions e.g., legislated renewable energy targets, planning system reforms, planning and development coordinating bodies, renewable energy zone development or direct investment could, if implemented in Western Australia, help to increase investor confidence and develop the renewable energy pipeline.

Figure 34

The pipeline of renewable energy capacity in Western Australia is smaller as a percentage of future grid requirements compared to other jurisdictions

Renewable energy projects categorised by progress status for Western Australia compared to the 2030 and 2050 requirements under the scenario extrapolated from the AEMO ESOO [3] and Australian Energy Statistics data [4]



Project categorisation based on Common Capital analysis using extensive desktop review of media releases and public reports on existing and pipeline projects – as of Feb 2025.

There are some large battery projects underway, but the pipeline is smaller than other jurisdictions

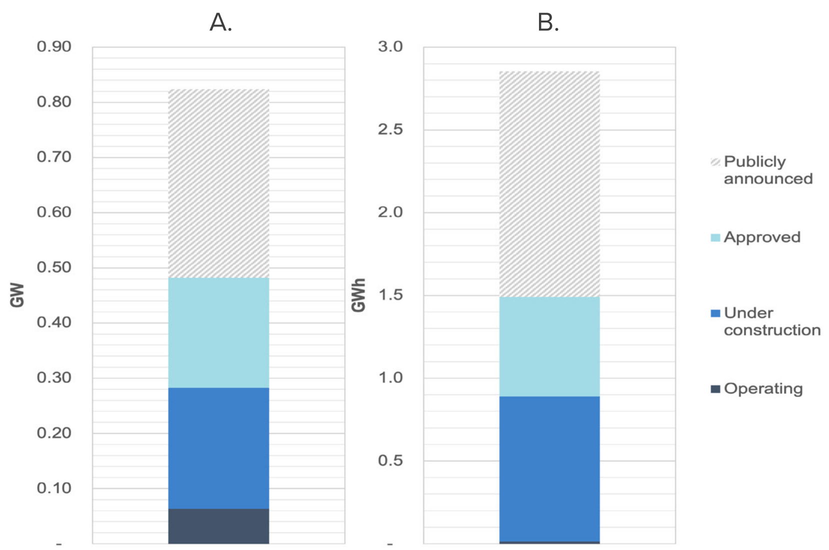
Western Australia has very few renewable energy storage projects in the pipeline and also has far fewer "publicly announced" projects compared to other jurisdictions (see Figure 35). The largest storage project is the Collie Battery which has been operational since October of 2024. The Collie Battery has a capacity of 219MW and four hour storage capacity. The Collie Battery Stage 2 (341MW/ 4 hour storage) is currently under construction and expected to be operational by the end of 2025 [37]. Once completed, this will make the Collie Battery the largest battery in the country. The Kemerton project is in the early stages of development, having lodged a planning approval document. Once in service it is expected to provide 660MW/ 2640MWh of storage for the SWIS [38]. Other storage projects in the pipeline are much smaller in capacity, mostly under 100MW, and many are in the early stages of development (i.e. approved or planning application lodged).

Western Australia does not have legislated storage targets. It is also not part of the NEM nor does it have AEMO ISP step change projections for storage requirements. Therefore, Common Capital has taken a bottom-up approach to sourcing the data required for this analysis, including considering projects that have been announced by private companies or through Government resources. Based on this analysis, Western Australia will need to accelerate the development and deployment of storage system projects to keep pace with other jurisdictions and meet future storage needs.

Figure 35

Western Australia's storage pipeline is much smaller than other jurisdictions

Storage projects categorised by progress status for Western Australia shown in A) as GW and B) as GWh



Project categorisation based on Common Capital analysis using extensive desktop review of media releases and public reports on existing and pipeline projects – as of Feb 2025.

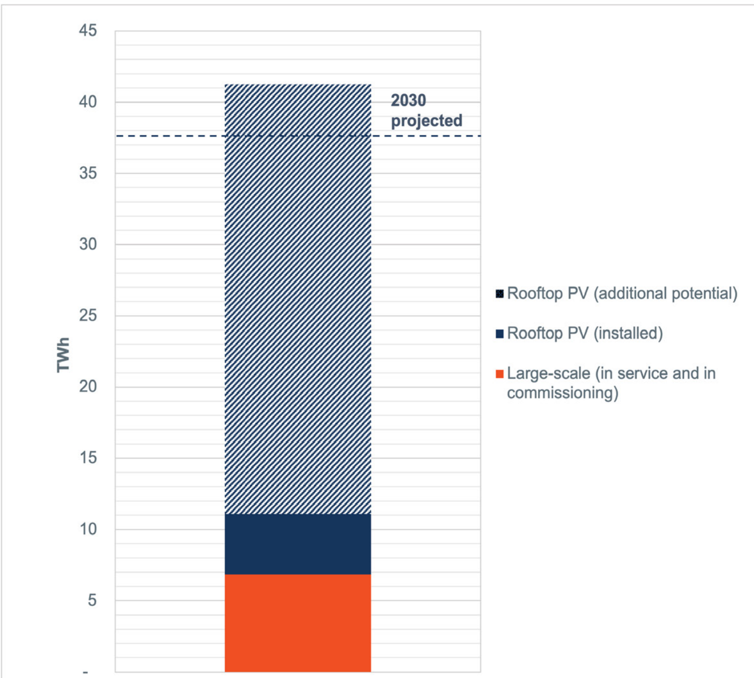
There is an opportunity to deploy significantly more rooftop PV in Western Australia

Western Australia has adequate potential additional rooftop PV capacity to reach its 2030 requirements, as seen in Figure 36. However, the level of deployment required to reach this level is substantial. Accelerating the uptake of rooftop PV in Western Australia can reduce the need for as much investment in large scale generation and storage capacity and transmission infrastructure, particularly in the short term. There are currently no rooftop PV incentive programs operating in Western Australia. However, there are opportunities for Western Australian homes and businesses to participate in Commonwealth Government programs, for example, rooftop PV and household battery incentives under the Small-scale Renewable Energy Scheme. There is also an opportunity for the Western Australian Government to complement these Commonwealth programs and further accelerate rooftop PV installations for households and small businesses while also unlocking the existing large scale project pipeline to help achieve short- and long-term renewable energy targets and meet future energy system requirements.

Figure 36

There is considerable untapped potential rooftop PV capacity in Western Australia

Potential rooftop PV [8] compared to currently installed rooftop PV [10] and large-scale renewables in Western Australia, in respect to projected 2030 requirements



Northern Territory

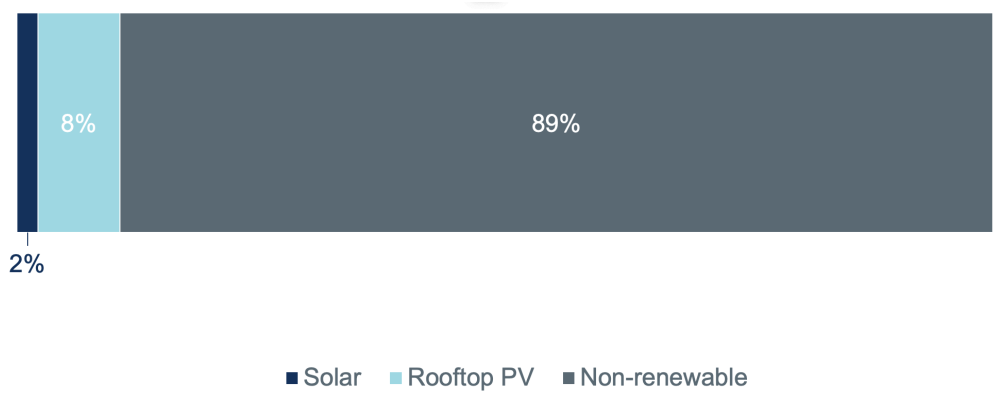
Northern Territory's electricity generation is currently 11% renewable

Common Capital analysis indicates that renewable energy generation currently accounts for approximately 11% of the Northern Territory's electricity generation [10]. Figure 37 provides a breakdown of renewable energy generation by type, which includes rooftop PV (8%), large-scale solar (2%), wind (0%) and hydro (0%) for 2024. The resulting 89% of electricity generation in Western Australia is from fossil-fuel sources.

Figure 37

Renewable energy accounts for 11% of current Northern Territory electricity generation

Northern Territory energy generation categorised by generation type for 2024 [10]



While the Northern Territory does not have legislated renewable energy targets, it previously had a non-legislated target of 50% renewable energy by 2030 (part of the Northern Territory Climate Change Response: Towards 2050), which was discarded in March of 2025 [39]. Reintroducing and legislating renewable energy targets alongside the introduction of policies that accelerate the development and deployment of the Northern Territory renewable pipeline will be vital to ensure the Territory can accelerate its energy transition.

Deployment must accelerate for the Northern Territory to keep pace with other jurisdictions

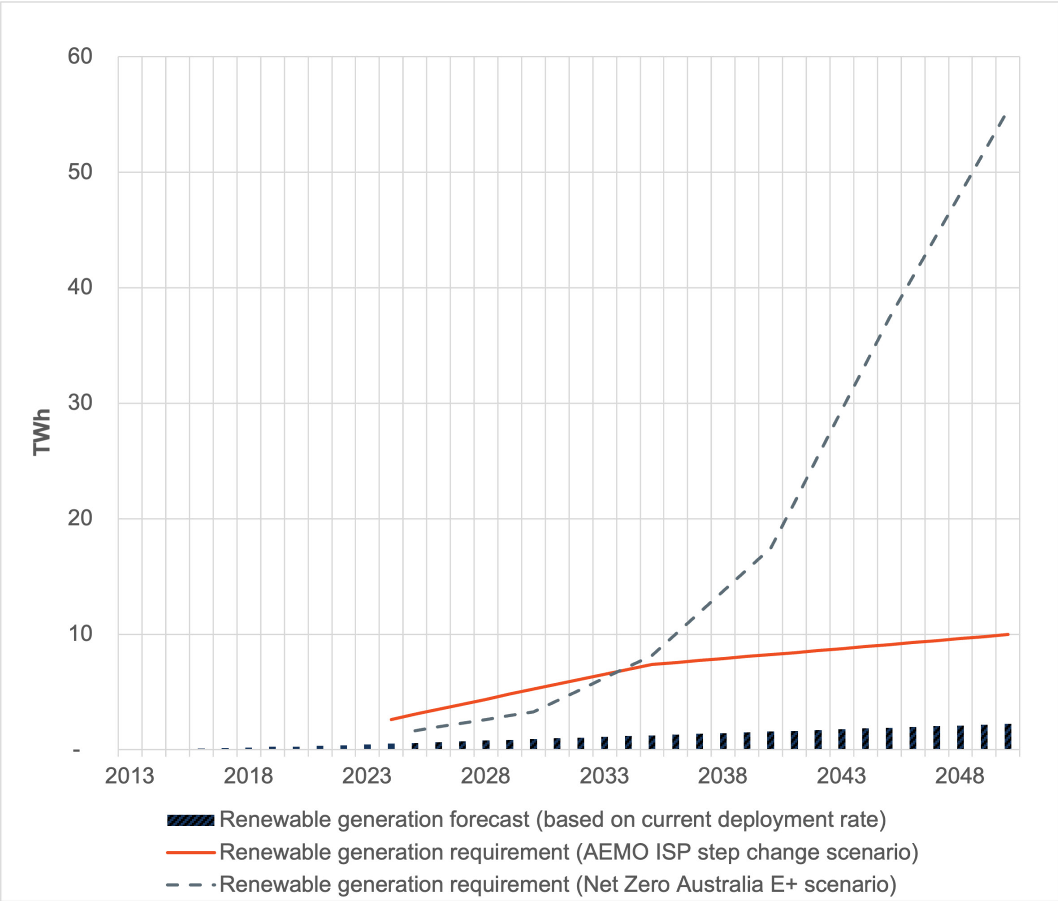
Based on current deployment rates of large-scale generation and rooftop PV, the Northern Territory is likely to fall short of the levels of renewable energy required to keep pace with other jurisdictions and align with net zero commitments. Figure 38 shows the gap between current deployment and Common Capital projections of future renewable energy requirements (based on the NT grid size and extrapolated based on AEMO ISP step change generation requirements for Tasmania, due to similarities in grid size and population [1]). According to our calculations the Northern Territory will need to generate at least 3TWh of renewables to meet 2030 requirements. This would require a deployment rate that is around 11 times the current rate. The gap in renewable energy deployment is even greater under the scenario modelled in the Net Zero Australia study, which includes rapid electrification of industry and transport as well as assumptions around the electricity required for carbon dioxide removal e.g., through Direct Air Capture (DAC) [2]. For the NT, the Net Zero Australia study projects significant growth in electricity generation out to 2050 based on assumptions around the Territory's contribution to renewable hydrogen production and exports (due to the considerable solar resource available).

There are limitations to the data used for the Northern Territory compared to that used for other jurisdictions. One reason for this is the Northern Territory is not part of the NEM, and therefore the NEM data used by Common Capital for the other jurisdictions is not available for the Northern Territory. This has meant that a bottom-up approach to identify projects that have been announced by private companies or through government resources has been used to understand the pipeline of renewable capacity. The Northern Territory also has multiple isolated networks which makes data collection more difficult. However, available data suggests that the Northern Territory has made limited progress to date in the rollout of renewables.

Figure 38

Accelerated renewable energy deployment is required for the Northern Territory to meet future electricity scenarios

Renewable energy capacity for Northern Territory based on current build rates compared to a generation scenario extrapolated from the AEMO ISP step change scenario for Tasmania [1] and the E+ scenario modelled in the Net Zero Australia study [2]



The build rate modelled has been calculated based on Clean Energy Council data using an average of the large-scale renewable generation capacity reaching commissioning over the last five years and APVI data on annual rooftop PV deployment [5] [10]

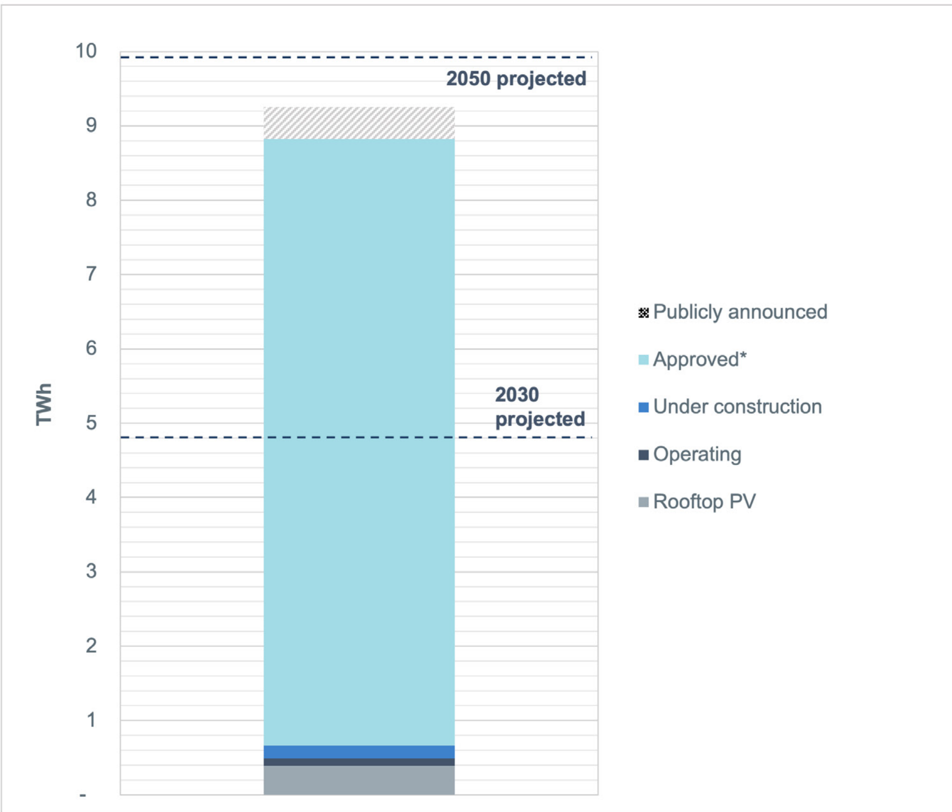
There is a lot of work to do to accelerate renewable energy and storage deployment in the NT

The Northern Territory does not currently have enough renewable energy generation capacity in the pipeline to reach Common Capital modelling projections for renewable generation requirements in 2030 or 2050. Of the 8.8TWh of capacity in the pipeline, approximately 98% is in the least certain development status categories ("publicly announced" and "approved"), as seen in Figure 39. The entirety of the 'approved' project capacity can be attributed to the SunCable project. SunCable is expected to provide 4GW of energy for domestic use in the Northern Territory [40]. If this project reaches an "in service" status, the NT will be close to achieving its requirements, however, DarwinLink (the Australian component of the project) is not expecting to reach FID until 2027 and will then commence a four year construction phase in 2028 [40]. Therefore, SunCable will not contribute to the network until at least 2032, and without SunCable's contribution, the Territory is far from on track for its transition.

Figure 39

The SunCable project accounts for almost all of the Northern Territory's renewable energy pipeline and it has not yet reached FID

Renewable energy projects categorised by progress status for the Northern Territory compared to the projected 2030 and 2050 renewable generation requirements



Common Capital analysis using extensive desktop review of media releases and public reports on existing and pipeline projects.

BREAKOUT BOX 4

Remote communities can benefit from the renewable energy transition

Currently remote communities in the Northern Territory are provided electricity through the Indigenous Essential Services (IES) program. The main source of electricity in these communities is diesel-fired generation, however, this type of electricity generation poses challenges such as energy insecurity and increased greenhouse gas emissions. The Northern Territory is currently working on the Remote Power System Strategy which will deliver renewable energy to the 72 communities currently under IES [41].

The remote community of Marlinja in the Northern Territory is one of many communities that experiences extreme energy insecurity, high power costs, and system outages resulting in regular electricity disconnection. In June 2024, the Marlinja Microgrid was installed, providing the community with a 100KW solar array and a 136KWh battery. This is the first grid-connected First Nations community-owned renewable energy project in Australia. It is an example of how connecting communities to renewable energy can improve community wellbeing, while providing lower cost, more reliable electricity. Residents of Marlinja were involved at all stages of the development process, including planning and the installation of the solar panels. Further, residents were encouraged to receive electrical technology and carpentry training to allow them to continue benefiting economically and socially from the renewable system. Connecting remote communities in the Northern Territory to renewable energy systems or microgrids will not only assist the state in its transition, but will provide significant social and economic benefits to residents [42].

The Northern Territory also has very few renewable energy storage projects in the pipeline. The largest storage project is the Darwin-Katherine BESS, which is the Territory’s first large-scale battery energy storage system and is a 35MW (35MWh) system. The system was expected to be fully operational by the end of 2024, however, it is unclear if this occurred [43]. Beyond this major storage system, there are a few smaller battery projects that are underway in more regional and remote areas of the territory with storage capacities around 5MW [44] [45]. Investment in large-scale storage is urgently needed to help bring existing solar farms online and balance energy supply and demand to manage risks to the Northern Territory's three electricity grids, particularly the Darwin-Katherine Integrated System. Investment in solar energy generation without adequate attention to storage needs will exacerbate existing grid stability issues already identified by the Territory's Power Water Corporation [46]. The Northern Territory will need to accelerate the development and deployment of renewable energy generation and storage system projects to keep pace with other jurisdictions and meet future system requirements.

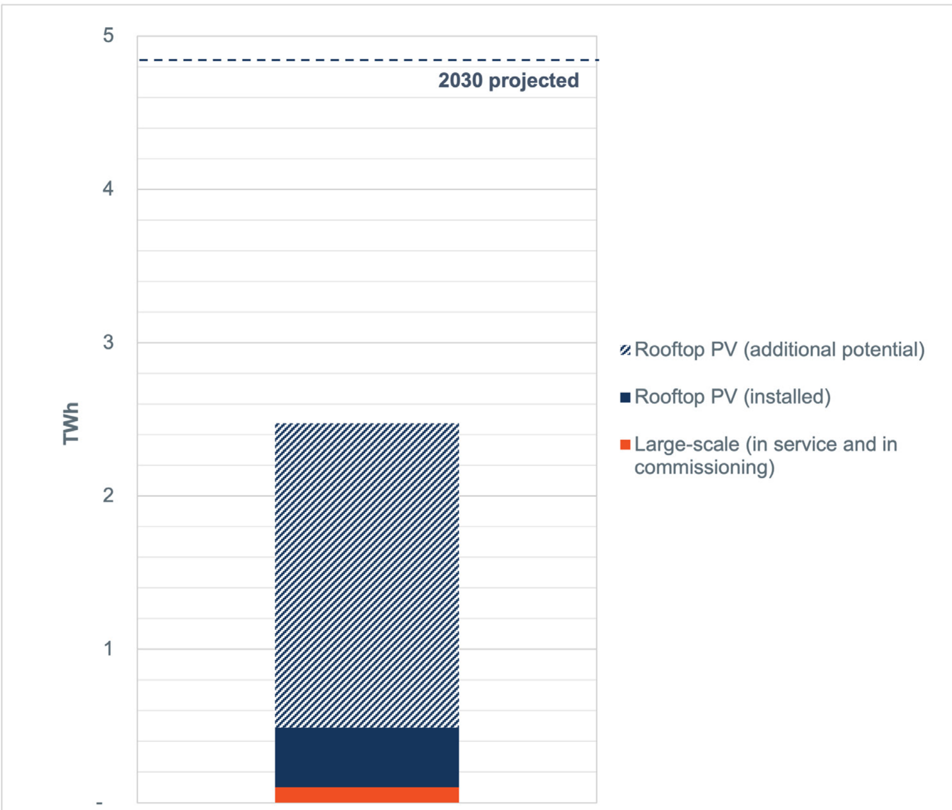
There is an opportunity to deploy significantly more rooftop PV in the Northern Territory

Unlike other jurisdictions, the Northern Territory does not have sufficient additional rooftop PV potential to meet its 2030 requirements (see Figure 40). However, given the modest progress made to date in the energy transition and the shortage of projects in the NT pipeline (other than SunCable), accelerating uptake of rooftop PV will be critical. Particularly in the short-term while the large-scale generation and storage pipelines develop. Accelerating the uptake of rooftop PV in the NT can reduce the need for as much investment in large scale generation and storage capacity and transmission infrastructure, particularly in the short term. The Northern Territory has the Home and Business Battery Scheme [47] which provides grants for eligible homeowners and businesses to install batteries and inverters (and rooftop PV if a system is not already installed). This is a small scheme, but can be complemented by the Commonwealth Government solar and battery incentives provided under the Small-scale Renewable Energy Scheme to drive uptake in the Northern Territory.

Figure 40

There is untapped potential rooftop PV capacity in the Northern Territory

Potential additional rooftop PV [8] compared to currently installed rooftop PV [10] and large-scale renewables in Northern Territory, with respect to projected 2030 requirements



Abbreviations

Abbreviations	Full form
AEMO	Australian Energy Market Operator
CDR	Carbon Dioxide Removal
CEC	Community Engagement Committee
CER	Consumer Energy Resources
DFP	Development Facilitation Program
DAC	Direct Air Capture
EVs	Electric Vehicles
ESOO	Electricity Statement of Opportunities
EnergyCo	Energy Coporation of NSW
ESS	Energy Savings Scheme
FID	Final Investment Decision
GW	Gigawatt
GWh	Gigawatt-hour
IES	Indigenous Essential Services
ILUA	Indigenous Land Use Agreement
LTESAs	Long-term Energy Service Agreements
MW	Megawatt
NEM	National Energy Market
NSW	New South Wales
NT	Northern Territory
PDRS	Peak Demand Reduction Scheme

Abbreviations continued

Abbreviations	Full form
QLD	Queensland
RASOD	Radar Assisted Shutdown on Demand
RE	Renewable Energy
REAP	Renewable Energy Approval Pathway
REZs	Renewable Energy Zones
ReCFIT	Renewable, Climate and Future Industries Tasmania
REPS	Retailer Energy Productivity Scheme
SETuP	Solar Energy Transformation Program
SA	South Australia
SWIS	South West Interconnected System
SEC	State Electricity Commission
TWh	Terawatt-hour
VEU	Victorian Energy Upgrades
VPPs	Virtual Power Plants
WA	Western Australia
YAC	Yindjibarndi Aboriginal Corporation
YEC	Yindjibarndi Energy Corporation
YNAC	Yindjibarndi Ngurra Aboriginal Corporation

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Appendix one

This appendix outlines the nature positive and social licence framework utilised by Common Capital.

I Nature positive framework

Nature Positive is a global goal to ’Halt and reverse nature loss by 2030 on a 2020 baseline and achieve full recovery by 2050’ [48]. The term is used to describe circumstances where nature is being repaired and is regenerating rather than declining [49]. The goal aims to ensure more nature is in the world in 2030 in comparison to 2020. Three key categories of metrics have been developed to measure nature-positive contributions, these include retaining and restoring 1) species, 2) ecosystems, and 3) natural processes at all scales [48]. A similar, local definition of nature positive was provided in the Environment Information Australia Bill which was introduced in 2024 but has stalled. The Bill stated that “nature positive is an improvement in the diversity, abundance, resilience and integrity of ecosystems from a baseline” [50].

These definitions are at an ecosystem level. For renewable energy projects, the concept of nature net gain relates to projects that prioritise protecting and restoring or improving nature. Nature positive renewable energy projects will be sited away from high conservation value areas, and they avoid and reduce nature impacts where possible, this often involves being sited on already cleared land. They go beyond compensating for damage to nature (via offsets) through proactively restoring degraded landscapes.

Our research has identified three key approaches for a nature positive renewable energy future, as seen in Figure 41. Comprehensive pre-site scoping and research focuses on using degraded or low-value land, while avoiding areas of ecological sensitivity. It also ensures rigorous environmental assessments to minimise harm to local ecosystems and ensure the sustainability of land use. Agri-voltaics (or agri-wind) incorporates renewable energy infrastructure within agricultural landscapes to boost land efficiency. This facilitates a circular, mutually beneficial relationship between renewable energy production and the agriculture sector. Biodiversity enhancement and ecological restoration includes planting native species, creating wildlife corridors, and establishing diverse habitats to enrich biodiversity on project sites.

Figure 41

There are three key approaches that can be considered for a nature positive renewable energy future

Three key approaches for a nature positive renewable energy future

The European Environmental Bureau (EEB) has provided guidance on the accelerated deployment of renewable energy while safeguarding the integrity of local ecosystems and benefiting communities. Their holistic approach to renewable energy expansion involves integrating various elements such as energy modelling, environmental sensitivity assessments, socio-economic impact evaluations, and leveraging multi-use spaces to maximise benefits while also minimising harm [51]. Their guidance involves the use of strategic spatial planning for both renewables and nature restoration targets, while ensuring compliance with environmental standards [51]. The EEB's summary for policymakers provides solutions for the challenges associated with nature positive renewable energy including adopting sound spatial planning criteria, establishing clear renewable 'go-to areas', and designating clear space for nature [52].

I Social licencing framework

Social license refers to the informal acceptance granted by communities and stakeholders to a project or technology, built on trust, credibility, and fairness. For renewable energy resources, obtaining social license requires addressing public concerns about environmental impacts, equitable benefit distribution, and governance. Communities are more likely to support projects that provide tangible local benefits, such as job creation, environmental restoration, or infrastructure improvements, and that include them in transparent and inclusive decision-making processes.

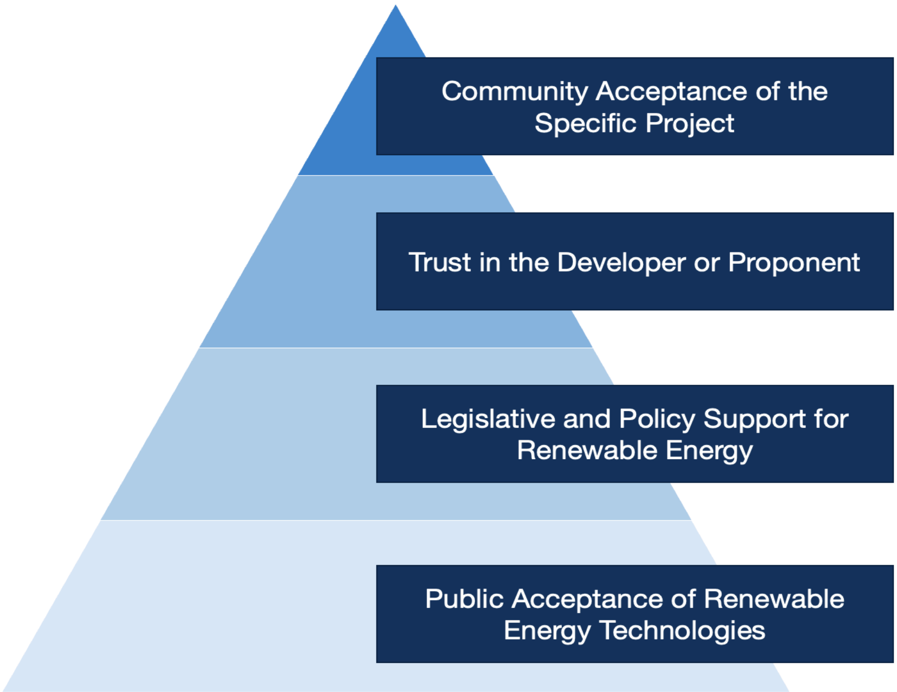
Equity and trust are key to fostering public acceptance. Ensuring that benefits are fairly distributed, particularly to those most affected by the project, and establishing clear regulatory frameworks with mechanisms for accountability are both critical steps. Proactively managing risks, providing accessible information, and involving diverse perspectives in planning can further build confidence in renewable energy initiatives and strengthen the public acceptance of different renewable technologies.

Common Capital has previously developed a social licence framework based on extensive research and consultation. We have identified four interrelated levels of social licence for renewable energy projects, depicted in Figure 42, that are required to facilitate scaled deployment. Public perception and acceptance of the technology itself is a vital consideration, with concerns of the environmental impact, long-term sustainability, and effectiveness needing to be addressed to ensure positive national and regional sentiment towards renewable energy technologies. Legislative and policy support includes the acceptance of overarching government policies and regulations for renewable energy, while also political and social support for broader policies such as climate action, clean energy mandates and grid transition strategies. Consideration can also be provided to the difference in regional and national perspectives on renewable energy policy direction. Trust in the developer is also a vital consideration. A positive track record of responsible development, transparency, and stakeholder engagement is key, as well as a positive reputation in relation to environmental stewardship and community relations. For individual renewable energy projects, project-specific concerns must also be addressed, for instance concerns around land use, environmental impacts, community benefits and localised disruptions. Building social licence across these four interrelated levels is vital for community acceptance of renewable energy deployment [53].

Figure 42

Social licence is required across four interrelated levels to facilitate scaled renewable energy deployment

Levels of social licence



Key themes to consider for the social licencing of renewable energy projects include:

1. Transparency: Open and accessible communication about a projects goals, impacts, and risks is non-negotiable.
2. Equity and Inclusion: Respect for Indigenous rights, equitable benefit-sharing, and inclusive decision-making are central to long-term success.
3. Environmental Responsibility: Prioritise protecting and restoring or improving nature. Avoid additional harm to the environment by using existing resources and infrastructure wherever possible.
4. Building Trust: Early engagement, addressing concerns, and involving communities actively to ensure lasting social licence.
5. Accountability: Rigorous legal and policy frameworks are needed to ensure integrity and prevent misuse of climate mechanisms.

Appendix two

This appendix outlines nature positive and social licence case studies that demonstrate a range of approaches.

Nature positive and social licence case studies

There are many examples of renewable energy projects and initiatives that are using different nature positive, environmental protection and social licencing approaches in the deployment of clean energy across Australian and international jurisdictions. Some of these examples are outlined below as case studies. These examples are not presented as best practice, rather they demonstrate a range of approaches that could be considered.

CASE STUDY ONE

Goyder South Wind Farm

State: South Australia

Ownership of 1000 ha of land has been transferred to the government of South Australia, which will be combined with 600ha of the adjacent Conservation Park, to create a new national park. The park's conservation activities will be supported for 30 years through an annual payment provided by Neoen, the project developer [54]. The outcome of this transfer will protect several threatened species of flora and fauna including the Pygmy Blue Tongue Lizard and the Flinders Ranges Worm-Lizard [55].

A Community Reference Group will be established to finalise the plans for managing the national park. Long-term collaboration between key stakeholders including Traditional Owners of the Ngadjuri Nation, the Regional Council of Goyder and SA Department of Environment and Water will continue to occur for this project [55].

CASE STUDY TWO

MacIntyre Wind Farm

State: Queensland

The project utilised trucks that were capable of transporting turbine blades weighing more than 29,000kg. This eliminated the need for long trailers and allowed for smaller internal access roads resulting in the minimisation of vegetation clearing. More than 20,000 square metres of farmland and vegetation have been left undisturbed at the construction site as a result of the new transport technology [56].

Continual collaboration with Queensland community sectors has occurred. Further, sponsorship has been provided by the developer ACCIONA Energia to local community organisations to develop beneficial community-led projects. This includes funding for schools, sporting clubs and community groups for events, community services and upgrades to facilities and equipment [57] [58].

CASE STUDY THREE

Mortlake South Wind Farm

State: Victoria

The wind farm was constructed on cleared, level land that is predominately used for dairy farming, with livestock grazing continuing around the wind turbines. The dual use agri-wind model ensures that agriculture activities continue, which allows for projects to acquire land with minimal disruptions. New technology was also used for transporting turbines which eliminated the need for additional roads to be built to the site. The new transport method meant that over 20,000 squared metres of farmland and vegetation was not cleared [59].

A Neighbourhood Benefit Payment is available for those who live in a dwelling that is within 4 kilometres of a wind turbine generator. Payments are offered to eligible residents, who can purchase goods and services at participating local business with the aim of assisting the local economy [59]. A Community Engagement Committee (CEC) has also been established to create an effective flow of communication from the developer to the community [60].

CASE STUDY FOUR

Blind Creek Solar Farm

State: New South Wales

The project aims to co-exist with organic grass-fed lambs, regenerative agriculture, a soil carbon sequestration project and restoration of biodiversity. There is a focus on co-location of regenerative agriculture with solar while engaging with community consultation [61] [62].

The project team consulted early with nearby landowners, First Nations peoples, local councils and community to design a shared-benefit model tailored to stakeholder needs. Developers led regular in-person individual conversations, community open days and online information sessions, while also releasing early media materials to prioritise transparency and earn community trust from the beginning. This is the First solar farm with a Community Shared Benefit Scheme. This involved sharing financial benefits directly with neighbours and broader community. This aligned with a vision for sustainable agriculture, environmental restoration and community building [61].

Blind Creek Solar Farm won the Clean Energy Council's community engagement award for its "pioneering benefit sharing scheme and agri-solar initiatives". It is expected that over the lifetime of the project, the community could share in up to $3.5 million in benefits [62].

CASE STUDY FIVE

Coonooer Bridge Wind Farm

State: Victoria

This wind farm combines community co-ownership with a rent proximity model. Landowners within a 3km, or homeowners within a 3.5km radius of a turbine receive an equity share per hectare based on the distance to the turbine. To fund this equity, landowners agree to take a smaller lease payment and the developer agreed to smaller profits. From the outset, the consultation process was an open and transparent discussion about calculating payments for landowners within a 3km proximity. Landowners have ownership and a say in the decision- making process for the wind farm which has been key for building social licence [63].

The developer also established a Community Grant Fund and allocated $1,315 per installed MW per year to go towards community initiatives. All neighbours of the project are able to vote on which applications receive the grant funding. To date, the grants have supported the local bowling club and the Coonooer Bridge Recreation Reserve, as well as a number of other local groups [64].

CASE STUDY SIX

Marlinja Community Microgrid

State: Northern Territory

Marlinja is located halfway between Alice Springs and Darwin and is home to approximately 60 residents, on the traditional lands of the Mudburra and Jingili peoples. Marlinja is one of the NT's many remote communities experiencing extreme energy insecurity, high energy costs and frequent and lengthy disruptions in supply. This project has involved a partnership between the Marlinja community and Original Power's Clean Energy Communities Project. The aim has been to empower First Nations communities to be involved with the renewable energy transition through community-owned solar projects across the NT [42].

Phase one involved the installation of solar panels on the Community Centre, which saw a reduction in power bills. Phase two involves a community-wide transition to solar and batteries through the installation of a microgrid. This was installed in June 2024 and has assisted in securing lower cost, clean energy for Marlinja residents and a reprieve from frequent blackouts. Original Power's Clean Energy Communities Project engaged community members in project planning and installation of rooftop solar panels, as well as in training in electrical technology and carpentry skills [65] [42].

CASE STUDY SEVEN

Denmark Community Wind Farm

State: Western Australia

The Denmark community wind farm began as a local response to climate change following a series of public workshops. A non-for-profit steering group was formed to identify potential sites and provide guidance for the building process. During surveying they considered areas with the best wind resource, environmental impact, noise, distance from residences and other infrastructure and potential constraints. Local businesses were employed in all phases of the project, from planning to surveying, roadworks, electrical works, construction, executive management and financial oversight. The community energy system minimises the need for built-in redundancy and reduces transmission losses [66].

Everyone in Denmark has access to the energy generated from the wind farm, regardless of whether or not they are shareholders in the project. The community has also established a fund, the Denmark Sustainability Fund, which is a significant shareholder that returns its income from dividends to the local community by funding local enterprise projects [67].

CASE STUDY EIGHT

Yindjibarndi Energy Corporation

State: Western Australia

Yiyangu Pty Ltd (a company established by Yindjibarndi Aboriginal Corporation and 100% owned by Yindjibarndi people) and ACEN Renewables developed a partnership agreement and created Yindjibarndi Energy Corporation (YEC). Yiyangu owns 25% of YEC with the balance controlled by ACEN. The agreement ensures Yindjibarndi approval of all proposed project sites, Yindjibarndi equity of 25% to 50% in all projects, preferred contracting for Yindjibarndi-owned businesses, and training and employment opportunities for Yindjibarndi people. Yindjibarndi Energy Corporation plans to develop, own and operate three large-scale renewable energy projects up to 3GW capacity in the Pilbara region [68] [69].

In April 2024, an Indigenous Land Use Agreement (ILUA) was registered. This ILUA aimed to advance renewable energy generation and storage on Yindjibarndi ngurra. Parties to the ILUA are the Yindjibarndi Aboriginal Corporation (YAC), Yindjibarndi Ngurra Aboriginal Corporation (YNAC), ACEN Corporation, and Yiyangu. The ILUA provides the necessary native title consents for the development of large-scale renewable energy projects on Yindjibarndi country [68].

CASE STUDY NINE

Barão de São João Wind Farm

Country: Portugal

The windfarm was identified as being in the migratory pattern of 5000 individual birds of 30 different bird species each autumn, including endangered species. A Radar Assisted Shutdown on Demand (RASOD) protocol was implemented. RASOD involves the turbines being turned off when pre-defined criteria of intense migration or presence of threatened species were met. The implementation of RASOD has resulted in no bird deaths from collisions during 5 consecutive autumns. The shutdowns have only equated to 0.2-1.2% of the wind farms annual activity [70].

CASE STUDY TEN

Ecotricity Solar Farms

Country: United Kingdom

Nature positive actions that have been taken include restoring meadows and managing invasive species. Hedgerows have been planted and wildlife corridors created, in addition to designing fencing to support wildlife movement. Other actions have been the inclusion of ponds, beehives and community orchards. This has resulted in increased biodiversity and pollination, aiding in restoring largely lost wildflower meadows. Soil health has improved which is important for leaving the land in better health by the end of the solar farm's life, ensuring it can be used for agriculture again or left as a rich biodiverse site. Improved soil health also allows for increased carbon sequestration [71].

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